



'Them' or 'Us'? A Question of Cognition:

The Case for Neanderthal Modernity.

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I'd like to thank the people who never let me give up on myself on my way here. This thesis is dedicated to them.

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*“The grisly folk we cannot begin to understand. We cannot conceive in our different minds the strange ideas that chased one another through those queerly shaped brains. As well might we try to dream and feel as a gorilla dreams and feels.”*

H.G. Wells, *The Grisly Folk*, 1921.

## Introduction.

The appearance of modern human behaviour in Europe has been the focus of many discussions throughout the past few decades. The sudden “explosion” (Mellars 1996) of symbolic artefacts after ~40 000 BP (before present) in European sites has given rise to several models describing the entrance of a behaviourally and anatomically modern population to the continent. Though recent discoveries and re-analysis of older data from both Europe and Africa have shown that the Upper Palaeolithic (UP) transition may not have been the revolution it once was thought to be (McBrearty and Brooks 2000, d’Errico 2003), certain prejudices seem to linger.

The Neanderthal is man’s closest relative in the *Homo* genus, disappearing from the record only after 27 000 years ago (Mellars 1996, Finlayson 2004). Since their initial discovery in the Neander Valley, Germany, Neanderthals have become the incarnation of the typically dim-witted and brutish Caveman and have had their adaptability, cognition and modernity in general challenged repeatedly (Sommer 2006). In May 2010, DNA studies produced evidence of Neanderthal contribution to the present day human gene pool, suggesting that gene flow from Neanderthals to the ancestors of non-Africans occurred before the divergence of Eurasian groups from each other (Green *et al.* 2010). Earlier studies of Neanderthal mtDNA have long been flagged as proof Neanderthal fell outside the range of anatomically modern human genetic variation (Krings *et al.* 1999, Ovchinnikov 2001).

The concept of Neanderthal behavioural modernity has become a lively debate along with the origins of behavioural modernity itself. Over the past 15 years, this debate has become one of the Big Questions that have dominated archaeological research. The development of theories regarding the origins of, as well as the traits defining modern human behaviour, has seen the rise of various models to be tested, some ultimately being set aside. The aim of this thesis is to investigate the claims of Neanderthal modernity in the material record and then consider the implications of the recent DNA results pertaining to the issue of their interaction with anatomically modern humans (AMH) in Eurasia.

Though Africa has proven rich in material pertinent to the overall origins of modern human behaviour on a global scale (McBrearty and Brooks 2000, Henshilwood and Marean 2003), this thesis will concentrate mainly on material found in the Eurasian archaeological record within the geographical expanse of the Neanderthal homelands.



Chapter 1 will explore the history of Neanderthal research. A survey stretching from the discovery of the ‘Old Man’ of Chapelle-aux-Saints to the present day image of the classical Caveman will be examined in an effort to understand the position of the Neanderthal in both academia and popular culture today.

Chapter 2 concerns the methodological, theoretical and terminological facets of Neanderthal research. An explication of the term ‘Culture’ will be presented through an overview of historical interpretations along with a critique of some of the methods employed later in the thesis. Furthermore, a synopsis of the traits dubbed the Hallmarks of Modernity (Henshilwood and Marean 2003) will proffer their origins and importance to the current debate before moving on to examine the key models for the spread of Modern Human Behaviour.

Next, Chapter 3 will present a review of the Eurasian climate throughout the period of Neanderthal inhabitation to clarify the environment in which they subsisted and survived. An overview of Neanderthal origins will build an understanding of their *in situ* evolution on the Ice Age Continent. Available fauna and flora will also be related after a presentation of the available climatological data.

Chapters 4, 5 and 6, will concern Neanderthal technology, economy and symbolic capacity, respectively. In each chapter, markers of modern human behaviour will be highlighted through a discussion of material culture available from sites in the Eurasian archaeological record. At the conclusion of every chapter, a short summary will forward an opinion as to the behavioural markers visible in the material remains of Neanderthal cultures.

In Chapter 7, the impact of the May 2010 DNA results will be discussed along with material evidence pertaining to the concepts of interaction, language, acculturation, and the roots of the Aurignacian technocomplex, currently assigned to anatomically modern humans (*Homo sapiens sapiens*).

In conclusion a review of the gathered information and discussion will be employed to determine whether the Neanderthals displayed a tendency towards modernity in their every day behaviour and to what degree the markers of modern human cognition can be seen in their material culture. Furthermore, consideration of the discussed concepts will result in the proposal of a new direction in the future of Neanderthal, and indeed human, research.

## **Chapter 1.**

### **A Neanderthal Story.**

#### The Old Man of La Chapelle-aux-Saints and other Neanderthals.

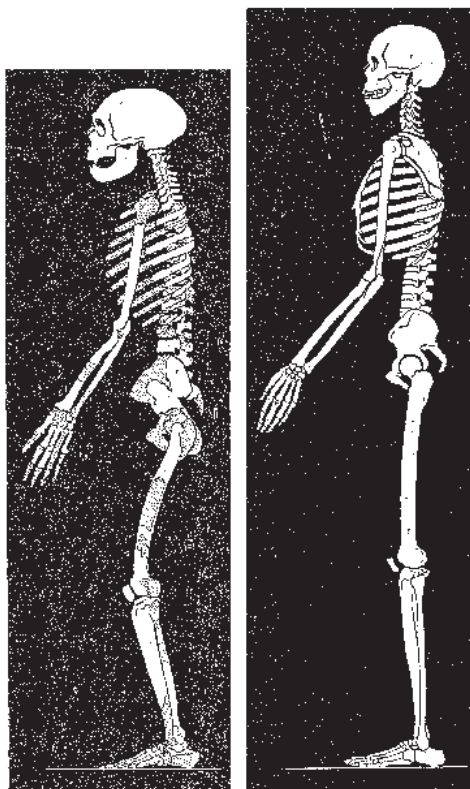
When ground was broken at La Chapelle-aux-Saints Cave in the Corrèze district of France, as with any site, no one knew what might be hidden beneath the soil. On August 3<sup>rd</sup>, 1908 French clerics Jean and Amèdeè Bouyssonie and the Abbè Bardon unearthed what turned out to be a Palaeolithic burial containing the most complete Neanderthal skeleton to date (Sommer 2006, Stringer and Gamble 1993). Earlier specimens had been found in Engis Cave, Belgium (1830), Forbes' Quarry, Gibraltar (1848) and Feldhofer Grotto in Germany (1856) (Stringer and Gamble 1993) but it was this discovery that due to unforeseen factors would become the scientific type specimen of the species *Homo neanderthalensis*. The clergymen, at a loss for what to make of these strange remains, heeded the advice of colleague Abbè Breuil and passed them on to Marcellin Boule (1861-1942), Director of the Laboratory of Palaeontology at the Musèum d'Histoire Naturelle in Paris (Bouyssonie *et al.* 1908, Stringer and Gamble 1993, Brace 1964). Under Boule's care, the interpretation, reconstruction and publication of the remains brought about a media sensation in the post-Darwin world (Sommer 2006).

Prior to this discovery, Louis Laurent Gabriel de Mortillet, curator of the museum at St Germain and co-founder of the Ecole, d'Anthropologie, had developed a chronological classification of the succession of Palaeolithic cultures based on differences in tool-making techniques and the shape of tools. He believed the cultures were part of several universal stages. This idea of lineal evolution followed the contemporary ideas of sociocultural evolution forwarded by Comte, Spencer and Morgan (Brace 1964), that societies moved from primitive to civilised form over time. In Mortillet's eyes the Neanderthals fitted into the 'sacred image of the same' (Sommer 2006) and belonged in the place directly before *Homo sapiens* in the Darwinian evolutionary model. He found support for his theory in the writing of Thomas Henry Huxley. Huxley was one of Darwin's first followers after the publication of *The Origin of Species* in 1863. Huxley wrote that "*though truly the most pithecoïd of known skulls, the Neanderthal cranium is by no means so isolated as it appears to be at first, but forms, in reality, the extreme term of a series leading gradually from it to the highest and best developed of human crania*" (Huxley 1863). Needless to say, not everyone agreed.

The 1856 discovery of what quarry workers thought to be the remains of a cave bear at Feldhofer Grotto in the Neander Valley, Germany, had also become the origin of a dispute regarding the evolutionary trajectory of the Neanderthal line. Biologist Herman Schaffenhäuser,

who performed an anatomical analysis of the remains, had proffered the conclusion that the unique morphological features displayed on the clearly human skeleton were representative of a new human species (Howells 1960).

Though many voices rose to contest Schaffenhause, loudest was perhaps Rudolf Virchow, the scholar commonly regarded as the founder of modern pathology. Virchow rejected the concept of evolution throughout his career at the University of Berlin (Trinkaus and Shipman 1992) and believed the Feldhofer specimen to be the remains of a person suffering from ‘rickets’, a



1.1 Boule's comparison of Neanderthal (left) with an Australian Aborigine. After Sommer 2006.

pathological disease (Klein 1999). Instead, Virchow proposed that the old, sick man had reached such an age by living a recent sedentary agrarian lifestyle rather than existing in an ancient hunter-gatherer society (Brace 1964).

Though various pathological abnormalities were also present in the skeletal remains from La Chapelle-aux-Saints (presenting ailments including arthritis, degenerative joint disease, and oral abscesses in later examinations), Boule initially found many morphological differences between the ‘Old Man’ and the gracile Cro-Magnon people from whom modern man had derived (Sommer 2006, Stringer and Gamble 1993). The new specimen had a greater robusticity with deep and wide muscle attachments visible on the bones, a large, barrelled chest, a flatter, elongated skull with suprianiac fossa marking the occipital bun, heavy brow ridges, a large nasal cavity and a more protruding face with no

chin (Stringer and Gamble 1993, Mellars 1996, Klein 1992). Boule compared the Neanderthal skeleton to an Aboriginal Australian in one of the most reproduced figures from his work. The significance of his choice of comparison should not be overlooked. Boule would have considered the Aborigine to be one of the ‘inferior races’, therefore being more akin with apes and notional human ancestors (Stringer and Gamble 1993, Sommer 2006).

Boule concluded that the Neanderthals were not part of the human succession, but rather an evolutionary dead end that became extinct without great issue (Brace 1964). He layered his argument by emphasising the simian traits of the skull and voicing claims that Neanderthal Man had carried a stooped posture, despite being aware of the ‘Old Man’s’ various ailments that may have obstructed his movement while alive (Sommer 2006). According to Boule, Neanderthal man differed significantly from modern humans both morphologically and culturally to be classified as a separate species. He used the scientific name *Homo neanderthalensis*, coined by Irish anatomist William King in 1864. Without secure dating models, guesses were made as to the antiquity of the

specimen. While Boule estimated an age of 20,000 years, Arthur Keith, curator of the Royal College of Surgeons in London contested that it was at least 500,000 years old. This was based on his dating of the controversial Galley Hill skull, discovered in the Thames valley in 1888, to 170,000 BP (Sommer 2006).

From newspaper clippings collected by Boule himself, it is possible to read between the lines and decipher the influences of the creationist church, the post-Darwin press and personal prestige on the image of Neanderthal that presented in publication (Sommer 2006 and references therein). Boule's interpretation of Neanderthal man as a side arm of evolution was ambiguous in nature, seemingly aimed to pacify both Evolutionists who were searching for a Missing Link to prove Darwin's theory and Creationists who demanded a classification as either animal or human to fit their world view. It would be biblically acceptable that an animal existed before humans, while a classification of human meant Neanderthal man was Adamite and had 'lost' his humanity like the other 'inferior races' of this Imperialist time (Sommer 2006). Through this double entendre, Boule aspired to earn public sympathy and increased acceptability for his scientific views. In fact, the conclusions in Boule's study of the 'Old Man' dominated human evolutionary studies up to and just beyond Boule's death in 1942 (Stringer and Gamble 1993).

In the same year excavations began at La Chapelle-aux-Saints, the complete skeleton of an adolescent Neanderthal was found at Le Moustier, France. This discovery offered evidence of a connection between Neanderthals man and the tool tradition named after that site classified by Mortillet, the Mousterian. Another discovery in the same region of France, at Combe Capelle, revealed the burial of an anatomically modern human, clearly associated with the Aurignacian technocomplex, named after the French site of Aurignac. Herman Klaatsch, a German anthropologist, voiced the opinion that the short time period between the Neanderthals at Le Moustier and the anatomically modern humans at Combe Capelle made it highly unlikely that Neanderthals had evolved into modern man, echoing the results of Boule's evaluation of the Old Man. Klaatsch though, took his theory one step further, arguing that Neanderthal had evolved into the Negroid race while the makers of the Aurignacian tools, *Homo aurignacensis*, had become the present day Caucasian race (Klaatsch 1924).

As the 1920's rolled by, the rate of Neanderthal discoveries slowed, partly due to later scientists adopting more time consuming excavation methods and partly because most of the more promising sites had already been excavated (Klein 1999a). In 1929, as the decade came to a close, two cave sites in what was then Palestine, today Israel, gave up their secrets. Excavations revealed the partial remains of about ten individuals at Mugharet es-Skhul and a partial female skeleton at Mugharet et-Tabun (Garrod and Bate 1937). All of the ten skeletons of Skhul seemed to be gracile anatomically modern humans, *Homo sapiens*, but the female from Tabun displayed, to the surprise of scholars, clearly Neanderthal cranial traits despite her limbs being somewhat gracile. Both the Tabun and Skhul remains were found in a clearly Mousterian context and the Tabun skeleton was the first Neanderthal skeleton found outside Europe. The premise of anatomically modern

humans in a Mousterian context gave rise to the question of antiquity. Could these modern humans be contemporary with, or even predate, the European Neanderthals? As it was, Arthur Keith and Thomas McCown concluded their skeletal analysis of the remains by deeming both the Skhul and Tabun remains as morphological variations of a single Neanderthal population (Keith and McCown 1939).

#### After the Second World War.

In the aftermath of the brutality of the Second World War, racial separation and the ascribing of certain qualities to certain racial groups became a social faux pas. In an attempt to distance oneself from the twisted ideals of the fallen Nazi regime, many scholars began to emphasize the similarities between Neanderthals and *Homo sapiens*. Some even went so far, in the context of that time, as to fuse them into the same species. In addition to this milder attitude towards Neanderthals, evidence of other, more archaic and simian-like hominid fossils was accumulating around the world. In comparison to these new fossils, known today as *Homo erectus* and *Australopithecus*, Neanderthal seemed more closely related to modern day humans than he had since the late 1800's. Researchers also began to open to the premise of Neanderthal symbolic capacity, and though burials were known from several sites, e.g. La Ferassie, Le Moustier and La Chapelle-aux-Saints, the interment of the dead was not yet considered to be symbolic (Trinkhaus and Shipman 1992).

In subsequent decades, scholars focussed their attention towards describing how and when the archaic and modern populations of the ancient world evolved to the present day's *Homo sapiens sapiens* dominance. Clark Howell (1951) divided Neanderthals into two main groups, basing his assessment on morphological differences. He claimed that fossils displaying the robust, heavy-browed traits of the type specimen were dominant in Europe solely during the last Glacial while the older fossils associated with earlier interglacial layers were more widespread and modern-looking, he dubbed the western European Neanderthals 'Classic Neanderthals' and concluded that the European record was characterised by a 'neanderthalisation' through time while Neanderthals from Krapina in Croatia and Mount Carmel in the Levant underwent a 'sapienisation' and evolved into the modern-looking makers of the Aurignacian technocomplex. Clark's work concluded that an increasingly mild climatic period in the middle of the last glaciation conditioned the spread of anatomically modern humans across Europe.

The rising opposition to the empirical methods of the Culture-Historical tradition in the early 1960's lead to a new perspective in research. Culture became the key incentive in human evolution. Literature arose theorising subsistence strategies as the driving force behind evolutionary leaps like bipedalism, language and the nuclear family unit (Lee and DeVore 1968). Also physical evolution could be explained by cultural advance. According to Brace (1963), the use of tools instead of the oral cavity could have reduced Neanderthal facial traits to anatomically modern standards over time.

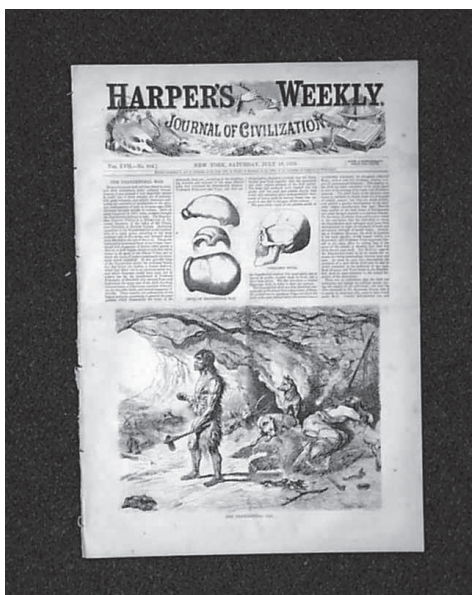
## A Cultural Capacity?

Ralph Solecki excavated a Neanderthal burial at Shanidar in Irak (Solecki 1975). Post-excavational analysis showed high levels of pollen in the surrounding soil. This was attributed to a ritual burial with flowers (Leroi-Gourham 1975). This new evidence of blatant cultural capacity was soon enhanced by another surprising discovery. A Neanderthal skull found near St. Cesaire, France presented in a clearly Châtelperronian context (Leveque and Vandermeersch 1980). This blade-based technology had previously been attributed solely to *Homo sapiens* (Gambier 1989). As more evidence gathered, researchers each embellished their own theories to incorporate or explicate this new concept of Neanderthal symbolic capacity.

Over the past 20 years, Neanderthal research has become increasingly focussed on how and when a cultural capacity has evolved and to what extent Neanderthal man actually possessed the degree of behavioural modernity that can be read in the Eurasian archaeological record. Scholars now debate whether Neanderthals themselves evolved this cultural consciousness or whether they learned or adopted the practice from the intrusive anatomically modern humans. An extensive database of expansion and migration models and lists soliciting the requirements to qualify a culture or technocomplex as culturally modern like the Aurignacian have been developed and presented. This will be further explored in Chapter Two.

