ON THE EMERGENCE OF ART AND SYMBOLISM: THE CASE OF NEANDERTAL 'ART' IN NORTHERN SPAIN

by

© Amy Chase

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ABSTRACT

The idea that Neandertals possessed symbolic and artistic capabilities is highly controversial, as until recently, art creation was thought to have been exclusive to Anatomically Modern Humans. An intense academic debate surrounding Neandertal behavioural and cognitive capacities is fuelled by methodological advancements, archaeological reappraisals, and theoretical shifts. Recent re-dating of prehistoric rock art in Spain, to a time when Neandertals could have been the creators, has further fuelled this debate. This thesis aims to address the underlying causes responsible for this debate and investigate the archaeological signifiers of art and symbolism. I then examine the archaeological record of El Castillo, which contains some of the oldest known cave paintings in Europe, with the objective of establishing possible evidence for symbolic and artistic behaviour in Neandertals. The case of El Castillo is an illustrative example of some of the ideas and concepts that are currently involved in the interpretation of Neandertals' archaeological record. As the dating of the site layer at El Castillo is problematic, and not all materials were analyzed during this study, the results of this research are rather inconclusive, although some evidence of probable symbolic behaviour in Neandertals at El Castillo is identified and discussed.

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List of Abbreviations

AMH	Anatomically Modern Humans
AMS	Accelerator Mass Spectrometry
BP	Before Present (usually refers to radiocarbon years)
cal BP	Calendar Years Before Present
EUP	Early Upper Paleolithic
ESR	Electron Spin Resonance
IUP	Initial Upper Paleolithic
MAT	Mousterian of Acheulian Tradition
MNI	Minimum Number of Individuals
MP	Middle Paleolithic
MSA	Middle Stone Age
MSM	Multiple Species Model
OIS	Oxygen Isotope Stage
SEM	Scanning Electron Microscopy
TL	Thermoluminescence
UP	Upper Paleolithic
U-Th	Uranium-Thorium

Chapter 1
Introduction

1.1 Introduction

During the last decade, there has been an intense academic debate about Neandertals' symbolic and artistic behaviour (e.g. d'Errico 2003; Moro Abadía & González Morales 2010; Nowell 2010; Wynn & Coolidge 2011). As Neandertals were our last living hominid ancestor, and coexisted with Anatomically Modern Humans (hereafter AMH) for thousands of years, there has been a strong tendency to compare their species with our own. Moreover, Western archaeologists and anthropologists have the tendency to consider our own species unique in comparison to other beings. This is the result both of a corpus of archaeological evidence and a number of prejudices and preconceptions concerning both AMH and Neandertals. Please note that, althougn the biological species concept implies that Neandertals may have been a sub-species of AMH, in keeping with the archaeological and anthropological literature on the subject of Neandertal symbolism, I shall use the term 'species' to describe both Neandertals and Anatomically Modern Humans throughout this thesis.

As art and symbolism have long been considered as exclusive to AMH, the debate surrounding Neandertal artistic capabilities is of great importance to paleoanthropologists and archaeologists. A number of objects and artefacts have been recently interpreted as possible evidence of Neandertal's symbolic capacities, including personal ornaments, bodily decoration, and a concept of personal identity (e.g. Peresani et al. 2007; Roebroeks

et al. 2012; Zilhão 2007). In this context, archaeological research on Neandertal 'art' has gained worldwide interest (Pike et al. 2012; Rodríguez-Vidala et al. 2014). In this setting, the publication of a number of Uranium-series dates suggesting a minimum age of 40,800 BP for some representations from El Castillo cave (Cantabria, Spain) in 2012 has been a controversial topic within archaeology (see García-Diez et al. 2015; Pike et al. 2012, 2016; Pons-Branchu et al. 2014; Zilhão 2013). The fact that both Neandertals and AMH were present in the region around 40,000 years BP (see Pike et al. 2012) is key to the debate surrounding the identity of the El Castillo artists.

This debate is also stimulated by important theoretical developments within archaeology, which are contributing to shifting views about Neandertals. While methodological advancements, along with new archaeological discoveries, are important in this debate, there are a number of theoretical discussions that have fuelled new ideas about Neandertals. The controversy surrounding Neandertal symbolic capacity lies in interrelated ideas about the emergence of modern behaviours and Upper Paleolithic (hereafter UP) complex cultures, and in what we know about the relationship and interactions between AMH and Neandertals. Understanding the emergence of complex behaviours and symbolic thought is therefore at the heart of this debate, as many researchers accept UP cultures of AMH to be fully complex and symbolic, while Middle Paleolithic (hereafter MP) cultures, particularly of Neandertals, are seen as primitive and lacking in symbolic and complex components by comparison.

A fundamental change seen across Europe near the beginning of the UP (40,000-30,000 BP), resulting in an explosion of symbolic and artistic behaviours, is often

attributed to the species-specific complexity of AMH, who migrated across the continent during this time frame (Mellars 2005; Klein 2000, 2003; Lewis-Williams 2002; White 2003). Many ideas about the emergence of modern behaviour, symbolism, and complex lifeways have, thus, been equated with biology and taxonomy; however, it is now becoming clear that the emergence of symbolic and modern behaviour was far more complex, and cannot be attributed solely to biological differences between the two species (Bar-Yosef 2002; Cabrera Valdés et al. 2006; d'Errico et al. 2003; O'Connell 2006; Soffer 2009; Tattersall 2009). Despite this, the persistence of a somewhat polarized debate regarding Neandertal 'art' and symbolism may reflect the existence of historical prejudices that have distorted some views of Neandertals (Villa and Roebroeks 2014; Zilhão 2012). This project seeks to step outside of this debate and review the evidence for Neandertal symbolic behaviour, focusing on the concrete case of El Castillo cave in Cantabria, Northern Spain. In particular, this project will re-evaluate archaeological evidence from El Castillo to determine whether it is plausible that Neandertals were responsible for the creation of some of the symbolic and/or 'artistic' materials at the site.

1.2 Framing the Research: Recent Debates on 'Neandertals' and 'Art'

Archaeology is constantly changing and improving, and is a product of the time period in which it is practiced. As such, improvements in methodology allow a greater understanding of human behaviour in the past, in terms of the complexity, planning, and

choice that goes into the creation of specific artefacts. With regard to the relationship between AMH and Neandertals, and the migration of AMH across Europe, there are a number of factors explaining the different frameworks and models developed to explain these phenomena. In the first place, a number of improvements in methodology have allowed for a greater understanding of both the interactions between the two species, and of Neandertal behaviours. For instance, more precise dating methods have allowed for archaeologists to determine a more complete picture of Neandertal and Modern Human interactions. Additionally, isotope analysis has allowed for a comparison of diet and subsistence strategies between the two species, and genetic analyses have allowed for a comparison of genetric traits in both species, along with a greater understanding of possible interbreeding and interactions between the two. In the second place, a number of archaeological and scientific discoveries have introduced new evidence to better understand the relationships between AMH and Neandertals. Finally, together with these methodological developments, theoretical shifts have also had an important effect on current conceptualizations of both species. Theoretical shifts allow for archaeologists to interpret findings in different ways. Although modern and complex behaviour have long been believed to be exclusive of AMH, recent shifts in archaeological practice and theory have called into question this dominant narrative. In particular, the so-called Multiple-Species Model suggests that the so-called 'behavioural modernity' was not exclusive to Homo *sapiens*, but it also arose among the last Neandertals (d'Errico 2003; d'Errico et al. 1998, 2003). In short, methodological improvements- archaeological and scientific discoveries, and a number of theoretical developments have fuelled recent debates about

Neandertal symbolic behaviour. Shifting ways of thinking about Neandertals and how we conceptualize 'art' are largely pushing this debate forward (Moro Abadía and González Morales 2010; Moro Abadía and Nowell 2014).

This theoretical shift is partly based on new ideas about the relationship between Neandertals and AMH, who are now considered to have been contemporaries who coexisted, and interbred, for thousands of years (Fu et al. 2015; Green et al. 2010; Moro Abadía and González Morales 2010; Villa and Roebroeks 2014; Zilhão 2012, 2013). This is coupled with shifting interpretations of personal ornaments and other symbolic objects, which are now considered to be 'art,' and recognized for their social and symbolic importance (Moro Abadía and González Morales 2010; Moro Abadía and Nowell 2014; Nowell 2006). Developments in perceptions of Neandertals are largely based on new discoveries, but also on a reappraisal of existing archaeological evidence (Moro Abadía and González Morales 2010). Evidence suggests that the two species may have had similar subsistence strategies and complex tool technologies, and exhibited some similar symbolic behaviours (d'Errico et al. 1998; Nowell 2010; Zilhão 2012, 2013). Neandertals are now widely understood to have shared aesthetic concerns with AMH and possessed complex intellectual and cognitive abilities (Moro Abadía and González Morales 2010; Nowell 2010; Zilhão 2012, 2013), and yet, whether they exhibited artistic behaviours is still highly debated.

1.2.1 Recent Debates about 'Neandertals'

Traditionally described as being an ape-like, hunchbacked creature with a stooping gait, Neandertal cognitive impairment has been a central notion since the end of the nineteenth century (Stringer and Gamble 1993; Trinkaus and Shipman 1992; Zilhão 2012). Early imageries continue to condition views about Neandertals, both in terms of general public perception, and within academia (Zilhão 2012: 35). The dominant narrative has long pitted AMH against Neandertals, depicting superior AMH as colonizers and victors in the defeat and extinction of inferior Neandertals (d'Errico and Stringer 2011; Harvati 2007; Straus 1997). This perception of Neandertals is beginning to shift, partly due to recent discoveries regarding the close relationship and interactions between Neandertals and AMH (Fu et al. 2015; Green et al. 2010; Mellars 2010; Villa and Roebroeks 2014; Zilhão 2012; 2013), along with archaeological discoveries and reappraisals suggesting Neandertals exhibited complex behaviours that, in some cases, could be similar to those of our own species (Peresani et al. 2007; Roebroeks et al. 2012; Zilhão 2007; 2012). Evidence suggests that, in addition to complex subsistence strategies and tool technologies, Neandertals used pigments, buried their dead, and created personal ornaments and other decorative objects; this has led many researchers to reevaluate Neandertal cognitive capabilities and artistic or symbolic behaviours (Peresani et al. 2007; Pike et al 2012; Rodríguez-Vidala et al. 2014; Roebroeks et al. 2012; Zilhão 2007, 2012).

Although the uniqueness of AMH, as well as their relationship to Neandertals, is now being questioned by many researchers, a heated debate surrounding Neandertal cognition and symbolism is ongoing. This is largely due to a "persistent, if subconscious influence in academia of Victorian-age ideas of evolution-as-progress and ancient-as-primitive" (Zilhão 2013:52). This influence, it has been argued, may explain certain researchers' attempts to negate or dismiss evidence for Neandertal symbolism (Bednarik 2014; Roebroeks 2008; Villa and Roebroeks 2014; Zilhão 2013). Thus, in addition to changes in our understanding of Neandertal anatomy, lifeways, and relations to AMH, another necessary shift is taking place, which is contributing to shifting views of Neandertal symbolism and artistic behaviour. As I will examine in the following section, recent debates on the conceptualization of 'art' are at the heart of new interpretations of Neandertal 'art' (Moro Abadía and González Morales 2010; Moro Abadía and Nowell 2014).

1.2.2 Recent Controversies about the Term 'Art'

Art has been traditionally considered a hallmark of modernity and of AMH (McBrearty and Brooks 2000; Nowell 2010). In recent years, however, many scholars have identified a number of problems concerning the use of the term 'art,' and its underlying connotations (Conkey 1987, 1995:50, 1997:176; Moro Abadía and Nowell 2014; Nowell 2010; White 1992, 2003). 'Art' is now recognized by many researchers to be a Eurocentric concept, which is rooted in Art History, and is mainly centered around

aesthetic values (Conkey 1987, 1995:50, 1997:176; Moro Abadía and Nowell 2014; Nowell 2006, 2010; White 1992, 2003). Because prehistoric art studies have been historically based on concepts borrowed from Art History, geometric signs, along with portable art and personal ornaments, have been overwhelmingly overlooked in favor of figurative art on cave walls, which is considered to be more aesthetically pleasing (Conkey 1983:203, 1995:51, 1997:163; Moro Abadía and González Morales 2010; Moro Abadía and Nowell 2014; Nowell 2010). This focus on parietal art has been seen by some researchers as potentially damaging to prehistoric art studies, as it limits a more holistic understanding of the complex cultural repertoire of Paleolithic peoples (Moro Abadía and Nowell 2014; Nowell 2006, 2010; White 1992, 2003). It has, therefore, recently been argued that prehistoric art studies should integrate these different types of art and symbolic behaviour (Conkey 1983:203, 1995:51, 1997:163; Moro Abadía and Nowell 2014; Nowell 2006; White 1992, 2003). This shift in which materials are considered to represent 'art,' resulting in the inclusion of items such as personal ornaments into the category, has contributed to an updated perception of the artistic capabilities of Neandertals (Moro Abadía and González Morales 2010; Moro Abadía and Nowell 2014).

Additionally, the recognition that 'art,' as it has long been defined, is not a universal concept has prompted many researchers to question the usefulness of the term to describe visual material cultures of Paleolithic groups (Conkey 1987, 1997:176; Nowell 2006, 2010; White 1992, 2003). Instead, some scholars have suggested that the term 'art,' along with its Eurocentric connotations, be changed to 'image,' 'representation,' or 'visual cultures' within prehistoric art studies, to reflect varying

cultural contexts (Conkey 1987, 1997:176; Moro Abadía and Nowell 2014; Nowell 2010; White 1992, 2003). This topic will be covered more extensively in Chapter 2, but merits mentioning as an introduction to some of the important recent theoretical shifts within archaeology which contribute to the debate surrounding Neandertal 'art' and symbolism.

1.3 The Theoretical Framework: Cognitive Archaeology and Cognitive Evolution

Prehistoric art and symbolic behaviour in the archaeological record can reveal a great deal about the human mind and the evolution of complex cognitive functions. An important task undertaken by those who study Paleolithic archaeology and cognitive evolution is to understand whether symbolic behaviour and modern cognition is specific to our own species, and when and how it developed (Renfrew 1994, 1998). A theoretical framework of cognitive archaeology and cognitive evolution is essential to this research project, as studying the origins of art and symbolism goes hand in hand with the study of the complex cognitive processes that bring these behaviours about.

Cognitive archaeology is "the study of past ways of thought as inferred from material remains" (Renfrew 1994: 3). It aims to contribute to our understanding of the nature and evolution of the human mind, and to examine the relationship between cognitive processes and their related social contexts (Abramiuk 2012:17; Johnson 2010:237; Mithen 1994; Renfrew 1994; Whitley 1992:69). Cognitive archaeology focuses on what we can infer about how ancient minds worked, and how this working shaped the actions of prehistoric people, from the material culture they left behind

(Abramiuk 2012:17; Renfrew 1994, 1998; Whitley 1992:68; Wynn 2002:390). Though some researchers have noted that cognition in archaeology is poorly defined, it usually relates to enhanced working memory, perception, symbol use, language, self-awareness, communication, planning, and innovation (Nowell 2010; Zubrow 1994). A major approach of cognitive archaeology is to examine how humans constructed and used symbols in the past, as these represent many aspects of human existence and cognition, including planning, measurement, social relations, representation, and understanding of the supernatural (Renfrew 1994). Cognitive archaeology is also focused on how cognitive processes impact archaeologists themselves, who are a product of their time and culture (Abramiuk 2012:14; Zubrow 1994). This is an important aspect of the theoretical framework for this project, as dominant paradigms and current surroundings greatly impact how archaeologists interpret materials, stimulating the need to reinterpret or reevaluate archaeological evidence with new insights and shifting theoretical positions. The influence of dominant paradigms on archaeologists has been especially evident in studies of both Neandertals and of prehistoric art, which have seen the lasting, pervasive consequences of outdated ideas.

1.4 Research Questions

The site of El Castillo cave, Cantabria (Northern Spain) is of particular interest to scholars studying Neandertal ‘art’ and symbolic behaviour. The site was heavily occupied for over 150,000 years, and its rich archaeological record contains 18-20 metres of

deposits spanning nearly all periods of the Paleolithic (Bahn 2012; García-Diez et al. 2015; Pike et al. 2012; Pimentel and García-Diez 2013). Select symbolic artefacts, including possible portable 'art' and personal ornaments, recovered from the site are some of the oldest in the region (Bahn 2012; García-Diez et al. 2015; Pike et al. 2012; Pimentel and García-Diez 2013). The site also consists of over 1 km of galleries containing prehistoric art in the form of paintings and drawings of both figurative and abstract depictions (Bahn 2012; García-Diez et al. 2015; Pimentel and García-Diez 2013). Recent Uranium-series dating has revealed some of the paintings in the cave to be among the oldest known in the world, including a red painted disk, dated to a minimum age of 40,800 BP (Pike et al. 2012). As the date provided for this painting falls during a time when both Neandertals and AMH were present in the region, this has further fuelled the debate surrounding Neandertal 'art,' as it presents the first known possible Neandertal cave painting (Pike et al. 2012, 2016).

The aim of this research project is to reevaluate the archaeological evidence present in El Castillo cave in order to examine the question of whether Neandertals were the creators of prehistoric 'art.' This project proposes a thorough examination of the archaeological record of El Castillo cave in Northern Spain. I approached this analysis through two research questions:

- What are the main models employed for explaining the origins of 'art' and symbolism?
- What is the main archaeological evidence for symbolic and artistic behaviour in Neandertals in El Castillo Cave?

By focusing on these questions, my research seeks to establish which archaeological materials signify artistic and symbolic behaviour, and to determine whether the analysis of El Castillo Cave can contribute to recent debates on the origins of 'art.' In order to contribute to the debate surrounding the creators of the rock images at El Castillo, this project set out to examine the extensive archaeological record and supporting documents from the site, to determine a chronology of its occupation by AMH and Neandertals. I approached this by combining multiple lines of evidence which have not been previously combined, including a comparative analysis of site records, archival research, and an extensive literature review in English, Spanish, and French, along with examination of material cultures to contribute to a more complete understanding of the site. Primary objectives in this research were to determine the plausibility of Neandertal creation of the painted disk, and to determine what other evidence present at the site may involve Neandertal symbolic behaviour and 'art' creation. This project aims to provide new insights into the cognitive capabilities of Neandertals, and the symbolic behaviour of our human ancestors, adding to growing literature on the origins of some of the first known cave 'art.'

1.5 Thesis Outline

Chapter 2 provides a comprehensive background on current archaeological and scientific evidence for Neandertal symbolic and artistic behaviour, situating this research project within the on-going debate surrounding Neandertal symbolic capabilities. It also

includes information regarding Neandertal lifeways, subsistence strategies, and tool industries in comparison to those of AMH. The chapter provides information surrounding the time frame of AMH migration and Neandertal- AMH contact in Western Europe, and discusses interactions between the two species, including possible evidence of interbreeding, co-habitation, and cultural contact.

Chapter 3 focuses on the site of El Castillo cave, including its discovery, excavations, and location. The chapter reviews evidence from the site, including cave art and archaeological materials, with a focus on evidence pertaining to the time frame of around 40,000 BP. This provides context for the 40,800-year-old painted disk, and provides a background on Neandertals at the site. The chapter also discusses the timeline of the site, with a focus on the occupation of the site by late Neandertals and AMH. A basic review of the findings of excavations is included in this chapter, though this topic is covered more extensively in Chapter 4.

Chapter 4 presents the methods used in analysis of the evidence at El Castillo, including examination of artefacts, cave sites, and documents. It focuses on planned research methodology, alterations to the research plan, and difficulties faced in determining a chronology of the site. Possible portable 'art' and other symbolic pieces examined from the site are emphasized in this chapter, with a focus on items which may represent Neandertal symbolic behaviour, and which have been largely ignored in the literature surrounding Neandertal symbolism. The chapter presents the results of the research, providing a brief analysis of these results, which will be followed by further discussion in Chapter 5.

Chapter 5 examines some of the implications of the findings of my research, including a discussion of Neandertal symbolism at El Castillo and the plausibility that Neandertals created the red painted disk in question. A discussion of pervasive ideas of Neandertal cognition and their impact on the interpretation of archaeological evidence, along with further research needed both for interpretation of the site of El Castillo and other possible Neandertal 'art' sites is provided. Answers to my research questions are proposed, along with the implications of this research, and its contribution to the controversy surrounding Neandertal 'art' and symbolism. Potential areas for further study are also presented within this chapter, along with a final conclusion of my research.

Chapter 2
Neandertal Cognition and Symbolic Behaviour: Debates and Questions

2.1 The Neandertal Archaeological Record

Neandertals' relationship to AMH has been the subject of debate since their discovery in Germany's Neander Valley in 1856 (Klein 2003; Mellars 1996; Pääbo 2014:3; Stringer and Gamble 1993:13; Trinkaus and Shipman 1992:411). Throughout the history of Neandertal research, differences between the two species have been both emphasized and scrutinized with specific regard to lifeways and subsistence, social organization, tool use, symbolic behaviour, and cognition. These points of emphasis have resulted in a widespread perception of a dichotomous relationship between the two species, and have pitted cognitively and behaviourally superior AMH (used as a yardstick for modernity and intelligence) against cognitively inferior Neandertals (a yardstick for primitiveness and ineptitude), a perception which is currently recognized as biased (Conard 2010; Harvati 2007; Roebroeks 2008; Soffer 2009; Trinkaus and Shipman 1992: 416; Zilhão 2012:36). Recent discoveries and archaeological reappraisals have uncovered striking similarities in how the two species lived and provided evidence of Neandertal complex cognition and symbolism. For instance, discoveries of complex hunting and subsistence strategies (Bar-Yosef 2002; Burke 2012; d'Errico 2003; d'Errico and Stringer 2011), complex use of fire (d'Errico and Stringer 2011; Villa and Roebroeks 2014; Zilhão 2007, 2012), and evidence of ochre and shell use for possible symbolic purposes

(Soressi and d'Errico 2007; Villa and Roebroeks 2014; Zilhão et al. 2010) within Neandertals have been compared to similar strategies and activities within AMH.

2.1.1 Lifeways, Subsistence Strategies, and Social Organization

Neandertals inhabited western Eurasia from around 350,000-30,000 BP and spanned a veritable geographic range, disappearing only 6,000-10,000 BP after the arrival of AMH to the continent (Harvati 2007; Stringer 2006; Villa and Roebroeks 2014). The life strategies of Neandertals may provide a greater understanding of our interactions with them and the causes of their demise. Some researchers have argued that MP life was remarkably different than that of the UP, as the UP saw changes in group mobility, intragroup dependence, emergence of social and self-awareness, sexual division of labour, bi-parental provisioning of the young, and invention of social categories (Bar-Yosef 2002; Davies 2012; d'Errico and Stringer 2011; Nowell 2010; Soffer 2009). Others have surmised that Neandertals were undergoing changes toward greater technological flexibility and innovation, along with diversified resource exploitation, and may have been transitioning to UP cultures independently, prior to the arrival of AMH in Europe (Cabrera 2001; Langley, Clarkson, and Ulm 2008).

