‘A MOST CURIOUS CLASS OF SMALL CAIRN’

REINTERPRETING THE BURNT MOUNDS OF SHETLAND

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Abstract

This research is concerned with the critical reinterpretation of the burnt mounds of Shetland. Burnt mounds have been described as ‘among the most boring sites with which a field archaeologist must deal’ (Barber & Russel-White 1990:59). Traditionally burnt mound studies have been dominated by concerns relating to technology, form and function. This approach is understood to be a product of modernist understanding of the world which views technologies as primarily adaptive.

As such, it is argued that a critical reappraisal of the frameworks through which burnt mounds are interpreted is required in order to develop an account of their construction and use which situates them within wider disciplinary discourses concerning the Bronze Age. In order to do so this thesis evaluates a range of theoretical frameworks which have explored the emergent and situated nature of encounters between people, places and things. Drawing upon this, a new approach is advocated that examines the relationship between burnt mounds and their wider landscape, and explores the material and social engagements which their construction and use affords.

In order to offer a more holistic approach in keeping with current archaeological discourses, this study reconceptualises the burnt mound as an active site within Bronze Age society, a place where meanings were negotiated and materials transformed. This thesis utilises GIS analysis and in-situ observation to explore the landscape setting of the burnt mounds of Shetland and combines this with an exploration of the material engagements involved in the construction and use of burnt mounds through a series of experimental firings at a replica site. Through this burnt mounds are identified as powerfully symbolic locations involving the interplay of elemental substances which combine to transform people, places and things.

This thesis further challenges the conception that burnt mounds are unable to offer any insight into life in the Bronze Age, by analysing the impact which this reinterpretation has on our understanding of Bronze Age Shetland. In particular, it is argued that in their concern with processes of fragmentation, regeneration and transformation Burnt Mounds reflect the cosmological concerns of wider Bronze Age society. The Bronze Age in Shetland has been identified as a period of apparent isolation and stagnation within the islands. By re-evaluating burnt mounds and situating them within a framework of wider Bronze Age practise this conception is challenged, and the Bronze Age of Shetland is presented as a dynamic period in which burnt mounds played a key role in the understanding of networks of persons, places and substances.
Declaration

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Chapter One: Introduction

‘Burnt mounds are, individually, among the most boring sites with which a field archaeologist must deal. Apart from new data and a new spot on the distribution map, individual sites have little to contribute to our understanding of the past.’

(Barber & Russel-White 1990:59)

1.1 The Burnt Mound Enigma

Burnt mounds are among the most numerous and enigmatic monuments of prehistoric Europe. The term refers to the heaps of fire cracked stones and ash which are found throughout England, Ireland, Scotland, Wales, Scandinavia and part of continental Europe (Fig 1.1). They are predominantly attributed to the Bronze Age, although individual examples have returned dates from the Neolithic to the Middle Ages (Campbell-Anthony 2003:2) (Fig 1.2). There are currently over 1900 burnt mounds recorded in Scotland alone, with the highest concentrations occurring in Shetland, Orkney, Caithness & Sutherland, and in Southern Scotland around Dumfries and Galloway (Fig 1.3) However, despite their prolificness burnt mounds rarely feature in syntheses of the British or European Bronze Age. This is largely because burnt mounds
Fig 1.2 Dates from Scottish burnt mounds. Red lines indicate the limits of the Bronze Age, to which they are traditionally attributed. (Reconstructed from Campbell-Anthony 2003:64)
Fig 1.3 Distribution of burnt mounds in Scotland. (Data courtesy of RCAHMS)

are notoriously difficult to interpret. A number of possible functions are proposed for burnt mounds (Fig 1.4), including brewing (Quinn & Moore 2007), textile production (Lucas 1965, Coles 1979, Jeffrey 1991, Denvir 1999), boat construction (Raising 1984) and leather working (Coles 1979). However, narratives relating to their construction and use have generally fluctuated between their potential as sites for food preparation and feasting, or the possibilities which they present as sites of prehistoric saunas (O’Kelly 1954, Barfield & Hodder 1987, Buckley 1990, Hodder & Barfield 1991, O’Drisceoil 1989).

Burnt mounds are renowned for being almost devoid of finds or any other diagnostic material which might help aid the understanding of the processes which may have taken place in order to create them, or provide information about the people who used them. Isolated finds at individual sites, such as the spindlewhorls from Coarrhamore and Richmond (O’Neill 2009:175) may hint at specific functions, but for the most part finds
are both generic and sparse. This in turn has led to the claim that they can offer little information about the lives of prehistoric peoples beyond a dot on the

- Cooking
- Bathing
- Brewing
- Textile Working (Fulling & Dying
- Hide Processing
- Steam Bending/Woodworking
- Boat Construction/Logboat Expansion
- Metalworking
- Brine Evaporation

Fig 1.4 The Possible Functions of Burnt Mounds and Hot Stone Technologies

distribution map (Barber & Russel-White 1990). The quote which appears at the beginning of this chapter illustrates the general attitude of ambivalence and disinterest which is displayed by archaeologists towards these sites. It is largely in response to this statement that this thesis has been developed. It is argued that this approach is based upon a paradigm which equates technology with adaptation, and therefore presents function as distinct from symbolic and social meaning. Thomas (2004) has illustrated that this concept is a product of a distinctly modern way of thinking which views matter as given and irreducible, and relies on a conception division between the mental and material. As such, it is recognised that in order to break the ennui which surrounds this subject, a new approach is required which looks beyond the constraints of function and considers the dynamic processes involved in the creation and use of burnt mound sites.

1.2 Research Background

This research has developed from a wider interest in regional identities in the British Neolithic and Bronze Age, and specifically from investigations into the material expression of insular identity in Shetland during this period. My first encounter with burnt mounds came in 2007 in Shetland as part of my early research into the prehistoric settlement and funerary architecture of the islands. This visit involved a preliminary
survey of 30 sites throughout Shetland with a view to developing a focussed survey area for fieldwork to be undertaken the following year. Amongst the sites recorded during this period, despite not being an established part of my research focus, were five burnt mound sites, visited for no other reason than curiosity, and their close proximity to other sites in my survey schedule. These five mounds, along with numerous others that I later encountered whilst travelling between sites began to raise questions about the nature of burnt mounds which form the basis of this thesis. In particular, I became interested in what the relationship between these strange bumps in the ground and the settlement and funerary sites that formed the basis of my original study might be. The frequency which I encountered them as I moved around the islands told me that they must once have formed an integral part of the daily landscape of Shetland. I was therefore intrigued as to why, other than an occasional throwaway mention, I had not come across them more often in my reading? Some precursory research told me that the reason that burnt mounds were not featured in wider synthesis of the Bronze Age period was because they were boring, and could tell me very little about the period. However, this account did not tally with my own impression of a group of monuments which were both diverse, and complex. The burnt mounds which I knew were a variety of shapes and sizes, and were associated with an array of earthworks, earthfast stones and tantalising glimpses of slab built hearths and or retaining walls. Moreover, they were irresistibly strange. If they did indeed represent cooking sites, as all my reading seemed to tell me, why on earth was it being performed on such a grand scale? And why were they creating these apparently monumental structures from the waste material rather than disposing of it discretely, or recycling the material elsewhere as wall core, or pottery temper? Moreover, if they were not cooking sites, what were they? Were there really over 30 saunas on the tiny island of Fair Isle? And if not, what were they doing, and perhaps more importantly why were they suddenly doing so much of it?

In 2008 my return to Shetland coincided with the opening of the reconstructed site and replica structures at Cruester (Fig 1.5). Originally excavated in 2000 (Moore & Wilson 2001) in response to a continued threat of coastal erosion, the site was found to contain a series of complex internal structures. Following this project the local community adopted the site and orchestrated its rescue and reconstruction outside of the local heritage centre. My attendance at this event proved to be the catalyst for the seeds which had been planted the previous year. Experiencing the pop and crackle of the fire
and the hissing and the screaming of the stones during firings, two things became immediately apparent. The first was that burnt mounds were far from dull. The second was that a reappraisal of these sites was clearly overdue. As will be explored in Chapter Four, the nature of Shetland’s archaeology makes the islands the ideal place for the study of archaeological sites within their wider landscape context. Moreover, the existence of the replica hearth and tank on Bressay allowed for the exploration of the material engagements involved in burnt mound usage in a spatially authentic setting.

The nature of these early engagements have undoubtedly informed the direction of this thesis. The approach taken is therefore reflective of an established understanding on my part, formed by my previous encounters with them, that burnt mounds were a part of a wider network of prehistoric features, and that to understand them it is also necessary to understand the materials and landscapes which are contemporary with them.

### 1.3 Research Aims and Objectives

This thesis seeks to create a contextualised understanding of the burnt mounds of Shetland, which considers both the relationship between the sites and their wider prehistoric landscape, and examines the material and social engagements which are afforded through their use. Additionally, it seeks to explore the potential of burnt mounds to contribute to wider narratives relating to the Bronze Age by examining the processes involved in their creation and use in relation to current themes within Bronze Age research. Particular emphasis is placed on recognising the processes involved in the construction and use of burnt mounds as elemental, fragmentary, transformative and
symbolically powerful. As such it offers an original perspective on the use of burnt mounds in attempting to situate them within wider discourses relating to Bronze Age cosmogonies. In doing so it also examines the validity of the category of burnt mounds, and examines whether, given the number of possible interpretations that exist for their usage, they represent one thing, or many things.

A number of research aims are therefore identified:

1) To critically analyse the approaches taken within burnt mound studies to date.

2) To develop a new framework for understanding the use of burnt mounds and hot stone technologies which acknowledges the embodied nature of experience, and which explores the reciprocal relationships between people, places and things in the creation of meaning.

3) To examine the relationship between burnt mounds of Shetland and the wider prehistoric landscape.

4) To explore the range of material engagements and networks of skill afforded through the use and construction of burnt mounds.

5) To recontextualise burnt mounds in relation to broader themes of research currently being explored in relation to the Bronze Age, specifically those concerning the fragmentation, elemental substances and transformation.

In order to achieve this a number of approaches have been taken. The background and framework for the reinterpretation of the sites is provided in Chapter Two and Three. In Chapter Two I provide an overview of previous approaches to burnt mounds and outline how the critical frameworks utilised within these interpretations have affected current understandings of burnt mounds. In Chapter Three I then analyse these frameworks in order to unpick the underlying assumptions which have prevented burnt mound studies from developing and engaging with current discourse. In particular, I identify an underlying conflation of technology and function which has prevented previous studies of burnt mounds from engaging with the social and symbolic aspects of burnt mound usage. Specifically I identify the concepts of fragmentation and transformation as significant in developing our understanding of burnt mounds, and how they are enmeshed with cycles of regeneration and fertility during the Bronze Age. The identification of earth, fire and water as elemental substances, is introduced as key to understanding the transformative nature of the processes carried out a burnt mound
sites. Following this I investigate an alternative framework for reconsidering these sites which engages with the embodied and emergent nature of experience. As such, it is identified that a critical reinterpretation of burnt mound sites must incorporate an understanding of the situated nature of encounter, as well as engage with the manner in which materials reveal themselves through bodily encounters. In light of the above I outline a methodology which combines GIS analysis, *in-situ* landscape survey, and a series of experimental burnt mound firings, in order to develop an overview of the landscape setting of burnt mounds, and the nature of the skilled engagements required to create and use them.

Chapter Four provides contextual information about the burnt mounds of Shetland which form the object of this study. In this chapter I summarise the nature of the prehistoric archaeology of Shetland, and draw out some of the shared characteristics of the material. Following this, I provide a summary of previous research into Shetland’s burnt mounds, and outline the key themes highlighted by this work. Finally, I provide an overview of those burnt mounds within Shetland which have been subject to excavation, and draw out some of the characteristics which define the Shetland burnt mound tradition.

Chapter Five and Six represent the findings of fieldwork undertaken as part of this thesis. Chapter Five presents the results of GIS and *in-situ* survey, and examines the landscape settings of burnt mounds and their relationship to other prehistoric sites. It provides an overview of their general landscape setting, and examines the relationship between burnt mounds and other features within the landscape. In particular, it focuses on the relationship between burnt mounds and water sources, and explores how the variation in landscape setting affects the experience of the site. Specifically, it identifies that burnt mounds occupy a particular type of landscape setting characterised by the presence of water, and a preference for low lying contours. Finally, the relationship between burnt mounds and nearby settlements are analysed, and a pattern of proximity but limited indivisibility is identified. Chapter Six then presents the results of the experimental firings undertaken as part of this thesis. Detailed description of each process is provided, with an overview of the development of shared skills, social and material engagements. Attention is given to exploring the sensory nature of burnt mound usage, and detailed consideration is also given to the role of danger and risk in burnt mound engagements.

Following this Chapter Seven and Eight consider the implications of this information for a more holistic approach to burnt mounds. Chapter Seven focuses on the development of
the mound, and considers practises of mounding in relation to other contemporary Bronze Age practises. In particular, attention is given to the role of fragmentary materials during the Bronze Age, and the incorporation of mounds and acts of mounding in the manifestation of cosmological schema are explored. Crucially, burnt stone is identified as a potent and transformative substance, and the accumulation and curation of mound material is identified as a key strategy in ensuring the continued success of the burnt mound. Chapter Eight considers the nature of elemental engagements and burnt mound sites, and explores the wider role of fire and water in the Bronze Age. Burnt mounds are then reconceptualised in light of other contemporary practises, and their status as transformative and regenerative locations is explored. Following this, the Bronze Age of Shetland is examined in light of the conclusions drawn in order to explore how a reinterpretation of burnt mounds might contribute to our understanding of life in the Bronze Age.

Finally, Chapter Nine summarises the arguments presented within this thesis, and presents the conclusion of this research.

In addition to the material described above, Appendix 1 presents a list of all Shetland burnt mound sites considered within this study, with coordinates and reference to the local SMR number, and tabulated landscape and location results from in-situ survey. Appendix B (CD in rear of the volume) presents a selection of GIS material compiled as part of this study.

1.4 Scope and Focus of Study.

As has been noted above, burnt mounds are a temporally and geographically diverse phenomenon. This thesis focuses specifically on the burnt mounds of Shetland, an island archipelago north of Scotland. As will be discussed in Chapter Four, the burnt mounds of Shetland predominantly date to the Bronze Age (see below for clarification in relation to the use of the term ‘Bronze Age’). However, consideration of sites falling outwith this period (eg the Neolithic site at Clowanstown, Co. Meath) are included in order to illustrate variations in the treatment of burnt stone, and to explore wider trends in the creation and use of burnt mound sites. It should be emphasised that this thesis represents an attempt to contextualise the burnt mounds of Shetland in relation to selected themes in burnt mound research, rather than a consideration of the entire corpus of research relating burnt mound and hot stone technologies. Specific attention is given to Irish material in order to examine the influence of the Irish literary tradition
and its application to Irish *fulacht fiadh* on the understanding of burnt mound sites. This thesis also focuses burnt mounds as a monumental phenomena, and restricts its investigation to those cases where the use hot stone technologies has resulted in the presence of a mound or mounds. It does not explore the utilisation of hot stones within a domestic contexts (eg pot boiler stones), or the occurrence of burnt stones within non-mound contexts.

### 1.5 Some Notes on Terminology.

For the purposes of this thesis, the phrase ‘burnt mound’ is the preferred terminology to describe the heaps of cracked stone which form the subject of this study. However, these sites are also known by a number of other terminologies, including *fulacht fiadh*, *fulacht*, *skärvestenshögar* or *køkkenmødding*. The terms *fulacht*, and *fulacht fiadh* are utilized within this thesis when referring specifically to the Irish tradition of burnt mound research, or to historical explorations of burnt mound sites. These terms are italicized to identify them, but are generally interchangeable. In Chapter Seven the term ‘mound’ is also employed to differentiate discussion between the burnt mound as a whole (including associated structures within), and the mound of fire cracked stones which form the primary part of the site. When the term ‘mound’ is used on its own in relation to burnt mounds it therefore refers to this aspect of the site alone.

Secondly, this thesis refers repeatedly to the Bronze Age. The Bronze Age is generally defined as the period falling between approximately 2000 – 500 BC. However, there is some debate as to whether this term is applicable within a Shetland context (c.f. Sheridan 2012). As will be explored in greater detail in Chapter Four, the Early Bronze Age of Shetland in particular could be considered as a misnomer, as the islands retain what appears to be a characteristically Neolithic culture for much of this period. For the purposes of this thesis however, the term Bronze Age is employed to provide a point of reference to activities taking place in the rest of Britain during this period and to contextualise the use of burnt mounds with other Bronze Age practices. Additionally, the chronology for the Neolithic and Bronze Age material in Shetland remains weak and uncertain (See Chapter Four). As such, it is not always possible to determine which sites would be contemporaneous with the Bronze Age use of burnt mounds in the islands, and which represent earlier, Neolithic, activities. For the purposes of this thesis the term ‘Prehistoric’ is applied to many of Shetlands Neolithic/Bronze Age sites in order to express the ambiguous nature of the material in the islands at the present time.
Chapter Two: Past Approaches to Burnt Mound Studies

2.1 Introduction
This chapter presents a detailed overview of the approaches to burnt mounds to date. It takes a broadly historical overview, following the development of burnt mound studies from early Irish Antiquarian writings to more recent experimental approaches. In doing so it is able to draw out some of the key themes and concerns which have influenced burnt mound studies to date, and explores some of the limitations of the approaches taken.

2.2 Burnt Mounds and Irish Literary Tradition.
Some of the earliest references to burnt mounds come from the Irish Literary tradition. While it is not clear how many of the ‘fulacht’ referred to in these texts are in fact references to burnt mounds, as will be explored in greater detail below, these stories have become so intrinsically linked with current archaeological interpretations that it is helpful to assess them here.

The nature of these early literary references has been explored in detail by O’Drisceoil (1990), who urges caution in their application to the archaeological sites that we recognise today. He notes that the range of material in which these references are found are extremely varied. They date from as early as the 9th Century AD to the eighteenth century. All are written in the Irish language, and range from law tracts, glossaries, saints lives, folklore, histories to annals and poetry. I will focus more on the implications of using such resources to aid archaeological interpretation in greater detail at a later point, however, as O’Drisceoil stresses, it is worth noting that the term fulacht fiadh does not appear in any of the early material examined, but rather appears to be a nineteenth or twentieth century invention (ibid 158). The term fulacht does appear, in various forms, including Inadh fulachta meaning ‘cooking place,’ however it is not at all clear that these terms refer to the boiling of water, or any of the other activities associated with burnt mounds. The word fulacht itself may have originally meant ‘recess’ or ‘cavity’ giving rise to the presumption that all references refer to a cooking pit or trough. However, as O’Drisceoil notes, it is necessary to examine the context in which these references occur in order to explore their meaning. When used in a text that relates to the privileges and responsibilities of poets for example, it is explained that it refers to the path of the voice.
from the lungs through the throat and mouth to the final expression of the poetry (Gwynn 1942 in O’Driscceoil 1990:158).

Of the ten examples that O’Driscceoil explores only two appear to be convincing examples of what we would recognise to be burnt mound activity. The first, from Keating’s ‘The History of Ireland,’ written in the 18th century, is particularly detailed, and forms the basis of O’Kelly’s later interpretation of burnt mound sites (see section 2.4). A hunting and cooking context is prescribed to the sites, and they are attributed to the actions of the mythical Fianna, a legendary band of warriors, found in both Irish and Scottish mythology, led by the hero Fionn mac Cumhaill. Keating describes how that after a morning’s hunting the Fianna would send their attendants to a particular spot in the hill, and that they would kindle fires, in which stones would be set to roast, and dig two pits in the clay. They would then set some of the meat to roast on the fire, and bind the rest in rope and set it to boil in one of the pits by dropping the stones from the fire into the pits periodically. The second pit would then be used by the Fianna for bathing and reviving themselves after the hunt, before they ate the meal. Keating goes so far as to identify these sites as being the places ‘now called Fulacht Fian by the peasantry’, making a clear link between the burnt mound sites which we recognise today and the activities described (Dinneen 1908 in O’Drisceoil 1990:160). However as O’Drisceoil notes, Keating is writing a considerable distance from the events being described, and it is clear that even he regards the sites as antiquities. While he may have been familiar with the practise of cooking with stones, it is unlikely that Keating had first-hand experience of this activity on a scale that would have produced the large mounds of stone found at fulacht sites.

The second account, found in an eighteenth century manuscript does not contain the word fulacht at all, but rather describes a process which fits closely to that described by Keating. The Romance of Mis and Dubh Ruis is particularly interesting, not only because it too describes processes of cooking and bathing using a pit and hot rocks, but because the site seems to have curative properties, and the processes involved form part of the cure for Mis’s insanity. Acts of cooking and bathing are also intrinsically linked with music and sex, as Dubh Ruis first attracts and calms Mis using music, before having intercourse with her ‘for he thought that if he could lie and have intercourse with her that it would be a good way to bring her to sanity again’. Mis is clearly impressed with his performance, as she immediately requests that he do it again. However, he refuses until he has killed a deer, cooked and eaten it, and then bathed her in the grease of the
animal ‘until he brought streams of sweat out of her like that’ (Ó Cuív 1954 in O’Drisceoil 1990:161). Although the first written account appears in the 18th Century, it is likely that the story itself comes from a much earlier oral tradition. There are some questions over whether the method of cooking described in this story is in fact a later addition to the tale. Given that the description tallies so closely with that given by Keating above, it is possible that these details were added to embellish the tale following the publication of his history.

What makes both of these accounts particularly interesting is the importance of food, bathing and other activities such as music and sex in their usage. As will be examined later (see section 2.4), accounts such as this might go some way to unlocking some of the complex properties and associations which burnt mounds possess, although at present these aspects remain significantly under explored.

A number of the other texts make reference to cooking activities being carried out at the fulacht, but the method used is often roasting, or grilling, and not the boiling activities that we would expect to take place at a burnt mound site (O’Drisceoil 1990). Others still seem to describe locations which would be suitable for burnt mound sites, such as ‘The Cooking of the Great Queen’ (Fulacht na Mórrigna) which describes a cooking place, which was made a long time ago ‘and cannot be worked without water’ (Hyde 1916:345 in O’Drisceoil 1990:160). However, other descriptions of Fulacht na Mórrigna describe a wooden shaft, a frame of iron, hooks, pullies and a sail (Mackinnon 1912 in O’Drisceoil 1990:160), which firmly establishes that these are not the archaeological fulacht fiaadh with which we are now familiar.

2.3 Burnt Mounds and Antiquarian investigation.

Given the above, it is perhaps unsurprising that some of the earliest Antiquarian accounts of burnt mound sites also come from Ireland. The first recorded account from outside of the literary tradition is by the Rev Horatio Townsend in the General and Statistical Survey of the County of Cork (1815:145). Townsend refers to the sites as being primitive cooking locations, and cites their regular proximity to water as being further proof of this function.

Other early accounts, such as T.L Cooke’s (1951) investigations at Killyon Church, published in the first volume of the Journal of the Royal Society of Antiquaries of Ireland, make direct reference to the writing of Keating. Cooke explicitly links the slab lined pit found at Killyon with those pits described by Keating, further cementing the link.
between the archaeological sites and the mythological and literary accounts of past behaviours. Cooke’s account seems to have coloured subsequent interpretations of these sites. Ó Néill suggests that the ‘traditions elsewhere’ mentioned in the Cork Examiner in relation to the discovery and excavation of a trough near Mallow in County Cork, may be a direct reference to Cooke’s earlier publication (2009:15), although it is equally possible that they are making reference to the early literary material given the popularity of early folkloric material during this period.

Other notable accounts of Irish burnt mound sites during this period include the discovery of the Mooghaun hoard, which consisted of 146 pieces, predominantly ornamental, and at least two unwrought ingots, in 1854. This site has more recently been identified as a burnt mound (Condit 1996), and contemporary accounts published also noted that the gold items were found ‘only eighteen inches under the surface of those little tumuli or mounds of stone which are supposed to be the open air cooking places of our primitive or our martial forefathers’ (in O’Néill 2009:15). It is uncertain whether these accounts accurately report the finding place (Condit 1996:20), however, as O’Néill notes, what is interesting is that the finding of the hoard did not spark a debate about the dating of these sites, despite the publication of Worsaae’s papers on the Three Age System in the Proceedings of the Royal Irish Academy in 1847. What is clear is that not only were burnt mounds already recognisable as a distinct type of monument during this period in Ireland, but that the link between burnt mounds and cooking activity was already firmly established. Evidence from excavated sites seemed to support and perpetuate this belief, rather than challenge it. This interpretation can be seen to continue throughout the nineteenth century, with many writers referring to them as ‘cooking sites’ without any direct reference to Keating or other literary sources. It is not until the 1880s that challenges to the cooking paradigm become raised in Ireland. For example in 1885 Redmond states that some sites in County Waterford may have been used for the purposes of brewing, while in 1895 Fairholme suggests that they may have a connection with smelting (O’Neill 2009:17). While both of these accounts are notable for their deviation from the accepted interpretation on these sites, as will be demonstrated below, they have very little impact on the way that burnt mounds will be considered for the next one hundred years.

2.3.1 Irish Antiquarianism, Nationalism and Romanticism

To fully appreciate the context in which early approaches to burnt mound studies were being developed, it is necessary to examine the social and political climate in Ireland
during the late 18th and early 19th Century, when Antiquarian investigations were at their height. By the late eighteenth century distinctions between what were previously seen as ‘Native Irish’, ‘Old English’ and ‘New English’ had begun to blur. The English no longer saw a clear distinction between the native Irish and descendants of early English settlers. Slurs once applicable to Gaelic Irish only began to be applied indiscriminately, creating a need to challenge these perceptions. Translations of early writing, such as Keating’s History became invaluable tools for Anglo-Irish Protestants to establish their links with the Gaelic past, and to incorporate themselves into its history (O’Halleran 2010). After the introduction of the act of union in 1801 the period saw an explosion in literary explorations of the notion of Irishness. Writers increasingly turned to narratives of the past in attempt to establish a sense of identity against ongoing political turmoil. Likewise, those wishing to study Ireland’s past increasingly turned to early Irish literature in an attempt to create a legitimate and usable version of Irish history and identity. There was a concerted movement towards to removal of the ‘Barbaric Irish’ stereotype, and its replacement with notions of a Golden Age of heroic figures and bardic traditions (Ni Munghalle 2008, O’Halleran 2006, 2010).

The link between Antiquarianism and the Romantic Movement is well documented. As Trigger (1996:112) notes, the Romantics were deeply interested in the past, specifically the past of individual peoples and nations. The publication of Macpherson’s Ossianic poems in the 1760s was had a great impact on the movement, and were taken as evidence that primitive peoples could produce great works of art (Connolley 2006; Murray 2000; O’Halleran 2006, 2010). While it has since been determined that Macpherson wrote the poems himself based upon a knowledge of Gaelic folklore and mythology (ibid), the link between the popularity of this material, and the mythology which provides the source of much burnt mound interpretation cannot be overlooked.

Ossian, or Oisin, is the son of Fionn mac Cumhaill, and narrator of many of the tales within the Fenian Cycle, several of which he features in himself. In this context he is regarded as one of Ireland’s most legendary poets (O’Halleran 2008, 2010, O’Connor. The impact of these tales on scholarly practise and national identity can be seen in the emergence of groups such as the Ossianic Society, formed with an interest in the promotion of the Irish language, and the Fenian Brotherhood, a militant Irish Republican group founded in America during the 1850s. The Fenian Cycle, and the stories within it are intrinsically linked to concepts of what it meant to be Irish in the late eighteenth and early nineteenth century (Connolley 2006; O’Halleran 2006; Smalikova 2002). The
stories refer to a ‘Golden Age’ populated with accomplished poets and heroic acts and it is within this context which the stories of cooking and bathing at fulacht sites colour the antiquarian imagination.

2.3.2 Antiquarian Investigations in Scotland

In contrast to the situation in Ireland there is very little recognition of these sites as being a unique phenomenon in Scotland until the mid to late nineteenth century. Although a number of sites which would now appear to be burnt mounds were investigated, there is an implicit understanding that these sites form part of a larger burial practise, and are often discussed in relation to other stone and earthen mounds (e.g. Hunt’s exploration of Shetland sites, as described below, or Anderson’s accounts of the Caithness cairns).

The earliest recognised account comes from Mitchell’s 1870 description of ‘rude stone implements’ found in the centre of what he describes as a ‘burnt stone tumulus’. Mitchell describes some of the material found during James Hunt’s investigations in Shetland on behalf of the Anthropological Society of London (cf Hunt 1866). Hunt’s particular interest was in the physical characteristics of different racial types, and he gave several controversial lectures ‘On the Negros place in Nature’ (Smith 2011). He visited Shetland after hearing of a large number of skulls that had been found in a cairn on the Muckle Heog, Unst. On examination these skulls were found to exhibit qualities ‘especially in the fore part, to the cranial characteristics we find in the Australian race’. Shetland was identified as having a wealth of anthropological and archaeological material, due to the undeveloped nature of agriculture in the islands, and was therefore seen to be an ideal location to study the remains of ‘aboriginal’ inhabitants. Hunt secured funding to visit Shetland, and then set about excavating a large number of archaeological sites, a good number of which were burnt mounds, and none of which contained any skulls (Smith 2011). While Mitchell recognised Hunt’s mounds as being made up of burnt stone, Hunt’s own agenda makes it clear that they believed these to be burial cairns, and there is no other explanation sought for their existence. Neither Hunt nor Mitchell offer any explanation as to how or why the stones came to be burnt.

Prior to Hunt’s investigations Black (1857) had also reported on a number of cairns excavated in Shetland, which were composed of material he described as being ‘reddened.’ However, unlike Hunt, Black comes to the conclusion that these sites were not the result of burning, but rather that the colouration was a result of the type of soils
in which they were found. Despite this assertion Anderson (1873: 295) later writes that they would appear to resemble a ‘curious class of small cairn’ also found in Caithness, and goes so far as to make the connection with sites found in Ireland and the cooking hypothesis. This remark is the first example of an awareness of the cooking paradigm within a Scottish context, although Anderson expresses scepticism of this interpretation, and suggests a preferred explanation would be something of a ‘sepulchral’ nature, reinforcing the association between burnt mound sites and burial during this period in Scotland (ibid). Further mound sites were investigated during the nineteenth century, including one on Fair Isle, and several in Mainland Scotland (O’Neill 2009:16-17). However, with the exception of the occasional account on the discovery of a new site, very little discussion of the nature of the burnt mounds occurs in print until the 20th century.

2.4 Early Archaeological Investigations
The earliest systematic survey of burnt mound sites in England and Wales was undertaken by T.C Cantrill and O.T. Jones (1911) in the late 19th and early 20th century. Cantrill and Jones recorded a large number of sites while undertaking geological survey in West Wales. Following this survey Cantrill (1913) went on to identify a number of sites in the Birmingham area based on his experience in Wales. They too regarded burnt mounds as cooking sites. Cantrill’s work continued to be the reference point for investigations into burnt mound sites until the 1930s, and it is no doubt thanks to him that, unlike their Scottish counterparts, the inventories published by the Royal Commission on the Ancient Monuments of Wales contain separate lists for burnt mound sites (1917, 1925, 1937). In the 1940s the RCAMS inventories for Orkney and Shetland contain lists of burnt mound sites, suggesting the acceptance that the sites represent something different than the burial tradition to which they had previously been assigned. Despite these developments, very little was published on burnt mound sites in the British Isles until the mid 20th century.

In the early 1950s O’Kelly carried out a series of excavations at Ballyvourney and Kileens, Co. Cork (1954). At Ballyvourney 1 he also undertook to reconstruct several elements of the mound and conducted an experimental firing ‘in order to discover how long it would take to set up the complete cooking place’ (1954, 117). He succeeded in boiling the 454 litres of water in around 35-40 minutes. Joints of meat, wrapped in straw were added to the trough, and through the continual addition of stones to maintain temperature were
cooked to an ‘edible standard’ (*ibid*). The experiments were successful in demonstrating that such sites were viable as cooking sites, and that ‘such a trough made in the ground could be used effectively for the cooking of meat in the manner described by the early Irish literature’ (*ibid*, 122) as well as providing valuable observations on the number of stones required for each firing.

That O’Kelly considered these sites to be cooking or ‘hunting camps’ from the outset is obvious from the assumptions he makes while writing, and from his stated purpose in running the experiments. In cases where sites were found without a water trough it was alternatively suggested that roasting might have occurred. O’Kelly notes that this method would take considerably fewer stones, and suggested that this might also explain those sites where a later, secondary, and much smaller hearth was found during excavation (1954: 123). O’Kelly draws directly from Keating in interpreting these sites, and several elements of the Finian mythology pass directly into archaeological interpretation without any question. Most notably evidence for seasonal usage, or alteration of the site after successive usage, such as the reconstruction of the hearths at Ballyvourney I and II and Killeens II, the multiple troughs at Killeens II, and the multiple hut structures discovered at Ballyvourney II, is taken as evidence of seasonal hunting (*ibid*, 137). He argues that this practise may also explain the grouping of sites, with each site representing a successive period of use as a group returned to the area year after year (*ibid*, 138). Secondly, O’Kelly’s confidence in the validity of the cooking argument from the outset colours his interpretation of other elements of the site. Thus secondary structures become ‘meat racks’ and ‘butchers blocks’ (*Ibid* 114), despite the lack of evidence of butchery of cooking debris found at either site. The only point on which O’Kelly deviates from Keating’s account is on the point of the second pit, in which Keating describes the *Finna* bathing themselves after a day’s hunt. Here O’Kelly prefers the interpretation of roasting or earth oven, and states that ‘while Keating was aware that two pits were sometimes made, he was unaware of the real purpose of the second, and to explain it away, made it a bathing-pool’ (*ibid* 140)

Cooney has noted that Irish archaeology is not known for embracing theoretical approaches, and has, as a whole, been defined by an empirical tradition which prioritises the acquisition of new data, and believes that ‘limitations in the data prevent reconstruction of many aspects of life in the past’ (Cooney 1995:205). O’Kelly was certainly no exception to this rule. While his work is incredibly detailed, he remains primarily descriptive, and there is little reflection on the theoretical underpinnings of the
interpretations being made. Illustratively, when O’Kelly later returns to burnt mounds in a short section in his book on Early Ireland (which in itself it notable as being one of the few accounts of prehistoric material which includes anything more than a brief line on this type of site), they are introduced under the heading ‘cooking places’ (O’Kelly 1989: 223-25). Despite writing after a period of intense debate about the possible uses of burnt mound sites (see section 2.5 below), and the validity of the early literary sources in understanding them, he makes only a cursory reference to the possibility of other interpretations, and no attempt at critical reflection on the approaches his own research took almost forty years previously.

Nonetheless the impact of O’Kelly’s work on burnt mound studies has been considerable. Not only did he produce the first set of radiocarbon dates for a burnt mound site, but the paper that he published as a result of this period of fieldwork was subsequently heralded as ‘the definitive publication’ (Buckley, 1990b:9) on the subject, and has, to a greater or lesser degree, influenced much of the work that was later done at Burnt Mound sites throughout the UK. His experimental work is one of the first tantalising glimpses into the sorts of activity which may have occurred at burnt mound sites. As will be explored in more detail in Chapter Six, O’Kelly’s account of the experimental processes employed at Ballyvourney gives a valuable insight into some of the considerations regarding stone transportation, hearth management, tank filling and cleaning. He also makes some interesting observations on the volume of stone required per firing, the number of firings a stone might be subjected to and the materials required to successfully carry out such an event (1954:131-132).

While the value of O’Kelly’s contribution to the field cannot be understated, its continued prominence remains somewhat problematic. His work is significant in that it represents the first considered archaeological account of burnt mound sites, but his reliance on early literary sources creates problems for those who wish to use his work as a reference for understanding burnt mound sites as a wider phenomenon. Although their roots may lie in the same source tradition, as Holtorf and Gazin-Schwartz have illustrated, the value of folklore as a direct ‘historical’ reference to past activity is questionable (Holtorf & Gazin-Swartz 1999b – see also other papers in that volume). O’Kelly’s approach was not unusual for his time. In 1951 Clarke argued that folklore could provide a valuable resource for understanding how artefacts were made and used in the past (Clarke, 1951). Such an approach relies on the presumption that folklore is not only based on some sort of past ‘truth’, but that there has also been an unbroken
line of transmission of such tales reaching back for thousands of years. As Holtorf and Gazin-Schwartz suggest, this presumption is more likely for material which deals with the relatively recent past, such as the highland clearings, but becomes inherently suspect when applied to the understanding of prehistoric events and materials. I have already outlined some of the inconsistencies in the association with the literary references to *fulacht* and the archaeological sites above. There may well be value in referring to folklore in relation to understanding burnt mound sites beyond a derivation of function, and this is something I will return to in greater detail in Chapter Nine, however as a historical source it remains particularly questionable. Questions of authenticity aside, there also exists the troubling practise of taking an analogy developed for a particular area, with a specific set of myths and stories associated in relation to it, and applying it to regions in which there is no such tradition. The character of Fionn Mac Cumhaill certainly passes into the corpus of both Manx and Scottish folklore, but traditions associated with burnt mounds and cooking do not move with him.

### 2.5 Function and Economics – Burnt Mounds and the Processual Legacy.

Despite the criticisms outlined above O’Kelly’s work can be seen as remarkably forward looking in its utilisation of experimental approaches and folklore to support the cooking hypothesis. His work shares many similarities with the approaches developed as part of the New Archaeology. In particular, as I will explore greater detail in Chapter Three (Section 3.1.2.1), the focus on function, and the adaptive and exigent properties of burnt mounds can be seen as characteristic of processual approaches to technology. This approach, I argue, can be seen to characterise and direct understandings of burnt mounds until the present day; however, despite this seeming synchronicity the 1960’s and 70s saw very little discussion in relation to burnt mounds. The notable exception to this is Hedges (1975) publication of Liddle and Beaquoy burnt mounds in Orkney. Both Liddle and Beaquoy contain complex stone built structures within the mound, which, despite being within relatively close proximity to each other (within the same island group,) also demonstrate marked differences in the style of construction (Section 4.3.1 Fig 4.8 & 4.9). Hedges (1975:74) argues that the complexity and variation of these sites lays some of the presumptions made by O’Kelly open to question. In particular he notes that O’Kelly’s confidence in the early Irish literary sources coloured his interpretation of many of the features on the sites (eg the ‘Butcher’s Block’ and ‘Meat
Racks’). In particular, Hedges (1975:74) suggests that had the Irish literary sources not existed, very few people would have come to the conclusion that burnt mounds represented seasonal hunting camps. Both Kileens and Ballyvourney displayed evidence for what O’Kelly (1954:137) interpreted as phases abandonment, which he suggested related to seasonal activity on the site, and thus, indicated their role as temporary hunting camps. However, as Hedges notes, many prehistoric sites display evidence of differential seasonal deposits (eg autumn leaves), however, this does not always translate into a period of abandonment. Equally, in the context of the Northern Isles he argues that the density of burnt mounds is much too high to support this. Instead Hedges argues that phases of construction and remodelling are not uncommon at prehistoric sites, and that their existence does not necessarily presuppose periods of abandonment (1975:74). He notes that the locations in which burnt mounds are found throughout the northern isles correlates with good farming land (ibid 98, Figs 21 & 22: 64-65), and thus suggests that the mounds are likely to have been associated with settled agricultural populations. He argues that though the methods of construction employed in Ireland are more likely to give the appearance of ephemerality than the slab built construction methods employed in Orkney it is equally possible that the Irish structures were also connected with permanent settlements (ibid 74) too. However, despite challenging aspects of O’Kelly’s interpretation, Hedges still concludes that ‘there cannot be much doubt, in view of the [...] evidence, that the peculiar features associated with burnt mounds were used as adjunctions to cooking with hot stones’ (ibid 73). Indeed, he even goes on to argue that continued discussion of the potential application of burnt mounds and hot stone technologies is ‘a little obsessive’ (ibid) given the availability of archaeological, ethnographic, literary and experimental evidence which suggests that cooking can be, and was carried out using hot stones from the Neolithic until the 18th Century. Thus, despite raising the tantalising suggestion that burnt mounds may be more varied and complex than was previously thought, Hedges work remains as rigidly functionalist as that which has gone before (and indeed which will come after). There is little attempt to challenge the ongoing perceptions of the site and no consideration of the material processes which contribute to the construction and use of these sites.

2.5.1 Variations in form and function: the cooking/bathing debate
The late 1980s and early 1990s saw a resurgence of interest surrounding burnt mound studies, sparked by Hedges (1975) publication of Liddle and Beaquoy, and a growing
awareness of the potential for variation and complexity in burnt mound structures. These considerations sought to question the accepted account of these sites as ‘hunting camps’ and ‘cooking sites’ and instead began to explore the possibility of alternate uses (Barfield & Hodder 1987; O’Drisceoil 1988). This development coincided with a period of growing dissatisfaction with the functionalist approaches to material culture found within the ‘New Archaeology’ (e.g. Binford 1962). New approaches advocated the importance of context in understanding culture (e.g. Hodder, 1982a; 1982b; 1992). Functionalism, it was argued, created cross-cultural generalisations in which difference becomes similarity, leaving no place for the existence of variation (Hodder 1982). Such approaches allowed for the blanket application of a functional hypothesis (cooking) to be applied to all burnt mound sites, based upon a set of shared typological traits (the existence of mounds of burnt stone). The new emphasis on context and variation afforded new possibilities for burnt mound studies, and for a short period of time, the field was invigorated.

This period of debate began with the publication of two articles in Antiquity in the late 1980’s. Based upon excavations at Cobb Lane near Birmingham, Barfield and Hodder (1987) argue for their interpretation as bathing, rather than cooking sites. They base this argument on a number of factors, including the lack of bone found despite extensive sieving, and the absence of artefacts that might be associated with cooking (such as pottery or tools for butchery). They observe that the location of the site was particularly unsuitable for inhabitation. Close proximity to the stream would render it liable to regular flooding, thus making it unlikely to represent the kitchen unit of a permanent settlement, while the volume of stone, suggested that the site developed over a period of time, and was therefore not the result of one of hunting expeditions (ibid: 371). In this interpretation focus is switched from the heating of water to the production of steam. In many cases water would be added to the heated stones, as opposed to the stones being added into tanks full of water, representing a divergence from the technological practises represented in the cooking hypothesis. Barfield and Hodder support this theory with a number of examples of sweathouse or sauna traditions from throughout Europe and Central America. They note that the basic requirements of a sweat or steam bath are a ‘heat source and an enclosed space’. This space can be quite insubstantial, such as with the pole-framed lodges erected by Native American tribes such as the Sioux, whereas more substantial structures tended to be built by settled communities (ibid 371-373). They also observe that a cold plunge is a frequent accompaniment to use of a
sauna or sweat lodge. In Finland, Russia and California sites were often located next to streams, rivers or lakes for this purpose, while in Ireland pools and streams were often dammed for the same requirement. Each of these features can be seen to correlate with the structures and locations associated with burnt mound sites throughout the British Isles (ibid 376-378).

In a subsequent paper O’Driscoeoil (1988) examines the evidence for both cooking and bathing at burnt mound sites. His paper acknowledges Barfield and Hodder’s contribution as a timely and much needed reassessment of burnt mound sites (1988:671), however, he expresses scepticism about the applicability of the bathing hypothesis, and continues to rely heavily on the experimental work of O’Kelly (ibid 674-5), and traditional literary accounts in order to support the cooking hypothesis (ibid 673-4). Unlike Barfield and Hodder, O’Driscoeoil does not see the lack of bone and other associated materials as evidence that cooking was not being carried out at the sites. Rather, he suggests that the boggy locations in which they are often found may create unfavourable conditions for preservation, and reiterates O’Kelly’s earlier argument that the activity of wild animals, or the transferral of cooked materials to a drier location for later consumption may also have contributed to this scenario (ibid 175). He supports this by drawing on several Irish burnt mounds sites which have demonstrated variable bone preservation during excavation, and which have produced evidence for the butchery of domestic animals on or near the site (ibid).

As was suggested by Hedges (1975:74) for the Northern Isles, O’Driscoeoil concludes that the mixture of domesticated and wild species found at sites such as Fahee South demonstrates that the cooking hypothesis need not rely on bands of roving hunters, as suggested by O’Kelly, but might instead prove to be an indicator of permanent settlement (1988:677). While conceding that it is unlikely that the locations themselves were dwelling places, he suggests that their distribution might be used as an indication of settlement sites nearby (ibid) – an approach that will have significant weight in later considerations of burnt mound sites (cf. Barber & Russel White 1990, see section 2.5.2 below).

O’Driscoeoil also suggests that the presence of substantial tanks at a number of sites ‘argues strongly against’ any sort of bathing activity (1988:679). He suggests that distinction needs to be drawn between wet bathing (through immersion in hot water) and dry steam bathing, as each process would likely produce significantly different remains. While structures such as those found by Hedges (1975) in Orkney, or at the
Irish site of Drombeg, may suggest a bathing function, he argues that a large number of
the pits and tanks excavated in Ireland are not found undercover, and therefore would
be of limited use in the production of steam (O’Driscceoil 1988: 677). The existence of
structures at some sites, he argues, cannot be taken as evidence for bathing activity at all
burnt mounds, as sites of this nature are currently rare. Even allowing for the possibility
that evidence of associated structures or buildings may have been missed during
excavation, he notes that at the majority of sites in Ireland it would appear that the
stones have been thrown directly from the tank onto the mound, thus making the
production of steam an unlikely product of any activities which would have taken place
around the tank (ibid). He concludes that while bathing is a possible alternative for some
sites, the most likely primary function continues to be cooking. Moreover in cases where
there is a large trough present this is particularly likely to be the case. The large
quantities of broken stone that occur in the bottom of troughs after a firing are likely to
make bathing by immersion uncomfortable and dangerous (ibid). However, he argues
that if we consider that these sites may have been used by groups of people without
pottery or other containers suitable for cooking large volumes of water over a fire, then
cooking becomes the most likely output. The possibility of bathing is not ruled out
completely, however, when it did occur, it is suggested that it was most likely in a
secondary context, as is found in Keating’s History, or in The Romance of Mis and Dubh
Ruis (ibid).

This exchange is significant in that it heralds the beginning of an ongoing debate about
the possible functions of burnt mound sites. Barfield and Hodder’s (1987) contribution
marks a departure from previous treatments in considering some of the non-tangible
aspects of burnt mound usage. They note that

‘it is not without interest that the concentration of burnt mound use in
Britain corresponds to the period when we have evidence for ‘water
based’ religion in Britain and in other parts of Europe’ and conclude
that it might be possible that some of the purifying properties of sauna
bathing may be linked to other ‘religious’ considerations of time times’

(Barfield & Hodder 1987:378.)

Yet despite this acknowledgement the focus of both papers remains primarily functional.
Barfield and Hodder make a precursory reference to a number of other possible
technological uses for hot stones, including boat building, butter production, brine
evaporation, brewing, pottery filler, fulling, leather working and metallurgy (ibid 371).
However, the overwhelming consensus from both of these papers is that there must be
one ‘primary function’ which best fits all burnt mound sites. As I will argue in Chapter Three, this focus is a consequence of a lingering approach to materials and technologies which, despite contemporary developments highlighting the importance of context, defines meaning in relation to function at adaptation. It is this attempt to find a unitary explanation which has dogged the field ever since, and which, as I illustrate below, has prevented archaeologists from fully exploring the potential which burnt mound sites have for aiding our understanding of Bronze Age life-ways and cosmologies.

2.5.2 The International Burnt Mound Conferences

The impact of a functionalist approach to burnt mound studies can be seen most clearly in the two volumes published on the subject during the early 1990s. Following on from the exchanges that took place in the pages of Antiquity two conferences were held entirely devoted to the topic of burnt mounds and hot stone technologies. The publication of these proceedings remains the most substantial body of work addressing the subject to date, and brings together considerations of burnt mound sites from throughout Britain, Ireland and Scandinavia for the first time.

Buckley’s introduction to the first volume gives a clear indication of the intent and tone of the publication. He notes that the existence of a ‘definitive’ and ‘substantive’ publication on the subject, in the form of O’Kelly’s 1954 work, has served to discourage further discussion of the sites, due to the perception that ‘everything has already been said’ (Buckley 1990b:9). He also notes that much of the work carried out on burnt mounds has been as a result of rescue excavation, and thus has tended to focus on the central area of the site, the hearth, or trough. The focus on the sites themselves or the internal structures (such as those at Liddle and Beaquoy in Orkney) has meant that while more is understood about burnt mound sites themselves, there has been little focus on their place within a wider prehistoric settlement framework (ibid).