## The Original Chinless Wonders

Boule's depiction of the Neanderthal in terms which have served journalists and scholars ever since as the basis for the caricature of the caveman has functioned as a stigmata. In short, Boule presented a Neandethal image consistent even today in Caveman lore and academia alike

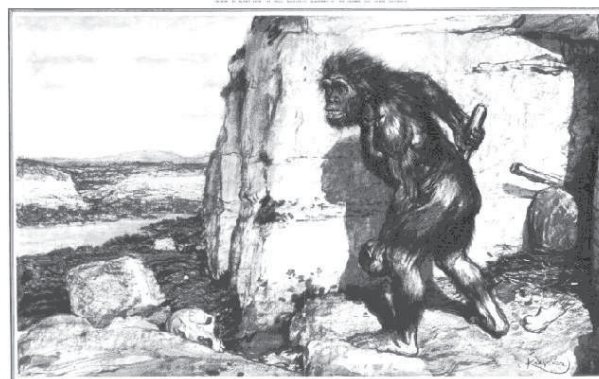


1.2 The front page of Harper's weekly, 19th July 1873.

(Brace 1964, Sommer 2006). Evidence of this influence is visible in the humanities and artists, authors and directors alike have all drawn inspiration in a variety of ways.

The first artist's rendition of Neanderthal Man was published in Harper's Weekly in 1873 (19 July edition), 35 years before the discovery of the Old Man. It showed an upright, albeit more primitive, hairless human with clothes, composite tools, a knowledge of fire and with a dog as a personal companion. It is clear from this image that Neanderthal had yet to reach it's peak as a symbol of the beastly caveman (Sommer 2006). On the contrary, the cultural setting given solicits the Neanderthals as within 'the sacred image of the same', in other words human, in accordance with the dominant theory of that time, forwarded by, among others, Mortillet.

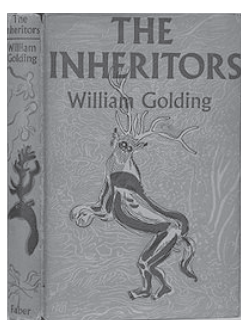
In 1909 however, the Czech artist Franz Kupka published another image in *L'Illustration*. It's imagery in comparison to the Harper's Weekly illustration is almost other worldly. Gone are the comforts of a warm cave and the companionship of canines as well as other members of the group. This representation of the Chapelle-aux-Saints Old Man, based heavily on Boule's reconstruction depicts a long-armed, club-bearing, hairy creature with highly simian features and a stooped posture, posing alone in a barren landscape.



1.3 Kupka's rendition of the Neanderthal from 1909.

Sommer (2006) comments that the shadow is considerably ape-like on close inspection. This representation distances the viewer from the hominid and clearly shows the change of attitude from the 1873 idea of 'sameness' to the 1909 manifestation of the ominous 'other'. Such art undoubtedly left an impression on the minds of the public, further solidifying the Neanderthal position as a primitive, brutish mistake on the road to full modernity.

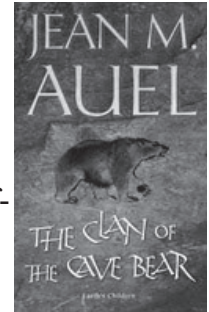
Over the next decades several artists added their own impressions, but it was not only in illustration that artisans took Neanderthals to their bosom as subject matter. Over the next decades, short stories, novels, motion pictures and television series all found inspiration in the world of the bumbling Caveman. In his 1921 short story *The Grisly Folk*, H. G. Wells writes of a clan of stupid and morally degenerate Neanderthals. They are large, clumsy creatures who are eventually hunted and annihilated by the 'True Men' from whom we are descended. Wells, like Kupka before him, drew heavily on Boule's interpretation of the Chapelle-aux-Saints specimen, making special mention of anatomical attributes such as 'those queerly shaped brains' and '...a big face like a mask, great brow ridges and no forehead' and added peculiar details such as the Neanderthals' inability to laugh (Hackett 2003). Wells' portrayal also reflects the general Imperialist opinion that the entire uncivilized world operated at an infantile level (Stringer and Gamble 1993).



1.4 William Golding, 1955.

It wasn't until the 1950's that the 19<sup>th</sup> century human-like Neanderthal was to re-emerge. In *The Inheritors* (1955) author William Golding gives life to Lok, a gentle hunter-gatherer living with his family in an evolving world. The Neanderthals in this novel are very childlike with a limited array of language and a vivid lack of understanding regarding the changes taking place around them. In the end, Lok dies alone of a broken heart after his family have been kidnapped or killed by the intrusive modern men, making this story an almost complete turn around from H. G. Wells' tale. Though this is a far more sympathetic view of Neanderthal Man, it still classifies him as lesser intelligent and unable to adapt to the changing environment of the Palaeolithic world where modern man is undoubtedly the conquering hero. Once again, the author has confirmed the prejudice alive since Boule's time.

Jean Auel's female heroine Ayla in *The Clan of the Cave Bear* (1980) is a Cro-Magnon child found and brought up by a female Neanderthal, Iza, after her parents' untimely death. Ayla's superior cognitive aptitude gives her the ability to compose new ideas concerning the group's survival. Ideas which she regularly voices, only to be met with suspicion and ignorance from the dominant males. The Neanderthal society described is strongly patriarchal and heavily reliant on tradition and included supernatural elements, such as telepathy connecting the Neanderthal tribe to its ancestors. Auel describes the males as the brutes popular image dictates, having them partake in various vigorous competitions as well as cave bear hunts, wife-beating and rape. The women on the contrary are peaceful, intelligent and civilized. Ayla eventually leaves the Neanderthals behind to their self-destructive, tradition-bound ways and seeks her own fortune in the world beyond, giving an image of the enlightened ancestors of man succeeding the primitive archaics. Common for all these portrayals are the insurmountable odds a changing world presents to the Neanderthals. In the end, they are not able to keep up and inevitably vanish in favour of the heroic modern men who rise in their wake.



1.5 Jean Auel, 1980.



1.6 Fred Flintstone with his wife Wilma and their daughter Pebbles.

As cinema and television became insolvent in popular media, they too found entertainment in the lives of Cavemen. Hanna-Barbera Productions' cartoon comedy *The Flintstones* originally aired in 1960 and gained immediate popularity. The humour in this animated series is based on the primitive, yet contemporary lifestyle lived by the inhabitants of Bedrock. Fred Flintstone lives with his wife, daughter and pets in a world where all mechanical labour is performed by tamed animals ranging from dinosaurs to recently extinct mammals and dodos. He is a clumsy, rather dim quarry worker who is quick to resort to anger over inconsequential matters and his neighbour's son shows extraordinary strength, both quite easily reminiscent of populist Neanderthal traits, though it is never explicitly said that they are Neanderthal, only Cavemen. A running gag in the show is the superior intellect of the newspaper boy Arnold, symbolising the next, more evolved generation, always seeming to outsmart Fred.

More recently *10 000 BC* (2008) introduces a community of hunter-gatherers in need of a new basis for their survival. The herds have moved on and groups of marauding 'others' are attacking social groups, abducting the able-bodied members to a life of slavery. Within this group there is an adopted female, Evolet. She has blue eyes, a trait not common among these people. Naturally, she is among those taken when the marauders do attack. Evolet is the love interest of the unlikely hero, D'Leh and his inspiration to overcome his fears and embark on a quest to rescue her. He overcomes all obstacles and returns home bearing seeds to sow. It is implied that the harvest of the seeds will secure the future of D'Leh's people. Granted, this motion picture is more parody than fact,



1.7 Promotional poster for the film *10 000 BC* (2008).



combining events spanned over tens of millennia into a single story, but the inability to survive without outside assistance and the introduction of new, strange people with an advanced society brings the classic Neanderthal narrative to mind. Also, the name of the female protagonist, Evolet is allusive to 'evolution', she is more evolved.

The above examples all reflect how the present public views Neanderthal man. Over a century after Boule's initial research, the impression of the primitive Neanderthal clearly owes its power to visual imagery and media rather than academic articles and research (Hackett 2003). The contrast between 'us' and 'them' persists, as if that is how we ultimately define ourselves and our capacities. It is very clear that the Neanderthal image was fashioned by the personal affiliations of those who discovered him (Hackett 2003, Sommer 2006, Brace 1964).

## Chapter 2.

### Theory, Method and Terminology pertaining to Neanderthal studies.

Before executing any attempt of scientific study, it is important to recognize the influences of theory, method and terminology on any approach. Though some factors may exist *a priori* they will also be scrutinised and revised during a scientific work process. Initially, in any science so well as archaeology, it is vital to label the theoretical and methodological preconceptions applicable to the study and present an overview of the potential, or lack thereof, they represent. It is also beneficial to locate and define any terms that might carry with them dogmatic presuppositions about the subject matter. These terms may have both direct effect on the research endeavour and a cognitive action on prospective readers.

This Chapter will present a review of selected theoretical, methodological and terminological conceptions valid to the presentation of this thesis.

#### Concerning Culture.

In colloquial terms, culture is an umbrella term, widely used and equally as vague. It is generally assumed to conceptualize a myriad of things. Culture can be a reason, a cause, a birthright, a way of life, entertainment, art or even a bacterial sample grown in a petri dish. Culture can also apply in non-human circumstances too. It is widely accepted that chimpanzees, gorillas, orca and dolphins all display their own forms of culture (Gabora 2001, Chase 2007). In archaeology, culture has been defined differently over time as paradigms have taken shape and ultimately been set aside.

In 1871, Tylor defined culture as “*the part of men’s behaviour that is learned*” in his book *Primitive Culture*. The Culture-Historical tradition that arose in the next fifty years based interpretations on the empirical premise that archaeologists could not discover facts about past societies from the archaeological record. Culture, synonymous with ‘People’ or ‘Race’ at this time was tantamount to the tradition and spatial variation in material culture mirrored ethnic or racial variation, while similarities were a result of shared spirituality and identity within a group (Olsen 1997). Changes in the culture of a historical society were typically explained by the diffusion of ideas from one culture into another, or by the migration of members of one society into a new area, sometimes by invasion.

Bruce Trigger (2007) notes that Culture-Historical archaeology “was a response to growing awareness of geographical variability in the archaeological record at a time when cultural evolutionism was being challenged... These developments were accompanied by growing nationalism and racism, which made ethnicity appear to be the most important factor shaping

human history.” The prehistoric record was initially interpreted by paradigms based on induction from later periods, but as time passed and more and more material was accumulated, it became clear that culture history could not explain it all. By 1951, nine years after the death of Marcellin Boule and six years after the second World War, Vera Gordon Childe had hailed culture as “*the durable material expression of an adaptation to an environment, human as well as physiographical, that enabled a society to survive and develop*” (1951).

In 1962, a young man spent a night awake writing what would become one of the most referenced pieces in archaeological theory and method. Lewis Binford (1962), expanded upon his mentor, Leslie White’s definition of culture as “the extrasomatic means of adaption for the human organism” (1959) and from it developed a whole new system of cultural detection. This gave birth to a new direction in archaeology, the Processualist tradition, also called the New Archaeology (Sabloff 1998). This new movement called for a scientific definition of archaeology and promoted a cross-disciplinary testing of theories. An example would be anthropological studies used as reference when interpreting the archaeological record.

Binford felt that the “lack of theoretical concern and rather naïve attempts at explanation which archaeologists currently advance must be modified” (Binford 1962). He proposed stepping away from the empirical Culture-Historical tradition to a hypothetical-deductive approach where the goals of research were to interpret artefacts based on their function in living systems and to find a set of positivist laws applicable to all societies. While historical explanations had so far served to explicate the mechanisms of a cultural process, systemic explanations gave life to the cultural processes behind the artefact or event. In such an interpretation, environmental factors had to be taken into account since the environment a culture inhabits must have a direct influence on it’s structure (Childe 1951). The logical connection that offers us this knowledge lies in the processes behind the artefact, giving the following middle range theory;



This systematic adjustment involved looking within a cultural context to find the true meaning behind an artefact. Binford (1962, 1965) proposed three categories of material culture within a cultural process; *technomic* artefacts with primary functions pertaining to the physical environment, *socio-technic* items which reflect sociocultural relationships, extrasomatically articulating individuals together into cohesive groups capable of managing both themselves and technology and *ideo-technic* artefacts with a primary function in the ideological sphere, signifying and symbolizing ideological rationalizations and providing the symbolic milieu of enculturation in which individuals are encultured. In addition to these, a set of formal stylistic attributes would encompass the milieu of enculturation and give a basis for the recognition of social distinctiveness.

Such research would produce laws about cultural processes and groups. Through other movements arose in subsequent decades, Binford's influence, and that of his contemporaries, radically changed the outlook of anyone working with the concept of culture in the archaeological record. Scholars turned their attention to the behavioural processes behind the material culture.

As a reaction to the New Archaeology and the issues connected to identification of universal laws dictating the connection between behaviour and material culture shown in ethnographical studies (Trigger 2007), the 1970's and -80's saw the rise of a new theoretical movement. Initially expanding from the United Kingdom and Europe, Post-processualist thought rejected positivism and empiricism along with the scientific definition of archaeology deeming it rather a social science. Post-processualism itself is an umbrella term, encompassing French structuralism, post-structuralism, marxism, feminist theory, critical theory, hermeneutics, behavioural and cognitive archaeology. Post-processualist researchers believe that human behaviour is too complex to be determined through process alone and that people structure their material world and natural processes do not entirely remove this structure (Trigger 2007, Dark 1995).

The concern for the implications of symbolism among post-processualists has encouraged a more cognitive approach to emerge in archaeology and thereby also in the definition of culture. Culture was no longer a purely material entity, the remains of past behaviour, it was now also psychological in nature. In the 1980's post-processual and processual scholars alike developed the theoretical background of what Renfrew (1985a) called "the archaeology of the mind". Cognition refers to the manner of thinking and how the mind operates. This cognitive archaeology encompasses everything concerned with belief, thought, perception and decision-making. Rituals, symbolism and planning also fall under this category. While post-processualists use this to define theories of society and investigate the individual and relative values of time and place to a culture, processualists believe that cognition in the past is analogous with generalisations about cognition based in the present. Cognition, like behaviour, is specific to space and time as well as to the individual and lies at the heart of post-processualist thought (Dark 1995, Deacon and Deacon 1999), giving the following middle range theory;



By 1997 Gabora had commented that culture is 'qualitatively different from anything else biology has produced.' Culture as a concept had been broken down into psychological entities, memes. These replicators of cultural information are analogous to genes and 'propagate themselves in the meme pool by leaping from brain to brain' (Dawkins 1976). When a cultural trait arises, 'the form it takes reflects the accumulated knowledge of individuals, the circumstances they found

themselves in, and the social structure in which they are embedded (Gabora 2001). The concept of memes will be revisited in Chapter 7 where the definition of culture used in a given study will be proved central to present day discussions of Neanderthal behavioural modernity.

It seems clear from the overview that most researchers presently agree that culture in archaeology denotes the material remains of past behaviours and that its material manifestation is dependent on the environment in which it is produced. But with archaeology moving more and more towards the immaterial processes behind artefacts and signs of culture visible in non-humans, we look to the concept of modern human behaviour to discern between cultures and dub them thereby primitive or modern. As logic requires, a culturally modern society would leave behind the material remains of modern human behaviour.

As seen in Chapter 1, it is more or less only since the dawn of processualist thought that Neanderthal research has at all opened to the possibility of this cognitive capacity in the archaic Eurasians. Cross-disciplinary studies published over the past 50 years have widened our horizon pertaining to the depth of information available from an artefact. Likewise, the study of cognition and the manifestations of behaviour on the processes employed to produce Neanderthal material culture have opened doors to new understanding of their society as we shall see in chapters 4, 5 and 6.

#### Dating methods.

The history of human evolution is based, for the most part, on punctuated chronological events evident via the application of various dating methods. The spaces between these events and the processes behind them are filled in by qualified assumptions (Pettitt 1999). It can be likened to a colouring where the dates are dots which when joined produce an outline that scholars later attempt to colour in. It is in this process of 'colouring in' that hypotheses are created. More dots create a more detailed outline as more dates give a clearer timeline. The fewer gaps, the less assumptions.

When studying Neanderthal Modernity, it is pertinent to have a secure and high-resolution chronological framework on which to base a hypothesis. Initially, researchers relied solely on intra-site stratigraphic sequences, and while these can be effective to a certain degree, e.g. in intra-site investigations where an occupation is evident over several generations, undisturbed sequences are rare and excavations of such sites at current day standards are even rarer. On a regional basis, stratigraphic sequences are a less effective method of dating and comparison. Radiometric dates are therefore paramount to inter-site comparative studies (Zilhão 2006). Though the array of dating methods has widened greatly over the past few decades,  $^{14}\text{C}$  dating is the standard when recording Neanderthal sites.

It is unfortunate then that  $^{14}\text{C}$  dating is far from the optimal method for this period. The total range of radiocarbon dating is approximately 50 kyr (thousand years, Hughen *et al.* 2004), but

samples older than 23 kyr tend to provide significantly underestimated dates. This is due to time-varying processes which affect  $^{14}\text{C}$  production in the atmosphere and a varying distribution of  $^{14}\text{C}$  among global carbon reservoirs (Hughen *et al.* 2004). The low proportion of carbon remaining in the oldest samples is also an issue. Even the tiniest amount of contamination to such a sample can have a dire effect on the date obtained (Mellars 2006).

In an effort to overcome these issues, scholars have formulated several methods of calibration. One such curve has been organized through the correlation evident between a series of marine  $^{14}\text{C}$  measurements and the stratigraphy recorded in the Greenland Ice Sheet Project 2 (GISP 2) (Hughen *et al.* 2004). Comparison of  $^{14}\text{C}$  and Uranium-thorium dates from corals have also provided a marine calibration curve valid to the last 30 kyr (Bard *et al.* 1990). These studies, along with various others published (eg. Chin *et al.* 2005, Voelker *et al.* 1998) have revealed that not only do traditional  $^{14}\text{C}$  dates diverge drastically from calendar years, but the results of different calibrations also differ from each other (Mellars 2006a).