In terms of size of social networks, Middle Stone Age AMH and MP Neandertal groups were comparable (Villa and Roebroeks 2014). While AMH tended to occupy their sites for single seasons, Neandertals likely occupied their sites for multiple seasons

(Pearson, Cordero, and Busby 2006). Although spatial organization is more common in UP sites, select Neandertal sites display structured spatial organization similar to that of AMH (Bar-Yosef 2002; Davies 2012; Villa and Roebroeks 2014). Complex use of space by Neandertals has been suggested at the sites of Kebara and Amud (Israel), Tor Faraj (Jordan), Abric Romaní (Spain) and Arcy-sur-Cure and Grotte du Lazaret (France) along with several others, although this organization may have been purely functional (Bar-Yosef 2002; Mellars 1996; Villa and Roebroeks 2014).

Complex behavioural organization is displayed at sites including Tor Faraj, through the presence of hearth-centered activity areas utilized for different purposes: a central domestic area, and areas for refuse disposal, sleeping, lithic processing, and food processing and preparation (Davies 2012; Henry et al. 2004; Mellars 1996). It has been proposed that Neandertal living spaces tend to lack clearly defined areas pertaining to the transmission of ideas, although it is likely that hearths and other high traffic areas were used for this purpose (Davies 2012; Mellars 1996; Wynn and Coolidge 2011).

Well-defined hearths are relatively common in Neandertal contexts at sites including Combe Grenal, Grotte Vaufrey, Pech de l' Azé II, and Grotte du Bison (France), and were potentially central in tool production and bone processing, although they were not consistent in location (Harvati 2007; Mellars 1996). Select Mousterian sites, including Le Moustier, La Quina, and Combe Grenal, have also been shown to contain pits, interpreted as possible areas for long-term food storage (Mellars 1996). Post-holes have also been found in Mousterian contexts, showing the occasional use of wooden posts and associated wood-working technology at MP sites (Mellars 1996). In

short, Neandertal living floors display evidence of complex site structures which were similar not only to UP humans, but also to modern hunter-gatherer groups all over the world (Henry et al. 2004; Wynn and Coolidge 2011:116).

Neandertals were equally omnivorous hunter-gatherers as AMH, subsisting on a broad diet of aquatic foods (including shellfish and marine mammals), birds, tortoises, rabbits, and plants (wild legumes, grasses, seeds, and fruits) (Finlayson et al. 2012; Harvati 2007; Langley, Clarkson, and Ulm 2008; Pearson, Cordero, and Busby 2006; Villa and Roebroeks 2014). They were skilled hunters, and relied strongly on meat, including bison, horse, reindeer, cattle, deer, wild boar, gazelle, ibex, woolly rhinos, and mammoths (Bar-Yosef 2002; Burke 2012; Harvati 2007). Neandertals exhibited specialized hunting techniques, concentrated on select species, systematically hunted reindeer and bison, and were able to kill multiple animals simultaneously, using similar techniques observed in later UP sub-Arctic Inuit sites (d'Errico 2003; Davies 2012; Pearson, Cordero, and Busby 2006). Isotopic and zooarchaeological analyses suggest that Neandertals shared a range of subsistence strategies and resources with AMH (Bar-Yosef 2002; Burke 2012; d'Errico 2003; d'Errico and Stringer 2011).

Neandertals lived in small groups, and their social lives revolved around face-to-face interactions (Soffer 2009; Wynn and Coolidge 2011:75). They had shorter adult life expectancies (45 years) than AMH (Soffer 2009), coupled with higher juvenile mortality rates, and overall higher levels of stress and trauma on the skeleton, indicating more violent encounters (Harvati 2007; McBrearty and Brooks 2000; Soffer 2009). Evidence suggests that Neandertals bonded in friendships and provided social assistance to others

(Harvati 2007; Soffer 2009; Wynn and Coolidge 2011). At multiple sites, including Shanidar and La-Chappelle-aux-Saints, Neandertals cared for sick, elderly, and handicapped group members who would have required help with eating and mobility, as indicated by highly worn or non-functional dentition, arthritis, and partially-healed lesions on skeletons (Harvati 2007; Soffer 2009; Wynn and Coolidge 2011).

Compared with MP Neandertals, some UP AMH groups had a broader diet, expanded geographic range, and were more invested in new technologies and symbolic art forms (Roebroeks 2008; Soffer 2009). However, although AMH are often believed to have had superior subsistence strategies, social organization, lifeways, and complex technologies and tools, overwhelming cultural and biological similarities between the two species are seen in the archaeological record (Roebroeks 2008; Villa and Roebroeks 2014; Wynn and Coolidge 2004; Zilhão 2007).

2.1.2 Tool Industries and Technologies

The Neandertal archaeological record displays evidence of complex behaviours and technologies dating back to the MP (Banks, d'Errico, and Zilhão 2013a). In Europe, the Mousterian lithic industry was produced entirely by Neandertals, who developed the Levallois technique for flaking, requiring the preparation of cores to knap standardized and thick flakes from; these were then used for scraping and cutting (Bar-Yosef 2002; Lewis-Williams 2002:75).

Transitional industries throughout Europe are considered to show strong affinities with the Mousterian, but also display UP elements and high degrees of technological complexity (Cabrera Valdés, Bernaldo de Quirós, and Maíllo Fernández 2006; Vaquero et al. 2006; Zilhão 2012, 2013). The most commonly known are the Châtelperronian of France and Spain, the Uluzzian of Italy, and the Szeletian of east-central Europe (Harvati 2007; Hovers 2009; Straus 1997:243). The Châtelperronian is now associated with Neandertals at many sites, as suggested by the presence of Neandertal remains, chronometric dates, and stratigraphic information (d'Errico and Stringer 2011; Harvati 2007; Zilhão 2013). The industry is characterized by distinctive curved, blunted-back, pointed blades, which are lacking from assemblages of UP Aurignacian industries in the same areas (Bar-Yosef 2002; Mellars 1999). The discovery of Neandertals with UP cultural elements brought about the idea of biological continuity concurrent with cultural change in a single population (Bar-Yosef 2002).

In addition to producing blade technologies, Neandertals also produced bone and ivory industry and composite tools (d'Errico 2003; Harvati 2007; Lewis-Williams 2002:75). Worked and decorated bone awls have been discovered at Châtelperronian and Uluzzian sites in France and Italy; artificially worked bone fragments have also been found in Mousterian levels of Cueva Morin, Spain (d'Errico 2003; White 1982). Composite tools and hafting technologies, using bitumen and other adhesives, once thought to signal the sophisticated technologies of UP AMH only, have also been found in Neandertal contexts (Burke 2012; d'Errico 2003; Lewis-Williams 2002:75).

The use of fire technology has been documented in Neandertal contexts at the sites of Königsaue, eastern Germany (50,000 BP) (Zilhão 2012) and Campitello, Italy (120,000 BP) (d'Errico and Stringer 2011; Villa and Roebroeks 2014; Zilhão 2007, 2012). Evidence at the two sites demonstrates that Neandertals created the first known artificial material, a glue made from heating birch bark to a specific temperature between 340-440˚C, through a several-hour long process in a tightly controlled, oxygen-deprived environment (d'Errico and Stringer 2011; Villa and Roebroeks 2014; Zilhão 2007, 2012). This process displays a level of sophistication and technical knowledge unsurpassed until the invention of Neolithic pottery kilns (Villa and Roebroeks 2014; Zilhão 2007, 2012).

Both AMH and Neandertals were manufacturing Mousterian-like tool types in the Levant 90,000 years ago, exhibiting similar transport, resharpening, and standardization strategies (d'Errico et al. 2003; d'Errico and Stringer 2011). Additionally, Initial Upper Paleolithic (IUP) industries (e.g. the Châtelperronian), once believed to have been AMH-produced, are now widely accepted as being Neandertal-authored (Bar-Yosef 2002; Harvati 2007). Both species relied on thrusting spears prior to the appearance of long-range spear throwers in the late UP; Neandertals may have chosen to work with wood and stone (rather than bone, as seen in AMH) to produce thrusting spears as a reflection of local tradition and cultural preference for more robust weaponry, rather than cognitive differences (d'Errico 2003). In short, "if relative technological sophistication is an indicator of cognitive abilities…there is not much to distinguish AMH and Neandertals" (Burke 2012:231).

2.1.3 Anatomical and Cognitive Differences Between Anatomically Modern Humans and Neandertals

Although Neandertal morphology was generally more robust than that of AMH, the two were not significantly anatomically different, despite being morphologically distinct species (Burke 2012; Harvati 2007; Soffer 2009; Stringer 2002; Stringer and Gamble 1993: 183; Trinkaus and Shipman 1992: 412). Neandertal morphological features include heavy brow ridges, large faces and nasal apertures, lack of a chin, short stature, a broad and deep ribcage, and an overall robust post-cranial anatomy, displaying strong muscle and ligament markings (Burke 2012; Harvati 2007; Stringer and Gamble 1993). These features are commonly taken to indicate adaptations to greater physical exertion and cold climate (Harvati 2007; Soffer 2009; Stringer and Gamble 1993), but a recent study has shown that some of these features actually fall within the range of variation for AMH (Burke 2012). A comparative study of Neandertal and AMH long bones has also shown that patterns of mechanical loading in Neandertal limbs were similar to those of recent AMH hunter-gatherer groups (Pearson, Cordero, and Busby 2006). Neandertal cranial morphology displays similarities to AMH, with both exhibiting enlarged brains, reduced prognathism, and longer, more rounded occipitals (Harvati 2007; Stringer and Gamble 1993; Trinkaus and Shipman 1992). Neandertal cranial capacities were basically identical to those of AMH (~ 1200-1700 cc) (Bar-Yosef 2002; Burke 2012; Harvati 2007; Stringer and Gamble 1993: 82).

Neandertals possessed additional similar anatomical traits to AMH, such as an expanded Broca's area in the brain, and were similar in terms of middle and outer ear anatomy, hyoid bone morphology, and size of the hypoglossal canal; these traits are specialized within our own species to allow for speech and perception, suggesting that Neandertals had linguistic capabilities (d'Errico et al. 2003; Harvati 2007; Stringer and Gamble 1993: 90). The presence of the FOXP2 gene in Neandertals has been interpreted as possible evidence of speech and language, assuming it functioned in the same way it does in AMH (Burke 2012; Krause et al. 2007; Shea 2011; Wynn and Coolidge 2011:131). Marked differences on Neandertal remains reflect active lifestyles and cultural disparities; osteological evidence suggests greater incidence of stress, and distinctive wear patterns on teeth are related to behavioural practices (Harvati 2007; Soffer 2009; Trinkaus and Shipman 1992).

Neandertals possessed expert cognition and long-term working memory, which allowed them storage of visual and spatial information, and problem-solving and decision-making capabilities (Wynn and Coolidge 2004, 2009, 2011). Some researchers suggest Neandertals had domain-specific intelligence, and did not share information between parts of the brain which account for nature, social interaction, and technology, whereas AMH brains connected all fields of information (Bar-Yosef 2002; Mithen 1994). It has been suggested that rather than a neurological shift to domain-sharing intelligence, cognitive differences in Neandertals can be explained in terms of the acquisition of Enhanced Working Memory in AMH (Wynn and Coolidge 2004, 2009, 2011). This Enhanced Working Memory would have enabled innovative and experimental thinking,

and may account for the low levels of innovation and creativity in Neandertals (Wynn and Coolidge 2004, 2009).

It is clear that high degrees of social and technical intelligence existed during the MP, and the associated behaviours and pace of change were similar to that of AMH in Africa at the time (d'Errico 2003; Mithen 1994; Villa and Roebroeks 2014). Differences seen in the archaeological record of Neandertals likely do not reflect innate differences in capacity, but rather performance; the outcome of social patterns, decision making, and habitual practicing of the behaviour (Bar-Yosef 2002; Soffer 2009).

2.2 The Contact Between Anatomically Modern Humans and Neandertals

Neandertals lived in large parts of Europe and Western Asia, inhabiting areas as far east as Siberia, as far South as the Middle East, and as far West as the Iberian Peninsula (Burke 2012; Green et al. 2010; Harvati 2007; Mellars 2010). Morphological features of Neandertals appeared in the fossil record of Europe ~400,000 BP, and disappeared everywhere by 30,000 BP at the latest (Fu et al. 2015; Green et al. 2010; Mellars 2010). Neandertals moved frequently within small territories and intensively used local resources, but had relatively smaller territories than AMH, who exhibited a pattern of rapid colonization during the UP (Burke 2012; Mellars 1996). The ranges of the two species differed somewhat, and they maintained spatial separation for quite some time (Burke 2012; Green et al. 2010). The two first came into contact in the Middle East about 80,000-60,000 years ago, and then later in Western Europe and Asia (Green et al.

2010). Widespread geographic distribution over Europe and the Near East, along with the ability to pass successfully through various glacial periods between 300,000-30,000 BP demonstrates that Neandertals were highly adapted to their environment (Burke 2012; d'Errico 2003; Green et al. 2010; Mellars 2010).

2.2.1 Anatomically Modern Human Migration into Europe

The general consensus among researchers is that AMH originated in Africa roughly 200,000 years ago, and then left Africa between 60,000 and 50,000 BP, expanding into Europe; this is known as the *Out of Africa* hypothesis (Shea 2011; Villa and Roebroeks 2014). Dispersal of AMH occurred rapidly across Europe between 45,000 and 35,000 BP (see Figure 2.1), through either a single or multiple migration events (Banks, d'Errico, and Zilhão 2013a; Fu et al. 2015; Mellars 2010; Villa and Roebroeks 2014). Generally, the human migration out of Africa and subsequent spread into Europe is viewed in one of two ways: either that AMH already possessed modern behavioural elements characteristic of the UP, and brought them into Europe, or that these characteristics were regionally developed and did not emerge from a single source (Bar-Yosef 2002; Cabrera et al. 2001; Hovers 2009; Nowell 2010).

The Aurignacian is commonly viewed as the first homogeneous cultural technocomplex associated solely with AMH, seen to signify the movement of AMH across Europe (Banks, d'Errico, and Zilhão 2013a). This is problematic, as there is no evidence that the spread of AMH and appearance of the Aurignacian automatically

occurred together; some argue that the origin of the Aurignacian is still largely unknown (Churchill and Smith 2000; Straus 1997).

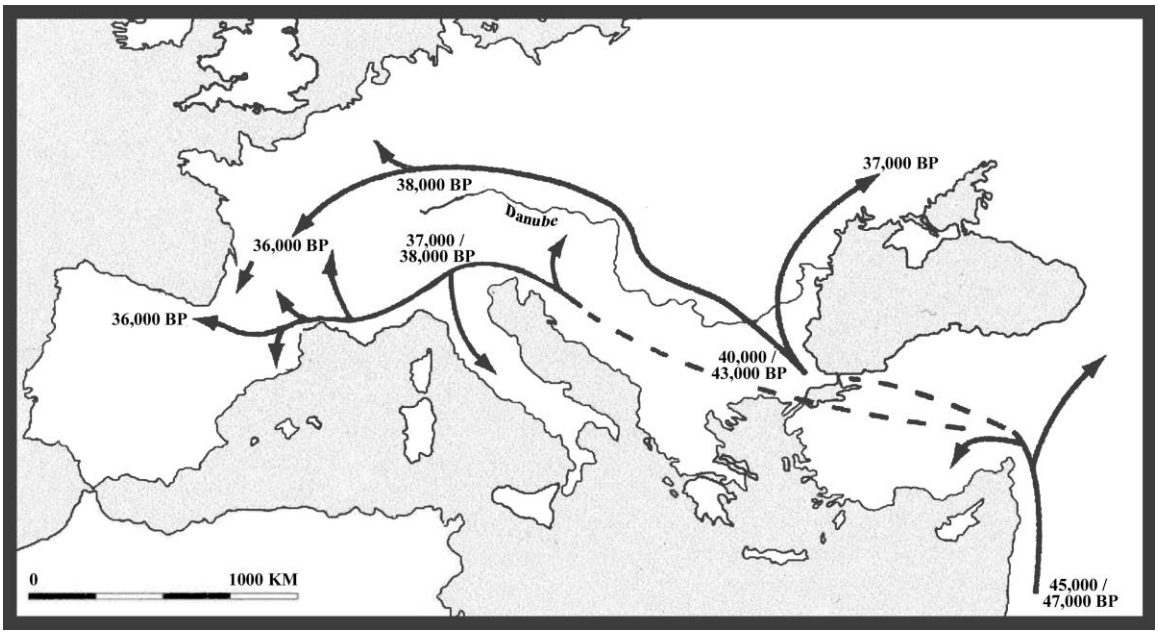

Figure 2.1. Apparent dispersal routes of the earliest AMH groups across Europe. Dates represent the earliest manifestations of Aurignacian, Proto-Aurignacian, and Early Upper Paleolithic technologies. After Mellars (2005). Digital illustration by Robyn S. Lacy.

2.2.2 The Middle-to-Upper Paleolithic Transition

The Middle-to-Upper Paleolithic (MP-UP) transition was marked both by biological and cultural changes, and occurred in Southwestern France and Northern Spain between 45,000-35,000 BP (Cabrera Valdés et al. 2006; Lewis-Williams 2002; White 2003). An explosion of behavioural changes in the UP occurred during a time period when AMH were migrating across Europe, encroaching into Neandertal territories

(Lewis-Williams 2002; White 2003). Although the nature of the transition period (between the Mousterian and the Aurignacian technocomplexes) is still somewhat unknown, it is generally accepted that Neandertals produced MP and IUP industries, while AMH produced Aurignacian and subsequent UP industries (Churchill and Smith 2000; Roebroeks 2008). As the precise timing of AMH arrival and Neandertal disappearance is difficult to identify, the MP-UP transition is problematic to researchers (Higham et al. 2014; White 1992).

Compared to the slow pace of the MP, the UP is argued to have been marked by rapid, wide-scale cultural and technological developments and population increase (Bar-Yosef 2002; Churchill and Smith 2000; Lewis-Williams 2002; Weniger 2006). Generally, these changes are thought to have included long-distance exchange networks, improved hunting practices and tools, increased social complexity and spatial organization, standardized tool production, and widespread symbolic innovations (Bar-Yosef 2002; Lewis-Williams 2002; Weniger 2006). The UP has also been traditionally defined by explosion of symbolic activity, including ritual burials, systematic use of pigments, and production of personal adornments, along with creation of both figurative and non-figurative portable art, paintings, and engravings (Bar-Yosef 2002; Weniger 2006; White 1982).

Neandertal authorship of the Mousterian is confirmed by fossils and direct dating, ending by ca. 41,030-39,020 cal BP across Europe (Churchill and Smith 2000; Higham et al. 2014; Zilhão 2006a). Dating to between 45,000-35,000 BP, early UP industries were originally thought to have been created by AMH due to their complexity, but were later

argued to have been authored by Neandertals (Banks, d'Errico, and Zilhão 2013a; Zilhão 2007, 2012, 2013). It has been argued that the earliest Aurignacian in Europe dates to 36,500 BP, and the transition therefore cannot reflect the immediate cultural influence of AMH, as they were non-existent in the region; it must have instead resulted from Neandertal cultural processes (Zilhão 2007, 2012, 2013). As scant human remains are available in association with transitional industries, taxonomic affinity has been the subject of debate (Banks, d'Errico, and Zilhão 2013a; Bar-Yosef 2002). However, a number of reliable associations between fossils and archaeological remains support the idea that Neandertals made most, if not all, transitional industries (Banks, d'Errico, and Zilhão 2013a; d'Errico et al. 2003; Zilhão 2012) although this notion is still questioned by some researchers (Bar-Yosef 2002, 2006; Douka et al. 2014).

The earliest unambiguous AMH remains in Europe date to ca. 35,000 BP (at Oase, Romania), post-dating Châtelperronian and other transitional industries in Europe (Banks, d'Errico, and Zilhão 2013a; Zilhão 2006b, 2012, 2013). Zilhão (2006b, 2007) has argued that it is reasonable to assume that, prior to this first unambiguous presence of AMH in the fossil record, Neandertals were the authors of the archaeological record of Europe, as they were the only species present in the region at the time.

The debate about the origins of UP technology is largely entwined with the debate surrounding interactions between the Neandertals and AMH and the cognitive and behavioural abilities of Neandertals (Bernaldo de Quirós and Maíllo-Fernández 2009; d'Errico et al. 1998; Higham et al. 2010). Whether UP changes were triggered by a cultural revolution, biological change, or by socio-economic circumstances is muddled by

difficulties in dating, lack of fossil evidence, and a number of prejudices about Neandertal cognition (d'Errico et al. 1998; Nowell 2010; Szmidt et al. 2010).

Human revolution models typically invoked for the transition propose a dramatic alteration in human behaviour 40,000-50,000 years ago; this is considered to be a reflection of AMH dispersal into Europe and subsequent replacement of Neandertals (Bar-Yosef 2002; Klein 2000, 2003; Mellars 2005; White 1982). These models have been criticized for a number of reasons. First, the revolutionary nature of the transition has been called into question (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004; d'Errico 2003; d'Errico et al. 2003; McBrearty 2007; McBrearty and Brooks 2000; Riel-Salvatore and Clark 2001) and it has been noted that this apparent 'revolution' is likely to be a product of discontinuity and preservation issues in the archaeological record, rather than a rapid biological or cultural change (Churchill and Smith 2000; Davies 2012; d'Errico et al. 2003; McBrearty and Brooks 2000). Second, the behaviours considered to be representative of the UP do not appear suddenly and together, but rather gradually and sporadically; these behaviours are also known from various MP sites in both AMH and Neandertal contexts (Bar-Yosef 2002; McBrearty and Brooks 2000; Straus 1997; Vaquero et al. 2006).

Some researchers have noted that no biological factor needs to be invoked for transitions; rather, populations change for a number of social, economic, and climatic reasons (Bar-Yosef 2002; Straus 1997). Adaptive cultural change continued in various AMH groups throughout the UP and beyond, unaccompanied by biological change (Bar-Yosef 2002; Straus 1997). Notable examples of this type of transition in AMH include

the Neolithic revolution and the boom of art and symbolism that occurred during the Magdalenian (Bar-Yosef 2002; Straus 1997). As such, it is problematic to automatically associate AMH with the Aurignacian, and Neandertals with the Mousterian, as lithic industries do not solve the debate over authorship in the absence of diagnostic fossils (Churchill and Smith 2000; Nowell 2010; Roebroeks 2008; Straus 1997; Vaquero et al. 2006). Due to limited stratigraphic sequences, lack of diagnostic fossils, and poor precision of radiometric dating techniques, the question of which species created which technocomplexes may never be truly answered for the MP-UP transition (Churchill and Smith 2000; Higham et al. 2014; Nowell 2010; Roebroeks 2008; Zilhão 2006a; 2013).

Although it is unclear what kind of factors brought about the MP-UP transition, some authors have proposed triggers including human-environment interactions, instable climatic conditions, and demographic stresses, as alternatives to invoking differences in cognitive capacity (Banks, d'Errico, and Zilhão 2013a, 2013b; Bar-Yosef 2002; Straus 2005a). Rather than a single explanation for the transition, it was likely a mosaic of demographic pressure and climatic instability on various geographic and temporal scales which caused this shift (Vaquero et al. 2006).

2.2.3 Models for Examining the Relationship Between Anatomically Modern Humans and Neandertals: Cohabitation and Social Interactions

A multidisciplinary debate surrounding the interactions between AMH and Neandertals evokes genetic, anatomical, cultural, technological, and symbolic evidence.