Perhaps most interesting is his statement that unlike ‘fairy forts’ in the case of ringforts, or ‘Diarmuid and Grainne’s Beds’ for megalithic monuments, *fulacht* carry ‘no historical or mythical connotations in popular folklore’ (Buckley, 1990b:9). Buckley states that their small and amorphous nature, and their location in prime development area means that they are at the forefront of ‘the destructive processes of land reclamation’, their study therefore takes on renewed importance ‘in the 1990s, when increased work of this kind may wipe out these important pointers to our prehistoric settlement in north-west Europe’ (ibid). Two points are made clear from this statement. First is that the value of
these sites is seen to be in their ability to indicate patterns of prehistoric settlement, rather than in relation to any of the particular processes and practises which were carried out at them. The second is that despite O’Driscceoill’s analysis of the role of folklore in the development of the cooking hypothesis (1988:673-4), Buckley makes no connection between folklore and the way in which burnt mound are perceived. While he recognises the role which stories relating to Fairy Forts, and the pursuit of Dairmund and Grainne have played in cementing hill forts and dolmens in the public imagination, he does not recognise the links between established archaeological interpretations of burnt mound sites, and those same stories. This is despite the fact that the story of Dairmund and Grainne forms a part of the Fenian cycle, the corpus of stories from which Keating takes his lead from in interpreting fulacht sites.

The conference proceedings aim to bring the discussion up to date by providing recent information on survey, excavation and dating techniques in relation to burnt mound sites in Scotland, Ireland, Wales, England and Scandinavia. Overall, volume is primarily descriptive, with papers predominately having a focus on distribution, new survey techniques and excvation and dating. While there is greater acknowledgement that there may be a multiplicity of practises occurring with sites, the dominant interpretation continues to be that of cooking (e.g. Barber 1990; Nixon 1990; Kelly 1990) and some sites are even presented as ‘ancient cooking places’ from the outset (Ryan 1990). A list of associated finds from Irish sites presents an illuminating overview of the range of materials which are found in association with burnt mound sites, but there is no attempt to analyse these relationships, nor to engage critically with previous approaches to the sites.

In perhaps the most telling testament to the attitude towards burnt mounds, the introduction to the Scottish material describes them as ‘among the most boring sites with which a field archaeologist must deal. Apart from a new date and a new spot on the distribution map, individual sites have little to contribute to our understanding of the past’ (Barber & Russell-White 1990:59). The author goes on to acknowledge that as statistical entities the sites may hold some value in revealing something of the ‘social patterning of emerging life in the Scottish Later Bronze Age’ (ibid), however, it is made perfectly clear that as entities themselves burnt mound are of little to no interest to the prehistoric scholar.

A further proceeding from the second International Burnt Mound conference largely continues the approach set out in the first (Barfield & Hodder 1991). While there is less
material concerned with descriptive overviews of sites in different areas, there is a continued focus on techniques for surveying and identifying the sites, particularly in relation to geophysical prospection. This volume continues the debate surrounding the possible function of burnt mound sites following the exchange of papers in *Antiquity*.

Barfield (1991) states that the subject of function should be open for unbiased discussion. He argues that the mounds themselves do not provide ‘incontrovertible evidence’ (*ibid*: 59) for any particular function, and as such the question should be one for future research. He advocates the study of burnt mound sites alongside discussion of other ‘more general phenomenon of the use of stones for heat retention’ and ‘the general study of hearths, ovens and furnaces’, citing examples such as Binford’s work on Namamuit ‘grease rendering’, Iron Age brine evaporation, and a Roman site at Wall in Staffordshire, which contained a long shallow trench filled with burnt stone and charred wood, as among the possible candidates for comparative study (*ibid* 62). He also notes the occurrence of burnt stones in non burnt mound contexts, such as the burnt flint found in tombs in Northern Germany and Sweden, or burnt stone found in connection with *monumentos com forno* from Iron Age Portugal and Spain. Crucially he argues that the debate on function ought to continue to be an important part of burnt mound research, particularly if their social role is to be understood. If burnt mounds are to be used in discussions of ritual or communal feasting, or any other form of conspicuous consumption, then it is vital that other possible functions are also understood and their implications for these arguments be considered. He concludes that ‘all options should be kept open for burnt stones’, and that future research programmes should be designed specifically to follow up the question of function (*ibid* 65). Barfield’s contribution is significant, in that it begins to open up the debate to the possibility of multiple functions, and to challenge the *a priori* presumption that all heat cracked stones represent ‘pot boilers (*ibid*)’. However, despite this acknowledgement, there remains a rigid adherence to the concept of function. Barfield’s message is clear. If burnt mound sites are to make a contribution to our understanding of prehistoric peoples, we must try harder to understand the function of burnt mounds, and identify ways of determining between different functions.

The question of function is also evident in Jeffery’s (1991) consideration of burnt mounds possible role in fulling and early textile production. He notes that burnt stones can be seen to have a role in the fulling of woollen textile in more recent times, citing examples of stories from Rhum, in the Hebrides, and Connemara in Ireland, where hot stones had
been known to be used to heat water before the waulking (fulling) process began, as well as footage filmed in 1929 by Aldred F Barker, of Kashmir Shawl production in Northern India. The footage shows hot stones being used in the waulking process, once the cloth had been dampened. The location, by a stream, and the associated features, including a hearth, he argues, make for a striking parallel to some burnt mound sites, although no tank structure was involved (ibid 101-2). He also suggests that burnt mounds may have been employed in the dying process, noting that when woad was employed for dying it was first crushed and kneaded, before being dried, crushed again, and then fermented in steam before a final drying. This material was then added to a vat of warm water along with a mordant to complete the dying process. Burnt mounds, or structures similar to them, he argues could be used in both the final phase, and in the steaming of the dyestuff during preparation. Based on their associated structures and the locations in which they are found Jeffrey argues that burnt mounds present some of the most promising opportunities for researching fulling and textile production in European Bronze Age contexts, although obtaining evidence for such activities would be difficult.

While these papers present a departure from traditional accounts of burnt mounds in their call for the consideration of other potential uses and outputs, they remain fixed in their determination to discover the true function of burnt mound sites. The implication is clear, without understanding what they were for, we cannot possibly begin to discuss their role in the wider social world. More specifically, if we do not understand what they are for we run the risk of misrepresenting them, and employing them to make comments on the social life of Bronze Age peoples which may not be at all applicable to the context. Certainly Barfield’s (1991:65) call for the consideration of ‘all options’ for burnt mound studies is admirable, but as I illustrate below, his continued emphasis of function, and of the need to define what that function may have been has continued to limit the potential which these sites possess for our understanding of life in Bronze Age societies.

2.6 Recent Approaches

Since the publication of the proceedings of the International Burnt Mound conferences in the early 1990s, there has been little new material published on the subject of burnt mounds. New examples continue to be excavated on a regular basis, and there is an increasing corpus of data predominantly from developer contexts on their composition and distribution, but little critical interpretative engagement. A number of PhD theses
have been produced dealing with aspects of burnt mound archaeology, including Campbell-Anthony’s (2003) work on thermoluminesence dating at hot stone sites in the Northern Isles, and O Neill’s (2009) synthesis of burnt mound research and evidence from Britain, Ireland and Scandinavia. Campbell-Anthony’s thesis illustrates the suitability of these sites for obtaining dates via thermoluminescence. Her work is particularly useful in illustrating the long and complex chronologies which these sites can possess (Chapter Seven). It also provides a succinct overview of existing dates available for the Scottish Mounds. O’Neill (2009) quite rightly notes that while a large number of these sites have been excavated, they still remain poorly published, and much of the information gathered languishes unseen (ibid: 8). He provides an invaluable overview of previous approaches to burnt mound sites, and a comprehensive gazetteer of excavated sites throughout Britain, Ireland and Scandinavia in an attempt to develop an overarching synthesis of knowledge relating to burnt mounds and hot stone technologies. He focuses particularly on classifying and grouping sites by structure and tank type, which serves to illustrate the varying range of forms that burnt mounds can take throughout the areas in which they are recorded. However, despite the thoroughness of their work, neither Campbell-Anthony or O’Neill seek to challenge the theoretical assumptions which have so far gone hand in hand with our understanding of these sites. Nor do they make any substantial attempt to situate them within a wider Bronze Age context. Instead, as with the material found in Buckley (1990) and Hodder and Barfield (1991), these studies concentrate on burnt mounds in isolation, and represent a continued focus on the documentation and classification of previously excavated sites, and the development of techniques which will allow us to draw more data from them.

A notable exception to this trend is MacGregor’s (2008) consideration of the transformative and elemental nature of burnt mounds. In comparing burnt mounds to contemporary funerary practises MacGregor argues that burnt mounds can be seen as the foci of transformative and elemental forces, and suggests that the transformations facilitated at burnt mound sites may have been metaphorically linked to the bodily transformations taking place at funerary sites (ibid 277) (see also Chapter Three, section 3.1.2.5, Chapter Eight). As such he suggests that both burnt mounds and cremation practises can be seen as material expressions of how people understood the world, its origins, and the cosmologies of the time (ibid 227-8). In developing this account MacGregor concentrates on cooking and bathing as the most popular interpretations of
burnt mounds. However, despite only dealing with a fraction of the potential for transformation and material relations at burnt mounds his account provides a tantalising glimpse into the potential for creating relational and contextual understandings of burnt mounds which situate the practises taking place within a wider social and cosmological framework. Likewise, in relation to the Scandinavian material, Kaliff (2007:105-133) has suggested that burnt mounds might be interpreted as altars. Using Indo-European creation myths as an analogy he suggests that burnt mounds might be representations of the ritual use of hot stone to express cosmological beliefs (ibid 134). Both of these accounts are significant in that they identify burnt mounds as being places of elemental transformation, and thus as relating to wider cosmological understandings, a concept which, I argue, is key to developing our understanding of these sites.

Burnt mounds were also the focus of a session during the 2008 Word Archaeological Congress in Ireland. Papers continued to deal predominantly with the themes of developments in excavation and analytical techniques and questions of function, however there was a notable move towards accepting a multi-use interpretation for burnt mounds in general, despite continued attempt to prove or disprove or particular functional interpretations. Significantly, there was a call to understand these sites as locales of activity in which a particular set of technologies were employed, rather than as a site typology. These papers are symptomatic of a more widespread dissatisfaction with the simplistic approach that has been applied to burnt mound studies to date. Yet, despite the general acknowledgement of variation and multi-functionality which can be observed in discussing these sites, little of this approach has filtered its way into the corpus of published material on these sites. The proceedings of the WAC session are, as of yet, unpublished.

2.6.1 Burnt Mounds & Experimental Archaeology

On a more positive note the last two decades have also seen an increase in the popularity of burnt mounds as suitable subjects for experimental archaeological techniques. Most notable is the work undertaken by Quinn and Moore (2007) in brewing. Their experiments have proved it is possible to run mash in a burnt mound trough using the hot stones to convert the starches in the grain to sugar. By adding crushed malted grain to hot water and then fermenting it they were able to produce, by all accounts, a pleasantly drinkable ale (Quinn & Moore, pers comm.). The brewing theory has attracted more attention than any other functional interpretation, and is now often cited as one of the more popular theories in relation to burnt mound usage.
Further experiments into brewing were also undertaken by Chapman, following the
discovery of an eroding burnt mound and charred grain at Hell’s Mouth on the Lleyn
peninsula (Pitts 2010). While these experiments have proved that hot stone
technologies can be employed in the production of ale, the validity of the interpretation
has been challenged, predominantly based upon the absence of charred grain and other
associated residue at burnt mound sites (Quinn & Moore, pers. comm.).

Other experimental work has focussed on the washing, dyeing and fulling of textiles.
Denvir (1999) created a replica wooden *fulacht* tank with the purpose of exploring the
possibility that these sites may have been used for textile production. She employed the
tank for all three phases of the process. The first phase involved the washing of the
fleece. This was achieved by filling the tank with stale urine to remove dirt and lanolin
from the fleece, and to prepare it for the dying process. Once the urine had been
removed and the fleece washed in the running water of a nearby river, the tank was
employed to hot wash the fleece by heating the water with stones in the traditionally
accepted manner. The second phase was then to dye the fleece. A dyestuff was
produced in the tank by heating a mixture of water and ivy berries with hot stones until
the water had taken on as much of the colour of the berries as possible. The fleece was
then submerged in this mixture for approximately five hours, after which all the dyestuff
had leaked out from the tank and the fleece had taken on a dark green colour. The final
phase involved fulling of a woven textile made from fibre that Denvir had spun from her
dyed fleece. For this part of the experiment stale urine was once again employed as a
detergent, added to water and heated with hot stones in the tank. Once the water had
reached a point where the mixture frothed the woven cloth was added to the tank and
agitated with a stick until the fibres no longer appeared to separate. The result was that
once dried the cloth had shrunk by approximately 3 centimetres in each direction, and
had a visibly tighter and closer weave.

**2.7 Summary**

From the above overview a number of themes can be pulled out for further
consideration. The first is our continuing dependence on Irish folklore to help us
understand these sites. Despite a number of publications which explore the validity of
the written sources from which these interpretations derive, it is clear that many
accounts of burnt mound sites continue to apply these interpretations in an uncritical
manner without consideration to the specific historical and political contexts which led
to their creation. There is also continued failure to critically engage with the embedded set of presumptions which accompany these sites, and this in turn has led to a general disinterest in them as monuments in their own right.

Secondly, despite several calls for us to attempt to understand burnt mounds in relationship to other prehistoric activities, there have been few attempts to study burnt mounds as part of a wider suite of social practises. Although some efforts have been made to attempt to contextualise these sites within their landscape, they are often deficient, and restrict themselves to descriptive commentaries on what preferred locations, contours and vegetation may have been. The tendency to consider these sites in isolation may be attributed to both the implicit perception that they have no real contribution to make to our understanding of the period (e.g. Barber & Russel-White 1990). This in turn is fuelled by the notion that in order to understand these sites we must first decide what they were for (e.g. Barfield 1991). This concept brings me neatly to my final point; the continued emphasis on function.

As is implied by Barfield (1991:65), unless we can determine the function of these sites, there is a perception that we will continue to be unable to say anything productive about their wider role in the understanding of Bronze Age contexts. However, as the texts reviewed above have repeatedly demonstrated, burnt mounds continue to foil any attempt to assign to them a definitive interpretation. Those characteristics that led Barber & Russel-White (1990:59) to dub them ‘the most boring sites with which a field archaeologist must deal’ are the same qualities that allow them to continue to defy a simple interpretation. It is largely in response to these statements and attitudes that the rest of this thesis has been developed.

Given the current disciplinary focus on the dynamic social relationships between people, places and things in the past, burnt mound studies can be seen to lag behind in their continued focus on technologies as a primarily adaptive tool. Nor has there been any explicit theoretical engagement with the methods by which we approach these sites, and what our views on their role within prehistory may have been. Most specifically there seems to be an overwhelming lack of people in our accounts of burnt mound sites, and (with the exception of MacGregor (2008) and Kallif (2007)) no attempt to engage with the physical and social processes that would have gone on within them. In short, they remain isolated from accounts of prehistoric life in which, as I will argue, they were a monumental presence.
The next chapter aims to overcome the barriers that have thus far prevented burnt mound studies from making a significant contribution to our understanding of the Bronze Age by outlining a more critical conceptual framework through which the sites may be reconsidered. In doing so it will be illustrated that by shifting our emphasis from product to process, it is possible to demonstrate that burnt mounds formed an integral part of a wider set of Bronze Age social practises and cosmologies. This framework will then generate a set of methodologies which can be used examine the burnt mounds of Shetland within a wider context, and to reintegrate them into contemporary discourses of life in prehistoric Britain.
Chapter Three - Towards a new way of working: Materials, Landscape and Inhabitation.

3.1 Part One: Theoretical Framework.

3.1.1 Introduction : Burnt Mounds and Transformation

In the previous chapter I explored how a preoccupation with function became a recurrent theme in studies relating to burnt mound sites. Those studying burnt mounds in the late 1980’s and 90’s expressed dissatisfaction with the blanket application of the cooking theory to all burnt mound sites throughout the British Isles (see Hedges 1975, Hodder and Barfield 1987, O’Drisceoil 1988). Their attempts to reinvigorate the subject were commendable, but ultimately they were unable to move beyond a repetitive rehashing of the functional debate. While the call to understand burnt mound sites in a contextual manner was consistent with contemporary thought, the continued focus on the output of the technologies represented in the mounds, rather than the processes which they represent has prevented the subject from fully embracing the totality of affordances represented by burnt mound sites and the use of hot stone technologies.

This chapter aims to create a framework for reconsidering burnt mound sites in a manner that focuses on exactly these processes. It is recognised that previous approaches to burnt mounds have failed to engage with the epistemologies which underpin them. This failure, it is argued, has led to the stagnation of burnt mound studies, and to a continued focus on function at the expense of the development of interpretative counts. Given that this thesis has been developed in response to this lack of engagement, it is therefore critical to develop an explicit understanding of the approaches to materials, places and people within this study to ensure absolute transparency in the approach taken. The first section outlines the history of the development of experiential approaches to materials, technologies and landscapes, and explores some of the implications that these approaches have for our understanding of burnt mounds and hot stone technologies. In particular I focus on the concept that materials and landscapes are emergent, and disclosed through embodied and sensual engagements. It also explores concepts of object biography and chaîne opératoire as tools for developing a nuanced account of the use of burnt mounds which explores the practises, skills and engagements which facilitate their construction and use. Additionally, this chapter introduces the idea of burnt mounds as elemental and transformative, and argues that as such they are ontologically significant and
symbolically potent. Following this, a methodological framework for reconsidering burnt mound sites is developed based upon the hermeneutic framework outlined in section one. This framework utilises a multi scalar approach to landscape via GIS and landscape survey, and explores the range of affordances presented by burnt mounds via a series of experimental firings.

Richards has questioned the emphasis placed on structure and finished form in studies of prehistoric monuments (2004a; 2004b; 2009; 2013 and papers within). He argues that the power and meaning of many of these places came from the processes of construction involved in them, and the social relationships that were created and manipulated during these periods of construction. In exploring these processes Richards highlights the performative and transformative nature of the act of construction allowing him to draw out some of the complex social and material relationships which flow together during the creation and use of prehistoric sites (2004a; 2004b; 2013). As I will explore in greater detail below, the concept of transformation is key to understanding the processes undertaken at burnt mound sites. Burnt mounds are themselves inherently transformative because whatever we might perceive their usage to be, for instance bathing, cooking, or another entirely different application, the processes undertaken naturally involve a number of transformative actions. By focussing attention on these processes, and the conditions required to undertake them, rather than the hypothetical outputs, and exploring the range of interactions between people, places and materials which these activities facilitate, it becomes possible to explore burnt mound sites in a greater depth than has been previously allowed.

3.1.2 Toward an embodied and emergent understanding of Materials and Technologies

3.1.2.1 Materials, Technology and Function

If we are to avoid the pitfalls which have plagued previous attempt to understand burnt mounds, it is perhaps sensible to begin by examining the frameworks employed within these accounts. As has already been noted, previous approaches to burnt mound studies have employed narrowly functionalist frameworks, which have limited our understanding of their social role. The trajectory taken by these studies is rooted in the work of Irish archaeologist O’Kelly (1954), and is largely symptomatic of the approaches to material culture employed at the time. O’Kelly attributed the presence of fullacht to bands of roving hunters, as characterised in early Irish folkloric accounts of the fianna. As
was explored in Chapter Two. O’Kelly’s approach was primarily empiricist, and concerned with the collection and creation of new data. However, his experimental approach to the sites, and the manner in which he tested his data against folkloric accounts could be seen as forward looking. Equally it would have had resonance with approaches to materials which developed later as part of the New Archaeology and the growth of the processual tradition. Although he never concerned himself with the study of burnt mounds, if we examine the work of Binford on the New Archaeology and the ideas on culture and function which it embodies, we can see that many of the critiques outlined below continue to be applicable to the way in which burnt mounds have been approached by a number of writers until the present.

Binford and his fellow processualists saw culture as an essentially homeostatic device (e.g. Binford 1972; Clarke 1968; Renfrew 1972). Societies were viewed as analogous to an organic being; if each system remains in balance then the society remains healthy. Culture was thus understood as an essentially adaptive tool designed to ‘maintain equilibrium relationships between the cultural system and it’s environment’ (Binford 1972:107). Changes in social systems were attributed to a change in environment, as an attempt to ‘overcome hardships’ and adapt or adjust to the natural environment. While Binford acknowledged that many of the environmental factors that he saw as being key to driving change were the result of human action, he continued to present a model which viewed society as essentially static, conservative and reactive.

Within this model each system is composed of separate sub-systems which work together to maintain the whole. These subsystems can be broadly categorised into three different classifications; Technomic (items which deal directly with adapting to the physical environment, such as pottery, stone tools etc), Sociotechnic (items whose primary function relates to the social sub system, such as crowns, jewellery, or other prestige items), and Ideotechnic (those relating to the ideological aspects of the social system, e.g. deity figures) (Binford 1962:219-20). In this view, a division is clearly made between the technological (things for doing things with) and the social and symbolic (things for communicating ideas with). As such, the meaning of a technomic artefact rests solely in what it does, and how it helps its user adapt to their external environment. The impact of this approach can be seen directly in the studies of burnt mounds outlined in Chapter Two. The equation of function and meaning in burnt mound studies has already been noted. In particular, Barfield, (1991), states that more attention needs to be paid to the question of function if we are to determine the social implications of these
sites. Likewise, Barber & Russel White’s (1990:59) claim that the value of burnt mounds lies only in a dot on a distribution map illustrates the problem of this approach. The equation of function with meaning necessitates the understanding that if we cannot determine the function of a site, then the site cannot contribute anything to our understanding of the people who used it.

The New Archaeology was established in reaction to the application of descriptive and normative ideas about behaviour in the past during the Culture Historical period. In order to eliminate the bias of subjective interpretation Binford argued for the application of rigorous testing of hypotheses to explain materials found in the archaeological record. He promoted the use of ethnographic analogy as a source of hypothesis by which material patterning in the past could be tested. Behavioural traits could only be said to exist in the past if a particular trait always went hand in hand with a specific piece of material culture. If a lawful correlation between actions and materials could be drawn in the present only then could this interpretation be reliably imposed upon the past (Binford 1965, 1967; Trigger 1999: 398-400). Binford later recognised that even the use of analogy was both subjective and theory laden. His answer to this problem was to develop the concept of Middle Range Theory, a science of archaeological materials which utilised cross cultural analogy, use-wear analysis and a whole range of other techniques to understand the impact of processes in the present. Once understood, these could be used to ‘decode’ and give meaning to the static material remains in the archaeological record (1977, 1978, 1983, 1989). It has already been noted above that in O’Kelly’s (1954) utilisation of experimental techniques can be seen as forward thinking. Much of his methodology has resonances with the principles of Middle Range Theory. Drawing on folkloric accounts of cooking O’Kelly was able to utilise experimental approaches to prove that cooking at burnt mound sites was possible, and that these processes replicated the kinds of results observed at excavated burnt mound sites. Certainly if we examine the reception of his work these experiments have been taken as ‘proof’ of the applicability of the cooking concept (eg O’Drisceoil 1988).

The impact of these approaches are far reaching, and this is not the place for complete analysis of their implications, however, there are a number of factors that are worth drawing out at this point. First, as has already been stated, is the equation of technology with function and adaption. Social and symbolic roles are seen as a secondary value, and are only applicable to the parts ‘left over’ when an object’s primary function has been determined. Second is the separation between the material and the social. Middle
Range Theory argues that in order to understand the static and inert archaeological record, we must first understand the processes which contributed to its formation. Once the material facts are established, then we can turn our attention to the exploration and interpretation of the ‘social’. This succeeds in ‘forcing a division between the analytical frameworks appropriate for matter (nature) and society (culture)’ (Thomas 2004:212). As Thomas has illustrated, this division relies on a distinctly modern way of thinking. The concept of matter as an ‘irreducible given substance’ (ibid:207), as resource or ‘raw material’ began with Aristotle and was later compounded the work of Locke, Newton and Descartes. Matter was seen as an inert, transformed only through cultural action, through which process it becomes material culture. Form, object and meaning are seen to rest within the mind, and are transposed onto matter through a process of rational thought. As such, this approach implies that the cultural sphere exists outside of material, and that meaning is imposed on materials through action in this social sphere. Yet, as will be explored in greater detail below, this division is flawed. All encounters with material are inherently social, and therefore we can never understand matter as meaningless and pure.

3.1.2.2 Agency, Biography and Chaîne Opératoire

The idea that materials play an active role in the way in which people understand themselves and their world has been one of the most significant developments in archaeological theory in recent decades. This understanding has revolutionised the way in which we think about the sites and objects that form part of our study. This concept was first introduced by Hodder in the early 1980s (1982a, 1982b). He argued that as meaning could be assigned to materials both intentionally and unintentionally it was necessary to understand the context in which the materials were created and used in order to fully understand the ‘code’. Hodder’s work was crucial in developing the trajectory for modern theoretical approaches, however the concept itself was not without critique. As Thomas has noted, Hodder’s argument remains reliant on the concept that formless matter is rendered meaningful through social interaction. Such a view implies that materials exist in a formless and meaningless state, prior to being ‘formed into material culture by meaning-giving subjects’ (2004:214). Additionally, Barrett has observed that Hodder’s claim that contextual archaeology provides a method for getting at the meaning ‘in the heads of past people’ requires us to accept that past meanings, once imposed upon materials, remain fixed and static, and therefore able to be read by archaeologists (1988, 2001). Barrett based his rejection of this scenario on
the work of Giddens (1984) and Bourdieu (1977), arguing that our actions both affect and are affected by the structures in which they take place. He stressed that actions are materially situated, that is, that knowledge is created in reference to, not just recorded by the material components of the world. Therefore ‘a theory of practise must understand the materiality of practise in order to explore how that materiality is engaged in the very structuring of practise. Materiality cannot be reduced merely to an archaeological record of the practises which once inhabited it’ (2001:153). Moreover, if we treat materials as the physical representation of agency, or even the physical representations of the knowledge of agents, then we ‘lose sight of the situated nature of practise over time and space’ (ibid: 157). In short, it is not enough to consider materials as the physical remains of particular sets of actions or ideas. In doing so we ignore a significant part of the relationship between people, places and things, and we overlook the way in which these things both create and are created by each other.

This understanding clearly creates fundamental implications for the way in which burnt mounds have previously been interpreted. As we have seen in Chapter Two, past approaches have focussed on attempting to identify a definitive explanation for the use burnt mounds (Barfield & Hodder 1987; O’Drisceoil 1988; Barfield 1991; Jeffrey 1991). This implies that burnt mounds are nothing more than the physical remains of a series of activities. Significantly, it overlooks the role of the materials involved in these activities to influence and direct the activities undertaken. In turn these activities are both influenced and directed by wider social structure, an aspect which is completely overlooked when, as is the case with burnt mounds, we study sites and materials in isolation from their wider social context. The implication for the reinterpretation of burnt mound sites is therefore clear. Any study of burnt mounds must also be a study of the processes by which they are formed and the social, temporal and landscape contexts in which these processes take place.

The extent to which material culture plays an active role in social engagements has been explored in two parallel, but not necessarily exclusive strands. The concept of object biographies was first explored in the volume The Social Life of Things: Commodities in cultural perspective (Appadurai 1986). By examining the processes of commodification and recommodification of objects as they are exchanged, Appadurai argues that objects, like persons, can be seen to have social lives. He suggested that by shifting focus to ‘things which are exchanged rather than simply the forms of exchange’ (ibid 3), we are able to explore the link between exchange and value. The meaning of things, he argued,
was ‘inscribed in their forms, their uses, their trajectories’. If we analyse these trajectories, then it follows that we ought to be able to explore and interpret those human actions that ‘enliven things’ (ibid 5). In the same volume, Kopytoff suggests that objects cannot be understood as singular and fixed, but rather as continually transforming in meaning. In order to understand the biography of an object he argues what we ought to ask the same questions we might ask of a person, who made it? What has its ‘career’ been so far, and what would the ‘ideal career’ be for an object of its type? How has its usage changed throughout its life, and what is the appropriate treatment of the object once its useful life has come to an end? (Kopytoff 1986; 66-67).

This approach is particularly useful when beginning to unpick the complex networks of materials and engagements that comprise a burnt mound. As an example we might ask these questions of the stones which are utilised in heating the water. What might the appropriate career for a stone be? As will be explored in greater detail in Chapter Seven, stones utilised in burnt mounds are selected from local drift geology (Buckley 1990c), and are sourced from surrounding fields (Hedges 1986). These stones might also find their way into clearance cairns, or in some cases be utilised as rubbing or pounding implements. Similar stones are also utilised in the construction of burial cairns. Who makes these mounds? Who might be responsible for the collection of the stones? Was this specifically undertaken as part of preparations for the burnt mound, or might the stones have been gathered during agricultural activities, as is the case for those found in clearance cairns? If so, are the people who gather the stones the same people who work with them in the burnt mound, and what does this say about the social relationships created and reinforced through burnt mound use? As we will see below (cf Chapters Seven and Eight), an understanding of the processes involved in working a burnt mound illustrates that the selected stones undergo a series of transformations which render them highly potent. It is argued that a comprehension of this potency is key in understanding the significance of the mounds of shattered stone which are a distinguishing feature of burnt mounds.

The notion of object biographies has been particularly influential in studies which have explored the relationship between materials and identity (e.g. Brück 2006; Strathern 1988; Fowler 2004). Strathern’s work with the Hagen of Papua New Guinea demonstrated how personal identity was produced through reciprocal networks of relationships between people and things (1988). As such the objects created, used and exchanged by a person are representative of their agency, and enable them to continue
exerting an effect on others at both spatial and temporal distances. It has also been employed with success by proponents of Leroi-Gourhan’s *chaîne opératioire* (1964; 1965), as a method of moving beyond operational sequences of tool production to methods which explore the embodied processes behind the production and use of objects (eg Conneller 2006; Dobres 2000; Edmonds 1990). This approach has particular value in avoiding the linear narratives often created by use of *chaîne opératioire*, providing a biographical framework to explore the wider processes and engagements that go into the production of object. As such, a biographical approach to materials is essential for developing a framework which allows us to explore the relationships between people and materials at burnt mound site, and to explore how these relationships are bound up in wider concepts of personhood and cosmology.

However, it is not simply enough to simply document these engagements. We must also understand in what form they take place, and how the objects discussed are both able to act and be acted upon. In order to do this, a number of studies have evoked the concept of agency. Agency is in itself a very slippery notion, about which there has been very little explicit theorisation (Dobres & Robb 2000:3; Dobres & Robb 2005: 159). In the context of material studies, concerns with agency have been directly related to an objects ability to act, or otherwise. More specifically, it relates to what Dobres and Robb describe as the ‘socially significant quality of action’ (2000; 8; cf Ahearn 2001). A number of questions have been raised through considerations of agency. Is our application of agency inherently reliant on notions of individuality and autonomy (Hoskins 2006)? To what extent is agency conscious and effective, and what are the implications of this (Robb 2004)? Perhaps more importantly for this study, are the questions can objects be said to possess agency (Robb 2004; Gosden 2005)and if so, what form does this take (Gell 1998)? As has been touched upon above, a number of explorations of the social role of materials have explored their ability to ‘act’ on the behalf of their creators. As such they may be described as having agency, but this agency is a property bestowed upon them during the act of making (e.g. Strathern 1988).

The work of Gell (1998) has been particularly influential in exploring the agency of materials. He draws distinction between different types of agency, suggesting that while humans, as conscious beings exert primary agency, objects, although able to have effects, are only able to exert a kind of secondary agency as a result of the human intervention with the object. As such they continue to rely on the view of materials as inanimate until activated by the agency of people (Ingold 2007:11, and see below for a
more detailed discussion of Ingold’s work on materiality). Robb’s analysis of the conscious or effective nature of agency presents a more nuanced account of agental action, in acknowledging that while objects are unlikely to exert conscious agency, they are nevertheless able to act effectively (such as in the example of a tree falling across the road) (2004:133). Discussions of agency have therefore been key in developing archaeologies which consider the role of materials as active, and which engage with the ability of objects to affect people, and participate in social action. In reinterpreting burnt mound sites this concept is crucial if we are to appreciate the way in which the materials and structures involved are able to enable and constrain action, and to some extent dictate the nature of the processes taking place on site (Chapters Six, Seven and Eight).

3.1.2.3 Disclosure, encounter and emergence.
While agental and biographic approaches have succeeded in producing a number of nuanced and detailed accounts of the relationships between things and people in the past (e.g. Jones 2005; Henderson et al 2008), there remains an underlying separation between the mental and the material in our approach to objects. In particular, Ingold has noted that a fixation with notions such as materiality and agency amongst others has led material culture studies to ignore the physical properties of materials in favour of a series of abstract philosophical properties.

“Suffocated by the dead hand of materiality, this world can only be brought back to life in the dreams of theorists by conjuring a magical mind dust that, sprinkled among its constituents, is supposed to set them physically in motion. It has come to be known in the literature as agency, and great expectations have been pinned upon it.” (Ingold 2007:13)

In a statement that has particular relevance to the interpretive framework underpinning previous approaches to burnt mounds as described in the previous chapter, Ingold notes that it is significant that material culture studies have tended to focus on processes of exchange rather than processes of production. This approach has focussed on objects ‘already crystallised out from fluxes of materials and their transformations’ allowing the materials themselves to vanish and be replaced with the finished object (ibid: 9). This situation accurately reflects the state in which we currently find burnt mound studies, in which the focus on discovering the output for the processes which the mounds represent has overshadowed our understanding of what these processes may be, and
the potential for understanding the transformations which have taken place to bring
them about.

Instead of viewing objects as solid and fixed, Ingold suggests that we consider them as
networks of materials. As such they represent ‘hives of activity’ in which materials gather
in a complex tangle of relationships. Rather than being fixed and inherent, the
properties of materials are emergent, and to describe them is to ‘tell the story of what
happens to them as they flow, mix and mutate’ (*ibid*: 14). Similarly, Hodder (2012) has
noted that the interaction between humans and things is dependent on a number of
different relationships. Humans are reliant on things, to perform tasks and enable us to
carry out everyday lives. Likewise, things are dependent on people, either through the
act of construction itself, or through acts of nurturing and maintenance, planting and
tending to crops, or repairing a crumbling wall. At the same time things are dependent
on things, whether this be through networks that create an equipmental totality (a
phone being plugged into the wall to enable it to work, or the various constituents of
plaster that combine to create the whole), just as people are dependent on people in
order to function within a wider social environment. Each of these factors draws objects
and people together, in a process which Hodder describes as ‘entanglement’ (*ibid* 88). In
this concept things do more than just facilitate action, they also tie people through
patterns of dependency, based upon their temporal nature. In order to interact with
these things, people have to observe particular patterns or orders of doing things, and
specific timescales of action (*ibid* 111). These entanglements can be far reaching, both
temporally and spatially, creating long ‘chains’ of interrelatedness that require constant
tending and maintenance.

For the purposes of this thesis these ideas are key, in that that they demonstrate that
our conception of things is not fixed, but rather depends on a wider set of relations
through which meaning is emergent (cf Heidegger, 1962: 98-102). As such, to attempt to
arrive at a fixed understanding of burnt mounds which is applicable to all sites,
regardless of spatial and temporal location, and which does not take into account the
gathering of materials and identities which takes place at its heart is inherently flawed.
Instead, by exploring these chains of interrelatedness it is possible to see how activities
taking place at burnt mounds function within a network of material and social
engagements. Materials, skills, and knowledge required for working a burnt mound, for
example the stones for the mound, the wood for the fire, animals for skins and meat,
tools for butchery, would also have been utilised elsewhere in the day to day life of
Bronze Age people. It is argued that the meaning and significance of burnt mounds is both born and reinforced through these reciprocal engagements.

3.1.2.4 Hot Stones and the concept of ‘Technology’

In the above sections I have already explored how critical reconsiderations of material culture and the active role in which it plays within society have allowed material culture studies to move beyond the Cartesian separation of mind/matter and nature/culture which is embodied in the functionalist approach. However, I would like to take some time here to consider these developments as they pertain to the concept of technology in more detail. The phrase ‘hot stone technologies’ is frequently employed in the discussion of burnt mounds, and brief analysis of this concept presents us with some insight into the approach being taken in understanding these sites. By unpicking what exactly is meant by the phrase ‘hot stone technologies’ it is possible to come to an understanding of how this situation was arrived at, and the steps which are necessary to move beyond it.

During the 1980s the increasing awareness of the active nature of material culture led to a number of studies that called for a reconsideration of the concept of technology itself. It was noted that while a number of previous studies had concerned themselves with the mechanics of technology, there was little critical engagement with the concept of technology itself (Dobres 2000; Dobres & Hoffman 1994; Ingold 2000; Lemmonier 1986, 1993; Kopytoff 1986: 84; Pfaffenberger 1992). These studies have demonstrated that this lack of engagement and theorisation is largely due to a conception of technology as ‘the rational principles which govern the construction of artefacts’ (Ingold 2000:294). Considerations of technological practise have tended to focus upon ‘choice of raw material, fabrication techniques, artefact form, function and so forth.’ These aspects are seen to ‘reside in the physical nature of the materials worked’ (Dobres 2000: 37). As Ingold argues however, this perception is deeply rooted in our own modern, Western conceptions of technology and tool use, and relies deeply on a Cartesian separation of subject and object (2007, see also Thomas 2004).

By focussing on function and separating the processes of production from the objects produced we succeed in separating the ‘made things’ from their makers, and thus also separate them from the social relationships through which they came into being (Dobres & Hoffman 1994:227). As such we prioritise the relationships between things, and not the reciprocal relationships between people, things and their surroundings. This leads to
a view of technology in which form follows function, and tools and objects are produced out of necessity, and develop in a unilinear fashion (Pfaffenberger 1992:494). This approach serves to objectify and limit technological relations to the point where people ‘drop out of the picture altogether’ (Dobres & Hoffman, 1994:230), as has been the case to date with studies concerning burnt mounds.

For our understanding of burnt mounds this approach is immediately problematic. If form follows function, and technology is developed as a response to an external stimulus (i.e. as a result of an adaptive requirement), then what are we to say about a technology for which no function can yet be determined? When viewed in this manner it is easy to see how burnt mound studies have become stuck in a repetitive loop which continually seeks to determine function (e.g. Barfield & Hodder 1987; O’Drisceoil 1988 and papers in Buckley 1990; Hodder & Barfield 1991), at the expense of any understanding or even appreciation of the social conditions under which burnt mounds come into existence.

In contrast Ingold suggests that there is no such thing as technology as we understand it in pre-modern societies (ibid: 314). Rather, he argues for a focus on the concept of technique and skill, and for a return to a person based approach to materials and the processes of making. In this view the process of making an object is transformed from the application of knowledge onto materials, to the emergence of knowledge through engagements with them. Thus, technique is not applied through tools, but rather is ‘embedded in, and inseparable from, the experience of particular subjects in the shaping of particular things’ (ibid: 315) While the word tekhné, originally related to concepts of skill and craftsmanship, and logos related to ‘the framework of principles derived from the application of reason’ (Ingold 2000: 294), in their modern combination Ingold argues that they have come to represent the reason of art, rather than the art of reason (ibid). Our view of the tekhnē, the skill or craftsmanship, aspect of technology has therefore been lost.

If traditional approaches to technology represent a conceptual dead end for burnt mound studies, requiring perpetual exercises in tail chasing on the part of those interpreting them, Ingold’s approach provides a refreshing alternative. If we were to consider burnt mounds not as the material remains of a particular set of activities designed around providing a given function, but rather as the location for material and social interactions, the possibilities for understanding them become much wider and more promising.
3.1.2.5 Elements, Fragmentation and Transformation

Having briefly considered Ingold’s conceptualisation of the ‘flux and flow’ of materials (2007:14), I would now like to turn my attention to the concept of elements in order to explore this idea further. Richards (1996) advocated an ‘elemental archaeology’ which took into account the significance of certain materials within cosmological frameworks. Elemental substances, he argues, ‘form a fundamental role in social beliefs of cosmogony and tend to take primacy in classifications of the natural world’ (ibid 315). These substances can be seen as the building blocks from which all materials, including people, are composed, and two which they will return (ibid 316). In particular it is noted that earth, water, air and fire are recognised as elemental substances in a wide range of societies (ibid 315 cf Taun 1975). The significance of these elemental substances is highlighted if we examine the central role which they often take in ritual processes. As MacGregor observes, elemental forces are most visible at times when materials change their form or nature (2008:207). The concept of ritual is slippery, and one which has been subject to much discussion (cf Brück 1999; Barrett 1991,1994; Bradley 2005; Richards & Thomas 1984; Thomas 2011). For the purposes of this discussion I will focus on those activities which can be seen to serve the purpose of marking the transition from one state to another (as per Barrett 1991, 1994; Turner 1967), which might be described as transformational. Richards (1996:315) notes, ritual centres around transitions from one state to another (cf Bell 1992, 1997; Turner 1967, 1969 1982, 1990; Schechner 2003; Schechner & Schuman 1976; Schechner & Appel 1990). As such he argues that the participation of elemental substances in transformative ritual acts will be linked to symbolise destruction, rebirth and transcendency (Richards 1996:315). The significance of individual elemental substances within a Bronze Age context will be explored in greater detail in Chapter Eight. However this concept can be illustrated if we examine the role of fire in cremation practices (Sorensen & Bille 2008). During cremation the body becomes fragmented, and it is argued that this process of fragmentation reflects the return of the body into its constituent parts. It is not merely an act of destruction, rather it is the process through which the materials within the body are returned to world to partake once more in natural cycles of fertility and reproduction (cf Brück 2001, 2006a; Kaliff 2007, 2011; Rebay-Salisbury 2010).

Recently there have been a wide range of publications which have explored the cosmological and symbolic status of materials (e.g. Boivin & Owoc 2004; Conneller 2011; Finlay 2008; Kaliff 2007; MacGregor 2008; Strang 2004; Sorensen & Bille 2008).
Both Kaliff (2007) and McGregor (2008) identify burnt mounds as being loci in which elemental substances are brought together in a manner which reflects deeper cosmological understandings. Kaliff (2007:106-118, 2011) explores the links between Scandinavian burnt mounds and Vedic altars. While his reliance on perceived correlations between pre-Christian Scandinavia and the Vedic tradition is questionable (Price 2008; Kristjánsdóttir 2008), in recognising the elemental and symbolic status of the materials within a burnt mound Kaliff is able to transcend concepts of function, and explore the role of the burnt stones themselves in understanding these sites. He argues that rather than being viewed as a residual product of processes taking place, it is worth considering burnt stone as being produced as a product in its own right (2007:121). This observation has significance for understanding the construction of the mounds of burnt stone which characterise burnt mounds. As will be explored in more detail in Chapter Seven, the mound is an act of generative construction whereby potent and transformative materials are gradually incorporated into the fabric of the site through use. The construction of these mounds, I argue, is not simply a product of disposal. Mound construction acknowledges the potency of these materials, and suggests that they are seen as both powerful and dangerous. Thus, their incorporation into burnt mound structures can be seen to both contain these potentially contaminating materials, and to harness their transformative powers in order to ensure the success of future firings.

The elemental status of burnt mounds is self-evident. Each of the functional interpretations explored in chapters one and two relies on a combination of water, fire and earth in order to achieve its end. In comparing burnt mounds and cremation practise MacGregor (2008:227) describes the elemental transformations taking place at burnt mound sites as ‘a transformation of water, through stone derived from fire’. These elemental transformations, he argues, can be seen as metaphorically linked to the transformation of bodies through cremation, and through the significance of water during these cremation processes via the deployment of ‘stone derived from water in a ritual context’. This observation, I would argue, is fundamental for understanding of burnt mounds. Moreover, as will be explored in greater detail in chapters six, seven and eight, burnt mounds afford a wide range of transformative potentials. Animals are slaughtered, food is transformed from raw to cooked, skin becomes leather. Some of the interpretations for burnt mound use can be seen as transformative in their own right. For example, land based trees become water based boats, themselves a transformative
object allowing transport onto another medium. During brewing grain and water are combined to produce alcohol, which is itself a powerfully altering substance. Perhaps most significant however, is the transformation which takes place over time as the burnt stone begins to pile up around the location creating the burnt mound itself, and transforming space to place.

Brück (2006) identifies similarities between the treatment of persons and things during the Bronze Age. She argues that the deposition of materials within structures can be seen as ‘event marking deposits’ (ibid 298-299). As transitions in the life of a person (e.g. birth, marriage and death) would be marked by special process, so phases within the life of a structure were marked by the placement of deposits. Moreover the treatment of materials and persons at the end of their lives can be seen as analogous. As was discussed above, cremation of persons returned them to their constituent parts and allowed these materials to re enter cycles of fertility and reproduction (Brück 2001a, 2001b, 2006a; Kaliff 2007, 2011). This process is also replicated in the treatment of house and other categories of materials, such as pots and quern stones through processes of fragmentation and burning (Brück 2006a: 302). The deliberate fragmentation of materials and the presence of closing deposits appear to mirror the treatment of human bodies after death, and therefore can be seen as indications of the ‘death’ of the object. The deposition of fragmented objects in liminal places (e.g. votive deposits) and the utilisation of midden as fertiliser are all seen as indicators of the links between death and fertility (Brück 2006a: 303-304, cf Brück 2001a; Downes & Lamb 2000; Fowler 2004; Parker Pearson 1996). Likewise human remains are deployed at strategic places, often on boundaries and thresholds, marking the link between death and other forms of transition and threshold (Brück 1995, 2006a). Both Kaliff (2007) and MacGregor (2008) illustrate that the treatment of stone at burnt mounds can be seen as analogous to the treatment of bodies during cremation processes. As such, it is clear that burnt stone and thus burnt mounds were viewed as both elementally potent and regenerative.

The treatment of persons and materials also informs us about concepts of identity during the Bronze Age. Brück (2001a, 2001b, 2004, 2005, 2006a, 2006b) has suggested that Bronze Age technologies such as pottery and metallurgy may serve as metaphors for the construction of the self. Following Strathern (1988) she suggests that rather than conceiving of the self as a bounded individual, Bronze Age identities were both fluid and relational, and were negotiated through relationships between other beings, places and
things. A dividual perception of personhood accepts that personal history is an essential part of one’s identity. As such persons, places and things which may be geographically and temporally remote can still form part of one’s self (cf Busby 1997; Fowler 2004; LiPuma 1998; Strathern 1988). Thus we can understand the elemental processes and transformations at burnt mound sites as linked to cycles of change and regeneration, the active negotiation of personal and social identity and the creation of deep links between people, place and things.

3.1.3 Landscape, Space and Place.
So far this chapter has explored the emergence of phenomenological approaches to materials and technologies. These approaches regard materials and technological practise as emergent, and knowable through processes of active engagement. However, these processes are only possible if we consider these materials and technical practises as part of a wider network of relations and encounters. It is with this in mind that I now turn my attention to the concepts of landscape, space and place.

Recent decades have seen an explosion of publications relating to the subject of landscape, and in particular, the relationship between archaeological sites and particular aspects of the landscape. This proliferation began with the publication of Bender’s Landscapes: Politics and Perspectives (1993) and Tilley’s A Phenomenology of Landscape (1994), but has since gone on to produce an overwhelming amount of literature (including, but not limited to Bradley 2000; Cummings 2000, 2001, 2002, 2003a, 2003b; Edmonds 1999; Richards 1993; Thomas 2001; Topping 1997). While a concern with landscape in archaeology was, at the time, not a new one, the difference occurred in the way in which landscapes were approached, and the understanding which was placed on the relationship between sites and various aspects of this landscape.

As with concepts of materials, culture and technology discussed above, the term landscape also brings with it a unique set of conceptual baggage. The term landscape itself derives from the Dutch lantschap (Bender 2006; Lemaire 1997; Thomas 2001) and etymologically, the term relates to both a piece of land, and a picture representing that land (Lemaire 1997: 5). However, as both Thomas and Bender have explored, later developments in our understanding of the word have developed a conceptual link between landscape and all that is ‘natural’. As was touched upon above (section 3.1.2.1), the development of epistemological concerns during the enlightenment saw a division between subject and object and thus allowed objects to be understood as
discrete and singular entities, existing in the world and knowable through analysis by a
detached subject (Thomas 2004). This subject/object dichotomy is also echoed in a
similar opposition of nature and culture. As such nature is objectified and subject to the
analysis and understanding of culture, passive, and therefore quantifiable and
observable. The conflation of landscape and nature therefore creates a situation where
landscape itself is seen as both quantifiable, controllable, and therefore commodifiable.
As such, previous archaeological approaches to landscape had focussed on landscape as
resource, or territory, and had explored the relationship between archaeological sites
and their wider settings in terms of available resources and optimum adaptational
exigency. Examples of the influence of this approach within archaeological studies can
be seen in the use of Theissen polygons to identify territorial areas in relation to
monumental sites (e.g. Renfrew 1973, Clarke 1977).