In a study from 1998, Kitagawa and van der Plicht uncovered inconsistencies in the deviation between radiocarbon years and calendar years beyond 31 kyr. It is therefore not possible to simply add 3000 years to the obtained  $^{14}\text{C}$  years as practised by some authors (Zilhão and d'Errico 1999). These discrepancies also suggest that a direct comparison of different dating methods such as electro spin resonance (ESR), thermoluminescence (TL), optically stimulated luminescence (OSL) and radiocarbon dates would not be secure (van der Plicht 1999).

Advances in pretreatment due to improvement of the instruments applied in accelerator mass spectrometry dating have greatly diminished issues connected to contamination. The application of ultrafiltration preparation techniques to samples has significantly reduced the risk of contamination (Bronk Ramsey *et al.* 2004).

Despite these advances both in calibration and anti-contamination methods, creating a secure chronology of the Neanderthal record is still handicapped by a lack of consensus regarding the correct application of obtained dates and of which calibration method is most reliable. In addition, differing interpretations of dating results between authors means the placement of singular finds in a chronological sequence differs greatly with each hypothesis (d'Errico and Sanchez Goñi 2003).

### Spatial Patterning.

As well as its placement in a stratigraphical context, the location of an artefact within a specific occupational level can also give an indication of the cognitive processes behind it. The concept of spatial patterning relies heavily on anthropological studies that have shown generalisations in the use of living space. Binford (1983a) presents an excellent case in his renowned study of archaeological patterning produced by people sitting around a hearth. The

evidence, photographs and anthropological descriptions, can be applied to the distribution of waste products, such a flint residue and faunal remains spread over an archaeological site.

Hodder (1982b, c) also suggests that a well-planned utilization of living space can produce knowledge of social organization. Deacon (1999) comments that a well tended hearth is evident of a strong female presence while Wadley's (2001) study of Rose Cottage Cave in South Africa has clearly shown a detailed plan in the use of living space. Such organisation shows a purposeful designation of specific areas of the living space to certain jobs.

The study of spatial patterning in archaeology is vulnerable to post-depositional influences and a secure stratigraphical context and as such, is open to criticism. Later intrusions, such as burials and erosion, can complicate the occupational surface and confuse results. An example of this would be the supposition that the skeletal remains of Vogelherd and Velika Pećina were recently proved to be intrusive Holocene burials rather than evidence of anatomically modern humans early presence in Europe (Smith *et al.* 1999, Conard *et al.* 2004). Even the sweeping of a domestic area by later inhabitants can skew the image of spatial patterning available to excavators.

#### DNA analysis.

DNA analysis has featured in Neanderthal research since the 1980's. The African Eve hypothesis originated from DNA studies showing that all modern day human populations stem from a common ancestor on the African continent some 200 000 years ago (Cann *et al.* 1987). This result has been forwarded as evidence against Neanderthal inclusion in the modern human genetic gene pool and was in later years supported by several studies into Neanderthal and modern human genetic diversity. In the past fifteen years mitochondrial DNA (mtDNA) studies have also produced evidence that Neanderthal genes fall outside the variation of modern human genetic diversity (Kriings *et al.* 1999, Ovinnichov *et al.* 2000, Ovinnichov 2005). Mitochondrial DNA is hereditary through the maternal line (Birky 1995).

Though DNA has been hailed as indisputable evidence, some have critiqued the methods applied (Abbott 2003). The process of procuring DNA from an ancient hominid is a meticulous and intricate process going through several stages of filtration before the final test sample is securely identified. Not only could degradation or chemical damage result in irretrievable DNA or misreadings, but contamination of the specimen, laboratory reagents and instruments with residual traces of modern human DNA must be avoided at all costs. In addition, the DNA available in the fossil record is also sensitive to natural post-depositional processes. Percolating water has been forwarded as a reason not all bone in layer G3 at Vindija, Croatia is equally well preserved (Green *et al.* 2006).

The successful mapping of the Neanderthal genome was published in May 2010 by researchers from the Max Planck Institute in Germany and did indeed produce evidence of such interbreeding (Green *et al.* 2010). As well as familial issues, mapping the Neanderthal genome has

the potential to examine the question of interbreeding between anatomically modern humans and Neanderthal as well as issues such as language ability and descent. It also opens for the study of biological studies of elements not yet available through any other process, and also as reference material in research into human/chimpanzee diversity and the identification of so-called 'selective sweeps' in modern humans (Green *et al.* 2006). As we shall see in Chapter 7, interbreeding even on a small scale implies an interaction that culturally is arguably significant. The implications of this study, along with a more detailed overview of the results, will be presented and discussed in Chapter 7.

### Defining Modern Human Behaviour.

Having found that a definition of culture today is heavily based on a cognitive approach, it is also critical to define what culture is in the material archaeological record. In 1967, Fredrik Barth defined culture as simply "nothing but the way to describe modern human behaviour. But what exactly is it that makes a behaviour modern?"

Henshilwood and Marean (2003) define Modern Human Behaviour as "... *behaviour that is mediated by socially constructed patterns of symbolic thinking, actions, and communication that allow for material and information exchange and cultural continuity between and across generations and contemporaneous communities*".

The accepted archaeological criteria believed to indicate Modern Human Behaviour are the behaviours that distinguish anatomically modern humans in the European Upper Palaeolithic from the Middle Palaeolithic Neanderthals. With a background in the Human Revolution model, a list of traits were set up as the hallmarks of modernity. Though this list has been contested and debated thoroughly over the past few decades, and though different researchers have applied different approaches to the subject, it is widely accepted that modern human behaviour can be seen in the material remains of symbolism, technology and economy employed by a culture.

Lyn Wadley (2001) hails "storage of symbolic information outside the human brain... the first undisputed evidence for cultural modernity". Symbolism opens the door for abstract thinking and the use of language and can be detected in several different ways. The use of ochre or manganese as ritual colourants, burial of the dead with or without grave goods such as ochre or other ritual objects, organized use of domestic space, standardisation of artefact types and of course in art, ornamentation and decoration (Henshilwood and Marean 2003).

Behavioural, economical and technological innovations are also thought to be signs of modern human behaviour. The traits marking this advance can be seen through worked bone, wood and antler artefacts, blade technologies, artefact diversity, changes in subsistence strategies (such as large mammal exploitation, fishing and fowling), expanded exchange networks, seasonally focussed mobility strategies and the use of harsh or marginal environments (Henshilwood and Marean 2003, D'Errico 2003, McBrearty and Brooks 2000, Mellars 2005).



Common for all of these ‘hallmarks of modernity’ is the inherent use of cognitive capacity to plan, evaluate and innovate. The arrival of these traits mark the origins of people placing value into items not directly related to survival. The desire to spend hours perfecting a tool beyond any call of purpose, the inspiration to put plan into action and gain long term rewards, and finding the ability to craft a language not bound by the physical world certifies a new outlook in the individual not only towards others in a social group, but towards the natural world he/she exists in. Chapters 4, 5 and 6 will delve deeper into the technological, economic and symbolic markers evident in Neanderthal assemblages.

Behaviour	Trait
Technology	Standardization of artefact types Artefact diversity Blade technology Worked bone, antler and other organic raw materials.
Economy	Effective large mammal exploitation Seasonally focussed mobility strategies Fishing and fowling Expanded exchange networks Use of harsh environments
Symbolism	Organized use of domestic space and complex hearth construction Symbolic use of ochre Ornamentation Art Burial of the dead as an indicator of ritual

*Traits Used to Identify Modern Human Behaviour: After Klein (1995), Mellars (1996), Deacon (2001), d’Errico (2003) and Henshilwood and Marean (2003).*

### Key Models for the Origins and Spread of Modern Human Behaviour.

The influx of modern human behavioural markers in Europe after ~40 000 BP is commonly called the Upper Palaeolithic Revolution (Stringer and Gamble 1993, Cunliffe 1994). It is shortly after this period that the European Neanderthals disappear from the archaeological record. How these markers came to be so prominent from this time onwards has been the basis of one of many models of the dispersal of modernity. To properly assess the validity of this ‘revolution’ or any other model, one must take a closer look at what each entails.

#### *African Origin, early: Human Ancestral.*

This model focusses its attention on the Acheluen/Middle Stone Age boundary 250,000 years ago (Deacon 2001, Henshilwood and Marean 2003, Gamble 200?). Proponents of this theory claim that the transition to modern human behaviour happened in Africa and then spread throughout the Old World. The lack of anatomically modern humans at this time opens the door for the possibility of modern human behaviour in archaic species. Support for this theory is found in the Kapthurin Formation where blade production is dated to 250,000 years ago (Deacon 1998, Gutin 1995). As for Neanderthal modernity, researchers believe that the supportive evidence is a product of acculturation as anatomically modern humans later made their entrance to Neanderthals habitats.

A similar line of thought places the origins of modern human behaviour between 195,000 and 128,000 years ago (Deacon 2001, Henshilwood and Marean 2003), even though it is from the beginning of the Late Pleistocene (125,000 BP) that the Middle Stone Age deposits in Africa are particularly rich (Deacon and Deacon 1999:95, McBrearty and Brooks 2000). Henshilwood and Marean (2003) explain that the lack of sites dated to the earlier MSA may be due to the fact that “populations were small and concentrated on now submerged offshore platforms during [oxygen isotope] stage 6”.

#### *African Origin, recent: Single Species.*

Greatly synonymous with the *Human Revolution* theory, this model rests its defence on the grounds that the Upper Palaeolithic (UP) produces some of the earliest, if not the earliest, proof of symbolic behaviour (Deacon and Wurz 2001, Mellars 1991). Prior to the 1990's there was widespread agreement that modern human behaviour originated only between 50,000 and 40,000 years ago. Thus implying that anatomically modern humans before this time were not behaviourally modern (Henshilwood and Marean 2003). Mellars (1991) remarks that the abrupt appearance of the Upper Palaeolithic can be described as a “cultural explosion”. This explosion of cultural material presumably evolved “at the flick of a switch” (Gamble 1993).

The abrupt appearance of modern human behavioural traits in Europe in the essence of this theory. Proponents believe that the indicative traits appeared as a package and rely solely on their temporal boundary. Although most researchers today agree that modern human behaviour originated in (northern-) Africa, the evidence for this model is still best represented in the European Cultural explosion (Henshilwood and Marean 2003). The African recent model discriminates the African Middle Stone Age (MSA) from the Late Stone Age (LSA) in the same way as it discriminates the European Middle Palaeolithic (MP) from the Upper Palaeolithic, ascertaining that modern human behavioural traits can be identified solely in the LSA and UP. Proponents assign to the MP and MSA key features such as absence of art, simplistic technology that lacks diversity and fairly basic subsistence strategies, where meat was solely acquired through scavenging (Klein 1995).

According to this model, modern human behaviour spread with culturally superior anatomically modern humans to the rest of the Old World and signalled a replacement of indigenous, archaic hominids. Replacement of Neanderthal populations in Europe by modern Cro-Magnon people seems to support the idea, indeed proponents advocate the Neanderthals as a different species; designating them *Homo neanderthalensis*. The sudden movement of anatomically modern humans north from the Levant around 40,000 years ago after tens of thousands of years in an environmentally controlled state of fluctuation is taken as a reliable indication that behavioural modernity originated around that time (Henshilwood and Marean 2003). The subsequent replacement of the archaic populations in Europe, Asia and Indonesia is seen as evidence for the greater cognitive abilities of the Cro-Magnons (Deacon and Deacon 1999:100). It is also claimed that the new technologies and mannerisms of the invasive moderns are highly evident in the archaeological record (Mellars 1996, Stringer and Gamble 1993).

Richard Klein explains this sudden emergence of symbolic behaviour in his *Neural Advance* theory. He maintains that the emergence of modern human behaviour 50,000 years ago was “the last in a long series of biologically based advances in the human mental and cognitive capacity (Klein 1992:12). This cognitive development is potentially unrecognisable in cranial anatomy (Henshilwood and Marean 2003). Klein also argued that modern behaviour and anatomical modernity had to evolve together (Wadley 2001) and thereby questions the actual modernity of fossil remains defined as anatomically modern which are older than 50 000 years BP.

The Recent African model, though newer articles have moved the dates used back to around 80,000 BP for the appearance of modern human behaviour (Mellars 2007, Klein 2008), still concentrates the evolution of modern human behaviour, the migration of anatomically and behaviourally modern humans throughout the Old World and the extinction of archaic hominids into a very short time span (Henshilwood and Marean 2003).

#### The Gradualist Approach: Multi-regional continuity.

Lindly and Clark (1990) contest that a punctuated break took place between the Middle and Upper Palaeolithic or at all. Gradualist researchers contend that humans developed to their current behavioural state in different places at different times. This can be based in the fact that “the genetic fixation of the neural substrate necessary for symbolic communication would have required invariable symbolic behaviour over thousands of generations and probably took somewhere upwards from 100,000 years to complete” (Deacon and Wurz 2001). If this is so, this approach opens for the possibility of archaic human forms also having the capacity to evolve modern behaviour over time.

Another fraction of Gradualists claim that behaviour may have emerged in different areas and coalesced to become behavioural modernity as we define it (Stringer 2002). This is echoed in the words of Henshilwood and D’Errico (2003) where they convey the thoughts of other authors “*the development of ‘modern’ behaviours is likely to have been a vast and complex series of events that probably developed according to a mosaic pattern*” (cf. McBrearty and Brooks 2000). It is also argued that this mosaic might include the Neanderthals (d’Errico 2003).

#### The Cultural Model: Multi-regional, Multi-species.

This model for the spread of modern human behaviour promotes the thought that modern day man has developed through adaptations to different environs and through interaction and interbreeding with other hominid types. Modern human behaviour thereby arose at different times in different places as a result of outside stimulus.

Francesco D’Errico (2003) forwarded the case for a multi-species origin for modern human behaviour. He advocated that Neanderthals also had the capacity for modernity by reviewing finds related to Neanderthals in light of the traits of modern human behaviour. Later discoveries in DNA research have also given evidence for the presence of modern behavioural traits in other archaic humans. The testing of fossil bone found in Denisova Cave in Siberia has proven that ornaments in

the same stratigraphical context may be the product of a third human subspecies contemporary to both anatomically modern humans and Neanderthals (Reich *et al.* 2010).

Proponents of this model also claim that “Neanderthal populations living in Europe during oxygen isotope stage 3 produced a repertoire of cultural behaviours – personal ornaments, formal stone and bone tools, pigments, burials – which are generally considered as hallmarks of behavioural modernity (Henshilwood and d’Errico 2005 and references therein) and now also base their conviction on DNA results from the Max Planck institute in Germany proving that Neanderthals contributed DNA to the modern population (Green *et al.* 2010).

The aim of this model is to promote the idea that there is no significant difference between Neanderthal subsistence, technological and symbolic behaviours and those of anatomically modern humans and other contemporary hominids displaying traits of cultural modernity. Proponents argue that finds containing Neanderthal burials and the discovery of the Châtelperronian and other transitional industries in Europe belong in a Neanderthal context support the theory and imply that Neanderthals were already developing their own transition to the UP before anatomically modern people arrived in Europe. D’Errico explains the coincidental appearance of modern traits and the migration of anatomically modern humans, arguing that “*the new situation involving contact between anatomically modern people and Neanderthals and the consequent problems of cultural and biological identity ...stimulated an explosion in the production of symbolic objects on both sides*” (2003).

Other evidence supporting this view can be found in the African archaeological record where plentiful examples of art, symbolism and technological advance pre-dating the UP revolution can be seen in the archaeological record of sites such as Blombos Cave and Klasies River (Henshilwood and Marean 2003).

## **Chapter 3.**

### **The Ice Age Continent.**

If it is so that culture and its manifestation in the material record is dependent on the environment in which it thrives then any study of Neanderthal culture must also present an overview of the environment in which Neanderthals prevailed. Neanderthal occupation of Europe ranges from 200 000 to 27 000 BP (Mellars 1996, Finlayson 2004), covering several contrasting climatic periods. After an overview of Neanderthal origins, this chapter will provide an overview of the environmental factors valid to a discussion of Neanderthal behaviour.

#### Etymology.

The name Neanderthal derives from the Neander Valley in Germany where the Feldhofer specimen was discovered in 1856. In the 1800's the German spelling of 'valley' was 'thal' thus giving the name 'Neanderthaler', loosely translated 'person from the Neander Valley'. Since then there have been changes in German orthography and 'thal' is now 'tal'. The use of Neanderthal/Neandertal is today interchangeable, though Neanderthal is more prominent in British English (Trinkhaus and Shipman 1992).

#### Neanderthal Origins.

Dmanisi in the Republic of Georgia, offers evidence of hominid presence in Central Asia at 1,77 million years ago (Vekua *et al.* 2002). The two almost complete skulls have been designated as *Homo erectus*, the forefather of both the Neanderthals and anatomically modern humans. At Sima del Elefante, Atapuerca, Spain, anatomical evidence of hominids crafting tools more than 1 million years ago is found in the form of a tooth, a jaw fragment and a proximal phalange (Bermúdez de Castro *et al.* 2004). The Gran Dolina site nearby, has revealed the remains of at least six individuals dating to the end of the Lower Pleistocene, about 800 000 BP (Bermúdez de Castro *et al.* 2004). The fossils have been given the classification *Homo antecessor*. This is the earliest evidence of human presence in Western Europe and may possibly represent a regional evolution from *Homo erectus*, having larger cranial capacity and a sapienisation of cranio-facial architecture.

Another of the earliest securely dated sites in Europe is Isernia La Pineta south-east of Rome, Italy. This site rests stratigraphically beneath a volcanic horizon where the Brunhes/Matuyamu boundary occurs, confirming a date of at least 730 000 years. Unfortunately, this site does not offer any hominid remains (Cunliffe 1994).