Historically, the dominant narrative has represented the relationship between AMH and Neandertals as dichotomous, with the former seen as superior, and the latter's inferiority invoked to explain their demise (Conard 2010; Roebroeks 2008; Soffer 2009; Zilhão 2012). Two main models evoked to examine the relationship between AMH and Neandertals are the Replacement Model and the Assimilation Model. In short, the Replacement Model surmises that AMH groups replaced Neandertals upon colonization of Europe, while the Assimilation Model argues that the two species interacted, resulting in the cultural and genetic assimilation of Neandertals into AMH, rather than a true extinction of the species.

2.2.3.1 The Replacement Model

Proponents of the Replacement Model view the MP-UP transition as marked by the relatively rapid replacement of Neandertals with AMH between 50,000-40,000 years ago (Hublin et al. 2012; Roebroeks 2008). Studies suggest that AMH populations may have been the more successful species as a result of a number of factors, including greater dietary diversity (Harvati 2007; O'Connell 2006), larger group sizes (Roebroeks 2008; Soffer 2009), and higher birth and lower mortality rates (Harvati 2007; Roebroeks 2008), allowing for replacement of Neandertals by competitive exclusion (Harvati 2007; O'Connell 2006; Roebroeks 2008). Some researchers also consider climatic and environmental factors to be driving forces behind Neandertal extinction, although this is

difficult to accept as the sole factor, considering they survived varied harsh climatic phases throughout their existence (Harvati 2007; Roebroeks 2008).

A Modern Human superiority complex has been invoked to explain the replacement of Neandertals by AMH, who are thought to have colonized Europe with fully formed, complex, cultural and cognitive capabilities (Villa and Roebroeks 2014). Most of the culturally-and behaviourally-based explanations for the replacement of Neandertals by AMH rely on archaeological evidence to show that AMH had more complex patterns of social organization, symbol use, and new technologies (Burke 2012; Mellars 2005; Villa and Roebroeks 2014; White 1992).

A main critique of the Replacement Model is that while the Neandertal demise does appear to roughly coincide with the appearance of AMH in Europe, the two are not necessarily causally related (Roebroeks 2008; d'Errico and Stringer 2011; Straus 1997). Additionally, biological replacement models featuring fully Modern Humans migrating out of Africa, resulting in an explosion of symbolic behaviour, do not account for a mismatch between cultural remains and fossils or for the gradual nature of cultural change (d'Errico and Stringer 2011; Straus 1997). Finally, evidence suggests that the two species may have interbred, resulting in assimilation of Neandertals into AMH populations (d'Errico and Stringer 2011; Garralda 1997; Henry et al. 2004).

2.2.3.2 The Assimilation Model

Proponents of the Assimilation Model of interaction between Neandertals and AMH argue that Neandertals assimilated biologically and culturally into AMH groups. Possible admixture between AMH and Neandertals has been argued to be demonstrated by both genetic and fossil evidence (Fu et al. 2015; Green et al. 2010; Villa and Roebroeks 2014; Zilhão 2012). The publication of results from the Neandertal Genome Project seems to support Assimilation models for Neandertal extinction, suggesting that Neandertals contributed to 1-4% of the DNA of Eurasian AMH (Fu et al. 2015; Green et al. 2010; Lohse and Frantz 2014; Mellars 2010; Pääbo 2014: 188; Stringer 2012; Villa and Roebroeks 2014; Zilhão 2012, 2013).

Although the two species could have interbred, it is unclear the extent to which interbreeding may have occurred or the exact location (Green et al. 2010; Higham et al. 2014; Pääbo 2014: 194). As the two species existed alongside one another in the Middle East for a long period of time (between 50,000 and 100,000 BP), this has been noted as the most likely place and time for interbreeding to have occurred; the similar cultural repertoires of the two species in the region during this period lend support to this possibility (Pääbo 2014: 197). The presence of fossil specimens from different sites, dating within a few millennia of contact between the two species, feature characteristics of both species, further supporting the Assimilation Model (Villa and Roebroeks 2014; Zilhão 2006b, 2007, 2013). One of the earliest known AMH fossils in Europe, from the site of Oase, Romania, displays both modern and archaic morphological traits, and has

been confirmed to contain both AMH and Neandertal ancestry within its genome (Fu et al. 2015; Zilhão 2006b, 2007, 2013). Genetic evidence produced from the genome of this specimen has suggested to some researchers that interbreeding occurred not only upon initial contact in the Near East, but also more recently in Europe, around 42,200 BP (Fu et al. 2015). In this way, even though Neandertal distinctive morphology disappeared around 30,000 years ago, they did not truly go extinct, but were instead incorporated into AMH populations (Pääbo 2014: 188; Straus 2005b; Villa and Roebroeks 2014).

That the two species were able to interbreed has been argued by researchers as evidence that we could not have been as biologically and culturally different as previously believed (Churchill and Smith 2000; Finlayson et al. 2012; Zilhão 2012, 2013). However, since it has been suggested that the majority of our genes (over 95%) come from our African ancestors (Pääbo 2014: 194; Stringer 2012), and AMH and Neandertals remained separate species with unique genotypes and phenotypes, it is unlikely that any interbreeding was significant (Stringer 2012). One possible explanation for such little genetic contribution from Neandertals to AMH is that the Neandertal Y-chromosome carried genes that were incompatible with other AMH genes, which may have provided a barrier to gene flow between the two (Mendez et al. 2016).

The 2010 publication of ancient DNA results of another hominin sharing DNA with both AMH and Neandertals added further controversy for researchers concerned with interactions and admixture between AMH and Neandertals (Krause et al. 2010; Pääbo 2014: 239). A team of researchers sequenced DNA from a small specimen from Denisova cave in southern Siberia, and found that it belonged to a separate species (now

known as the Denisovans) who shared a common ancestor with both AMH and Neandertals ~ 1 million years ago (Krause et al. 2010). The Denisovans lived in close proximity to AMH and Neandertals between 30,000 and 50,000 BP (Krause et al. 2010; Pääbo 2014: 250). In addition to the co-occurrence of these species, researchers have surmised that gene flow occurred between Denisovans and AMH, with Denisovans having contributed between 2-4% of their DNA to the genomes of present day Melanesian people, who also carry some Neandertal DNA (Pääbo 2014: 243; Stringer 2012; Vernot et al. 2016). As such, genetically-based arguments about the relationship between AMH and Neandertals must also apply to the relationship between AMH and Denisovans.

Although one possibility is that the three species interbred with each other to varying degrees and on different temporal scales (Pääbo 2014: 246), another possibility has been raised regarding the shared DNA of these species. Shared DNA may be the result of remnants of common African ancestral genes passed on to all three species (Erikkson and Manica 2012; Pääbo 2014: 247). If this were the case, the argument that AMH and Neandertals must not have been drastically different due to their ability to interbreed would no longer be viable. Further nuclear DNA sequencing is necessary to clarify the relationship between the three species (Krause et al. 2010; Pääbo 2014: 253).

2.3 The Neandertal Symbolic Record

Symbolism is widely considered to be one of the most important characteristics of modern behaviour and complex cognition. A symbol is considered to be anything (e.g. object, gesture, sign, or vocalization) that stands for or represents something beyond itself; a visible representation of an idea (Kyriakidis 2007; Mellars 1996; Renfrew 1994). Symbolic behaviour demonstrates the capacity to attribute meaning to common signs and aspects of experience, to communicate in abstract concepts, and to regularly manipulate symbols (d'Errico and Stringer 2011; McBrearty and Brooks 2000).

Literature on prehistoric art and symbolism converges upon a number of archaeological signals thought to characterize symbolism, including notational pieces, pigment use, body modification, burials, personal ornamentation, and figurative art (d'Errico et al. 1998; d'Errico et al. 2003, Langley, Clarkson, and Ulm 2008; McBrearty and Brooks 2000; Nowell 2010). In this setting, the oldest unanimously accepted examples of symbolic behaviour in AMH contexts come from Blombos cave, South Africa, in the form of ochre pieces with abstract or geometric patterns engraved on them, dated to 100,000-70,000 BP (d'Errico et al. 2003; McBrearty and Brooks 2000; Pettitt 2014). Although it is beyond question that the archaeological record of AMH shows significantly more evidence for symbolism than the Neandertal record, a number of the abovementioned archaeological signatures have been found in Neandertal contexts. Though it has been traditionally accepted that symbolic behaviour and thought are unique to our own species, some researchers have questioned this axiom, particularly in light of

some of the archaeological evidence attributed to Neandertals (d'Errico 2003; d'Errico et al. 1998; d'Errico and Stringer 2011; Nowell 2010).

2.3.1 Possible Cases of Neandertal Symbolic Behaviour

Recent finds and reappraisals suggest Neandertals may have engaged in a number of symbolic activities, including purposeful burial of the dead (d'Errico 2003; Mellars 1996; Riel-Salvatore and Clark 2001), systematic pigment use (d'Errico and Stringer 2011; Roebroeks et al. 2012; Soressi and d'Errico 2007), personal ornamentation (Caron et al. 2011; d'Errico et al. 1998; Peresani et al. 2013; Zilhão et al. 2010), and creation of 'art'-related objects (Finlayson et al. 2012; Radovčić et al. 2015; Villa and Roebroeks 2014; Zilhão et al. 2010). Some authors have suggested that this symbolic activity could be prior (and therefore independent) to the arrival of earliest AMH in Europe (d'Errico et al. 1998, 2003; Peresani et al. 2011; Rodríguez-Vidala et al. 2014; Zilhão 2006b, 2007). Due to the relative scarcity of symbolic objects in Neandertal contexts, it has been argued that, though Neandertals may have developed some kind of symbolic culture, it is likely they were not immersed in it (Chase and Dibble 1987; Mellars 1996, 2005; White 2001), and the research presented here cannot present an alternative argument.

2.3.1.1 Burial

It has been suggested that Neandertals practiced intentional burial of the dead (d'Errico et al. 2003; Lewis-Williams 2002; McBrearty and Brooks 2000; Pettitt 2014; Wynn and Coolidge 2011:109), though this subject is still considered controversial to some researchers, and debate exists surrounding whether burial was practiced with symbolic intent (d'Errico et al. 2003; Lewis-Williams 2002; Pettitt 2014; Riel-Salvatore and Clark 2001). Some researchers have interpreted Neandertal burials as including grave goods at sites such as Le Moustier, La Ferrassie, and La Chapelle-aux-Saints in France, and Dederiyeh, Teshik Tash, Shanidar, and Amud in the Middle East (d'Errico and Stringer 2011; Riel-Salvatore and Clark 2001). Examples of possible grave goods include stone tools, engraved bones, flowers, and a ring of ibex horns, as well as objects incised or engraved with lines and geometric patterns (d'Errico and Stringer 2011; Riel-Salvatore and Clark 2001). Although Neandertals may have buried their dead, some authors have argued that the interpretation of supposed grave goods is weak (Gargett 1989; Mellars 1996). The rarity of supposed grave goods in Neandertal contexts lends credence to this possibility (Belfer-Cohen and Hovers 1992; Gargett 1989; Mellars 1996). Additionally, it has been noted that burial of the dead is not necessarily symbolic in nature, and could have been purely functional (i.e. to dispose of bodies) (Mellars 1996; Riel-Salvatore and Clark 2001).

In fact, although purposeful internment of Neandertals is now widely accepted among archaeologists, it has been argued that the simplest explanation for some of the

supposed ritual offerings or grave goods, such as a bone with evenly-spaced cut marks dating to 75,000-60,000 BP from La Ferrassie (Zilhão 2007, 2012), may be accidental incorporation in the graves, and that AMH burials demonstrate a much clearer inclusion of grave goods than Neandertal burials do (Chase and Dibble 1987; Gargett 1989; Mellars 1996). However, Riel Salvatore and Clark (2001) have argued that greater differences exist between early UP and late UP AMH burials than between Neandertal and AMH burials. Some researchers have argued that most, if not all, of the supposed grave goods included in Neandertal burials happen to be the most common objects at MP sites, such as stone tools and animal bones, which would have inevitably been incorporated into the infill of purposely dug graves (Chase and Dibble 1987; Gargett 1989; Mellars 1996: 379). However, Zilhão (2007, 2012), contends that such arguments for evidence from sites including La Ferrassie are attempts to ignore or explain away evidence which is clearly purposeful in nature. In short, taking into account the available evidence, it is possible that AMH and Neandertals engaged in a variety of funerary practices, and it is likely that some of the practices they engaged in did not leave traces in the archaeological record (d'Errico and Stringer 2011).

2.3.1.2 Pigment Use

The use of coloring materials by Neandertals is now accepted by an increasing number of researchers (d'Errico 2003; d'Errico and Stringer 2011; Mellars 1996; Morin and Laroulandie 2012; Roebroeks et al. 2012). Pigments such as red ochre and black

manganese oxides were utilized in MP contexts, having been discovered at more than forty European Neandertal sites dating to between 60,000-35,000 BP (d'Errico 2003; Finlayson et al. 2012; Mellars 1996: 370; Roebroeks et al. 2012; Soressi and d'Errico 2007; Wynn and Coolidge 2011:120). A number of authors have suggested that pigment use by Neandertals could indicate deliberate choice of intense red hues, pigment sourcing from distant locations, thermal alteration, and complex mixing and preparation techniques (d'Errico 2003; d'Errico and Stringer 2011; Roebroeks et al. 2012; Soressi and d'Errico 2007; Zilhão 2012; Zilhão et al. 2010).

A number of pigment fragments within Neandertal contexts bear traces of modification and use, which may provide clues as to their functions; grinding and scraping of pigments to produce a powder provides the possibility that these pigments were used to color objects such as leather or stone and bone tools (Dayet, d'Errico, and Garcia-Moreno 2014; Mellars 1996; Soressi and d'Errico 2007; Wynn and Coolidge 2011:120). Wear facets present on blocks of pigments in Mousterian sites are similar to those observed on pigments in the UP, and suggest that they were applied directly to a surface (Mellars 1996; Soressi and d'Errico 2007; Zilhão 2012). At some Neandertal sites, such as Pech de l'Azé, some researchers have suggested that a number of blocks of pigment intentionally shaped into what appear to be pencils or crayons illustrate that Neandertals decorated their bodies (d'Errico 2003; Soressi and d'Errico 2007; Wynn and Coolidge 2011:120; Zilhão 2007, 2012). As some evidence for Neandertal pigment use dates to a time prior to the earliest Aurignacian, at sites including Cueva de los Aviones and Cueva Anton, Spain (50,000 BP) (Zilhão et al. 2010), Pech de l'Azé I, France

(60,000-40,000 BP) (Roebroeks et al. 2012), and Maastricht-Belvédère, The Netherlands (250,000-200,000 BP) (Roebroeks et al. 2012), it is possible that this reflects independent development of this behaviour in Neandertals (Dayet, d'Errico, and Garcia-Moreno 2014; d'Errico et al. 2003; Soressi and d'Errico 2007).

European evidence of Neandertal pigment use is similar to that of African MSA sites at the time, suggesting that the two species could have used pigments in similar ways and for similar purposes (as has been suggested by d'Errico 2003; d'Errico et al. 2003; d'Errico and Stringer 2011; Obermaier 1924; Roebroeks et al. 2012; Wynn and Coolidge 2011; Zilhão 2012). Although Neandertal pigment use has been suggested to represent bodily decoration and symbolic behaviour, some have argued instead for a functional interpretation, noting that its symbolic utility is difficult to determine (Mellars 1996: 370; Roebroeks et al. 2012; Zilhão et al. 2010). In the ethnographic record, utilitarian uses of ochre include skin protection (from insects or sun), medicine, food preservation, tanning of hides, and adhesives (d'Errico and Stringer 2011; Roebroeks et al. 2012; Soffer 2009; Wynn and Coolidge 2011:120; Zilhão 2007). However, it has been argued that no modern society exists where the use of colorant is purely functional (d'Errico 2003; d'Errico and Stringer 2011). Moreover, symbol use is ultimately functional, and is used to enhance group cohesiveness and mark individual and group identities, providing an adaptive advantage (d'Errico and Stringer 2011).

2.3.1.3 Feather Exploitation

Some authors have mentioned a number of examples indicating that Neandertals exploited birds, such as raptors and corvids, for purposes other than subsistence, extracting large feathers in a systematic fashion within a geographically and temporally broad range (Finlayson et al. 2012; Morin and Laroulandie 2012). While evidence in this sense is still weak, the purposeful selection and removal of colourful and unique feathers from particular birds, as suggested by cut marks on bones at sites in Gibraltar (Gorham's Cave, Vanguard Cave, and Ibex Cave) and Italy (Fumane Cave) might indicate symbolic use of feathers (e.g. for bodily decoration) by Neandertals (Finlayson et al. 2012; Peresani et al. 2011; Zilhão 2012). In AMH, systematic removal of feathers in this manner has been shown to represent creation of ornaments for bodily decoration, and some researchers have suggested that we must assume the same use in Neandertals (Finlayson et al. 2012; Peresani et al. 2011; Zilhão 2012). Repeated and systematic use of feathers has been suggested to demonstrate planning and anticipation capabilities, along with complex cognition and self-awareness (Finlayson et al. 2012; Peresani et al. 2011; Zilhão 2012), although this use is difficult to demonstrate in the Neandertal archaeological record, in part due to preservation issues.

2.3.1.4 Ornament and Pendant Creation

Personal ornaments are considered to be anything involved in bodily decoration, including shell beads, pendants, perforated teeth, bracelets, rings, carved bone objects, and colorants (Moro Abadía and Nowell 2014). A number of studies on hunter-gatherer groups indicate that body decoration is used to communicate self-awareness and individual or group social identity (Bar-Yosef 2002; d'Errico et al. 1998; Zilhão et al. 2010). Although personal ornamentation is commonly associated with AMH and is taken to represent cognitive and symbolic capacities, a number of personal ornaments have also been found in Neandertal contexts, suggesting that Neandertals could have produced and worn a variety of personal ornaments (d'Errico et al. 2003; Radovčić et al. 2015).

A reappraisal of evidence from the sites of La Ferrassie, Saint-Cesaire, Quinçay, and Grotte du Renne (France) and Fumane Cave (Italy) may suggest Neandertals could have used ornaments and engaged in other symbolic activities, behaviour previously believed to be attributed to AMH only (Mellars 2010; Moro Abadía and González Morales 2010; Zilhão 2006b, 2012). The site of Grotte du Renne at Arcy-sur-Cure (central France), is often cited as yielding evidence of Neandertal production and use of personal ornaments (Caron et al. 2011; d'Errico et al. 1998; Welker et al. 2016; White 2001; Zilhão 2012, 2013). First excavated by Leroi-Gourhan in 1948, the site contains Aurignacian layers dating between 32,000-33,000 BP, and Châtelperronian layers which date between 32,000-45,000 BP, although the dates and stratigraphy of the site are problematic (White 2001). Artefacts reportedly recovered from the Châtelperronian

layers at the site include 39 personal ornaments produced from grooved and pierced incisors and canines of various animals, including fox, wolf, hyena, and red deer, along with small perforated ivory beads, a fossil shell, mammoth ivory rings, and a reindeer metapodial bearing grooves suited for suspension, and other possible symbolic items (see Figure 2.2) (Caron et al. 2011; d'Errico et al. 1998; Moro Abadía and González Morales 2010; Zilhão 2012, 2013).

Some researchers contend that the ornaments and symbolic items recovered from the site are reliably associated with Neandertals (d'Errico et al. 1998, 2003; Zilhão 2006b, 2007, 2013), based on what they believe to be confirmed stratigraphic integrity through dating and taphonomic studies (Caron et al. 2011; d'Errico 2003; Zilhão 2013) and on skeletal remains with Neandertal morphological traits (Bailey and Hublin 2006; Zilhão 2013) and which have been identified through ancient DNA as Neandertal (Welker et al. 2016). Others have pointed out numerous problems with the integrity of the site (Higham et al. 2010; Mellars 2005; White 2001). Some researchers have cautioned that it is likely that the ornaments at Grotte du Renne have been mistakenly attributed to Châtelperronian layers at the site as a result of admixture between these and overlying Aurignacian layers (Higham et al. 2010; White 2001). It has been noted that the site is geologically and stratigraphically complex, having been excavated between 1948-1966, prior to the high standards of excavation, recording, and recovery used today (Higham et al. 2010; White 2001). The complex depositional history of the site, combined with early poor excavation techniques, makes it difficult to be sure that Neandertals created the Châtelperronian ornaments (Bar-Yosef 2006; Higham et al. 2010, 2014; White 2001).

White (1982, 2001, 2007:292) has argued that the techniques and raw materials used in the production of supposed Châtelperronian ornaments at Grotte du Renne are inconsistent with MP bone and antler assemblages, but instead fall within the range of techniques and raw material choices known for Aurignacian sites across Europe. In fact, some techniques and types demonstrated in the production of ornaments at Grotte du Renne, such as 'rainurage' and ivory rings, are actually peculiar to the Châtelperronian in general, so the fact that they are so well-represented at the site is curious, and may indicate admixture with overlying Aurignacian layers (White 2001). Lending support to this idea is the fact that the ivory rings from Châtelperronian level X have been shown, through microscopic and metric analyses, to display possible manufacture stages for finished objects in the overlying Aurignacian level VII (White 2001). In short, the similarities between those ornaments found in Châtelperronian layers and those found in Aurignacian layers at the site are so striking that it is extremely unlikely that they originated independently (Mellars 2005, 2010; White 2001).

An additional issue with the integrity of Grotte du Renne lies in disagreement over dates and chronology at the site (Higham et al. 2014; Hublin et al. 2012; Mellars 2005; White 2001). This is in part due to a large range of radiocarbon dates provided for the material in question (49,000-21,000 BP), making a substantial mixing of materials from various levels probable (Higham et al. 2010; Mellars 2010). It has also been argued that the Aurignacian predates or is contemporaneous with the Châtelperronian, possibly meaning that the production of ornaments at the site postdates the arrival of AMH (Hublin et al. 2012; Higham et al. 2014; Mellars 2005; White 2001, 2007: 291). Although

the site is often accepted as one of the main sources of evidence for Neandertal ornament use (Caron et al. 2011; d'Errico et al. 1998; Hublin et al. 2012), there are a number of issues with the integrity of the site which may never be resolved, and White (2001, 2007: 299) has argued that we must abandon the use of this site as support for Neandertal symbolism.

Figure 2.2. Châtelperronian symbolic artefacts from Grotte du Renne. Personal ornaments made of perforated and grooved teeth. After Caron et al. (2011). Digital illustration by Robyn S. Lacy.

Evidence of similar ornaments from the Châtelperronian at the sites of Quinçay and St. Cesaire has been generally accepted, as there is little possibility of admixture, given that there were no overlying AMH occupations (Chase and Dibble 1987; White 2001; Zilhão 2007, 2012, 2013). However, it is possible that Neandertal-created ornaments at the sites are a reflection of interactions with AMH groups (Mellars 2005; White 2007: 291), and the archaeological validity of these sites has been questioned (Mellars 2010). Although rare, ivory rings similar to those found at Grotte du Renne have

been recovered at the sites of Trou Magrite (Belgium) and Ilsenhöhle (eastern Germany), displaying similar manufacturing techniques to those of Châtelperronian sites, and interpreted to be pendants (Zilhão 2007, 2012). However, dating of these objects is extremely problematic; the 19th century excavation of Trou Magrite produced an apparently mixed collection of Mousterian, Szeletian, and Aurignacian occupations (Zilhão 2007, 2012), with no evidence of a Châtelperronian occupation (White 2001). The ivory disc recovered from the site of Ilsenhöhle, reportedly from an Altmühlian transitional level, has not been dated, and only a drawing remains (Zilhão 2007; 2012). Perforated objects including a swan vertebra and wolf metapodial from Bocksteinschmiede in west Germany (45,000 BP) and perforated reindeer phalanges from the Mousterian levels at La Quina (France) have also been interpreted as evidence of Neandertal personal ornamentation (Zilhão 2007, 2012), although the perforations of these objects are likely to have been the result of carnivore punctures and chemical erosion (d'Errico et al. 2003; Mellars 1996: 374; White 1989, 1992).