The early 1990’s saw a growing dissatisfaction with the Cartesian representations of
landscape. Following the work of human geographers (e.g. Cosgrove 1984, Cosgrove &
Daniels 1988, Daniels 1993) a number of approaches began to explore alternative ways
of understanding between people and place (e.g. Cummings 2002, 2003a, 2003b;
Cummings & Whittle 2004; Tilley 1994 Thomas 1993a, b). These considerations draw
explicitly on the work of Heidegger (1962), and incorporate a hermeneutic notion of
‘being in the word’, in order to understand prehistoric encounters with landscape.
Central to this understanding is the idea that a place is never experienced in abstract, but
is continually disclosed through embodied engagements and interpretations of it
(Heidegger 1962). Thus, place is always understood as a place ‘of something’ (Thomas
2001:173). Tilley regarded human body as the ‘fundamental mediation point’ through
which we understand the landscape (1994:14). He later argued that he human body, and
the ‘bones’ of the landscape remain essentially the same today as in the past (2004:73).
By engaging in embodied encounters with prehistoric landscapes, we are therefore able
to suggest the ways in which prehistoric people may have possibly engaged with these
same places.

One of the most frequently recurring arguments both for and against the interpretation
of burnt mounds as cooking places is the boggy and inhospitable locations in which the
mounds are often found. These locations are not deemed to be ‘suitable’ or desirable
for dwelling places, which has led to the suggestion that they either represent temporary
hunting camps (O’Kelly 1954), or that some other interpretation should be favoured
more suited to the environmental conditions under discussion (Barfield 1991; Barfield &
Hodder 1987; O’Driscceoil 1988; Hedges 1975). Accounts of burnt mound sites which make significant reference to the landscape context of the site are still relatively rare, and those that do exist generally restrict themselves to discussion on the immediate locale, and identification of a suitable water source which would allow the site to be worked (Barfield 1991; Barfield & Hodder 1987; O Driscoil 1988; Ehrenberg, 1991 and other papers in Buckley 1990; Hodder & Barfield 1991). As such they continue to view the landscape setting of burnt mound sites in a purely commoditised sense. More recently Yates and Bradley’s (2010) work on the location of metalwork deposits and mounds in the English fenland has demonstrated that a landscape consideration of burnt mounds can provide an illuminating perspective on our understanding of these sites. The apparent relationship between the landscape setting of burnt mound sites, and of deposits of metalwork in waterly locations provides allows for interesting parelells to be drawn between the two practises. Likewise, Pryor has noted that burnt mounds form a fundamental part of landscape divisions in the south of England (Pryor 2011). This in turn may link their presence with increasing agricultural activity. The presence of linear droving ways through these formalised landscapes suggests that the mounds may be related to practises such as sheep farming during the Bronze Age. These examples demonstrate the value of moving away from a commodotised sense of landscape in relation to burnt mounds. It is therefore fundamental that this thesis readdress understanding, and develop a framework for reconsidering burnt mound sites which situates them within a wider landscape setting, and which acknowledges that this landscape is emergent through bodily encounters with it.

3.1.3.1 Archaeologies of Inhabitation
Phenomenological approaches have been instrumental in developing embodied understanding of landscape, and in encouraging us as archaeologists to “think imaginatively about the political and social implications of spatial layout and landscape settings” (Brück 2005:65). However, despite its popularity phenomenological approaches have not been without their critics. Specifically it has been suggested that these approaches have a tendency to offer little insight into the sites themselves and offer nothing but ‘banal phenomenological truisms’ (Fleming 1999, 2005; Jordan 2003:130). Brück notes that the presumption of a universal body is flawed as does not take into account the variability of experience which often accompanies both age and gender, or consider ‘how culturally specific conceptualisations of the body may affect ways of engaging with the world’ (1998:28), (see also Brück 2005:55). Likewise Barrett and Ko
(2009) argue that through focussing on visual correlation between monuments and points in the landscape, the work of Tilley, Cummings, Whittle and those who follow them move away from the phenomenology of Heidegger. The monuments become, not the product of in-the-world engagement with materials, but rather ‘the result of pre-planned execution, an intellectual project designed with specific intention’ (2009: 284)

As a result of this, there has been a move towards developing a sensory understanding of the world, which acknowledges that experience is made up a number of multisensory engagements. This approach has seen the development of a number of studies concerned with otherwise overlooked senses, especially sound (e.g. Gosden 2001; Hamilakis 2002; Ouzman 2001; Watson 2001).

It is clear therefore that an understanding of prehistoric landscapes based solely on visual correlations between sites and landscape features is not satisfactory. Such an approach is both theoretically unsound, and neglects a wide range of the sensory experiences which make up our experience of the world around us. Ingold writes that a place within the landscape does not exist as a ‘cut out’ from the whole. Rather it exists as a point within a networked whole. Its character depends on those who spend time there, and the nature of the activities carried out there. Each place has its own specific sights, smells, sounds and affordances. It is through the experience of these, through acts of dwelling that meaning is drawn (Ingold 1993:155). A critical reassessment of the relationship between burnt mounds and their wider prehistoric context must therefore encompass a broad spectrum of experience, and which focusses on engagement with landscapes and materials, not as isolated entities, but as part of a wider network of knowing and being.

In developing such an approach for this thesis Ingold’s concept of taskscape (1993) has been particularly useful. For Ingold, landscape is not fixed notion, but rather is contextual, and subject to continual change through people’s engagement with the world. Thus, landscape exists not as a backdrop for action, from which sites can be viewed from, or form a locus for viewing, but rather is emergent and understandable through everyday actions. Landscape is ‘the world as it is known to those who dwell within, who inhabit its places and journey along the paths connecting them’ (Ingold 1993:156). Ingold’s notion of the taskscape centres around the notion that human action is always embedded within our sociality. Thus, the taskscape is ‘the entire ensemble of tasks, in their mutual interlocking’ (ibid 158). He argues that the taskscape is inherently temporal, not in that it adheres to a chronological or historical sense of time
as we might recognise it, but rather in that each event is intrinsically related. This temporality, he suggests, is social, ‘not because society provides an external frame against which particular tasks find independent measure, but because people, in the performance of their tasks, also attend to one another’ (ibid 159). Furthermore, Ingold suggests that when viewed in such a way, both landscape and taskscape are in fact one and the same. They both exist through reciprocal engagements between people, places and things, between inanimate and animate objects. This concept is key to formulating an understanding of the role of burnt mound sites. Rather than viewing them as the remains of technological processes designed to produce one specific output, we must understand them as situated locales, in which, through embodied engagements between persons and things, materials are transformed from one state to another. These processes are both socially and temporally situated – thus in order to understand burnt mound sites, we must widen our gaze, and begin to explore the totality of engagements, or possible engagements which go into their creation and use.

Clearly then, if we are to reassess our understanding of burnt mound sites a two pronged approach, which considers these sites within a local and specific context is required. Such an approach needs to explore both the landscape setting and wider relationships of burnt mounds as monuments, while simultaneously exploring the material relationships and embodied processes that take place within the mound. This next section builds upon the critical approaches outlined above, in order to develop a new way of working which encompasses these points.

3.2 Part 2 – Methodology

So far this chapter has established that meaning is created through reciprocal engagements between people, places and things, and that these engagements take place within a specific temporal and cultural context. As was explored in Chapter Two, current interpretations of burnt mound sites have focussed almost exclusively on identifying a definitive output for the technologies that the sites represent. These approaches have created a homogenised view of burnt mound sites based on typological definition. As such, they do not allow for variation in morphology, location or temporal context. As we have seen above, this approach is largely informed by an interpretive framework which sees technologies as adaptive, and which views meaning as something which is applied externally to inert matter through the application of ‘cultural’ intervention. This view has been identified as being the product of a distinctly modern
understanding of the world that relies on a conceptual separation of the mental and material and nature and culture, which we have seen is inherently false. It is suggested, therefore, that a new approach is required which moves us beyond a focus on output, and explores some of the processes which are involved in working with burnt mound sites. In particular, it is noted that a deeper understanding of the material engagements involved in these processes is necessary in order to understand how these sites may have been perceived by those who used them, and to understand the potential which these sites afford in exploring how Bronze Age peoples related to the world around them. In order to do so, the sites must be placed within a wider context of activities that frame the interactions that take place within them.

In order to do this, this study has developed two distinct approaches, which when combined will create a more detailed understanding of the creation and use of burnt mound sites within a specific place.

- Development of a nuanced understanding of landscape use and relationships through GIS and in-situ survey.
- Exploration of the material engagements involved in the construction and use of burnt mounds through a series of experimental firings at a replica site.

### 3.2.1 GIS study and in-situ survey

In first section of this chapter we saw how approaches to landscape have often perpetuated the Cartesian division between nature and culture, either by representing the landscape as a resource to be exploited, or by requiring a separation of subject to allow the observer to set themselves apart from the object being observed in order to understand it (cf Tilley 1994:12 as discussed in Barrett & Ko 2009:280). Given the phenomenological framework that informs this thesis, and the emphasis already placed on inhabitation, engagement and being-in-the-world, it is perhaps questionable why I have chosen to utilise Geographical Information Systems (GIS) as a medium for understanding these sites. In order to explore this further a brief overview of the criticisms of GIS is therefore necessary.

One of the major criticisms levelled at GIS analysis is the tendency for such studies to create both reductionist and functionalist views of the landscape in question (e.g. Gaffney & Van Leusen 1995; Thomas 2004; Van Hove 2004). The utilisation of GIS software to analyse sites requires, by its very nature, a conception of landscape that both quantifies and commoditises it, breaking units down into identifiable features, and
explaining relationships between these features in terms of mathematical formulae. As such, it is the very opposite of the contextual, human perspective which is promoted through the application of a phenomenological framework. Recently moves have been made to incorporate a person centred approach into GIS usage, through methods such as viewshed and pathways analysis (Cripps et al 2006; Gillings & Goodrick 1996; Goodrick & Gillings 2000; Rennel 2009; Wheatley & Gillings 2002). However, Thomas suggests that these approaches fail, in that they rely on the continuing perception that the pixels used to represent soils, structures, or whichever other data we feel relevant to our enquiry represent ‘what the world is really like’ (2004: 200). Our job is then seen as simply to interpret how this world may have been experienced in the past.

While it is not possible to argue with the above objections, I would argue that to discard the value of GIS as a tool for thinking about and displaying geographic data altogether is to throw out the baby with the bathwater. The problem, I would suggest, lies not within GIS itself, but rather the way in which we think about the use of GIS in relation to embodied landscape experience. Kwan (2002a, 2002b) has suggested that a reflexive approach to GIS which acknowledges the limitations and partiality of the perspective offered by GIS may help to overcome these objections. Additionally Lock (2000:61) has argued that GIS should be viewed as an ‘interim stage’ in landscape investigation. Rather than considering the results of GIS analysis as being the final explanation of landscape phenomena, we ought to view them as stepping stones to further research. Brück (2005) notes that GIS it is also useful in identifying wider patterns of relationships that may be useful to support phenomenological approaches that have previously been subject to criticism. One of the critiques levelled at Tilley, Cummings and Whittle by Flemming (1999) was that it is impossible to validate the observations made within their work due to the highly individual nature of their methodology (see section 3.1.3.1). Rennel (2009, 2011) notes that both GIS and phenomenological approaches can be seen to develop partial accounts of experiencing the landscape in the past. Through the very act of recording, describing and documenting observations and sensory experience phenomenological approaches remove the researcher from the embodied engagements which they seek to study (Rennel 2011:523). The creation of phenomenological methodologies therefore requires those undertaking the study to detach themselves from the object of their study in order to define it, thus creating an inherent contradiction. As such Rennel argues that GIS and experiential approaches can be seen as complementary (ibid). Each approach develops a different account of landscape
experience, which in combination may help to enrich each other. In this instance the argument which Brück (2005) presented for the value of phenomenological approaches, despite their individualising tendencies might be reiterated here. Just as phenomenology has encouraged people to think about the social and political aspects of landscape use, so GIS can be seen as providing a forum through which it is possible to think about the spatial affordances of particular landscapes (cf Gillings & Goodrick 1996; Cripps et al 2006; see also Gillings 2011 regarding GIS and the concept of affordances).

For the purposes of this thesis then, GIS is utilised in combination with in-situ landscape survey to develop a multi-scalar approach to understanding the landscape settings of burnt mounds in Shetland. GIS is employed to produce an initial overview of the types of landscape settings occupied by burnt mounds within the study area. This thesis identifies a number of research questions which it is felt are fundamental to understanding the relationship between burnt mounds and the wider prehistoric landscape. Firstly, as was described in Chapter One, the proximity to water has been identified as one of the defining features of burnt mound sites. However, it is suggested that this statement masks a number of potential variations that need further examination. As will be explored in greater detail in Chapter Eight, water is an important and symbolically loaded substance in many cultures (e.g. Taun 1974). The type of water source utilised in burnt mound use (standing, free flowing, groundwater or coastal) would alter the experience of the site and may tell us much about the types of activities undertaken at the site, and affect how we understand the relationship between these sites, the landscape and their place in wider cosmological frameworks.

Secondly, it has been suggested that burnt mounds occupied a marginal space within the wider prehistoric landscape (cf Barfield & Hodder 1987; O’Drisceoil 1988 Buckley 1990; Hodder & Barfield 1991). The ‘unsuitability’ of these sites as dwelling places, based upon concepts of landscape commodity and adaptational exigency has often been cited in cases for and against the different functional interpretations (e.g. Barfield & Hodder 1987; Barfield 1990; O’Driscoil 1988, 1990). Here the nature of this marginality, will be explored, as will the relationship between burnt mound sites and known prehistoric settlements within the study area. I will also explore the relationship between burnt mound sites and other contemporary and older prehistoric sites, in order to determine the frame of reference in which burnt mound sites would have been experienced when they were operational.
Finally, this study intends to explore the relationship between individual burnt mound sites themselves. Burnt mounds are among the most numerous prehistoric monuments attributed to the Bronze Age recorded within Scotland. As will be explored in greater detail in Chapter Six, sites often appear to be clustered together in groups, suggesting specific areas of burnt mound activity within the wider landscape. I will explore this phenomenon to determine whether clusters of activity can be identified within a given region, and to explore what the relationship between these groups and other landscape considerations may be.

As such, the following types of analysis were undertaken:

1) Location based analysis to determine what percentage of sites are within a given distance of water, and what types of water source are preferred (if any).

2) Viewshed analysis to explore inter-visibility between burnt mound sites and other sites of prehistoric activity.

3) Cluster/Heat Map analysis to identify ‘hot spots’ of burnt mound activity.

The problematic nature of GIS in relation to notions of encounter, emergence and the embodied and contextual nature of knowledge and experience has been discussed above. As such, it is recognised that GIS analysis alone is not sufficient for understanding the landscape setting of burnt mound sites. A supplemental programme of in-situ site survey was therefore planned to both complement and verify the data created through GIS analysis (cf Rennel 2009, 2011). Visits were undertaken at a selection of sites within study area, selected as a result of insights gained from initial GIS analysis. At each site visit in-situ observations about site location were noted, along with comments on site morphology include mound shape, approximate size, and the visible relationship between the site and any nearby water source. Comments were made about site experience and all visits were documented photographically. In addition a 360 schematic drawing was created for each site (following Cummings 2000; Cummings, Jones & Watson 2002), noting the aspect of the site from all angles. These drawings were produced partially as an aid-memoir to allow for later discussion of on-site observations, but also drew from Ingold’s considerations of the role of drawing in observation and engagement within anthropological analysis (2011).
3.2.4 Experimental Firings

‘Could not engagement – working practically with materials - offer a more powerful procedure of discovery than abstract analysis of things already made?’

(Ingold 2007:3)

In order to break away from the restrictive functionalist approaches discussed in the previous chapter, this study recognises the need for practise-based interpretations of burnt mound sites. In particular it recognises the need to look beyond site typologies to the social processes of construction and use (as per Richards 2004). By examining the processes involved in their creation and use it is proposed that a greater understanding of how materials, landscape and people will not only influence what it is possible to achieve through hot-stone technologies, but also how the materials, landscapes and people involved in them would have been interacted with and been perceived by both those inside and outside of the process itself. More specifically, the most prominent feature of burnt mounds is the burnt stones that create the fabric of the monument. Unlike other sites, such as round barrows or houses, the practises occurring at burnt mounds can be characterised as generative processes of construction. In other words in contrast to a view of use being a feature of constructed completion, the burnt mound is necessarily always in a state of becoming (Chapter Seven).

In order to do so a series of experimental firings were undertaken at a replica burnt mound site on the island of Bressay. As will be discussed in greater detail in Chapter Six, the replica was created using the exact dimensions of a site excavated at Cruester, also located on Bressay. As such the site presented a unique opportunity to explore how some of the architectural characteristics of sites within the study area might constrain or enable burnt mound usage. Ingold (2007) has called for a move away from concerns with abstract concepts such as materiality and agency, towards an approach which takes into consideration the properties of materials. It is through engagements with materials that their particular qualities are revealed. The concept of affordances as described by Gibson (1977, 1979) has been of particular use in the development of this study. Gibson noted that knowledge obtained from perception was always practical. As such, the knowledge which you gain about any given object or event is always directly related to the activities in which you are currently engaged (1979:127-43). Therefore, all knowledge about an object is related to its particular affordances. These affordances are understood to be directly relational to the skill and requirements of the person involved. Thus, a chair
affords sitting only if you desire to sit down, and are capable of carrying out that action, in other circumstances it may afford climbing upon, or door propping open (Knappet 2005:47-49). The affordances of an object are also culturally specific – there is nothing inherent about a chair which suggests it should be sat upon other than our own cultural awareness of that property. Nevertheless, Gibson suggests that the chair continues to afford sitting regardless of whether or not we perceive this possibility at the time (Knappet 2005:49). Following this, it is therefore suggested that to understand burnt mounds fully is to understand their affordances, the potential which they represent for the carrying out of particular activities. As these affordances are relational, and emergent through the performance of particular tasks, they are best known through the act of working with the burnt mounds themselves. These experiments then, represent not acts of reproduction or replication, but rather a medium through which it is possible to explore some of the possible affordances of working with these technologies, and to develop an appreciation of the relationships between people and materials which make them understandable.

Burnt mounds have already proven to be popular subjects for experimental archaeology, as was discussed in Chapter Two. However, previous experimental firings have focussed on ‘testing’ hypotheses relating to the functional application of burnt mounds. This thesis seeks to break free from functionalist approaches in order to explore the holistic totality of interactions between people, places and things at burnt mound sites. The firings undertaken as part of this study were not intended to determine the possibility of carrying out individual acts at burnt mound sites. Instead, they explored a range of potential outputs proposed for burnt mound use, as outlined in Chapter One. It was accepted that it was at least hypothetically possible to produce each of these applications using the technologies represented by burnt mound sites. Thus, rather than trying to prove or disprove a particular theory, the experiments were able to focus on the various skills, physical processes and materials involved in undertaking each application. In doing so it was possible to explore networks of material relationships with spread beyond individual functional outputs, and explore how the different activities proposed became linked through shared practises and knowledge.

Specifically the study aimed to explore, through experimental processes the range of practises afforded by burnt mounds how these are linked in with knowledge of the landscape, local plant life, animal husbandry, geology and the sea. To examine how relationships between people places and things might be negotiated through the use of
burnt mounds and create a more holistic approach to the understanding of burnt mounds as monuments, in line with that already applied to other aspects of prehistoric life. In order to do this a number of specific objectives were developed, as follows:

1) Establish a method of heating water using hot stones

2) Create a skin boat using the burnt mound to prepare hides and bend wood to create the frame

3) Wash and dye fleece using local plant material.

4) Brew ale – create wort from grain mash using a hot rock mashing technique. Create a finished ‘gruit ale’ from the wort.

5) Cooking – compare the processes boiling and dry roasting.

6) Winter firing – to test how the skills learnt during the summer firings can be applied during winter conditions.

Observations made during the firings were recorded in a site diary, and all actions were photographed, and, where possible, filmed. Water temperature was monitored during each experiment using a digital thermometer to aid comparison between methods, and notes were made on external factors which may affect the firing, such as ambient water temperature and local weather conditions.

**3.4 Conclusion**

This chapter has explored the development of phenomenological approaches to both materials and landscapes in order to create a critical framework against which burnt mound sites can be reconsidered. It has argued that in order to move away from restrictive functionalist approaches it is necessary to consider both the material engagements taking place within the mound and the wider landscape and social context. Specifically it has charted the development of hermeneutic approaches to materials and landscape, and has argued for an embodied approach to understanding the relationships between people, places and things. These approaches, it is argued, are fundamental to developing a contextual and interpretive account of burnt mounds. Concepts of object biography (Kopytoff 1986) and *chaîne opératoire* (Leroi Gourhan 1964, 1965) were highlighted as holding potential for documenting the processes involved in the creation and use of burnt mound sites, and for exploring how these processes might be employed in the creation of identity during the Bronze Age. Additionally a brief overview of approaches to landscape were given, focussing on the development of embodied
approaches to the landscape, and the importance of creating an understanding of the world which incorporates multi sensory engagements with both materials and places (cf Bender 1993; Bradley 2000; Cummings 2002, 2003a, b; Cummings & Whittle 2004; Tilley 1994; Thomas 1993a, b). Ingold’s (2007) concept of the taskscape was introduced as a framework for understanding the world through reciprocal engagements of people places and things. These approaches have highlighted the problems for burnt mound studies in perpetuating a functional and commodified concept of people’s engagements with materials and places. It has been illustrated that this perception relies on the opposition of mind/body and nature/culture, which is observed to be a distinctly modern understanding of the world.

It has been proposed that a two-pronged approach to understanding burnt mounds is required, which explores the landscape settings of burnt mound, and places them within their wider prehistoric context, while simultaneously exploring the affordances of those processes taking place within the mound. In keeping with this, a methodology utilising GIS and landscape survey in combination with experimental firings at a replica mound was proposed.

While burnt mounds have been popular subjects for experimental activities for some time, these approaches have tended to focus on proving (or disproving) a particular functional theory. Traditionally, experimental archaeology has focused on the testing of hypotheses (cf Cunningham et al 2008; Millson 2011, Chapter Six). However, the experiments designed as part of this thesis have been developed using a phenomenological framework. As we have seen above, meaning is understood as emergent through the use of things, and dependant on complex relationships between people, places and materials (Ingold 2000, 2007; Hodder 2012; Thomas 1996) rather than fixed and abstract, as is implicit in previous studies of burnt mounds. Therefore, if we are to understand the nature of burnt mounds and fully explore the affordances which this technology provides, then it is imperative that we appreciate the processes which are behind their creation and use. As Ingold (2007:3) suggests, engagement with materials is far more likely to produce an understanding of their properties and potential, than the abstract analysis of things which have already been made. The experiments detail in Chapter Six, therefore, are designed, not to test whether it is possible to produce any of the proposed outcomes using burnt mounds, but rather to explore the range of sensory engagements, skills and relationships which make up these processes.
The implications of GIS usage have already been explored section 3.2.1. While the universalising tendencies of GIS are understood it is argued that it presents an ideal space for thinking about large scale patterns of landscape usage, and for generating questions regarding landscape experience which can direct further study (Lock 2000). It is however acknowledged that GIS alone is not sufficient as a replacement for experience and ‘being there’. It is there suggested that by supplementing GIS analysis with in-situ survey which records a variety of sensory experiences and bodily engagements with the landscape this bias can largely be overcome. Additionally, the use of GIS may assist in addressing some of the criticisms regarding the individual experiences that phenomenological approaches develop (Rennel 2011). In combination these approaches allow for analysis of landscape use and experience at a range of scales, and can assist in the development of a nuanced account of the relationship between burnt mounds and their landscape.

In clearly defining the range of critical approaches which inform this methodology, I have attempted to address any bias or imbalance which may be present within the frameworks applied. The problems of applying a phenomenologically informed approach to methodologies have already been discussed above. This study does not pretend to have overcome these concerns. However, by applying a range of different approaches to the study at varying scales of analysis it is hoped that this thesis will be able to overcome some of the universalising tendencies of the methodologies employed. Moreover, in attempting to address the reductive nature of the frameworks applied in the studies outlined in Chapter Two, it is argued that this thesis represents an original attempt to think outside of the traditional parameters of burnt mound studies, and to explore new possibilities for understanding these sites within a specific context.

The rest of this thesis is dedicated to reinterpreting burnt mounds in light of the framework outlined above, and to considering results gained from the approaches detailed within the methodology. Chapter Four outlines the current state of knowledge regarding burnt mounds in Shetland, and provides the context against which fieldwork takes place. Chapter Five explores the landscape settings of burnt mounds, building on detail gathered from GIS analysis and in-situ survey, while Chapter Six details the observations and experiences gained through experimental firings. Further detail about the methodologies chosen is provided in each chapter respectively. Chapters Seven and Eight then focus on exploring the implications of this data for our interpretations of burnt mounds how they function within a wider Bronze Age context.
Chapter Four: Shetland’s Burnt Mounds in their Archaeological Context.

4.1 Introduction

Having established that there is a need within burnt mound studies to develop a context specific understanding of these sites, and to relate them to a wider set of prehistoric practises and life ways, this chapter aims to provide the archaeological background to the sites which will be explored in greater detail in chapters five and six. The first section gives an overview of the Neolithic and Bronze Age of the study location, while the second provides a more detailed account of those burnt mound sites within the study area that have already been subject to archaeological investigation. Reference will also be made to those sites outwith Shetland that are of relevance to the study, either as comparative points, or to illustrate a wider trend of practise. In particular, detail is provided on excavated burnt mound sites in Orkney, in order to situate the Shetland sites within a wider context of burnt mound practise within the Northern Isles.

The final section considers the information already available on the Shetland burnt mounds in light of their archaeological context, and identifies a number of themes that inform the direction of this thesis.

4.2 The Prehistoric Archaeology of Shetland

The Neolithic and Bronze Age periods of Shetland are, by and large, under researched and poorly understood, particularly when compared to our understanding of the rest of mainland Scotland, and its nearby neighbour Orkney. Over the last two decades archaeological research in Shetland has largely been directed towards the Iron Age and Viking period, (c.f. Dockril et al 2010; Turner 2010). The islands also present relatively limited scope for developer-led investigation, although it is likely that this situation will be dramatically reversed in the coming years. Yet despite this relative lack of activity, Shetland is still recognised as one of the locations par excellence for studying prehistoric remains in their landscape context (Sheridan 2011).

Much of Shetland’s landscape is still covered in a thick blanket of peat, which, as recent excavations on the site of the new Laggan-Tormore gas terminal at the Hill of Crooksetter (Brend 2010) have illustrated, can both conceal and protect substantial archaeological deposits. Even on the more fertile lowland areas the trend towards sheep farming over arable activities mean that few sites are subject to intensive ploughing. The
result is that Shetland possesses a wealth of upstanding archaeology on a scale unrivalled anywhere else. Entire field systems and settlements can often be seen clearly poking through the topsoil, and the pattern of land-use appears to have changed very little from the prehistoric period until the modern day. However, while there is an abundance of material to be studied, Shetland is lacking in the grand monumental complexes that have attracted students of prehistory to other areas of the country. This contrast is perhaps most striking when compared to it’s nearest neighbour, Orkney, whose impressive monumental complexes have attracted scholars for centuries.

Until relatively recently there has been little investigation into prehistoric materials since Whittle’s excavations at Scourd of Brouster in between 1977 and 1979 (Whittle et al 1986). The islands have undergone periods of concentrated interest, such as Calder’s (1950, 1956, 1961, 1964) work on settlement evidence in the West Mainland and Whalsay, Henshall’s (1956, 1963) work on Chambered Cairns and funerary practices, the excavation of prehistoric houses at Sumburgh Airport in the 1970s (Downes & Lamb 2000), and Gordon Parry’s West Burra Survey (Hedges 1984a), which provide us with glimpses into the quality and quantity of material available. More recently there is evidence for an increasing interest in the Shetland material, with the discovery of Mesolithic deposits at West Voe, Sumburgh (Melton & Nicholson 2004), and the Danish National Museum’s Farming on the Edge: The Cultural Landscapes of the North project (Mahler & Andersson 2011, Mahler 2012, Mahler 2013).

The earliest evidence for occupation on the islands comes from midden deposits found at West Voe in Sumburgh. Dates obtained from the lowest levels of the midden place the activity at approximately 4200 – 3600 BC (Melton & Nicholson 2004, Melton 2009), suggesting at least a visiting human presence in the islands during the late Mesolithic. It has also been suggested that a drop in the ground and shrub flora seen around 7500BP could indicate the introduction of grazing animals such as red deer, and may be attributed to a Mesolithic presence (Bulter 1998). While the chronology for the Neolithisation of Shetland remains under dispute Sheridan’s (2012) analysis of dates obtained from sites throughout the islands demonstrates that by c3300- 3000BC settlement in Shetland is firmly established. The earliest phases of many of the more substantial prehistoric ‘farmstead’ settlements in the islands appear to relate to this period, including pre-settlement evidence for houses 1 and 2 at Scord of Brouster (Whittle et al 1986), the cist at Sumburgh Airport (Hedges & Parry 1980), and possibly the earliest layers of occupation at Jarlshof (Hamilton 1956; Dockrill et al 2004).
4.2.1 A Bronze Age for Shetland?
The existence of a Bronze Age in Shetland itself is something of a moot point (cf Sheridan 2013), and the implications of this will be discussed in greater detail in the final section of this chapter (see also Chapter Eight). This period is characterised by the arrival of copper and copper alloy materials and the introduction of a suite of so called ‘continental novelties’ and practises (Sheridan 2012:25), such as the introduction of individual interments with increasing indications of gender and social differentiation, Beaker pottery, and a range of localised developments (e.g. Clava Cairns and recumbent stone circles) (ibid). Much of this material appears to be absent from the Shetland assemblage. Evidence for metalworking is particularly rare. Isolated examples, such as the tanged blade from Northhouse (Coles 1969) do exist. However, currently, the only example of Bronze working in Shetland comes from houses III and IVa at Jarlshof (Hamilton 1956). Moulds for numerous items, including axes, swords, gouges and pins were found. 200 fragments of clay bivalve moulds, and 44 fragments of mould gates were recovered in total (ibid 29). Bronze working appears to have been established in House III during the late Bronze Age, moving to House IVa after its construction. Fragments of crucibles and isolated bronze implements were also recovered from later Bronze Age houses IVb, c, V and VI. Hamilton suggests that the presence of bronze working at Jarlshof can be attributed to the arrival of a bronze smith ‘trained in Irish traditions’ (ibid 39).

Recent reconsideration of radiocarbon dates from Shetland sites, in combination with a re-analysis of several pottery assemblages has led some to suggest that many of the sites which have been established as Neolithic (eg Ness of Gruting, Scord of Brouster House 2, Benie Hoose and Stanydale ‘Temple’) may in fact date to what would traditionally be termed the Bronze Age on the Scottish Mainland (Sheridan 2012 cf Downes & Lamb 2000: 121, Hedges 1986). As will be explored below, many of Shetland’s prehistoric sites display evidence of continued occupation over many centuries. At Sumburgh evidence for early wooden structures beneath the north house have been dated to 2290-1510 cal BC, while later stone structures are believed to have been in use from the later Bronze age into the Iron Age (Downes & Lamb 2000:34). Other Bronze Age structures from Shetland include House 3 at Scord of Brouster which has produced radiocarbon dates of 1750-1450 BC to two sigma and 1910-1520 to two sigma (Whittle 1986), and Ness of Gruting, where charred grain has produced a date of 2200-1500 BC to two sigma (ibid). Recent radiocarbon dates obtained from organic residue adhering to a large
undecorated steatite vessel from the Beenie Hoose, Whalsay, has also produced a Bronze Age date (1740 – 1530 cal BC) (Sheridan 2005: 183, 2011:27).

The construction and use of steatite vessels is one of the most characteristic elements of Bronze Age Shetland. Steatite objects have been recorded in Shetland from the late Neolithic onwards (Foster & Sharman 2009). The majority of those found have been recovered from Bronze Age contexts, including Sumburgh, Scord of Brouster, Kebister and Jarlshof (ibid). The most substantial assemblage comes from the site at Bayanne, Yell. The assemblage is comprised of more than 400 fragments, including square, sub-rectangular and circular vessels, as well as decorated and collared vessels and decorative items (including beads and a bracelet fragment) (ibid 31-33). While the majority of steatite finds in Shetland come from domestic contexts, non-domestic finds are also known. A steatite vessel was found in the cist at Little Asta, Tingwall, while two steatite beads were recorded from the Neolithic multiple cist burial at Sumburgh. A small adze shaped object was also recovered from a heed shaped cairn at the Hill of Dale, Delting (Sharman 2009:39). In Orkney over 30 steatite cinerary urns have been recovered (Sharman 2009). Perhaps the most impressive is the example found at Linga Fiold, which is comprised of two vessels stacked on top of each other and bound together to form one large bucket like vessel (Downes 1995). As there are no steatite outcrops in Orkney, the Orcadian urns are likely to have been imported from Shetland. The high percentage of steatite items from funerary contexts in Orkney contrasts with the predominance of domestic materials from Shetland. A number of cinerary urns have been reported from Shetland, however these were largely excavated during the antiquarian period, and have subsequently been lost (Sharman 2009:39). As well as steatite urns a number of ceramic urns with steatite temper have also been recovered from Orcadian contexts (Sheridan 2003: 213). The presence of Shetland steatite in Orcadian funerary contexts, and thus the necessity of importing the materials, indicates that this material was given prestige status. Moreover, it indicates the possibility of ongoing contact and trade links between the two archipelagos, and perhaps most interestingly, demonstrates the level of skilled seafaring obtained by Bronze Age occupants of Shetland and Orkney (ibid).

The lack of what might be considered to be period diagnostic materials has led some to suggest that the Bronze Age of Shetland was a period of difficulty and isolation (Kaul 2011). However, as Sheridan has noted (2012:25-26; see above) the existence of Shetland Steatite urns in Orkney indicates a degree of contact between the two island groups during the Bronze Age, while the presence all over corded ware from Stanydale
(Calder 1950, Sheridan 2012), the adoption of cremation and cist burials, and the deposition of finished and partial miniature battle axes at Gruting and Sumburgh (Calder 1956, Downes & Lamb 2000) indicate that Shetland was at least partially involved in wider networks of exchange and value during the second millennium cal. BC. Despite this, however, these elements appear largely fragmentary and isolated (Sheridan 2012). Excavation at Scord of Brouster (Whittle et al 1986) and landuse survey in South Nesting (Dockril et al 1998) both suggest that the period saw a phase of increasing peat encroachment, and a depletion of available agricultural land, which gradually pushed settlements and infield systems closer to the coastline. The continued use of crude stone artefacts, coupled with a lack of bronzes or ‘prestige items’ has led Kaul (2011:48) to suggest that the Bronze Age in Shetland was ‘a time of regression’. However, as I have noted elsewhere (Doughton 2013; Chapter Eight), this view fails to take into account the apparent explosion in burnt mound usage which takes place in both Shetland and elsewhere during this period.

4.2.2 Settlement

![Fig 4.1 Plans of prehistoric houses in Shetland (Downes & Lamb 2000:120)](image)

Early settlement evidence in Shetland is characterised by the presence of oval houses and associated field systems. The term ‘oval house’ was first applied by Calder (1956)
during his work on houses at Ness of Gruting, Gruting School and Stanydale. It describes the floor plan of the houses, which are longer than they are wide. The internal layouts can be divided into two broad categories. The first, such as at Stanydale, Ness of Gruting or Gruting School, are composed of a large primary chamber, with a smaller rear chamber, while the second appear to comprise of a larger chamber with regular recessed cells, the largest of which is often the rear chamber, such as at Scord of Brouster, House 3 or Jarlshof (Fig. 4.1). Many of the excavated examples also exhibit evidence for earlier structures in the form of postholes (eg Scord of Brouster, House 1 (Whittle et al 1986:7), Sumburgh (Downes & Lamb 2000:8-10)), suggesting some of Shetland’s earliest houses may have been at least partially timber built. A number of Shetland houses also possess an enclosed external space, or courtyard area, (e.g Benie Hoose (Calder 1961), Jarlshof (Hamilton 1956)). In some cases this courtyard structure is replaced with a secondary, or ‘paired’ house, such as at Sumburgh Airport (Downes & Lamb 2000). In many cases these courtyards or pairs can be seen as an extension of the ‘heel shape’ façade as described below. While no clear chronology has been established from the Shetland houses, a general progression from structures with a large rear chamber (e.g Stanydale House) to the more regular recessed interiors (e.g Benie Hoose) and then finally to sub-oval structures with radial piers rather than recesses (e.g Mavis Grind) has been proposed (Downes & Lamb 2000:121-123).

From Downes (Downes & Lamb 2000:117-119) analysis of the Sumburgh houses (Fig 4.2) we can see that the use of space within Shetland houses developed over time and was subject to frequent phases of reorganisation and restructuring. At Sumburgh activities appear to have moved from house to house during the lifetime of the structures. Prior to the construction of the South House and courtyard spatial distribution indicates that the living/cooking area of the North House was situated at the back of the house, while the front circular area functioned as a work area and animal stall (ibid:118). Later, cooking and living activities appear to have centred around the hearth within the South House, while the North House appears to have become ancillary to the activities taking place in the South. While both North and South House appear to function as one distinct dwelling, with access to the North House only possible through the South House, they function as spatially distinct parts, the function of which was subject to change through time. As Downes notes, these changes indicate a fluidity which reflects the dynamics of social practise, and a recursive relationship between social structures and architecture (ibid:119).
4.2.3 Funerary

As with the settlement evidence, the sequence for the development of funerary traditions within Shetland remains uncertain. Some of the earliest dates from the islands come from a multiple inhumation cist at Sumburgh, discovered during the extension of the runway at Sumburgh Airport (Hedges & Parry 1980). The cist contained the disarticulated remains of upwards of 27 individuals, comprising both adult and juvenile members of both sexes, and appears to have been in use over a substantial period of time. Analysis of the skeletal material indicates that the individuals suffered from a range of traumas and diseases, and that some of the bones were subject to weathering prior to deposition (Melton & Montgomery 2009). While no human bone has ever been found from within a Shetland chambered cairn, the skeletal material from the Sumburgh cist suggests a similar suite of mortuary practices to those found in Orkney, including curation of material, selection and movement of individual body parts and possible excarnation. The chambered cairns of Shetland are characterised by a wide concave façade, short, low passage and small chamber, often cruciform in construction (e.g Vementry). In other examples the chamber is smaller and more cist like in construction (e.g Ronas Hill) (Fig 4.3). While it is possible that many of these structures may have
Fig 4.3 Shetland’s Chambered Cairns, showing proposed chronology (Sheridan 2012:29)
been open for considerable periods of time, and contained the remains of several generations, the structures themselves are not large enough to allow for the elaborate processes which are suggested to have taken place in the Orkney monuments (e.g. Hedges 1984b). Entry to these structures is gained by crawling, and once inside there is no room for an individual to stand up, and certainly no scope for multiple persons or ceremonial activities to be accommodated within the tomb itself.

The lack of dating evidence available for the Shetland tombs makes it impossible to determine a firm chronology, however Sheridan (2012) has suggested a broad development from simple round cairn passage tombs such as that at Ronas Hill, to the later heel shaped cairns with trefoil chambers (Fig 4.3). From the multiple phases of construction at Vementry (Fig 4.13) it is possible to see that the heel shape is a later development, added to a previously round cairn, which also suggests an intermediate phase of round cairns with trefoil chambers (Bryce 1939). Other local traditions also developed, such as the square cairns at Pettigarths fields in Eshaness, which may be contemporary with the introduction of the heel shaped façade.

During the Bronze Age cremation appears to have become the favoured practise within the islands, although there is evidence to suggest that both cremation and inhumation were practised concurrently throughout the period (e.g. Little Asta, a dual layered cist containing an unburnt inhumation and steatite cinerary urn (Corrie 1932)). At some locations, such as at Muckle Heog, Unst (Henshall 1963: 170), these cremations have been deposited within cists found within a heel shaped cairn, while others, such as Little Asta, displayed no indication of the presence of the monument above ground. It is worth noting at this point that many of the early excavations at burnt mound sites identified them as burial mounds (eg Hunt 1866). This can partly be contributed to the similarity between mounds of burnt stone, and the stone cairns constructed around burial sites, however, a distinct contributing factor must be the striking resemblance between the stone troughs so often found in burnt mound sites in Shetland, and the stone cists constructed for funerary purposes. Both cists and burnt mound troughs share the same slab built construction, and almost certainly required the same techniques to build them. As such, it should be considered that this similarity was probably not lost on those that constructed them, and that the similarity between the trough and a burial cist was probably not unnoticed by those who constructed and used burnt mounds.
4.3 Burnt Mounds in Shetland

There are currently over 346 burnt mounds recorded in the Shetland SMR, including over 30 to be found on the small island of Fair Isle alone. Radiocarbon and Thermoluminescence dates from a number of excavated sites demonstrate a predominantly Bronze Age date (Campbell Anthony 2003), (Fig 4.4) although many of them have long and complex histories of construction, use and reconstruction and may even date from the Neolithic onwards.

Fig 4.4 Overview of dates from burnt mounds in the Northern Isles (Campbell Anthony 2003: 315)

At Cruester underlying peat provided a *terminus post quem* of 2630 – 2470 cal BC (Campbell Anthony 2003:308). TL dates obtained from throughout the mound provided an average age of 1810 ± 70 BC (*ibid* 309), while an isolated deposit of stones at the east end of the mound provided a date of 1445 ± 145 BC, suggesting an isolated firing occurring later than the main body of activity at the site. Final abandonment of the structures appears to have taken place after 1000BC (*ibid* 311), placing the site firmly within the early-mid Bronze Age in Shetland. Likewise, dates obtained from Houlls burnt mound indicate a wide time range for activities on site, begininning around 2500-3000BC and terminating around 1000BC (*ibid* 312). The site at Loch of Garths appears to have been in use for a shorter period of time, providing a date range of 1740 – 400 BC for the life of the site (*ibid*). The date ranges suggest that burnt mound use in Shetland was therefore contemporary with the occupation of sites such as Ness of Gruting, Scord of Brouster house 3, and the dual house structures at Sumburgh (see above). Thus, while burnt mounds as a whole remain substantially under-researched, the examples in
Shetland have been subject to a number of phases of survey and excavation, as detailed below, allowing a more detailed picture of their nature to be developed than is often possible elsewhere.

4.3.1 Landscape Survey and Recording

The first comprehensive account of the sites within the Isles was Calder’s (1964) survey of the west side of Shetland. Having worked as a surveyor for the Royal Commission in the 40s, Calder was aware that the examples detailed in the published Gazeteer represented only a fraction of the material visible on the ground. His work was instrumental in developing an understanding of the nature of the islands prehistoric archaeology, and in particular the recognition of the oval shaped house sites as detailed above. As well as increasing the number of cairns and houses recorded for the isles, Calder noted a large number of burnt mounds. Like his contemporaries, he speculated that they were related to cooking activities (ibid: 78). He also noted a number of ‘graves’ or cist like structures found within the sites, and conjectures that these, when combined with reports of steatite urns found within the mounds, indicate that some of the mounds had been re-used as burial monuments (ibid: 79). While it is probable that the ‘graves’ he refers to are actually the stone lined tanks found at many of the Shetland sites (see below for examples), none of the urns can be verified, so the possibility of the addition of cremated material as closing deposits remains inconclusive.

While a number of antiquarian excavations had previously explored burnt mounds within the islands (below), Calder’s survey was the first account of the sites that placed them within their prehistoric context and considered them alongside other contemporary sites. Following Calder’s work, surveys carried out on West Burra, by Parry (Hedges 1984a), and on Fair Isle by Hunter (1996), continued to add to our understanding of the distribution of the sites, as well as adding valuable detail about their variable relationships with the wider prehistoric landscape. While a number of sites appeared to be isolated from other prehistoric structures, the majority were identified as being peripheral to wider prehistoric settlement activity, indicated by field systems and divisional earthworks. At Tougs in Burra, the mound itself seemed to be a central part of the complex (Hedges 1986). This relationship was further outlined during the South Nesting Paleolandscape Survey, which recorded the entire archaeological landscape of the area (Dockril et al 1998). The survey outlined a shift in landscape use during the Bronze Age, which saw settlement move closer to the coastlines as peat encroachment in the hill began to reduce the area of cultivable land available. Burnt mounds were
found to occupy the marginal area between the more fertile lowland and peat covered hill. This relationship was also supported by GIS analysis carried out by Mike Canter (1998), which demonstrated that the mounds displayed a strong affinity for land below the 50m contour. A smaller number were found to occupy land in between 50m and 100m, while no sites at that time were recorded from above the 100m contour mark, the favoured location for burial cairns. The burnt mounds were also found to display a preference for S-SW slopes, with a smaller cluster of sites favouring NW-N aspects. Canter lightly suggests that the NW-N preference may have been to take advantage of the best views of the ‘Simmer Dim’ – the period in which the Shetland experiences near continual daylight during the summer months – during seasonal feasts, while the S-SW facing sites would have had greatest exposure to prevailing winds, facilitating hotter fire (ibid: 54). Oval houses were also found to occupy the lower contours, demonstrating a similar preference for the land below 100m, with a slightly higher preference for the 50-100m contours than was visible in the burnt mound sites (ibid: 49).

4.3.2 Excavation
The burnt mounds of Shetland have been subject to a number of excavations and investigations, both amateur and professional, since the antiquarian period. In the 1950s Black (1957) excavated a number of mounds on his land at Kergord, which, although not identified as burnt mounds at the time, he described as being composed of fragmented stone which appeared black and charred. In the 1860s Hunt and Tait also excavated a number of burnt mounds in their search for anthropogenic material (Chapter Two).

One of the most distinguishing characteristics of the Shetland burnt mounds is the number of sites which have been found contain substantial internal features. The earliest example of features from a Shetland burnt mound comes from the unpublished site of Stoura Cottage, Ness of Sound. A hearth and trough, surrounded by what has been described as an ‘oval house’ were found (Small 1972). Structures were also found during the excavation of Tougs (Fig 4.5), Burra (Hedges 1986). A rectangular building containing a conjoined hearth and trough was revealed between the southern edge of a burnt mound and a prehistoric field wall. The hearth was rectangular, of flag stone construction measuring c.1.6m by c.0.8m. Stones set on edge defined the end abutting the trough, however the northwest end remained open. All of the stone displayed evidence of having been heated. The trough was also rectangular and of flagstone construction. No
entrance to the structure was discernible, however Hedges speculates that it may have been to the SE of the structure, as at this point a reserve of unburnt field stones were found abutting the structure and the associated field wall. More recently, excavation at the coastal mound (Mound A) at Trowie Loch (Dockril et al 1998:65-67) revealed the remains of a hearth like feature which lay on top of a spread of burnt stone. The hearth appeared to have at least two phases of use. Between the arms of the mound a pit was discovered with a fill of burnt stone. Upcast material from this pit was found to be covering the hearth, suggesting that either the hearth was an earlier feature, and that there may have been another unexcavated tank associated with its use, or that the upcast material represents a period of ‘cleaning out’ of the pit at a later date. Examination of the central depression of the mound also revealed an area of flagging, bordered by two orthostats. Further stone alignments revealed through excavating the mound material may also be associated with this feature, and suggests the presence of a more complex set of structures within the mound itself.

The best recorded examples of structures within a burnt mound come from the sites of Cruester in Bressay (Moore & Wilson 2001, 2008, Below), and Tangwick (Moore & Wilson 1999), in Eshaness. Both of these sites were subject to active coastal erosion, and were excavated following an extensive survey of coastal sites within Shetland. In both cases features were already visible within the coastal section prior to the
commencement of excavation (Moore & Wilson 1999, 2001, 2008) At Tangwick (Moore & Wilson 1999) (Fig 4.) a stone built oval structure was revealed, partially revetted into the mound. It was truncated to the southern and western sides, but its original dimensions are thought to have been at least 7.6m by 6.6m. The structure was of cellular composition, comprising at least three cells on both the east and west sides, with a further cell to the north. A chute ran from the northern cell (Cell D), which has been interpreted as a hearth cell, to a tank situated centrally in the south end of the structure near to the limits of the erosion damage. It terminated at a ‘portal’ comprised of two orthostats, one of which was still in situ at the time of excavation, while the other existed only as a stonehole. The chute has been interpreted as the method by which stones were transported from the hearth to the tank (ibid:213). The tank was self filling, and underwent two stages of construction, the first being a rectangular slab built feature, measuring 1.6m long, 0.9m wide and 0.6m deep. A compartment was later added dividing the tank in half, which possibly acted to protect materials within the tank from being damaged by hot stones (ibid). The southern end of the tank displayed evidence of clay luting, while the northern end appeared to have been left unsealed to allow for the ingress of water. An additional stone slab was interpreted as having been used as a cover for the tank.

The walls of the hearth cell survived to a maximum height of 1.1m and sloped inwards, suggesting a corbelled roof. The primary floor surface was clay lined, and was covered by two successive layers of paving, which sealed layers of peat ash. The walls and floors of the cell were reddened in a manner that suggests exposure to extreme heat, evidence of which could be seen continuing up the full height of the walls. The Cell was later sealed off with a wall which was subsequently covered by stratified layers of burnt stone. Moore & Wilson (1999:217) interpret this to mean that the site continued to be used following the closure of the cell, although no secondary hearth is reported (See also Chapter Seven). Three further cells (Cell A, B and E) were also subject to later sealing off prior to the abandonment of the site (ibid: 218). In several cells a paved floor was visible. In Cell C this extended beneath the walls of the structure, suggesting that the walls were of secondary construction. The largest of the cells (Cell G) was connected to the main structure by a passageway running roughly NNE. On the SW limit of the cell the walling was interrupted by a curved slot delineated by two rows of stones set on edge. Although this had been scoured by the sea at the time of excavation, Moore & Wilson (1999:218) speculate that this may have contained a wooden barrier. Two paving stones
beneath it, which overlay a natural clay deposit. Although it is not mentioned in either of the excavation reports it is worth noting that the stone on the NW side of the tank were laid across the slot at almost the central point, which may have provided entrance to the building. A secondary area was also excavated at the northern side of the mound, and revealed two fragments of walling, and what was interpreted to have acted as kerb to the mound during some phase in its development. The relationship between these structures and those to the south of the mound was not determined.