230 000 years later we find the first dated glimpse of the next step in European hominid evolution. By this time, Europeans had already undergone a marked regional evolution. A new type of hominin had evolved from the sub-Saharan form of *Homo erectus*, archaic *Homo sapiens*. A massive mandible from a gravel pit at Mauer near Heidelberg was discovered in 1907. This specimen is often referred to as *Homo heidelbergensis* (Cunliffe 1994). A minimum of 28 individuals of this species have been unearthed at Sima de Huesos, Atapuerca, Spain dated to around 500 000 BP (Bermúdez de Castro *et al.* 2004). These individuals endured up until 200 000 BP. After 200 kyr BP, we see evidence of yet another hominid appearance. Neanderthals, *Homo sapiens neanderthalensis*, evolved from *H. heidelbergensis* through archaic *H. sapiens* (Cunliffe 1994, Stringer and Gamble 1993).

As seen in the Pontewydd and Arago specimens from Northern Wales and southern France respectively, the Neanderthals facial traits and thickening of dental roots evolved in those archaic hominids. These ancestral traits are found in later populations along with a robusticity of the cranium and evidence of a massive musculature as well as very thick limb bones. The large Neanderthal skull housed an equally large brain, typically measuring 1600 cm<sup>3</sup>, at the high end of anatomically modern human size range. A variation such as this can be attributed to cold habitat adaptation, a thermoregulatory mechanism reducing the metabolic expenditure of regulating the temperature of such a costly organ (Cunliffe 1994). Large teeth and a large nose are also typical traits, the latter designed to warm air during inhalation to protect the brain. The long, low cranium rounds off in an occipital bun while the front, or face, just out under heavy brow ridges and ends in a chinless jaw (Klein 1992, Stringer and Gamble 1993, Mellars 1996).

Heightwise, Neanderthals were short and rather stocky. Males averaged at a height of 1.65 m while females were generally 10 cm shorter. Both sexes displayed a robusticity of build with characteristically short legs and long bodies. These morphological variations are best explained as local adaptation to cold stress (Cunliffe 1994).

#### Glacials, interglacials, stadials and interstadials.

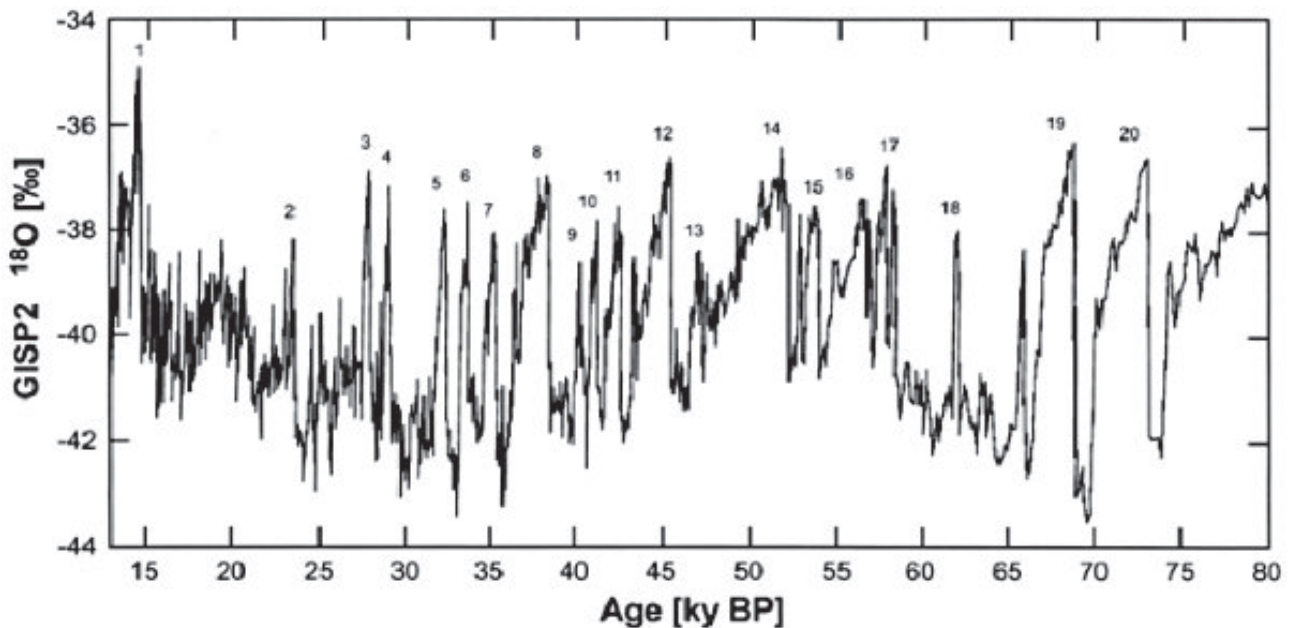
In 1909, Penck and BrUckner determined that the Pleistocene contained four Ice Ages following studies in the alpine foreland; Gunz, Mindel, Riss and Würm. Today it is clear that the chronology of the Pleistocene was far more complicated. The climate fluctuated between predominantly warm and cold periods. Long-lasting cold periods are known as glacials while the corresponding warmer periods are called interglacials. Stadials and interstadials appear within glacials and interglacials and reflect shorter cold and warm events, respectively.

It is important to note that the relative nature of a stadial or interstadial to the preceding climatic periods can result in some interstadial conditions being similar to stadial conditions of other time periods (Behre 1989).

### Oxygen Isotope Stages.

The current pattern of Ice Ages derives not from the continent, but from the tiny skeletons of marine creatures trapped in sediment on the ocean floor. In life these foraminifera lived at the surface of the oceans where their skeletons, consisting of calcium carbonate, absorbed oxygen isotopes present in seawater. By measuring the ratio between two specific isotopes, oxygen-16 and oxygen-18, researchers have developed a method of determining Pleistocene climatic variation (Mellars 1996, Cunliffe 1994).

In colder, glacial periods great icesheets would expand from Caledonia, the Alps, and the Pyrenees and water from the oceans would become bound inland, leaving the seas less voluminous. The lighter  $O^{16}$ -isotope followed this water migration inland whilst the heavier  $O^{18}$ -isotope remained in the oceans. In such periods, the ocean levels sank to a maximum of 150 metres below present day levels, exposing the North sea Continent between Europe, Britain and Scandinavia and opened a plain in the Adriatic. Milder periods witnessed the retreat of these ice sheets and the return of moisture to the rising oceans along with the  $O^{16}$ -isotope, giving a lighter isotope count (Cunliffe 1994, Shackleton 1967). These variations in OI-count are recorded in the chemical construct of foraminifera and can be read to this day in the analysis of core samples from sea beds and ice sheets (Stringer and Gamble 1993).



3.1 Ratio of O-18 isotope over the past 80 000 years. After GISP2.

Perhaps the most profitable side of this information is that it can not only be measured, but also dated. Over time the OI-ratio shows a jagged and continuous sequence of repeated glacial and interglacial stages. In the past 730 000 years, since the Brunhes/Matuyamu boundary when polarization was reversed and the Middle Pleistocene began, there have been eight full glacial/interglacial cycles.

Analysis of the last cycle shows that the extreme opposites of warm, forested interglacials and cold, full glacials were comparatively short-lived. Using this as a template for earlier periods shows that most of the Ice Ages were neither fully glacial nor interglacial, but rather somewhere inbetween. Neither were these intermediates constant. Stadials and interstadials within a glacial or interglacial denote interstage changes in temperature.

Throughout this thesis 'oxygen isotope stage' will be contracted to 'OIS'.

### Pollen sequences.

A second source of environmental information spring from pollen sequences originating from various sites in Europe. La Grande Pile and Les Echets in France, Valle di Cartiglione in Italy and Padul in Spain (Woillard and Mook 1982, de Beaulieu and Rielle 1984) show long and highly detailed sequences stretching over thousands of years. Other sites, such as Hengelo and Amersfoort give information about shorter timespans. Pollen preserved in these cores can paint a picture not only of the temperature of a certain period, but also of the flora present in a given area at a specific time (Mellars 1996).

By correlating the results of both OIS studies and pollen sequences, it is possible to create an image of the landscape Neanderthals once lived in. Temperature and topography dictate flora which again dictates the herbivores and carnivores present in a specific area.

### Oxygen Isotope stage 3.

OIS3 has been called "one of the most enigmatic parts of the last glaciation" (Mellars 1996), and it is this period especially that has been scrutinized in terms of late Neanderthal lifestyle. Ranging from 60 000 to 25 000 BP, OIS3 encompasses both the anatomically modern influx to Europe and the Neanderthals' ultimate disappearance from the archaeological record after around 27 000 BP (Finlayson 2004). Though this period is predominantly mild, no less than a dozen significant climatic oscillations have been noted in the high-resolution studies of oxygen isotope ratios in ice cores (GRIP members 1993, Dansgaard *et al.* 1993, Bond *et al.* 1993). Many of these stadials and interstadials, called Dansgaard-Oeschger stadials and interstadials, have short transitions of less than 50 years (Dansgaard *et al.* 1993) and most were short-lived, of around 1000 years in duration. It is believed that the brief nature of these oscillations did not manifest fully in the larger picture of climatic amelioration (Mellars 1996). The pattern of highly variable and rapidly fluctuating climatic and ecological conditions during OIS3 is of particular interest from an archaeological and behavioural standpoint.

Some researchers have forwarded the opinion that the climatic conditions of this period had an adverse impact on Neanderthal survival (Finlayson 2004, Gamble 2004, Mellars 1998). Their standpoint is simply that Neanderthal was unable to adapt to the climatic constraints on their livelihood. Anatomically modern humans, on the other hand, seized the opportunity of expansion



and with their superior brain devised better methods to exploit the resources of Europe, ultimately succeeding the archaic population. Such climatic constraints would encompass a switch in flora and thereby Neanderthal choice of prey.

### Flora and Fauna.

	Europe	Middle East and Central Asia
Carnivores	cave bear, lion, hyena, wolf, leopard, arctic fox, red fox, lynx, wolverine, badger, wild cat, caucasian dhole	wolf, hyena, jackal, tawny fox, brown bear, extinct fox
Herbivores	aurochs, bison, giant deer, horse, red deer, reindeer, pig, roe deer, ibex, chamois, steppe ass, saiga antelope, wild sheep, musk ox	red deer, fallow deer, gazelle, wild sheep, wild goat, pig, roe deer, onager, steppe ass, hartebeest
Megafauna	mammoth, woolly rhino	hippopotamus
Large rodents and lagomorphs	porcupine, hare, rabbit, marmot	beaver, marmot, pika, hare, rock hyrax

*Variation of fauna in areas of Neanderthal settlement (After Stringer and Gamble 1993)*

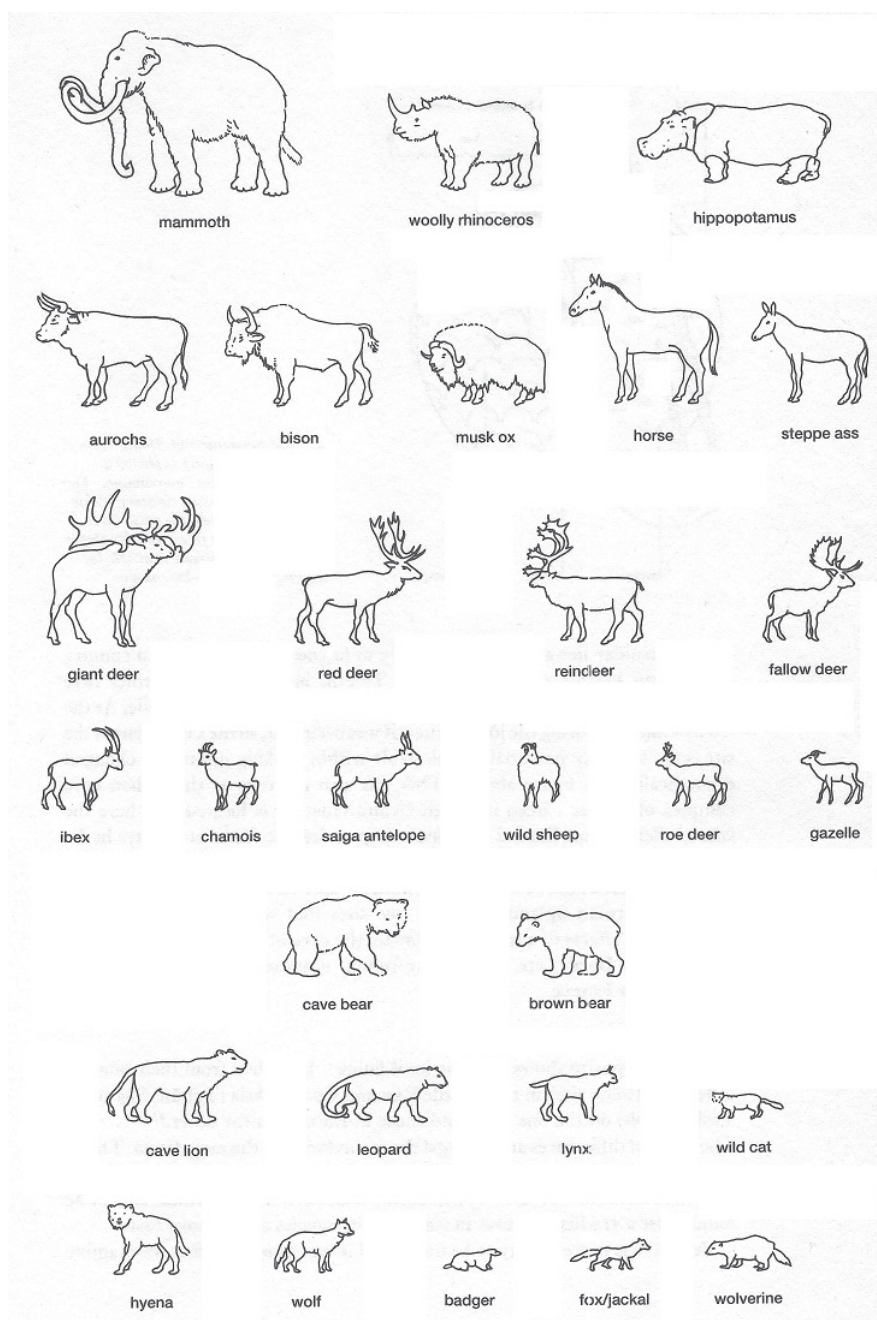
In an oscillating climate, it is natural that the vegetation and also fauna of an area also fluctuates. In general terms, there is a typical sequence. At the dawn of an interglacial, or lengthy interstadial, the floral record shows an initial period of birch- and pine dominated forestation followed by a consistent succession of warmth-demanding deciduous species ranging from elm and oak, through to alder, hazel, yew and hornbeam. During the last interglacial period, OIS5e dated from 126 to 118 kyr ago, thick forest colonized most of the European continent. In fact, in OIS5e temperatures rose to a high of 2-3 degrees centigrade above present day temperatures and faunal evidence shows the presence of semi-tropical species such as hippopotamus and the European pond tortoise in Northern Europe (Mellars 1996).

Towards the end of a warm period, as temperatures waned, a reversion to coniferous species such as spruce, silver fir and pine can be seen in pollen records. A further indication of waning climatic conditions is a shift towards more open landscapes recorded in pollen sequences by a rise in species associated with a more steppic or tundra-like topography. Periods of a more open character are typified predominantly by grasses, sedges or other tundra-like plants and steppic species such as *Artemesia*, *Thalictrum* and *Chenopodiaceae* (Zagwijn 1990), though some patches of hardy tree-life such as pine, birch and willow are evident (Mellars 1996).

In contrast to OIS5e, OIS4 was a period of major expansion of the continental ice sheets. Scandinavia went from being an island to being covered by a thick ice-sheet and temperatures fell dramatically. The polar front in the north Atlantic extended to the latitude of 45 degrees north. During this period vegetation in northern Europe below the massive and extensive glaciation consisted entirely of open tundra, possibly also with areas of barren polar desert and midsummer temperatures have been estimated to around 5 degrees centigrade. In southern Europe however,

a drier and more continental climate produced a more steppic flora (Mellars 1996, Stringer and Gamble 1993).

Herds of animals would have thrived in both open and forested conditions, but perhaps more so in the open steppe/tundra conditions. Bison, horse, red deer and reindeer were supplemented by megafauna – mammoth, woolly rhinoceros, giant deer, musk ox and aurochs, and in some areas also by ibex, chamois and wild sheep. Carnivores also reigned abundantly in these habitats. Lions, hyena and wolves were commonplace, alongside the massive cave bear.



3.2 An Ice Age Bestiary. After Stringer and Gamble 1993, p. 21.

### Neanderthal occupations.

Having developed morphological traits specialized for a colder climate (Cunliffe 1994), Neanderthals were well adapted physically to survive in Ice Age Europe. Even so, in colder periods like OIS4, Neanderthal sites are confined in the more southern regions of Eurasia (Mellars 1996, Stringer and Gamble 1993). In warmer periods, they expanded north onto the European plains where herds of animals were abundant. Towards the end of the Neanderthal dominance, in late OIS3, we see a drop in the number of Mousterian sites in addition to a retreat once again into southern territories such as Iberia (Zilhão 2000). This corresponds with the gradual deterioration of climate towards the Last Glacial Maximum (LGM) at 18 000 BP (van Andel *et al.* 2003).

Contrary to these results, scholars have recently discovered the lithic remains of a Mousterian presence at Byzovaya near the Polar Ural district of Russia, 1000 km north of known Neanderthal sites (Slimak *et al.* 2011). This area, though far north, was free of ice sheets during the past 50 000 years, even during the LGM. Prior to this discovery, it was assumed that initial presence in this area was by anatomically modern humans brandishing Upper Palaeolithic technology. The site had been dated to 28 500 BP (Slimak *et al.* 2011).