Symbolic use of bird bones and talons has also been suggested at a number of MP Neandertal sites in France and Italy (d'Errico and Stringer 2011; Morin and Laroulandie 2012; Radovčić et al. 2015). It has been argued that the over-representation of non-edible bird foot bones and claws bearing multiple cut marks, polishing facets, and signs of abrasion at select Neandertal sites demonstrates the symbolic use of these items (d'Errico and Stringer 2011; Morin and Laroulandie 2012; Radovčić et al. 2015). At the sites of Krapina (Croatia) and Pech de l'Azé (France), these items are older than 100,000 BP (d'Errico and Stringer 2011; Radovčić et al. 2015), and at Fumane Cave (Italy), and

Combe-Grenal and Les Fieux (France), these date to 60,000-40,000 BP (Morin and Laroulandie 2012), prior to the presence of AMH in Europe. Use-wear analysis at the site of Krapina suggests that eagle talons may have been manipulated for suspension and strung using fibre, as seen in comparable UP assemblages (Radovčić et al. 2015).

Shell ornaments are present in Uluzzian contexts at select sites in Italy and Greece, and at the site of Willendorf II in central Europe (Zilhão 2007, 2012). The Uluzzian industry, a European transitional industry dating to 45,000-39,500 BP (Douka et al. 2014), is considered to be a regional variant of the Châtelperronian in Italy and Greece (Bar-Yosef 2006; Churchill and Smith 2000; Harvati 2007; Pettitt 2014). Although some researchers accept the Uluzzian as Neandertal-authored (Churchill and Smith 2000; d'Errico et al. 1998; Zilhão 2006b, 2007, 2013), this industry, along with other transitional industries, is still debated, and its chronology and taxonomic affinity at many sites is largely unknown (Douka et al. 2014; Mellars 2011). Some of the oldest evidence of shell ornaments in Neandertal contexts was recovered from two MP sites in Iberia, Cueva Antón and Cueva de los Aviones (see Figures 2.3 and 2.4), which yielded perforated and pigment-stained marine shells dating to 50,000-45,000 BP (d'Errico and Stringer 2011; Morin and Laroulandie 2012; Wynn and Coolidge 2011; Zilhão et al. 2010). Similar evidence has been found at Fumane Cave, Italy, consisting of a Mousterian age fossil marine shell, dating to 47,600-45,000 cal BP (Peresani et al. 2013). This object displays deliberate coloring (with a pigment mixture) and transport (from over 100 km away) of an exotic object by Neandertals, who then modified the object for suspension, as demonstrated by use-wear striations (Peresani et al. 2013).

Figure 2.3. Perforated shell partially covered with pigment from Cueva Antón, Spain. After Zilhão et al. (2010). Digital illustration by Robyn S. Lacy.

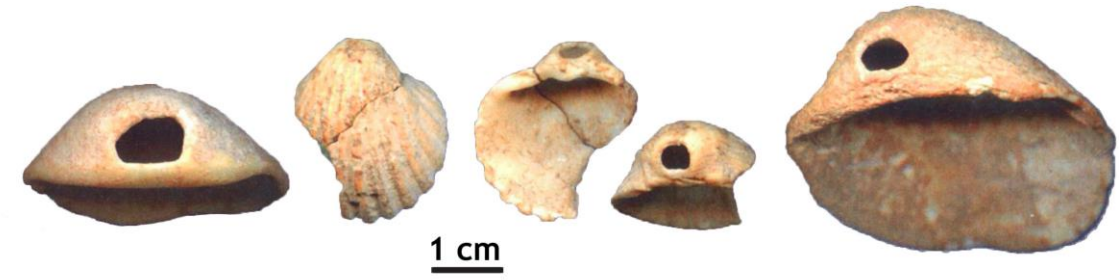

Figure 2.4. Perforated shells from Cueva de los Aviones, Spain. After Zilhão et al. (2010). Digital illustration by Robyn S. Lacy.

As some of the evidence for Neandertal personal ornamentation occurred earlier than the first AMH arrival in Europe, some authors have suggested this indicates that Neandertals developed this behaviour independently of AMH influence (d'Errico et al.

1998; Peresani et al. 2013; Zilhão 2012; Zilhão et al. 2010). Although differing explanations have been proposed for the presence of ornaments and 'art' objects in Neandertal contexts, similar archaeological evidence found in AMH contexts at MP and MSA sites in the Near East and Africa has been interpreted as personal ornamentation un-controversially (d'Errico and Stringer 2011; Peresani et al. 2013; Zilhão 2007, 2012; Zilhão et al. 2010). However, as the symbolic utility of these objects is quite apparent in the AMH archaeological record (d'Errico and Stringer 2011; McBrearty and Brooks 2000; Mellars 1996), if similar perforated objects are genuinely associated with Neandertals, it has been argued that they could have served utilitarian functions, such as toggles or other clothing items (Mellars 1996: 375), or could have been related to sexual display or prestige (Mellars 2005).

2.3.1.5 Portable 'Art' Objects

Portable 'art' objects found in Neandertal contexts are very scant in comparison to those found in AMH contexts, and have been contested (Chase and Dibble 1987; Mellars 1996; White 1992). This being said, some possible evidence of Neandertal portable 'art' could have been overlooked or dismissed. For instance, a Mousterian-age engraved stone from El Castillo Cave, Spain, has been excluded from much of the literature surrounding Neandertal 'art' and symbolic objects (for further information on this artefact, see section 4.3.5.2.) (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera et al. 2001). At the Hungarian site of Tata, a round Nummulite fossil, containing a straight, natural crack

running through the centre was possibly altered by Neandertals, who could have engraved a second perpendicular line to form a symmetrical cross on the object (Mellars 1996; Soffer 2009; Wynn and Coolidge 2011:119). Select researchers (Chase and Dibble 1987; White 1992) have argued that the second line present on this object was not intentional or human created, but rather natural, and that the collection of this object may signify an aesthetic interest in Neandertals, but does not represent symbolic thought. An ivory plaque made from a mammoth molar which had been shaped, beveled, and smeared with red ochre was also recovered from the site (Zilhão 2007). From an Altmühlian transitional level at the site of Ilsenhöhle, an ivory disc and a needle-like bone point were discovered in Neandertal contexts, although the site's stratigraphy is questionable, and the artefact is no longer available for analysis (Zilhão 2007; 2012). Some have interpreted these artefacts as possible Neandertal portable 'art' (Soffer 2009; Wynn and Coolidge 2011:119; Zilhão 2012).

At the site of Grotte du Renne, nine Châtelperronian tools were found marked with four sets of notched v-shaped incisions (d'Errico et al. 2003; Zilhão 2007). Additionally, one third of the 50 bone awls and three bird bone tubes from the Châtelperronian layers of the site exhibited regular markings, indicating possible deliberate decoration (d'Errico et al. 2003; Zilhão 2007). Decorated bones have also been found in Mousterian contexts at Pech de l'Azé II, France, and Cueva Morin, Spain (Mellars 1996: 374). Some archaeologists have argued that rather than being symbolic, incised, evenly spaced lines on bones could have been produced through butchering activities (Mellars 1996: 374; White 1992). In any case, the engravings and possible

portable ‘art’ objects presented in Neandertal contexts do not nearly approach the obvious intentionality, organization, and complexity of the UP (Mellars 1996; White 1992).

2.3.1.6 Engravings and Rock ‘Art’

Rock paintings and engravings are considered to be a major cognitive step in human evolution, as they convey symbolic codes and information to others (Lewis-Williams 2002; Rodríguez-Vidala et al. 2014). This type of art-work, also known as parietal art, has long been considered exclusive to AMH, and is often used to argue for significant cognitive differences between AMH and Neandertals, who are thought to have lacked this particular behaviour (Lewis-Williams 2002; Rodríguez-Vidala et al. 2014).

The recent dating and discovery of rock ‘art’ images in a context chronologically compatible with the presence of Neandertals in Iberia has sparked some controversy surrounding Neandertal cognition (Pike et al. 2012; Rodríguez-Vidala et al. 2014). At El Castillo cave in northern Spain, a painted red disk has been dated to a minimum age of 40,800 cal BP (35,500 radiocarbon years BP), a time when either AMH or Neandertals may have been in the area (Pike et al. 2012; Zilhão 2013). While some archaeologists have suggested that Neandertals could have created the disk, as well as some negative handprints (Pike et al. 2016; Zilhão 2013), there is not definitive evidence for Neandertal rock ‘art’ in the region. Additionally, some researchers have noted that the Uranium-Thorium dating method for rock art is still rather experimental in nature, and sometimes produces dates which are thousands of years older or younger than other dating methods

(Sauvet et al. 2015). It has been suggested that in the case of El Castillo, the presence of a single date, with no additional dating methods to support it, is not sufficient grounds to speculate about Neandertal 'art' (Sauvet et al. 2015).

Figure 2.5. Possible Neandertal engraving from Gorham's Cave, Gibraltar. Retrieved from Rodríguez-Vidala et al. (2014).

An engraving (see Figure 2.5) consisting of a cross-hatched pattern has been discovered at Gorham's Cave, Gibraltar, dating to 39,000 cal BP (Rodríguez-Vidala et al. 2014). The engraving was covered by an undisturbed Mousterian layer, suggesting the possibility that Neandertals created the image (Rodríguez-Vidala et al. 2014). Some archaeologists have suggested that the engraved lines were created intentionally, a fact that has been interpreted by some as evidence of Neandertals' capacity for abstract thought (Rodríguez-Vidala et al. 2014). While this possibility cannot be excluded, the

lack of supplementary evidence calls into question the idea that Neandertals created rock art in a systematic way. Although burials, pigment use, and personal ornamentation can be interpreted as possible instances of Neandertals' symbolic behaviour, there is not significant evidence of a tradition of rock art, or of figurative representations in any medium, in Neandertal contexts (White 1992, Pettitt 2014).

Although these two examples are so far the only possible instances of Neandertal rock 'art,' over 95% of decorated caves remain undated by chronometric methods, opening the possibility of more early dates in the future (Pettitt and Pike 2007). Even if Neandertals did not create rock 'art,' this does not necessarily indicate that Neandertals were not cognitively advanced people, as many AMH groups, both current and prehistoric, do not use depictions, and some even prohibit them (Wynn and Coolidge 2011:119). In this setting, the argument that absence of cave art provides definitive proof of Neandertals' inferior cognitive capacities is certainly problematic. It is possible, for instance, that Neandertals were simply using other mediums than the cave walls to express themselves (Finlayson et al. 2012). In other words, while rock art is unanimously considered as one of the markers of modern behaviour, the lack of it should not be equated to the lack of complex cognition.

2.4. The Notion of 'Behavioural Modernity'

Behavioural modernity is a way of conceptualizing the uniqueness of AMH, and is considered to be representative of all modern living humans (Conard 2010; Shea 2011).

With reference to the past, behavioural modernity refers to the point in human evolution when people became cognitively like us (Conard 2010; Shea 2011). Although there is no consensus on criteria for modern behaviour, in general it seems to be accepted that symbolism is at its core (d'Errico et al. 2003; Nowell 2010; Wynn and Coolidge 2009). As illustrated in Table 2.1, modern behaviour is considered to be characterized by a number of archaeological markers, including composite tool use, bone and ivory working, intrasite spatial organization, and the creation of beads, pendants, and 'art,' demonstrating abstract thinking, planning depth, behavioural and technological innovativeness, and symbolism (Bar-Yosef 2002; Conard 2010; d'Errico et al. 2003; McBrearty and Brooks 2000; Nowell 2010; Shea 2011). How and when behavioural modernity emerged, and whether it is unique to AMH, has been widely debated in recent years (Conard 2010; d'Errico and Stringer 2011; Nowell 2010; Zilhão et al. 2006).

Three basic scenarios have been proposed for the origin of behavioural modernity. In the first, known as the 'Human Revolution Model,' modernity is unique to AMH and arose and stabilized with the arrival of modern people into Europe (Mellars 2005; White 1982, 1992) possibly due to a neurological change around this time (Klein 2000, 2003). A second scenario proposes that behavioural modernity emerged gradually in Africa starting 200,000 years ago, with the emergence of our own species on the continent (Conard 2010; McBrearty and Brooks 2000; McBrearty 2007). A third scenario posits that behavioural modernity is not unique to our species, and that Neandertals also had modern behaviour and cognition (d'Errico 2003; d'Errico and Stringer 2011; Langley, Clarkson, and Ulm 2008; Peresani et al. 2011; Shea 2011; Zilhão 2006b).

Table 2.1. Archaeological signatures of modern behaviour. Adapted from McBrearty and Brooks (2000: 492).

Ecology	**Technology**	**Economy and social organization**	**Symbolic Behaviour**
-Range extension to previously unoccupied areas -Increased breadth of diet	-Standardization of tool types -New lithic technologies -Composite tools and hafting -Manufacture of bone and antler tools -Greater control of fire	-Long-distance procurement of raw materials -Specialized hunting techniques -Seasonal resource exploitation -Intensification and diversification of resource use -Intrasite spatial organization	-Regional artefact styles -Body adornment (e.g. ornaments and pendants) -Pigment use -Ritual burials -Notched and incised objects -Image and representation

The Human Revolution Model proposes that AMH left Africa with modern cognition already in place, and then rapidly expanded and encountered/replaced Neandertals (Klein 2000, 2003; Mellars 1996, 2005, 2011; White 1982). This model, also referred to as the Single-Species Model for behavioural modernity, was the dominant paradigm until recently, promoting the idea that 'art' and symbolism are unique to AMH, who are more anatomically and cognitively complex than other species (Klein 2000, 2003; Mellars 1996, 2005, 2011; White 1982, 1992). Some researchers have pointed out that the evidence is not sufficient to support the Human Revolution Model (McBrearty and Brooks 2000; McBrearty 2007; Zilhão 2012). AMH have roots in Africa between 200,000-160,000 BP, long before the first symbolic behaviours reflected in the archaeological record ~100,000-80,000 BP, demonstrating a lag between anatomical and cultural modernity (Nowell 2010; Tattersall 2009; White 2003). As such, there appears to

be no correlation between modern anatomy and modern behaviour (Caron et al. 2011; McBrearty and Brooks 2000; Nowell 2010; White 2003; Zilhão et al. 2010).

A Multiple-Species Model (MSM) of behavioural modernity has been proposed by some authors, who argue that most traits characterizing behavioural modernity arose in Neandertals, and that 'art' and symbolism are not exclusive to AMH (Caron et al. 2011; d'Errico 2003; d'Errico et al. 1998, 2003; Nowell 2010; Shea 2011; Soressi and d'Errico 2007; Zilhão 2012; Zilhão et al. 2006). According to Moro Abadía and González Morales (2010), the emergence of the MSM is related to a number of theoretical shifts in definitions of 'art' and 'Neandertals.' In short, they argue that new conceptualizations of the relationship between Neandertals and AMH as having been contemporary populations for a substantial period of time, along with shifts in the category of 'art' to include items such as personal ornaments, have contributed to the development of the MSM. All living humans are known to be capable of a wide variety of behaviours, and this applies to past AMH and Neandertal groups as well (d'Errico and Stringer 2011; Shea 2011). It has been argued that behavioural differences between Neandertals and AMH are largely dependent on group size and cultural exchange rates, and varying adaptive strategies, rather than on built-in cognitive differences (d'Errico and Stringer 2011; Nowell 2010; Shea 2011).

Trait lists defining modern behaviour are often derived from the European Upper Paleolithic, which is known to represent AMH (Langley, Clarkson, and Ulm 2008; McBrearty and Brooks 2000; Shea 2011). This is often presented in contrast with MP Neandertal behaviour, reducing the behaviour of the two species to a dichotomy (Conard 2010; Shea 2011). Developing trait lists for behavioural modernity from what is seen in

the archaeological record of UP AMH is a problematic approach, resulting from *a priori* assumptions about cognition based on biological affinity (d'Errico and Stringer 2011; McBrearty and Brooks 2000; Shea 2011; Wynn and Coolidge 2009).

An additional problem with trait lists for behavioural modernity is that they are general labels that do not account for variation present in both prehistoric and modern AMH groups; as different groups have varying strategies and life histories, trait lists are not universally applicable (d'Errico and Stringer 2011; Hovers 2009; Langley, Clarkson, and Ulm 2008; McBrearty and Brooks 2000; Shea 2011). Additionally, some researchers have suggested that the concept of behavioural modernity is essentialist and qualitative, reflecting the European origins of Paleolithic archaeology and outdated views of AMH superiority (Langley, Clarkson, and Ulm 2008; Shea 2011). These scholars suggest instead a shift to understanding behaviour in terms of 'variability' or 'complexity' (Langley, Clarkson, and Ulm 2008; Shea 2011).

2.5 Historical Views of Neandertal Symbolic and Cognitive Capabilities

Neandertals were originally believed to be the missing link between AMH and their ape-like ancestors (Lewis-Williams 2002:71; Stringer and Gamble 1993; Trinkaus and Shipman 1992: 190). First depictions of Neandertals as hunchbacked, ape-like creatures were based on the anatomy and posture of an old specimen who suffered from severe osteoarthritis, deforming its vertebral column (Lewis-Williams 2002; Moro Abadía and González Morales 2010; Trinkaus and Shipman 1992: 191). A generally

accepted view of Neandertals held that they did not possess cognitive capabilities similar to those of AMH (Chase and Dibble 1987; Moro Abadía and González Morales 2010; Trinkaus and Shipman 1992: 158). This view has been pervasive in both literature and in public perception of Neandertals, although it has recently been challenged, in part due to DNA evidence indicating a complex relationship between the two species (Moro Abadía and González Morales 2010; Pääbo 2014). Discoveries of UP assemblages associated with Neandertal remains, and MP assemblages associated with AMH remains, have caused a reconsideration of the relationship between behaviour and anatomy (Cabrera Valdés et al. 2006; Churchill and Smith 2000; d'Errico et al. 2003; Straus 2005b).

Early misconceptions have guided some negative views about Neandertals, and many researchers still view the archaeological data as evidence for cognitive and behavioural differences (Henry et al. 2004; Mellars 1996, 2005; Straus 2005b). In the past, Neandertals have been compared to 'primitive' cultures in the ethnographic record, and have come to be known as a symbol for savage, uncivilized people (Soffer 2009; Trinkaus and Shipman 1992; Weniger 2006; Zilhão 2012). Due to recent discoveries and new, more human-like depictions and conceptualization of Neandertals, public and academic perceptions of Neandertals are slowly changing (Chase and Dibble 1987; d'Errico et al. 1998; Weniger 2006).

2.6 Interpretations of Archaeological Evidence

Dominant paradigms have a strong influence on archaeologists' positions on human origins and prehistory (Churchill and Smith 2000; d'Errico et al. 2003; Zilhão and d'Errico 1999). Some researchers now suggest that AMH and Neandertals, despite being biologically different, were culturally similar, with similar cognitive and intellectual capacities (d'Errico et al. 1998; Roebroeks 2008; Villa and Roebroeks 2014; Zilhão 2012, 2013). These authors argue that, as Neandertals may have practiced some UP and possible symbolic behaviours prior to their interactions with AMH, modern behaviour can no longer be associated solely with our own species (Banks, d'Errico, and Zilhão 2013a; Zilhão et al. 2006; Zilhão and d'Errico 1999). Some researchers have argued that there is a widespread reluctance to accept evidence for Neandertal symbolism (Morin and Laroulandie 2012; Zilhão 2012, 2013), and that an "anti-Neandertal prejudice has been blocking a correct appraisal of the empirical data relating to the Middle-to-Upper Paleolithic transition" (d'Errico et al. 1998: S22).

Although this pervasive prejudice against Neandertals has undoubtedly impacted interpretations of archaeological evidence, this prejudice cannot account for all objections to supposed Neandertal symbolic finds. As is the case with Grotte du Renne, many sites containing supposed Neandertal symbolic artefacts were excavated decades or centuries ago, with poor excavation techniques, and the archaeological integrity of these sites is of utmost importance. Additionally, some authors have noted that, while there are some sporadic occurrences of possible Neandertal symbolism in the archaeological record prior

to the MP-UP transition, which have been largely used to argue for Neandertal gradual and independent invention of these behaviours (d'Errico 2003; d'Errico et al. 1998; Langley, Clarkson, and Ulm 2008), a notable explosion of art and symbolism can be clearly seen in the European record at the beginning of the UP, when AMH happened to be migrating across the continent (Mellars 2005, 2010; White 1982, 1989:366, 1992).

Some researchers have argued that the chronological overlap of the two species would have allowed for emulation and acculturation (social transmission or diffusion of ideas from one group to another) (Davies 2012: 107), which may explain some complex or symbolic behaviours in Neandertals (Bar-Yosef 2006; Higham et al. 2014; McBrearty and Brooks 2000; Mellars 1999, 2005, 2010; Straus 2005b; White 1992). It has been argued that it is an "impossible coincidence" (Mellars 2005) that after hundreds of thousands of years of not having personal ornaments or symbolic elements as part of their cultural repertoire, Neandertals would have independently invented these behaviours, in some cases using the same raw materials and precise techniques as AMH, right around the time of coming into contact with them (Higham et al. 2014; Mellars 2005; White 2001). As evidence of AMH symbolic behaviours in the African archaeological record predates these innovations in Europe by 30,000-40,000 years, that AMH dispersed into Europe with these behaviours as part of their cultural traditions and may have come into contact with and shared these behaviours with Neandertals is not only possible, but predictable and inevitable (Mellars 2005).

Some researchers have invoked long-distance cultural diffusion from AMH groups to explain innovations by Neandertals after 100,000 BP, but prior to the arrival of

AMH in the region, through communication between geographically adjacent Neandertal groups (McBrearty and Brooks 2000; Mellars 2005). Although Zilhão (2007) argues that it is unlikely that these behaviours would have survived so many transmissions between groups without an understanding of their meaning and importance, Mellars (2005) notes that some innovations would have had strong adaptive advantages, and transmission of symbolic meaning would not be necessary.

Despite some researchers' arguments that if cultural diffusion or acculturation were responsible for Neandertal symbolic objects, we would expect the cultural traditions of the two species to be similar (d'Errico et al. 1998; Zilhão 2006b, 2007, 2013; Zilhão and d'Errico 1999), Mellars (2005) contends that exact replication of the behaviour of AMH would not necessarily have been involved, as it would have been assimilated into the pre-existing behaviours of the receiving community of Neandertals.