At Cruester (Moore & Wilson 2001, 2008) excavations revealed an L-shaped stone built structure consisting of two passageways and a number of cellular structures. Removal of the flagged floor in passage B revealed a sub floor drain extending between the hearth and the tank and curved towards cell A (Moore & Wilson 2008: 11) Traces of previous drains were also revealed, but had been subsequently cut by the construction of the later drain. The SW end of passage B terminated in two large orthostats, similar to those found and Tangwick, behind which a large slab constructed tank measuring 1.6m by 1.1m and 0.6m deep was discovered. The tank was dug into peat deposits below the
Fig 4.7 Structures at Cruester (Moore & Wilson 2008)

floor and the area around it was paved with slabs that were set flush or slightly overlapping its rim (*ibid* 2001:10). Removal of the tank revealed a further set of slabs was worn smooth as if it had been subject to prolonged wear from something being repeatedly dragged over it. To the west of the tank, along the line of the erosion edge a further two cells (E & H) were also revealed. Both cells were badly eroded and it was not possible to determine how they might have been accessed in relation to the rest of the site. The floor of cell H was dug to the same level as the bottom of the tank, and filled rapidly by water. For that reason it was interpreted to have been some form of cistern (*ibid* 2001:14).

Cell G was interpreted as a hearth cell (*ibid* 2001:14). The walls of the cell appear to have been cracked through exposure to heat, and had been relined at some period during the site’s use. The floor consisted of 8 layers of heat-cracked paving. The secondary wall appeared to be contemporary with the fourth layer of flooring. Two upright slabs were also added at a later date to narrow the opening, and these appear to
be contemporary with the final soil deposits in the cell. A number of the cells survived to a height where it was possible to determine the structure of the roof. The upper levels of masonry in Cell H displayed signs of the beginnings of corbelling and were thought to have originally stood at about c.1.2m. A lintel slab also survived towards the back of Cell D, and suggested a similar roof height \((ibid\;2001:12)\). Both the cells and passages appeared to have been subject to phases of remodelling throughout the use of the site. Removal of what as thought to be structural slabs on the west side of passage B revealed a further course of masonry, while removal of Cells B and C revealed a layer of burnt stone overlying a flagged floor which appeared to have been cracked, possibly through heat \((ibid\;2008:11)\). Access to Cell A appears to have been blocked or altered by the addition of a series of upright slabs set across the entrance. While these slabs were not big enough to impede entrance, it is possible that they represent the abandonment of Cell A at some point during the life of the site \((ibid\;2001:11)\).

In addition to the stone built features described above, another, more unusual structure was discovered at Kebister \((Owen\;\&\;Lowe\;1999:101-2)\). This feature consisted of a double post ring outlining a sub rectangular building and contained a substantial hearth, two ‘cooking pits’ and a conduit for transporting water. This feature was recovered from the lower contexts of the site, and was badly disturbed in places. It has been suggested that this structure represents a ‘cooking site’ and was in use at the time when burnt mound technologies were being developed in Shetland \((Owen\;\&\;Lowe\;1999:101)\). In plan the structure appears to be comparable to the rectangular building found at Tougs \(see\;above\) and the primary building at Beauquoy, Orkney \((Hedges\;1975)\). A number of other features \(e.g\;‘meat racks’\) are suggested with reference to features found at Irish burnt mound sites \(cf\;O’Kelly\;1954\). However, its most unusual feature is that although the pits at Kebister were lined with burnt stones, no burnt mound material was recovered from the structure. However Owen \& Lowe \((1999)\) suggest that the truncated nature of the feature makes this unsurprising.

**4.3.2 Comparable Structures from Orkney.**

In addition to the structures found within mounds in Shetland, a number of similar features have been excavated from sites within Orkney. These sites provide an interesting point of comparison to the Shetland mounds. The burnt mound at Liddle \((Hedges\;1975)\) \(Fig\;4.8\) on South Ronaldsay, Orkney is most often compared to the
Shetland mounds, due to the similarities between the complex internal structures found within. Unlike the Shetland sites the mound at Liddle has not been subject to coastal erosion, making it particularly interesting when exploring the use of space at these sites. The structure was comprised of a roughly oval shaped building, containing recessed chambers and a central tank. A substantial amount of mound material had accumulated around the building, particularly to the south and north east of the structures, although this had been subject to modern quarrying and was much denuded in all but the south/southwestern end. Entrance to the building initially appears to have been gained through the north east side of the building. Secondary walling was also constructed along the edge of the mound on this side. This is interpreted as having been to prevent the slippage of mound material over the access route, although this wall was later completely submerged beneath additional mound midden material (ibid:34). The North East entrance is also later blocked by the construction of a cell and associated drain structure. This structure leads from a cistern cell linked to a natural spring occurring directly outside the building to the northwest, via a flag lined gulley which leads through a hole in the blocked north east entrance. The northernmost end of the building appears to have been constructed over natural peat deposits, and although the site itself is situated close by to the Burn of Liddle (now redirected) it is likely that the natural water table also played some role in the activities carried out on site. The southern end however is constructed directly over a local clay deposit, a situation that is echoed in the
location of the site at Cruester in Shetland, and may have been deliberately chosen to assist in waterproofing the area around the tank, preventing natural water level subsidence. A secondary entrance was found in the southern end of the building that opened directly onto the mound itself (ibid:45). A paved pathway, partly destroyed by quarrying appears to lead up over the mound, suggesting that in later times at least, access to the structures was gained by walking over the mound itself, and that the users were actively involved with landscaping and controlling the mound material during the life of the site.

Two structures were also found in association with a mound at Beauquoy (Hedges 1975), Mainland, Orkney (Fig 4.9). The mound had been subject to substantial damage and alteration prior to excavation, to the extent that it was impossible to determine its exact size and shape, other than to note that it had once bounded the stream. The primary structure had been truncated by the construction of an agricultural shed.

Fig 4.9 Structures at Beauquoy (Hedges 1975:52)
Preserved features appear to show a building of sub-rectangular shape, possibly similar to Liddle, walling was traced on the long sides of the building, but was absent for both the NNE and SSW ends, possibly due to destruction, but which may also indicate a lack of walling, or the presence of entrance ways in these locations. A large flag built hearth, reinforced with clay was located in the south end of the building, two fire reddened sockets either side of this structure have been interpreted as possible supports for a cross piece or spit over the fire (ibid: 53). No indication of a tank or similar feature were noted within this structure. Outside of the structure the remains of an insubstantial wall constructed 1.2m from the main wall were discovered. This was interpreted as a possible indicator of a ‘circumambient walk’ similar to the feature described at Liddle (ibid: 54).

The secondary building was also substantially destroyed (ibid). The walls were constructed using two different methods. All of the south, and part of the north wall, forming the long side of the building were rubble built using a mixture of land and river stones. The walls in these sections appeared insubstantial, measuring only 15cm wide in parts, were preserved to a level of 0.3 and were only faced internally. Elsewhere a trench was dug into the original mound material, approximately 20cm wide and 19cm deep. Burnt mound material and chocking stones were then added to accommodate either a wooden, or more likely vertical flag built structure. The floor inside the structure appears to have undergone several phases, and originally appears to have been formed of primary burnt mound material, before being covered with flagstone paving. The interior space appears to have been divided in several different ways during the life of the building. The remains of a rectangular compartment were discovered beneath the flag stone floor along the N wall. This feature, which measured 2m by 1.25m, was interpreted a being similar in nature to the box bed structures found in prehistoric Orcadian houses (ibid:56). In the south east corner of the building an area of the flagstone floor was removed and relaid with yellow clay, which the excavators also interpret as relating to an interior division. Entrance to the building is interpreted as having been gained at the eastern end, marked by the presence of a silstone and external flagging. A pile of unburnt stones were also found stacked against the northern wall of the building.

The trough in the secondary building consisted of a pit, roughly 2.5m across and 1.7m deep, dug into the existing mound material and lined with yellow clay (ibid:54). No hearth was found at the site, but it is suggested that this may have been located in the western end of the building, which was heavily disturbed (ibid). A feature described as a
‘quoined well-like structure’ was also revealed on the western end of the building (ibid:56). This feature was dug through existing mound material into a natural clay deposit, and appeared to originally protrude above it. The hole was originally floored with flagstone before the quoining was put in. It appears to have been able to hold up to 0.5m of water, while anything in excess of this would have overflowed into the adjacent ditch.

In 2005 severe storms revealed an additional site at Meur (Toolis et al 2007) (Fig 4.10) in Sanday. Excavation revealed a multi-cellular structure incorporating a tank and cistern with associated drainage feature. The entire western side was subject to coastal erosion, and as such there is limited information available about the original extent of the structure, and its internal spatial arrangement. The site featured a central slab built tank, the base of which was set onto the old ground surface and lined with clay (ibid:33-4). A flagstone floor was laid respecting the edge of the tank, although this feature only survived in the easternmost space of the structure. A large recumbent slab was also found partially covering the tank, which is interpreted to have acted as a cover (ibid).

![Fig 4.10 Structures at Meur (Toolis et al 2007:34)](image-url)
To the east of a tank was another compartment, defined by upright orthostats and separated into two areas. The northernmost of these areas possessed a flag lined floor, and had been partially subjected to coastal erosion. To the north was a secondary corbelled structure built into existing mound material and measuring 1.2m in diameter and over 0.85m deep. Excavation ongoing as part of the SCHARP project (www.shcarp.co.uk) at the time of submission has indicated that this structure is a substantial well, incorporating a series of steps leading down to a rectangular cist at the bottom. Organic remains currently being removed from this feature have the potential to reveal much about the usage of burnt mounds in Orkney. This feature also incorporates a drain that fed from a sluice-like channel in its western side, suggesting a complex system of water management at the site (ibid:36). No hearth was found in association with the structures, but this is likely to be due to the effect of coastal erosion, as the mound material itself presents the classic signs of having been subject to heating. The excavators did not interpret Meur as having been roofed at any point, as was the case at both Liddle and Beaquoy, due to the lack of substantial walling (ibid:49). Rather, the upright orthostats were interpreted as having served to delineate space, and to prevent ingress of mound midden into the working area.

4.4 Characteristics of Shetland Architecture

4.4.1 Recesses
Recesses are a defining element of the prehistoric architecture of Shetland, featuring in the houses, burnt mounds and tombs. In the early prehistoric houses they appear to be a dominant characteristic of the organisation of internal space. At Stanydale Temple, Scord of Brouster and Jarlshof (Fig 4.1) the recesses are evenly spaced around the walls creating a symmetrical appearance to the buildings, while at houses such as Stanydale House and Gruting School the recesses are less regular. Recesses serve to delineate space and creating an area which offers privacy. In a number of houses (e.g Stanydale House, Gruting School, Jarlshof) the rear recess is larger and more distinct than the others. It is possible that this space represents the most sacred and significant area of the house, as is the case with the Orcadian rear dresser spaces (Downes & Lamb 2000:124, cf Parker Pearson & Richards 1994). Significantly, it is this rear space which houses the hearth at both Cruester and Tangwick. This illustrates that fire not only played a significant role in the use of the burnt mound itself, but that is had a significant symbolic status in relation to the organisation of the building, and its relationship with
other Neolithic and Bronze Age practices. By way of comparison, the hearth in the Shetland house almost always occupies a central location, however in burnt mounds this space is most often occupied by a large tank, or similar structure. The full implications of this relationship will be discussed in detail in Chapter Eight, however for now it is sufficient to observe that this arrangement creates an interesting juxtaposition between fire and water which serves to further cement the links between these two elemental substances at burnt mound sites.

At Cruester (Fig 4.7) and Tangwick (Fig 4.6) the architecture seems to represent an exaggerated form of the recesses found at house sites. Cells located off central passageways echo the division of space, and create discrete areas for storage or other activities. This division of space and isolation of activities can be seen as consistent with the general approach to defining space within burnt mounds. As will be explored in Chapter Seven, the construction of the mound acts to shield the interior of the structure from the outside, whilst simultaneously protecting the outside world from the powerful and transformative processes within. This approach can be seen as echoed in the internal structures, where space is clearly differentiated, possibly to prevent the contamination of materials and persons during firings. Moreover, as we have seen with the architecture at Sumburgh (above), the structures within the burnt mound were subject to frequent reorganisation, change and closure, echoing the fluid relationships between social practise and material structures which is reflected in the domestic architecture.

4.4.2 Heel Shaped Façade

The heel shaped façade is another characteristic element of Shetland architecture. The structure at Stanydale (Fig 4.11), identified as a ‘temple’ by Calder due to perceived similarities with the Maltese structures (Calder 1950:203) is a excellent example of the use of both the heel shaped façade and recesses in Shetland architecture. As with many of the Shetland structures, Stanydale was subject to restructuring and reorganisation during its usage (Mahler 2011:14-15). Perhaps best interpreted as a hall rather than as a temple, Stanydale appears to have functioned as a significant gathering place, and it situated within a highly structured and ritualised landscape containing a number of other
prehistoric structures, standing stones and field boundaries. As I will discuss in further detail in Chapter Eight, it is situated in one of the few places in Shetland where the sea is not visible. The area is skylined by ridges of high ground on top of which a number of cairns have been constructed. In addition, a defined approach leading from the nearby (but not visible) Loch of Gruting, delineated by small standing stones indicates that the experience of the landscape was carefully controlled (Clarke & Renwick 2013). In this context the façade serves to emphasise the presence of the building in the landscape, and provides a focal point for those approaching the site. However, while this may be the case at Stanydale, the addition of a concave façade to the buildings at Sumburgh would have had an entirely different affect. At Sumburgh (Fig 4.2) the façades are a late addition to the buildings, and, rather than facing out into the landscape, face inward towards each other. The construction of the façades at Sumburgh coincides with the decommissioning of the central hearth in the South House, demonstrating that the hearth no longer functioned as a central feature within the house. Downes (Downes & Lamb 2000:127) suggests that the aggrandisement of the entrances at Sumburgh might therefore represent an increased emphasis on the importance of threshold as the new pivotal feature of the house.

As with the houses, the role of the concave façade on the Shetland tombs is subject to some debate. Bryce (1939) noted that while there was a temptation to define the Shetland tombs as ‘degenerate’ versions of the Caithness horned cairns, the heel shaped tombs appeared to be an entirely local development. While it has been suggested that
court yard or horned cairns served to delineate or frame a space for ritual or ceremonial activities outside of the tombs themselves (e.g Fleming 1973, Thomas 1990). The location of some Shetland tombs, such as Vementry, where the façade is immediately above a steep drop in the hillside (Fig 4.12), suggests that even if this were the case for some sites, it is certainly not a universal application. Rather, as at Stanydale, it appears that the façade served to draw attention to the front of the cairn, and enhance the presence of the site on approach.

At present, none of the mounds excavated in Shetland have produced any evidence of having utilised a heel shaped façade as an entrance marker. This may indicate (as will be outlined in further detail in Chapter Seven), that the mounds are not intended to monumentalise the site in a way which draws attention to the location, or to present a ‘face’ to those approaching it, but rather served to enclose or protect the site and the viewer from inappropriate exposure. It should be noted however that at both Cruester and Tangwick substantial areas of the site was lost to coastal erosion. As no obvious entrance was determined for either of these sites it is probable that this was located in those areas now lost.

4.4.3 Use of Midden.

The use of midden in building is a characteristic of Shetland houses. As will be explored in greater detail in Chapter Seven, the use of midden in Shetland houses follows a similar pattern to the deposition of mound material at burnt mound sites. Both processes involve the gradual accumulation of symbolically significant material over time, facilitating the creation of deep temporal links. Midden material appears to have been used as foundation deposits at Ness of Gruting (Fig 4.14), where carbonised barley and a broken quern were found at the base of the wall (Calder 1956:353). Other materials such as peat ash, pottery and flaked stone tools are recorded as being found in wall
deposits from houses throughout Shetland (Calder 1956, 1964, Downes & Lamb 2000, Whittle 1986). However, it is not just during initial acts of construction that midden is incorporated into the structures. Rather, following the construction of the walls, material appears to have been piled up against the structures repeatedly, so that the thickness of the house walls grew over time. In some instances, such as at Yoxie, Beenie House and Ness of Gruting, stone revetting was used periodically to consolidate the material (Calder 1956, 1964: Downes & Lamb 2000: 125). The practise of constructing with midden is also common elsewhere during the Neolithic and Bronze Age, and its significance has been discussed by a number of authors. At Skara Brae the houses were built onto existing midden deposits, while further midden was deposited around the walls so that the entire settlement was surrounded by the refuse of past and present inhabitants (Childe 1931) while at the multi period site of Old Scatness midden was incorporated into the surrounding soils (Dockril et al 2010:10). As was discussed in Chapter Three, the deposition of fragmented materials within domestic contexts can be seen to be linked to a concern with natural cycles of death, fertility and rebirth. As such the use of midden within the walls of houses relates to concepts of fertility and status, and can be seen as an active attempt to ensure the longevity and fertility of both inhabitants and settlement (cf Parker Pearson 1996, Fowler 2004, Bruck 2001).

Of particular interest is the inclusion of flaked stone ard points and mattocks within these midden deposits. These implements are found in large quantities both within the walls of house structures, between floor layers, and also within field clearance cairns. The significance of these items has been the subject of some debate. Large quantities of stone tools have been recorded from the top layers of abandoned houses, as well as from within wall deposits themselves. Whittle has been suggested that this pattern may be explained by the storage of stone tools within rafters or loft space within the house, or by the placement of stone tools on the roof of the structure following use (1986:134). Alternatively this may represent the casual discarding of broken implements onto abandoned structures during cultivation (Downes & Lamb 2000:126, Downes 2005:195). However, as Downes argues, a large number of these items show no indication of wear or use, suggesting that their deposition was intentional, and that these tools represent something other than the casual discarding of materials which are no longer of practical use (2000:126). At Jarlshof and Sumburgh both ard points and mattocks were recovered from successive floor levels where no periods of abandonment were apparent (ibid). Flaked stone tools have also been recorded from the stone kerbs surrounding Bronze
Age burial mounds in Orkney as closing deposits (Downes 2005). It is argued that these deposits are related to concepts of fertility and regeneration (Chapter Seven). By placing stone tools and midden material around the edges of the houses the inhabitants were entering into an ongoing conversation with the land and with cycles of fertility and reproduction. Moreover, as Downes suggests, the incorporation of midden into soils indicates that the soil itself has become an acculturated, and that cycles of fertility and reproduction were not a given (cf Owoc 2004). Rather, the earth had to be negotiated with, and a complex series of practises were required to ensure the ongoing success of agricultural endeavours. This is particularly significant in relation to our understanding of burnt mound sites, if as has already been suggested (Chapter Three), we view them as both transformative and elemental processes. As will be explored in greater detail in Chapter Eight, the processes undertaken at burnt mounds have deep resonances with wider cosmological understandings during the Bronze Age. As such their increasing popularity may be attributed to concepts of ongoing negotiation between people and the land, and in particular notions of the regenerative and destructive properties of both fire and water and the immutability of stone and earth. Moreover, as will be explored in Chapter Seven, the potency and significance of these fragmented materials suggests that the practise of creating a mound from burnt stone at burnt mound sites involved more than just the disposal of waste materials, and instead represents the intentional curation of culturally and symbolically significant materials at the site.

4.5 Conclusion

One of the aims of this thesis is to place the burnt mounds of Shetland into their wider prehistoric context. The lack of a clear chronology for early prehistoric Shetland renders this process somewhat problematic. The lack of firm dating evidence and a clear pottery typology for the period means that many of the sites in Shetland remain defined as ‘early prehistoric’ without any ability to determine how early or late they may be. This uncertainty poses difficulties in understanding the relationship between burnt mound sites and their wider prehistoric context. Any attempt to do so, such as that which follows in the remainder of this thesis, is therefore required to make presumptions and judgements about the contemporaneity of sites which may or may not prove to be incorrect in light of future works. Despite this, this chapter has been able to illustrate number of striking links between the architecture of Shetland’s burnt mound, settlement and funerary material. Moreover, as was explored in section 4.2.1, recent dating programmes have been able to provide a small window into understanding the
chronology of early prehistoric settlement in Shetland. Evidence suggests that a large number of the settlement sites known can be attributed to the Bronze Age (cf Sheridan 2013). Likewise dating undertaken at burnt mound sites indicated that many of the Shetland burnt mounds date to the late Neolithic/Early Bronze Age and see continuous use throughout the remainder of the period, indicating a reasonable degree of contemporaneity between the sites in question.

Through this detailed examination of the excavated mounds of the Northern Isles, it becomes clear that there is a greater degree of complexity associated with the sites than has previously been acknowledged. Certainly within Shetland, and perhaps within parts of Orkney too, mounds with complex internal structures are more common than is realised. An examination of the distinctive architectural styles found in Shetland during the prehistoric period demonstrates that burnt mounds were part of a wider set of architectural traditions and practices. Structures found within burnt mounds display strong similarities with the architecture of both houses and tombs. These similarities demonstrate a shared concern for spatial organisation throughout each of the three site types examined, as well as an ongoing concern with the deposition of fractured and fragmented materials. As such burnt mounds can be seen as being part of a wider tradition of practice, and a shared symbolic lexicon during the Bronze Age.

The density of the burnt mound distribution in Shetland renders some of the more traditional approaches to burnt mound studies difficult. While it may be possible to accept that in some places these sites may have been constructed as temporary hunting camps for roving bands of people moving across the landscape, when applied to the small island of Fair Isle, it immediately becomes problematic. Would such a small island really have needed so many saunas? And if so, why are they of such varying shapes and sizes, a will be illustrated in Chapter Five.

The integration of the mound material into the access routes at the Orcadian mounds also highlights the importance of the mound itself in our understanding of these structures (Chapter Seven). Rather than representing material simply discarded after use, the mound appears to be an integral part of the structure itself, and has a direct influence on how the interior space is accessed, and viewed from the outside. Moreover, it is suggested that the incorporation of midden and flaked stone tools into the walls of houses can be seen as analogous to the accumulation and curation of burnt stones at burnt mound sites. This has clear implications for the way in which we understand the significance of the mound, and the processes through which it is accumulated. If, as has
been suggested (Chapter Three) we understand the accumulation of fragmented and fragmentary materials as being linked to death and fertility, then the curation of mound material must therefore be seen as both an intentional and symbolic act.

While at first glance the Bronze Age of Shetland may appear to be a time of increasing stagnation and isolation (Turner, 1998, Kaul 2011), the apparent proliferation of burnt mound activity within the islands suggests that the period actually saw an explosion of activity. A more detailed understanding of the processes which took place at these sites, and the way in which they related to the wider prehistoric landscapes is therefore required to allow us to explore the role which burnt mounds had in mediating relationships with and increasingly challenging and changing landscape. This in turn can be used to explore how these practises fitted in with a wider set of understandings and cosmologies which characterise the British Bronze Age as a period. The next two chapters will attempt to readdress the imbalance in our understanding of burnt mound usage, by first by exploring the nuances of their location, size and morphology within wider patterns of land use and settlement, and then exploring the range of activities which took place within them, and how they might relate to each other to create a network of embodied meaning through practise.
Chapter Five: Burnt Mounds in their Landscape Context: GIS and In-Situ Survey

5.1 Introduction
One of the aims of this thesis is to explore burnt mounds within a wider landscape setting, and place them within the context of other prehistoric activity within the study area. In order to achieve this a multi scalar approach was developed, which combined GIS analysis with in-situ visits and recording. As was outlined in Chapter Three, neither phenomenological or GIS approaches to landscape have been without their detractors. I have argued that the combination of these two methods allows us to draw on the strengths of each form of analysis, and to create an understanding which encompasses a broad range of potential interactions between burnt mounds, people and their wider landscape. As with the experimental approaches which will be described in Chapter Six it is important to stress that these approaches are in no way intended to replicate the engagement of prehistoric persons with their landscapes. Instead, they illustrate a range of potential encounters, and open up discussion as to how these encounters may affect the way in which Bronze Age people understood the use of burnt mound sites, and their place within the wider understanding of the world.

This chapter outlines the result obtained from both GIS and in-situ survey, synthesising the insights gained from both approaches to form an understanding of how burnt mound sites in Shetland relate to their landscape setting. Where appropriate these insights will be illustrated through maps, photography or hand drawn schematics, pulling together the range of approaches taken within the study. The final section will explore how both techniques inform upon each other, and will evaluate the potential that this approach has on the understanding of burnt mound sites within a defined context.

5.2 GIS Analysis

5.2.1 Creating the Geodatabase
For the purpose of this thesis it was decided to create a spatially referenced site database using the Geodatabase format supported natively by GIS. Site data was gathered from the Shetland SMR, and backed up with information from the Royal Commission’s CANMORE database. Data from CANMORE was provided by The Royal Commission for Ancient and Historical Monuments as a point data shapefile, and was directly imported into ArcGIS, while data sourced from the Shetland SMR was provided
in both Excel and Word format. An opensource pythonscript coordinate converter was used to convert British National Grid References used by the SMR into Latitude and Longitude, and the information was then imported into ArcGIS as point data using the Add X Y function within ArcMap. Mapping data was sourced from Edina Digimap and OS Opendata. Coastline and inland water data was sourced from OS Mastermap Topography layer. While this layer contains the most complete record of watercourses, it does not specify the types of water (standing or flowing), nor does it always differentiate between natural water courses (such as streams) and modern features (such as culverts and drainage ditches). In order to add this layer of information it was necessary to cross reference the Master Map data with mapping data at a broader scale, such as OS Meridian, which contains hydrographic data. By cross referencing the proximity of master map data with the lakes and streams data from Meridian it was possible to create a bespoke layer using the Mastermap water data but applying the classifications drawn from the Meridian layer for all water features in Shetland. This was also cross referenced against ariel photography layers, such as Bing Map and ArcGIS 10’s native photography base layer to confirm the type of water feature represented in the mapping layers. An OS Panorama DTM layer was added to create an elevation model for the creation of viewsheds. The geodatabase allowed all information collected as part of this thesis to be stored, viewed and searched geographically, and to be displayed with other geographic material in a relational manner. The use of digital terrain modelling allowed for person-centred models of site locations to be created and examined on an island wide scale.

Records downloaded from the SMR included fields for site name, type, national grid reference, and general description of the site itself. For Burnt Mound data a simple search was run on the term ‘Burnt Mound’ which returned of 346 results. Of these results several represented multi-site locales, but only a single site represented in the search had to be discarded due to an inaccurate coordinate, which placed it several hundred meters into the North Sea. Analysis of this record demonstrated the possibility of it being a duplicate of an already existing record however. Additional searches were also run to capture both the funerary and settlement sites for the period. Each site description was read through carefully to verify whether or not the record appeared to describe a prehistoric location. As was explored above (section 4.5), many of the site featured within this study are of uncertain early prehistoric date. However, by monitoring the site descriptions it was possible to ensure that the sites selected represented those with typical Neolithic/Bronze Age attributes (see section 4.4). Any
sites which seemed to be ambiguous, or were described as possibly representing natural features or other non-prehistoric activity were excluded. In total 344 Burnt Mound Sites, 122 Funerary Sites, and 432 Settlements sites were included in the GIS Database. Due to the indeterminacy of chronologies for settlement sites within Shetland (Chapter 4, section, 2.1) settlement evidence selected for analysis included both Bronze Age and Neolithic material. Many of the houses originally attributed to the Neolithic are now believed to be Bronze Age (Downes & Lamb 2000:121, Hedges 1986), and thus it was felt it was not possible to successfully differentiate between the two. Additionally, many Shetland settlements demonstrate successive periods of remodelling and continued occupation (Downes & Lamb 2000, Whittle et al 1986). Funerary material included contemporary Bronze Age cairns and cremation burials, such as those at Asta or Upper Scalloway, and Neolithic chambered cairns. There is evidence for re-use of Neolithic cairns in Shetland during this period, such as at the South Nesting, where fragments of cremated material were added to an existing heel shaped cairn (Turner 1998:43) As such, it was felt that these monuments would have remained as significant landscape features during the Bronze Age.

Two scales of analysis were completed on the data retrieved. The first examined the wider landscape setting of the burnt mound sites, and was completed on an Island wide scale. Simple spatial analysis was run on all burnt mound sites to determine their relationship with water and with other prehistoric sites. At this scale the analysis included sites from all areas of Shetland, including those in the outlying islands of Foula and Fair Isle. For local scale analysis sites were selected from a variety of locations on Mainland, and were supplemented by examination of sites on the islands of Papa Stour, East and West Burra and Bressay in order to correlate with areas examined during in-situ Survey (section 5.3). Particular attention was also paid to the west side of Mainland during this scale of analysis. As was described in Chapter Four, each of these locations have been subject to detailed local survey, and there is detailed data available on the distribution of prehistoric sites within these areas. The availability of this data made these regions the ideal location to apply more detailed analysis of the relationship between prehistoric sites and their local landscapes. Sites from elsewhere in Shetland were also included to supplement this data and verify whether the patterns observed within these regions were more widely applicable to burnt mound sites throughout Shetland.
5.2.2 Distribution, clustering and other locational considerations.

Canter’s (1998) work on the landscape settings of prehistoric sites in Shetland established that burnt mound sites are to be found on land below 100m elevation. Likewise Dockril et al (1998:81) observed burnt mounds in Nesting appeared to be concentrated to the central fertile belt now occupied by modern day settlements, while other prehistoric occupation was more widespread. They therefore suggest that this distribution may be representative of a contraction of settlement area, perhaps brought on by climatic variation in the Bronze Age. The wider patterns of site distributions were determined through a number of methods. Firstly, the elevation of each mound was extrapolated through the ‘Extract Values to Points’ feature within the Spatial Analyst Toolbox in ArcGIS. This tool uses the elevation data within the DTM layer to determine the height above sea level of particular points. Secondly, site density was determined using the ‘Point Density’ tool within ArcGIS. This tool calculates the density of points within a given neighbourhood. The number of points falling within the neighbourhood is totalled, and divided by the area of the neighbourhood. The result is a ‘heat map’ giving visual representation of areas which contain a greater concentration of sites than others. Finally cluster analysis was undertaken to produce a representation of areas where multiple sites could be found clustering within a given distance of each other.

A number of observations can be drawn from the analysis undertaken at this scale. Firstly, while it is possible to see from the distribution map that burnt mound sites appear to be relatively common throughout most of Shetland (Fig 5.1), point density analysis (Fig 5.2) demonstrates a number of locations where the density of distribution appears to be greater than elsewhere. It should be noted that many of these clusters coincide with areas which have been subject to detailed archaeological survey. For example, South Nesting was surveyed as part of the South Nesting Palaeolandscape Project (Dockril et al 1998). The West Side of Shetland was initially surveyed intensively by Calder (1950, 1956, 1964) and subsequently by Whittle during work undertaken at Scord of Brouster (Whittle et al 1986,) More recently this area has also been studied as part of the Danish National Museum’s ‘Northern Worlds’ project. Other clusters occur in Burra, which was surveyed intensively by Gordon Parry (Hedges 1984), and later by Deborah Lamb as part of a PhD project and Fair Isle, which has been closely documented by Hunter (1996, 1998). A final cluster can be observed in the south Mainland, an area which has been subject to close archaeological scrutiny as a result of the extensive
Sumburgh Head environs project, and the work undertaken at Old Scatness Broch by Shetland Amenity Trust and Bradford University.

Fig 5.1 Burnt Mound Distribution
Fig 5.2 Burnt Mound Density
Given the above may appear that the distributions observed are the result of targeted survey, rather than a true reflection of the spread of burnt mound activity. However comparison of burnt mound distribution with known prehistoric settlement and funerary sites suggests that there may be more to the picture than is first supposed. In particular, it is worth paying attention to the West Side, which contains a noticeably high concentration of burnt mound sites, particularly in the areas to the south and southwest. Comparison between the distribution of burnt mound sites and settlement and funerary sites (Fig 5.4) in this area demonstrates that while the West Side has, in general a higher percentage of recorded prehistoric sites than other areas in Shetland (see Fig 5.1), both the settlement and funerary evidence appears to be more evenly distributed than the burnt mound data. Most notable is the relative absence of burnt mound sites from the central and northern areas of the west side when compared with the settlement evidence. These areas are characterised today by a rugged landscape with extensive peat cover, and is less densely populated than the more fertile looking southern area (Fig 5.3). It is possible that the lack of modern occupation in the area has led to a lower visibility of prehistoric sites. Sites are often uncovered through activities such as peat cutting, or through the improvement of land for agriculture. However the identification of prehistoric houses in the northern regions of the west side suggests that it would not be difficult to identify burnt mound sites in this region. This distribution may therefore support the idea that burnt mound sites are in general associated with better agricultural lands (Dockril et al 1998).

![Fig 5.3 Differing landscapes on the West Side of Mainland: South: Dale of Walls (left) & North: West Burraorith (right) – Image: Eileen Brooke-Freeman.](image-url)
Secondly, as Canter observed (1998:51), there is a preference for lower lying regions for the location of burnt mound sites. Only one site, at Graven in Delting was observed to be located above the 100m contour. A further 31 sites were located in between 50m and 100m contours, although of these 21 were below 60m, with only 1 site found above the
90m contour. The rest of the sites were located well below the 50m contour, with the majority of sites favouring locations below 30m in elevation. This preference for low-lying values is not exclusively a feature of burnt mound sites. Of the 432 settlement locations analysed as part of this thesis, only 82 were found to occur above the 50m contour, and of those only 18 were found above 100m. These lower lying areas often represent the more sheltered and fertile regions, and have remained popular for inhabitation until the modern day. Likewise, as Canter noted, the majority of funerary sites also appeared to favour positions below the 50m contour. The viewshed analysis, detailed below, suggests that some funerary sites were located with more commanding views than those otherwise associated with burnt mound or settlement sites, but that in general the location of early prehistoric sites in Shetland does not seem to be focused towards commanding views of the surrounding area, or focal points within the landscape, but rather, as will be discussed in greater detail below, in creating and defining localised landscapes.

Finally, within the areas identified as being high density, further clustering of sites was noted during fieldwork. While burnt mounds appeared to be evenly spaced in some areas it was observed that some locales, such as the Burn of Setter on the west side, appeared to be focal points for burnt mound activity. In this area 4 individual mounds could be found within close proximity of each other distributed along the length of a stream. Analysis of sites was undertaken using the ‘collect events’ tool in ArcGIS, which allows multiple ‘events’ (in this case, burnt mound sites) at one location to be pulled together and displayed using a weighted symbology (Fig 5.5). This highlighted areas where up to eight individual mounds were found clustered around a specific location, most commonly a water source. Field visits to sites like this, e.g. Burn of Setter, the pair of mounds at Brunatwatt, and the complex at Loch of Foratwatt (Fig 5.6), revealed that often one of the mounds appeared to be much larger than the others. This may represent satellite activities relating to the main burnt mound site, but could also represent later short-term activity at an appropriate location which was known to have been used for burnt mound activity in the past. A further more tantalising suggestion raised during experimental firings in Bressay concerns the potential for danger, both physical and symbolic, at burnt mound sites, as will be discussed in greater detail in Chapter Six. In these instances it is possible to imagine that catastrophic events at burnt mound site led to the closure of one inauspicious mound and the relocation of activities to another nearby site respecting the taboos created by past events at the previous
Fig 5.5 Localised clustering of burnt mound sites
mound. Accepting this it is clear that some locales were considered to be particularly suited to burnt mound usage, and acted as focal points for the activities which were undertaken there.

5.2.3 Variations upon a theme: Burnt Mounds and Water.
Having established some of the more basic factors affecting burnt mound distribution in Shetland, the next stage of analysis focussed on the relationship between burnt mounds and water, the topographical association most readily attributed to burnt mounds. Indeed, proximity to water is often seen as one of the defining features of burnt mound sites. Water is essential to perform most of the tasks which have been suggested as being responsible for creating burnt mound sites. Specifically, the placing of hot stones into water is responsible for the distinctive shattered stones which make up the main body of burnt mound sites. However, while the relationship between burnt mound sites and water is well established, there has been little discussion about what kind of waterside locations are preferred. For the purpose of this thesis, four separate types of water source were identified. These were as follows:

- Running freshwater, such as streams and hill runoffs.
- Standing freshwater, such as lochs and smaller shuns.
- Coastal saltwater locations
- Groundwater.
Mounds constructed in boggy areas with no obvious alternative water source may have utilised a groundwater source. Alternatively it is possible that a cistern type structures, or self filling tanks, such as those found at Cruester (Moore & Wilson 2001, 2008) may have been utilised in these cases. This information is unlikely to recorded in traditional mapping, and as such groundwater utilisation was most difficult to identify through GIS analysis. Instead it became more evident through site visits, or in the case of excavated sites, by examining the behaviour of the local groundwater level during excavation. In the case of coastal mounds it was often not certain whether saltwater was utilised within the mound. Many coastal mounds, such as Cruester and Tangwick, were also located near to sources of freshwater (Fig 5.7). While saltwater may have been utilised for brine evaporation, none of the other interpretations required its use. However, the affinity between some burnt mounds and coastal location may be more significant if we consider their potential application in boat construction. Of course, the presence of saltwater may also have had strong cosmological associations, as will be explored in Chapter Eight.

To explore the relationship between burnt mounds and water simple proximity analysis was employed to determine the distance between burnt mounds sites and nearby water sources. Proximity searches were run at 100m increments, with most sites having a water source within 500m of the mound. Of 347 sites within the database, only 22 were found to be over 500m away from a modern day source of standing or running fresh water, and of these sites, only one was over 500m from the coast (Fig 5.8). Running fresh water proved to be the most popular water source, with 312 sites being located within 500m of a stream or other significant runoff, (Fig 5.9) while 128 sites were located within 500m of lochs (Fig 5.10). Many of the sites were located within 500 meters of both lochs and streams, such as at Brunatwatt. Here two mounds are located less than 100m from the course of a burn, and only 300m from the edge of a loch(Fig 5.11). Analysis confirmed that there is a correlation between burnt mounds and watery locations, but that this relationship is far from simple.
Fig 5.7 Location of watercourses and coastline at Cruester (Moore & Wilson 2001)
Fig 5.8 Mounds within 500m of coast
Fig 5.9 Mounds 500m from streams
Fig 5.10 Mounds 500m from lochs
In the cases where two or more types of water source can be identified in close proximity to the site, it is not possible to tell if either type of source was preferred for the processes taking place within the mound, or whether both may have been employed to different ends.

While GIS analysis was useful in demonstrating the positive nature of the relationship between water and burnt mounds, it was not possible to examine the qualitative nature of this relationship via a digital medium. Nor was it possible to explore how the mound itself was orientated in relation to the nearby water source, or indeed whether there were alternative water sources available to the user, such as natural springs. Visits made to sites often revealed the locations to be boggy and easily waterlogged, and aspects such as this were lost within the digital model. This highlighted the necessity of being there, to corroborate the information generated by the GIS, and to supplement the general observations made with more specific localised information. Water data within the GIS was also not able to identify the difference between established fast flowing streams, and what appeared to be smaller, more seasonal runoffs in the vicinity of the mounds. What this analysis was able to highlight however, is the problematic nature of the burnt mound and water relationship. Rather than presenting it as clear cut, it has illustrated that even within a small region, the type of water source utilised varies, as does the distance between the source and the site itself, presenting a range of possibilities for interaction, from localised flooding and ‘self-filling’ to scenarios which see the users move a greater distance from the site to reach a water source, or are able to choose between flowing and standing water depending on the activities being performed.
5.2.4 Creating a person centred GIS analysis of burnt mounds in the wider prehistoric landscape: multi-scalar viewshed analysis

The final phase of GIS analysis involved the creation of viewsheds for a number of sites throughout the study area. Viewer height was set at 1.6m, approximately the height of the author, to allow for data generated through viewshed analysis to be compared with that visible in the field at a later date. In addition to burnt mounds, viewsheds were also calculated for nearby house sites and for funerary monuments, to enable the comparison of visual experience at each different type of site. One of the questions which this thesis set out to explore was how burnt mounds relate to other prehistoric sites, and what level of interaction prehistoric peoples may have had based on that proximity. In order to do this it is helpful to establish a quantifiable sense of scale which relates to the way in which GIS understands landscape but is also understandable from a person-centred point of view. Rennel’s (2009) work on incorporating GIS and phenomenological approaches to landscape identifies a range of scales by which people relate to their local landscape based upon site catchment analysis (ibid 108-10) (see Fig 5.12). These scales outline the distance at which people are able to recognise features within their landscape, and the frequency with which these features would have been encountered. Based upon sight, these scales of analysis allow us to understand how a person working and living within this environment would experience these scales, and at what ranges items within the landscape would begin to blur and become unrecognisable, whilst also providing us with a geometric distance through which the GIS is able to identify and classify these regions of interaction. These scales of analysis have proved to be particularly useful for this study in creating a spatial definition of the scales of interaction within a landscape which is both understandable through GIS and relates to the way in which people interact with and understand a space. By applying these distances as buffers to the viewsheds generated it was possible to determine whether the visual focus from each site fell within the local, regional or distant scale, and determine how each type of site fitted in to the wider landscape, based upon a sense of scale for everyday interactions.
Sites for viewshed analysis were selected using a number of criteria:

- **Geographical Location**: sites were selected from throughout Mainland to provide a broad geographical coverage, and to represent the regional variations in terrain which occur throughout Shetland.

- **Cluster Analysis**: detailed focus was targeted at areas identified as being foci for burnt mound activity through cluster analysis (section 5.2.2, Fig 5.8). In particular, focus was paid to the West Mainland, and Burra, where good detailed

<table>
<thead>
<tr>
<th>Landscape Spaces</th>
<th>Description</th>
<th>Social Space</th>
<th>Approximate measured distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Landscape Space</td>
<td>At this scale people can be recognised. Sheep can be distinguished from natural rocky outcrops.</td>
<td>Roundhouse and immediate surroundings&lt;br&gt;Intimate landscape knowledge&lt;br&gt;Local community&lt;br&gt;Identity: local status, age, gender&lt;br&gt;Daily involvement</td>
<td>0-1500 m</td>
</tr>
<tr>
<td>Regional Landscape Space</td>
<td>At this scale houses, field systems and general landscape features can be recognised. People are blurry and individuals cannot be identified.</td>
<td>Familiarity with landscape&lt;br&gt;Regional community&lt;br&gt;Identity: family status</td>
<td>1500-4500 m</td>
</tr>
<tr>
<td>Distant Landscape Space</td>
<td>At this scale the landscape is hazy. Detailed landscape features cannot be identified. Sheep are difficult to distinguish from natural rocky outcrops.</td>
<td>Increasingly unfamiliar landscapes&lt;br&gt;Identity: Clan or perhaps island based</td>
<td>4500m +</td>
</tr>
</tbody>
</table>

Fig 5.12 - Defining Social Scales - Following Rennel 2009:108
information on a range of prehistoric sites allowed a clearer picture of prehistoric occupation.

- **Proximity Analysis:** In order to explore intervisibility between sites which appeared to fall into the ‘local scale’ as described above, and which may therefore have formed a component of an individual settlement unit a simple proximity search was run to select settlement sites which fell within 1500m of a burnt mound sites, and burnt mound sites which fell within 1500m of a settlement site. This produced records of 173 burnt mound sites which were within a ‘local scale’ distance of known settlement sites, exactly half of all the sites within the study area. Viewsheds created for both the settlement sites and the burnt mounds could then be compared, to examine similarities and differences in site aspect, and to explore patterns of intervisibility between the different site types.

Examination of the viewsheds created suggested that the view available from the location was not a key factor in the location of burnt mound sites. While many of the viewsheds appeared to cover a wide area, Rennel (2009:267) has noted that this does not necessarily equate to a wide vista. Perception of an extensive view relies on unbroken lines of sight. Due to the low lying ground favoured for burnt mounds, these lines of sight appeared to be restricted to the immediate vicinity of the mound, in what Rennel terms as ‘local’ space (*ibid* 108) (Fig 5.13). As will be discussed below, this was something that was borne out by the *in situ* survey. Instead, burnt mounds appear to be located in areas best described as natural amphitheatres. The exception to this rule occurred at sites located closer to the coast. These sites often had wider views out to sea, although the landward vistas continued to be restricted by surrounding high ground.

Outside of the local scale much of the landscape visible from burnt mound sites a falls into this category of distant landscape space. The undulating and hilly nature of the Shetland landscape means that from the low lying areas the horizon is frequently littered with hilltops and ridges, and it is the presence of these high points and landmarks within the wider landscape that characterises the experience of burnt mound sites, as will be discussed below. Comparison of viewsheds taken from settlement and burnt mound sites demonstrated similarities and differences in the viewsheds afforded. Settlement sites were identified as having similar visual ranges to burnt mounds within the local scale, but were also noted to afford wider vistas over the regional and distant scale. This was most markedly noticeable when settlement sites afforded views over the sea (Fig
5.14). Thus, it appears that while settlements appear to be both inward and outward looking, visibility from burnt mounds focussed almost entirely on the immediate environs. Intervisibility between

Fig 5.13  Local Scale visibility from Willapund

Fig 5.14  Viewshed from settlement locations at Dalsetter, South Mainland
burnt mounds and settlement is also variable. In some locations burnt mounds are in full view of both settlement sites and other burnt mounds (Fig 5.15), whereas in others there appears to have been an intentional use of local topography to segregate the burnt mound from neighbouring sites (Fig 5.16). There appears, therefore, to be a dual pattern in the relationship between burnt mounds and other contemporary prehistoric sites. Some mounds, such as Tougs in Burra, appear to be part of a wider settlement landscape, and show no indications of segregation or separation (Fig 5.17). This observation appears to be contrary to the perception that burnt mounds occupy marginal spaces on the edge of settlement, which has been used to support their interpretation as either bathing sites, or locales of ‘unpleasant’ activity (Barfield & Hodder 1987, Turner 1998:56). However, other sites appear to be located so as to avoid
visual interaction with other prehistoric locales, and as such appear to be both marginal and isolated.

Fig 5.16 Lack of intervisibility between settlement and burnt mounds at Minn, Burra.

As was mentioned above, while 173 of the sites studied fell within 1500m of settlement sites, and thus formed a part of the local everyday landscape, a further 173 sites did not. As has already been discussed above the differential recording of sites in some areas of Shetland will undoubtedly account for some of this, as will differential preservation. Being formed of more substantial stone, settlement sites present a more attractive source of reusable stone than burnt mound sites which may lead to greater preservation of burnt mound sites in some areas. However, despite these factors there remains the tantalising suggestion that some burnt mound sites were constructed in locales designed to avoid proximity with nearby settlement. This differentiation may be related to the
variation function proposed in Chapter Four. It may also indicate that some activities were considered to be more potent than others, and required greater segregation.

Fig 5.17 Tougs & its proximity to other prehistoric features. (Hedges 1986:2)

However, while they are physically apart from nearby settlements, they still maintain some of the similarities of landscape use observed above. Viewshed analysis of burnt mounds within 1500m proximity of settlement sites, and those without showed no differentiation between the two. In Chapter Four I described how many burnt mound sites shared an architectural lexicon with settlement sites. We must also remember that the visual is not the only method through which links between people, places and things can be developed (cf Barrett & Ko 2009). As will be discussed in the following chapter, burnt mounds are characterised by a distinct set of sensory and bodily engagements. As such, despite being physically remote, they remain connected to a wider network of practises, skills and landscapes through the material engagements which take place within them. Therefore, rather than treating burnt mounds as a segregated form of practise, and consequently an isolated topic for study then, as has been the tendency for past interpretations of burnt mound sites (Barfield & Hodder 1987, Buckley 1990, Hodder & Barfield 1991, O’Drisceoil 1988) it seems pertinent to include them into our
considerations of day to day life in the Bronze Age. As will be discussed in greater detail in Chapter Eight, this observation has particular bearing on the claims that the Bronze Age in Shetland was a period of stagnation and difficulty, during which the islands inhabitants had little time to engage with the wider set of practises more generally associated with the British Bronze Age (Kaul 2011, Turner 1998:51-52 cf. Doughton 2013).

5.3 Site Visits

Site visits for this thesis were undertaken over a period of four weeks in 2008 and 2009. Survey took place on Mainland, Burra, Bressay and Papa Stour. A pro-forma (Section 5.3.1) was developed which recorded information on site location, landscape type, mound shape, water source and a general description of the site including any observations about visible features, as well as my own experience during the visit. Each visit was documented photographically, and a 360 degree schematic drawing completed. In addition to the targeted site visits, I also made extensive walks of areas known to have good prehistoric preservation. These visits allowed me to build up a picture of the character of Shetland’s prehistoric material in its complete topographic context. A total of 40 locales were visited, comprising 88 mounds and approximately 35% of sites within the study area (Fig 5.19), of these sites, two mounds were found to be so substantially robbed and ploughed that it was not possible to determine the exact location, while a further two had previously been excavated and had minimal material left in situ at the time of visiting.