3.3 Europe in the late Middle Palaeolithic. Map by Amanda Coburn.

## **Chapter 4**

### **Keeping Track of Neanderthal Technological Advance**

Stone tools are classified and compared typologically based on size, shape and retouch, or lack thereof. Flakes are knapped from a nodule that can be either prepared or raw and can be used as they are or further modified to tools.. In a Neanderthal context, the predominantly Middle Palaeolithic Mousterian tradition along with early Upper Palaeolithic technocomplexes bear particular interest (Stringer and Gamble 1993).

François Bordes (1919 – 1981) standardized procedures and introduced a quantitative approach to the study of Middle Palaeolithic typology. His work focused on intra- inter site comparisons of materials from south-west France along with quantification of the methods employed in their manufacture and the extent of blade production. Many tools were named reflecting their assumed functions, based on informed guessing. The tool class known as scrapers have upon use-wear studies proved to be exactly that. These same functional descriptions are commonly used, and enhanced, throughout the Middle Palaeolithic world (Stringer and Gamble 1993). In Upper Palaeolithic technologies however, de Sonneville-Bordes and Perrot created a method of typological study different to that of the Middle Palaeolithic (1953). These differing approaches present difficulties in the comparison of technology across the transitional boundary and have given rise to misinterpretations in regards to assemblage richness and size (Grayson and Cole 1998).

From a behavioural perspective, the cognitive aspect of tool manufacture and technological advance shows a forward planning and a pride in workmanship beyond the realm of pure function. Composite tools and the use of organic raw materials in tool production show a movement from an essentially expedient technology towards more labour-intensive and conceptualised process, often consisting of several techniques to produce the final product (Blackwell and d'Errico 2005). Blade manufacture also reflects a heightened investment in tool production (Mellars 2006, Henshilwood and Marean 2003).

This standardisation of artefact types also has a certain symbolic component to it. As certain traits and traditions prevailed in isolated populations, a social concurrence of how tools can and more importantly should look would be symbolic of the communal ideas and economy of said society. These communal ideas become norms and are thought to have impact on the development of language and cultural identity (Chase 2007).

In this chapter, an overview of traditions and technique will explore the possibility of

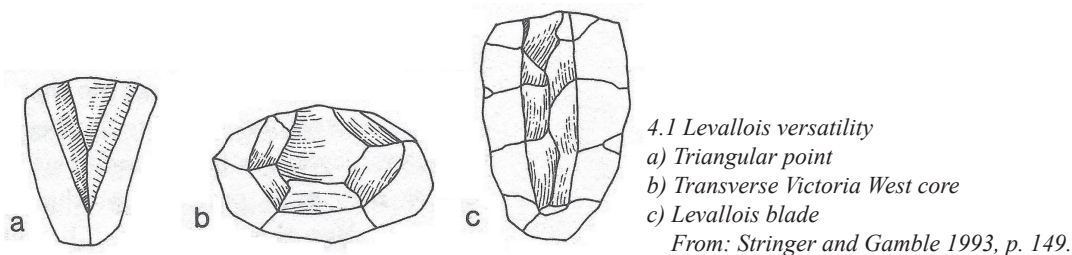
Neanderthal technological modernity by searching the material record for evidence of the markers of modern human behaviour.

Behaviour	Trait
Technology	Standardization of artefact types Artefact diversity Blade technology Worked bone, antler and other organic raw materials.

*Technological Traits Used to Identify Modern Human Behaviour: After Klein (1995), Mellars (1996), Deacon (2001), d'Errico (2003) and Henshilwood and Marean (2003).*

### Levallois technique.

The Levallois technique, named after Levallois, the suburb of Paris where it was first recognized, is a knapping technique that presents initially around 40,000 years ago. The process entails preparing a core to ensure the shape of the flake before it is struck. A domed surface is created before the striking platform is defined, the flake is then struck with precision. The core is then prepared again and a new flake is struck until the core is exhausted (Stringer and Gamble 1993). Though this technique is widespread throughout Europe, Asia and Africa, there is good indication that it the Levallois evolved *in situ* in Europe from the local variation of the Acheulean (Moncel *et al.* 2011). If this is so, it shows a clear standardisation and spread of a useful and directed technological advance in early Neanderthal, and indeed human, society. Variations in the initial core shape produce several regional types (Stringer and Gamble 1993).



In addition to flakes, Levallois technique has also been utilized in the production of Middle Palaeolithic blades. Stringer and Gamble (1993) have contested the behavioural implications of such an industry pre-dating the Upper Palaeolithic, naming differences in core preparation techniques and end product as evidence of lesser forward planning involved in Levallois manufacture. On the other hand, the predetermination and intent involved in the Levallois technique can be interpreted as a greater depth of directed thought and forward planning because the manufacturers had a clear image of how the final product would, and more culturally important, should look before the first flake is struck. Standardisation like this could also point to a specialisation in hunting techniques.

## The Mousterian.

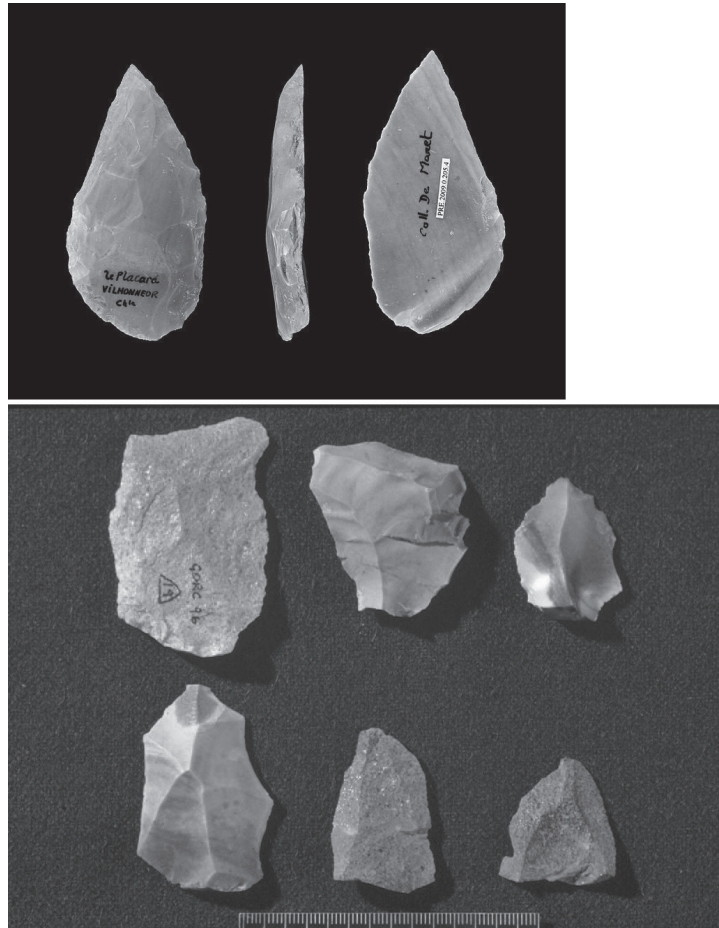
The tradition known as the Mousterian presents after 200 000 BP as an established collection of stone tools typified by hand-axes, flakes, Levallois flakes and blades, side scrapers, points, cores and pebble/chopping tools. This limited range of tool types, once established, continues to appear in the record until 130 000 years ago. This boundary marks the beginning of the later Middle Palaeolithic and the introduction of distinctly shaped stone tools into assemblages.

After 75 000 BP, classic triangular hand axes/knives found in the English and French Middle Palaeolithic signify the reappearance of large, hand-axe like implements to a MP context, while small Micoquian (named after the cave of La Micoque, France) hand axes and knives are widespread over the continent, even showing some regional variation e.g., the asymmetrical knives from Bockstein Cave, Germany and the Pradnik ‘knives’ from Poland (Stringer and Gamble 1993).

Based on Bordes’ classification, the Mousterian presents in five variations. La Quina with a low percentage of Levallois technique and a high frequency of racloirs; La Ferassie with a high percentage of Levallois technique and a high percentage of racloirs; Typical with a moderate percentage of racloirs; Mousterian of Acheluen tradition, variations A with hand-axes and B with backed knives; and Denticulate with a high frequency of notched and denticulated tools. Bordes

believed these variants to reflect five Neanderthal tribes living in the same area, but with very little contact with each other (Stringer and Gamble 1993, Mellars 1970), commenting that “*A man must often have lived and died without meeting anyone of another culture, although he knew ‘that there are men living beyond the river who make hand axes’*” (Bordes 1968).

Sally and Lewis Binford re-examined Bordes’ material in the 1960’s. Their results led them to argue that the variability in Mousterian assemblages should be viewed in a regional context. They believed the inter-site differences reflected the mobility of Middle Palaeolithic people in the



4.2 Mousterian lithics.

Top: Mousterian points from the collection of the Museum of Toulouse. From Wikipedia.

Above: Selected Mousterian tools from Gorham's cave, Gibraltar showing the small size and technique typical of the Neanderthal's Mousterian Industry. From Shipman 2008.

landscape due to uneven resource distribution. Their conclusions were that two of Bordes' five groups could be connected to a *base camp* where food was prepared and consumed while others, defined by denticulates and scrapers, were the remains of activities carried out at *work camps* where food and raw materials were obtained (Binford and Binford 1966).

It has been suggested that triangular Levallois points made in Mousterian contexts may have been hafted (Stringer and Gamble 1993). Hafting as a process involves a greater degree of conceptualization than a simple stone tool. In addition to the energy expended in the procurement and manufacture of the stone point, organic materials must also be foraged to mount and fix it in place on its projectile. With this measure of investment, a hafted tool can hardly be considered expedient. A hafted tool is a more efficient tool, allowing the exertion of more pressure and forming a length and weight extension of the stone tool (Rots 2003). Evidence of hafting appears in technologies after the Acheluen/Middle Palaeolithic border around 300 – 250 kya (Ambrose 2010).

In the Levant, the Mousterian is found not only in Neanderthal contexts, but also with anatomically modern humans (Bar Yosef *et al.* 1992, Stringer and Gamble 1993). The modern human remains of Qafzeh Cave presented in a Middle Palaeolithic technological context. Upper Palaeolithic assemblages appear and disappear in between these Mousterian layers. This discovery forwarded speculation as to the origins of the Mousterian in Europe, but these are largely laid to rest by evidence of Mousterian evolution in the European record.

The success and longevity of the Mousterian recommends it as a satisfactory technology in the Neanderthal landscape. Large, rugged tools, hafted to wooden spears served well in the close counter hunting of Ice Age fauna (Bar-Yosef and van Peer 2009). It is also worth mentioning that the blade-based lithic technology found in layer D at Tabun Cave, Israel and dating to the end of OIS 6 (Bar-Yosef 1992a,b, 1994) are of Neanderthal origin, showing that some behaviourally modern markers are present early in the Middle Palaeolithic.

### The Aurignacian.

At the dawn of the Upper Palaeolithic new tool types and production methods appear in the archaeological record. Klein (1995) suggests that the prime marker of the Middle to Upper Palaeolithic transition is an increase in the diversity of artefact types. The hypothesis is that the UP brings with it an explosion of technological advance that can be seen in the material record so well as in the advanced behavioural adaptations of the manufacturers (Stringer and Gamble 1993, Mellars 1996) and fits securely within the *African Origins, recent* model of modern behavioural dispersal. The earliest fully Aurignacian lithic industry in Europe can be dated to 38 000 BP in southern Germany (Terberger and Street 2003). Since its initial discovery, this technocomplex has been firmly assigned to anatomically modern humans. And the advances inherent in its production lay the basis of discrimination between what is considered modern and archaic in terms of behavioural markers (MrBrearty and Brooks 2000, d'Errico 2003).

The composition of the Aurignacian is important for several reasons. Firstly, the Aurignacian is widely accepted as 100% modern and is aligned to anatomically and behaviourally modern humans. The lithic, bone and symbolic artefacts found in Aurignacian horizons have served as a ‘template’ for modernity in other traditions (McBrearty and Brooks 2000, d’Errico 2003). The lithic diversity spans over such specialized artefacts as strangled blades, nose scrapers and Dufour’s bladelets. Researchers claim that the *chaîne opératoire* (core reduction sequence) and end products gained in the Aurignacian display a greater depth of forward planning in the manufacturers than the less stylistically impressive Mousterian. Polished and decorated bone and ivory projectiles as well as other tools produced from organic materials are present in the Aurignacian.

Dating the arrival of the Aurignacian in Europe has been problematic. Not only do the



#### 4.3 Aspects of the Aurignacian

Left: Lion Man of the Hohlenstein Stadel. From Wikimedia Commons. Top: Curved back point from the collection of the Muesum of Toulouse. Photo by Didier Descouens, 2011. Wikimedia Commons. Above: Double edged scraper on blade from the collection of the Museum of Toulouse. Adapted from Didier Descouens, 2011. Wikimedia commons.

dates found by radiocarbon dating need calibration, but the over-dating of some sites in comparison to others and a tendency to mix dates from different dating methods give rise to contention (d’Errico and Goñi 2003, d’Errico and Zilhão 1999). While skeletal remains from Peștera cu Oase show modern presence in Eastern Europe around 33 000 BP (Zilhão *et al.* 2007), the earliest dates for the Aurignacian technocomplex span the area of 35 – 45 000 BP (Belfer-Cohen and Goring-Morris 2007). The anatomically modern remains from Mladeč appear as an exception to the scarcity of securely dated and diagnostic remains found with early UP assemblages, dating to 31 000 BP (Bailey *et al.* 2009, Wild *et al.* 2005). The rarity of clear human affinity has given rise to speculation amongst researchers as to who truly developed the Aurignacian and how it spread through Palaeolithic Europe. This issue will be

discussed further in Chapter 7.

The Levantine Aurignacian appears later than the European Aurignacian (Shea 2007) and stratigraphically succeeds the Levantine Mousterian and transitional industries in all sites where both are present. The later dates from the Levantine collection compared to the European dates shake the foundation of the image of modern humans migrating from the south to bring their technology into the cold, more primitive north. This conundrum will also be revisited in Chapter 7.

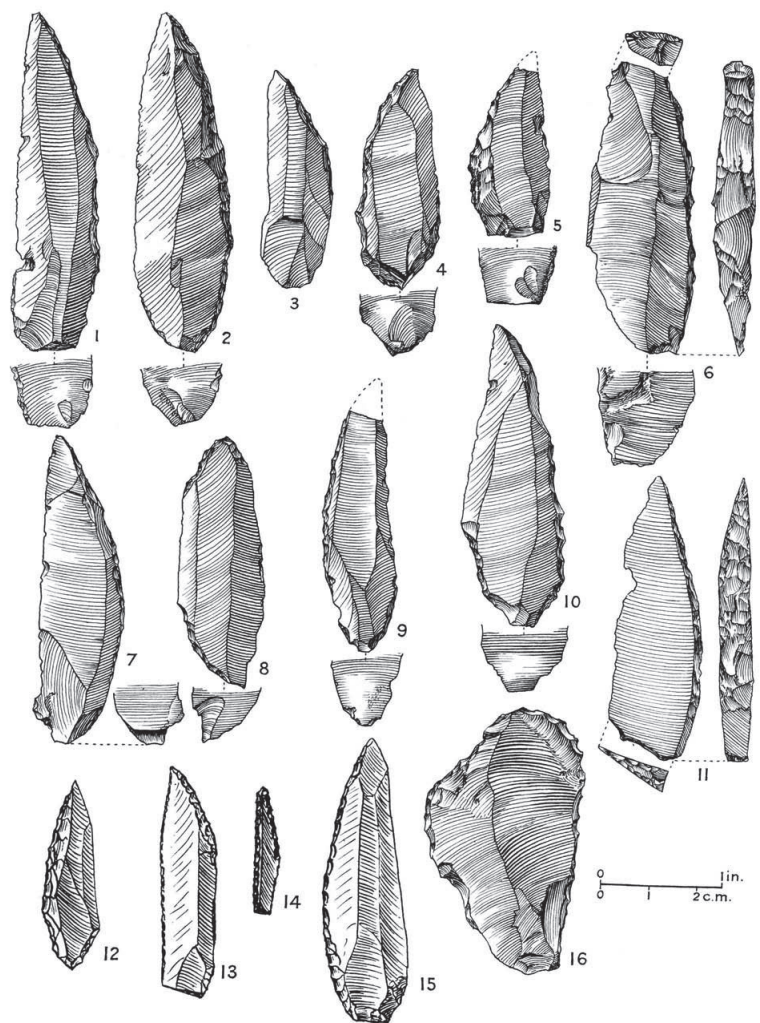


## Neanderthal Upper Palaeolithic Traditions.

In the preludes to the Upper Palaeolithic, between 50 and 30 kya, new technologies began to develop among Neanderthals. These technologies represent the last marked cultural and behavioural evolution of our relatives before they disappear from the archaeological record (Peresani 2008). The Châtelperronian, Uluzzian and Szeletian, among others, are all composite tool traditions reflecting a degree of modernity in their manufacturers. These industries are often referred to as transitional industries and have been explained as the result of interaction with modern humans (Mellars 1996, Stringer and Gamble 1993). The issue with this assumption of acculturation or imitation being that horizons containing these assemblages always underlie the Aurignacian in sites where both are present (d'Errico 2003).

### *The blade-based Châtelperronian.*

Originally thought to be a product of anatomically modern humans, the Châtelperronian is the only transitional assemblage to yield significant human remains. These remains, procured from two separate sites (Arcy-sur-Cure and St. Césaire; Churchill and Smith 2000), are clearly Neanderthal. This is not surprising, as the technocomplex shows an affiliation with the local Mousterian of Acheulean Tradition B (Bailey *et al.* 2009). The Châtelperronian appears in Western Europe around 42 000 BP (d'Errico *et al.* 1998). Tools, including backed knives and points with curved, steeply blunted backs are made on well-struck blades and a predominance of blanks found in these assemblages are struck from carefully prepared blade cores. Other aspects of the Châtelperronian are personal ornaments, and decorated bone tools (Zilhão *et al.* 2006).