Proponents of the acculturation model tend to agree that, even if Neandertals created this behaviour under the influence of AMH, it still implies a high degree of cultural and technological adaptation and advanced cognition in Neandertals (d'Errico and Stringer 2011; Mellars 1999, 2005; Nowell 2010; White 1992, 2001). It is plausible that contact between the two species would have precipitated the need to differentiate group and individual identities, resulting in an increase of symbol use among both AMH groups and late Neandertals, who always had the capacity for this behaviour, but had not encountered external circumstances to trigger its emergence (d'Errico et al. 1998; Nowell 2010; Szmidt et al. 2010; Villa and Roebroeks 2014). Additionally, independent invention of behaviours within Neandertal groups and influence through cultural

exchanges with AMH groups are not mutually exclusive possibilities, and may explain the emergence of Neandertal complex behaviours in various spatiotemporal contexts (Straus 2005b; Villa and Roebroeks 2014).

2.7 Changing Definitions of 'Art'

Recent theoretical and methodological shifts in Prehistoric 'art' and cognitive evolution have impacted the ongoing debate surrounding Neandertals' artistic capabilities (Moro Abadía and González Morales 2008). Scholars have recently expressed concern about the concept of 'art' being applied to the UP (Conkey 1987, 1995:50, 1997:176; Moro Abadía and González Morales 2007; Nowell 2010; White 1992, 2003). Previously, the use of the term 'art' to define prehistoric images was unquestioned, along with a tendency to prioritize rock 'art' above personal ornaments and portable 'art' (Moro Abadía and González Morales 2007, 2008; White 1992). These trends have been challenged and are beginning to shift (Moro Abadía and González Morales 2008; Nowell 2010). The concept of 'art' itself is also undergoing changes, contributing to a shift in understanding the artistic abilities of prehistoric groups (Moro Abadía and González Morales 2008).

The use of the term 'art' is rooted in Art History studies and is largely a Western construct, relating to aesthetic qualities of visual imagery (Moro Abadía and Nowell 2014; Nowell 2006; White 2003). Though this dominant view of 'art' is often treated as a universal concept, prehistoric art scholars argue that this western construct largely

predetermines our perception of prehistoric images (Conkey 1987, 1997:176; Moro Abadía and González Morales 2007; Nowell 2006; White 1992, 2003). Many researchers have argued that terms such as 'representation,' 'image,' or 'visual cultures' are more neutral than 'art,' bearing less connotations relating to Art History and aesthetics (Conkey 1997; Nowell 2006; White 1992).

The artistic and symbolic importance of non-rock art objects, such as portable 'art' and personal ornaments, has long been overlooked (Moro Abadía and González Morales 2008; Moro Abadía and Nowell 2014). Until recently, under the influence of Art History, personal ornaments were trivialized and considered as trinkets, whose sole purpose was to beautify the human body (Moro Abadía and González Morales 2010; Moro Abadía and Nowell 2014). Paleolithic personal ornaments are now understood to be artistic representations, recognized for multiple symbolic, social, and cultural roles in prehistoric groups, and considered an indicator of cognitive, symbolic and artistic behaviour (Moro Abadía and González Morales 2008; Moro Abadía and Nowell 2014; White 1992, 2003). These new perspectives are, in part, fueled by methodological developments allowing for the understanding of the expert material knowledge of prehistoric ornament creators, and also due to theoretical developments in archaeology, under the influence of anthropology (Moro Abadía and González Morales 2010; Moro Abadía and Nowell 2014; White 1992). Recent theoretical shifts have influenced the interpretation of both geometric signs and of personal ornaments to be included within the concept of 'art,' as applied to prehistoric images and symbolic objects (Moro Abadía and González Morales 2010; Moro Abadía and Nowell 2014; Nowell 2006).

To some, ‘art’ is one of the distinctive traits that separates us from Neandertals (Moro Abadía and González Morales 2007). The idea that AMH were the only species to create ‘art’ is now being re-evaluated by some scholars, in part due to the association of Neandertals with personal ornaments at sites like Grotte du Renne and St. Cesaire (Bailey and Hublin 2006; Banks, d’Errico, and Zilhão 2013a; Caron et al. 2011; Zilhão 2007, 2013). Although some researchers have pointed out that figurative ‘art’ and cave ‘art’ are lacking from the Neandertal repertoire, recent shifts in the concept of ‘art’ to consider body ornaments as being artistic and symbolic have influenced the elevation of Neandertals to ‘artists,’ recognizing their cognitive and behavioural abilities (Moro Abadía and González Morales 2010).

Chapter 3: A Study Case: The Cave of El Castillo

3.1 Introduction, Site Overview, and History of Research

The Cantabrian region of northern Spain is one of the richest in the world with regards to the period between 40,000-10,000 BP (Straus 2005a). El Castillo cave is located in the town of Puente Viesgo, Cantabria, on the conical hill of Monte Castillo, along with the caves of La Flecha, La Pasiega, Las Monedas, and Las Chimeneas; the latter three, along with El Castillo, contain prehistoric art (Bahn 2012; Butzer 1981; Cabrera et al. 2001; Cabrera Valdés et al. 2006; Cabrera Valdés, Bernaldo de Quirós, and Maíllo Fernández 2006; García-Diez et al. 2015; Pastoors and Tafelmaier 2013; Rink et al. 1997). El Castillo itself is an important site for research on Neandertal 'art' and symbolic behaviour, as it contains possible portable 'art' objects and some of the oldest cave paintings in the world (Cabrera et al. 1997; Pike et al. 2012). The site was discovered in the early 20th century, and was named a UNESCO world heritage site in 2008 (Bahn 2012; García-Diez et al. 2015; Pastoors and Tafelmaier 2013).

The first excavations at the site took place shortly after the discovery of the site, under the direction of Hugo Obermaier and his team (Cabrera Valdés 1984; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997; Obermaier 1924). Though research was halted at the beginning of World War I, Obermaier's team was able to excavate 18 m of deposits from the centre of the rockshelter (Cabrera Valdés 1984; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997; Cabrera Valdés, Bernaldo de Quirós, and Maíllo Fernández 2006; Camps 2009; Pimentel and García-Diez 2013). Recent

excavations were initiated in 1980 at the site, under the direction of Victoria Cabrera, who uncovered levels 18-26 (Cabrera Valdés 1984; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997). The stratigraphic succession at El Castillo has been identified as one of the most complete of the Paleolithic, with 18-20 m of stratified deposits spanning the entire European Paleolithic (Cabrera Valdés 1984; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997; Obermaier 1924:162; Pastoors and Tafelmaier 2013). The rich stratigraphy of the site consists of 26 levels of deposits, alternating between sterile and human occupation levels (Cabrera et al. 2001; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997; Garralda 2006; Pastoors and Tafelmaier 2013).

El Castillo is of particular importance to Paleolithic researchers, as the environment of the site is a combination of both a true cave and a rockshelter, causing the accumulation of both internally and externally derived archaeological deposits (Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997). The accumulation of sediments onsite after level 20 reduced the available occupation area over time, changing the size of the site (Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997).

Standing out in the landscape, Monte Castillo would have served as a landmark for prehistoric populations during the Paleolithic (García-Diez et al. 2015). The surrounding area is rich in natural resources, and would likely have been a place of importance to prehistoric peoples (García-Diez et al. 2015; Pastoors and Tafelmaier 2013). Archaeological materials from the excavations at El Castillo have since been dispersed amongst select museums, the bulk of which are housed at Spain's National

Archaeological Museum in Madrid and at the Regional Museum of Prehistory and Archaeology in Santander (Giménez de la Rosa 2006).

3.1.1 Location

Located half way up the steep, conical-shaped mountain of Monte Castillo, 1 km south of the town of Puente Viesgo, Cantabria, El Castillo cave lies at an altitude of 197 m (Bahn 2012; Butzer 1981; Cabrera, Pike-Tay, and Bernaldo de Quirós 2004; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997; Pastoors and Tafelmaier 2013). Situated approximately 30 km from the coast, the cave's mountainous location provided ideal visibility to observe routes and movements of herds of animals, making it an ideal habitation area in the past (Bernaldo de Quirós and Maíllo-Fernández 2009; Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010; Cabrera, Pike-Tay, and Bernaldo de Quirós 2004; Pimentel and García-Diez 2013).

3.1.2 Discovery and Excavations

The site of El Castillo was discovered in 1903 by Hermilio Alcalde del Río (Bahn 2012; Cabrera Valdés, Bernaldo de Quirós, and Maíllo Fernández 2006; Pimentel and García-Diez 2013). The first excavations onsite took place from 1910-1914, led by H. Obermaier and P. Wernert, with assistance from H. Breuil, under the direction of Paris' Institut de Paléontologie Humaine (Bernaldo de Quirós and Maíllo-Fernández 2009;

Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010; Cabrera Valdés, Bernaldo de Quirós, and Maíllo Fernández 2006; Obermaier 1924:161). Prior to these initial excavations, the cave was almost completely filled with sediments; the original excavations emptied almost two-thirds of the site (Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997).

El Castillo contains the most complete stratigraphic sequence in Paleolithic Europe, with 26 levels of occupations spanning from the Acheulean to the Azilian (Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010). The site demonstrates clear stratigraphy, with black organic cultural layers easily distinguished from sterile red layers in an alternating sequence (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera et al. 2001; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997).

During the early excavations, Obermaier excavated a key section from the centre of the overhang in the rockshelter's entrance area down to a depth of 18 m (Butzer 1981; Churchill and Smith 2000; Obermaier 1924). As a result, he identified three cultural levels with Aurignacian artefacts: layers 'o' and 'm,' which were thought to be late Aurignacian levels, and layer 'h' or 'Aurignacian Delta,' which were thought to represent the earliest Aurignacian at the site, overlying the Mousterian layers (Churchill and Smith 2000). Horizontal exposures were practiced during excavation, and each occupation level was treated as a distinct cultural unit (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera 1984; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997).

Early excavations at the beginning of the 20th century lacked in methodology and recording standards that are currently in practice (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera et al. 2001; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997). Obermaier took extensive field logs, photographic archives, drawings, and sketches, which aided further study of the site (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera 1984; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997).

Obermaier died in 1946, unable to complete his study of the materials at El Castillo (Cabrera Valdés, Bernaldo de Quirós, and Maíllo Fernández 2006). These materials, along with Obermaier's unpublished notes and extensive archives, remained unstudied until 1978, when V. Cabrera examined them for her doctoral research (Butzer 1981; Cabrera Valdés, Bernaldo de Quirós, and Maíllo Fernández 2006). Cabrera's research confirmed the stratigraphy raised by Obermaier and analyzed occupations related to the Middle-to-Upper Paleolithic transition (Cabrera Valdés 1984; Cabrera Valdés, Bernaldo de Quirós, and Maíllo Fernández 2006).

In the 1980s, under the direction of Cabrera, further excavations were conducted at El Castillo, concentrating instead on the outer zone, rather than the internal area of the early excavations (Bernaldo de Quirós and Maíllo-Fernández 2009; Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010). These recent excavations intended to analyze the activities and occupations of level 18 in order to determine the nature of the MP-UP transition at the site (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997). Prior to the recent excavations, the exterior portion of the cave was partly covered, as both the result of a rock fall and

the construction of a parking lot, which was cut back during excavations (Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997). Using photos of prior excavations pertaining to the interior portion of the cave, excavators were able to match levels to those of the new excavations (Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997).

The new excavations respected Obermaier's original enumeration systems and overall terminology, though the levels have been renamed over time (see Table 3.1), and it is now possible to differentiate multiple distinct occupation levels within the Obermaier's original site plan (Bernaldo de Quirós and Maíllo-Fernández 2009; Butzer 1981; Cabrera et al. 2001; Cabrera Valdés 1984; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997). These new excavations divided Obermaier's Unit 18 (Aurignacian Delta) into sublevels 18b and 18c, which Cabrera identified as 'Transitional Aurignacian' (Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010). Obermaier's original Alpha Mousterian, Unit 20, was subdivided into levels 20 a/b, 20c, 20d, and 20e (Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010).

3.2 Site Significance

El Castillo is a key site for archaeologists, as it contains 18-20 m of deposits, representing occupations for 150,000 years or more, spanning the entire Paleolithic period (Bahn 2012; Pimentel and García-Diez 2013). El Castillo has been argued to have been a place of social importance, due to intensive occupations for thousands of years

(Cabrera Valdés 1984; Cabrera Valdés et al. 2006). This is demonstrated by the density, richness, and importance of the archaeological data uncovered during the 1910-1914 excavations, and by the presence of a large quantity of game during the MP-UP transition and the UP at the site (Cabrera Valdés 1984; Cabrera Valdés et al. 2006). The density of rock art in El Castillo also supports the theory that this site was a social epicenter, especially during the UP (Cabrera Valdés 1984).

Figure 3.1. Negative hand print from the Panel de las Manos, El Castillo. Courtesy of D. and G. von Petzinger.

El Castillo cave contains numerous engravings and paintings in various pigments, both figurative and non-figurative, spanning nearly the entire UP (González Sáinz, Cacho Toca, and Fukazawa 2003). The art covers a full range of themes, techniques, and styles,

and features more than 100 images within multiple chambers, with over 1 km of galleries in total (Bahn 2012; García-Diez et al. 2015; Pike et al. 2012). Figurative art at the site includes engravings and drawings of bovids, horses, ibex, and deer, while non-figurative depictions include numerous dots, hand stencils (see Figure 3.1), and lines, coupled with quadrilateral and other geometric signs (Bahn 2012). Images in the cave have been painted in red, black, white, and yellow, and many of the images enhance the shapes of the cave walls or other natural features (Bahn 2012; Pimentel and García-Diez 2013). The art in the cave dates from beyond 40,000 years to 4,500 years, containing some of the oldest known paintings in the world (Pike et al. 2012; Pimentel and García-Diez 2013).

Some researchers argue that the archaeological remains at El Castillo show a clear continuity in technological, subsistence, and settlement between the late Mousterian, Châtelperronian, and Archaic/Lower Aurignacian (Cabrera Valdés et al. 2006; Garralda 1997; Lloret Martinez de la Riva and Maíllo Fernández 2006; Straus 1997, 2005a). An age of 40,000 BP has been proposed for the early Aurignacian in Northern Spain, implying a long period of spatial and temporal overlap between the Mousterian, Early Aurignacian and Châtelperronian in Cantabria (Bar-Yosef 2002; Garralda 1997; Rink et al. 1997). Human remains are scarce and lack key documentation in Cantabria, so it is largely uncertain which species created each assemblage (Straus 1997, 2005a).

3.3 Site Chronology and Archaeological Record

El Castillo contains 26 layers, alternating between occupation and sterile levels, extending to a depth between 18-20 m (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera 1984). These include two early Middle Paleolithic, one Upper Acheulian, two Mousterian, two Aurignacian, two Upper Perigordian, one Middle Solutrean, three Magdalenian, and one Azilian layer (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera 1984; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997; Cabrera Valdés, Bernaldo de Quirós, and Maíllo Fernández 2006).

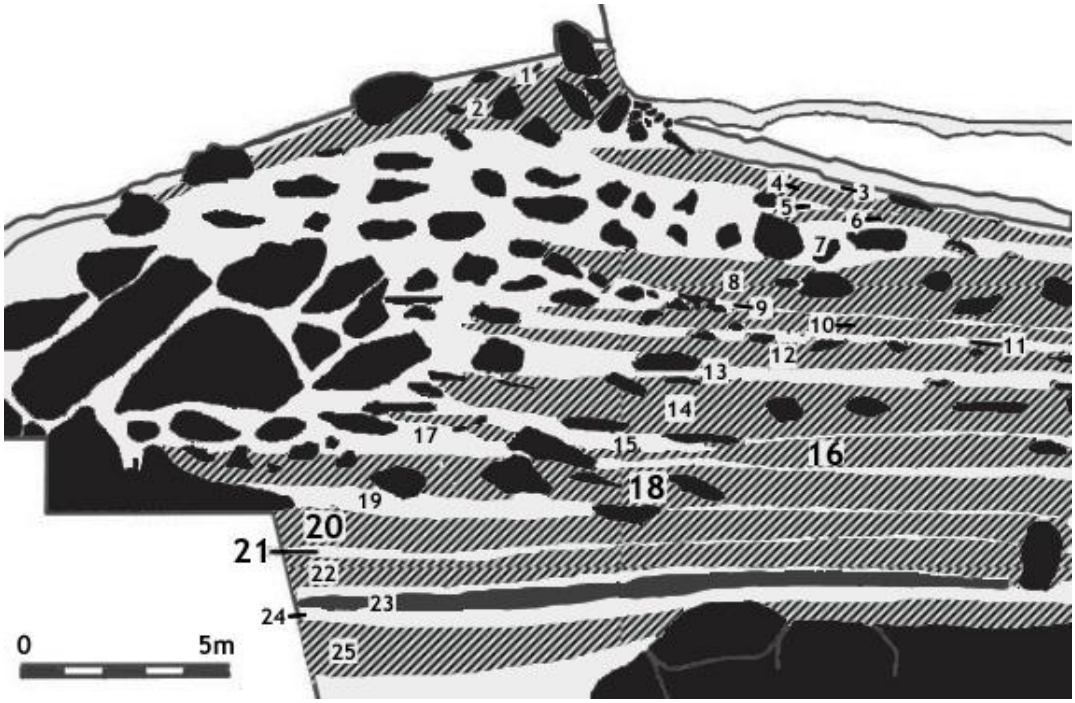

Figure 3.2 Stratigraphy of El Castillo. After Cabrera, Pike-Tay, and Bernaldo de Quirós (2004). Digital illustration by Robyn S. Lacy.

Although determining a chronology at El Castillo is difficult, particularly with regards to the time period of the Middle-to-Upper Paleolithic transition at the site, both relative and chronometric dates have been produced for the occupation layers. A date of 120,000 BP has been suggested for level 25 at the site, and level 23 has been directly dated to 89,000 BP by Uranium-series dating (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004). Mousterian layers 21 and 22 at the site have yielded ESR dates of 70,000 BP combined (Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010; Cabrera, Pike-Tay, and Bernaldo de Quirós 2004; Rink et al. 1997). Mousterian level 20a has been AMS radiocarbon dated to between 43,300 +/-2900 and 39,300 +/- 1900 BP (Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010).

Table 3.1. Comparison of archaeological sequences at El Castillo. Adapted from Cabrera Valdés (1984: 390).

H. Obermaier (1910-1914)	**H. Obermaier (1916-1924)**	**H. Obermaier (1925)**	**V. Cabrera (1978)**
Aurignacian Gamma	k	Q	16
Sterile level between Gamma and Delta	i	R	17
Aurignacian Delta	h	S	18b, 18c
Sterile level of stalagmitic crust	g	T	19
Mousterian Alpha Superior and Inferior	f	U	20 a/b, c, d, e
Yellow silt layer between Mousterian A and B	e	V	21
Mousterian Beta	d	W	22

As the most recent excavations at the site focused on the Middle-to-Upper Paleolithic transition, a complete series of dates is available for level 18, considered to be

a Transitional Aurignacian level (Bernaldo de Quirós and Maíllo-Fernández 2009). AMS radiocarbon dating has provided a date of between 42,200 and 39,800 BP for the base of level 18c, and 40,700-37,000 BP for the base of level 18b; these dates are also confirmed by ESR dating (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera et al. 2001; Morán and Tejero 2006; Rink et al. 1997). As the earliest Aurignacian transitional industry at the site is dated to 42,200 BP, this has been argued by some researchers to confirm an exceptionally early Aurignacian at the site, preceding the Châtelperronian (Cabrera et al. 2001; Bernaldo de Quirós and Maíllo-Fernández 2009), though this has been contested (Camps 2009; d'Errico and Stringer 1999). The dates provided for the late Mousterian, the Middle-to-Upper Paleolithic transition, and the Aurignacian at the site demonstrate that these time periods all fell within Oxygen Isotope Stage 3 (OIS 3) Würm Interpleniglacial, and may demonstrate the correlation of a heavier occupation at the site with warmer climatic events (Garralda 2006; Straus 2005a). Although El Castillo was occupied for nearly every period of the Paleolithic, the remainder of this chapter will focus on the Late Mousterian, Transitional Industries, and Early Aurignacian at the site, as these correspond most closely with the focus of this thesis- the existence and activities of late Neandertals and early AMH arrival at the site.

3.3.1 Mousterian Industry

In the European archaeological record, the appearance of Levallois *débitage* methods is considered a distinctive sign of MP sites (Bernaldo de Quirós, Sánchez-

Fernández, and Maíllo-Fernández 2010). Mousterian remains on the Iberian Peninsula, and most or all of Europe, have been found to be associated mostly with Neandertals (Garralda 1997). The Mousterian industry at El Castillo is represented by level 20, which was originally called Mousterian Alpha (or Mousterian A) by Obermaier (Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010; Cabrera Valdés 1984). AMS radiocarbon dates have been reported as 43,300-42,000 BP +/- 3800BP for the top of level 20 (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004). The layer is characterized by a large collection of tools presenting technical features indicative of the lower Levallois; the layer also displays the presence of hearths and work shop areas (Cabrera Valdés 1984). Repeated use of hearths in the Mousterian levels at El Castillo have been taken as evidence of intrasite spatial organization (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004).

The Mousterian industry can be characterized by its differing knapping and production techniques, including discoid, Quina, and laminar methods, all showing a degree of complexity similar to that of Levallois technology (Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010). The lithic industry of level 20 is characterized by a richness in side scrapers, few denticulates, and very little evidence of Quina-type retouch (Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010; Rink et al. 1997). Dufour-esque bladelets have been recovered from the level, along with cores and *débitage* representative of every step of the *chaîne opératoire* (Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010; Cabrera, Pike-Tay, and Bernaldo de Quirós 2004).

Level 20e is considered to represent the typical Mousterian, with cleavers being the characteristic feature present (Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010). A reductive strategy for cleaver flakes is present in the level, for which coarse-grained raw materials, such as sandstone and diabase, were utilized (Cabrera Valdés et al. 2006). The main reduction strategy in Unit 20 is the discoidal approach, with both unifacial and bifacial techniques utilized; the latter has been shown to utilize coarse-grained raw materials, which would have been useful for the extraction of thicker, longer blanks, to produce elaborate cleavers (Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010; Cabrera Valdés et al. 2006). Bladelet production at the end of the Mousterian at El Castillo is one of the most interesting in Cantabria, with bladelets opportunistically reduced from waste blanks (Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010). Some bladelets at El Castillo bear wear marks, along with possible indications of hafting (Cabrera Valdés et al. 2006). Though Mousterian assemblages of Cantabria tend to display typological monotony, "the inherent limitations of the quality of local raw material can be regarded as a catalyst for technological innovations that form the basis of all Upper Paleolithic industries that follow" (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004: 438). Both unipolar and bipolar prismatic cores were used in bladelet production in Mousterian levels 20 and 21 at El Castillo; this has been argued to show a clear relationship with the method used to produce carinated endscrapers in Aurignacian levels 18c and 18b at the site (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004).