Areas visited were selected based upon the results of preliminary GIS analysis. Specific areas, particularly West Mainland, and Burra were selected as being good candidates to explore the relationship between burnt mounds and other prehistoric sites, based upon proximity analysis described above. The opportunity to visit sites on Papa Stour was provided during an otherwise unrelated visit to the island with Assistant Archaeologist Chris Dyer, while mounds on Bressay were visited during time spent on the island undertaking experimental firings at Cruester replica site (Chapter Six). Additional sites were then chosen at random in order to achieve broader geographic coverage of Mainland Shetland.

Site visits were comprised of two parts. The first involved extensive walks in the local landscape, approaching the site all four cardinal directions where possible, or following any other apparent approaches suggested by the local topography. This enabled me to
situate the site within its wider landscape, to explore any relationships between the burnt mound and any other natural or archaeological features within the landscape, and

Fig 5.18 Sites visited
to examine any processes of disclosure and emergence which may characterise the
approach to the site from the outside. Secondly time was spent in the immediate
vicinity of the mound, recording the location in detail. Observations on site orientation
and the relationship between the site and any prominent local landmarks and the shape,
and where possible records of both the size and shape of the mound were also obtained.

5.3.1 The Pro-Forma

All sites were recorded using a standard pro-forma (Fig 5.19a & b) designed to capture
basic information regarding site location, morphology and the general landscape
experience. Page one of the form included sections for information on site name,
location, elevation, SMR number and other basic information based upon existing
database records in order to enable data to be integrated into the GIS Geodatabase at a
later date if required.

Additional fields included:

- **LOCATION**: For recording information about the type of location in which the
  mound is currently situated (e.g. pasture, hillside scattald, developed area, coastal
  location).

- **NEAREST SITE**: For recording details of sites identified as being within a 1500m
  ‘local scale’ radius of the site in question during GIS Analysis.

- **VISIBLE SITES**: For recording details of those sites which are visible from the
  location of the site in question (both within and outside the 1500m radius).

- **DIMENSIONS & MOUND SHAPE**: For recording details about the general size and
  shape of the mound (e.g. crescent, dual, irregular)

- **ORIENTATION**: For recording details of any visible site orientation, and any
  specific alignments with other local features.

- **RELATIONSHIP TO WATER**: For recording observations regarding nearby water
  sources, and any other relationships between the site in question and nearby
  bodies of water (e.g. approaches, audibility etc).
<table>
<thead>
<tr>
<th>SITE NAME</th>
<th>RECORD NUMBER</th>
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<tbody>
<tr>
<td>LOCATION</td>
<td>DATE VISITED:</td>
</tr>
<tr>
<td>GRID REF</td>
<td>ELEVATION:</td>
</tr>
<tr>
<td>SITE TYPE (eg burnt mound)</td>
<td>LOCATION (eg Hillside)</td>
</tr>
<tr>
<td>PERIOD (eg Bronze Age)</td>
<td>SMR/NMR NUMBER</td>
</tr>
</tbody>
</table>

NEAREST SITES

VISIBLE SITES

OBSERVATIONS REGARDING SITE.

Fig 5.19a Proforma, Page 1.
<table>
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<th>ORIENTATION</th>
</tr>
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<td>LENGTH:</td>
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</table>

<table>
<thead>
<tr>
<th>RELATIONSHIP TO WATER (eg coastal)</th>
<th>RELATED RECORDS.</th>
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<tr>
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**DRAWING & OTHER NOTES.**

![Diagram with North (N), East (E), West (W), South (S)]

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<th>UPLOADED TO DATABASE (date)</th>
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<tbody>
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Fig 5.19b Proforma Page 2.
• RELATED RECORDS: Details of other pro-formas relating to the site in question (eg in the case of satellite mounds, twin mounds, mound complexes)

• OBSERVATIONS REGARDING SITE: Space for general observations regarding the site, landscape experience and other notable features.

• DRAWING & OTHER NOTES: Space for completion of 360 schematic, and any other sketches and notes.

As will be explored in greater detail in section 5.5, the pro-forma demonstrates a bias towards the collection of visual data, which, as I have already explored in Chapter Three, is a failing of many phenomenologically informed archaeological studies (cf Barret & Ko 2009). The perpetuation of this within this study can, in part, be explained my own (incorrect) supposition that as mounds, burnt mounds represent an intentional attempt to create a monumental presence within the landscape (see Chapter Seven), which in turn would be designed to be seen and possibly to see from. The results of this survey demonstrated that this presumption was indeed false. In particular, the section for recording site orientation proved to be almost obsolete. In many instances it was impossible to determine an orientation for the mounds, except for in those instances where a crescent shaped mound was formed, or where there were structural remains visible to indicate a possible focus for activity on the site. In addition, the number of sites displaying structural remains was not initially anticipated, and so no provision was made for the recording of this within the pro-forma. Details of such occurrences were captured within the comments section of the form, but a separate field would have allowed for speedier data correlation and analysis. Overall however, the form facilitated the capture and comparison of data from site visits with that already obtained from GIS study. This, in combination with photographic records and on site diary records allowed for the following observations regarding the landscape setting of burnt mounds to be made.

5.3.2 General Position
Almost all of the sites visited were located in what can be described as pastoral land. All of the sites were located in lower ground, the majority of which was either still in cultivation, or displayed evidence of having been part of crofting landscapes in the recent past. The nature of the pasture land varied from site to site. In some locations,
Fig 5.20 The larger mound at Brunatwatt, located in good pasture land.

such as Muckle & Little Brownie’s Knowe and Brunatwatt (Fig 5.20), the mounds were found to occupy well drained fertile pasture lands. Others were located in what would be best described as rough pasture (Fig 5.21). These locations had higher concentrations of mosses and heather, and appeared to be less well drained than the former. Two additional land types were also identified. The third was marsh, as at Lu Ness in Burra (Fig 5.22), and the final was foreshore locations.

Fig 5.21 Lower Loch of setter, a typical rough grazing setting.
Both of these land types were closely associated with rough grazing, and tended to be on the periphery of grazing lands. Land at the foreshore was observed to be broken and stony due to the action of the sea. Sites located at the foreshore, such as Cruester (Fig 5.23) and Tangwick have been subject to coastal erosion and it is likely that during the Bronze Age these sites were further inland, and would have been in rough grazing or marshy locations, such as those observed at Loch of Brouster, or Hamnavoe (Fig 5.24). While the location of the mounds varied from site to site every mound visited presented as a grass covered knoll in the landscape. Many mounds were subject to natural erosion or rabbit action, meaning that deposits of reddened and cracked stone could be seen protruding from the surface. The single exception to this was the mound at Willapund. Here a thick covering of heather prevented the details of the mound from being seen, although the general shape was observable (Fig 5.25).
5.3.3 Mound Shape & Size

A number of different mound shapes were identified. These were broadly categorised into crescentic, round, irregular and dual (Fig 5.26). The most common shape was the classic crescentic kidney or horseshoe shape, with a central depression and two surrounding arms, such as at Eilams Wells (Fig 5.27). The second most common shape was a circular or ovoid shape, occasionally with a depression in the centre, but often with no indication of a central focus of activity or possible tank location, (eg Burn of Setter, Fig 5.28). Dual mounds, similar in appearance to the kidney shaped mound but with a depression running right through the centre of the mound and less defined ‘arms’ were also observed, such as the mound at Tunnigarth (Fig 5.29). This site was originally recorded in the SMR as two mounds, but appeared to be one site with separate dumps.
Fig 5.26 Mound shapes observed

of material surrounding a central working place. Other more unusual shapes were also recorded. At Loch of Foratwatt the mound appeared to have been spread out into an elongated shape, running away from the loch to the east (Fig 5.30). This mound was situated in boggy ground at the head of the loch, and was paired with a second smaller oval mound. These mounds are currently separated by a small patch of boggy and flooded ground, however it is not certain whether they represent separate workings, or if they were once part of the same structure. The linear shape of this site is markedly different from any other site observed however, and as such represents a different approach to the management of mound material. In addition to variation in shape,

Fig 5.27 Classic Kidney Shaped Mound at Eilams Wells
it was also noted that mound size varied dramatically from small heaps (e.g. Lower Loch of Setter Fig 5.31) to large imposing structures (e.g. Dutch Loch Fig 5.34).

At Loch of Niddister the disjointed appearance of the mound suggested that the mound may have been subject to multiple phases of deposition (Fig 5.32). While the centre of the mound conformed to the classic kidney shape, the east end of the mound appeared to be made up of several smaller deposits. The larger crescentic portion of the mound would appear to represent a period continued use during which mound managing strategies were employed, while it is suggested that the uneven deposits to the east represent separate events. It is possible that this represents re-use of the mound at a later date, or perhaps the abandonment of the mound prior to material being incorporated into the larger structure. This pattern was also witness at the Lower Loch of Setter, where a large crescentic mound was accompanied by a several smaller deposits of mound material on the opposite side of the burn (Fig 5.31). Evidence from Cruester and Tangwick (Moore & Wilson 1999, 2000, 2008) illustrates that burnt mounds
in Shetland were subject to frequent phases of remodelling and construction. At Trowie Loch in South Nesting, a secondary pit and hearth had been inserted into the mound at a later date, suggesting either a total remodelling of the site, or perhaps a return to a disused site after a period of time (Dockril et al 1998). As such, the presence of these secondary deposits further supports the interpretation of burnt mounds as having deep temporal links, and as being places which attracted particular types of transformative and symbolic behaviours.

Fig 5.30 Elongated Mound and small ovoid mound at Loch of Forratwatt

Fig 5.31 Primary mound and secondary mound material at Lower Loch of Setter
In addition to the variation in mound shape, a number of the sites visited demonstrated signs of possible internal structures. Several sites excavated in the Northern Isles have produced evidence of substantial stone structures within the mound. These structures are not normally visible above ground prior to excavation. In the case of Cruester and Tangwick (Moore & Wilson 1999, 2001, 2008) the buildings were revealed through coastal erosion, but in other cases mound material completely covered all structures prior to excavation (cf Hedges 1986:3). Substantial stone structures were also found at Tougs (Hedges 1986), and at Stoura Cottage (Small 1972) in Shetland, as well as at Liddle, Beauquoy (Hedges 1975) and Meur (Toolis et al 2007) in Orkney (see Chapter Four).
presence of large, earthfast stones in or around the perimeter of the mound were therefore taken to be possible indicators of internal structures. With the exception of Little Brownie’s Knowe, all of the potential structures were located in crescentic mounds, and were focussed around the central recess. This bias does not preclude the presence of structures within ovoid or other shaped mounds. Prior to excavation the mound at Tougs was described as ‘elongated’ and displayed no signs of containing any materials (Hedges 1986:3). The mounding strategies employed to construct crescentic mounds leave shallower deposits of burnt stone around the central area. This central area is often the location of the tank (e.g Bogers Burn, Northmavine Fig 5.33). As such, the shallower deposits covering structures at crescentic mounds are likely to be more prone to erosion, and thus produce evidence for materials within. The lack of this central recess at ovoid sites may indicate the intentional remodelling of the mound following the abandonment of associated structures, as will be discussed in Chapter Seven. Possible structures were identified at Dutch Loch (Fig 5.34), Loch of Niddister (Fig 5.32), and Skelberry (Fig 5.35), while other sites, such as Brunatwatt and Little Brownie’s Knowe where noted to be associated with single earthfast stones (Fig 5.36). The relationship between these single stones could not be determined from ground survey. Strongest evidence for structures were identified at Hamnavoe (Fig 5.37), where a curved line of stones ran along the edge of the central hollow in the mound. These stones appear similar to the revetting walls employed at Liddle and may have acted as a kerb to the mound material.

Fig 5.34 Possible structural remains in the central recess at Dutch Loch
Fig 5.35 Possible structural remains at Skelberry

Fig 5.36 Single earthfast stone at Muckle Brownie’s Knowe

Fig 5.37 Remains of kerbing at Hamnavoe
5.3.5 Relationship with Water

The presence of water was the most prominent characteristic of the burnt mounds visited. Site visits revealed a number of different categories of water associated with burnt mounds (Fig 5.38). All of the sites visited were within close proximity of one or more bodies of water, with the exception of two mounds at Biggings, Papa Stour (Fig 5.39), which had no visible water source. This site appeared to be substantially improved grassland however, and it is possible that drainage activities have removed any trace of previous watercourses. Ordinance Survey mapping indicates a number of wells in the immediate vicinity of Biggings, which raises the possibility of a groundwater source or spring being utilised at this location.

Despite its almost universal presence however, the relationship between water and burnt mounds is far from straightforward. In some locations what appeared to be a stream on the map was in actuality a patch of boggy ground with ingress and egress for drainage (e.g Lu Ness Fig 5.24). While this water could still be tentatively classified as ‘flowing’ the stream side representation on the map does not do full justice to its true nature. In some of these locations concentrations of mosses and marsh marigold in the surrounding areas indicated a tendency to flooding, particularly in low lying areas surrounded by higher ground. Other areas appeared to have no visible water source, but bore evidence of possible seasonal runoffs which may produce flowing water during periods of heavy rainfall (e.g Clothie Fig 5.40). In both these instances it is possible that
recent landscape changes have affected the local hydrology. This was particularly evident in areas which are currently crofted, or which bear evidence of intensive crofting activity in the recent past. Hence the relationships between mounds and water situated in areas of improved grazing were most difficult to determine. Often these locations overlooked a body of standing freshwater, such as a loch. In these instances the mounds were at greater distance to the water sources than those found in rough pasture. This was the case at both Muckle Browne’s Knowe and Brunatwatt (Fig 5.11). At Brunatwatt a pair of mounds are situated in improved grazing or hay pasture approximately 350m above the loch. Ordinance Survey mapping records a stream directly to the north of the mounds running into the loch, however field visits revealed this to be a small seasonal runoff rather than a substantial water source. At Muckle Brownie’s Knowe the nearest source of water was a small seasonal runoff which passed by the nearby site of Little Brownie’s Knowe approximately 350m to the east. However, the most visible source of fresh water was Huxter Loch, some 700m north of the site.

While no obvious orientation for the mound sites could be determined for circular, dual or irregular shaped mounds, crescentic mounds with an immediate waterside location often opened directly onto the water. More interestingly perhaps, all of the sites which
were identified as having a directly coastal location, and which possessed identifiable central recesses or internal features seemed to be directly orientated towards the sea (Fig 5.41). Often however, these were not the sites with wider views over stretches of coastline, but rather those which have focussed and limited views of specific harbours or coastal inlets (see below). At Tully Knowe, for example a substantial crescent shaped mound is situated in a marshy area at the confluence of two branches of a fast flowing burn, suggesting the possibility of the utilisation of both flowing fresh water and groundwater sources. However, despite the proximity to both of these water sources the central recess of the mound is directed at the sea. This observation was repeated at Hamnavoe, Cruester, Tangwick and Loch of Brouster. All four sites were situated in coastal locations, in marshy areas prone to flooding. Many sites had multiple relationships with water sources. The burnt mound at Lower Loch of Setter is situated on the banks of a burn as it feeds into the Loch of Setter. Similarly both mounds at Brunatwatt were situated in view of the loch, but were in close proximity to a small feeder burn while the mound at Willapund was situated at the mouth of a loch, besides a burn that drained from an area of deep marshland.
5.3.6 Mound Clusters
The presence of clusters of mounds was also a recurrent theme. Mounds regularly occurred in pairs, such as at Minn, Muckle and Little Brownie’s Knowe and Biggins, or even trios, such as at Lu Ness and Loch of Foratwatt. In some cases, such as at Loch of Niddister and Lower Loch of Setter the satellite sites were so small that their appearance would suggest they represent short lived activities, or possibly even the practise of storing or, as was suggested above, moving mound material from the original site into an alternative location. Even in cases where there were several more substantial mounds (such as at Lu Ness) there was normally one mound larger than the other. At Burn of Setter a group of four mounds was recorded spread at even intervals along the length of the burn (Fig 5.6). The clustering of mounds in this manner suggests that certain locations where favoured for burnt mound use, and attracted multiple uses over a period of time. It is not certain whether these clusters indicate contemporary workings, and are therefore indicative of centres of burnt mound usage, or whether they represent successive periods of use and abandonment.

Visibility between burnt mounds was variable. While at Loch of Brunnatwat, Loch of Foratwatt (Fig 5.31) and Biggins (Fig 5.40) the mounds are clearly visible from each other, at other sites there seems to have been a conscious attempt to avoid intervisibility. This
is most evident at Lu Ness (Fig 5.24) in Burra where the mounds are located on a small peninsula in the low ground between to rising slopes. The narrow spit of land is bounded to the north by the harbour of Hamna Voe and to the south by waters leading into Meal Beach. In the centre of the isthmus is a large rocky knoll. The Lu Ness burnt mounds are positioned either side of this knoll, so that neither is visible from the other. This is also the case at Tully Knowe and Green Knowe, which despite being in close proximity are not visible from each other.

5.3.7 Relationship with other prehistoric sites

Intervisibility between burnt mounds and other prehistoric features was variable. Mounds and settlement sites were found in close proximity to each other but were observed to have limited intervisibility. This was most evident at Scord of Brouster. Here the excavated remains of the settlement at associated field systems make the site easy to identify from a distance. Loch of Brouster burnt mound is situated south west of Scord of Brouster, and the head of the tidal Loch of Brouster. The crescentic mound is situated in an area of marshy runoff immediately adjacent to the water’s edge. As was observed above, the central recess faces towards the water, and affords views out into the Voe of Browland and the Ward of Browland. Views of the settlement at Scord of Brouster are blocked by the slopes of Gallow Hill. Whittle (et al 1986) notes that there are a number of prehistoric walls and lynchets running off into Gallow Hill, and it is therefore probable that some elements of the settlement would have been visible from the mound. The houses, however, appear to be directly out of site. Likewise, from the higher vantage point of the settlement it is possible to see out towards the Loch of
Brouster, but it was noticed that the burnt mound itself appeared to be hidden by the surrounding contours. A similar relationship was also observed at Ness of Gruting, where the burnt mound was observed to be just out of sight of the house. Visibility in both directions was blocked by the contours of the headland. Lack of visibility does not preclude a relationship however. Whilst the burnt mounds and settlement sites may not be visible from each other, their proximity presumes interaction when moving about the landscape. Additionally, travelling to or from burnt mounds one regularly passes prehistoric field boundaries (Fig 5.42) or other structural remains (Fig 5.43). This provides burnt mounds with a unique status within prehistoric settlement contexts. Close proximity to settlement suggests that they formed part of the day to day landscapes of Bronze Age Shetlanders. At Tougs, Burra, this was illustrated through their incorporation into surrounding field boundaries (Fig 5.17). However, the lack of intervisibility between burnt mounds and settlements suggests that they were subject to stringent controls regarding interaction with and participation in the processes taking place within.

GIS analysis demonstrated that exactly half of the burnt mounds within the study area were more than 1500m away from known settlement site. Despite this apparent differentiation however, visits to a number of these sites failed to demonstrate any change in landscape setting which might indicate a differing approach to these locales. Sites within this category include Tully Knowe, Muckle & Little Brownies Knowe, Loch of Foratwatt, Clothie and Willapund. These sites utilise all of the water sources identified above, demonstrate both single mounds and multiple mound groupings, and included a number of sites with possible internal structures. I have already suggested that this dual distribution suggests that some of the activities taking place at the mounds were deemed unsafe or polluting (section 5.2.4, cf Chapters Three, Seven & Eight). As will be explored in Chapter Seven, it is possible that the construction of the mound formed part
of the strategy for mitigating against this danger. This argument is reinforced by the apparent separation of burnt mounds and houses within settlement locations, and further reiterates their status as powerful and transformative locales.

5.3.8 Open and Closed Views

Aside from the obvious affiliation with water the most consistent aspect of the landscape setting of burnt mounds was the subjective sense of enclosure that accompanied most visits to site locations. The topography of Shetland is such that there are very few flat locations, but a good deal of valleys and hill ridges. At the lower locations favoured by the burnt mound sites, there was often the appearance of a natural amphitheatre, surrounded on all sides by higher ground. While in some instances this higher ground was some distance away, and consisted of larger hills and notable landmarks, quite often this appearance was enhanced by the immediate topography, so that the gentle slopes of the immediate foreground appeared to rise up and meet with the steeper ones of the surrounding hills (Fig 5.44). While Shetland is not mountainous, and has no especially steep or dramatic hills, it has a constantly undulating topography which means that you are never far from a patch of rising ground and the horizon in the low lying areas is often formed of hilltops. Within these amphitheatre locations, the views are restricted to the immediate vicinity (Fig 5.45), as was suggested previously through viewshed analysis.
This is a secretive, hidden world where the undulating nature of the ground means that features which are only several meters away are not visible from nearby locations. Hence, as was explored above, a person working at the burnt mound site may be aware of a nearby site or settlement, and indeed may be able to hear it, smell the smoke from the fire, and even see the plumes rising, they would not always be able to see the buildings themselves. The lasting impression taken away from these locations however, is not that they are separate or outside of the localised landscape. On the contrary, being at the lowest point and looking upwards and outwards to the surrounding areas the subject is somehow tucked away in the middle.

Mounds with a coastal location were generally found to have wider vistas. At Hamnavoe, Loch of Brouster and Tully Knowe sea views were restricted and appeared to be bounded on all sides by land (Fig 5.46). However, at Muckle & Little Brownie’s Knowe, Wick and Links of Quendale these views are more expansive, and extend out to the horizon. Mounds with extensive sea views were predominantly found in the south
mainland, and on western coast of west mainland. The cliffs and wide bays in these areas afford wider vistas than the enclosed voes and inlets found elsewhere in Shetland. While these open views seem to be in opposition with the sense of enclosure experienced at other burnt mounds, they are very much in keeping with the focus on watery places outlined above. As will be explored further in Chapter Eight, water is a symbolically potent element. The presence of the sea may be linked with concepts of island identity, and with the seas as a medium of transport and connection. Undoubtedly it also links with the concept of water as a transformative element, and the central role which these properties play within burnt mound sites. We have already seen burnt mounds are not only located by, but appear to be orientated towards bodies of water. As such, the presence of extensive watery vistas can be seen as an extension of this principle

5.3.9 Encountering Burnt Mound Sites.
Having explored the locational considerations of burnt mound sites, I would now like to turn my attention to how these factors influence the experience of burnt mounds within the landscape. I have already outlined the various forms of water source associated with burnt mound sites. These variations have a profound effect on the experience of burnt mounds. The diverse character of water is explored in detail in Chapter Eight. It is argued that it is water’s ability to take on a variety of forms, and to shift from state to state which provides it with much of its symbolic meaning. This diverse character means that it also affords a range of sensory experiences. The sonic qualities of water were one of the most notable factors in the encounters with burnt mounds described above. Watery sounds were experienced at sites next to flowing freshwater sources such as burns and hill runoffs, and at coastal sites, but to a lesser extent at standing freshwater sources such as lochs and marsh. The intensity of the sonic experience also depended on weather conditions. After a period of rain the volume of water flowing through streams and hill runoffs increases. In doing so the sound of running water becomes more intense, and what at one time can be experienced as a gentle tinkling can become a rushing roar. At sites such as Clotlie (Fig 5.39), which is situated next to a very small hill runoff, this change in water volume makes a marked difference in the experience of the site. This site was visited following a period of relatively dry and stable weather. Initially I had identified this site as having no visible water source. The slight nature of the runoff meant that it was barely visible below overgrown grasses, and on arriving at the site I was unable to see it. It was not until I began to explore the surrounding area that I
noticed the glint of water through a gap in the foliage, and was then able to trace its path towards the mound and determine the relationship. During periods of wetter weather this watercourse is likely to be swell and become prominent however, and so the experience of the site, and the perception of its relationship with water is likely to differ too. The sonic qualities of water were most evident at sites with a coastal location. During calm weather this took the form of the gentle lap of waves upon the foreshore, while during more unsettled weather this rose to constant roar, accompanied by the sounds of waves crashing upon nearby rocks. However, this experience was not limited to sites at which the sea was visible. At East Collaster the roar of the sea was distinctly audible, despite there being no line of sight to the coast from the site. In this case, the sonic qualities of water were able to create links between the burnt mound and bodies of water which would otherwise have appeared disconnected from the site.

The low lying contours occupied by burnt mounds also have a profound effect on the way in which they are experienced. We have already seen how lines of sight between burnt mounds and settlement sites appear to have been deliberately avoided, so that the burnt mounds reveal themselves as you move through the landscape towards them. This effect is heightened when approaching the sites from the surrounding area, as was demonstrated at Willapund (Fig 5.47). The site is surrounded on three sides by high ground, and by rising ground leading to the sea to the north. Approaching from a distance its location next to the loch is immediately visible. While today the mound is covered in a thick layer of foliage and heather, which makes it difficult to discern from its
surroundings at a distance, we must remember that the mound we see today is the final stage of its construction, and would only have been achieved after it fell out of use (Chapter Seven). The mound would have grown through use, and would have appeared as a bare heap of fragmented rock besides the loch. As such we can imagine that the site would have been more readily visible than it appears today. In approaching the mound the agent moves through the landscape downhill. This downward movement gives the impression of moving into the landscape. Watercourses also provide a focus for movement, directing the agent through the landscape. Bends and meanders of watercourses such as at Burn of Setter direct movement between mounds, and prevent the agent from taking a direct route between mounds, instead forcing them to follow the natural contours of the landscape, while patches of deep marsh can redirect movement for some distance until the ground becomes firm enough to walk upon.

5.4 Shetland’s Burnt Mounds in their Landscape Context.
In this chapter I have explored the results of two different scales of analysis in order to determine the wider landscape context of burnt mound sites. GIS analysis on a regional scale has shown the burnt mounds of Shetland to occupy a distinct landscape setting characterised by low lying ground and affinity to water. Within this wider pattern however a range of variations were revealed, particularly in relation to the type of water source which appears to have influenced the location of the sites. Two major categories of water source were identified through GIS analysis, these being flowing water and standing water, with a small proportion of sites appearing to display a coastal affinity outside of these groups. However, in-situ survey demonstrated that these categories could be further sub-divided to include marshy areas, seasonal runoffs, and apparently multi water source locales. Further variation in site morphology was also identified which combined with the evidence from previously excavated sites detailed in Chapter Four suggests that far from being homogenous, the burnt mounds of Shetland appear to possess a wide range of variation both in location, size, shape, and internal structure. GIS analysis was also able to demonstrate that the preference for low lying locations was not exclusive to burnt mound sites, with the majority of settlement sites also occupying land below the 50m contour. From this observation I suggest that far from being marginal and separate to settlement locations as has been suggested for some burnt mound sites (Barfield & Hodder 1987), many of the burnt mounds of Shetland appear to occupy the same landscape setting as settlement sites. Simple proximity analysis
demonstrated that exactly half of the sites within the study area fell within 1500m of settlement sites, forming part of what has been defined above as the ‘local’ scale (Rennel 2009:108). This is defined and characterised by everyday interactions by those with an intimate knowledge of the landscape. A large percentage of these sites fall within the areas identified above as being locales of good preservation and recording, suggesting that it may be possible to extend this relationship to other areas within Shetland should similar levels of recording and survey be applied to these areas. Viewshed analysis of burnt mound sites throughout Shetland demonstrated that the sites appeared to be locally focussed, and afforded views of the immediate landscape, rather than being situated in locations with strategic views of nearby landscapes. This pattern appeared to replicate the results seen for settlement sites, which also demonstrated a local focus, rather than preferring locations with commanding views of the wider surrounding area. Moreover, the localised focus suggested through viewshed analysis appears to translate into a feeling of centrality and enclosure when experienced on the ground.

The wider patterns observed through GIS analysis were supported by a series of site visits which appeared to confirm that burnt mounds sites were indeed closely related to the settlement evidence. In areas of good preservation it was possible to observe that burnt mound sites and settlement sites appeared to form a network, an observation which has also been raised by Deborah Lamb’s work exploring the development of landscapes in Burra. Lamb observed that the location of burnt mound sites appeared to be directly related to the location of known settlements, and even suggested that the burnt mounds may form central points in between individual homesteads (D Lamb, pers. com). However, while proximity does indicate a relationship, site visits have revealed this to be complicated and nuanced. Burnt mounds are found to occupy hidden locations within the landscape which prevent visibility from settlement locations, and often from other burnt mounds. This is consistent with the discovery that 173 sites within the GIS database fell outside of the ‘local’ proximity of burnt mound sites. It is possible that this differentiation relates to the type of activities taking place at the site, and how suitable it was deemed to be to perform this near to areas of habitation. As will be explored in Chapter Six, many of the experimental activities carried out at the burnt mound site (particularly tanning, but not exclusively) resulted in unpleasant odours, or utilised bodily fluids and other materials which may be seen as polluting. However, visits to these sites determined that they occupied the same type of location as those in close proximity to
settlement. It is suggested therefore that the powerful and transformative processes taking place within necessitated landscape locations which controlled access, and prevented the possibility of pollution. As such, the locations occupied by burnt mound sites can be seen as having special status, and being transformative in their own right.

5.5 Evaluation & Conclusion
In this chapter I have explored how a combination of GIS analysis and in-situ survey may be combined in order to develop a person-centred overview of the landscape setting of Shetland’s burnt mounds. A number of methodologies have been employed in order to achieve this:

1) **Regional scale location based GIS analysis to determine patterns of landscape use, and examine the relationship between burnt mounds, topographical features and other prehistoric sites.**

Based upon initial observations from early site visits, location based analysis was able to successfully provide an overview of the relationship between burnt mounds and key features within the landscape. Specifically it was possible to identify that burnt mounds demonstrated an affinity for watery locations, and that the water sources utilised could be subdivided into flowing freshwater, standing freshwater and saltwater locations. Additionally it was observed that there was an equal divide between burnt mounds which were within close proximity to other prehistoric sites (local scale), and those which fell outside of this proximity. However, this type of analysis was not able to illustrate some of the more subtle nuances of burnt mound locations, particularly in relation to types of water source.

2) **Local scale viewed analysis to explore the affordances of the visual experience at burnt mound sites.**

Viewshed analysis was utilised in order to explore the visual affordances of burnt mound sites. Examination of viewsheds taken from sites throughout Shetland was able to demonstrate patterns of limited visibility, and enclosed space at burnt mound sites. However, it should be noted that it was only possible to interpret the information from viewsheds fully with supporting information from in-situ survey. In particular, it is viewshed models may give the appearance of wide areas of visibility, but that this is not translated into the experience of wide vistas on site unless the line of site is continuous and unbroken. Viewsheds
generated as part of this study were able to demonstrate a pattern on close views at burnt mound sites, with the exception of coastal sites, which appeared to have more open vistas when looking out to sea.

3) **In-situ** analysis of individual burnt mound sites through phenomenologically informed site visits.

*In-situ* analysis of the locations of burnt mound sites was essential for the proper understanding of data generated by GIS analysis, an enabled the more general patterns identified above to be expanded upon, and in some cases, reconsidered. As was noted in Chapter One, all research undertaken as part of this thesis was developed as a result of initial site visits, through questions relating to landscape use, and the relationship between burnt mounds, water and other prehistoric sites were formed. Likewise, as *in-situ* survey allowed provided the framework for GIS analysis, so GIS analysis provided a series of questions and observations which were then explored more fully in the field.

Criticisms of both GIS analysis and phenomenologically informed approaches to landscape have been noted, however I have argued that by combining the two approaches in a reflexive dialogue it is possible to mitigate some of these critiques. As it noted above, individually both GIS analysis and *in-situ* survey only gave a partial understanding of the landscape setting of Shetland’s burnt mound sites. Rather, it was through an iterative and reflexive dialogue between both of these methodologies that a deeper understanding of burnt mound sites was developed. As such, I have suggested that when combined in this manner GIS and phenomenology do not need to be mutually exclusive, but rather can be seen as complementary. In exploring the landscape setting of burnt mounds GIS has proved to be a useful tool in drawing together wider patterns of landscape setting, and in providing a series of questions and observations to be explored through survey. Site visits to burnt mounds within the study area have largely confirmed the observations drawn from GIS analysis, but have demonstrated the need to visit sites and experience them first hand in order to fully explore the subtleties and nuances of the landscape experience. While viewshed analysis provides an overview of the visual affordances of a landscape, it is not a substitute for viewing. Rennel (2009:267) has noted that viewsheds are unable to offer an accurate understanding of views available from site. She suggests that a viewshed with large magnitude (ie those with a large area which is potentially viewable) does not translate into an area with a wide vista. These vistas, she argues, depend on unbroken lines of sight, and the relative contribution of
different landscapes into the vista. Thus, by having a reflexive dialogue between GIS and phenomenological approaches it has been possible to understand how the models created through GIS relate to landscape experience. Moreover, it should be noted that viewsheds produce a static image of visual potential from one particular point. However, \textit{in-situ} survey illustrated that the burnt mounds were involved in phases of concealment and disclosure as the agent moved through the landscape.

The importance of being there was also highlighted through exploration of the relationship between burnt mounds and watery locations. As was suggested by the GIS results, stream side locations were found to be the most common, but were not as numerous as the results indicated. While map based survey proved to be efficient at identifying sites which were located next to standing water (loch side), it was less accurate in differentiating between running water sources and areas of boggy ground in which a groundwater source may have been utilised. While in situ survey was more suitable than GIS analysis to identify some of these variations however, it should be noted that a number of excavated sites have revealed internal drainage features and cisterns, such as those found at Cruester, which indicate that the relationship between mound sites and their local water sources may be even more complicated that appears on the surface. In such cases only excavation and other invasive techniques are likely to uncover the true nature of what appears to be a very complex relationship.

Finally, it is noted that accounts both GIS and \textit{in-situ} survey continue to focus predominantly on the visual experience of burnt mounds at the expense of other sensory engagements. Viewshed and visibility studies were successful in highlighting the complex relationships between burnt mounds and other prehistoric features. Specifically they have illustrated that the location of burnt mound sites, and therefore the experiences which they afforded was subject to high levels of control. Sites appear to have been established in locations with limited visibility of other locales, even when in close proximity to other activity. This, I have argued suggests that the processes involved in their creation and use may have been seen as powerful and transformative, and as such necessitating segregation and separation from other areas of activity. However, as has already bee explored in Chapter Three (section 3.1.3), visual approaches rely heavily upon the primacy of the finished object at the expense of exploring the processes and procedures which go into its construction. As such it is necessary to engage with the full range of sensory experiences involved in burnt mound usage. To do so requires that we engage with the processes involved in the creation and use of the mound, rather than
focussing on their static final form (see also Chapter Seven). It is to this end therefore that the next chapter turns.
Chapter Six: Experimental Firings

6.1 Introduction: Experiment or Experience?

This chapter will detail some of the observations, experiences and new understandings that have come about as the result of a series of experimental firings at a burnt mound site in Shetland. The experiments were undertaken to allow me to explore the direct experience of thermal technologies in order to develop a new understanding of how burnt mound practises may have been understood in the past. While previous considerations of burnt mounds have focussed solely on the output of the technologies employed at such sites, this study aims to unravel the range of processes involved in achieving these outputs, and to explore the material and social engagements which both facilitate and are facilitated by these activities. As such, the firings undertaken are perhaps not what is traditionally thought of as ‘experimental archaeology’, therefore before I go on to give any more detail about the work undertaken at the replica site, it is first necessary to clarify exactly what I mean by the term ‘experimental firing’.

Experimental approaches have formed a part of archaeological practise since the antiquarian period (Coles, 1973; Forrest 2008; Millson 2011). Experimental archaeology is a key tool in developing our understanding of the use and creation of past technologies. Experiments such as Pitt-River’s work using antler picks at Cissbury, Sussex (Millson, 2011:1; Pitt Rivers 1876. 382-3), McGuire’s work with stone tools and metal process (Coles 1979; Forrest 2008), and other, larger experiments e.g. Severin’s (2005) replication of the Brendan Voyage and Heyedahl’s (1950) Kon-Tiki voyage allow us to explore the limits and possibilities of the endeavours of past peoples. Despite its longevity, there remains the sense that experimental work remains somehow ‘outside’ of standard archaeological practises. Forrest suggests that much of this may be due to its perception as ‘amateur’ and its association with re-enactment and public engagement activities, rather than serious academic research (2008:67). This status has led some to call for a code of practise or guidelines for undertaking experimental archaeology (see Cunningham et al 2008:vii), and for a return to the scientific principles of experimentation to reinstate the field as a legitimate tool in the archaeological toolkit. Millson describes experimental archaeology as ‘an objective approach targeting specific questions and resulting in data which can be empirically understood (2011:3). As such it should have a clear set of aims, and outline all methodologies and materials used, so that it is both repeatable and testable (Cunningham et al 2008; Millson 2011). Moreover, in
order for it to be useful, it should always be related back to the archaeological record, so that it can inform on our understanding of the objects, places or processes under study. In particular, Cunningham et al draw a clear distinction between what they perceive as experimental, and what might be termed as experiential (2008:v). While experimental processes may be experiential, they stress that not all experiential works are experimental. In relation to this definition then, the processes carried out as part of this study and described below are most decidedly not experiments. It is important to stress here that these processes are not designed to ‘test’ whether any of the proposed functions can or cannot be carried out at a burnt mound site. Nor are they intended to be accurate replications of prehistoric processes, using strictly prehistoric techniques, and there is certainly no aspiration to objectivism within the design of this study. Rather, these experiments fall within what has been described as experiential, in that they are designed to explore the range of skills and experiences developed as part of attempting to carry out some of the functions ascribed within the literature to burnt mound sites. However, that is not to say that these processes do not inform on the construction and use of burnt mound sites, and have not led to observations which can be directly related back to the archaeological record.

In this context the term experiment is used here to describe an exploratory series of actions designed to answer questions about the experience of working a burnt mound site. These experiments explore questions relating to practise, and provide insight into technologies of the body in terms of skill and actions attached to burnt mound firings. Of course, these processes will not develop the same social relationships or require the same material interactions as those who used them in the past. For this reason there has been no emphasis placed on ‘authenticity’ or a rigid adherence to replicating prehistoric methods in the performance of these tasks. Rather, these experiments are designed in direct response to the statement that little information could be drawn from burnt mound sites beyond an indication of settlement or population distribution (Barber & Russell White 1990). By exploring their potential for creating relationships, developing skills, and creating networks of materials and persons these experiments challenge this presumption, and instead illustrate the potential for viewing burnt mound sites as hubs of activity, and nodal points in the flux and flow of people, places and things.

As was discussed in Chapter Three, the experiments undertaken for this thesis explored a range of activities which have thus far been proposed for burnt mound usage (cf Chapter One), specifically:
In addition, a winter firing was performed in order to explore how seasonality might affect the process of working a mound. These processes were chosen to represent the range of processes proposed for burnt mound usage. During hide processing experiments it was decided that the worked skins would be utilised to construct a skin boat. This process was inspired by the Raising’s (1984:20) account of the use of hot stones in the expansion of dugout log boats. Shetland’s treeless nature suggests that skin boats, rather than log boats were more likely to have been utilised during the Bronze Age. Nevertheless, the presence of coastsally located mounds (Chapter 5) raised the possibility that burnt mounds may have been in some way connected to the sea and the use of waterways as transport routes, and as such, the decision to construct a boat was made. In addition, it was decided not to experiment with metalworking, due to the lack of information available as to how these sites may have been utilised in this process. It is my belief that this application has been suggested due to the association of burnt mounds with hoards of metal, such as the Moughan hoard (Condit 1996), and through their presence in locations otherwise associated with metal deposition (Yates & Bradley 2010), rather than any real indication of a metalworking application.

The applicability of many of these functions are still contested within burnt mound studies (cf Barfield & Hodder 1987; Hodder & Barfield 1991; O'Drisceoil 1988, 1991; Quinn & Moore 2007). However for the purposes of this study each of these applications were treated as equally plausible. As was discussed in Chapter Four, the application of hot stone technologies at burnt mounds in Shetland appears to have varied from site to site. Therefore if we accept that burnt mounds could have been utilised for a range of purposes, the question then becomes how these practises may be related, and what kinds of skills are required to successfully perform these actions. How might the skills acquired undertaking one task affect the way in which another is performed, and how might any shared practical knowledge affect the way in which each of these activities are perceived? Moreover, in what way do the practises carried out at burnt mound sites
relate to others understood to have been carried out elsewhere during the Bronze Age, and how does that affect our understanding of burnt mound sites themselves?

6.2 The Replica Tank & Hearth

The experiments undertaken as part of this study were carried out at the replica hearth and tank constructed on Bressay, as part of the Bronze Age Bressay Project. This project was developed in partnership with Scottish Archaeology’s Adopt-a-Monument scheme and the SCAPE Trust. The replica structures were constructed to the exact floor plan and dimensions of structures excavated from the nearby site at Cruester. The burnt mound at Cruester was originally identified as being under threat from coastal erosion during a survey of sites undertaken by EASE Archaeology in 1996 (Moore & Wilson 1999, 2001, 2008). Excavation in 2000 revealed a series of complex structures (Fig 6.1) (Chapter
Four) as a result of which the local community decided to approach the Adopt-a-Monument scheme with the view to fully excavating the site, removing the structures within and reinstating them in a safer location. During excavation each stone within the site was numbered individually, so that it might be replaced in its original position within the reconstruction. In addition to this it was decided to create a replica site which could be used to conduct experimental firings, and would form a part of a public outreach project. The replica was constructed to the exact dimensions of the original site, and includes the hearth cell, central passageway (Passage B), compete with terminating orthostats, a side cell (Cell D) and the tank itself. As such, the site represents a unique opportunity to explore how the specific physical setting and internal structures of the site either constrain or enable action.

6.3 The Experiments

6.3.1 Transporting Stones & Heating Water

In order to carry out any of the processes intended to be explored as part of this study it was first necessary to establish the essential skills involved in working the site; creating a fire, filling the tank with water, roasting stones, and transporting the stones from the hearth cell to the tank. Without a method for achieving each of these things none of the other activities would have been achievable. These seemingly simple tasks form the backbone of any process proposed to have taken place at burnt mound sites, and O’Kelly’s (1954:119-123) accounts of experimental firings at Ballyvourney were particularly useful at this stage in providing insight into possible methods for the constructing the fire, transporting stones and emptying and cleaning the tank.

The stones for the experiments on Bressay were gathered from the foreshore by a local landowner who transported them to the site using a small flatbed trailer. They were then stored next to the hearth in a pile prior to firing. Transferring the stones from the trailer to the hearth cell required a large team of people, and several trips. Stones were placed into buckets for ease of transportation, and despite the assistance of modern technologies, the effort of shifting the items even this short distance was considerable. Once they were on site they could be lifted by hand from the storage pile into the hearth cell as required. During the course of the process it was found that most stones lasted for at least three or four firings before they shattered and had to be disposed of. A new delivery of stones was normally required every two months during regular firings.
A number of methods were initially explored to find the best method for constructing the fire within the hearth. O’Kelly (1954:120) describes a method of fire construction by which stones and wood were placed in layers across the floor of the hearth. The fire was then lit from one side, and allowed to burn through the stones and wood, so that it moved from one end of the hearth to the other. This method appears to be a particularly efficient method of ensuring a continued supply of stones in order to ensure a prolonged burn. However, while this method of construction was particularly suited to the wide open hearth structures found at Ballyvourney, it was less suited to the enclosed hearth cell at Cruester, and so alternative methods had to be sought. Initially, a traditional conical shaped fire was constructed with the stones at the centre. Once this had begun to burn additional fuel was added to the fire in order to provide a sufficient burn to heat the stones. However it was found with this process that the number of stones placed in
the fire was not always sufficient to heat the water in the tank, and that when the stones were piled in the centre of the fire itself not all of them were heated directly by flame. Later, it was decided to construct the fire using a ‘pyre’ type arrangement. Alternating layers of wood and stones were placed in the hearth one atop the other, and the fire was built up to the required size in this manner. Kindling could then be added in the spaces in between the wood, and the result was a large blaze with a good quantity of stone spread evenly within it (Fig 6.2).

Unlike its prehistoric counterparts, the replica site was not situated near to a natural water source. As such the only method of filling the tank available was to attach a hosepipe to the tap in the public toilets outside the heritage centre. This process alone often took in excess of 30 minutes to fill the tank, depending on the level of the local water table and the amount of water already in the tank (as will be discussed bellow, the tank occasionally self filled to a certain degree, and often self drained). O’Kelly (1954:119) noted that the trough at Ballyvourney began to fill naturally once the local water table rose. However, despite this it was still found to be necessary to draw water from the nearby stream. A similar process could have been expected to occur at Cruester. The tank was constructed into natural peat deposits, and during excavation was observed to fill with water on a regular basis (Moore & Wilson 2001:10).

In filling the tank it was found that the water reached a natural level, beyond which it was impossible to fill the tank any further. This was probably due to water escaping through the larger gaps between the stones forming the walls of the tank at the top of the structure. However, after a few firings it was found that this natural optimal level was almost exactly the level required to allow for displacement of water once the stones were added to the tank. After time this level became identifiable by a ‘tide mark’ on the walls of the tank itself, although this was more noticeable following those processes which left a greater degree of residue, such as brewing and hide working, than those which involved just heating the water. The method of filling the tank at the original site is still open to speculation, although it is probable that water would have to have been added to the tank using a container from another water source. In the case of Cruester, cell H, to the north of the tank appears to have been constructed as a cistern, and was dug down below the water table to create a self filling reservoir of water (Moore & Wilson 2001:14). Thus, while the original location appeared to have paleochannels running around the mound it is possible that these channels were not utilised in the filling of the tank itself.
The stones were heated within the hearth for upwards of an hour prior to being removed from the hearth cell and transferred to the tank. During this period the area around the hearth cell became hot and smoky; the frequent pops and bangs of expanding materials within the fire made it an uncomfortable and dangerous location to work in and constant vigilance was required in order to avoid injury. The enclosed hearth meant there was limited access to the fire, which restricted the options for working with it. The replica structure was open air and only included one side cell, while the fire in the original site was enclosed and built up on all sides. Working conditions would have therefore have been cramped, uncomfortably hot, and occasionally quite frightening (for more on the dangers associated with working burnt mound sites see section 6.4 below).

A long handled implement was required to rake and manage the fire. During earlier firings there were some attempts to create suitable wooden tools to perform the task, however many of these became charred or burnt, or were simply not efficient in moving the stones in the manner required. Later on an old, long handled agricultural fork, which had lain disused in the shed of one of the local volunteers, became the favoured tool for fire management, as it provided enough reach to allow the user to stand at a more comfortable distance from the fire whilst raking it. Wooden tongs were also created to lift the stones into the tank, however a ‘roll and flick’ method was soon developed, using modern gardening shovels and forks, which proved to be a faster and more intuitive method for transferring the stones from the hearth to the tank (Fig 6.3).

During the excavation of Tangwick and Cruester it was noted that both sites appeared to have a ‘chute’ leading from the hearth cell to the tank. At Tangwick the stones lining this feature were reddened in a manner consistent with heating, suggesting that the chute had been employed in transporting the stones from the hearth cell to the tank directly below (Moore & Wilson 1999). This arrangement of hearth and tank was directly mirrored at Cruester, and the site was constructed on a slight incline, so that there too it was possible to imagine the stones being rolled down the passageway and into the tank. This incline was reconstructed at the replica, facilitating the passage of the stones to the tank, where they could then be ‘flicked’ over the lip of the tank and into the water. The raised lip of the tank, and the two orthostats immediately before the tank meant that stones did not often roll directly into the tank itself, nor did they go shooting past. This enabled the individual working at the tank edge to have some control over the speed and location at which they entered the tank. This process required at least two people, one to roll, and one to flick. However it was actually found to be most efficient with
three. First one person working at the fire raked the stones from the embers. A second propelled them from the area in front of the hearth towards the third individual who was standing at the tank edge controlling the stones entry to the water. Successive attempts at this process demonstrated that the faster the stones were transferred from the fire to the tank, the higher it was possible to raise the water temperature. During these initial tests, the water temperature was raised to an average level of 70°C within a short space of time, but later it quite often reached temperatures in excess of 80°C and even reached boiling point in parts of the tank.

![Fig 6.3 - Stones being transported from the hearth to the tank.](image)

While the word ‘control’ has been applied to describe the process of ‘roll and flick’ above, it should be accepted with some caution. In fact, the process was often anything
but controlled. The irregular shape of the stones meant that their path down the
passageway to the tank was often erratic. Those working within this space during stone
transfers often found themselves jumping out of the way as a hot rock veered
unexpectedly at their feet. Often hot clumps of embers would also come rolling down
the passage with the stones, and would lie fizzling at the lip of the tank, or else they
would be caught up with the stones being flicked in to the tank, and would extinguish
and disintegrate on contact with the water, leaving flecks of smouldering charcoal
floating on the top of the water. The water itself, which started out greyish due to the
clay lining in the tank, soon darkened and became filled with debris from the soot, ash
and dirt clinging to the stones.