4.4 Lacaille's (1947: Figure 2) illustration of "steeply dressed flint implements" from Châtelperron. From Zilhão *et al.* 2008.

Despite the conclusive connection to Neanderthal remains, there is debate as to the origins of the technological prowess displayed in assemblages. Doubts concerning interstratification at key sites such as Grotte du Renne, Roc-de-Combe and the Châtelperronian-type site Grotte des Fées in France and El Pendo, Spain have given rise to the opinion amongst some researchers that the

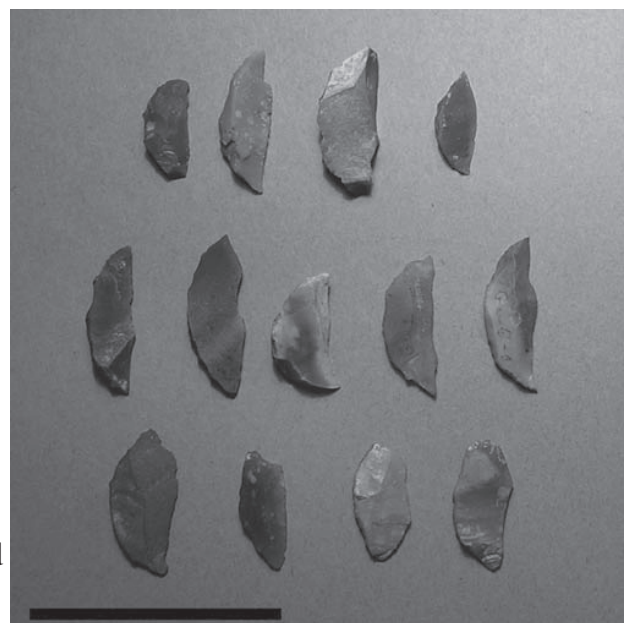
technologically advanced tools found at these sites are the result of admixture between occupational horizons or acculturation; the borrowing of cultural traits from another cultural group. They view interstratification as evidence of a temporal overlap and co-existence between Neanderthal and anatomically modern groups. For example, at Grotte des Fées no less than 11 diagnostic Aurignacian tools were found in the Châtelperronian assemblage (Mellars 1996, Gravina *et al.* 2005, Mellars *et al.* 2007).

This contention in turn has been refuted through several opposing articles where it is argued that though there is clear interstratification at this site due to post-depositional forces, the Châtelperronian soundly pre-dates the Aurignacian based on radiocarbon results. This means the long-term contemporaneity necessary to support the acculturation and imitation models explaining the presence Neanderthal modern behavioural traits is not present in the record (Zilhão *et al.* 2006, Zilhão *et al.* 2008 and comment by Mellars and Gravina, Riel-Salvatore *et al.* 2008). It has also been shown in the past decade that issues of interstratification in other Châtelperronian sites have been greatly exaggerated (Zilhão *et al.* 2008, Bordes 2003). Riel-Salvatore (2008) comments that when transitional industries are interstratified, they are only mixed with the local Mousterian traditions, not Upper Palaeolithic Aurignacian assemblages.

The news that this tradition was Neanderthal in origin, facilitated by the discovery of Neanderthal remains at St. Césaire, opened scholars' eyes to the possibility of Neanderthal technological innovation and behavioural advance and even today proffers an array of technological implements showing a greater depth of cognition, equal to that of the Aurignacian lithic tradition.

#### *The Uluzzian.*

Uluzzian horizons containing larger lithic tool sets containing new implements appear in the Adriatic region during the Middle to Upper Palaeolithic transition, coinciding with the Châtelperronian in Spain and France and the Szeletian in central Europe (Zilhão 2009). At this point in time sea levels were lower opening the Great Adriatic Plain in the Adriatic bay between Italy and the Balkan peninsula. Uluzzian lithic technology is predominantly characterized by unidirectional or bidirectional flake production and multidirectional, polyhedral and discoidal cores and is believed to have developed from some variety of late Denticulate Mousterian. Though blades are also present, the production is not usually standardised and these artefacts are short and sometimes cortical.

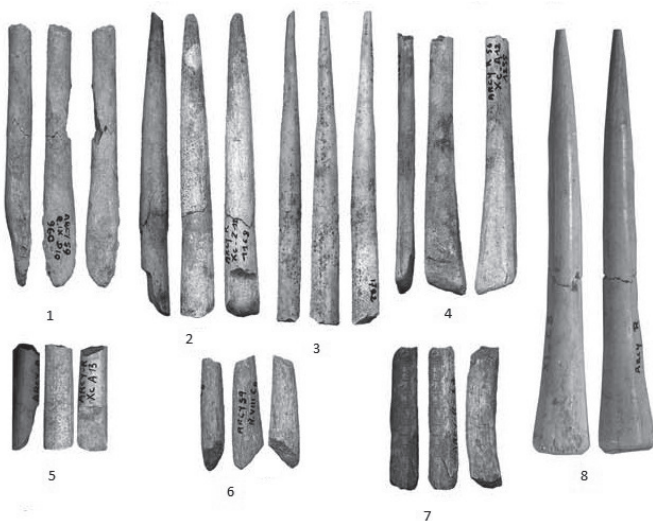


4.5 Uluzzian Lunates from grotta del Cavallo, Level E III.  
From Riel-Salvatore 2009. Scale bar = 5 cm.

Assemblages include tools such as burins, end and side scrapers, denticulates, steeply retouched tools and splintered pieces (Peresani 2008).

Perhaps the most notable artefacts in this assembly are the microlithic blades found at Fumane Cave on the southern fringe of the Venetian Pre-Alps. Layers A4 and A3 present a clear differentiation in lithic technology from the preceding Late Mousterian and the overlying Aurignacian characterized mostly by formal blade and bladelet production with typical retouched tools. These are found in context with other Uluzzian-type artefacts and have been dated by radio carbon to 33 -34 000 BP. Crescent shaped geometric microliths, usually referred to as lunates, can be found in the standardized assemblages of southern Italian Uluzzian sites and though presenting in a general low frequency have become the type fossil of the industry (Riel-Salvatore 2009, 2010). This obvious artefact diversity in the Uluzzian recommends it's manufacturers as behaviourally modern. It is also interesting to note that microliths do not generally occur as a standard part of lithic assemblages before the Mesolithic (Gamble 2007).

### Worked Organic Material.



4.6 Chatelperronian bone tools from Grotte du Renne, Arcy-sur-Cure.

- 1) I X-D10.960
- 2) R Xc-Z12.1168
- 3) R Xc-A11.1782
- 4) R Xc-A12.1255
- 5) R Xc-A13.sn
- 6) R VIII-C6.sn
- 7) R Xa-A13.sn
- 8) R XI-C8.sn

From d'Errico et al. 2003.

As the Upper Palaeolithic dawns, researchers have noted a proliferation of tools made from alternative, organic raw materials such as bone, antler and wood (Klein 1999, Mellars 1996). These tools, unlike stone tools, are formed with greater control by their manufacturers, relying not on the fracture of isotropic materials, but on specialized techniques such as grinding, scraping and grooving to accurately produce a highly determined shape (Blackwell and d'Errico 2005). The difference between these tools and bone implements from earlier periods (such as those at Broken Hill, Zambia: Barham *et al.* 2002) is exactly the energy spent in their execution. A bone used for simple percussion and a polished bone point or awl have obvious differences, both in appearance and innovation. Richard Klein makes the separation acutely by defining bone tools that have been 'cut, carved or polished to form points, awls, borers, and so forth' as 'formal' (1999),

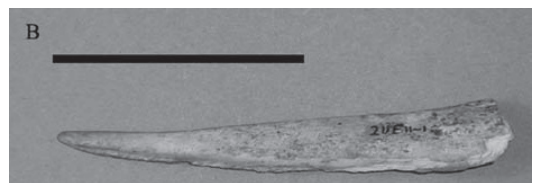
while McBrearty and Brooks list the task-specific shaping of bone and antler as diagnostic of behaviourally modern humans (2000).



4.7 Vi-3438:  
Split-based point  
from the G1  
unit of Vindija  
Cave, Croatia.  
Adapted from  
Zilhão 2009.

Forty-eight bone tools found in the Châtelperronian layers of Grotte du Renne at Arcy-sur-Cure date to ~38 000 BP (d’Errico *et al.* 2003). Classified as mostly awls, these tools are polished and ground into shape. Some also bear intentional markings, equidistant parallel notches on nine of the awls clearly display symbolic content in their making. Others among the more intensively decorated specimens proffer evidence of colourant use in the notches left by stone tools. The Châtelperronians even used certain bones for specific tools, showing an understanding of anatomy in their prey (d’Errico *et al.* 1998).

The central European Szeletian industry, prominent in level G1 at Vindija Cave, Croatia, presents a split based bone point and three massive-base bone points (Peresani 2008, Zilhão 2009). Bone perforators made on atrophic metapodials



4.8 Bone Awl from Grotta del Cavallo. Adapted from Riel-Salvatore 2009. Scale bar = 5 cm.

have been recovered from the Uluzzian levels at Grotta La Fabbrica and Grotta del Cavallo caves (Peresani 2008). Cylindrical bone points with fractured bases have been interpreted as throwing spears (Peresani 2008). Though Aurignacian bone tools arguably show a higher degree of polish (Klein 1999), the variability and spread of bone as a raw material in the late Middle Palaeolithic shows clear use of organic material in tools.



4.9 The excavation of a wooden spear from Schöningen, Germany.

The Pleistocene site at Schöningen, Germany has produced eight wooden throwing spears about 400,000 years old (Thieme 1997, 1999). These are thought to be the oldest complete hunting weapons discovered to have been used by humans. They were found in association with stone tools and the remains of more than ten horses. These spears strongly suggest a systematic hunting strategy involving planning, foresight and the use of specialized technology. Notable for this find is the homonid affiliation to the site. At this point in prehistory it is not Neanderthal but *Homo heidelbergensis* who would have been hunting the European wilderness. This early marker of modern behaviour in a morphologically archaic context raises the question of behavioural modernity in archaic populations.

Neanderthal technology has evolved *in situ* at European sites and presents evidence of all the markers demanded to deem a culture behaviourally modern either previous to or directly preceding the Upper Palaeolithic transition. Standardisation beginning with the Levallois technique at the Acheluen/MP border, composite tools in the Mousterian, the blade-based Châtelperronian, microliths and artefact diversity in the Uluzzian and the exploitation of organic raw materials dating back 400 000 years to Neanderthal predecessors amount to almost irrefutable support of Neanderthal technological behavioural modernity.

Protests as to the significance of these artefacts centre around production method, the form of the end product and even the intent involved in manufacture. Even if Mellars' objections to the stratigraphic integrity of the Châtelperronian at Grotte des Fées should prove to be justified, this does not explicate the other instances of advanced technology at other sites (Gravina *et al.* 2005, Mellars *et al.* 2008).

From a technological point of view, industries generally show the amount of sophistication needed to survive in a given environment. In other words they are the material remains of behavioural adaptation to an environment. The next chapter will look more closely at methods employed by Neanderthals to exploit their immediate surroundings.

## Chapter 5

### An Exploration of Neanderthal Economy.

Economy as a concept encompasses how a culture exploits its natural surroundings and the efficiency with which it does so. The logistics demanded to successfully navigate a landscape are dependent on climate, topography and also the cognitive capacity of the cultural group in question in regards to social structure and group organization, including hunting and task delegation (Mellars 1996). Such organization and distribution of tasks demands the ability to communicate as well as the foresight to see the advantages and disadvantages of different approaches. McBrearty and Brooks (2000) comment that economic specialization and exchange relations between groups would have been connected to a capacity for composite language.

Neanderthals inhabited the European mainland throughout the Middle Palaeolithic; a time of Ice Ages and Interglacials. While the fauna and flora available in tropical temperatures remains somewhat stable throughout the year, in temperate, colder areas like the Neanderthal homelands of Eurasia, seasonal shifts in temperature force flora, fauna and thereby hominids to migrate to more profitable areas in winter. Needless to say, this oscillating but predominantly cold climate demanded more of those living in it than a warmer, tropical area would (Marean 2005). The exploitation of harsh environments, the absence of scavenging as a survival technique, exploitation of marine and avian resources, a seasonal mobility pattern and the rise of long distance raw material procurement and exchange networking are all acknowledged as economic markers of modern human behaviour (Henshilwood and Marean 2003, d'Errico 2003, Klein 1999).

In this chapter, evidence of marine and avian resource exploitation will be presented from the European record along with data regarding exchange networks, long distance raw material procurement and the exploitation of harsh environments. In a study of mobility patterns, the Levantine sites of Kebara, Qafzeh and Tabun will be investigated as three sites affiliated to the same lithic tradition but different human editions to test them against the markers of modernity. First though, a study of the issue of scavenging.

Behaviour	Trait
Economy	Effective large mammal exploitation Seasonally focussed mobility strategies Fishing and fowling Expanded exchange networks Use of harsh environments

*Economic Traits Used to Identify Modern Human Behaviour: After Klein (1995), Mellars (1996), Deacon (2001), d'Errico (2003) and Henshilwood and Marean (2003).*

## Scavengers?

Scavenging as a survival strategy falls outside the range of modern human behaviour. Obligate scavenging, in contrast to opportunistic scavenging, would mean a group's sole source of animal protein is dependant on the discovery of carcasses instead of actively hunting. In the 1980's, Binford argued that Neanderthals were indeed obligate scavengers along with their early modern contemporaries (Binford 1981, 1984, 1985, 1988). Because it is expected that a hominid gaining early access to a prey animal would take the highest ranking parts first and leave behind a signature in the form of cut- and percussion marks, the predominance of head-and-foot assemblages (low meat yielding mandible and foot long bone fragments) with signs of carnivore activity in Mousterian sites has been cited as evidence of a non-modern subsistence strategy (Marean and Kim 1998, Klein 1992).

It has been proposed that the high proportion of head-and-foot assemblages may be due to the fact that excavators only preserved easily identifiable bones, discarding small fragments. If they did preserve the whole sample, those less easily identified may have been ignored in the faunal analysis (d'Errico 2003, Marean 1998). Another factor to consider regarding the composition of faunal collections may be that greasy articulate bones are very attractive to carnivores. In the temperate climate of Eurasia, sites would be stinking bone yards with carnivores waiting to feed as soon as hominids moved on (Marean and Kim 1998).

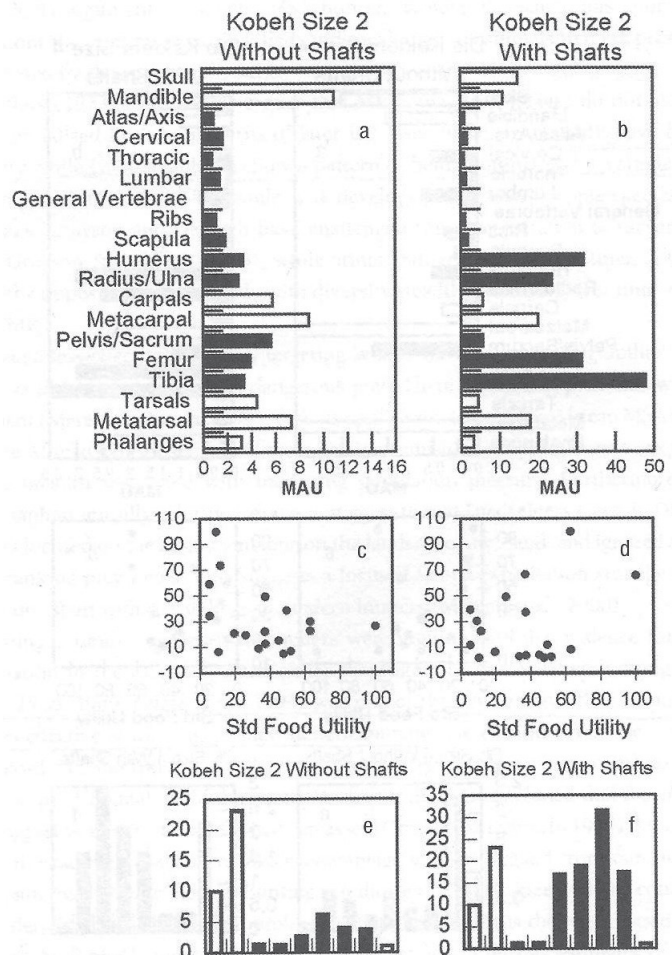
Carnivore teeth marks on faunal remains occur at all Mousterian sites. There are three possible explanations for this;

- 1) Carnivores were the primary accumulators of the assemblage
  - 2) Hominids were scavenging carcasses after carnivores had first access to them
  - 3) Carnivores scavenged the bone after hominids had discarded them
- (Marean and Kim 1998).

At some sites, e.g. Kebara, Israel, there are clear indications that carnivores have collected a small portion of the bone residue, but these accumulations are mostly confined to a certain area of the cave site (Bar-Yosef *et al.* 1992). Also, if you take into consideration the amount of bone accumulated and the clear hominid presence (lithics) at the sites in question, it is difficult to imagine carnivores as the sole collectors of bone.

In 1986, Robert J. Blümenschine published a study on the sequence in which non-human carnivores consumed the edible parts of herbivore carcasses. According to Blümenschine's model, carnivores who have first access to a carcass will leave a high frequency of tooth marks on the mid-shaft regions of the bones, while a carnivore scavenging from a hominid dump will leave few tooth marks on the mid-shaft regions (Blümenschine 1986). An extensive six year study of material from Kobeh Cave in the Zagros Mountains of Iran showed a frequency of tooth marks

on mid-shaft fragments of 20% “... much closer to the 7-10% shown by the hominid-first model that the 69-81% of the carnivore model” (Marean and Kim 1998). The high percentage may indicate that the Kobeh Neanderthals scavenged opportunistically from time to time, a practice recorded in the variation of modern human behaviour and practised by hunter-gatherers to this day (Marean 2005, Conard 2005). Material recovered from Kebara also points towards a hominid-first scenario; bone concentrations were found in connection with ash- and organic-rich cultural horizons, suggesting that periods of cultural activity were also periods of bone accumulation (Bar-Yosef *et al.* 1992). Unfortunately, studies like that done by Marean and Kim of the Kobeh cave lithic sample are mostly not possible due to the disposal of not easily identified bone fragments during early excavations, but it is possible that a re-evaluation of existing, fully salvaged assemblages can further substantiate Neanderthal subsistence strategies. In the meantime, basing a hypothesis of scavenging on the analysis of an incomplete faunal sample cannot be deemed acceptable.