The fauna of level 20 indicates a predominance of red deer, large bovids (bison), horse, and small bovids (ibex and capra), which would have provided the main source of protein, fat, skins, and other animal products during the MP in Cantabria (Cabrera Valdés 1984; Cabrera, Pike-Tay, and Bernaldo de Quirós 2004). Additionally, the remains of wild boar, rhinoceros, and cave bear have been recovered within the Mousterian levels, along with migratory birds, raptors, and several types of fish (Cabrera Valdés 1984; Cabrera, Pike-Tay, and Bernaldo de Quirós 2004). Faunal analysis suggests year-round hunting throughout the MP and Early Upper Paleolithic (EUP) at El Castillo (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004). Seasonal patterning differs slightly from the Mousterian to the Early Upper Paleolithic at the site, with the majority of animals in Mousterian levels hunted from late Fall through Spring, while in the EUP, the majority of animals were hunted from Winter through Spring, suggesting a slightly more limited season of occupation during this period (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004). Prime-aged animals dominate both Mousterian and Early UP occupations, and the mortality profile of prey remains constant through the MP-UP transition (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004). There is no evidence that Early Upper Paleolithic occupants at El Castillo were any more or less effective at targeting a particular age group of animals than the prior Mousterian occupants (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004).

It has been argued that there is convincing evidence in the Middle Paleolithic levels at El Castillo for the roots of cultural, technological, and behavioural traits once thought to characterize the UP, demonstrating behavioural similarities between the late

Mousterian and early UP occupants of the site (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004:455). Neandertals at the site have been argued to have had a sophisticated pattern to manage time and space, along with similar symbolic capabilities to AMH (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004:455). This is partially indicated by the presence of red and yellow ochre in Mousterian deposits onsite, that, according to Hugo Obermaier (1924:211), might have been used as body adornment, in a similar manner to AMH. Additionally, some decorated pieces present in Mousterian levels at El Castillo may indicate that Neandertals created symbolic or communicative objects (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004).

3.3.2 Aurignacian and Transitional Industries

Level 18 and level 16 at El Castillo have been classified as Aurignacian levels due to the presence of a high scraper index and split-based bone points in each level (Cabrera Valdés 1984). Level 16 is considered to represent a true Aurignacian level, whose occupants were AMH, while level 18 is thought to represent a transitional industry, whose occupants are unknown and have been the subject of much debate (Cabrera Valdés 1984). On average, dates for level 18 range between 40,000-38,000 BP (Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997; Rink et al. 1997; Straus 1997). The earliest AMS radiocarbon date for sublevel 18b is 37,100 +/- 2200 BP, and the earliest for sublevel 18c is 42,200 +/- 2100 BP (Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997).

What was first known as layer ‘h’ (‘Mousterian Alpha’) in Obermaier’s excavations is now known as level 18 (‘Aurignacian Delta’); it contains an assemblage characteristic of the basal Aurignacian of Cantabria (Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010; Cabrera Valdés 1984; Churchill and Smith 2000). Artefacts in this level include split-based bone points and other bone and antler elements (which are more common in the lower portion of the layer), Aurignacian blades, carinated and nosed scrapers, and dihedral burins (Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010; Cabrera Valdés 1984; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997; Churchill and Smith 2000; Obermaier 1924). A Châtelperronian point was also uncovered from this level (Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010; Cabrera Valdés 1984; Churchill and Smith 2000). AMS radiocarbon dating of charcoal from the layer yielded dates ranging from 40,000 +/- 2,100 to 37,700 +/- 1,800 BP (Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010; Cabrera Valdés 1984; Churchill and Smith 2000). During the new excavations, level 18 was subdivided into 18b and 18c (Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997; Cabrera Valdés, Bernaldo de Quirós, and Maíllo Fernández 2006).

It is now believed that the transition from Middle to Upper Paleolithic cultures occurred in level 18 (Cabrera Valdés 1984). Levels 18b and 18c are considered by some researchers to be ‘Transitional Aurignacian’ levels, similar to other transitional industries in Europe (e.g. Châtelperronian and Uluzzian), as they exhibit characteristics typical of

both Mousterian and Aurignacian industries (Cabrera Valdés, Bernaldo de Quirós, and Maíllo Fernández 2006; Garralda 2006; Morán and Tejero 2006).

The typological composition of level 18 shows no significant differences between sublevels 18b and 18c, although level 18b is slightly richer in artefacts and contains somewhat more varied tools (Bernaldo de Quirós and Maíllo-Fernández 2009). The industry is similar in level 18 from one sublevel to the next, featuring simple and carinated endscrapers, dihedral burins, and an abundance of side scrapers (Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997). Both recent and early excavations uncovered a high incidence of Aurignacian-type endscrapers with carinated or nosed forms, some which exhibited the same retouching techniques as Quina side scrapers, along with a scarcity of burins (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera Valdés 1984; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997). The level also contained a high frequency of archaic (Mousterian-like) artefacts, among which side scrapers were especially common (Cabrera Valdés 1984; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997). An atypical Châtelperron point made of quartzite was also recovered (Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997:181). Aurignacian blades are present in moderate numbers throughout the level (Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997).

A large number of retouched tools are present in levels 18b and 18c, including side scrapers, endscrapers, and denticulates (Bernaldo de Quirós and Maíllo-Fernández 2009). The majority of cores were quartzite, knapped employing a uniform discoidal technique; this technique also proves abundant within Mousterian levels at the site

(Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera Valdés 1984). The predominant raw materials utilized at El Castillo during the Paleolithic were black Jurassic limestone from the streambeds surrounding the Pas River valleys, ophite from a nearby outcrop, and high-quality, fine-grained Cantabrian quartzite (Bernaldo de Quirós and Maíllo-Fernández 2009; Butzer 1981; Cabrera, Pike-Tay, and Bernaldo de Quirós 2004; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997). Stone debris suggests there was a waste area or disposal site near the living area; additional evidence suggests the presence of a butchering area and hearths in the level (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera Valdés et al. 2006; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997).

The most common fauna present in level 18 are deer, large bovines, and horses; straight-tusked elephants, rhinoceros, cave bear, various felines and canines, and migratory birds, such as woodcock and waterfowl, were also found in the level (Cabrera Valdés 1984). Additionally, a large tooth belonging to a sperm whale was uncovered in the level; this was likely collected from a beached animal (Cabrera Valdés 1984). Year-round occupation and hunting at the site is suggested by fauna, though in level 18c, more animals appear to have been killed in the Spring than in any other season (Cabrera Valdés et al. 2006). Although animals of various ages were hunted by the occupants of level 18, prime-aged ones dominate the assemblages of both the Mousterian and Aurignacian levels at the site (Cabrera Valdés et al. 2006) Rich concentrations of lithic and faunal materials in level 18, along with a more focused seasonal hunting emphasis, may indicate

larger-scale occupation of the site in the Spring, and possibly represent the use of El Castillo as an aggregation site (Cabrera Valdés et al. 2006).

Strong technological ties have been suggested between IUP and MP groups in the Cantabrian region, in part due to similarities in percentages of particular tool types between the two (e.g. side scrapers, denticulate tools, and notches between the Mousterian and Transitional Aurignacian at El Castillo) (Bernaldo de Quirós and Maíllo-Fernández 2009). Some authors have argued for a clear continuity in the production of bladelets from level 21 through level 16 at El Castillo (Cabrera Valdés et al. 2006). Bone and antler industry is present throughout level 18, and has been demonstrated in both the new and old excavations (Bernaldo de Quirós and Maíllo-Fernández 2009). Ten split-based bone points with oval cross-sections were recovered from the level during the Obermaier's early excavations (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera Valdés 1984; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997). In sublevel 18b, mammoth bones and tusks, along with a deer antler handle and a perforated bear canine were recovered (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997). Two distal fragments of spear heads manufactured from deer antler, elongated antler splinters (the by-products of spear-making), a fish hook made from a bone fragment (similar to Aurignacian objects found at Abri Castanet, France), and an awl made from a bone splinter were recovered from sublevel 18c (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997). Engravings on antler and bone objects have been found throughout level 18 (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera

Valdés 1984). The distal end of a bone chisel in sublevel 18c contains a regular series of horizontal lines, resembling similar objects from early Aurignacian sites in other parts of Europe, and possibly signifying hunting tallies (Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997:183). Additional engraved objects in the level include bone fragments bearing various incisions, punches, and two possible zoomorphic representations, one on a piece of diaphysis and one on a deer hyoid (Cabrera Valdés, Bernaldo de Quirós, and Maíllo Fernández 2006). Most of the bone and antler industry in the level comes from the base of sublevel 18c, suggesting that this industry was present at the beginning of the formation of level 18, and possibly signifying continuity with underlying occupations (Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997:185).

As the lithic and bone industry of level 18 displays a "technological affinity with the underlying Quina Mousterian" (Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997:185) but also an abundance of typical Aurignacian tool types, this level has been argued to represent an *in situ* Middle-to-Upper Paleolithic transition at El Castillo; continuities in this behaviour and technology are seen through level 16 (Cabrera Valdés 1984; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997:185). As Aurignacian behaviours and technologies developed gradually at El Castillo, with their roots in Mousterian industries, this local transition is argued to demonstrate that Neandertals transitioned to Upper Paleolithic cultures and technologies independently of the influence of invading AMH groups, prior to their arrival in the region (Bernaldo de

Quirós and Maíllo-Fernández 2009; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997).

Other archaeologists have criticized this interpretation, arguing that level 18 is likely a palimpsest containing a complex depositional history, in part due to rock fall evidence for the outside area, where the new excavations were conducted (Zilhão 2006a; Zilhão and d'Errico 1999). These researchers have suggested that, rather than assigning all of level 18 at El Castillo to a homogeneous Aurignacian, instead (in concurrence with Obermaier's original suggestion), the level is composed of a minimum of two stratigraphic units: a Mousterian or Châtelperronian unit, and an Aurignacian unit (Zilhão 2006a; Zilhão and d'Errico 1999). The multicomponent nature of the level, they contend, explains the presence of both MP and UP tools in the level, as well as the variety of dates and the presence of possible archaic human remains (Zilhão 2006a). Other researchers have agreed that level 18 demonstrates a continuity in lithic reduction systems over several different cultural periods, but argue that this is a reflection of the shape and quality of available local raw materials, rather than of cultural continuity and knowledge transfer (Pastoors and Tafelmaier 2013).

3.3.3 Occupation of the Site by Neandertals and Anatomically Modern Humans

As we have seen, continuity in technology and subsistence strategies has been suggested between the Mousterian and Aurignacian at El Castillo (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós

1997; Pastoors and Tafelmaier 2013). This has been suggested to be either due to the availability of local resources (Pastoors and Tafelmaier 2013), or to represent an independent local transition in Neandertals to UP behaviours and technologies (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997). The stratigraphic integrity, interpretation of bone industry, and occupants of level 18 have been extensively debated by researchers (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997; Pastoors and Tafelmaier 2013; Zilhão 2006a; Zilhão and d'Errico 1999). As level 18 corresponds to possible symbolic objects and artistic representations in the cave, understanding which species was present at El Castillo during this period is of great importance in this discussion.

Human remains, including an infant jaw and an adult molar, were recovered from level 18 during Obermaier's early excavations, and were originally housed at the Museum of Prehistory and Archaeology in Santander, Cantabria (Cabrera Valdés 1984; Garralda 1997, 2006; Obermaier 1924). Unfortunately, the whereabouts of the fossils is now unknown, as they have been misplaced from the museum; however, they were analyzed and documented by H.V. Vallois prior to their disappearance, who at the time was professor of anatomy at the University of Toulouse, France, and later became director of the Institut de Paléontologie Humaine in Paris (Garralda 2006). Vallois' documents and analysis were archived and later extensively reviewed by V. Cabrera as part of her research on the MP-UP transition at El Castillo (Cabrera Valdés 1984; Garralda 2006). A number of features have been noted by scholars to demonstrate that

these remains were likely to be Neandertal remains; a lack of a mental prominence (chin), along with tooth cusp morphology, large tooth dimensions, and overall robustness of the cranial remains, have been stated to be more similar to Neandertals than to AMH populations (Garralda 2006). As the remains from El Castillo apparently fall within the ranges of variation for both Neandertals and for early modern Europeans, it is difficult to make a taxonomic diagnosis (Churchill and Smith 2000; Garralda 2006). As these remains are missing, we are unable to study them further to obtain more information regarding which species they belonged to (Churchill and Smith 2000; Garralda 2006). Because there is scarce fossil evidence for the time period of the MP-UP transition at El Castillo, it is very difficult to be certain of which species created which industries at the site, or to be certain of when the species co-existed at the site.

Some researchers have noted that, despite the unknown taxonomic status of the makers of level 18 at El Castillo, all other significant remains from the time period in question (43,000-36,000 BP) in Europe have been Neandertal (e.g. St. Cesaire and El Sidrón) (Garralda 2006). Additionally, while all Iberian fossils associated with Mousterian industries have been classified as Neandertal, some exhibited features that could be classified as evolved or modern (Garralda 1997). The earliest known AMH in Europe is at the site of Oase, Romania, dating to 35,000 BP; 4,000 years more recent than the individuals found in level 18 at El Castillo, and geographically distant (Garralda 2006; Zilhão 2013). Although this should be taken into account when considering the makers of level 18 at El Castillo, we cannot be certain who authored the early northern Spanish Aurignacian technologies, as the only remains found were undiagnostic and were

lost without further study or publication (Garralda 2006; Mellars 1999). Additionally, the cultural variability present during the Middle-to-Upper Paleolithic transition in Iberia (50,000-30,000 BP), may be linked to the co-existence of both AMH and Neandertals in the region, though this is also dependent on scarce fossil evidence; therefore, it is very difficult to draw concrete conclusions about the species present at El Castillo during this time frame (Garralda 1997).

3.4 Prehistoric 'Art' During the Middle-to-Upper Paleolithic Transition

Although there is relatively scant evidence of portable or parietal 'art' during the Middle-to-Upper Paleolithic transition, especially on the Iberian Peninsula (Straus 1997), El Castillo is one of few sites to show some remains that can be defined as 'artistic' and 'symbolic' behaviours at the time (Cabrera et al. 2001; Cabrera Valdés, Hoyos Gómez, and Bernaldo de Quirós 1997). Additionally, the recent re-dating of a cave painting at El Castillo to a minimum age of 40,800 BP (Pike et al. 2012) has intrigued select researchers (e.g. Pike et al. 2016; Rodríguez-Vidala et al. 2014; Zilhão 2013) and fueled some debate surrounding the artists at El Castillo (see Pike et al. 2016; Pons-Branchu et al. 2014; Sauvet et al. 2015; Zilhão 2013), as this date falls within a time when Neandertals may have been in the area. As the occupants of the site during the MP-UP transition are still relatively unknown, the presence of artistic objects and symbolic behaviours at the site may signify either that Neandertals were exhibiting these behaviours, or that AMH possessed these complex behaviours as part of their repertoire

upon arrival in the region. It may also signify co-occupation and co-operative behaviours between the two species at the site. In any case, a further examination of the types of 'art' and symbolic objects present at El Castillo during the Middle-to-Upper Paleolithic transition may provide a greater understanding of the initial development of these behaviours in the region, and the species who created them.

3.4.1 Portable 'Art' Objects

A number of objects recovered from level 18 at El Castillo have been argued to signify symbolic and artistic behaviour. These objects include incised and colored pieces of bone and antler (interpreted as portable 'art'), perforated objects designed for suspension, an incised distal fragment of a chisel, an engraved sandstone plaquette, and red ochre present on bone industry and in various places throughout the level (Bernaldo de Quirós and Maíllo-Fernández 2009; Giménez de la Rosa 2006).

A pierced and grooved bear canine with anthropic incisions from the root to the crown has been recovered from sublevel 18b at El Castillo (Morán and Tejero 2006). Although this object has been interpreted as a pendant, as it appears to have been adapted for suspension, further optical microscopic analysis is necessary before conclusive statements can be made (Morán and Tejero 2006).

A fragment of a red deer metapodial shaft, bearing a series of anthropic parallel incisions, was recovered from sublevel 18c (Bernaldo de Quirós and Maíllo-Fernández

2009; Morán and Tejero 2006). Three deep, irregular incisions are situated in the middle of the fragment; two are parallel, and one is oblique, diverging away from the others (Bernaldo de Quirós and Maíllo-Fernández 2009; Morán and Tejero 2006). Microscopic analysis has shown the internal morphology of the incisions to be v-shaped, likely created using a lithic tool with a thick edge (Bernaldo de Quirós and Maíllo-Fernández 2009; Morán and Tejero 2006). The pattern of the incisions does not correspond to butchering activities, and the marks have been argued to be non-functional, and possibly symbolic (Bernaldo de Quirós and Maíllo-Fernández 2009; Morán and Tejero 2006).

A triangular fragment of a sandstone plaquette was also recovered from level 18 (Bernaldo de Quirós and Maíllo-Fernández 2009). This artefact bears four deep engravings on its flattest surface; these engravings are internally u-shaped in section, and are thought to have been created using a thick-edged lithic tool (Morán and Tejero 2006). Some authors have interpreted this object as portable 'art', with a major incision running from the vertex of the triangular piece, aligned on its long axis, and oblique traces and notches on its edges (Morán and Tejero 2006).

Two objects found in level 18 at El Castillo are believed by some researchers to represent early figurative 'art' (Bernaldo de Quirós and Maíllo-Fernández 2009; Morán and Tejero 2006). Recovered from sublevel 18b was a fragment of a red deer hyoid bone decorated with engraved lines and pigment on its upper face (Bernaldo de Quirós and Maíllo-Fernández 2009). The object was intentionally decorated with painted traces and engravings, which have been argued to represent the front leg of an animal (Bernaldo de Quirós and Maíllo-Fernández 2009; Morán and Tejero 2006). However, the fragment is

incomplete, and a portion of the decoration was lost as a result (Morán and Tejero 2006). Microscopic and chemical analysis has demonstrated the presence of manganese inside of the engraved lines on the object; it has been suggested that the manganese was used in pencil form, leaving the incision behind (Bernaldo de Quirós and Maíllo-Fernández 2009; Morán and Tejero 2006).

A flat bone fragment decorated with painted lines on the outer surface, interpreted by some researchers as a figurative representation of an animal head, has also been recovered from level 18 (Bernaldo de Quirós and Maíllo-Fernández 2009; Morán and Tejero 2006). Scanning Electron Microscope (SEM) analysis has detected the presence of natural pigments (graphite) on the object (Bernaldo de Quirós and Maíllo-Fernández 2009; Morán and Tejero 2006). Some researchers have argued that claims for figurative portable 'art' in El Castillo level 18 are unconfirmed, as the evidence is rather ambiguous and incomplete (Zilhão 2007). However, possible symbolic evidence in El Castillo is similar to that found in other sites with the same chronology.

3.4.2 Parietal 'Art'

Although there are examples of portable 'art' and personal ornaments dating back to the MP, parietal 'art,' or cave 'art,' is very rare before the UP in Europe. Though an engraving has recently been discovered at Gorham's Cave, Gibraltar, dating to 39,000 cal BP (Rodríguez-Vidala et al. 2014), evidence for rock 'art,' and especially paintings, in Europe during this time frame is scant. Aside from this engraving, the only other

possibility for Neandertal parietal 'art' is a painted disk at El Castillo which dates to the Middle-to-Upper Paleolithic period (García-Diez et al. 2015; Pike et al. 2012).

3.4.2.1 A 40,800-Year-Old Painted Disk

Recent re-dating of calcite overlaying a red painted disk on the Panel de las Manos at El Castillo cave has yielded a minimum age for the 'art' of 40,800 BP (Pike et al. 2012; Pike et al. 2016). This makes the disk the oldest known cave painting in Europe, and places it among the oldest known 'art' in the world (Pike et al. 2012; Pike et al. 2016). As this date very closely coincides with the arrival of the first Proto-Aurignacian (and presumably the first AMH groups) in the region, some time between 43,000 and 42,00 cal BP (Pike et al. 2016; Pons-Branchu et al. 2014), a debate surrounding which species created this painting has been at the forefront of Paleolithic art research in recent years. A minimum age of 40,800 BP for the painting at El Castillo reveals that either cave 'art' was already a part of the culture of the first AMH groups in the region, or, as has been suggested by some archaeologists, that Neandertals may have been the authors of some of the first known cave paintings (Pike et al. 2012). At the very least, the 'art' is Early Upper Paleolithic in age, and its creation falls close to a time when both the first AMH groups and last Neandertal groups were in the area, posing interesting questions regarding the authorship of the 'art' (Pike et al. 2016).

Uranium-series (U-series) dating is considered by some researchers to be the least controversial and most reliable of all available chronometric dating methods used for

rock art (Pettitt and Pike 2007; Pike et al. 2012, 2016). However, it has also been noted that this method is still rather experimental in nature, especially with regards to dating rock art, and, like all absolute dating techniques, is problematic (Pons-Branchu et al. 2014; Sauvet et al. 2015). This technique allows for dating of thin calcite layers, which form on the surfaces of rock engravings or paintings, by measuring uranium isotopes (Pettitt and Pike 2007; Pike et al. 2012). This method has an advantage over other chronometric techniques, such as AMS radiocarbon dating, as it can provide dates for engravings and other art that does not contain organic pigment, such as charcoal or organic paint components (Pettitt and Pike 2007; Ochoa and García-Diez 2015). Many Paleolithic paintings and engravings lack these organic components, and have previously been unsuitable for AMS dating; in recent years, U-series dating has been able to provide accurate dates for these art works (Ochoa and García-Diez 2015; Pike et al. 2012). Uranium-series dating requires small sample sizes (of less than 10 mg), minimizing damage and conservation issues (Ochoa and García-Diez 2015; Pike et al. 2012; Pike et al. 2016). This method is especially useful as it is possible to obtain samples which have a direct stratigraphic relationship with the art, and can sometimes be used to obtain a series of dates in stratigraphic order through a section of calcite, providing a minimum age for the art (García-Diez et al. 2015; Ochoa and García-Diez 2015; Pettitt and Pike 2007; Pike et al. 2012, 2016).

In many cases, engravings or paintings lie directly between two calcite formations, allowing for both minimum and maximum ages for the art to be ascertained (García-Diez et al. 2015; Ochoa and García-Diez 2015; Pettitt and Pike 2007; Pike et al.

2012; Pike et al. 2016). Although a minimum age can be determined for the art, as the painting cannot be younger than the calcite formation covering it, it is difficult to determine the delay between the creation of the painting and the formation of the calcite, so the art may be much older than the calcite covering that overlies it (Pike et al. 2012). Accurate dating of cave 'art' should be helpful in attempting to determine when the first cave art was created and by who (Pike et al. 2012). However, the lack of associated archaeological and fossil remains at El Castillo makes assigning a species to the 'art' creation difficult; this is complicated by uncertainties in the chronology of the MP-UP transition in terms of the taxonomic affiliation of those involved (Rodríguez-Vidala et al. 2014). As we currently only have a secure minimum age for the 'art' at El Castillo, but no maximum age has yet been produced, we cannot rule out that it was created by Neandertals (García-Diez et al. 2015). However, it also cannot be concluded that Neandertals were responsible for the 'art,' as AMH were entering the region at the time; in order to determine with reasonable certainty that Neandertals were the authors, calcite ages predating the arrival of AMH in Northern Spain (42,000-43,000 cal BP) would need to be obtained for the 'art' (García-Diez et al. 2015).

In addition to the minimum age of 40,800 BP obtained for the red disk at El Castillo (see Figure 3.2), a minimum age of 37,300 BP for a nearby red negative hand stencil was also obtained (García-Diez et al. 2015; Pike et al. 2012; Pike et al. 2016). It has been argued that, as they occur in the same contexts (being the first themes on cave walls in all instances of superpositions) on the same panel, using the same techniques and colors, images of hand stencils and disks were likely contemporaneous (García-Diez et al.