Readers of this chapter will soon note that the sounds, smells and sensations involved in
using a burnt mound site are some of its most defining features. The use of hot stone
technologies is an extremely visceral and physical process, involving a wide range of
sensory engagements. Even without the specific textures, odours and sensations
involved with working with particular materials at the mound (as will be described
below), burnt mounds have a unique set of sounds and sensations which go hand in
hand with their usage. As the stones entered the water they hissed and groaned, sending
up small clouds of steam. Eventually when the water was sufficiently heated the entire
tank was shrouded in a low haze of steam. Areas around the hottest stones continued to
bubble for some time after the stones were entered. It was also found that after adding
the stones the temperature would continue to rise for some time until the heat from the
stones transferred fully, at which point the temperature would stabilise, before
beginning to drop again. When the tank became particularly full, the addition of a new
hot stone would cause the others around it to vibrate slowly, adding a low, rumbling
sound to the hissing and growling of the stones themselves. Other stones let off a high
pitched scream as they hit the water, usually before shattering into pieces. Within the
hearth the fire popped and crackled, occasionally emitting a loud band which would send
more experienced members of the team scattering to the edges of the site, as will be
discussed in more detail below. Stones rolling from the hearth rumbled and clattered,
and the smoke from the hearth cell left everyone working there with a distinctive woody
aroma, and a dried ‘kippered’ sensation as they left for home.
6.3.2 Brewing

Experiments in brewing took place during the summer of 2010 and 2011. As was discussed in Chapter Two (section 2.6.1), experiments in hot rock mashing have been successfully carried out by Quinn & Moore in Ireland, and their work resulted in a ripple of discussion on the potential uses of burnt mound sites both online (e.g. http://irisharchaeology.ie, http://www.mooregroup.ie) in the popular press (Quinn & Moore 2007) and at the 2008 World Archaeological Congress in Dublin. Early attempts at brewing at the replica mound met with problems when the stone tank developed a leak and required re-sealing with clay. In order to keep the planned schedule of experiments on track it was therefore decided that an alternative container should be sought to run the experiments in, with the view to re-running the process in the tank the following season. As such, the first run was carried out using an old sink as the tank with the second being performed in the stone tank the following year. Aside from the difference in container no other variables were changed, and the processes involved in both experiments were otherwise the same. The outcomes of both runs were successful, however the materials responded slightly differently in the different containers. Most notable was the difference in temperature reached during the firings. Water in the sink took less time to heat, but retained the heat less efficiently than water within the tank. The resultant mixture within the sink was also slightly thicker, despite both containers having comparable capacities. These differences can be explained by the larger surface area of the sink, which allowed for greater evaporation of liquid during the firing process. However, this experience serves to illustrate that even slight variations in the dimensions of internal structures within the burnt mound may have an affect on the outcomes experienced.

The process of brewing requires the conversion of grain starches into sugars, which are then fermented (cf Dineley 2004). The conversion requires the temperature within the tank to remain at an optimum temperature of around 65°C in order to convert without killing the enzymes. Brewing therefore presented a challenge in relation to fire management, not least because the temperature needed to be maintained constantly over a period of time in order for full conversion to be achieved. To do so it was necessary to identify which stones had been in the tank longest and replace them regularly, whilst simultaneously making sure that the fire was being managed in a way which ensured a ready supply of hot stones. Initially this required continuous use of the digital thermometer to manage the temperature. However during our second firing the
presence of experienced brewers on site allowed us to rely on the appearance of the surface of the water (which gains a ‘glassy’ look at the appropriate temperature) to determine whether the mixture was at the correct temperature.

Hot rock mashing requires the use of crushed malt for the successful conversion of starches into sugar. Malting begins with the germination of the grain, usually achieved by soaking the grain. Germination is then carefully monitored through the use of ‘malting floors’ as can be seen at many historic breweries and distilleries, where the malt is carefully turned until the appropriate level of germination has been achieved. Germination is then stopped by drying or ‘kilning’ the grains, before the grain is gently crushed (Dineley 2004:10-12). For the experiments in this study a six row variety of barley known as ‘Bere’ was used. This ancient strand of barley is still grown in areas of Orkney and Shetland, and elsewhere in Scotland, and is used locally for baking traditional beremeal bannocks, and in the brewing of some of the local archaeologically inspired ales. The Bere was sourced from local brewers and came pre-crushed, so no processing was necessary.

The initial phase of brewing involved heating the water with the roasted stones as described above, before adding them to the tank. A two person rolling method was employed to transport the stones from the hearth cell towards the tank, and then stones were lifted into the water. As the temperature was required to reach a specific level, this process was slower and more controlled than at other experiments, and involved a less frenetic activity. Once the water had reached the desired temperature a woven basket was lowered into the tank, and the crushed malt was poured into it (Fig 6.4). This method was employed both to control the amount of malt going into the tank, ensure its even spread and ease of mixing. It also prevented it from charring when coming into direct contact with the hot stones. The malt was stirred gently to mix it with the water before it was poured out and a new batch added. In this way the mixture was created gently, incrementally, until the correct combination of malt and water was felt to have been achieved. During this time, the water in the tank turned from clear to a pale brown liquid, which slowly darkened over time. On initial contact with the water the malt separated, and the lighter husks began to float to the surface, while the floury grains themselves began to swell and form a porridge-like substance. The more grain was added the thicker and darker the substance became, until the entire tank became full of a thick wet mash of saturated grain with a clear dark brown fluid floating on the top. While unpleasant smells will become a feature of the descriptions of the processes
carried out during this study, one of the most notable differences between the brewing experiments and others undertaken was the mouth watering smell which resulted. On adding the grain to the water the mixture took on an appealing edible smell, not unlike that of porridge or malted drinks such as Horlicks and Ovaltine which as it matured then took on a sweeter, syrupy smell.

![Fig 6.4 Brewing in the tank (Image courtesy of Merryn & Graham Dineley)](image-url)

The temperature was maintained for approximately an hour while the starches in the grains converted to sugar. During this time the tank was covered with a large wooden sheet in order to prevent the temperature dropping too suddenly due to surface evaporation and cooling. Occasionally new stones were added to maintain the temperature, and older ones were taken out. On these occasions the hot stones hitting the water resulted in a short period of hissing and bubbling, and an overpowering smell of toasted oats. Once in the area around the stone continued to bubble for a short period of time causing localised spikes of heat in the tank. These spikes could be seen in the thicker mixture by a thick bubbling in the grain mixture which resembled the movement of mud at hot springs, while in the more dilute mixtures it was evident from the swirling of floating grain husks and froth on the surface of the liquid as the convection currents beneath moved the material around. Once the starches had converted, ascertained by testing the mixture to see how sweet it tasted, the stones were removed from the tank and the liquid was then bailed out, strained through a piece of loose woven cloth to remove the remnants of grain and husk and decanted into
10litre plastic fermentation containers. These containers were then left to cool for a period, while the spent grain was removed from the tank.

Fig 6.5 Residue from brewing (Image Courtesy Merryn & Graham Dineley)

As with filling the tank, the removal of liquid from the tank itself presented some challenges. While in many of the processes described here, the liquid in the tank was a by-product, and could be left to slowly drain naturally, or could be reused repeatedly, in brewing, the liquid was an essential part of the end product. Removal of this liquid firstly required as many of the stones as possible to be removed so as to present less of a barrier to the containers being used for bailing. This was done by hand, and required those working the site to repeatedly plunge their hands into warm, thick and sticky liquids, often beyond the elbow, to retrieve the stones. The stones themselves could be hot, and so care had to be taken not to handle freshly heated stones, especially when adding or removing stones during the heating process itself. Stones, once removed, were covered in sticky residue, and often had parts of grain husk stuck to their surface. Some of this made its way back into the hearth to be re-heated, and consequently added to the smell of charred grain on site (Fig 6.5). These sticky grain remnants became a feature of the site for several firings after the brewing processes were completed, and small pieces of grain which had become wedged in the joins of the tank, or been pushed into the clay seal often floated to light in later works. The liquid wort was removed by hand using a shallow bucket, and the process of emptying the tank was both time and labour intensive. Once the liquid was removed a large quantity of spent grain remained
in the tank, and had to be shovelled out into a separate container. It has been noted that this material makes excellent as animal fodder (Dineley 2006), and while brewing processes at the site certainly created a large amount of mess and residue in the period following the work; its traces were not lasting and were soon washed or burnt away during subsequent firings.

Alongside the spent grain, one of the most enduring legacies of the brewing activities was the fine, sticky residue which remained over both the site and the practitioners following its completion. The process of repeatedly immersing hands into the tank for stirring, stone removal or bailing meant that those involved quickly became sticky, and the residue left on the skin quickly attracted other material from the site such as bits of grain husk, charcoal and flecks of dirt. The stones themselves were sticky and the ground around the tank quickly became so too. The residue from firings proved to be attractive to local invertebrate life, and there was a noted increase in slugs around the area of the tank following firings.

After cooling, brewers yeast was added to the mixture to begin fermentation. At this point small hessian bags of flavouring material were also added to the mixture. Initially it was planned to use meadowsweet flowers in all the brews, a plant known to be used in historical brewing processes, and which also possesses anti-inflammatory and pain killing properties. The use of meadowsweet not only flavours the brew, but assists in its preservation, meaning that the mixture keeps longer before turning. However, the poor summer experienced in Shetland in 2010 meant that many of the plants were behind in flowering, and after some last minute research into historic gruit ale recipes, sage was selected as a suitable alternative which was readily available from the local supermarket. During later runs however, it was possible to source meadowsweet, which grows abundantly in Shetland. This was then crushed gently with a stone before being added to the mixture. The mixture was then left to ferment for approximately a week, until it was complete.
Overall forty litres of wort were fermented during the first run, with a further 50 litres produced during the 2011 season. Fermentation vessels were initially left in the side chamber of the replica, insulated by packing material in an attempt to keep the yeast at a suitable temperature, while material from the later runs was brought home by the author in order to observe the process more closely. As those who have visited a distillery or brewery will know, the smell of fermenting wort is a sharp and distinctive, and the area inside the side cell soon began to take on this distinctive character. Fermentation is a lively process, and as the containers bubbled away, they occasionally leaked, spilling small amounts of sticky wort onto the floor. Modern day fermentation vessels are closed, and contain a water filled ‘airlock’ at the top to allow for the escape of carbon dioxide produced during fermentation. The result is a regular and audible ‘bloop’ which betrays the lively processes going on within the container. Material fermented in open top vessels is quieter, but the bubbling and heaving frothy mass at the top of the container would leave the observer with no doubt that some sort of life was contained within. The resulting brew was light and pleasantly drinkable, and had a rich honey colour. Sediments from the tank, including spent grain, clay particles and dead yeast settled to the bottom of the fermentation vat in a thick sticky grey layer (Fig 6.6), while the beer itself was clear and sparkling.
6.3.3 Creating a sewn hide boat

Of all the experiments undertaken at the site as part of the study the creation of a sewn hide boat was by far the most involved and complicated. The creation of the boat was designed to explore the processes involved in cleaning and working hides at the mound site, whilst simultaneously taking in processes of steam-bending and woodworking. While burnt mounds could conceivably have been used to work hides for a number of purposes, the creation of the boat was chosen to explore some of the potential links between burnt mounds and maritime activity, and was, in part inspired by the coastal location of the eroded site at Cruester. These experiments also drew inspiration from a description by Gad Rausing (1984:20) of Finnish log boat expansion using hot stones. While log expansion was deemed to be impractical for the purposes of these experiments, requiring a higher level of skill in woodworking than the author or any site volunteers possessed, and improbable given the relatively treeless nature of Shetland during the period under discussion, the potential for linking other related practices with maritime activity was deemed worthy of further exploration.

One of the primary concerns for the creation of the boat was the selection of suitable hides for the creation of the skin, and the sourcing of the required amount of wood for the creation of the frame. For this experiment cow hides were selected as the most suitable variety for working, as they provided the largest working surface area, and are widely available. Willow was selected as the most appropriate wood for the frame, being easily bendable, and popular with modern day makers of currach and coracle style skin boats. However, while we were initially able to identify a two willow coppices within the islands as a source of material for the experiments, at the time the hides were ready to be worked it was discovered that none of the local sources were able to provide willow pieces of sufficient length to form the frame of the boat. Other options, such as the import of willow from the Scottish mainland were considered. This also proved problematic, not only because the transportation of the materials proved to be expensive, but because the time required to transport them to the islands meant that they would not be available for the period during which the hide working experiments were planned. As the wood was needed at a time when skilled labour was available, and the hides were in a state to be worked, imported wood from a local builders merchant was purchased instead.

The hides were sourced from an abattoir, and were delivered salted, with large deposits of fat and other connective tissues still attached. The animals were of varying size, and
each hide was a different thickness with varying levels of fatty deposition. Fatty deposits were typically thickest along the back of the animal along the spine, and particularly at the base of the tail. In order to process these items it was therefore necessary to remove these deposits, and to scrape the hide into as uniform thickness before sewing them together to form the boat. There are a number of traditional methods for removing the fat from the hide (cf. Churchill 1987; Grant 2006; Waateringe et al 1999).

These include:

- Wet or dry scraping
- The use of lime, soda ash or lye to burn both fatty tissue and hair from the animal (bucking)
- Leaving the hide to partially putrefy before scraping off the material.

Dry scraping requires the use of sharp implements to shave off the residual fatty tissue, and is particularly efficient if the hides being worked are thick and require thinning prior to working. Bucking assists in removing hair and membranous material which might prevent the penetration of tanning materials. Wet scraping involves soaking the hide and warming it to make the fats and sinew pliant, before scraping off the material. Unlike dry scraping, this can be done with relatively blunt instruments and lessens the chance of over scraping or the creation of holes during processing. As this method made most use of the tank and hot water, and there was no intention of tanning the hides, it was selected as the chosen methodology for working with the hides at the replica site.

The experiments in hide working took place over two weeks in July 2010. As with all the processes described here, the author was assisted by a number of people in conducting the work, including members of the Bressay History Group, who formed the core team of burnt mound practitioners during the course of this study. Prior to working, the hides needed to be soaked to remove the salt and rehydrate the skins. For this process the water in the tank was required to be warm, but not boiling, so as to render the hides pliant and easy to work, but not break down the tissues too extensively, or shrink the material. As such, a single firing with one batch of stones was required to heat the water. Stones were added prior to placing the hides within the tank so as to prevent the hot rocks from scalding or otherwise damaging the skins on contact.
The work required to manage the hearth for hide working was simpler than for other processes. As there was no requirement to achieve a particular temperature, or maintain this temperature for a given time a single burn was all that was required. Stones were added to the tank swiftly using the three-person technique described above (section 6.3.1) so as not to lose too much heat in the transfer. A total of six firings were required to complete the construction of the boat. The ambient temperature varied from 13°C - 20°C throughout the course of the time this work was carried out. The average pre-boil temperature was between 12°C and 16°C, while the highest temperature reached was 85°C prior to adding the skins. Once the skins were in the tank the temperature generally evened out to around 60°C, although during winder periods it was recorded at low as 50°C. During the periods between firings a large piece of wood was utilised as a cover to help maintain the temperatures in the tank.
The first skin was heated and then left to soak for a period of 24 hours, before being re-heated in prior to scraping. During the soaking the water in the tank took on a grubby grey colour, and was covered with a thin layer of shiny fat (Fig 6.7). During firing this fatty layer became more pronounced, and large globules of fat could be seen floating on the top of the water. Once removed the hides were draped over a frame and scraped using siltstone tools (Fig 6.8). For most of the hide a blunt edged instrument was sufficient to scrape off the material, but for larger more sinewy deposits a sharper blade was required. The process of scraping took several hours, during which the hides often began to dry out and had to be softened by the application of water from within the tank. After the first hide was scraped it was initially pegged out onto the ground and left to dry, but this resulted in the hide shrinking so that it became much smaller than the other two hides in use, and was too stiff to work. Following this, all hides were returned to the tank following scraping in order to keep them pliant ready for stitching and stretching over the frame.
The frame of the boat was created by applying hot water from the tank to the wood in order to bend it into shape, and was then lashed together using a length of leather thong (Fig 6.9). Once all the hides were scraped, they were sewn together using leather thonging, a bone needle and bone awl (Fig 6.10). Overall three hides were required, which were trimmed along the long side to provide an even edge and then sewn using whipstitch. They were then pulled over the wooden frame and overstitched at the top. A small area at the bow also required an additional piece of hide removed from the top of one of the animal’s legs in order to fill a small gap left due to the shrinking of the primary hide. Once completed the three hides came together to form a small boat a little larger than a traditional curricle (largely due to the lack of flexibility in the shop-bought wood used to create the frame). The hides were then left to dry and shrink to the fame of the boat, bringing the entire thing together and strengthening the structure (Fig 6.11).
The original intention was to then dry out the boat before caulking the seams using a mixture of hair and fats. It was then planned to waterproof it using either fats, or more readily available Stockholm tar (a pine resin) before taking the vessel (christened the Ermintrude) out for sea trials in a nearby sheltered bay. Unfortunately in this aim we were ultimately thwarted by the moist Shetland climate and it proved to be impossible to dry the vessel out thoroughly in order to waterproof it. Ultimately it began to moulder and smell so badly, that it had to be disposed of.
While I have already stated that this was one of the most involved and complicated processes undertaken at the site as part of this study, it is worth noting that it was also one of the most varied in terms of the range of actions and sensory experiences. The use of burnt mound sites is itself highly sensual, involving a range of associated sounds, smells and sensations. During the working of the hides these sensations were heightened further. Most striking was the lingering acrid smell of rancid fat that began to permeate everything after the first day of working. The pre-salted hides had their own pungent slightly rotten smell, however, once washed and supple this took on an entirely different character, both rancid and soapy. Those who have visited a tallow candle workshop such as the one at the Blists Hill in Shropshire will appreciate the type of smell I am describing. Not only did the hides themselves smell, but shortly afterwards, those working with them also began to take on the odour too. Working the hides required constant bodily contact with them. From hauling their heavy, slippery forms out of the tank following soaking, to the repeated process of resting arms or body over them as you pushed all your weight into the stone tools to remove a stubborn piece of fat, or crawling over them to scrape or sew them when stretched on the ground. The stone tools themselves became slick with fat, and the substances pooled up behind the blade, spilling over its edges and becoming ingrained in knuckles and behind nails. By the end of the process, those of us involved in the scraping of the hides were slick with fatty oils from head to toe, especially on a rainy day (of which there were several) when the added moisture in the air seemed to help spread the fatty residues further. The ground itself was often slippery, and littered with globules of removed fat. The local bird population hovered expectantly throughout the whole process – the following morning the area was always picked immaculately clean. As I sit here now typing this with my field notebook beside me, the faint smell of rancid fat still wafts up from its pages. I had to throw away my waterproof clothing following these activities, as the smell was too strong to render them wearable in public ever again. It was noted, however, that all of us involved in the process had beautifully soft skin by the end, a contrast to the usual smoke dried, kippered sensation that usually followed working at the site. Not only did the fat have its own particular odour, but it also created a unique sound, squelching gently as the stone tools ran over it or bumped up against a large deposit, or creating a satisfying gentle ripping sound when a large piece of sinuous material came away from the body of the hide. The soft slap of wet hide hitting water, and the wet slithering
sound of the heavy saturated skins being dragged out of the tank again at the end all formed an integral part of this experience.

The toolkit and raw materials required for working with the hides was also the most extensive required for all the experiments. As well as the hides and the wood required for constructing the boat itself, and the usual supply of stones and fuel, a supply of bone for needles and awls was required, as well as several siltstone tools for scraping, and a wooden frame for draping the skins over prior to scraping. As well as the hides for the skin of the boat large quantities of leather thonging was required to sew the skins together, while supplies of fat or tar would have been required had we have reached the stage where the boat was ready to be waterproofed and used.

6.3.4 Washing, Dying and Fulling

The potential for burnt mound sites to have been used in textile production was first discussed in detail by Paul Jeffery (1991). Jeffrey cites the discovery of a clay bi-conical spindle whorl from Durrington Walls, and the existence of well-preserved woollen cloth in Danish mound burials (cf Barber 1993; Broholm & Hald 1940) as evidence for the existence of woven woollen textile leading back to the Neolithic (Jeffrey 1991:103) and suggests that prior to this felting would have also been common practise (ibid 97). He notes that there are reports of hot stones being utilised in waulking in Connemara in Ireland and on the Island of Rhum in the Inner Hebrides (ibid 102). Likewise he suggests that burnt mounds may have also been utilised in the process of preparing dyestuffs, and in creating the liquor for the dying process itself.

Fulling is essentially the act of cleaning and thickening cloth, and Jeffrey suggests that this may have been carried out while the wool was still on the fleece, or later when the woollen cloth had been produced (1991: 97). For the purposes of this experiment it was decided to follow the entire process from start to finish, beginning with washing the fleece to remove the lanolin, before dying and then eventually fulling a finished cloth if such could be produced. Fleeces were obtained locally directly off the back of the sheep, with vegetable and faecal matter still embedded within the fibres. The initial challenge was to clean the fleece to remove both the lanolin and any other undesirable extras from the wool and prepare it for dying. The first experiment in fleece working was carried out in August 2010. The fleece used during the first firing was not pre-soaked in any detergent, but rather was simply immersed in a tank full of hot water to determine how the fleece would react to the temperature of the tank, and to see what level of
cleaning could be achieved using water alone. The result was a much whiter fleece, which though cleaner in appearance still retained too much of the lanolin to allow it to be dyed. Much of the additional vegetable matter had been removed however, and the faecal matter had softened and washed out during the process, meaning that the fleece itself would have been suitable for spinning or further working if required. It was noticed that some areas of the fleece had begun to felt. Felting is normally achieved by applying heat and agitation to the fleece, normally through the addition of hot water and vigorous rubbing, until the fibres bind. By using hot water and occasionally stirring the fleece in our attempts to clean it, it would appear that we had inadvertently replicated these conditions. As a result of this it was decided that for the purposes of future experiments the fleece ought to be pre-treated with a form of detergent to ensure the best chance of any dyestuffs being absorbed into the fibres. It was also noted during this process that the water levels in the tank dropped noticeably when items were left to soak for a period of time (24 hours as was the case above). This observation led to the use of a temporary tank being used for early brewing processes, as described above, while the tank was resealed in preparation for later work.

Fig 6.12 Dyestuff in the tank

A second run of dying experiments were carried out in 2011 (Fig 6.12). In this instance the fleece was pre-soaked in a solution of stale urine and water for several days prior to it being heated and washed. The soaking was undertaken in a separate container again,
and was stored at the author’s house so as to allow for easier addition of detergent during the preparation period. The use of detergent resulted in a much cleaner fleece, and simultaneously a much smellier process. Once the fleece was washed a quantity of cut nettles was added to the tank, and the water re-heated to produce a liquor for dying. Nettles give a subtle green colour when used as a dyestuff, and grow abundantly in most places, including Shetland, which made them a sustainable and easily obtainable source. While during the washing process the temperature was kept low so as not to shock or burn the fleece too substantially, during dyeing it was possible to raise the temperature higher, to ensure that the plant matter broke down and released sufficient dyestuffs to create a strong enough liquor. The addition of hot stones also served to bruise the plant material, acting in a similar manner to a pestle and mortar, and releasing more colour into the water. After a while the water took on a subtle green colour, and was littered with small pieces of floating plants. The fleece was then lowered into this, and left to soak for 24 hours.

Unfortunately, the following day it was discovered that the water levels in the tank had dropped so significantly that the fleece itself was found sat on a layer of stones and nettles, clear above the water level of the tank. It appeared that at least 50% of the water in the tank had drained naturally after the firing was completed. This was probably due to the clay luting in the tank having been washed away during the preceding firings. It was also noted that the work was carried out during a period of reasonably dry weather, which resulted in the local water table being lower than was normal. As has already been described, the original tank was built into a natural bed of clay, which would have significantly improved the water retaining abilities of the tank. No such bedding was applied to the replica however, so the tank sits directly above excavated soils and bedrock and is therefore much more susceptible to self-draining. Once the fleece was removed from the tank it was necessary to wash it again to remove the small fragments of broken stone and plant material from the fibres of the wool. Rather than doing this in the tank using hot water, the fleece was taken to a running stream and immersed in the water, so that the fragments trapped could be carried off downstream by the current. While this succeeded in cleaning off any dirt that had accumulated in the tank, it also removed all traces of dye from the edges of the material, meaning that the colour of the fleece, although still cleaner in appearance, was not significantly changed by the dyeing process.
While the experiments to both wash and dye using the tank were unsuccessful due to the methods employed to create the replica tank and the type of location in which it was constructed, it does not follow that the processes employed cannot produce the desired results. The use of a burnt mound tank to wash, dye and full cloth has already been described by Anne-Marie Denvir, who carried out experiments as part of her undergraduate degree at Belfast (Denvir 1999) and was successful in dying her fleece using Ivy Berries. While we were unable to dye our fleece using the tank itself, we were able successfully use hot stones to create a nettle dye liquor in smaller containers and dye three skeins wool spun during the earlier experiments by one of the volunteers on the project. The same methodology was applied, using hot stones to warm the water and create the liquor, before soaking the spun wool in the mixture for 24 hours, replicating the processes that were carried out at the tank on a smaller scale. The result was that the wool took on a subtle, but distinctive sage green colour, as can be see in the image above (Fig 6.13)

![Fig 6.13 Cleaned fleece and dyed skeins of wool.](image)

As with all the other processes described so far, the act of washing and dyeing fleece produced its own unique set of sensory engagements. The fleece itself had a distinct aroma prior to washing, which when combined with the smell of stale urine made for a uniquely pungent experience. Likewise, the quantity of nettles cut to produce the dyestuff also added to the olfactory experience on site, and produced a smell not...
dissimilar to the urine, so that it became difficult to tell which of the combined materials was contributing most to the aroma. The fleece itself was soft, light and greasy prior to going into the tank, then wet, heavy and slippery upon extraction. In some places it held together as a solid fabric, while at other times it pulled apart easily in the hands, making the process of removing it from the tank particularly difficult. Plant material became entangled with the fibres of the fleece, while small fragments of stone and gritty tank lining covered it in a grey clayey substance. Away from the tank the process of nettle pulling involved a high risk of stings and the accompanying itchiness, while washing the fleece after soaking involved standing with hands and feet submerged in chilly fast flowing water.

6.3.5 Cooking

While most of the experiments conducted at the replica met with some degree of success, the only notable exception was in relation to the processes involving cooking. A great deal of attention has been given to the role of cooking at burnt mounds, owing to the popularity and longevity of the hypothesis. In particular, experimental work carried out by O’Kelly (1954) demonstrated that it was possible to broil meat within a space of roughly three hours by the continual application of hot stones to the tank. Cooking experiments were among the earliest attempted at the replica site in Cruester. Prior to the completion of the experiments which form part of this study the author was present at the official opening of the replica site, as part of Archaeology Scotland’s ‘Adopt a Monument’ scheme. As part of this event, living history practitioners ran a firing and attempted to cook a small joint of meat within the tank. Although they were successful in heating the water, on this occasion the cooking process was unsuccessful, and upon removing it from the tank the joint of meat remained largely raw. Unfortunately it had taken on a slimy, saturated and entirely unappetising appearance. As such, when beginning these experiments it was already clear that cooking may prove to be more of a challenge than the literature on the subject suggested.

Cooking with hot stones is well documented (cf O’Drisceoil 1988; Bullows 1927; Burt 1754; Carson 2002; Layard 1922; Heubert et al 2010), and ‘pot boiler’ stones are not uncommon in prehistoric contexts. However, while the production of sufficient stones to keep a small pot or skin container hot enough to cook is a simple enough task, when attempting this in the replica of Cruester, the main obstacle was the production of enough hot stones to keep the tank consistently hot for long periods of time. As described above, many of the other applications explored in this study required
temperature of the tank to be raised for a short time only, or, in the case of brewing, required warm, but not boiling temperatures to achieve the desired affects. In order to cook, it was determined that large amounts of stone would be required both to achieve the desired temperature initially, and then maintain it until the process was complete. While carrying out other processes, it was discovered that one of the principle obstacles to maintaining a sustained burn at the site was in fact the shape of the hearth cell itself. As has already been discussed, the most successful method of fire construction employed on site was that of a stacked pyre; in which alternate layers of fuel and stones were place atop each other until sufficient stones had been collected to raise the temperature in the hearth. Three layers of stones, each comprising an area of roughly one meter square each proved to be about the quantity required to raise the temperature in the tank to around 80°C and sustain this for up to an hour. The stones themselves also required approximately an hour to reach temperature. Thus, while it was possible to raise the water to a temperature sufficient for the initial stages of cooking, the problems came when trying to maintain this.

Once a fire was lit in the hearth cell, the chambered architecture of the cell meant it took on a fierce character, something akin to a furnace. The area around the hearth cell became unbearably hot and difficult to work in. During this initial period of burning it was almost impossible to work with the stones roasting within without exposing yourself to the dangers of burning, even with the modern safety equipment and tools employed during these processes. Once the fire had burnt down a little it then became possible to access the stones, and to remove them from the fire and add them to the tank. Following this process, if additional stones were required the fire was re-built and the process repeated. This allowed a regular supply of hot stones at intervals of approximately 30 minutes to 1 hour, depending on the size of the fire constructed. While this proved to be adequate for working with fleece, hides and to a lesser extent, brewing, it was inadequate for cooking joints of meat. As was described above (6.3.1) O’Kelly’s experiments at cooking in Ballyjourney utilised a wide hearth in which a could be lit at one end and allowed to burn through to the other. This sort of arrangement would certainly provide a more suitable method for roasting the stones for cooking than that provided by the enclosed hearth cell at Cruester. However, this is not to say that it is not possible to cook at a site such as Cruester. Rather, the level of skill in fire management and maintenance required to do so is such as was never obtained by members of the team during the process of these experiments. It may have been
possible to cook by maintaining lower temperatures over longer periods of time, requiring less regular additions of stones; however it was not possible to achieve this within the timescale of this study.

6.3.6 Winter Firing
The final firing undertaken as part of this study was designed to explore challenges of working at a burnt mound site in different weather conditions. Although the earlier firings had been carried out in a variety of weather conditions, from brilliant sunshine, blustery winds, driving rain and low cloud and fog, they had all been carried out during the reasonably temperate summer season. This firing explored how the lower temperatures experienced in winter might affect the way the site works, and how this might affect the overall experience of working the site.

Shetland is famous for experiencing four seasons in one day. The weather is remarkably changeable, and a day which starts bright and calm can quickly descend into howling gales, driving rain or impenetrable fog. During each firing a note was made of the specific weather conditions to determine whether or not these had a marked affect on the results of the firing. The temperatures ranged from 21°C to 13°C during summer firings. It was noted that during the warmer days there was a more marked difference between the air temperature and that of the water in the tank, which normally measured around 12-13°C. This was most likely due to the method of filling the tanks via the local tap water supply, as on the occasions where tank water was re-used over successive days (for example during hide working processes), the water was at a similar temperature to that of the surrounding air.

The winter firings took place in November 2011. On the day of the firing the weather was calm, and not particularly wintry, with a slight drizzle. The previous days had been significantly colder however, and the surrounding ground was hard and cold. On taking the cover off the tank after several months of disuse, the water level was found to be quite high, and there was a significant level of debris in floating in the water, some of which appeared to be the decomposed remains of nettles left over from the last dyeing experiment.

The pre-firing temperature of the tank was measured at 6°C, while the ambient air temperature measuring only a fraction more at 6.2°C. During summer firings the tank witnessed an average temperature rise of at least 40°C, with some firings achieving temperatures of up to 60-70°C higher than the pre-firing temperature. During the
winter firing however, the highest temperature achieved was 26°C, rising to 40°C in areas immediately surrounding a hot stone. While this may in part be due to the colder temperatures experienced during the firing. Lower ground temperatures may have resulted in increased cooling from the sides of the tank as well as the surface. However it is suspected that the primary contributing factor in the low temperatures achieved was the poor quality of the fire used to roast the stones. Considerable difficulty was had in lighting the fire, which burned more slowly and with less vigour than had previously been experienced. On removing the stones from the fire it was noticed that several large pieces of wood remained unburnt, indicating that even after a prolonged period in the hearth, much of the fuel had not fully kindled. This supposition is supported by experience from an additional firing carried out following the work for this thesis. During this experiment the wood used for the fire was found to have been pre-treated with a preservative which prevented it from properly kindling. Once again large amounts of unburnt wood remained in the hearth following the firing, and the temperature of the tank was only raise by 20 degrees. These observations suggest that it is not the ambient temperature which determines whether a firing will be successful, but rather the ability to light and maintain a fire within the hearth that will roast the stones to the required degree. During winter months the ability to source and store enough dry fuel would be crucial for the continued use of the mound. The significantly lower temperatures achieved suggest that seasonality makes a substantial difference to both the experience and outcomes of working a burnt mound.

Aside from the difficulties in maintaining the hearth and replicating the results experienced during summer firings, the most notable difference in the winter firing was the increase in steam generated during the process. Despite the lower temperatures achieved within the tank, the cooler air meant that hotter stones hitting the surface of the tank let off a more visible cloud of steam and the process of heating seemed more tangible. In addition, it was noted that the hearth cell itself steamed during firings. It had already been observed during a number of earlier firings that once the hearth was lit water trapped within the drystone walls began to seep on the outside of the cell walls, and the back of the hearth cell often appeared damp, and was very warm to the touch as a result of this. During winter firings however, this water turned to steam, so that in addition to the clouds of smoke billowing from the front of the cell, small puffs of steam and hissing droplets of water could be witnessed seeping from the back of the structure.
6.4 Danger

While I have already discussed the various small successes and failures experienced by the team in carrying out the processes described above, I would like now to focus on wider concepts of success, failure, and the dangers inherent in burnt mound technologies. Douglas observes that places, people and objects in transition are often perceived as dangerous (1966). It has already been noted that burnt mounds are a product of and medium for transformation and as such represent locations of danger and uncertainty. However, while a degree of symbolic risk of failure is always present during any technological or construction process (see Richards 2013), at times during the firings, the very real and physical dangers represented by these technologies were made apparent.

Of course any activity which involves fire incorporates a certain amount of risk. One of the greatest difficulties involved in working with the burnt mound site was the immense heat emanating from the hearth cell, which at times prevented members of the team from getting close enough to work in the area. Doubtless many of the risks involved with the experimental firings conducted at Bressay were the direct result of inexperience on the part of practitioners, and would be reduced as skills and experience were gained, however there were a number of occasions where no level of experience or preparation would have prevented the occurrence of a sequence of unplanned events.

Some of the most common dangers encountered were related to burning. I have already described how stones propelled down the passageway towards the tank would often veer unexpectedly at user’s feet. I distinctly recall one rock which bore the perfect imprint of the sole of one of the group member’s boots after accidentally stepped back onto it during a firing. Had the individual not been wearing modern safety boots, designed for use in the construction industry, then the result may have been burnt and blistered skin, rather than melted rubber. Nor was this event a one off occurrence, and it soon became habit to dodge the approaching stones while tending the tank, or to shelter behind one of the small orthostats until the next batch of stones had arrived at the rim and it was safe to manoeuvre them into place. On other occasions the danger came in the form of scalding, dipping a hand into the tank to test the waters, only to find that the temperature was much higher than was expected. This became of particular concern when spent stones needed to be removed from the tank and replaced with fresh warm ones. If the wrong stone was chosen and discarded at the side of the tank
then users ran the risk of encountering hot stones in places where they would only normally expect to find cool ones.

It was not just hot stones that posed a risk. Stones in the hearth cell were liable to slip and roll during the construction of the fire. My own finger was bruised and slightly crushed when placing a stone in the hearth cell prior to lighting. The weight of the new stone caused materials in the cell to shift slightly, and other stones rolled rapidly to the place where my hand was still arranging the newest addition. At other times volunteers dropped stones onto their own feet. Members of the team each had their own little tales of burnt mound injury or near miss, and many times on site the air turned blue as the result of some form of mishap. On these occasions, and others, the individuals involved were protected by the modern health and safety precautions employed as part of the project. Steel toe capped boots, protective goggles and heat proof welder’s gauntlets were made available to any who wished for them, in order to reduce the risks to those who gave their time. However, even these were not able to stop some of the most dramatic incidents.

The most defining characteristic of burnt mounds is the shattered stone which makes up the mounds themselves. These stones, subjected to thermal shock from repeated heating and rapid cooling, broke into pieces and then were discarded (see chapter 7). During the experiments we found that this process of shattering occurred most frequently in the tank itself. A stone, when dropped into the water would let out a particularly loud groan, and would disintegrate on removal, or become broken up when other materials were added to the tank. Occasionally stones which had already been subject to repeated firings would crumble as they were rolled down the passageway to the tank, and would arrive in several jagged pieces, leaving splintered fragments of hot stone in its wake. However, very occasionally the process of heating would cause small pockets of air within the stones to expand, and on these occasions the stones exploded, with often dramatic results.

The first time this was experienced was during one of the preliminary firings exploring methods of fire construction and stone transportation. Members of the team were standing at the far end of the tank, away from the hearth cell, discussing methods for removing the stones from the hearth, when they were disturbed by a loud bang, followed by a splash from the tank. Closer inspection revealed that this had been caused by an exploding stone, which had sent fragments flying from the hearth cell, one of which landed directly in the tank. This happened again on a number of occasions, and
soon members of the team learned not to stand directly in front of the hearth during a firing, when possible, and were often sent scattering to a safe distance when the fire popped or banged.

![Fig 6.14 Fire damage to the side cell](image)

On a separate occasion one of these exploding stones disturbed the structure of the fire itself, causing the entire thing to shift dramatically, and dislodge a number of hot stones. One of these stones rolled down the passageway, neatly illustrating the suitability of this space for the transportation of stones. It came to a rest at the entrance of the reconstructed side cell, just before the orthostats that mark the beginning of the tank area. At the time the cell was being used as a store for the fermenting vats of beer from the hot rock mash, two hand turned wooden bowls, and a pile of un-threshed grain which one of the members of the living history team had been storing for a demonstration on grain processing later that week. In order to keep its contents dry the cell had been covered by an old tarpaulin, which acted as a curtain over entrance. On hitting this tarpaulin heat from the ejected stone set it alight, and thus setting fire to the whole structure. At this point members of the team were all within the heritage centre building. We returned to the site to see that in a matter of minutes the tarpaulin had
been completely burnt away, taking with it most of the grain and one of the bowls, and badly burning the second. Timber supporting the turf roof on the cell was also badly scorched, as were the turves themselves (Fig 6.14). Thankfully, due to whatever product had been used to waterproof the old tarpaulin, the fire caught and burned so rapidly, that only the things in immediate contact with it had time to kindle, and the wider structure and surrounding area was left unharmed. By the time most of us had realised what was going on, it had already burnt itself out. Following this incident as a precaution a mesh panel was hooked in front of the fire to absorb the impact of any materials flying at it. The bent, dinted and in some places even perforated nature of this panel attests that it has done just that, and that without it, a number of other stones may have escaped and travelled in the direction of people working at the site.

The final incident happened, thankfully, towards the end of the programme of firings, and did not threaten any of the events planned for this study. On this occasion a stone exploded within the hearth cell with such force that it and another stone were sent hurtling upwards, smashing through the stone lintel of the hearth cell itself. The lintel was blown outwards, and the stones themselves evidently continued upwards for a short distance, before coming back down to land as they were found resting on top of the hearth cell itself. Again, this happened with such rapidity that members of the team were unaware of what was taking place. A loud bang from the hearth cell was heard, following which the top of the cell was observed to be open. Once the stones had been removed and the structure had cooled, we were able climb up onto it and see the remains of the lintel and the responsible stones sat atop the cell (Fig 6.15 & 6.16).

While by this point members of the team had already come to have deep respect for the power of the fire and the potential for disaster which it represented, it was this final incident which really illustrated how powerful it was, and how catastrophic these events had the potential to be. It has already been mentioned, but it is worth noting again here, that the replica site itself represents only a small part of the entire original structure and there would have been more cells and additional walling, much of which is likely to have been roofed. While we had the opportunity to leap aside when the fire let off a bang, with these structures in place it would not have been possible. We have
no information about what the cells at these sites may have been used for, and so cannot tell whether fires such as those experienced at the replica would have been a possibility. However, it seems safe to say that a collapsed lintel stone within a confined
structure could be potentially disastrous. Almost certainly those who worked regularly at burnt mound sites would have had their own scars and stories to tell. Possibly these marks would have identified them as being someone who undertook a particular type of task. It is also possible to imagine injuries far greater than minor cuts and burns occurring - might this sort of event be the cause of the abandonment of a site, or the motivation behind the remodelling or closing off of particular areas?

6.5 Creating a Community: Shared Knowledge and Experience

Throughout the above accounts I have repeatedly referred to ‘members of the team’ or ‘volunteers’ involved in the execution of the experimental firings at the replica site. In this section I would like to turn the spotlight onto the these figures, and explore how the activities undertaken on site facilitated the creation of a community bonded by common experience, and fostered through the sharing of specific skills and knowledge.

While each of the experiments undertaken for this thesis were designed and led by the author, the successful execution of them required a wider network of skilled craft practitioners, living historians, and specialists. In addition to this, a number of volunteers were also required to work the mound itself, assist in the creation of the fire, the transportation of the stones and the management of the tank. The individuals who made up the team of practitioners on Bressay came from a variety of backgrounds and locations. Many had been involved in the original Bronze Age Bressay project, and had followed the site from excavation through to reconstruction. As such, their knowledge of the site and the methods of construction used in creating it were invaluable in developing methods for working on site, and for understanding the many quirks of the replica itself. During firings it soon became clear that members of the groups had strengths in particular areas, and soon the team began to develop designated roles within the wider scope of activities. Some were particularly skilled at setting the fire, and were able to construct it in a manner that meant that it lit with ease, and that the stones were evenly roasted prior to adding to the tank. It is worth noting that on the two occasions where the fire proved to be particularly difficult to manage, and the stones failed to roast, none of the members of the specialist fire team were available to work at the site. On these occasions the fire proved to be difficult to manage, and although much of this can be attributed to environmental conditions such as damp wood and high winds, it is likely that a more skilled and experienced practitioner could have coaxed a better fire from the hearth than I was able to achieve. Others were able to provide
essential local knowledge which allowed us to identify suitable sources of plant matter, stones, fuel and other resources such as clay for lining the tank. Such knowledge was invaluable for obtaining many of the raw materials required to carry out the firings.

As well as the regular members of the team a number of specialist craftpersons and practitioners were brought in to assist with the work at the site. Living history practitioners Tony Sherrat and Keith Prosser of Timezone have worked regularly in Shetland as part of living history and educational outreach projects at a variety of sites. They also travel the country providing practical workshops and outreach activities using traditional and historical skills. Both Keith and Tony are skilled craftspeople, and are practised with working with a range of raw materials. They had also previously worked with the replica site and were involved with running firings exploring heating water, cooking and bathing in 2008 when the site was first completed. They were able to bring a wide range of skills and experience to the project, and were invaluable in constructing many of the tools utilised in the production of the hide boat. Having previously worked in Shetland they were already familiar with the local raw materials, and were able to construct siltstone tools for use on the hides using recognised forms from excavated sites, and were able to adapt these tools to the purposes of the experiments. Keith and Tony were also instrumental in developing the pyre style fire construction technique which proved to be so successful in the firings. They were able to build on their previous experience of the site to determine what shape of fire would both work within the hearth structure and allow for a sufficient number of stones to be roasted to heat the tank. Without their previous experience of working with the site the process of determining the best way to heat the stones and transport them to the water would have been longer and more complicated. Their involvement allowed this project to build on the experience and understanding already gained from working the site during previous firings.

During brewing experiments the project benefited from the experience of Merryn and Graham Dineley. Merryn has conducted extensive research into prehistoric grain and grain processing and acted as consultant to Declan Moore and Billy Quinn before they undertook the original brewing experiments in Ireland. Graham is a craft brewer, and both he and Merryn have previous experience in carrying out hot rock mashing processes. During their visit they were able to work with the team in running a mash in the tank, and were able to point out many of the subtleties of water appearance, colour change and smell that were missed during the original brewing experiments due to lack
of experience. We were also happy to accept the assistance of Sarah Foster-Jarden, a spinner and dyer who became involved with the project after visiting the site during the earlier hide working experiments. Sarah works with natural dying techniques, and was able to offer advice regarding the quantities of material required to create a dyestuff within the tank, and was able to suggest appropriate ways of cleaning the fleece prior to dying. As well as those present during the firings, I was also able access a wider network of people to discuss the processes involved in working the site, including individuals who had previous experience running experiments at burnt mound sites, experienced spinners, weavers, dyers and textile workers, brewers, crofters, hide workers, and other traditional craftspeople. Each of these encounters and engagements contributed to the work undertaken at the site.

On site the work was a collaborative process. The working of a burnt mound site such as that at Cruester cannot be undertaken by one person alone. It was found that at least two people were required to enable the transfer of stones from the hearth to the tank, although often higher numbers were necessary. During this time each individual assumed a specific role, combining with others to ensure the completion of the task. The result was a close knit community of burnt mound practitioners, bonded by a shared set of experiences and stories, each understanding and participating in the processes undertaken, and often, as will be discussed below, identifiable through appearance, smell and even on occasion injury. Within this community were a variety of roles and levels of expertise. Some members participated in all of the activities, developing a ‘core’ set of skills which allowed them to work the site, while others passed in and out, adding specific knowledge and skills to the task in hand. Each firing allowed those involved to develop their skills further, gain knew knowledge or share previous experience with other members of the team. The processes were characterised by a shared sense of learning and achievement, and each day was marked by learning, both on site and behind the scenes, either through the completion of a specific task, or through the social sharing of stories, techniques and skills.

It follows, therefore, that the construction and use of burnt mounds in the Bronze Age was a communal activity, involving the coming together of persons with specific knowledges and skill sets in order to create the desired outcome. Richards (2004:74) illustrated that the construction of a monument extended far beyond the monument itself. Through the fashioning of tools, weaving of ropes and collection of food for offerings preparation for the construction of the monument enmeshed people within a
web of relationships, and created a temporality relating to the everyday lifecycles of people involved. Thus the monument is able to shape and direct social relationships before it is even created. This is also applicable to burnt mound sites. As we have seen, the creation and use of burnt mounds drawn upon a wide range of skills and materials. The processes explored within this chapter have required the sourcing of a range of materials from plant matter to animal hides. As such we can see how burnt mounds are related to seasonal cycles and the daily lives of Bronze Age peoples. The production and selection of these materials thus links burnt mound with wider social networks, and enmeshes burnt mound practise within the everyday lives of those around them. Activities within the mound also require the development of social relationships to ensure the successful and safe performance of the tasks in hand. We have also explored the role of fragmentation in the creation of Bronze Age identities. The deliberate destruction of objects is seen to be linked to concepts of death and fertility. Thus materials can be seen to undergo the same processes of death and regeneration as persons. Acts of construction and making are therefore metaphors for creation, and can be seen as symbolic of the development of relationships such as kinship. The fragmentary processes at burnt mound sites may have provided metaphors for an understanding of personal and social identity which is both fluid and relational. Finally we have also considered how burnt mounds can be seen as both physically and metaphorically dangerous. The possibility of injury and physical disfigurement as a result of working with them would identify those who used them, and serve as a powerful reminder the potent and transformative processes taking place within. Given the highly symbolic nature of burnt mounds it is therefore possible that those working them were imbued with special status, due to their role as mediators or facilitators in elemental and transformative practices.

6.6 Sensory Engagements

The sensory experience of the various processes undertaken at the replica burnt mound site have already been remarked upon in the descriptions above, however it is worth taking time here to dwell upon this point little further. To work a burnt mound site is to engage in a set of specific, and often overwhelming sensory experiences. These are apparent regardless of the functional application undertaken. The heat and crackle of the fire, the steam from the tank and the hissing and splashing as stones hit the water are features of every burnt mound firing undertaken. On top of this shared sensory vocabulary, the type of process being undertaken then adds other layers of texture,
taste, sound and, perhaps most notably, smell. There are no two ways of putting it, burnt mounds smell. They are smokey, quite often they are sweat-inducing and on top of this there is the aroma of dead cow, of burnt grain, of sweet sticky wort, of stale urine, fermenting plants and sheep wool. Not only are the mounds smelly, but after spending any considerable amount of time within one, you become smelly. You become coated in a thin layer of soot, and grime, slicked with animal fat, gummed together with sticky liquids.