5.1 The Kobeh Mousterian faunal assemblage Size 2 bovids projected without shaft fragments (a,c,e) and with shaft fragments included (b,d,f). In the bar charts (a,b,e,f), very low utility elements are indicated by open bars, while darkened bars are elements with significant amounts of flesh. Note the abundance of low-utility parts in the 'without shafts' set, and the reverse utility curve produced by the data. When shafts are included, meaty elements dominate the profile and the reverse utility curve breaks down. From Marean 2005, p. 341.

### Neanderthal; The Hunter- Gatherer.

Hunting “... requires theoretical and practical knowledge, experience and teaching; it builds traditions, creates memory, and structures society by particularly increasing social cohesion and cooperation” (Patou-Mathis 2000). In contrast to past discrimination, it is now widely acknowledged that the Neanderthals were accomplished hunters. Stable isotope ( $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$ ) analysis of mammal bone collagen applied to two Neanderthal specimens from Vindija Cave, Croatia has shown Neanderthals to inhabit the role of a top-level carnivore, obtaining almost all their dietary protein from animal sources. Results from Scladina Cave, Belgium and Marillac, France have pointed to the same conclusion (Richards *et al.* 2000 and references therein). This role of predator is supported by evidence of Neanderthal spears such as at Schöningen and Clacton-on-Sea (Oakley *et al.* 1977, Conard 2005) and also by the rare examples of weapons in the remains of prey animals, e.g. a wooden spear in the ribs of an Elphas skeleton at Lehringen, Germany and a



Levallois point embedded in the cervical vertebrae of an Equus at Umm el Tlel, Syria (Boëda *et al.* 1999). Trauma patterns in the anatomy of recovered Neanderthal specimens and a predominantly heavy weaponry points towards a strategy based on the close-counter hunting of large animals (Berger and Trinkhaus 1995, Shea 1988).



5.2 The site of La Cotte de St. Brelade. From Wikimedia commons.

The Schöningen spears were also found in the context of a large number of horse remains, indicating a specialization towards this species (Thieme 1997). In fact, Patou-Mathis comments that there is a predominance of assemblages dominated by a single species or a combination of two or three species concluding that evidence of specialized hunting is visible as early as OIS 7 in Western Europe and the northern part of Central Europe (2000). 250 000 years ago, Neanderthals at the site of La Cotte de St. Brelade, Jersey mammoths

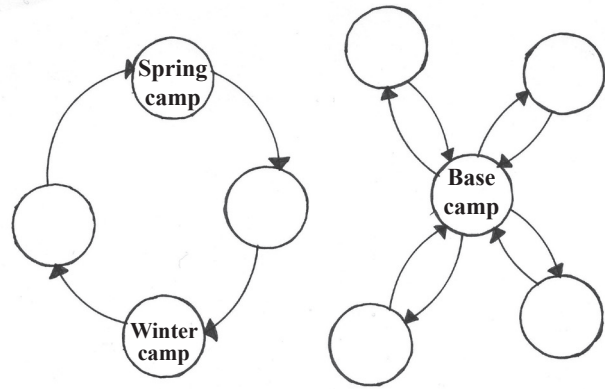
were stampeded and driven off nearby cliffs (Scott 1980). A similar strategy is evident in deposits at La Quina, France (Hardy 2004). This hunting strategy ensues a high degree of cooperation and planning comparable to that of later hunter-gatherer groups.

Although displaying a subsistence strategy as carnivores, Neanderthals were morphologically omnivores (Richards *et al.* 2000). The lack of plant materials in Neanderthal contexts has led some researchers to suggest they did not utilize plants in their diet (Stiner 2006 IN BOOK). This has been challenged by several discoveries at Amud (Madella *et al.* 2002), Kebara (Lev *et al.* 2005, Albert *et al.* 2000) and Hayonim (Albert *et al.* 2003) showing that Levantine Neanderthals utilized a variety of plant materials, including date palms, grasses, legumes, acorns and pistachios. Microfossils have also been recovered from teeth excavated at Shanidar Cave, Iraq and Spy Cave, Belgium. Analysis of starch grains and phytoliths preserved in the dental calculus gives conclusive evidence that Neanderthals included a spectrum of plants in their diet. Traces of grass seeds, dates, legumes, plant underground storage organs and other presently unidentified plants, several of which were cooked (Henry *et al.* 2011). The geographical distribution of these two sites also points towards Neanderthal use of plant foods being widespread.

### Movement in the Levantine Landscape.

A circulating pattern of mobility consists of several temporary home bases, each used on a seasonal basis. Each base camp would be inhabited in the season when resources in that area were most advantageous to collect. Such a seasonal strategy is widely recognized as modern because it would place the unit in close vicinity to the highest yielding resources at any given time and also give the area a ‘time out’ to replenish when the hominids had moved on to the next camp (Lieberman and Shea 1994).

A radiating pattern of mobility functions rather differently. In this instance a single base camp acts as a multi-seasonal home camp. It is important to remember that this would not ensue a sedentary lifestyle, but rather the use of the same base camp through several seasons. Instead of moving continually with the change of season, several smaller logistical sites located at reasonable distances from the main camp cater to specialized resources and activities (Lieberman 1993, Lieberman and Shea 1994) e. g. one site each for the procurement of lithic raw material, colourant and the hunting of game animals. In theory, this subsistence strategy should produce a well stocked main camp with all resources at hand, but it is nonetheless deemed non-modern by some researchers who claim that such a strategy would result in an exhaustion of local resources (Lieberman and Shea 1994).



5.3 Seasonal (left) and Radiating mobility patterns. Seasonally based mobility patterns entail moving from site to site as resources become seasonally available. A radiating pattern entails the multi-seasonal use of a base camp with several outlying camps for resource procurement.

Until the early 1980's it was widely believed that the evolutionary transition from *Homo neanderthalensis* to *Homo sapiens* took place in this geographical area known as the Levant. This was based on the contemporary finds of both Neanderthals and anatomically modern humans utilizing the same lithic technology; the Mousterian (Binford 1968). Kebara, Tabun and Qafzeh all lie in present day Israel; Qafzeh in Lower Galilee and the other two on the slopes of Mount Carmel. Dates show that the anatomically modern fossils of Qafzeh and Tabun C pre-date the Neanderthals of Tabun B and Kebara (Klein 1999, Stringer 2002). Some believe that neither of these populations were modern (Klein 1999) while others maintain that the anatomically modern humans of the Levantine Mousterian had more complexity in their actions and survival skills and classify them as cognitively modern (Stringer 2002).

Cementum increment studies, in addition to giving an age of death for the animal in question, also can serve to show which season the animal died in, giving an indication of the seasonality of the inhabitants of a given site (Lieberman and Shea 1994 and references therein). Cementum is continually deposited around the teeth in the form of a bone-like tissue from the onset of occlusion until death or the tooth falls out. The season of death can be determined by looking at the colour of the acellular cementum last deposited on the tooth. Translucent bands indicate that the animal in question died in a season of growth, while opaque bands indicate death in a season of reduced growth. The faunal samples of Kebara and Tabun B, represented respectively by *G. gazella* and fallow deer were subject to cementum increment studies, indicating that both sites were used on a multi-seasonal basis, reflecting a radiating mobility pattern (Lieberman 1993, Lieberman and Shea 1994). In contrast, the same analysis performed on faunal remains from Tabun C and Qafzeh

portrayed a seasonal utilization of the sites (Lieberman and Shea 1994).

It has been maintained that the radiating pattern of the Neanderthals reflects their inability to adapt to their surroundings and a lesser capacity for cognitive thought, but the truth is that such a strategy would require a high degree of planning and tactical depth (Binford 1989). A climatic explanation for the Kebara and Tabun B radiating seasonality is given by Lieberman and Shea (1998). They suggest that the colder climate in OIS4 and late OIS3 (possibly as a result of the Mount Toba super-eruption) may have caused a wider distribution of woodlands at a time when Neanderthals were present in the Levant, allowing them to forage in a relatively small region throughout the year. In contrast, the warmer period of OIS5 may have restricted the ability of resources forcing the anatomically modern humans of Qafzeh and Tabun C to adopt a pattern of circulating mobility in order to access these resources. If this is indeed the case, the radiating mobility pattern of the Levantine Neanderthals shows a high degree of adaptation to the local environment and promotes their modernity.

Staying in one place over a longer period of time also has its advantages. Stability increases the return on material culture, betters the ability to monitor high quality resources and will improve the capability of storage within the group. It is probably these benefits that caused the Yanomamo to adopt a radiating mobility pattern and their modernity has not been challenged (Lieberman and Shea 1994 and references therein). In a radiating mobility pattern, the Neanderthal exploitation of large game would give more return per unit (Lieberman 1993), and superfluous meat could be stored at the base camp. Klein (2001) cites the incentive to hunt larger animals as a sign of modernity in the technology of a group, and thereby the group themselves. If indeed the radiating mobility pattern of the Levantine Neanderthals was an adaptation to the local environment, and it in turn gave motivation to develop specialized hunting tools to hunt specific game, there is no incentive to consider the strategy, in the Levant or elsewhere, as a trait of non-modernity.

#### Long distance procurement of raw materials and exchange networks.

The sourcing of lithic materials from Middle Palaeolithic sites often points to a short distance procurement of raw materials, though there are some instances indicating the curation of pieces over more than 50 km. Upper Palaeolithic anatomically modern humans behaved in largely the same way (Mellars 1996) with some instances of lithic material being moved over distances of over 100 km (Bar-Yosef 2004). It has been suggested that this difference in range displays a behavioural divergence between the two hominids (Stringer and Gamble 1993). Roebroeks *et al.* (1988) however, have recorded Middle Palaeolithic raw material procurement in Europe from a distance of over 100 km dating to 200 000 BP. Later in the Middle Palaeolithic, the situation changes and distances of up to 300 km have been recorded (Stringer and Gamble 1993).

Mellars (1996) comments that there is no reason to believe that Upper Palaeolithic people were “*securing raw materials from more extensive catchment areas than those documented in the majority of the Middle Palaeolithic sites in the same region*”, but also notes that the quantity of

better quality raw materials from more distant sites does rise from 1-2% in the Middle Palaeolithic to 20-25% in the Upper Palaeolithic. Furthermore, these raw materials are predominantly introduced to sites as retouched tools in the Middle Palaeolithic while in the Upper Palaeolithic finished tools appear alongside specific blank forms and cores (Mellars 1996).

The mid-shaft cortical bone distribution of a late Neanderthal femur from Les Rochers-de-Villeneuve, France radiocarbon dated to ~40 700 <sup>14</sup>C years BP shows a possible change in loading patterns of the human lower limb during the late Middle Palaeolithic, indicating a possible increase in mobility levels (Beauval *et al.* 2005). This suggests that the behavioural shift implied by an expanding range of mobility had its roots in this period and did not solely arrive in Europe as a by-product of the influx of anatomically modern humans.

Evidence of a social network has also become visible in mitochondrial DNA (mtDNA) studies. The results of analysis of 12 specimens recovered in the El Sidrón, Spain have shown that while the three adult males of the group all shared the same mtDNA lineage, implying kinship, the three females each belonged to a different lineage. These results point towards a patrilocal mating behaviour among Neanderthals, meaning that females would leave their own family to live with their mate's family group (Lalueza-Fox *et al.* 2011). The diversity of the female mtDNA lineages shows a contact network between at least four groups. If exchanges of female group members were taking place over group boundaries, it is not unreasonable to assume that also other resources and artefacts were changing hands.

The greater distances travelled by raw materials in the later Middle Palaeolithic may not only be connected to a greater mobility in MP groups, but could also reflect dawning social networking, making long distance exchange of raw material and prestigious objects easier (Stringer and Gamble 1993). It's worth noting that the influx of anatomically modern humans to Eurasia during the transition to the Upper Palaeolithic would increase the general population of Europe (Green *et al.* 2008). A higher density of social groups in the landscape would expedite expanding networks. It is also plausible that pioneering anatomically modern humans brought gifts with them from places they or their forefathers had stopped by on their travels and that the exclusivity of these artefacts created a demand for more, much like the import of exotic produce such as potatoes and tea created a demand in Europe in their own time.

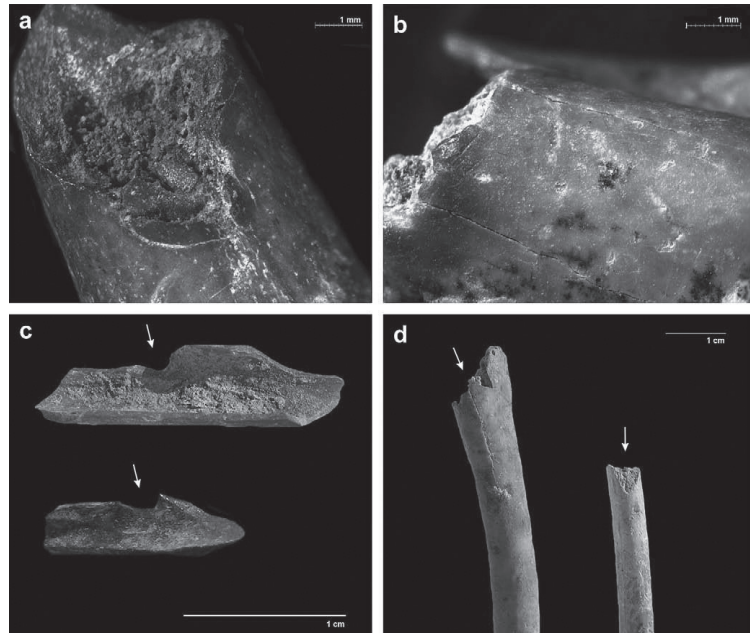
#### The utilization of avian and marine resources.

The exploitation of avian resources is commonly portrayed as part of a larger broadening of the dietary niche associated with modern humans which gave them an advantage over the Neanderthals. The capture of birds is thought to require a sophisticated technology and involve obtaining and processing methods different to those used for large and medium sized prey.

At Fumane Cave in Italy, there is evidence of avian exploitation at 44 000 BP. Human modifications

on the bones of avian species not directly related to subsistence has lead researchers to believe that the Mousterian Neanderthals of this site were removing feathers and in one instance a claw. The reasons for this are unclear, but can be connected to some sort of symbolic practice. Evidence of the use of avian bones by Neanderthals has also been recovered at Pech de l'Azé in France (Peresani *et al.* 2011).

Meanwhile, at Bolomor Cave, Spain, level XI dating to OIS 6 has provided clear diagnostic elements documenting the acquisition and use of birds for food. Remains of *Aythya sp.* (diving ducks) display cutmarks on both front and hind limb bones, a presence of burning patterns on less meaty areas of the skeleton, and human toothmarks on limb bones (Blasco and Peris 2009). Blasco and Peris remark that the processing and consumption of smaller prey (like diving ducks) requires little or no use of lithic technology as hands and teeth can be effectively employed in place (2009).



5.4 Examples of anthropogenic breakage and human toothmarks on *Aythya sp.* remains observed at Level XI of Bolomor Cave: a) stereoscopic view of human toothmark on distal diaphysis of bird tibiotarsus; b) stereoscopic view of pits and scores associated to broken edge on an *Aythya femur*; c) examples of crenulated edges related to anthropogenic consumption; and d) examples of fractures associated to longitudinal fissures and pits on an ulna (left) and peeling on a femur (right). From Blasco and Peris 2009.

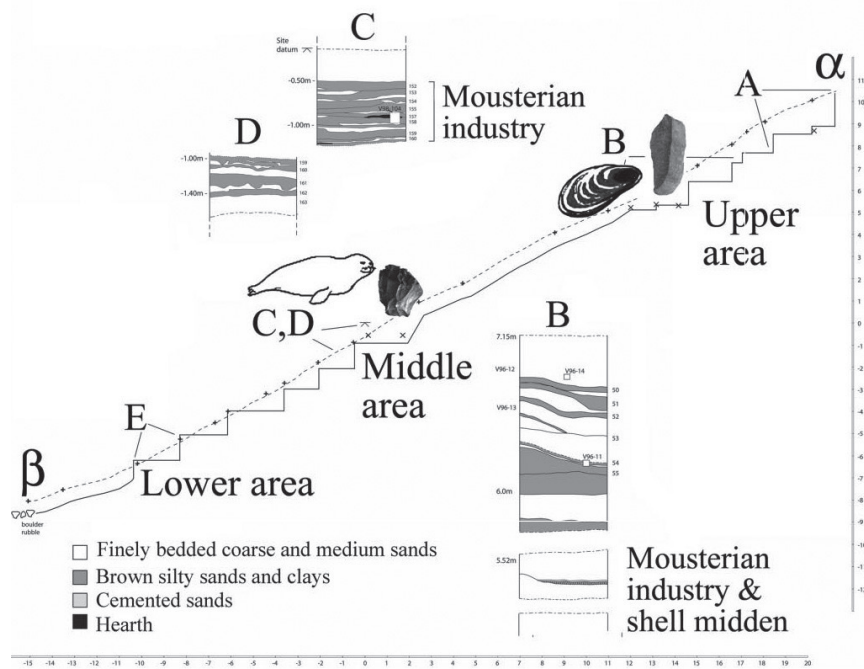
Recurrent use of Vanguard and Gorham's Caves in Gibraltar (Stringer *et al.* 2008) points towards another dietary niche that has been considered too behaviourally advanced for Neanderthals (Klein *et al.* 1999). The stratigraphic sequences of these sites have proffered evidence of Neanderthal exploitation of marine resources. The upper unit of Vanguard contains a layer of ash associated with marine molluscs dominated by the species *Mytilus galloprovincialis*, clear evidence



5.5 The shaft of a seal phalanx displaying cutmarks made by a stone tool, confirming that a hominin processed this animal. From Shipman 2008.

of Neanderthal dietary expansion. Lower units include remains of marine mammals such as seal and dolphin along with molluscs, fish, marine birds and tortoise (Stringer *et al.* 2008). Two monk seal fossils show human induced damage suggesting defleshing activity and disarticulation during butchery greatly coherent with historical observations of Inuit procedures (Henshaw 1999). The recovered seal fossils are also predominantly immature individuals, suggesting that exploitation occurred on a seasonal basis (Stringer *et al.* 2008).