2015; Ochoa and García-Diez 2015; Pike et al. 2012). The minimum age for the red disk (40,800 BP), then, may represent the minimum age for the entire composition, including 40 hand stencils, dozens of large disks, and oval and rectangular signs (García-Diez et al. 2015; Pike et al. 2012). This would imply that the initial phase of cave 'art' in Europe was non-figurative, with figurative art not confirmed until about 32,000 BP (García-Diez et al. 2015; Ochoa and García-Diez 2015; Pike et al. 2012).

Figure 3.3. U-series sample location of the red stippled disk on the Panel de las Manos, El Castillo. After Pike et al. (2012). Digital illustration by Robyn S. Lacy.

If these paintings date to just shortly before 40,800 BP, and AMH were the authors of the Proto-Aurignacian, this supports the hypothesis that AMH brought cave art with them into Western Europe upon their arrival at 41,500 cal BP (Pike et al. 2012). However, since the age provided is only a minimum age, it cannot be ruled out that this 'art' was created earlier, and that the earliest paintings at El Castillo represent the symbolic expressions of Neandertals, who were present in Cantabria until at least 42,000 cal BP (Pike et al. 2012). If this were the case, then at least some of the hand stencils were Neandertals,' and the other non-figurative signs on the panel were likely also their creations (García-Diez et al. 2015).

Pike et al. (2012)'s dating and conclusions have been criticized as being unreliable due to open-system behaviour of calcite causing a leaching of Uranium (Pons-Branchu et al. 2014). However, Pike et al. (2016) have argued in response that such open-system behaviour is an exception, not a rule, and that the criticisms proposed by Pons-Branchu et al. (2014) introduce a misleading bias into the debate, as they provide a few exceptional examples and make generalizations based on them (Pike et al. 2016). It has also been argued that the dates provided for the red painted disk at El Castillo fall well within the confines of the Early and Proto-Aurignacian (and therefore, AMH) in the region, and that there is no basis for an interpretation of these dates to include the possibility of Neandertal authorship (Pons-Branchu et al. 2014). This and other criticisms put forth by Pons-Branchu et al. (2014), have been argued to be oriented towards their desire for the U-series dates provided by Pike et al. (2012) to be younger (Pike et al. 2016).

Although Pike et al. (2016) caution that researchers should make no assumptions about the creators of this 'art,' they also note that it cannot be ruled out that Neandertals created it, as to rule this out would be a subjective interpretation that Neandertals were unable to create paintings, when there is currently no evidence to support this (Pike et al. 2016). Though there is currently no dating evidence which directly supports painting of caves by Neandertals, it is important to keep in mind, in this case, that archaeological theory is often overturned by discoveries of particular behaviours and artefacts after long periods of apparent absence (Pike et al. 2016). After all, it was not long ago that there was no accepted evidence for Neandertal use of pigment or creation of bone tools (Pike et al. 2016). Evidence now demonstrates that Neandertals curated and used pigments and frequented deep caves; this, combined with a considerable lack of chronometric dating for the majority of cave 'art,' provides the possibility that Neandertals created at least some of the 'art' (Pike et al. 2016).

It is possible that the 'art' at El Castillo is actually much older than the U-series dates provided, as the researchers followed a sampling protocol where they did not collect the first calcite layer overlaying the 'art,' so as to never remove any of the 'art' itself; because of this, sufficient material remained between the red disk and the base of the measured calcite (Pike et al. 2016; Zilhão 2013). To assume that the underlying 'art' is the same age as the calcite covering on top of it would be a mistake, and would underestimate the true age of the 'art' (Pike et al. 2016). Although the 'art' could have been created around 41,000 BP by the earliest AMH in Europe, only if the growth of the calcite occurred shortly after the painting's deposit, this is rather unlikely because of the

sampling protocol in place (Pike et al. 2012). Despite the ages of the 'art' at El Castillo coinciding roughly with the Proto-Aurignacian in the region, some researchers have argued that it is more likely that Neandertals were the creators of the paintings on the Panel de las Manos (Pike et al. 2016; Zilhão 2013). In more than half of the sites dated by Pike et al. (2012), the 'art' was much older than the dated calcite covering overlaying it, as verified by previous radiocarbon and U-series results (Zilhão 2013). Some have argued that it is possible that the red disk was executed instead around 42,000 BP or before, when only Neandertals inhabited the continent (Zilhão 2013).

As this subject is at the centre of a debate surrounding Neandertals' artistic and symbolic capabilities, this research examines the archaeological record of El Castillo cave in order to determine the evidence for Neandertal 'art' and symbolic behaviour at the site. Using the dates provided by Pike et al. (2012) as a reference point, this research aims to build a further chronology of symbolic behaviour present at the site in order to determine if the species responsible for the creation of some of the earliest known cave paintings can be determined.

Chapter 4: Methods, Results, and Analysis

4.1 Planned Research Methodology

The first objective of this research is to determine which artefacts signify and define artistic and symbolic behaviour in the archaeological record. This has been accomplished through the extensive literature review presented in Chapter 2. The second, and primary, objective of this research is to determine the archaeological evidence for Neandertal symbolic and artistic behaviour at El Castillo, and whether further analysis of the site can contribute to our knowledge of prehistoric 'art.' In order to accomplish these objectives, my field work was coordinated in three phases. The first was to translate and analyze Spanish documents pertaining to the Middle-to-Upper Paleolithic transition at El Castillo. Documents accessible from Canada were analyzed initially, and the remaining documents were analyzed during and subsequently after two months of extensive fieldwork in Spain. The second phase aimed to examine and analyze select artefacts from the site which may signify 'art' creation and symbolic behaviour during the Mousterian and Middle-to-Upper Paleolithic Transition. Finally, a visit to the cave site itself along with other Paleolithic caves containing 'art' in the Cantabrian region was planned, in order to establish context for the paintings at El Castillo.

A permit to examine the materials housed in the Museum of Prehistory and Archaeology in Santander, along with examining prehistoric 'art' present at El Castillo and other nearby caves, was obtained from the Government of Cantabria. My interest in examining the collections pertaining to levels 18 and 20 at El Castillo was first

established through email communication with Adriana Chauvin Grandela, an archaeologist working at the Museum of Prehistory and Archaeology in Santander. Accompanied by a research assistant (University of Toronto Anthropology graduate student Nicole Murray), I travelled to Spain in order to examine the artefacts at the museum archives.

Although we had been granted access to all available artefacts pertaining to the Middle-to-Upper Paleolithic transition at the site, only a small number of artefacts were planned to be thoroughly examined: those which may represent 'art' and symbolic behaviour at the site. As such, it was expected that the majority of this fieldwork would involve document translation and analysis, and site visits to view the prehistoric art. Planned artefact examination involved note-taking, photography, visual analysis, and utilization of a microscope when necessary and available.

4.2 Limitations and Alterations

As planning and preparation for fieldwork was carried out from Canada, it was expected that some alterations would be made to the research plan upon arrival in Spain. The majority of these changes were due to differences in the quantities of documents and artefacts available for analysis; these were unable to be determined prior to the first visit to the museum archives in Santander. Documents present in the museum archives included original photographs and field notes from both early and recent excavations and artefact catalogue sheets.

Artefacts available for our examination included 118 boxes containing hundreds of artefacts pertaining to archaeological layers 18 and 20, the bulk of the artefacts consisting of lithic and faunal material. Artefact examination was carried out with the goal of potentially identifying 'art' -related materials, such as ochre, charcoal, engravings, or paintings. Objects which could be interpreted as portable 'art' or personal ornaments, objects which may have been used to mix or apply paint, were also of interest. These artefacts potentially included carved, painted, or engraved objects, beads and pendants, or perforated objects made of bone, antler, or stone, mortar and pestles, paintbrushes, or bone tips smeared with ochre, which could have been used to mix paint. Extensive lithic and faunal analysis for the site has been previously completed by archaeologists responsible for the most recent excavations, who are experts in these areas (Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010; Cabrera 2001; Cabrera, Pike-Tay, and Bernaldo de Quirós 2004; Cabrera Valdés et al. 2006), and analysis of these materials was not undertaken for this research project.

4.2.1 Artefact Availability and Time Constraints

Most of the artefacts associated with the site of El Castillo are housed at Santander's Museum of Prehistory and Archaeology, though some artefacts are housed at other museums, such as Spain's National Archaeology Museum in Madrid. Unfortunately, we were unable to examine artefacts housed in Madrid or outside of Spain; as such our interpretation covers only those artefacts available in Santander.

However, we were also able to examine documents and to examine previous analyses for other objects (Cabrera Valdés 1984; Cabrera Valdés et al. 2006; Garralda 1997, 2006; Obermaier 1924), gaining further insight with which our analysis could be supplemented.

The Museum of Prehistory and Archaeology in Santander had located and organized these materials for use prior to our arrival, which aided the process considerably. Additionally, Professor Federico Bernaldo de Quirós, one of the primary researchers for the recent excavations, was generous enough to allow us access to his personally curated materials at the archives. As a result of this hospitality, all materials housed in Santander were made fully available for analysis.

In addition to the museum archives, the Museum of Prehistory and Archaeology itself housed a small collection of artefacts which are believed to represent portable 'art' and symbolism from the site of El Castillo. In order to examine these artefacts, a special request for these items to be retrieved and sent to the lab for examination was submitted. An additional four items of this nature are on permanent display at the museum, and an appointment was made to examine these artefacts at the museum itself outside of business hours. Curators at the both the museum and the archives were invaluable to our fieldwork, making time to meet with us and to ensure that we were able to access the desired materials.

All artefacts made available to us were examined for evidence of 'art' creation, although we were unable to photograph and document all artefacts given the considerable quantity of them and our short (1 month) duration in Santander. We were able to fully examine, analyze, and photograph the most important artefacts, the majority of which

were recovered from level 18 onsite, along with select artefacts from level 20. In order to further establish continuity between levels at the site, it would have been ideal to have examined a sample of the materials from level 16 (Aurignacian) as well. This was simply not feasible given the time constraints and the size of the research project. In addition to spending time at the archives, we also scheduled museum visits and cave site visits.

4.2.2 Taphonomic and Terminological Considerations

As many of the artefacts examined were recovered from the early excavations of Hugo Obermaier, some of these artefacts were mislabelled (e.g. faunal materials labelled as lithic material, etc.) or unlabelled. Additionally, artefacts from different levels at the site were often mixed within the same bags or boxes. Many of the faunal materials, as well as some lithic materials, were in a crushed or powdered state, and were unsuitable for analysis.

An additional issue that we dealt with was the difficulty in discerning natural or taphonomic markings on bone from anthropic markings. This is especially true of natural lines, such as vascular grooves, present on bone; these lines often appear similar to an anthropic engraving upon examination. These artefacts were, then, closely examined under a microscope provided in the lab (sometimes with the assistance of other archaeologists and curators) in order to determine their probable origin.

As discussed in Chapter 3, terminology at the site shifted with the recent excavations. As such, labels and notes created by Hugo Obermaier and his team during the early excavations were quite different from those created by Victoria Cabrera and Federico Bernaldo de Quirós during the most recent excavations. These labels, along with documents being analyzed, had to be carefully examined to gain a reasonable understanding of their contents. This was especially difficult with regards to labels provided within the artefact boxes and bags, as many different terminologies were used interchangeably for the same materials.

4.3 Artefact Examination and Analysis

Artefacts were examined at the lab space provided at Santander's regional Museum of Prehistory and Archaeology archives. The artefacts were housed in plastic bags within boxes; a total of 118 boxes were examined. These artefacts were retrieved from museum storage by the archivist and laboratory staff prior to our arrival. The artefacts themselves were examined on a foam tabletop, and gloves were used for delicate items. Extensive notes were taken on select artefacts, which were photographed and sketched as needed. A microscope was provided by the lab for closer examination of artefacts. Our primary goal in the examination of artefacts was to identify evidence of 'art' and symbolic behaviour; this includes paintings, engravings, pendants, and other objects that are non-utilitarian in nature. Artefacts were examined for the presence of powdered pigment, such as ochre, which may or may not have been mixed with other

substances to create paint. This would have created a red, brown, or yellow colouring on any given object. In addition to ochre, artefacts were also examined for the presence of black pigment in the form of charcoal, graphite, or manganese. This pigment may have been present in the form of drawings or paintings, or may have been present on artefacts as a by-product of mixing to create paint; it also could have been present as a result of natural processes, wherein an artefact came into contact with naturally occurring pigment. Artefacts were also examined for the presence of human-created engravings or carvings, which would have been demonstrated by purposeful and often deep markings created by stone tools. Additionally, artefacts were examined for anthropic perforations (created using stone tools) which could indicate that they were designed for suspension and used as pendants.

4.3.1 Lithic Industries

Although hundreds of lithic artefacts were present in the collections we examined, lithic and faunal analysis were not the primary objectives of this research. In this setting, we mainly focus on certain objects that could be related to symbolic and/or artistic activities. Previous analysis of the faunal and lithic material at El Castillo has been carried out extensively by researchers (Bernaldo de Quirós, Sánchez-Fernández, and Maíllo-Fernández 2010; Cabrera 2001; Cabrera, Pike-Tay, and Bernaldo de Quirós 2004;

Cabrera Valdés et al. 2006). For the purposes of this research project, this chapter will focus on bone industry and possible portable 'art' and symbolic behaviour at the site.

4.3.2 Bone Industry

The diversification of bone industry is considered by some to represent complex cognition and modern behaviour (Nowell 2010; Shea 2011; White 1989). This section will briefly discuss key bone artefacts recovered from level 18 at El Castillo. As this is not the primary focus of artefact analysis at the site, coming sections will provide a detailed analysis of portable 'art' and symbolic artefacts.

An artefact manufactured from the tip of a red deer antler was recovered from sublevel 18b (Cabrera Valdés et al. 2006: 453). The object has been sawed transversely, its spongy tissue removed to void the internal cavity (Cabrera Valdés et al. 2006: 453). This artefact has been described as a haft, which would have been attached to bone or lithic artefacts (Cabrera Valdés et al. 2006: 453). From sublevel 18c, the end of a bone point, thought to be a possible awl, has been recovered (Cabrera Valdés et al. 2006). Erosion of the surfaces of the object makes it difficult to analyze for the presence of traces of manufacture (Cabrera Valdés et al. 2006). A double-pointed tool made from a bone fragment was also found in this layer, and is thought to be a possible fish hook, as it displays similarities to those seen in Châtelperronian and Aurignacian contexts (Cabrera Valdés et al. 2006).

4.3.3 Portable ‘Art’ Objects

Portable ‘art’ objects are considered to be ones that are engraved, painted, or otherwise decorated with figurative or non-figurative designs, or beads and pendants which represent personal ornaments. In the case of El Castillo, artefacts believed to be portable ‘art’ objects have been found in both Transitional Aurignacian level 18 and Mousterian level 21. These artefacts from the site are seldom mentioned in the literature surrounding the Middle-to-Upper Paleolithic transition and Neandertal symbolic behaviour. Although objects deemed to be portable ‘art’ from the site have been previously analyzed by a number of researchers (Cabrera 2001; Cabrera, Pike-Tay, and Bernaldo de Quirós 2004; Cabrera Valdés et al. 2006), the site illustrates the dominant preference of parietal ‘art’ over portable ‘art.’ The following sections will describe and analyze some of these materials in order to establish the origins of ‘art’ and symbolic behaviour at the site.

4.3.3.1 Transitional Aurignacian Portable ‘Art’

Artefacts believed to represent portable ‘art’ from El Castillo, which were on display at the museum, were examined on days when the museum was closed to the public. Microscopes were not available for use onsite, and examinations were carried out using a magnifying glass and light provided by the museum; gloves were used for handling these items.

A red deer hyoid bone fragment from level 18b, Cat. No. CST 1998/18b/K15-1, was examined at the Museum of Archaeology and Prehistory. The artefact is decorated with black engraved and painted lines on its upper flat surface (see Figure 4.1). This object measures 27 x 24 x 4 mm. Additional striations and black markings on the sides of the object may be the result of natural processes, such as marks from vegetation or vascular grooves, although this was difficult to determine without the use of a microscope. The decoration on this object has been suggested to depict the line of the stomach and hind leg of an ungulate; if this interpretation is accurate, this artefact may constitute the oldest figurative representation in Southern Europe (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004; Cabrera Valdés et al. 2006). This artefact was previously analyzed and dated to 38,000 BP; Scanning Electron Microscopy (SEM) has determined that the incised lines were created using a piece of manganese, supporting the idea that this artefact was created intentionally and represents 'art' creation (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004; Cabrera Valdés et al. 2006).

A semi-triangular sandstone plaquette, Cat. No. CST 2000/18b/K15-1/413, recovered from sublevel 18b, was also examined at the museum. This object displays a series of six small, roughly evenly spaced engraved lines along one edge, along with six long (approximately 0.5 cm), deeply engraved intersecting lines (see Figure 4.2), placed slightly off-center from the long axis of the object, and located on its flattest surface (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004; Cabrera Valdés et al. 2006). The object itself measures 55 x 48 x 23 mm, and its triangular morphology appears to represent intentional shaping.

Figure 4.1. Red deer hyoid bone fragment decorated with black engraved and painted lines, recovered from sublevel 18b at El Castillo. Photo courtesy of D. Briggs.

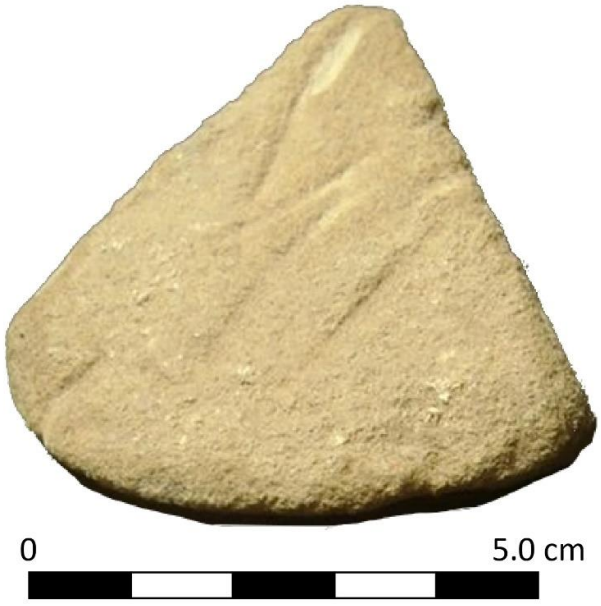

Figure 4.2. Sandstone plaquette bearing a series of engraved lines, recovered from sublevel 18b at El Castillo. Photo courtesy of D. Briggs.

A flat bone fragment from sublevel 18c, decorated with straight and relatively deep engravings, along with strokes of black colouring on its upper face, was also examined. According to Cabrera Valdés et al. (2006), the depth of the engravings suggests that they were created intentionally; this depth was noted upon our own visual inspection of the object. The artefact, Cat. No. CST 1990/18c/N18-1/2175, measures to 29 x 32 x 2 mm, and has been previously analyzed using SEM, which has demonstrated the presence of graphite within the engravings (Cabrera Valdés et al. 2006). The carved lines on this object have previously been interpreted as a horse's head (Cabrera Valdés et al. 2006), though we found this difficult to confirm. As painted pieces are rare in Cantabria, some researchers have taken this evidence to demonstrate that these groups developed complex symbolic behaviour (Cabrera Valdés et al. 2006).

A pierced and grooved brown bear canine recovered from sublevel 18b, Cat. No. CST 1986/18b/J12-5/38, demonstrates evidence of possible drilling at the bottom of the root. Previous observations using SEM have discovered 'u' shaped gouging on the surface of the root, along with incisions (Cabrera Valdés et al. 2006). This item has been interpreted as a pendant with modifications for suspension, and has been argued to be similar to those found at Grotte du Renne (Cabrera Valdés et al. 2006).

Other items recovered from level 18, which have been argued to represent portable 'art' and symbolism, include a fragment of a bone chisel with three series of incised lines, a fragment of a red deer metapodial with engraved lines on its upper surface, and other bone objects (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004; Cabrera Valdés et al. 2006). The symbolic nature of these items have been called into

question, and it has been suggested that the markings on these items likely relate to subsistence activities, such as filleting (Zilhão and d'Errico 1999; see also Cabrera et al. 2006: 452 for rebuttal). Upon visual and microscopic examination of these artefacts, we were unable to find any evidence which draws us to either interpretation.

4.3.3.2 Mousterian Portable 'Art'

A quartzite cobblestone bearing a series of incised dots was recovered from Mousterian level 21. The artefact, Cat. No. CST 2001/21b.E/N17.2/325, displays a straight row of four evenly spaced incised points, which are positioned above a fifth incised dot situated directly in the centre of the upper row (see Figure 4.3). The marks appear to be slightly deeper in the centre, and appear to have been intentionally incised using a stone tool. It has been argued that the marks on the artefact cannot be interpreted as the result of any actions produced during knapping or from natural processes, and therefore were created intentionally (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera Valdés et al. 2006: 450). The presence of anthropic marks on bone can be debated as possibly relating to taphonomic or subsistence activities, but on lithic materials, when these marks are not associated with débitage, they are unlikely to be utilitarian in nature (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera Valdés et al. 2006). This being said, it is unclear whether or not these dots have a symbolic value.

The object measures 41 x 34 mm, and has been dated to 70,000 BP using ESR (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004; Cabrera Valdés et al. 2006). As

current evidence indicates that Neandertals were the sole inhabitors of Europe at this time, this artefact makes a strong case for Neandertal portable 'art' and symbolic behaviour (Cabrera Valdés et al. 2006). In addition to continuities argued for lithic industries and subsistence practices, it has been argued that the cultural behaviour demonstrated by this decorated stone and other symbolic objects develops and continues, without a gap, through the earliest and later Aurignacian at El Castillo (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004; Cabrera Valdés et al. 2006).

Figure 4.3. Quartzite cobblestone bearing a series of incised dots, recovered from Mousterian level 21 at El Castillo. Photo courtesy of D. Briggs.

4.3.3.3 Other Possible 'Art' Signifiers from the El Castillo Excavations

Red ochre has been discovered in various locations in both Mousterian and Aurignacian levels at El Castillo. Our visual and microscopic examinations support Cabrera Valdés et al. (2006)'s assertion that ochre was present on many lithic materials and other artefacts recovered from both Mousterian level 20 and transitional Aurignacian level 18. As this ochre was present in powder form, rather than being mixed with other substances to create a paint, its purpose as decorative, functional, or utilitarian is impossible to determine (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004; Cabrera Valdés et al. 2006).

4.4 Document Analysis

Human fossil remains were recovered from level 18 during Obermaier's early excavations (Cabrera Valdés 1984; Cabrera Valdés et al. 2006). The entirety of level 18 has been dated to between 45,000 and 37,000 BP by ESR and radiocarbon methods, with most remains found in the lower portion of the level, corresponding to between 45,000 and 40,000 BP (Cabrera Valdés, Bernaldo de Quirós, and Maíllo Fernández 2006; Cabrera Valdés et al. 2006; Churchill and Smith 2000). The detailed descriptions of these fossils were never published, and the fossils were subsequently lost from the museum (Cabrera Valdés 1984; Cabrera Valdés et al. 2006; Churchill and Smith 2000). Handwritten notes of Obermaier, an unpublished 1933 study of the material by Henri

Vallois, and a short note by Basabe (1974) are the only original existing documents pertaining to the fossils; however, these documents have been studied extensively by select researchers (Cabrera Valdés 1984; Cabrera Valdés et al. 2006; Garralda 1997:157, 2006). These studies, along with some original documents, and archived and published photographs of the documents, were available for examination, photographing, and scanning at the Museum of Prehistory and Archaeology in Santander. The main purpose of our examination of documents and studies of these human fossil remains was to determine whether we could establish a more complete chronology of El Castillo during the Middle-to-Upper Paleolithic transition. Our specific objective was to ascertain if it was possible to determine which species was present at El Castillo around 41,000-40,000 BP, in order to tentatively attribute a species with the creation of the painted disk.