In Chapter Three I touched briefly on the emphasis placed on the visual within archaeological studies, particularly those with phenomenologically informed roots. The application of experimental (experiential) approaches is invaluable in highlighting the multi-sensory nature of this experience, in that, to use an appropriate turn of phrase, they open our eyes to the range of sensory engagements available as part of any given process. While visually and materially burnt mounds may appear to conform to a particular class of monument, and therefore be homogenous, when the form of classification is altered to include a range of sensory engagements we can begin to see that they represent a far more diverse context for a wide range of experiences. Each of these sensory experiences forms an integral part of understanding what a burnt mound is, and how it is understood by those working within it. Each of the processes involved has its own unique sensescape, incorporating a range of sounds, smells, textures, and tastes which are unique to the tasks being undertaken. These in turn are situated within a wider sensory understanding of the world, and form part a cultural lexicon which would allow the user to place the activities being carried out within its wider social context.

6.7 Networks of Shared Knowledge and Practise.

These experiments have begun to illustrate what a visceral and sensory experience working a burnt mound would have been. And while were not always completely successful in producing the intended output, they have been invaluable in illustrating the range of skills and knowledge required to successfully work with these technologies. The limited success we have had has drawn upon a large number of people with a wide range of skills, brought together in one place and mediated through material interactions.
By focussing on the output of burnt mound sites, rather than exploring the processes taking place within, past studies have overlooked this interlinked nature, and in doing so have been able to represent the sites as bland and meaningless. Through the experiments described above however, it has been possible to illustrate that the practise of constructing and using burnt mound sites is complex, temporal and dependant on a wide range of human-thing, thing-thing, human-human and thing-human relationships (Fig 6.18), coming together in what Ingold describes as the flux and flow of materials (2011). The properties of burnt mound sites are emergent through their use, and dependant on the specific qualities and affordances of those materials coming through them, and on the skills and knowledge of the individuals working with them. As such they represents nodal points in wider networks of social and material relations. Spaces where things and people come together, and are ultimately transformed, through practise (for a fuller discussion of the role of transformation at burnt mound sites, see chapters Three, Seven and Eight.). If we examine the some of the tools and processes involved in the performance of the various proposed applications for burnt mound sites we can begin to see how each of these activities relate to each other through shared networks of practise, skills and through sensory engagement with materials. Moreover, if we expand our view beyond the immediate vicinity of the burnt mound and begin to examine how these interactions and relationships connect with a wider set of practises it becomes possible to understand burnt mounds, not as an isolated phenomenon, but as a part of a wider network of understanding and engagement within the Bronze Age world.
Chapter Seven: The Mound.

As archaeologists we are, of course, very familiar with the imagery of prehistoric mounds. These mounds take various forms, for example large deposits of debris and waste such as the Mesolithic shell middens, stone built structures such as cairns or earthen tumuli such as Bronze Age barrows. They have been interpreted as territorial markers and demonstrations of power and wealth (Renfrew 1973), as vessels for the dead and places for veneration, mourning and remembrance (Barrett 1994; Last 1998), as foci for the creation or reconstruction of kinship and group identity (Garwood 1991, 1999 Mizoguchi 1992, Last 1998), or, as has been explored more recently, as dynamic transformative locales in which concepts of identity and cosmogony are played out (cf, Bruck 2004; Downes 2005; Owoc 2005). However, perhaps unsurprisingly given the minimal level of attention which has previously been directed at burnt mound sites, there are no existing accounts which explore the nature of the burnt mound, or take time to examine how they came to assume the format which is so familiar to us today.

Thus far this thesis has given detailed consideration to the potential for, and the nature of, material transformations taking place within burnt mounds. Little attention has been given to one of the most defining aspects of these sites; the mound itself. In this chapter I would like to take a moment to examine the construction of a burnt mound, to explore the processes involved in its becoming, and to explore how these processes resonate with or differ from other similar contemporary practises. In particular, I explore the similarities between the construction of burnt mounds and funerary barrows. It is argued that similarities can be drawn between the highly structured processes of construction at barrows, and the curation of burnt stone at burnt mound sites. Specifically, it is suggested that both of these practises represent an integral part of the transformative act, and that as such, the construction of mounds of burnt stone at burnt mounds represents the intentional curation of powerful symbolic and transformative substances.

7.1 Mounds and Mounding in the Bronze Age

Mounds, barrows and cairns are among the most recognisable features of the European Bronze Age. Construction of a mound has a profound effect on the landscape. Its presence necessitates that the area is thought about in a new way (Barrett 1994:113). The act of construction transforms a point in the landscape from space to a meaningful place (Thomas 1996; Taun 1977, Cummings & Whittle 2004). Their utilisation in burial traditions has been interpreted as an attempt to make a lasting monument within the
landscape (Barrett 1989; Bradley 2003). As such, they have been interpreted as the focus of commemoration and mourning (Barrett 1994; Last 1998). In particular, studies of barrow cemeteries have focussed on the notions of kinship an ancestral identity. These approaches understand the growth of these cemeteries as manifestations of concepts of descent and historicity (eg Garwood 1999; Last 1998). Detailed analyses of Bronze Age barrows in Orkney and England has revealed that their construction often follows a strict sequence of material deposition. Owoc (2005) describes how at Trelen 2 the builders of the mound engaged with the local landscape and with the materials involved in its construction to create a scheme through which the mound was rendered meaningful. Members of the community engaged with the site through processes of construction, and the deposition of materials in an ongoing process through which group identities and the identity of the deceased were defined (see also Bruck 1994; Barrett 1994). The materials used in the construction of the mound carefully reflect and invert the natural stratigraphy, representing and aiding in the processes of transformation undertaken by both the dead and the communities around them as the individual makes the journey from living to dead. Owoc (2005) argues that these engagements with materials, particularly those which can be seen to have taken place after a hiatus of activity at the site create links with ancestors and help affirm group identity, while the reversal of the stratigraphy within the mound echoes cosmological classificatory systems relating concepts of up/down with living/dead. Similarly, Downes (2005) describes how deposition in Orcadian barrows place a strong emphasis on the vertical axis, both through the use of local topography (2005:231) and through the inverted deposition of pyre and mound material in their construction (2005: 197. See also Owoc 2001). She argues that the materiality of the barrow relates to broader strategies relating to regeneration, rather than to concepts of personal identity as suggested by Bruck (2004). The barrow acts to complete an event, controlling access to, mediating or accentuating a transformative event or place (Downes 2005:213). I would argue that a similar approach is required in order to understand the significance of the construction of burnt mounds. In particular, studies detailing the regenerative properties of transformative events such as cremation and barrow construction can offer us a useful insight into how we might interpret the practise of creating mounds at burnt mound sites.

7.2 Mounds of Burnt Stone

The presence of a mound is clearly one of the defining characteristics of burnt mounds and its construction is one of the fundamental aspects of burnt mound usage. Unlike
many of the mounds mentioned above (with the notable exception of shell middens), burnt mounds are unusual. On initial investigation they appear to be a by-product of a prolonged activity, rather than a conscious attempt to construct a mound, as might be ascribed, for instance, to the construction of burial cairns or mounds. While it is true that burnt mounds are composed predominantly of what can be considered as waste material, examination (below) of the relationship between burnt mound structures and their mounds makes it clear that they are anything but secondary.

![Fig 7.1 Underlying processes in the development of a burnt mound.](image)

The construction of a burnt mound is a generative process which develops throughout the life of the site. While there are a number of possible applications for hot stone technologies, the processes through which the mound comes to be remain substantially unchanged for each (Fig 7.1). The primary component of a burnt mound is, of course, burnt and broken stone. Repeated heating and cooling in the hearth causes the stones to become gradually weaker, until eventually they begin to break apart. This can take place within the hearth as a result of heating, meaning that some stones never get as far as the tank on their final firing. At other times they may shatter on the journey to the tank, broken apart by the impact of being rolled or jostled with other stones. The majority however will disintegrate within the tank. Sometimes they will do so audibly, emitting a high pitched scream as the air is forced from cracks and crevices in the stone. More often however it takes place out of sight, beneath the grey murky waters of the tank and among the other materials to be heated. These broken stones remain undiscovered until the process of cleaning the tank begins in preparation for the next firing (Fig 7.2). Stones that have remained intact are removed from the tank and stored prior to re-use. Those which have not are then removed and placed into a pile. Over time, and after repeated firings, this pile builds gradually into the mounds we recognise today.

As archaeological features burnt mounds are often covered in sparse vegetation, and thus present as grassy mounds within the landscape. At the time of working however,
the mound would have been bare, and the reddened fragmented stone would have been visible. These mounds would have been extremely distinctive, and the burnt characteristic of the debris would no doubt have served as a reminder of the activities taking place within to anyone who saw them. As has already been touched upon in Chapter Five, there is a considerable degree of variation in the size and shape of burnt mounds suggesting a variety of mounding strategies could potentially have been
employed by those who created and used the sites. The most common is the classic horse shoe or kidney shaped mound, with a distinctive central depression, but variations including elongated, dual (where the central recess of the mound appears to divide the structure in two, creating the appearance of two individual mounds rather than one unit), circular and ovoid also exist. The pattern in which this material was distributed therefore varies from site to site. At Tougs (Fig 4.5) the material seems to have been mounded against walls of the structure to the north and kept separate from the cobbled entrance to the east. Classic kidney shaped mounds appear to be the result of a mounding strategy which sees material distributed evenly around the rear of the site, eventually creating the characteristic recess where the tank itself is found, such as at Boger’s Burn in Northmavine (Fig 7.3). Other interesting mound formations observed in Shetland include the example at Foratwatt (Fig 5.29) where the stones appear to have been arranged in a linear fashion leading away from the water course, and at Tunnigarth (Fig 7.4) where a dual mound appears to have been accompanied by additional material mounded up at the foot of a natural outcrop.

![Fig 7.4 Possible instance of mounding against a rock outcrop at Tunnigarth.](image)

### 7.2.1 Sourcing Stone

The selection of stones is a prerequisite to burnt mound usage. As stones break and disintegrate during firings so more stones must always be ready to fill their place. In Chapter Three I touched upon the elemental status of stones, and explored how processes of burnt mound usage can be seen as a transformative process combining
earth, water and fire. A number of studies have explored the symbolic and material properties of stone. Parker Pearson and Ramilisonina (1998) explored the symbolic links between stone, wood, life and death (Parker Pearson 2004). The hardness and permanence of stone is contrasted to the transience and malleability of wood. These properties, it is argued, are symbolically linked to concepts of hardening through age. In particular, the permanence of stone is seen as being symbolic of the ancestors, while wood is taken to symbolise the living. Through the contrast of materials Parker Pearson and Ramilisonina (1998) are able to draw out a framework for the Stonehenge landscape which understands wooden monuments such as Durrington Walls and Woodhenge, as being monuments for the living, and the stone monument at Stonehenge as a monument for the ancestors. Movement between these monuments therefore reflects the journey from life to death, into ancestorhood. Other approaches to stone have also focussed on the enduring and embodying properties of stone, and their ability to create permanent markers within the landscape (e.g. Tilley 1994, 2004; Cummings & Whittle 2004). Richards’ (2013a) work on the stone circles of the north has demonstrated how the lithology of stones plays a central role in their selection and deployment within monuments. At the Ring of Brodgar in Orkney stones appear to have been selected from throughout the islands. In this way the monument acts as a materialised representation of community (Downes et al. 2013:148). Similar concerns with local lithologies are also demonstrated at Temple Wood, Kilmartin (Richards & Wright 2013:41-45) and at circles in Lewis (Richards et al. 2013, Richards 2013b). Attention has also been given to the social and symbolic role of quarrying (Scarre 2009, Richards 2004, 2009, 2013a, Richards et al. 2011). Quarrying can be seen as a cosmogenic process through which stones are ‘born’, and the act of quarrying involves great risk, both symbolic and practical. Other studies have also focussed on the significance of colour in stones (e.g. Cooney 2004, Darvill 2004; MacGregor 2004). In short the properties of stone can be seen to play a key role in its selection, use and perception (Scarre 2004). Cummings (2012) has illustrated that far from being a homogenous material it is likely that the perceptions of stone were based upon their individual biographies and the context in which they were deployed. Given these observations it is therefore pertinent that we give some consideration to the sources of stone utilised within burnt mounds.

During the occasional use of replica mound to perform experimental firings it was sufficient to gather stones once or twice in a season, as our limited activity at the site failed to produce large quantities of debris. The frequency of stone gathering depends
level of activity required at the site, the longevity of the activities being carried out there, and the durability of the stone utilised. The amount of time a stone will last before shattering depends on its geology. Buckley (1990b) conducted comparative analysis of two fulact fiadh located in different parts of Ireland with differing subsurface geology. Muingbaun in Co. Galway was located in the Limestone Belt, while Castlebellingham in Co. Louth was located in a greywacke area. In both cases it was found that there was a preference for sedimentary rocks, although other rocks were also utilised (cf Dennehy 2008:11). Perhaps more interestingly however, he noted that there appeared to be a preference for drift derived material, suggesting that stones were gathered from the surface in and around the local area, rather than quarried from specific rock outcrops (Buckley 1990b:172; Buckley et al, 1987). As part of this study, Buckley also conducted experimental analysis on the longevity of different geologies under firing. These experiments found that sedimentary rocks lasted approximately 5-10 firings before fracturing and becoming unusable, while igneous rocks appeared to have much greater longevity. In two examples, Gabbro and Vesiculated Basalt, there appeared to be no upper limit with as many as 25 successive firings (Buckley 1990b:171). Buckley suggests that this differentiation might go some way to explaining the variation in burnt mound size and distribution observed throughout the British Isles. For example at Ballyremon, Co. Wicklow a burnt mound comprised mostly of igneous rock was found. This site was visible only as a slight spread of stones, which although fire cracked appeared barely burnt. In contrast other sites in the area, which he describes as “a group of classic horseshoe-shaped mounds” were found to be composed almost entirely of sandstone (Buckley 1990b:171). While Buckley appears to have entirely overlooked the intriguing occurrence of an entirely igneous mound in an area of otherwise sedimentary mounds, and the questions which such a marked variation should undoubtedly supply, it does suggest that burnt mounds comprised of igneous rocks may take on a different, more ephemeral appearance than their sedimentary counterparts. It also suggests that, contrary to our own concepts of modern efficiency, the longevity and resiliency of the stones may not have been a key factor in the selection of materials for use in burnt mounds.

In Shetland the subsurface geology is extremely complex, and while concentrations of burnt mounds do indeed appear to be found in areas of sedimentary geology, they also occur in areas of igneous and metamorphic rocks, suggesting that the underlying geology, while significant, is not the deciding factor in site location (Fig 7.5). Campbell-
Anthony (2003:93) suggests that burnt mounds are overrepresented in areas of sandstone and lava, and underrepresented in areas of Schist, Gneiss and Phyllite.
Given the preference for sedimentary rocks described above, this may indeed indicate a deliberate selection of materials. However, it should also be noted that these geologies generally represent areas of higher ground where we would not expect to find burnt mounds. At Tougs, where a supply of unburnt stone was found stacked between the field wall and burnt mound, Hedges describes the stones as ‘field stones’ (Hedges 1986:11). The stones excavated from the mound are also described as being of the type and size that would be picked up through field clearance. Observation at sites visited confirmed that where visible, stones forming the mound appeared to be largely uniform angular pieces of the same sort of materials still readily available on the ground surface today. At Scord of Brouster (Whittle et al 1986) the field systems were are littered with small clearance cairns; heaps of field stones piled up in the centre of the field to clear the surrounding ground for cultivation or grazing (Fig 7.6). These small irregular cairns are composed of stones the same shape and size as would have been utilised for burnt mounds. It is therefore possible that the stones gathered for burnt mound usage would have originated in the same manner. Selection of stones would therefore be linked to the agricultural cycle and to wider concepts of fertility (see below).

![Fig 7.6 A modern clearance cairn at Loch of Brouster](image)

When conducting the experiments described in Chapter Six, a source of stone was located from a nearby beach. The result was that when the stones fractured they
produced a mix of angular and rounded fragments. The debris closely matched that observed at Tangwick where the rounded nature of much of the remaining mound material suggested the utilisation of beach stone. This observation is particularly significant, as I discovered when I began to work on the experimental material, as beach stone has a reputation for exploding more violently than field stone. The story of exploding beach stone was reiterated independently by a number of sources when discussing potential experimental firings, and is plausible if it is considered that beach stone has a greater chance of containing pockets of water which may expand on heating, especially when using porous rocks. The number of violent explosions described in Chapter Six may indeed stand as confirmation of this fact, although no field stones were used in the experiments to provide a point of comparison. If this is case however, it is notable that despite the greater chance of danger and failure through stone explosion, this presence of this risk did not deter prehistoric burnt mound users from utilising this stone source. This suggests an ingrained notion of risk and danger already associated with burnt mound usage, regardless of the stone source.

Selection of stone for burnt mounds therefore appears to be focused on two aspects. Firstly, there is a preference for sedimentary geologies, specifically sandstones. However, it does not appear that the underlying geology was a prime factor in the location of sites. Nor does it appear that specific sources were utilised for stone selection, although it is not possible to tell how wide an area stones were sourced from. Secondly, there is a preference for readily available field stone of the type which is seen in field clearance cairns. This preference may seen to be unusual when compared to the careful selection and quarrying which is utilised for other monuments, as described above. However, I would argue that the significance of this material may lie in its already fragmented state. As will be explored below, fragmented stone from burnt mounds was regarded as a potent and powerful material, and was subject to specific processes of deposition and mounding, which culminated in the wrapping of the site in a mound of burnt stone. The small and fragmented nature of field stones may therefore have been viewed as previously fragmented, and therefore as suitable for utilisation in burnt mounds. This is particularly significant if we consider that supplies of these stones may have regularly been turned up through ploughing, and thus would conceivably have been seen as having been ‘born’ from the earth, and thus integral to cycles of fertility. Moreover, the utilisation of stone from watery sources, such as at Tangwick, would therefore appear to echo the transformation of stone through water which occurs at burnt mound sites.
7.2.2 Use Form and End Form

Having explored the general processes through which burnt mounds come into being above, I would like now to make a more detailed examination of the development of a burnt mound, and explore the changes which it undergoes throughout its life. In particular, I would like to explore the difference between the use form and end form of mounds and how this might affect the experience of these sites in the past.

The processes involved in the construction of burnt mounds are not always clear from excavation reports. Mounds are often excavated in spit rather than stratigraphically, as the time required to identify and record separate layers in the complex mound matrix is not considered to be proportionate to the amount of information the exercise would
yield (cf Hedges, 1986:7, Dennerhy 2008:12). In these instances the mound is treated as a unit, and is described separately from any features associated with it; thus, the relationship between the two, and the depositional processes which result in their final form is not always discernible. However, work undertaken by Campbell-Anthony (2003) at Cruester has gone some way into illuminating this elusive relationship. Thermoluminescence dates taken from locations throughout the mound allow us to build up a picture of how the mound grew around the site (Fig 7.7). Dates obtained indicated that the structures were in use for a period of approximately 400 years between 1400 and 1000 BC, with pre-structure activity dating back as far as 3000BC (Campbell-Anthony 2003:314, see also Chapter One). The earliest dates were obtained from the area behind the hearth cell and north east of the cistern, suggesting that these areas might represent the focus for early phases of deposition. Generally however dates appear to be evenly spread throughout the mound, indicating a uniform pattern of distribution over all areas. Evidence from Cruester (Moore & Wilson 2008:13), Tangwick (Moore & Wilson 1999) and Beaquoy (Hedges 1975) indicates that burnt mound activity began on site prior to the construction of the internal structures. Structures at Cruester were found to be built on top of, and in some cases revetted into a pre-existing layer of ashy material containing burnt stone (Moore & Wilson 2001:6, 2008:13). Similarly, at Tangwick two phases of mound were identified - the primary mound, which pre-dated the construction of the structures, and the secondary mound, which was deposited around the structures following their completion (Moore & Wilson 1999:212). In both cases it was not deemed to be possible to determine a difference between the burnt stone which pre-dated the structures, and that which followed it. The presence of mound material prior to the beginning of construction confirms the generative nature of these sites. The status of burnt mounds as transformative locales depends on the successful performance of firings on site. As will be explored below, existing burnt mound material attracts subsequent phases of mound activity and, I argue, is linked to concepts of fragmentation, transformation and cycles of fertility and rebirth. As such, it is perhaps not surprising that a number of those sites which possess complex internal structures appear to be well established prior to their addition.

As was discussed in Chapter Four, the structures at Cruester, Tangwick, Stoura Cottage (Ness of Sound) and Tougs are constructed using the same methods employed in house construction in Shetland. Structures were subject to several phases of alteration and repair following their initial construction. At Cruester, the removal of flagstones from
passage B revealed additional surfaces and a series of drains running beneath the floor (Moore & Wilson 2008:11-12). Removal of Cells C & B also revealed a second floor relating to an earlier phase of the structure. This surface appears to represent the floor of a single cell which was later sealed by a layer of burnt stone when the pier of walling separating the two cells was constructed (ibid 14). Additionally, Cell A, the largest of the cells, was later closed off by the erection of blocking stones in the entrance (Moore & Wilson 2001:11). This process was also echoed at Tangwick, where several cells are described as having been closed during the life of the mound, and then subsequently buried in burnt stone (Moore & Wilson 1999:218). At Cruester the hearth cell underwent no less than ten phases of reconstruction. Over time the flagstone lining in the cell became damaged through the repeated application of heat, and a new layer of clay and flagstone flooring was added to repair it. Dates taken from these layers indicate that this occurred approximately every 40 years (Campbell-Anthony 2003:309) suggesting that the replacement of hearth stones would have been experienced only once by each generation, and may have coincided with a transitional period within the mound such as the death of a significant individual. Other mounds in Shetland also demonstrate evidence for phases of reconstruction and maintenance during their life. At Trowlie Loch a secondary tank was inserted into existing mound structures, a pattern repeated at several of the sites visited as part of this thesis demonstrating indications of secondary mound accumulation, or isolated periods of tipping following the construction of the main mound (e.g Loch of Niddister & Lower Loch of Setter).

Following the construction of the internal structures mound material continued to build up around the exterior. As was explored above, stones may be reused several times before being added to the mound and this alludes to the mound material around the site building up slowly over years of use. At Cruester the mound grew to approximately 2 meters in height and around 20m in diameter over the lifecycle of the mound (Moore & Wilson 2008:2). The result of this would be that the experience of the mound would gradually change over time as cumulative deposits built up around the structures. Given the longevity of this mound the difference in mound size over one generation would have been minimal in relation to the final whole. Moreover, this gradual accumulation of mound over an extended period of time indicates that the final form of the mound would have varied considerably from the form it took during use. Indeed, it may be that for some part of the life of the mound, the mound itself appeared as a spread rather than a mound at all, giving the site a very different character to the one with which we,
as archaeologists, are familiar with. At Liddle in Orkney we can see that the growth of mound material prompted a response from the users. A retaining wall was constructed along the inside of the mound to prevent mound material from encroaching onto the walls of the structure, creating a circumambient walk by which access to the site was directed between the mound and structure (Hedges 1975:34). Later, a paved walkway was inserted over the mound, indicating that by this point the mound had already reached a considerable height, and that users were now required to cross over the mound and crest its height before being able to gain access to the structures within (ibid) Similar structures were also found at Beauquoıy, indicating that mound management was an ongoing concern at Orcadian burnt mounds. Likewise, we have already seen how the structures within the mound were subject to repeated alteration and manipulation during its life. Areas were closed off, and even covered in mound material following their abandonment. Given these processes of remodelling and closure, what might we say about the development of the final form of the mound, and the processes through which this came about?

As with the processes which formed them, the events which make up the end of the life of a burnt mound can be equally difficult to determine. In Chapter Four I examined the use of ard points as closing deposits at houses and funerary sites in the Northern Isles. It was argued that these materials linked closely to concepts of fertility and regeneration, and that their deployment marked periods of transformation and change (Bruck 2006a). Bruck (1999, 2006a) has demonstrated that like persons, settlements and structures can be seen as having a lifecycle, and that this lifecycle is linked to that of its inhabitants. ‘Odd’ deposits, such as the blade and awl found in roundhouse 3 a Black Patch are interpreted as closing deposits, representing the death of the building. These deposits mark a formal process by which the relationship between the deceased and the building are ended or transformed (Bruck 1999:334, cf Barrett & Needham 1988:137). Similarly deposition of ard points between floor layers at Jarlshof suggests that the tools were deposited within the house to ensure the continuing success of cultivation following periods of reconstruction and rearrangement within the household. It may be that these events took place at a time of transformation and shift within the household, such as the death of an individual, or the passing of household responsibility during other rites of passage such as marriage or coming of age. Ard points and mattocks are significantly over represented at settlement sites, the more so due to the fact that these tools are unlikely to have been made or used within the house itself (e.g Calder 1955, 1956;
Downes & Lamb 2000). However they are less numerous at burnt mound sites. Where ard and mattock points are found they are often recorded from relatively high up in the context layers (Moore & Wilson 1999: 225), suggesting that they were deposited intentionally, perhaps as either closing deposits, or to mark a point of transition or alteration within the structure of the site itself. Given this observation, the question then is whether mound material was actively used in the decommissioning of burnt mound structures.

Fig 7.8 Wooden container from Clowanstown.
(http://www.archaeologicalconsultancy.com/projects_clowanstown1.asp)

The Neolithic burnt mound site at Clowanstown in Co. Meath is unusual, in that it represents an early example of the use of burnt mound technologies. It comprises of five burnt mound sites, as well as an earlier Mesolithic fishing platform, and associated structures (Mossop 2006). The mounds appear to have been intentionally located in reference to the earlier Mesolithic site. The significance of the location may be due its status as a transformative locale, having once been a lake before the water receded and bog encroached on the area. Many of the mounds featured foundation deposits of crushed cremated bone, burnt flint or broken carinated bowl, which distinguishes them from sites examined in Shetland which appear to have no foundation deposits. Mound material seems to have built up in a similar manner to the Shetland sites however, with periods of activity resulting in accumulation of burnt stone into mounds. These mounds appear to have been periodically consolidated with deposits of marl and sandstone. There is no indication of the relationship between the mounds during their use; however their end of life treatment suggests that the entire complex was viewed as a unit. A
wooden container, created from a single trunk, was placed into the top of mound A (Fig 7.8). This container had an external rebate which appeared to allow for a wooden base to be lashed in place. This base had been replaced by two quarried limestone slabs, and a quantity of redeposited Marl. Following this, all of the mounds were sealed with a further stone spread, which was also found to contain a number of lithic items and crushed and cremated bone. At least seven skulls were also found within this deposit located around mound C (Mossop 2006). Mounds at Kilcor South on the Cork-Dublin pipeline are also believed to have been intentionally flattened in order to cover the tank (Hurley 1987:47), suggesting that acts of closing at burnt mounds may be more widely practised than is currently acknowledged.

In Shetland, both Tangwick and Crueser were described as having a fill of burnt stone, however it is not clear whether this material was intentionally spread over the site to seal it when it went out of use, as was the case at Kilkenny (Stevens 1999) or if the material is present as a result of post depositional slipping as the structures within the mound began to break down. At Cruester we know that access to Cell A was closed through the addition of upright slabs in the doorway while the structures were still in use (Moore & Wilson 2001:11). It is also possible that oval mounds with a central recess, such as those at Utnabrake (Fig 7.9) or Loch of Brouster might indicate the manipulation of mound material

Fig 7.9 Utnabrake: The central indentation suggests the collapse of structures buried beneath the mound.
following the decommissioning of the site. The presence of the central recess indicates the possibility of the collapse of structures at the centre of the mound. This being the case, the greatest volume of mound material appears to be situated over the centre of the site, in the area where the tank and hearth are presumed to be. This distribution may be the result of intentional piling of debris over the structures in order to formally close the site. However, no mound answering to this description has yet been excavated to confirm whether this is the case. Additionally, as suggested in Chapter Five, the presence of satellite mounds around larger mounds may also relate to the deliberate abandonment of mounds following a catastrophic event. In such cases, it is possible that the primary site may have undergone a process of closing to ensure the continued safety of those working within its proximity.

7.3 Burnt Mounds, Memory and Monumentality.

The choice to create mounds from burnt stone rather than to dispose of it discretely or reuse it in other locations is one that merits further consideration. The very act of mound building itself is unlike any other act of construction. As Ingold (2013:78) notes, if, in possession of a time machine, we returned to the past to question the intent of mound builders in their activities, it is unlikely that any of them would answer that they were 'building a mound'. The process of mound building is unique, in that it is hardly ever the purpose of the activities undertaken. Rather, mounds grow as the result of other practises taking place on site, be they disposal of waste, the burial of the dead, or the performance of other ritual activities. A mound, therefore, is not a finished object, but rather, the result of a process of mounding, which is itself part of some other wider process (*ibid.* Cf Downes 2005:202-225). It is important therefore to qualify what is understood by the term monument in this context. As Scarre notes (2011:9), the term monument invokes concepts of size, durability, permanence and memory. The danger here then is that we conceptualise the burnt mounds as permanent monuments erected with the intent of creating a memorial to burnt mound activity, and whilst this is undoubtedly the affect that they have for us as archaeologists. Indeed, as was explored in section 5.3.1) – the notion of mounds as an intentional visual marker of past activity, meant to be seen and to see from, both influenced and biased the initial approach taken to recording burnt mounds within this study. It is true that burnt mounds serve to mark the landscape and create a sense of place which defines these places as locations of transformative activity. As will be explored below, this quality played a key role in attracting subsequent phases of activity and re-use, such as at Burn of Setter, or Lower
Loch of Setter. However to ascribe intentionality to this aspect of the mound relies on the notion that those who created these structures had a preconceived notion of how they would appear when finished. If we examine the processes of mound construction at burnt mound sites we can see that this is false. As Pauketat & Alt ask “was it the *mound* that was the goal of the builders, or the *act of construction* itself?” (2003; 152, original emphasis). The mound is not built, rather, as was seen above at Cruester, it *grows* alongside the processes taking place on site, and is tied up with the flows and transformations of materials of the ongoing activities which create. Burnt mounds are inherently temporal, in that they involve, or are the product of, accumulation. It is the accumulation of materials, produced by particular practises, that give rise to monuments which in turn act as mnemonics to these practises.

Recently there have been a number of studies dedicated to memory (Van Dyke & Alcock 2003; Williams 2003). These studies have explored the power of monuments to act as mnemonics, and to serve as markers for the formation of group identities and kinship. Connerton’s seminal work on social memory identifies two types of practise through which memory is ‘ammassed’ in the body (1989:72). *Incorporating practise*, such as a handshake, are enacted through bodily activity, and are present only when the body is present to perform it. *Inscribing practise* is performed through media which can store and transmit information. While incorporating practise is likely to be unintentional and part of a wider ingrained way of behaving within a particular social group (e.g bows, curtsseys), inscribing practise is deemed more likely to be intentional. It is the notion of inscribing practise which appears to have most appeal to archaeologists dealing with the concept of memory. These practises leave physical traces, and thus can be ‘read’ by those wishing to understand them in the present day (cf Lillios 2003). The danger in this approach is that we see past materials as the vessels of their originators intent and as passive entities onto which meaning can be imposed (cf Barrett 1998, 2001). As was explored in Chapter Three, this approach has the affect of separating the mental and the physical, which Thomas has demonstrated is the product of a distinctly modern way of understanding the world (2004). It is important therefore that we acknowledge the role of construction within the creation and maintenance of memory (Pauketat & Alt 2003). The act of mound building facilitates the gathering of materials both past and present, and combines them through action. Thus those involved in its ongoing maintenance are able, through their actions, to interact with past events, to replicate them within the present and thus to integrate themselves within a tradition of mounding. It is therefore
through practise and construction, that the temporality of mounds are revealed. Likewise, it is in their status as mnemonics to these practises that their monumentality lies.

In Chapter Four I touched upon the tradition of using midden material within construction in prehistoric Shetland. The accumulation of midden and its incorporation into structures has much in common with the deposition of spent burnt stone around burnt mound sites. In both cases waste materials from activities taking place on site are incorporated into the wider structures, so that the debris of the past become intertwined with the activities of the present. There are however, some fundamental differences between the composition of midden, and the composition of burnt mound material. Both are arguably transformative and potent, however, while midden is in the process of transformation as it decomposes and reduces, the mound material at burnt mound sites has already undergone its transformation. There is a contrast therefore between the process of decay involved in middening practises, and the apparent immutability of the stone involved in the construction of the mound. As was explored above, there have been number of studies concerned with the properties of stone (Tilley 2004; Parker Pearson & Ramilisonina 1998; Boivin & Owoc 2004) as pertains to its use within prehistoric contexts. Conneller notes that many of these studies have focussed on the use of stone in monumental construction, and as such, have concentrated on the monument as a finished product (2011:80). Thus, while there have been notable studies concerning quarrying and construction practises, there has perhaps been an over emphasis on the perceived hardness and durability of stone (cf Parker Pearson & Ramilisonina 1998; O’Connor & Cooney 2009; Tilley 1996). Yet as Conneller illustrates, while the endurance of stone is a quality which is apparent to us as archaeologists, it does not follow that this property was recognised or selected for by those who used it in the past. Indeed, she illustrates a number of contexts where stone can be seen as mutable, easily worked and shaped, used, and then disposed of (2011:82, cf Cummings 2012). These mutable properties are brought to the fore through burnt mound use. Though the mounds of stone can be seen to endure in the present day, the experience of those creating them would have been of a material demonstrably changed through the processes involved. Far from being immutable and fixed, the stone within burnt mound appears as fragile, volatile and shifting. This is especially relevant if, as was noted above, we consider the prevalence of friable and fragile sedimentary rocks within burnt mound contexts, in comparison with the more enduring properties of igneous and metamorphic
rocks. As such mound and midden appear to be used to the same end. Both are intrinsically bound up in processes of mediation between people and land, and are instrumental in ensuring the continued success of the endeavours of those who work with them.

In Chapter Three I introduced the transformative nature of burnt mound site and the power of these transformative properties, I argued, has close links with the concept of elements, and the fundamental make up of the world. Burnt mounds are locales where materials and people are transformed from one state to another, either through acts of feasting, acts of bathing and cleansing, the production of state altering substances, or through the construction of new materials and objects. Through the application of fire and water activities taking place at these sites may have had metaphoric links with processes such as metalworking, the transformation of bodies through cremation and traditions of votive offerings. As both Owoc (2005) and Downes (2005) argue for barrows and burials, it is not the final form of the mounds which are significant, but rather the role in which the materials in the mound play in mediating transformation, and in ensuring the correct appropriate flows of materials and substances for successful completion of the event in hand. We have already considered the transformations undertaken by the materials within the mound, and the social transformations which they might facilitate as part of these processes (Chapters Three and Six). Just as materials and persons are transformed within, so the stones themselves undergo transformation and fragmentation as part of this process. In the consideration of the geological makeup of burnt mounds and the selection of stones for the firing process above it was noted that a number of sites demonstrated a preference for sedimentary rocks, despite their tendency to shatter and fragment after only a few firings. Likewise it was also noted that despite being noted for catastrophic failure during heating, beach stones were not avoided as a potential source of material when selecting stones for use within burnt mounds. I would argue that the fragmentation of the stones within the burnt mound was seen as key to the success of the other transformative processes taking place within. Fracturing and fragmentation of the stone occurs as the heat within the stones is transferred to the water, and the materials within the tank are transformed, water to steam, raw to cooked and so on. When viewed in this way the fragmentation of the stones becomes, not a by-product of repeated thermal shock, but rather the medium through which the transformative powers of fire and water come to be combined. Therefore, burnt and fractured stone represents a series of successful
transformations, and the presence of this material surrounding the site may also have been seen to ensure the continued success of future events.

The significance of burnt stone in ensuring the success of future firings becomes more plausible when considered in light of known sequences of construction and mound management at excavated sites throughout the Northern Isles. At both Cruester and Tangwick a significant amount of mound material was built up before the construction of the internal structures (Moore & Wilson 1999, 2001, 2008). Successive phases of building and re-modelling within both sites incorporated existing mound material within the structures. Rather than completely clearing out the structures, deposits of fragmented burnt stone were allowed to build up between floor layers, and were incorporated into the fabric of the building as time went on. The entrances to both of these sites were lost to coastal erosion, so it is not possible to say how the structures might have originally been accessed. However, as was noted in Chapter Four, these sites have close parallels in the Orcadian sites of Liddle and Beaquoy (Hedges 1975). At both of these sites it is possible to see a close relationship existed between mound and structures. At Liddle for example the mound originally surrounded the structure to the south, east and west, although much of the material to the east has been removed by quarrying. As was described in Chapter Four, entrance to the site was originally gained through a door in the east wall, and a low revetting wall was constructed along the edge of the mound to prevent it encroaching into the access route to this entry. The retaining wall ran all around the building, allowing access to all of the walls. A similar feature was also identified at the nearby site of Beaquoy. At Liddle the internal structures were reorganised during a later phase (Chapter Four), during which the entrance was moved to the south. A flagged path was found leading from the entrance onto the mound, although this too had been partially destroyed by quarrying (Hedges 1975:45-6). The presence of this path indicates regular passage from the structures onto the mound, and suggested that entrance to the site was gained by crossing over the mound itself. As such the mound can be seen to have formed an integral part of the wider structure. Those working within the site can be seen to engage with the material on a regular basis, adding to it through the activities taking place within the burnt mound, negotiating with it via the construction of the retaining wall, and crossing over it to gain entrance to the building. Kerbs have also been excavated at burnt mounds at Attyflin, Co. Limerick and Coarhamore, Valentia, Co. Kerry (Gahan 1998, 111; Sheehan 1990, 31), and traces of what appeared to be a kerb were observed at Hamnavoe, Eshaness. (Fig 5.36).
Construction of structures into existing mound material at Liddle, Beaquoy, Tangwick and Cruester (Moore & Wilson 1999, 2001, 2008; Hedges 1975) and the insertion of a secondary tank into the mound at Trowie Loch (Dockril et al 1998) indicates that the presence of mound material is a central concern to the activities carried out at burnt mounds. Mound material is actively incorporated into structures, and subsequent phases of activity appear to be orientated towards places already established as loci of burnt mound activity. At Lower Loch of Setter, and Niddister multiple phases of deposition and smaller secondary mounds were observed (Fig 5.50), while at Burn of Setter several burnt mounds were observed to cluster around a single water course (Fig 5.6). As such we should see the accumulation of the mound as an ongoing process which both ensures the success of the processes taking place on site, and which also establishes the location as a place of burnt mound activity. The mound marks the location as one in which transformative acts have taken place. Larger mounds demonstrate repeated activities, creating deep temporal links and demonstrating the ongoing success of the site. By constructing the mound the user actively engages with an ongoing tradition, associating their work with that which has gone before, and in doing so ensuring its continued success.

The presence of mound material around the entrances of the site would have had the affect of controlling visibility of the activities taking place inside. By the end of its life the mound at Liddle had reached approximately 2 meters in height (Hedges 1975:39). Agents approaching the site would find their view of the interior of the structures blocked by mound material. Entry to the structures was gained by walking over the mound via the paved walkway. Thus, visual contact with the interior of the site would only have been possible once the mound had been crested. The interior of the mound would undoubtedly be seen as symbolically potent and dangerous. Given the transformative nature of the practises which take place within, burnt mounds would have been perceived as locations where things were constantly in flux, unstable and therefore potentially unsafe. The mound material may therefore have also served to protect those outside of the mound from contamination by the activities taking place within, or conversely to protect the delicate processes within from external influences which may jeopardise the success of the activities. Richards (2013c:16-17) introduces the concept of wrapping as a method for conceptualising the architecture of Neolithic monuments. Wrapping, he argues, can be utilised for a number of reasons, to conceal, protect, contain, unify or re-present. Moreover, wrapping is indicative of a process; wrapping, or
unwrapping is an activity which one is engaged in, and as such can be seen as a structuring or ordering principle. The concept of wrapping is useful for exploring the architecture of burnt mounds, and in particular the construction of mounds of burnt stone, rather than their disposal in discrete spreads. The accumulation of mound material can be seen as an act of wrapping. As the mound builds up it conceals the interior structure, protects the outside world from contamination whilst preserving the inner space as a location of transformation and contains the transformative properties of the burnt stone within the burnt mound.

7.4 Conclusion
In this chapter I have explored the status of burnt mounds as mounds of burnt stone. Mounds have been identified as culturally significant structures during the Bronze Age, and their construction is understood to relate directly to concepts of transformation and regeneration. It is argued that far from being an accident of disposal the construction of mounds played a central role in the success of the activities performed at burnt mounds. Burnt Stone is identified as symbolically potent, and therefore potentially dangerous and contaminating. The construction of the mound is therefore interpreted as a generative process, through which the site becomes wrapped in mound material. This process is not seen to be a conscious attempt to create a visual mnemonic to burnt mound activity; rather it is viewed as an intentional process by which the potent and transformative properties of burnt mounds are mediated and controlled. More specifically, the construction of the mound is identified as being the defining characteristic of burnt mounds. It is the curation of mound material, and the gradual construction of the mound which sets burnt mounds apart from other uses of heated stones (eg pot boiler stones).

In chapter six I explored some of the disparate uses of burnt mounds and hot stone technologies, and examined how each of these functions were brought together at burnt mound sites through shared practice and a common skill set. Likewise, the construction of the mound at burnt mound sites unifies each of these different functions. As such, despite representing a variety of different possible functions, it is possible to see identify burnt mounds as a distinct type of site, characterised by the curation and development of mounds of culturally significant, transformative, heat shattered stones over the life of the site.
Chapter Eight: People of Fire and Water: Burnt Mounds and the wider Bronze Age World.

8.1 An Elemental Understanding: Fire and Water.

*It sort of mesmerises you doesn't it, looking at fire... I suppose fire and water are the basic elements of life.*

M Rule in Strang 2005:51

The elemental and transformative nature of burnt mounds and their wider setting has been remarked upon throughout this thesis. Within these transformative processes fire and water can be seen to have special significance. In this chapter I would like to take time to examine the qualities of these elements in detail. It is argued that both of these elements are transformative and powerful, and it is their combination which lends symbolic potency to the practises carried out at burnt mound sites. It is also noted that both fire and water are of special significance in other Bronze Age practises. By examining these practises it is then possible to draw out common themes which cross cut between different Bronze Age contexts. These themes, it is argued, are linked to an elemental understanding of the world and the role of elements such as fire and water in cycles of creation and fertility. Following this, I will examine how the role of water at burnt mound sites might affect our understanding of the conceptualisation of water and watery places within prehistory. Finally, this understanding is then applied the Bronze Age material of Shetland, in order to draw out how an elemental and transformative perception of burnt mounds allows them to contribute to a wider understanding of the Bronze Age in the islands.

8.1.1 Water.

Water is constantly changing (Fig 8.1). Strang (2004, 2005, 2008) has suggested that it is the qualities of fluidity, transmutability and change that provide water with its meanings (cf Oestigaard 2011). It is able to shift from steam to ice, to fill any container, to shift and flow between places. It can take the form of a large lake, a flowing stream, or a cup or drop. In turn, each of these states has distinct and oppositional qualities (Strang 2005: 49). The contrast of solidity of ice and the fleeting rapidity of steam allows for a wide range of symbolic properties. Within each of these properties there remains the potential for each other (steam always has the possibility of condensing, water of freezing and boiling etc) and as such water is always fluid and in a state of potential transformation. The form which it takes varies depending on the context in which it is
found. It may be apparently constant, such as a large lake, constantly ebbing and flowing like the sea, or dynamic and rushing such as a river. It may fall regularly as rain, or come rarely and seasonally, through monsoonal conditions. In the case of springs, it may even appear to defy natural rules by appearing from the ground.

As was noted in Chapter Five, interactions with water comprise of a specific set of sensory engagements. The sonic experience of water is as varied as its physical appearance. It may be soft and lulling (such as a trickling stream) or dramatic and roaring (such as a waterfall, or the crash of storm waves on the coast). Goldhahn (2002) has illustrated the crucial role which the sound of water plays in the location of rock art sites in Scandinavia. Likewise smell can play a key role in our engagement with water. Water in its pure form is both tasteless and without scent, as such smells associated with fresh water suggest pollution and danger (Strang 2004:58). This sense is also tightly bound up with perception of colour, and any shift or change in the hue of the water may suggest contamination. However, while smell is not welcome in fresh water, the opposite appears to be the case for saltwater. Thus, our perception of water and its qualities can also be seen to be tied up in our understanding of the necessity of water for the continuation of human life. While much of this perception is undoubtedly related to modern concepts of cleanliness, (cf. Strang 2005:58), it goes some way to illustrate the potential complexities in the relationship between people and water.

The duality of water also extends beyond its physical form. Water is fundamental to the development and survival of all life yet at the same time it can be a powerful tool for destruction. Strang (2004, 2005) illustrates that one of the most evocative engagements people have with water is through immersion. She notes how many people associate the act of immersion with relaxation, and a womb like sense of security. However at the same time there is a perceived distrust of deep water and a sense of claustrophobia associated with a fear of drowning (2004:56-7). The power of water and its potential for destruction is illustrated by the number of sites featured within this thesis which have
been subject to coastal erosion. As such water can be seen as both constantly transforming and transformative, with the power to change its physical form, and also to change and affect the characteristics of its surrounding landscape and the people within it. Douglas ([1966] 1994:162) has also noted water’s ability to dissolve and break down forms, its associations with cleanliness (washing) and pollution (urine and other bodily substances). Water is powerfully regenerative and is associated with concepts of fertility and regeneration.

Richards notes that the movement of water from its source in the hills ‘through inhabited lands’ and on to the sea can be seen as a metaphor for journeys (1996:316). Likewise the flow of water is also symbolically linked with the passage of time. “To sit by a river is to watch time passing”, it can serve as a symbol of mortality, the ebb and flow of the river symbolising the ebb and flow of life (Strang 2004:64). As was discussed in Chapter Three, water is recognised as an element in a wide range of societies (cf Taun 1974: 18-23). As such it constitutes one of the fundamental building blocks of the world; a substance from which everything begins, and to which everything returns, and has strong cosmological associations. The significance of water as an elemental substance during the Neolithic has been remarked upon by Richards (1996) in his exploration of the relationship between henge monuments and water. Henges are regularly found in association with water, and are often linked to these bodies of water through the addition of stone or wooden lined causeways. Richards argues that many of the ditches surrounding these sites have been observed to readily fill with water during excavation, and suggests that as archaeologists we are overlooked the symbolic significance of water in the location and construction of these sites. He notes that the circular form of henge monuments such as the Ring of Brodgar and Stones of Stennes in Orkney can be viewed as embodiments of the local ‘natural’ landscape, composed using the same elemental materials which make up the world around them. As such, the architecture of henges embodies both spatial and temporal (through the seasonality of water tables and the activities taking place there) definition (ibid 332).

Unsurprisingly there is a wealth of folklore, ritual and superstition surrounding water. Stories containing water spirits, such as Kelpies, Njuggles (Fig 8.2) and Mermaids can be found in the mythologies of many countries (for examples see Macinlay 1993; Strang, 2004, Lindenlauf 2003; McNiven 2003; Västrik 1999). Bodies of water are embodied with the powers of spirits or deities; often the origins of a water source are accredited to dramatic or spiritual events (Bradley 2000:21). Waters were said to heal, or malignant
spirits said to drown unsuspecting victims. Both Macinlay and Västrik record examples of sacrifices made to the water spirits in order to ensure fruitful harvests or calm seas (Macinlay 1993:4, Västrik 1999). Additionally, watery practices such as fishing are subject to a number of taboos and superstitions (Westerdahl, 2005) relating to when it is safe to go to sea, and with whom.

8.1.2 Fire

*Fire is the ultra-living element*

*Bachelard (1968:7)*

In discussing the visual properties of water Strang (2005:51) likens its mesmeric properties to that of fire; dancing, unfixed and constantly changing. Like water, fire holds a fascination for people and as with water it holds an inherent duality. It is both substance and non-substance. It appears to have no material presence, but despite this seeming insubstantiality we are able to both see and feel it. It brings heat and light, and yet can bring devastation and destruction (fig 8.9). Again, like water, fire is identified as an elemental substance in a range of societies (Taun 1974). Sørenson & Bille (2008:254) note how fire is readily adopted as a metaphoric substance, used to express concepts of life, death and emotion. Anger burns, love is a fire. One can be described as having ‘burnt out’ through exhaustion, and a departed person may be described as having ‘burned brightly’ in life, or to have been ‘extinguished’ too soon.

Drawing on the work of Bachelard (1968) Sørenson & Bille explore the associations between fire and life (2008:254). Fire is constantly moving, a dynamic element
consuming fuel, almost giving the appearance of being a living entity itself. Likewise, fire is fragile, liable to be starved, smothered or blown out. It must be tended and kept in order to ensure its survival, but conversely must be controlled and monitored, to prevent it from becoming out of control. In Chapter Three I explored concepts of material agency, and the concept that objects might be able to act back on those who use them and affect their surroundings (cf Dobres & Robb 2000, 2005; Robb 2004; Gell 1998; Gosden 2005). Both water and fire appear to be embodiments par-excellence of this concept. They are able to affect the worlds around them visibly, often with lasting and dramatic affect. In the experimental firings detailed in Chapter Six, the ability or inability to control the fire, was one of the most limiting facets of the entire process. The ability to achieve the correct temperatures and length of burn in order to roast the stones and achieve the required affect was crucial for the success of each experiment. Where the fire burned too quickly, or could not be sustained for long enough periods then the results of our endeavours were compromised. Heat and smoke from the fire dictated where users stood within the structures while working and much of our inability to work with the fire in order to extend its burn during firings was related to the extreme heat which emanated from the hearth cell. The power and physical presence of the fire was therefore able to affect our activities, despite its very presence having originated through our endeavours. Fire is also associated with a specific range of sensory engagements. It provides both light and warmth but has the potential to burn and injure. The smell of fire is distinctive, and dependent on the materials being used to fuel it. It permeates its surroundings, so that after time both people and materials in proximity to the flames take on a distinctive smokey smell. The presence of smoke can also be felt as it dries the skin and eyes. Alongside smell, heat and other tactile sensations, fire is also sonically distinctive. Flames roar, crackle, pop and bang unpredictably. The experience can be soothing, as with a gently crackling hearth, or dramatic and frightening, as was the case with the exploding rocks experienced during several of the firings detailed above (Chapter Six).
8.2 Fire and Water as Elemental Substances in the Bronze Age

The role of fire as a sacred and elemental force has been explored in some detail by Kaliff (2007, 2011), particularly in relation to the role of fire in Indo-European cosmogonies. In the Vedic tradition fire is a substance which is active everywhere. It is embodied in the god Agri, who is present in the sky, in lightening, the sun, but also in water, a point which is of some significance when considering the combination of water and fire at burnt mound sites. The significance of fire and water during the Bronze Age is expressed through a wide and complex range of iconographies. These iconographies suggest a cosmology focussed on images of water and the sun. Through examinations of imagery in rock art and portable objects such as razors Kaul (1998) outlines a cosmological schema for the Scandinavian Bronze Age which focuses on the journey of the sun across the sky during the day, before being transported back below ground (Fig 8.3). This is expressed through objects such as the Trundholm chariot (Fig 8.4), which is understood be representative of the passage of the sun above ground during the day. It is also visible in depictions of boats, which, depending on their direction of travel are understood as transporting the sun through the sky during the day (travelling to the right), or returning...
invisible below ground during the night travelling to the left. These objects are also associated with cosmological fish or serpents, which are viewed to assist the sun on its journey (Kaul 1998, cf Bradley 2006, Kristiansen 2010). Brück (2011) notes that cosmological schema involving boats and chariots are also found in other mythological traditions. In Greek mythology Helios rode the sun chariot across the sky each day to bring light and warmth to the world, while Charon the ferryman transported souls across the river Styx to the underworld.

It has been suggested that watery locations function as a liminal space within the Bronze Age, providing points of access to the underworld (Brück 2011:389). Bradley has
suggested that the placement of ship carvings at the foot of low hills in Sweden may serve to ‘convey the idea of water itself’ (1997:321, Bradley 2000) (Fig 8.5). He argues that these ship carvings create inland islands, and may mark the location of areas which were once islands. When studied in relation to the location of cairns in the wider landscape he argues that these carvings can be seen to define an inland archipelago which would have been understood and used in the same manner as coastal island groups (Fig 8.5) (ibid 322). The elemental and cosmological status of water in the Bronze Age is also attested through the deposition of objects in watery places (cf Bradley 1990 [1998]). A wide range of materials have been found to be deposited in bodies of water throughout the Neolithic, Bronze and Iron Ages. These include human and animal remains, pottery, and agricultural equipment (Bennike et al 1986, Bradley 1990 [1998] 28-31, Glob 1945). In Shetland a wooden spade and clod breaker discovered during peat cutting have been dated to the late Iron Age (Murray 2011). During the Bronze Age metal objects were deposited in a variety of watery contexts. Drawing on the work of Strang (2008), Yates and Bradley (2010) have explored the range of different contexts under which watery deposition took place. Examining deposition practises within the Fenland area they argue that a correlation between types of materials and different water sources can be seen. They argue that there is a clear association between finds of complete weapons and principle river channels, while hoards of weapons were found to more commonly be associated with bogs or still water pools. In turn, fragmentary remains of weapons were more likely to be found on dry land than whole examples (Yates & Bradley 2010:413). Most importantly, this illustrates that a clear differentiation was made between different types of water. This perception was acknowledged and mediated through different strategies of deposition, and through the differentiation between materials deposited within these locations. This distinction is also reflected in the utilisation of different water sources at burnt mounds, as will be explored further below.

One of the most familiar uses of fire within a Bronze Age context is, of course, the act of cremation. While cremation was already well established as a form of mortuary ritual during the Neolithic, it gains particular significance and popularity during the Bronze Age. One of the most significant elements of the act of cremation is the destruction and fragmentation of the body. Kaliff (2011:52) suggests that these processes of fragmentation can be seen as linked to creation myths by which the world is born from the body parts of a mythical being. The process of cremation therefore transforms the
body back to its constituent parts, and as such provides material for the continuation of the cosmos. In Chapter Seven I explored how the process of mound construction at burnt mounds can be likened to the construction of burial mounds. I argued that as a burial mound completes the transformation of the bodies, and contains powerful transformative materials, so the construction of a burnt mound could be seen to complete the processes of transformation taking place within the site, and to ensure the continued success of any future endeavours. The similarities between burnt mounds and cremation go beyond the construction of the mound. Fundamentally, the stones within the burnt mound can be seen as having undergone the same process as the cremated body, and thus, as I have argued, are powerful substances in their own right. Each process involves the transformation of materials through fire, and the resulting materials are both physically and metaphorically changed. These links are further supported by the presence of burnt stone material in some burial mounds, such as at Mousland. Here, a burial cist was found to contain deposits of burnt bone, ash, cramp and burnt stone (Downes 1994: 146). Across the top of the cist was a close packed layer of burnt stone (ibid 151). The similarities between cists and the troughs found within burnt mounds in the northern isles have already been remarked upon (Chapter Four). As such, the inclusion of burnt stone within the cist at Mousland can be seen to echo the accumulation of burnt and fragmented stone within the tank at the end of a firing. The use of burnt stone to seal the deposit further indicates the special symbolic status of burnt stone, and suggests that the stones may have been viewed as having played an active part in the transformation of the body.

As Brück (2001, 2006a:302) illustrates, processes of fragmentation are not just related to death, but rather seem to be linked with concepts of ongoing fertility and regeneration during the Bronze Age. In Chapter Four I discussed the accumulation and use of midden at settlement sites in Shetland, and the deposition of stone tools associated with pounding and grinding within burnt mound contexts. I argued that each of these activities can also be seen to relate to a wider association with concepts of transformation, fragmentation, death and fertility (Chapter Three). As materials are broken up so they return to their constituent parts, and thus are able to reenter the regenerative cycle, ensuring a continual flow of materials (cf Brück 2001, 2006a,b; Kaliff 2007, 2011).

The symbolic properties of fire would also have been familiar to Bronze Age metal smiths. Budd & Taylor (1995) argue that the process of metalworking would have been
closely linked to concepts of magic and ritual. While metallurgy is often considered in terms of industry, economy and networks of exchange, if we examine the processes involved with the smelting and forging of metallic items we can see that they have much in common with the transformative processes already discussed within this thesis. That metal and metal goods were considered to be special and significant objects is evident from the contexts in which they are often deposited, as is noted above. If however, we disregard the objects themselves for a moment, and consider the production of metal as a combination of fire and earth to produce new materials, then the ritual and transformative significance of these processes becomes evident. Brück (2006a:306) illustrates how bronze is transformed from one state to another through fragmentation and the application of fire. Production of metal involves the crushing, smelting and casting of ore. Likewise, existing objects may undergo processes of fragmentation prior to deposition in watery places, or being melted and utilised in the production of new items (ibid). Barber (2001:166) notes that in ethnographic accounts of ironworking, smiths and smelters are often viewed as being participants in natural processes of transformation, aiding the process through adherence to a range of rituals, technological processes and taboos (cf Haaland 2004). Thus, we can appreciate that Bronze Age metalworking was also subject to its own set of rituals, taboos and beliefs, all of which combined to ensure the successful transformation of the materials involved.

8.3 Burnt Mounds: Elemental Confluence

Fire and water are at the heart of burnt mound activity. As we have already explored in Chapter Three, the process of burnt mound usage can be understood as the elemental transformation of materials through the application of fire, water and earth. Water is the medium through which all materials within a burnt mound become transformed. We have already seen how burnt mounds display a strong affinity for watery locations (Chapter Five). Explorations of the landscape setting of burnt mounds in Shetland demonstrated that burnt mounds are associated with a variety of different types of water. As was explored above, water’s most significant characteristic is its transmutability. Yates and Bradley’s (2010) analysis of the deposition of metalwork in the Fens has demonstrated the importance of different types of watery location within the Bronze Age. This study also illustrated that deposits of metalwork were closely associated with spreads of burnt flint and burnt mounds (ibid 413). This association is also seen elsewhere in Britain and Ireland (Bradley 2007: 214-6). This association suggests that there are similar underlying cosmological considerations in the deposition
of metal objects in watery places, and the location of burnt mound sites. As such the waterside location of burnt mounds is not just utilitarian. Rather, it reflects an understanding of the world which identifies water as an elemental substance, and, following Kaul (1998), watery places as points of contact between the different realms of the world.

Kaliff (2007, 2011) has examined the role of fire in the creation of Scandinavian burnt mound sites. He suggests that the reddened and cracked appearance of the stones would have been a visible indicator that the fire was born from the stone (ibid 2007:123). Burnt stone is therefore not just the product of heating, or the medium of heat transfer, but rather the instrument through which transformative processes are born, and through which elemental substances combine. As such I have argued that as elemental bodies themselves the presence of burnt stones at burnt mound sites would have been viewed as crucial to the ongoing success of the site (Chapter Seven). The elemental composition of burnt mounds can also be drawn out through comparison with Vedic Altars (Kaliff, 2007:123, 2011:57). These altars are composed of bricks, each of which can seen as a combination of elements - earth, water and fire - giving them special symbolic meaning. The processes involved in burnt mound use, in which stones are cracked through the application of fire and water can be seen as analogous to the construction of these bricks. As was discussed in Chapter Seven he production of burnt stone involves a combination of earth, water and fire and thus the stones themselves would have been viewed as both potent and symbolic. Moreover, Kaliff (2007:122) suggests that the production of burnt stone at burnt mound sites can be seen as an intention of the burnt mound itself. He argues that the stones themselves can be seen as having undergone the same transformation as cremated remains (2011:57). Analysis of burnt mounds found in the Stockholm area demonstrated that approximately 30% of the mounds contained human bone (Kaliff 2007:107). Mounds at Skalby in Uppland, and Skravsta in Sodermanland also contained human remains. At Ringeby in Sweden burnt mounds were found in association with oval stone settings and a number of burials (O’Neill 2008:184-5). This association therefore supports the view that burnt mounds were understood as powerfully transformative locales, and that, through the combination of fire, water and earth, the processes involved in their construction and use were linked with wider understandings of the cosmological makeup of the world, and with cycles of death, fertility and reproduction.
From the examination of interior structures of the mounds, we can also see how fire and water take on special significance within the spatial organisation of these buildings too. Both Kaliff (2011:84) and Brück (2011) note that as well as being a powerfully transformative element with strong ritual and symbolic associations, fire is also a key player in the domestic sphere, through pottery firing and acts of cooking. Thus, as Brück notes, the cosmological concerns played out in ritual processes are also encompassed within the home and elsewhere in the landscape(2011: 398). As was discussed in Chapter Four comparison of internal arrangement of burnt mounds and houses within the Northern Isles reveals some interesting contrasts. The central role of the hearth within Orcadian Neolithic houses has been commented on by Parker-Pearson & Richards (1994 41-42). As the main source of light, heat and as the focus for cooking and eating the fire would have been a focal point for activities within the house. This central position is echoed in the architecture of Shetland houses, such as those at Sumburgh, Ness of Gruting, Scord of Brouster (Fig 8.6). However, as we have seen in Chapter Four, the central space in burnt mound sites is often occupied by the tank, with the hearth
towards the rear of the structure, echoing the significant rear space within prehistoric houses. This arrangement can be seen repeatedly in excavated examples throughout Shetland, including Tangwick (Moore & Wilson 1999), Cruester (Moore & Wilson 2001 2008), Tougs (Hedges 1986) and Stoura Cottage (Small 1975).

Although as of yet none of the excavated structures in Shetland have produced indisputable proof of an entrance, the lack of apparent access points at both Cruester and Tangwick suggests that entry to the structures was gained from the opposite end of the building, in the regions lost to coastal erosion. On entering the burnt mound site your eye would therefore be drawn over the tank along to the hearth at the back of the structure. In both Shetland and Orkney this rear space appears to have heightened significance within house structures. In Orkney this space is often occupied by the dresser, such as in House 7, Skara Brae and house 3, Barnhouse (Fig 8.7). In Shetland this space is often occupied by a substantial recess, or even entirely separate chamber, such as at Gruting School, Yoxie and Stanydale House. The subversion of the organisation of central and rear space within burnt mound sites could therefore be seen both as affording heightened significance to the fire and cementing the cosmological ties between fire and water.

Excavation at Cruester and at Liddle in Orkney also revealed complex drain structures running beneath the floors. Parallels for these structures can also be found in prehistoric
houses in Shetland, such as the double house at Sumburgh Airport (Downes & Lamb 2000), and at Kebister (Owen & Lowe 1999). Similar drains are also found at prehistoric houses in Orkney, indicating a shared concern with flows of materials. At Kebister agricultural tools, including ard points, mattocks and quernstones were utilised within the fabric of the drain structures. As was discussed in Chapter Four, these materials are symbolically loaded, and can be seen to relate to concepts of fertility. It is possible that these drains were viewed as analogous to processes within the human body. Flows of water beneath the house can be seen as representative of the flow of liquids (urine, blood, saliva and semen) through the body, and the purging of dangerous or polluting materials. The flow of water and other fluids through these drains can therefore be seen to relate to concepts regarding the flow of materials, cleanliness, pollution and the natural cycles of death, fertility and reproduction, as outlined above. The construction of drains in both houses and burnt mounds demonstrates that these flows of materials were considered significant, and were tightly controlled and monitored within both of these contexts (cf. Downes 2000: 234).

8.4 Boundaries or Bridges? Reconceptualising Watery Places.

Having explored the role which water plays in bringing together substances and transforming them in burnt mound sites, I would now like to take some time to explore the effect this understanding has on the way in which we conceptualise watery places in prehistory. As has already been explored above, watery places are clearly imbued with special symbolic meaning during the Bronze Age. Given this role it is therefore very tempting to conceptualise watery places as ‘liminal’ or ‘other’, an almost unknowable space somehow between one thing and the other. However, I would argue that this concept has its dangers. While it offers a rich seam for exploring symbolic meaning in Bronze Age activities, as has been explored above, it also has the potential to marginalise the role of water and watery places within a prehistoric context. Land and water are often presented as two diametrically opposing states; one fluid and unpredictable, the other solid and knowable. This conceptual boundary has been reflected in the archaeologies which we create and the way in which we define our subject matter. In such terms the past appears only to exist where it occurs on dry land, and the watery landscapes are given over as the preserve of the marine or maritime archaeologist (Cobb & Ransley 2008). These perceptions have contributed significantly to the view of Islands as bounded and isolated (Terrel 2004, Rainbird 2007), and have created the view that coastal locations are marginal. They rely on and perpetuate concepts of a Cartesian
duality between land and water. Where the sea is mentioned it often presented as something that encircles or encloses. Something to be viewed from the land, rather than lived upon. These interpretations have been particularly redolent in our attempts to construct cosmologies for prehistoric communities, such as Richards (1996) interpretation of henge monuments in Orkney – whereby the water filled ditch serves as a symbolic referent to the sea, encircling the land, or in Phillips (2004) account of chambered tombs, strategically placed on hilltops with sea views, facing outwards towards the landscape of the dead. In each of these accounts water is presented as outside, bounding the action, a place to be viewed, or to be viewed from.

However, if we examine the role of water at burnt mound sites as above, we can see that the conceptualisation of water as a bounding or external force does not fit with the evidence presented. As we have seen, rather than enclosing the sites, water is a central feature which not only forms the heart of the burnt mound (the tank), but also in the case of Cruester, flows beneath it. Construction of drains allows for the flow of

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*Figs 8.8 & 8.9 Views, Loch of Breckon, Burn of Setter.*
water and other materials beneath houses and other structures. Thus, water is not utilised as a boundary, but can be seen running beneath and through the everyday lives of prehistoric peoples. It is controlled, covered and separated, preventing pollution, but yet still a constant feature. Moreover, if we examine the landscape setting of burnt mounds in Shetland (Chapter Five) we can see that water is often the central feature within the landscape. At Loch of Breckon the mound sits directly beside a loch (Fig 8.8) and is surrounded on all sides by rising ground, while at Burn of Setter several mounds cluster around a stream which runs through the centre of a flat valley, again surrounded on all sides by rising ground. (Fig 8.9). Thus, rather than being enclosed by water, the impression is of being encircled by land. This is emphasised when we consider that those sites with most expansive views are often the ones which are located by the sea. Thus, rather than enclosing, watery vistas open up the landscape, and suggest the possibility of movement and travel.

The centrality of water in Shetland is evident if we examine the location and internal structures of Stanydale, on the West Mainland. Excavated in 1949 by Calder (1950), the site comprises a large stone built structure with concave facade and recessed interior. It shares many characteristics with both the Shetland oval house, and heel shaped tombs, as described in Chapter Four. Significantly though, it is situated in one of the few locations in Shetland where no body of water, be it loch or sea, can be seen. The site is bounded by high ground on all sides, and these ridges are marked by lines of cairns, marking the area out as a place of some significance (Mahler 2011). Access to the site appears to have been controlled through the use of a route demarcated by pairs of boulders which takes the walker over a series of ridges and furrows, so that sight of the building is strictly controlled throughout the approach. The approach also involves the crossing of two waterways. While the smaller seasonal runoff may conceivably have developed later as a result in changes of vegetation cover and land use, a small boulder built bridge across the nearby stream indicates that the crossing of waterways was a key part of the approaching the site. At this point in the approach the building is out of sight, however, on crossing the bridge and progressing up the ridge above the burn the site becomes skylined (Clarke & Renwick 2013:20). The internal organisation of Stanydale also illustrates the significance of water at the site. Traditionally the central feature of a Shetland house is the hearth (Chapter Four), however at Stanydale the hearth is offset to the left of the building, and the central space is dominated by two postholes each containing a pair of spruce posts (Calder 1950:191) (Fig 4.11). Spruce is not, and never
has been native to Shetland (ibid: 192). The most likely source of this wood is therefore driftwood (Dickson 1992:50-54). The implications of this on our understanding of the building at Stanydale are significant. Despite its seeming isolation from nearby water sources, the presence of substantial pieces of driftwood at the heart of this significant building suggests that the sea, and by extension other watery locations have central significance in the way in which prehistoric Shetlanders understood their world.

The centrality of water at both burnt mound sites and sites such as Stanydale urges us to question the approach traditionally applied to watery sites by archaeologists, particularly as pertains to the sea and island communities. Rather than bounding or enclosing, water appears to be central and underpinning to activities. Even in areas where no water is visible, such as at Stanydale, it remains a central presence. This is not to say that water was not considered both powerful and transformative, and as such dangerous and symbolically loaded. This is clearly not the case; rather that the transformative and symbolic properties of water enable it to be seen as a medium for movement, a substance which affords change, and facilitates the bringing together and transformation of other materials. Instead of seeing watery places as the boundary between worlds, or as liminal spaces, ‘half way’ between one state or another, it is perhaps more valuable to see them as bridges, and as nodal points, where people and materials flow together in the process of transformation.

### 8.5 Fire and Water in Prehistoric Shetland.

*The Bronze Age was a time of regression, where Shetland was constantly facing an agricultural crisis with reduction of arable land due to peat growth and rising sea level... When times were hardest, we can imagine that some people were waiting for a ship to arrive, to carry them away from these islands of depleted and overgrazed soils at the margins of agriculture.*

Kaul (2011:48)

The Bronze Age of Shetland has, until recently, been significantly under-studied. In a period which is deemed to be characterised by the arrival of metal and other ‘continental novelties’ (Sheridan 2011. Cf ScARF, Downes 2012), Shetland, with its relative lack of metallurgy and seeming isolation has, by and large, been overlooked. To the uninitiated the Bronze Age of Shetland can appear under developed. As Kaul notes, “there was a rich Neolithic full package culture in Shetland [sic]” but “no Bronze-Age” (2011: 47). Most obvious is the almost total lack of Bronzes, or the accompanying elaborate burial traditions that characterise the period elsewhere in Europe. There is
evidence for contact with the outside world, in the form of a local variation of all over corded beaker from Stanydale, and the existence of Shetland Steatite cinerary urns in Orkney (Ritchie 1995: 92), coupled with the adoption of cremation and cist burials although a version of this practise has been present in Shetland from the early Neolithic, which hints at an awareness of trends elsewhere (Hedges & Parry 1980). The presence of an unfinished miniature battle axe at Ness of Gruting (Calder 1956: 392), along with the finished example from Sumburgh (Downes & Lamb 2000: 67) also suggests awareness of some of the expressions of prestige that were in use elsewhere in Britain (see Sheridan 2012 for a full discussion). However, these expressions remain for the large part fragmentary. Although the Bronze Age of Shetland remains recognisably British, there is a distinct impression that Shetland followed its own trajectory during this period, which, coupled with a continued use of stone tools and a Neolithic lifestyle gives the impression of stagnation and isolation (cf Kaul 2011).

More recently it has been acknowledged that many of the structures previously assumed to have been Neolithic may indeed date to the Bronze Age, (Downes 2000:121. c.f. Hedges 1986, Chapter Four), although more work is required to establish a secure chronology for the Shetland material. However, as was explored in Chapter One burnt mound usage is often conspicuously absent from syntheses of the Bronze Age and whilst getting to the roots of the function and meaning of burnt mound sites remains elusive and mysterious, it is possible to understand that they formed a part of a wider range of beliefs and practises which manifested themselves in a number of ways during the Bronze Age, as has been discussed above. The technologies involved in their creation and use have been available to prehistoric peoples since before the Mesolithic, but their popularity during the Bronze Age can be attributed to the way in which they enmesh within a wider set of worldviews, and facilitate an ongoing dialogue between Bronze Age people and the world around them. As locales of transformative processes through which the earth, fire and water come together to create new materials and substances, and alter the states of existing ones, burnt mounds can be seen to fit into a wider suite of practises used to actively engage with the landscape and negotiate a place within the world.

Therefore, while at first glance it may appear that the Bronze Age of Shetland is impoverished and stagnant, a closer examination reveals a different scenario. The proliferation of burnt mound usage in the Islands indicates a period of ongoing activity and industry. The construction and use of burnt mounds indicates an active engagement
with the Bronze Age cosmogony identified above. Thus it would appear that not only were the prehistoric inhabitants of Shetland aware of aspects of wider Bronze Age culture, but that they embraced them, and incorporated them into their daily lives. Rather than standing on the shoreline waiting for the boats that would take them away to warmer climes, it is possible to imagine that the inhabitants of Bronze Age Shetland embraced the challenges presented by their changing landscape, and faced them head on.

8.6 Conclusion

This chapter has explored the elemental nature of fire and water, and has highlighted the role which these elemental substances take in transformative practices throughout the Bronze Age. It is argued that elemental substances are significant due to their role in bringing the world into being. As such, ritual and transformative practices involving water can be seen as relating to concepts of creation. By examining a range of practices throughout the Bronze Age it has been possible to draw out recurring themes centring around processes of fragmentation and transformation through the utilisation of elemental substances. These processes are understood to act to ensure the continuation of cycles of fertility and reproduction through the breaking down of materials into the constituent elements. Moreover is argued that burnt mounds constitute powerful locales in which elemental substances are brought together through transformative processes in the production of new materials and objects. The proliferation of burnt mound usage during the Bronze Age is therefore attributed to the way in which burnt mounds and hot stone technologies relate to wider cosmological frameworks during this period. Specifically it is argued that an understanding of burnt mounds in relation to wider practices of transformation and fragmentation in the Bronze Age allows us to recontextualise the Bronze Age material of Shetland. This recontextualisation problematises views of Bronze Age Shetland as isolated and stagnant, and instead reinterprets it as a period of dynamic activity in which cosmological understandings of the world were mediated and reinforced through material engagements.
Chapter Nine: Summary & Conclusion

... in my opinion [burnt mounds] should be regarded as among the most enigmatic and ambivalent features that occur. As such they have great potential to say something about prehistoric people, their activities and ideas.

(Kaliff 2007:110)

9.1 Reinterpreting the Burnt Mounds of Shetland

This thesis was developed to challenge to conception that burnt mounds are unable to offer any insight into the life of prehistoric peoples. In order to do this it has focussed on the construction of a contextualised and practise based understanding of burnt mounds in order to reinvigorate a subject which I have argued has been rendered stagnant by continued adherence to outdated concepts of technology, function and form. Having opened the introductory chapter with a quote regarding the dullness of burnt mounds, it seems fitting now to close with one which celebrates the potential which these sites hold for exploring how Bronze Age people interacted with their world, and the manner in which they understood it.

Chapter One introduced the subject of the burnt mound and provided the background to this study. Most significantly, it highlighted dismissive attitude taken by archaeologists towards burnt mounds, and introduced the belief that burnt mounds offer little by way of understanding about life in the Bronze Age beyond a dot on a distribution map. As such it was recognised that a critical reinterpretation of burnt mound sites was required which focussed on the relationship between burnt mounds and their wider landscape, and which explored the material and social engagements which their construction and use affords. These aims have been addressed in the following manner.

Aim 1) To critically analyse the approaches taken within burnt mound studies to date.

In Chapter Two I developed a broadly historical overview of the approaches to burnt mound sites so far. This overview highlighted three key themes which are as follows

- Current interpretations continue to depend on Irish folklore in order to interpret these sites (O’Kelly 1954, O’Drisceoil 1987, Moore & Wilson 1999). More specifically, despite the publication of papers exploring the applicability or otherwise of these accounts (O’Drisceoil 1990), these interpretations continue to be applied uncritically, without consideration of the specific historical or political context in which they were developed.
• There is a failure to engage with the wider context of burnt mound usage. Studies which explore the landscape context of the sites have tended to commoditise the landscape or restrict themselves to analysis of distribution patterns (eg Canter 1998).

• There is a continued emphasis on determining the function of these sites. This, in turn, I argue, has led to the stagnation of the subject. There is an implicit understanding that until the true function of these sites is identified they cannot be fully understood and as such, they cannot contribute anything to our understanding of prehistoric life.

Following this, Chapter Three analysed the theoretical frameworks underpinning these approaches, and argued that there was a continued conflation of technology and function within burnt mound studies. This approach understands the meaning of things through their adaptive value, which has been identified as a product of the modern perception that matter is inert and meaning can therefore be imposed upon it through social action (Thomas 2004).

**Aim 2)** To develop a new framework for understanding the use of burnt mounds and hot stone technologies which acknowledges the embodied nature of experience, and which explores the reciprocal relationships between people, places and things in the creation of meaning.

In order to do this Chapter Three outlined the development of phenomenological approaches to landscapes materials and technologies. Two key themes were identified in relation to the understanding of burnt mound and hot stone technologies. First was that materials are understood as emergent through use within an equipmental totality. As such, meaning is revealed through embodied engagements with materials and places, which take place with a specific historical and temporal context. Secondly, following Ingold (1993) it is understood that concepts of place, practise and identity are inseparable. As such any reconsideration of burnt mound sites must understand them as situated locales which are knowable through a series of a reciprocal engagements between people places and things. Interpretations of these sites must therefore consider both their wider landscape setting and their relationship with other prehistoric monuments and locales, as well as the material engagements which afford their creation and use. To this end a programme of GIS analysis, *in-situ* survey and experimental firings were proposed.
**Aim 3)** To examine the relationship between burnt mounds of Shetland and the wider prehistoric landscape.

This was achieved through a combination of GIS analysis and *in-situ* survey to explore the relationships between burnt mounds and specific landscape features, as well as record information regarding the landscape experience of burnt mounds. The results of this analysis were presented in Chapter Five. The relationship between burnt mounds and other features within the landscape was explored via simple proximity analysis and the generation of viewshed models. Following Rennel (2009) a person-centred scale was applied which allowed data generated by the GIS to be interpreted in terms of human engagement with the landscape. This analysis was then corroborated through site visits which allowed me to gather information about the embodied landscape experience, and to compare the data generated by GIS to that of the experience of ‘being there’ in addition to gathering information about the appearance and morphology of burnt mounds in Shetland.

The following insights were therefore drawn:

- The relationship between burnt mounds and water is extremely complex. While it is true that burnt mounds appear to be orientated towards water, this relationship can take a number of different forms. Burnt mounds may be associated with either flowing or standing freshwater, or a groundwater source. Additionally, a number of mounds also seem to display a relationship with saltwater locations, but this is nearly always found in combination with a second freshwater watersource. Similarly, burnt mounds may have a relationship with more than one freshwater watersource, or conversely, appear to have no relationship with water at all.

- This relationship with water profoundly affects the experience of the burnt mound site. The sonic properties of water make each encounter unique, while bodies of water also have the power to direct movement, and to limit and affect interactions between persons and burnt mounds.

- As with water, the relationship between burnt mounds and contemporary prehistoric sites is also extremely complex. Exactly half of the sites within the study area were found to be within 1500m of a nearby settlement. However, despite their proximity burnt mounds were found to have limited intervisibility with neighbouring settlements. As such it was proposed that while burnt
mounds formed an integral part of the prehistoric landscape, encounters with these sites were tightly controlled.

- The landscape experience of burnt mounds is one of isolation and enclosure. Burnt mounds were found to occupy low lying contours, and to occupy spaces which could be described as natural amphitheatres. Sites were often bounded on all sides by high ground and afforded limited views of the wider landscape. The exception to this was found in coastal locations. These sites appeared to have wider vistas than their inland counterparts, though these were restricted to views of the sea rather than of the land.

- Certain locations within the landscape appeared to attract burnt mound activity. Mounds were observed to cluster in particular areas. Often this appeared to take the form of one larger site accompanied by smaller satellite sites.

**Aim 4)** To explore the range of material engagements and networks of skill afforded through the use and construction of burnt mounds.

Chapter Six detailed the results of series of experimental firings at the replica burnt mound in Bressay which were designed in order to explore the material affordances of working at a burnt mound site. These experiments explored numerous facets of burnt mound usage including the creation of fire, transportation of hot stones into the tank and the use of hot stone technologies in brewing, textile working, hide processing and wood bending. Analysis also recorded details on the social networks developed as a result of working a burnt mound site, the transfer of knowledge through skilled engagement, the sensory experience of hot stone technologies, and the potential for danger and disaster during burnt mound firings.

**Aim 5)** To recontextualise burnt mounds in relation to broader themes of research currently being explored in relation to the Bronze Age, specifically those concerning the fragmentation, elemental substances and transformation.

Chapters Seven and Eight explored the relationship between burnt mounds and contemporary Bronze Age practises. Chapter Seven considered the role of the mound during the Bronze Age, and explored the status of burnt mound as mounds of fragmented and shattered stone. The process of mound construction was analysed and a biography of the mound was created which explored the difference between use form and end form. Comparison was drawn with the construction of burial mounds, and the strategic employment of soils and cremated materials in order to subvert natural
topographies and reflect cosmological concerns was noted upon. The deposition of fragmented and transformed materials was identified as playing a key role in maintaining cycles of fertility and reproduction during the Bronze Age. As mounds of fragmented material burnt mounds were therefore identified as being symbolically potent. As such it was argued that the construction of mounds from burnt stone was an intentional act concerned with the continuing success of the mound, and was therefore an integral part of the process of working a burnt mound. Specifically, it was noted that it is this practise of the creation of mound from fragmented stone which defines burnt mounds as a site type, and unifies all the possible functional hypotheses, allowing burnt mounds to be considered as distinct category of site, despite the potential for variation demonstrated.

In Chapter Eight the status of burnt mounds as an elemental practise was considered. Fire, water and stone were identified as elemental substances, and as such were considered to playing a key role within cosmogony and ritual practise. As locales in which fire, water and stone come together burnt mounds were therefore identified as powerful and transformative locales. The significance of water and fire during the Bronze Age was drawn out through an examination of the processes of cremation and metalworking, and through the deposition of objects within watery places. As such it was argued that as transformative locations, concerned with the combination of fire and water burnt mounds were reflective of wider cosmological concerns during the Bronze Age.

This study can be seen as a unique contribution to knowledge in that it breaks tradition with burnt mound studies by focussing on the practises of creation and use rather than on the functional output of these sites. In doing so it is argued that this research has been able to move burnt mound studies away from stagnant reiterations of functional hypothesis towards an approach which considers the dynamic role which burnt mounds play in creating Bronze Age identities.

9.2 Reconsidering Bronze Age Shetland.
Having summarised the contribution of this thesis to our understanding and perception of burnt mound sites as a whole, I would now like to take some time to explore how the insights gathered have advanced our understanding of the study area. One of the core aims of this thesis was to present a contextualised account of burnt mounds, and to reintegrate them into wider narratives concerning prehistoric life. As such, this study focussed on reinterpreting burnt mounds from one specific region (Shetland).
As was discussed in Chapter Four, the prehistoric archaeology of Shetland is rich, well preserved and highly unique. Yet despite this, or perhaps because of it, like the burnt mounds themselves, Shetland remains substantially under-researched and underrepresented in accounts of prehistoric life in Britain. This is particularly the case if you compare the islands to their nearest neighbours, Orkney, which along with material from the south of England tends to dominate discourse about the British Neolithic and Bronze Age (cf Barclay 2000, Harding et al 1996). Much of the research undertaken to date has focussed on empirical studies of individual sites or specific areas within the islands (eg Downes & Lamb 2000; Moore & Wilson 1999, 2001, 2008; Whittle et al 1986). Excavations of Shetland’s burnt mounds have proved a wealth of detail about the potential variation at burnt mound sites, while surveys such as Calder’s (1950, 1956, 1964) work on the West Side of Mainland Shetland provided an excellent overview of the potential of the islands for studying sites within wider prehistoric landscape. Later studies such as Parry’s West Burra Survey (Hedges 1984a), and Dockril et al’s (1998) South Nesting Palaeolandscape Project and a range of coastal surveys and excavations have all added to this picture, however, until relatively recently there has been little attempt to construct an interpretive narrative from this material. This thesis brings together existing research into Shetlands burnt mounds, early settlement, funerary sites and portable material culture, and begins to construct a narrative concerning how places and things were constructed and understood in prehistoric Shetland.

Information gained from in-situ survey undertaken as part of this thesis has contributed to a more in-depth understanding of burnt mounds in Shetland. Specifically, it has facilitated the development of a detailed understanding of the relationship between burnt mounds and local landscapes, and has provided an overview of the complex relationship between burnt mounds and other prehistoric sites. Experimental archaeology undertaken at the replica site in Bressay has also provided additional context for the possible applications of burnt mounds and hot stone technologies in a Shetland context. While the experiments undertaken as part of this thesis were not designed to ‘test’ potential functional outputs, they have been able to provide an insight into the resources and materials which would have been required to work them. In particular the number of burnt mound sites in Shetland found in close proximity to the modern day coastline raised the suggestion that they might be in some way connected with maritime activites. This may have been the production of craft suitable for sea travel, such as was attempted in our skin boat experiments, or it may have been as a
route to transport materials and practitioners from different areas in order to carry out the desired activity. Experiments also offered specific insight into the possible use of Cruester mound. As was noted in Chapter Four, the smooth lip of the tank was consistent with repeated dragging of materials in and out of the tank. This process was found to be replicated perfectly during experiments involving skin and textile working at the site, providing a tantalising glimpse into (one of) the possible past uses of the site.

In Chapter Four I also presented an overview of the characteristics of early prehistoric architecture in Shetland. Several recurring stylistic themes were identified as a result of this process, including construction of heel shaped façades, the use of recesses, and the incorporation of midden material into structures. In particular, it was identified that both the use recesses and arrangement of internal space, and the utilisation of midden in construction are reflected burnt mound practise. This allows for insights drawn from new understandings of the construction and use of burnt mounds to be applied to other aspects of early prehistoric life in Shetland. In particular, the deposition of fragmented items, and the control and flow of elemental substances has been illustrated to be a key theme in both burnt mounds and domestic sites. In Chapter Eight I explored the status of fire and water as elemental substances in the Bronze Age, and examined their role in understanding wider Bronze Age cosmologies. It was argued that both fire and water were understood to be powerful transformative mediums. A concern for water at burnt mound sites is illustrated by the central placement of the tank, and the utilisation of complex drainage systems, such as those found at Tangwick (Moore & Wilson 1999), Cruester (Moore & Wilson 2001, 2008) and Meur (Toolis et al 2007). This feature is also echoed at domestic sites, such as at Sumburgh (Downes & Lamb 2000), where complex drain systems were discovered running beneath the floors of the structures. Both burnt mounds and settlement sites therefore appear to place emphasis on the flow of water, and the movement of substances through the site. Likewise, fire can be understood as an important, powerful and symbolic substance in early prehistoric Shetland. In burnt mounds fire combines with stone to facilitate the transformation of materials within the tank. The hearth often occupies the chamber at the rear of the site, such as at Tangwick (Moore & Wilson 1999) and Cruester Moore & Wilson 2001, 2008). In early prehistoric houses this space is often occupied by a deep rear recess, or a small separate chamber. It has been suggested (Downes 2000) that this space may be the equivalent of the large rear dresser found in Orcadian houses, and represents the most significant and sacred space of the house. In domestic spaces fire is generally a central and focal presence, and
activities can be seen to take place around it. The spatial considerations of fire placement in both burnt mounds (rear, sacred) and houses (central, focus) therefore indicates a shared concern with the importance of fire, and its transformative and life giving properties.

In Chapter Seven it was suggested that the construction of mounds of burnt stone at burnt mound sites indicated a concern with the symbolic and transformative properties of fragmented materials. These materials, it is argued, represented the stuff from which all substances came from, and the processes through which things are created and destroyed. Processes of fragmentation were identified as analogous to the death of an object or person (as can be seen through the practise of cremation), but also the method through which the materials returned to a cycle of life and creation and became available for reintegration into new objects. As such, fragmented materials were identified as potent symbols of fertility and regeneration. The construction of mounds of burnt stone at burnt mound sites was therefore interpreted as a method of controlling these powerful substances, and of ensuring the ongoing success of the site and the processes taking place within. This process is also echoed in the incorporation of midden materials in the construction of houses. At Ness of Gruting, large numbers of stone tools were recovered from within and around the walls of the building, as well as peat ash, and charred grains (Calder 1956). In Chapter Three I explored how the deposition of broken and fragmented objects at prehistoric sites can be viewed as an expression of personal or group identity and of wider cosmological understandings. These deposits may have been linked with significant changes in the life of the household, such as birth, marriage or death, and could be viewed as an active attempt to ensure the continued success and fertility of a settlement or household.

Finally, and perhaps most significantly, this work has begun to shed new light on how we view the Bronze Age in Shetland. As was explored in Chapter Four and Eight, the Bronze Age of Shetland has been identified as a time of stagnation and regression. This presumption is based on the lack of period diagnostic material, and in particular the lack of bronze working in the isles. Examination of existing dates from early prehistoric sites in Shetland has illustrated that a large number of what were originally labelled as Neolithic sites have dates extending well into the Bronze Age. These dates are found to be cotemporary with burnt mound usage in Shetland. Examination of the processes of transformation and fragmentation at burnt mound sites, and the utilisation of elemental substances in order to achieve these processes has been identified as relating to a wider
cosmology, such as that identifiable in the Scandinavian Bronze Age. Burnt mounds can therefore be understood as part of a concern with the material make up of the word, and an understanding of the construction and ordering of things which identifies particular materials (water, fire, earth) as being elemental substances. These substances are recognised as the materials through which the world and all things in it are constructed, and to which they will return. As has been explored in the final chapters of this thesis, this understanding is also manifested in the practise of cremation, in the deposition of fragmented objects, and in the creation of metal objects. Such an understanding immediately problematizes the claim that the Bronze Age of Shetland was a time of isolation and stagnation. Evidence from burnt mound activity indicates that far from this being the case, Bronze Age Shetlanders were engaging with wider aspects of Bronze Age culture and cosmogony, and were actively involved in the creation and understanding of their place within the world.

This thesis represents a unique attempt to draw together the various threads of research relating to the early prehistory of Shetland. New knowledge generated relating to burnt mounds has allowed the Bronze Age of Shetland to be examined in line with current understanding about Bronze Age cosmology. This interpretive framework has been key in highlighting hitherto unconsidered aspects of Shetland’s Bronze Age culture, and to challenge misconceptions about the isolated nature of life in the islands during this period. As such, it is hoped it will serve as a much needed catalyst to future discussions of the Bronze Age in Shetland.

9.3 Limitations of Study and Scope for Further Research

The limitations of this study have largely been discussed within the body of this thesis as they occurred, however it is pertinent to summarise them here. The main limitation considered within this thesis is the utilisation of GIS in considerations of the landscape setting of burnt mounds. As has been discussed, GIS represents a Cartesian conceptualisation of the landscape, and as such is contradictory to the hermeneutic framework which this thesis applies. This limitation is explored in greater detail in Chapter Three, however, as I have argued the combination of GIS analysis with in-situ survey serves to mitigate many of the criticisms of this approach. Additionally, within the GIS scales of analysis were incorporated which are drawn from human frames of reference. Moreover, GIS analysis was undertaken with prior experience of Shetland’s burnt mounds and their landscape setting. This allowed for the interpretation of GIS
analysis in a way which relates to the embodied experience of burnt mounds. Finally, the utilisation of experimental archaeological approaches serves to offset the primarily visual approach to landscapes employed by both GIS and in-situ survey. As such the combination of methodological approaches serves to create a rounded and nuanced approach.

The second limitation which this study encountered with the variability of data available regarding burnt mounds. Although the burnt mounds of Shetland are better documented than many areas, it was still difficult to obtain sufficient data to explore aspects of the creation and use of these sites. This was especially evident when trying to obtain information regarding the development of the mound at burnt mound sites. In many instances the mound receives nothing more than a precursory mention during the discussion of other features at the site. Yet, as this study has illustrated, the construction of the mound is one of the most fundamental aspects of the construction and use of burnt mound sites. What this thesis has demonstrated is the need for detailed and targeted research at burnt mound sites. In particular, it has highlighted the value of detailed programmes of excavation and dating such as those carried out at Cruester in developing chronologies which examine the construction and use of these sites.

Finally, the lack of established chronology for Neolithic and Bronze Age Shetland renders the contextualisation of Shetlands burnt mounds difficult. As was noted in Chapters One, Three and Four, this thesis has treated all material with a Neolithic/Bronze Age date as potentially contemporaneous on the basis that numerous sites in Shetland have been demonstrated to have extensive lifespans, and that there is a general sense of continuity between the Neolithic and Bronze Age periods in Shetland. However, this limitation has prevented the development of a more nuanced account of the relationship between burnt mounds and other prehistoric features.

Other directions for study include the application of a similar landscape based approach to other areas of Britain and Europe in order to determine regional patterns of burnt mound use throughout the area. Similarly a comparison of the British burnt mound tradition with Scandinavian hot rock sites may yield some interesting comparisons regarding the nature of these practices. There is also a need for more good quality, research driven excavation of burnt mound sites in order to full explore the processes involved in their construction. In particular it is suggested that further attention be paid to the accumulation of the mound. Finally it is noted that there are still large gaps in our understanding of burnt mound sites. In particular studies from the Northern Isles and
Ireland are seen to dominate the literature. As such there is a need for a more general interest in these sites, and their research potential.

9.4 Final Conclusions.

In concluding this thesis I would like to return once more to the folkloric accounts first introduced in Chapter Two. In *The Romance of Mis and Dubh Ruis* hot stone technologies are employed to cure Mis of her madness. Firstly, Dubh Ruis uses the hot stones to heat water in order to cook the deer which Mis has caught. Once the deer is eaten Dubh Ruis then utilised the hot water and fats from the cooking site to bathe Mis, until the madness is sweated out. While I have argued that the early Irish folkloric accounts are dissatisfactory as historical sources for the use of hot stone technologies, the story of Mis and her return from madness is a fitting one to close our considerations of burnt mound sites on. Burnt mounds and hot stone technologies are identified as powerful and symbolic, and the processes involved in their creation and use had the power to transform both people and materials. Mis’s encounter with hot stone technologies can be seen as a continuation of this tradition. In we turn our focus away from the methods through which Dubh Ruis returns her to sanity, and instead explore the processes which are taking place within this story we can see that the themes identified as part of this thesis are indeed present. It is not just the immediate use of hot stones to heat water for cooking and bathing that is instrumental to the processes taking place within this tale. What is clear however is that while the hot stones have been used for both cooking and bathing, the intended outcome of these processes was neither nutrition, or cleanliness. Rather these processes combine, with sex and music, to facilitate the return of Mis to her senses. As such, Mis undertakes a transformation, alongside the materials involved and is brought from madness into sanity. Moreover, in this story the burnt stones are not just utilised for cooking, or for bathing, they are used for both. As this thesis has demonstrated, the transformative nature of burnt mound sites and the processes taking place within meant that the materials passing through its centre were viewed as being imbued with special transformative and symbolic status. Following this, it stands to reason that these potent materials might be considered as useful to more than one end. We have already seen that burnt stone took on special status, and that the waste materials from burnt mound activity were intentionally reincorporated into burnt mound structures themselves, and thus were viewed as central to the transformative processes taking place on site. Might not the same be said for the water, or any other materials transformed within? Fragmented materials were
viewed as having strong connections with fertility and regeneration in the Bronze Age. Waste products from transformations at burnt mound sites, such as spent grain, used dyestuffs, or animal remains, would also have been understood as being potent and powerful. We know from the treatment of cremated remains and other fragmentary materials (Brück 2006), that these materials were viewed as having fertile properties, and were frequently reincorporated into other contexts, or subject to complex schemes of control in their final deposition. The fertile and transformative properties of materials from burnt mound sites would therefore render them ripe for reincorporating into other contexts. Spent grain provides an ideal feed for livestock (Dineley 2006), while other materials may have been incorporated into the curated midden deposits such as those found built up around dwelling sites in the northern isles. Given these properties, it is reasonable to consider that not only could hot stone technologies be put to multiple uses, but that in any given context more than one function might have been seen to be taking place at a given time. As such it is possible that the model for an embodied, nuanced and multivalent interpretation of burnt mound sites has been at our fingertips the whole time. While burnt mounds still prove to be enigmatic and difficult to interpret, the research presented in this thesis goes some way to refuting the claim that they are among the most boring sites with which an archaeologist must deal, and instead suggests that there is a strong possibility they may prove to be the most exciting of them all.
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**Appendix 1**

**Gazeteer**
This appendix provides a list of the burnt mounds which comprise this study. Mounds are listed by local SMR number. Data obtained from the Shetland SMR.

31
_Sweinkatofts_
HU 6333 9001

37
_Selli Geos_
HU 613 874

50
_Burn of Funzie_
HU 663 897

51
_Burn of Funzie - north_
HU 6607 8978

53
_Skeo Knowe_
HU 3581 7778

67
_Clings Water_
HU 3140 5587

78
_Voe of Clousta_
HU 3090 5730

85

_Tresta Voe_
HU 3582 5033
92
_Sefster_
HU 3020 5020
93
_Hackland_
HU 3014 5137
111
_Loch of Breckon_
HU 2142 7803
115
_Tangwick_
HU 2335 7755
135
_North House_
HP 5798 0422
188
_Hool_
HZ 203 706
193
_Murrister - North_
HP 6068 0147
210
_Whirlie_
HU 1705 5940
211
_Whirlie_
HU 1711 5941
212

_Sotra Water_
HU 1728 5991
215
_Little Heogan_
HU 1823 5985
216
_Sotra Water_
HU 1727 5992
218
_Little Brownies Knowe_
HU 1737 5670
219
_Muckle Brownies Knowe_
HU 1716 5640
228
_Loch that Ebbs and Flows – South_
HU 1656 6129
231
_Billy Horries Knowes_
HU 1641 6141
236
_Dutch Loch_
HU 1607 6095
242
_Setter - Southwest_
HU 1710 6020
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**Visited Sites and their Landscape Setting**

This table contains an overview the sites visited as part of *in-situ* survey undertaken for this study. Information is presented on the relationship between the mound and nearby water sources, its landscape setting, and its proximity to other prehistoric sites. Water sources are divided into five categories, Freshwater – Flowing (streams and substantial hill runoffs), Freshwater – Standing (Lochs, ponds and other small bodies of water), Groundwater (Boggy areas, or those sites known to have utilised a cistern), Saltwater (sites which appeared to have a strong link with the sea or coastline), and Unknown (sites for which a water source could not be determined). The landscape setting is divided into the two main categories witnessed during site visits 1) Sea View – this represents those sites in a coastal location which demonstrated open or partially open vistas across the water. 2) Closed – this category represents those sites in inland locations where the view was substantially enclosed, or those sites with extremely limited coastal visibility which appeared to be enclosed on all sides by other landmasses.

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