The remains, labelled Castillo A, B, and C, belonged to at least two individuals: an adult (Castillo B), and a 3-5-year-old child (Castillo C) (Cabrera Valdés 1984; Cabrera Valdés et al. 2006; Churchill and Smith 2000; Garralda 1997, 2006). Both Obermaier's notes and Vallois' study described the remains as an adult right lower second molar, a fragment of a child's jaw, ten small cranial bone fragments, and four very small bone fragments (Cabrera Valdés 1984; Garralda 1997).

The Castillo A specimen consisted of several small adult cranial fragments (Churchill and Smith 2000; Garralda 2006). These fragments reportedly corresponded to the parietal, frontal, and occipital regions of the skull, and were noted to have belonged to a robust adult, and to have been thick in comparison to AMH cranial bones (Garralda 1997, 2006). The Castillo B specimen consisted of an adult right lower second molar

(M2), either belonging to the same individual as Castillo A or to another individual (Garralda 1997, 2006). The dimensions of the crown of Castillo B were large, including the mesial-distal diameter; two roots were also present (Garralda 1997, 2006). The Castillo B adult molar is relatively large both by Neandertals and AMH standards, and generally exceeds comparative recent European populations, but fits within the range of variation for both species in terms of size and shape (Garralda 1997, 2006).

The Castillo C specimen is considered to be a 3-5-year-old child, represented by an incomplete mandible with deciduous molars present (Churchill and Smith 2000; Garralda 1997, 2006). Both Castillo C deciduous molars have mesiodistal diameters similar to or larger than both AMH and Neandertal groups, despite having small buccolingual diameters (Churchill and Smith 2000; Garralda 1997). The first deciduous molar of Castillo C was observed to be mesiodistally long in comparison to that of AMH, and right on the mean for Neandertals (Churchill and Smith 2000; Garralda 1997). However, the buccolingual diameter of the molar was found to be below the mean for Neandertals, and close to the mean for AMH samples (Churchill and Smith 2000; Garralda 1997). The second deciduous molar of Castillo C was shown to be similar, with a crown area close to the AMH sample mean, but a crown index below both the early AMH and Neandertal means (Churchill and Smith 2000; Garralda 1997). Some researchers, including Vallois and Basabe, who originally examined these remains, have argued that the remains, particularly the mandible of Castillo C, display archaic (Neandertal-like) features, such as a robust symphysis and lack of a mental prominence (accentuated chin) (Cabrera Valdés et al. 2006; Churchill and Smith 2000; Garralda 1997,

2006). The material present in Castillo C is not unlike other Neandertal specimens of a similar age (Garralda 2006). There is a high degree of variability present within the morphology of both AMH and Neandertals, and without the physical remains present, it is impossible to classify the remains as either species based on the limited information available (Cabrera Valdés et al. 2006; Churchill and Smith 2000; Garralda 1997, 2006). However, if these remains were attributed to AMH, they would be the oldest in Europe, and their presence in the region would be surprising for the time, since no other similar evidence exists (Cabrera Valdés et al. 2006).

Recent excavations have recovered two sets of human remains, including both cranial and post-cranial fragments, from sublevel 18b, dating to 38,500 BP (Cabrera Valdés et al. 2006; Garralda 2006). These fossils represent a MNI of 5 or 6, and include three children's teeth, along with adult remains, which display archaic traits (Cabrera Valdés et al. 2006: 460; Garralda 2006). These fossils belong to the crowns of three deciduous teeth, including a second right molar (Castillo 292), an upper left first molar (Castillo 492) and an upper left central incisor (Castillo 924); each of these teeth is large in meso-distal diameter (Cabrera Valdés et al. 2006). The Castillo 924 incisor is shovel-shaped and has an asymmetric crown, prominent lateral crest, and a lingual tubercle (Cabrera Valdés et al. 2006: 460). The shovel-shaped morphology, asymmetry of the incisor crown, and presence of four peaks on the Castillo 492 specimen are similar to Neandertal juveniles found at Shanidar, Krapina, La Ferrassie, and other sites (Cabrera Valdés et al. 2006). Researchers have argued that the large dimensions of these teeth, coupled with their shovel-shaped morphology, robustness, and cusp and root pattern (3-4

peaks present) are more similar to Neandertals than AMH, who usually have only two-three peaks present (Cabrera Valdés et al. 2006; Garralda 2006).

These new fossils are larger than those of Neandertals found at Krapina and Pech de l'Azé, and there is no evidence of these fossils being a mixed group of AMH and Neandertals (Cabrera Valdés et al. 2006). As such, they have been attributed to Neandertals by researchers, due to the presence of many Neandertal-like characteristics; this has been questioned, however, due to the time frame being so close to the arrival of AMH in the area (Cabrera Valdés et al. 2006; Garralda 2006). The fossils display a general robusticity and various distinct archaic features, but some researchers have declared it impossible to classify the remains as Neandertals or archaic AMH (Cabrera Valdés, Bernaldo de Quirós, and Maíllo Fernández 2006; Garralda 1997). Based on the morphological characteristics present, if these fossils were found in an earlier context, there would be no question of this association with Neandertals (Cabrera Valdés et al. 2006; Garralda 2006).

4.5 Determining a Chronology of the Middle-to-Upper Paleolithic Transition at El Castillo

There are many difficulties in attempting to determine a chronology of occupation during the Middle-to-Upper Paleolithic transition at El Castillo. Although this research project sought, rather ambitiously, to establish this chronology, it is now clear that this objective was not feasible to accomplish within the project's parameters. In fact,

researchers have been attempting to piece together such a chronology for the past three decades. One problem in attempting to establish a chronology for this time frame is that radiocarbon dating becomes less reliable when utilized in this period, making dates less consistent and specific than they would be for earlier time periods. Another issue is the lack of directly dated materials for the site. Further dating of fauna and other materials recovered from the site in the future may provide a more detailed chronology.

The end of the Mousterian at El Castillo falls between 50,000-39,000 BP, while the Transitional Aurignacian falls between 40,000-38,500 BP, overlapping with the Châtelperronian at the site (Bernaldo de Quirós and Maíllo-Fernández 2009). The Archaic Aurignacian then lasted from 36,500-30,000 BP in the Cantabrian region (Bernaldo de Quirós and Maíllo-Fernández 2009). Unfortunately, when attempting to determine a chronology of the Middle-to-Upper Paleolithic transition at El Castillo, the limits of radiocarbon dating result in a broader range of dates given (Bernaldo de Quirós and Maíllo-Fernández 2009). More precise dates would allow for a more accurate chronology, which would be necessary in order to pinpoint the activity at the site during the period in question (Bernaldo de Quirós and Maíllo-Fernández 2009). In the future, directly dating materials from old excavations may provide a more complete synopsis of the MP-UP transition at El Castillo (Davies 2006). It is also important to consider that, even with more accurate and precise dates for the industries at the site, it is very difficult to associate a taxonomic group with a tool industry in the absence of associated skeletal materials.

One of the most substantial barriers for determining a chronology of occupation by Neandertals and AMH at the site is the lack of associated fossil remains. Although original notes and descriptions of the fossils recovered from level 18 during Obermaier's excavations are available for study, and appear to describe Neandertal characteristics, as these fossils were misplaced, it is impossible to definitively classify them taxonomically. Additionally, more recently recovered fossils from sublevel 18b at the site show archaic traits, but are difficult to classify, in part because they consist mainly of dental elements. The skeletal remains both from the early and more recent excavations do suggest a possible Neandertal occupation of the site at the time, which may suggest that Neandertals were responsible for the early Aurignacian at the site, although this cannot be confirmed nor denied, based on the available evidence. We cannot automatically associate either species with specific industries at the site. Additionally, even if Neandertals occupied the site between 42,000-38,000 BP, at this time we also cannot rule out that AMH may also have been present at the site, either co-habitating or in alternating occupations.

4.6 Summary of the Evidence for Neandertal Symbolic Behaviour at El Castillo

Despite the difficulty in establishing a chronology of the Middle-to-Upper Paleolithic transition at El Castillo, there does appear to be evidence for symbolic behaviour in Neandertals at the site. The cobblestone decorated with five incised dots,

dating to 70,000 BP and thought to be possible Neandertal portable 'art,' is one of the most intriguing pieces of evidence from the site. As the marks on the stone do not correspond to knapping or subsistence activities, this artefact is likely to represent symbolic behaviour in its creators, who were most likely Neandertals, given the age of the artefact. Although previous research at the site (Cabrera Valdés 1984; Cabrera Valdés et al. 2006; Cabrera Valdés, Bernaldo de Quirós, and Maíllo Fernández 2006; Obermaier 1924) had confirmed the presence of ochre in both the Mousterian and Transitional Aurignacian layers, the purpose of this ochre cannot be determined. However, given that many different cultures, past and present, have used ochre and other pigments for symbolic purposes (d'Errico 2003; d'Errico and Stringer 2011), and that evidence suggests that Neandertals did so at various sites (d'Errico 2003; Finlayson et al. 2012; Mellars 1996; Roebroeks et al. 2012; Soressi and d'Errico 2007; Wynn and Coolidge 2011:120), it is entirely possible that this pigment was being used in a similar manner.

The precise timeline of AMH and Neandertal occupation at the site of El Castillo is complex and difficult to determine. Fossil remains from the site cannot rule out the possibility that Neandertals inhabited the site during the Transitional Aurignacian (level 18), from approximately 42,000-38,000 BP (Cabrera Valdés et al. 2006; Cabrera Valdés, Bernaldo de Quirós, and Maíllo Fernández 2006). A number of possible portable 'art' and personal ornamentation objects recovered from the site date within this period. These artefacts include engraved, painted, and perforated objects manufactured from bone, stone, and animal teeth. While some of these objects are ambiguous, others almost certainly represent symbolic behaviour of some kind; it cannot, at present, be ruled out

that at least some of these objects were created by Neandertals, though this is also true of AMH. In order to come to a more concrete conclusion about the creators of these objects, more information is necessary, in the form of both direct dates and of associated skeletal material. The same situation applies to attribution of the red painted disk at the site, dated to 40,800 BP (Pike et al. 2012). At this time, it cannot be ruled out that Neandertals created this painting, and some researchers argue that there is strong evidence that this is the case (García-Diez et al. 2015; Pike et al. 2016; Zilhão 2013). While I am unable to make an argument for either case, it is important to note that the evidence from El Castillo, in terms of portable 'art' objects, and of the use of non-figurative signs, is consistent with symbolic evidence from other Neandertal sites in Europe, including Grotte du Renne and Gorham's Cave (Caron et al. 2011; d'Errico et al. 1998; Zilhão 2013; Rodríguez-Vidala et al. 2014). It is certainly within the realm of possibility that Neandertals were responsible for these symbolic items. Although no other cave painting has been found in Neandertal contexts, given evidence of systematic use of pigment and ability to engrave on cave walls (Caron et al. 2011; d'Errico et al. 1998; Moro Abadía and González Morales 2010; Zilhão 2012, 2013; Rodríguez-Vidala et al. 2014), this behaviour is not unexpected, provided no presumptions about Neandertal capabilities are invoked.

Some researchers have argued that at El Castillo, the Mousterian industry evolved locally into the Aurignacian industry, excluding the dominant notion of a non-European origin of the Aurignacian spreading across the continent with incoming AMH (Cabrera Valdés et al. 2006; Cabrera Valdés, Bernaldo de Quirós, and Maíllo Fernández 2006). In

addition to a local transition to the Aurignacian, it has been argued that there is increasing evidence for the local roots of symbolic behaviour in the Mousterian (within Neandertals) at El Castillo (Cabrera Valdés et al. 2006; Cabrera Valdés, Bernaldo de Quirós, and Maíllo Fernández 2006). As discussed in Chapter 2, associating a species to a specific industry is problematic, and should be done so with caution and with sufficient associated fossil evidence. The evidence for possible Neandertal symbolic behaviour and association with UP technocomplexes at El Castillo affirms that researchers should stop assuming that AMH are responsible for all UP technologies and symbolic behaviours (Cabrera Valdés et al. 2006). We must instead utilize a scientific approach when examining the evidence, and eliminate initial prejudices against Neandertals (Cabrera Valdés et al. 2006).

While the hypothesis of a local transition within Neandertals may or may not exclude the participation of AMH, I believe that the explosion of symbolism in various parts of Europe around the time of contact between the two species may well be a result of interactions and sharing of cultures between the two. There is certainly evidence of possible symbolic behaviour in Neandertals at El Castillo, and this evidence (that has been largely ignored in the literature surrounding Neandertal symbolism and cognition) requires further analysis. The evidence present at El Castillo must be included in the growing body of support for Neandertal complex cognition and symbolism, and confirms the necessity of re-evaluating old collections and outdated ideas about the past.

Chapter 5: Discussion, Implications, and Conclusion

5.1 Discussion and Implications

The archaeological record of El Castillo is of great importance to debates surrounding the Middle-to-Upper Paleolithic transition and Neandertal symbolic behaviour. Unfortunately, current evidence cannot provide a clear timeline of events at the site, in terms of species occupation and co-habitation during the period of the transition to UP cultures. Some researchers have argued that a local transition, within Neandertals, to UP lifeways and cultures occurred at the site (Cabrera Valdés et al. 2006; Cabrera Valdés, Bernaldo de Quirós, and Maíllo Fernández 2006). I see no reason to disagree with this argument; however, further analysis of this local transition, in terms of technological change, is beyond the scope of this project.

In terms of the primary objective of this research project, determining the evidence for 'art' and symbolism in Neandertals at El Castillo, some general observations and conclusions can be asserted. The most important is the fact that the archaeological record from the Mousterian levels of El Castillo is consistent with the symbolic evidence currently attributed to Neandertals in many European sites. For instance, ochre was clearly present in Mousterian layers at the site (Cabrera Valdés 1984; Cabrera Valdés et al. 2006; Cabrera Valdés, Bernaldo de Quirós, and Maíllo Fernández 2006). Skeletal material in Europe during the Mousterian is typically attributed to Neandertals (Churchill and Smith 2000; Higham et al. 2014; Zilhão 2006a), although it is important to note that

equating a species with an industry is problematic. At this time, as evidence does suggest Neandertals were likely to have authored the Mousterian at El Castillo, I am confident in stating that ochre was present in Neandertal-associated layers at the site. Equating this presence to symbolic behaviour is a more difficult matter. The ochre recovered at the site was in its most basic state, either in the form of naturally occurring lumps or in the form of a powder produced by scraping pigment lumps (either through natural or human-driven processes), and this pigment shows no signs of alteration or mixing with other substances to form a paint. This ochre could have been obtained from a nearby outcrop, though its use for either symbolic or utilitarian purposes, given the current evidence, is impossible to determine. It is important to reiterate here, however, that no modern society exists where ochre use plays a purely functional role (d'Errico 2003; d'Errico and Stringer 2011). Although its use may have been functional to some degree, it is also likely that the ochre was used for symbolic or decorative purposes.

The quartzite cobblestone, containing five incised dots, recovered from Mousterian level 21 and dating to 70,000 BP (Cabrera, Pike-Tay, and Bernaldo de Quirós 2004; Cabrera Valdés et al. 2006), in my opinion, presents a good case for Neandertal symbolism. Again, I am comfortable associating this object with Neandertals until new evidence suggests otherwise, as current evidence dictates that Europe was occupied by Neandertals at the time (Cabrera Valdés et al. 2006). The concern here, then, is whether the artefact is symbolic. As some researchers have noted (Bernaldo de Quirós and Maíllo-Fernández 2009; Cabrera Valdés et al. 2006) the marks present on the object do not correspond to lithic activities, and are unlikely to have been related to subsistence

strategies, as the object is made of stone. While the fact that these marks cannot be correlated with industrial activities does not make of them symbolic images, it is legitimate to wonder whether they were created and patterned intentionally, and whether this object is likely to represent symbolic behaviour in Neandertals, although to label it as 'portable art' may be premature at this point.

While the ochre and possible portable 'art' from Mousterian levels at the site can be reasonably associated with Neandertals, but has questionable symbolic properties, other evidence from the site can be reliably considered to be symbolic, but its association with Neandertals is questionable. The evidence for transitional Aurignacian portable 'art' and symbolic pieces from level 18 at El Castillo is convincing, particularly with regards to objects that have been decorated with pigment and incised. There is no question that these objects were decorated in such a manner intentionally, and, as they show similarities to other UP objects which are considered to be symbolic, I believe it is reasonable to interpret these objects as evidence of symbolism. However, I was unable to conclude that any of the drawings or engravings on these objects represented figurative depictions. Additionally, a fundamental issue with these symbolic objects is their association with either AMH or Neandertals. As the chronology of the site's occupation by each species remains rather ambiguous for this period, to attribute level 18 (in particular, sublevel 18c) to either species (or both) conclusively, given the current evidence, would be erroneous. Given previous descriptions of fossil evidence from Obermaier's excavations, along with fossil evidence found in new excavations from level 18, it does seem likely that at least some of level 18 was deposited by Neandertals

(Cabrera, Pike-Tay, and Bernaldo de Quirós 2004; Cabrera Valdés et al. 2006; Zilhão and d'Errico 1999). Whether the symbolic objects were deposited by Neandertals is impossible to determine at present, and in order to gain a better understanding of this matter, further fossil evidence and analysis would be necessary.

In terms of the red painted disk, like other evidence for symbolic behaviour at the site, it cannot, at present, be assigned to Neandertals. While we cannot rule out this possibility, evidence is still very weak to make such a big statement. Although there is currently no evidence for any other cave painting created by Neandertals, it is possible that they engraved a geometric sign on cave walls in Gibraltar (Rodríguez-Vidala et al. 2014) and that they treated and used ochre and other pigments in a manner that could have been suitable for painting or drawing (d'Errico 2003; Soressi and d'Errico 2007; Zilhão 2007, 2012). Additionally, some researchers have suggested that it seems that Neandertals were capable of making and using abstract signs (García-Diez et al. 2015; Ochoa and García-Diez 2015; Pike et al. 2012; Zilhão 2012, 2013), and likely, if these oldest known paintings in Europe were created by Neandertals, the geometric signs depicted are continuous with their cultural traditions. However, there is currently insufficient evidence to argue that Neandertals were indeed responsible for the cave painting at El Castillo, or for the 'artwork' at any other painted caves.

5.2 Could Neandertals have Created the Red Painted Disk?

Given the current evidence, it is not possible to attribute the red painted disk at El Castillo to Neandertals. It is known that AMH were responsible for the creation of cave paintings at this site, and many others, for the entire UP period. There is, however, no sufficient evidence that Neandertals painted or created rock 'art.' However, given the chronology at the site and the antiquity of the painting, in order to rule out the possibility that Neandertals were present during the creation of the painting, further analyses are required. It was hoped that this project would establish a more detailed chronology of the site, with regards to the occupation periods and overlap between the two species. However, the type of precise chronology which could help to determine the species present during the time of the creation of the painting is not possible. Although the answer to the question of whether Neandertals did paint the red disk at El Castillo remains unanswered, evidence at a number of sites in Europe has demonstrated that Neandertals exhibited behaviours which are considered to be symbolic and highly complex (Caron et al. 2011; d'Errico et al. 1998; Moro Abadía and González Morales 2010; Rodríguez-Vidala et al. 2014; Zilhão 2012, 2013).

5.3 Potential Areas for Further Study

In order to gain a better understanding of the chronology of the site of El Castillo, and the nature and creation of symbolic artefacts and 'art' at the site, a few key

developments could be made to further this research. First, the scope of this particular project only allowed for an examination of the archaeological collections available in Santander's Museum of Prehistory and Archaeology. Analysis of any materials available in Madrid's National Archaeological Museum, or materials located outside of Spain, and subsequent integration of these finds, may provide a clearer picture of the nature of the MP-UP transition at El Castillo.

Additionally, pigment analysis at the site in order to compare pigment composition on the cave walls (the Panel de las Manos) to the pigment composition found in both the Mousterian and Aurignacian layers at the site, and to the pigment found on painted artefacts from Level 18, would be beneficial to this research. This may provide insight into patterns of pigment use, pigment sourcing, and possible preparation methods used, and may also provide evidence of corresponding episodes of pigment use within the occupation layers at the site. Further chronometric dating of organic artefacts in the collections may add to the range of dates provided for specific industries at the site. Uranium-series dating of the calcite underlying the red painted disk would provide a maximum age for the 'art'; this could offer insight into which species was most likely present at the site during the art's creation. In the case that additional calcite layers were determined, this dating may even provide a precise chronology of the creation of the painting, greatly influencing this debate.

It also seems to be that Neandertal sites containing depictions and symbolic objects regularly display non-figurative signs, such as cross-hatches and dots. Further

study of the patterning of geometric sign use in Neandertal contexts across Europe may provide insights into their behavioural and symbolic tendencies and cognitive abilities.

5.4 Final Conclusion

As I have demonstrated throughout this thesis, the archaeological record of Neandertals, with regards to possible symbolic behaviours, is complex and is not without problems. Although prejudice against Neandertals and lingering biased views has likely influenced the evaluation and dismissal of some Neandertal symbolic items, such as the incised Mousterian stone from El Castillo, anti-Neandertal prejudice is not responsible for all skeptical views of Neandertal symbolic evidence. It appears, from the archaeological record of both AMH and Neandertals, that the two species exhibited different types of symbolic behaviour (with AMH exhibiting behaviours which could be more easily considered 'art') and used symbolism to varying degrees (with the Neandertal record lacking in the quantity and regularity of behaviour that the AMH record exhibits). This does not necessarily mean that Neandertals were not cognitively advanced or not adapted to their surroundings, but rather that the two species may have exhibited different cultural and adaptive choices. As the archaeological record demonstrates, there are some traits which could indicate that Neandertals reached a significant level of complexity, especially with regards to technology.

In terms of the evidence from the site of El Castillo, the 40,800-year-old painted disk cannot be attributed to Neandertals at this time, which is consistent with the

Neandertal archaeological record, lacking any convincing examples of Neandertal rock art. At the same time, taking into account the dating of this image, the possibility that Neandertals created such a representation cannot be totally excluded. Unfortunately, this research is unable to resolve this question either way. The possible portable 'art' objects at El Castillo, from Mousterian (and likely Neandertal-associated) contexts as well as Transitional Aurignacian (possibly Neandertal-associated) contexts, is consistent with similar evidence displayed in Neandertal contexts in Western Europe. This evidence is consistent with that displayed at sites such as Grotte du Renne and St. Cesaire in technique, artefact type, raw material choice, and in presence of possible geometric markings. Ochre presence in Neandertal contexts at El Castillo is also consistent with that demonstrated in the Neandertal archaeological record in Europe. Overall, evidence at the site of El Castillo seems to show continuities with that of other sites in Europe, and displays possible evidence of Neandertal symbolic behaviours, but does not suggest evidence of Neandertal-created rock art.

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