Richard Klein and Teresa Steele in their reply to Stringer *et al.* (2008) have challenged the implications of these finds, claiming that such a small assemblage does not qualify to compare Neanderthal marine exploitation with that of anatomically modern humans. Even so, the presence of marine mammals, fish and molluscs in a secure Neanderthal context along with the evident recurrence of the occupational horizons is indeed significant in the discussion of Neanderthal economic behaviour.



5.6 Profile of Vanguard Cave: Unit B where the mussel unit was uncovered associated with a hearth. The fossil association of terrestrial and marine mammals was found in units C and D. From Stringer *et al.* 2008.

### Exploitation of harsh environments.

Adapting to the demands of harsh and marginal environments is also hailed as a marker of modern human behaviour (Henshilwood and Marean 2003, McBrearty and Brooks 2000). In stark contrast to this theory, Neanderthal use of such areas had been called an opportunistic use of extremities of their habitat and is suggested to be the result of displacement by anatomically modern humans (Mellars 1996). Stringer and Gamble (1993) go so far as to classify Neanderthal expansion as “*nothing more than opportunistically filling up some of the less attractive landscapes in their world*”.

Recent research in northern Russia has uncovered a Neanderthal occupation level at Byzovaya in the foothills of the Polar Urals near the Arctic Circle dating to 28,500 BP. The Mousterian artefacts found alongside at least 21 separate mammoth specimens and other fauna indicate it’s function as a processing site. Byzovaya is located about 1000 km further north of any earlier known Mousterian site (Slimak *et al.* 2011). This expands the expanse of Neanderthal habitat, possibly by several thousand square kilometres.

The southern part of the Iberian peninsula is one of the localities where Neanderthal populations linger after 30 000 BP. At Gorham’s Cave, Gibraltar, a high-resolution Neanderthal horizon with a Mousterian lithic tradition dates to 28 000 BP (Finlayson *et al.* 2006). It has been theorised that they were forced into this area because they could not compete with anatomically

modern humans in the deteriorating climate of OIS3 and were scraping a living together in this marginal landscape (Mellars 1996, Stringer and Gamble 1993). Deposits at Gorham's Cave show that the Neanderthal tenants enjoyed a varied diet of plants and vertebrates with access to an array of different terrains (Finlayson *et al.* 2006). This image does not wholly equate with the scenario of a struggle to survive in a marginal area, rather a group thriving in a diversified landscape.

In truth, Ice Age Europe as a whole was a harsh and demanding environment in which to survive and the Neanderthals did so over a period of more than 200 000 years. Neanderthals were an evolutionary product of existing in this environment both morphologically and behaviourally. If anything the behavioural advances visible in the colonization of such areas should be assigned to their predecessors, *Homo erectus*, who made the original influx into colder territory.



5.7 Map showing the expanse of Neanderthals in Europe. Map by Amanda Coburn.

In conclusion, it seems clear that economic adaptations in Neanderthal groups are largely dependant on their immediate environment. Colder, harsher conditions demand more focus on survival from day to day than expending energy on long distance travel to procure exclusive raw materials when fully functionally resources are readily available nearby. A people displaying a radiating mobility pattern paired with specialized hunting and a specified weaponry, if anything, seems more like a lifestyle adopted through natural causation than a lack of ability to better utilize the landscape around them. The presence of small game and marine and avian resources in deposits ranging over the expanse of the Neanderthal homelands points towards a full capacity to exploit alternative food resources in addition to active hunting of large mammalian prey. Though there is less evidence of well-organized exchange networks in Mousterian sites, the lack of great behavioural discrepancies between Neanderthal and anatomically modern human exploitation of local resources raises the argument that this issue is not pertinent to the origins of modern human behaviour in Middle Palaeolithic populations.

It is therefore natural to conclude that though there are slight differences between Neanderthal and anatomically modern human economic strategies, this might be seen as nothing more than two independent populations from culturally and climatically different backgrounds adapting to the same area in different ways.



## Chapter 6

### A Survey of Neanderthal Symbolism.

In the search for behavioural modernity, there is perhaps no stronger indication than the use of symbols. Storage of symbolic information outside the human brain might very well be an indisputable source of confirmation in the search for modern human behaviour (Wadley 2001). The transmission of cultural information through inanimate artefacts implies a depth of cognitive ability beyond purely technological and economic prowess. Symbolism entails a conceptualization not only on an individual level, but also transcending social groups and boundaries. Symbols can show belonging, reflect cultural norms, mark boundaries and transcend language. Indeed it is suggested that the presence of symbolically loaded artefacts in an assemblage bears witness of the language capacity of the manufacturers (Henshilwood 2007). The initiative to imply identity in an artefact is a clearly a product of modern cognition. Traditionally it is agreed that symbolic capacity can be seen in an array of concepts. The organized use of living space, pigment utilisation, the creation of objects of personal adornment and art, and the deliberate interment of the dead are all markers of a symbolic behaviour (McBrearty and Brooks 2000, Henshilwood and Marean 2003, d’Errico 2003).

There is some degree of symbolism visible in the technological and economic traits of modern human behaviour. The standardisation of artefact types in special traditions is documented with Neanderthals in the Uluzzian, Chatelperronian and Slezatian in Europe and show a social kind of symbolism. The regional variety in these traditions no doubt show different regional traditions and extractive activities (McBrearty and Brooks 2000). This standardisation must also be seen as evidence of teaching and a cultural concurrence in regards to how tools should be made and what they should look like.

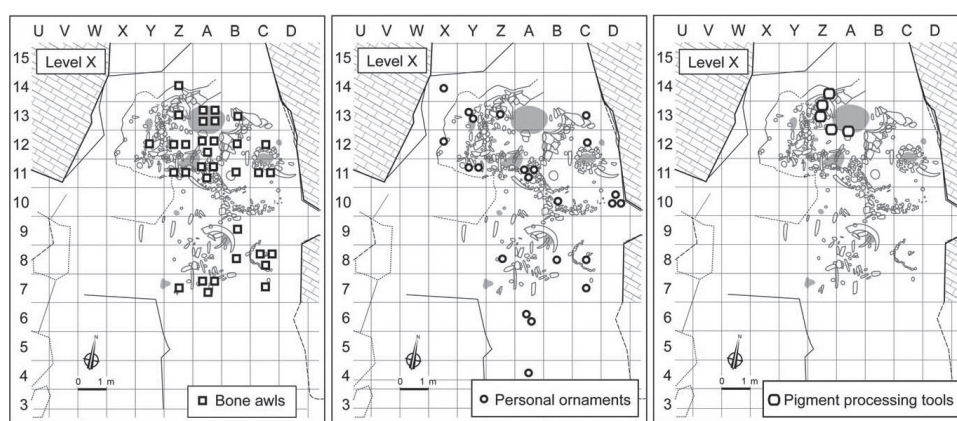
The long distance procurement of raw materials can also have a symbolic nature. Lithic materials of exclusive quality may be carried to exhibit social status while certain shades of pigment may be preferred above others (d’Errico 2003). These social incentives could quite easily have inspired the practice of long distance raw material procurement.

Behaviour	Trait
Economy	Effective large mammal exploitation Seasonally focussed mobility strategies Fishing and fowling Expanded exchange networks Use of harsh environments

*Economic Traits Used to Identify Modern Human Behaviour: After Klein (1995), Mellars (1996), Deacon (2001), d’Errico (2003) and Henshilwood and Marean (2003).*

### Organised use of domestic space.

Intra-site spatial patterning is seen as a marker of symbolism in the way that certain areas of the living space were dedicated to certain pursuits. The appearance of individual domestic hearths in Middle Palaeolithic living areas has been said to show a greater awareness in the organization of living areas. The internal structure of a site can also help define its function in the landscape as a whole and thereby contribute to an understanding of the seasonality of a given group. At the site of Hortus, France some time in the Last Glacial, a Neanderthal took shelter, made a fire, ate parts of an ibex and knapped some tools, then left after an overnight stay (Pettitt 1997). Knapping around a fire, as a group or an individual, can be seen as many sites.



6.1 Grotte du Renne, distribution of bone awls, ornaments and pigment processing tools in Chatelperronian level X. The areas in grey are hearths. From Caron et al 2011.

Deacon (1998) comments that individual hearths also imply that they were owned by reproductive women. Klein (2001), although he acknowledges the ability of pre- Upper Palaeolithic peoples to regularly construct fireplaces, dismisses this as sufficient evidence of symbolic or modern behaviour on the basis that it is possible further research might show that even earlier populations also constructed fireplaces. He acknowledges that Mousterian people had the capacity to regularly construct fireplaces (Klein 1999).

Mellars also acknowledges the presence of internal organization in some Middle Palaeolithic sites, mirrored by the concentration of some activities close to hearths and others in marginal areas, but he concludes that “to qualify as modern spatial patterning needs to be more complex than mere disposal of waste and a coincidence between tools and food waste” (1996).

Ample information can be read in the context of simple bio-mechanical principles, such as the way humans sit around hearths (Gamble 1986). A record of 20 000 years of Neanderthal occupations at Abric Romani rock shelter, Spain has produced almost 200 hearths of various types. Small, flat hearths near the site walls have been interpreted as heat and light sources in sleeping areas, while large, centrally placed hearths dense with bone and lithics demonstrate cooking and

tool use areas. Though these central hearths show spatial variation through six consecutive layers, they still cluster around a central point. This is taken as firm evidence that Neanderthals regularly organized their living space over the span of several millennia (Balter 2009). Kebara Cave, Israel presents hearths devoid of bone and poor in lithic materials. Research has shown that the debitage was swept into rubbish accumulation areas (Bar-Yosef *et al.* 1992). At Pech de l'Azé IV and Roc de Marsal in France, hearths also showed signs of habitual raking and cleaning (Balter 2009).

Tor Faraj rock shelter, Jordan dating to between 69 and 49 kyr BP, displays a collection of typically Neanderthal tools, but no human remains. Two living floors excavated here show evidence of well-differentiated spaces assigned specifically to butchery, lithic production, bone and antler working, sleeping and dumping rubbish (Henry 1998). This degree of intra-site spatial patterning mirrors those found in modern human occupation sites (Balter 2009). Though she agrees that Neanderthals and anatomically modern humans were essentially doing the same thing in their organization of living space, Wadley digresses that Neanderthal sites were orderly “*although probably not yet in a symbolic way*” without explaining what exactly Neanderthals sites lack to deserve such reservation (Balter 2009).

Spatial segregation of activities can also be seen at Cueva Morín, Spain (Freeman 1978). While scrapers were predominantly found near the cave mouth, typical slicing tools were found in the interior of the cave. This indicates a dichotomy between jobs requiring scrapers, light and space and tasks connected to cutting which might not need as much light or space (Pettitt 1997).

Evidence of small huts or living structures originate from several sites across Eurasia. At Fumane Cave, Italy, dwelling structures have been recovered with hearths and a concentration of discarded, knapped byproducts, charcoal and a few bones (Persani 2008). Small huts at Lazaret (de Lumley 1969) and Molodova I and V (Chernysh 1965) and the Châtelperronian huts from Arcy-sur-Cure (Leroi-Gourhan 1976) present as high-resolution traces of structured and organized living spaces.

### Pigmentation.

The systematic use of ochre or manganese as pigments is one of the hallmarks of the Upper Palaeolithic (McBrearty and Brooks 2000). But, as Hovers *et al.* (2003) remark “*there is an increase over time in the frequency of pigment occurrence in the prehistoric record, but although it occurs at different times in different regions, in general it can be placed in the context of the [Middle Stone Age and Middle Palaeolithic] in Africa and Europe, respectively*”.

The use of manganese and ochre as colourants is recorded in the deposits of many European Middle Palaeolithic sites. The preserved residue of a red lepidocrocite base mixed with ground, dark red-to-black fragments of hematite and pyrite was recovered in situ inside a *Spondylus* shell at Cueva de los Aviones, Spain (Zilhão *et al.* 2010). Pigments from Pech-de-l'Azé I have been dated to ~50,000 to 60,000 years ago, most of them showing traces of abrasion from use and some

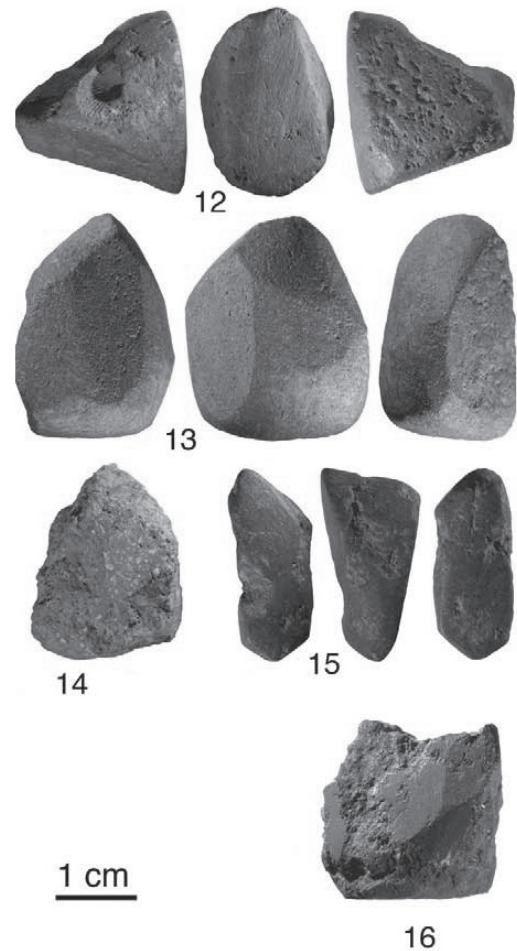
also show evidence of use as crayons (d'Errico 2003). This is also the case in Kenya and Zambia. Recent excavations at Kapthurin and Twin Rivers have unearthed convincing proof that colourants were used as far back as the Acheulean/MSA boundary. The dates vary from 260,000 to 400,000 (d'Errico 2003).

At Grotte du Renne, Arcy-sur-Cure, France no less than 14,580 g of pigment was found distributed across occupational level X alone (Caron et al. 2011). Due to anomalies in the radiocarbon dating of artefacts and levels at the site, the stratigraphical integrity has been challenged (Bar-Yosef 2006, White 2001, Mellars 2010, Higham et al. 2010). Caron et al. reject that displacement of artefacts and human remains explains the association of symbolic artefacts with Neanderthals. Instead they suggest that the anomalies observed in the radiocarbon dating of the sequence is due to incomplete decontamination of the bone samples used based on the distribution of pigments and other characteristically Châtelperronian artefacts through the sequence (2010).

Mellars (1996ab) distinguishes between symbolic and domestic use of pigment claiming that Neanderthal use of pigment was solely for the purpose of changing the surface appearance of things, much like dyeing clothing. But even the purely domestic use of pigment to colour hides can be interpreted as a form of social symbolism and cultural identity within a group. As d'Errico (2003) remarks, there is no traditional modern society in which the production and use of colourant is mainly functional. It is therefore naïve to assume, given the quantity and frequency of finds, that Neanderthals were not using pigments in symbolic activities. The conclusion must be that the established use of colourants in Neanderthal contexts points to a symbolic capacity in the people.

#### Objects of personal adornment.

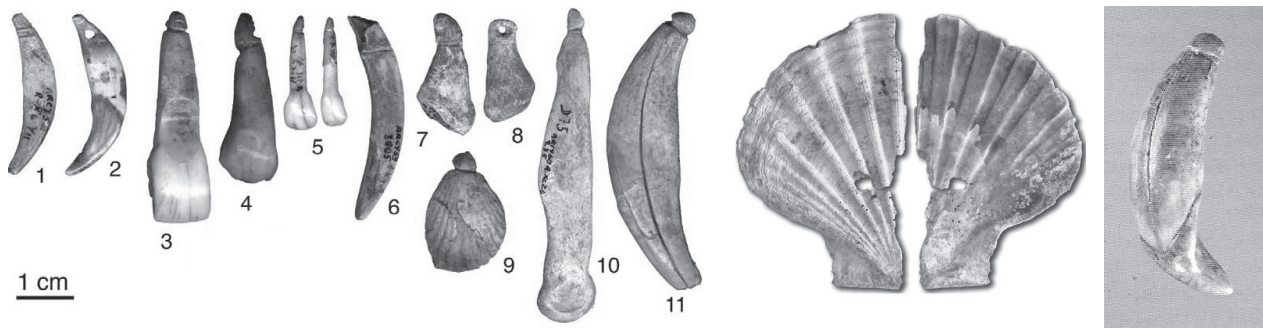
The act of accentuating one's appearance with objects of personal adornment is so ingrained in present day society that most people would hardly give a second thought to the cognitive implications of sporting a given pendant, bracelet or body piercing. In the Palaeolithic it is safe to assume that personal ornamentation reflected the social identity of the bearer, possibly transmitting information of status within a group or marking the individual as belonging to a certain culture or social group. The symbolic meaning of personal ornaments must have been shared and transmitted through syntactical language (Henshilwood 2009).



6.2 Red (12-14) and black (15-16) colorants bearing facets produced by grinding. Adapted from Caron et al. 2011.

Personal ornaments are infrequent in the Middle Palaeolithic; those found are generally from early excavations or originate after the appearance of anatomically modern humans in Europe. This has given rise to a scepticism concerning Neanderthal ornamentation. There is no clear evidence of early Neanderthal ornamentation, but towards the end of their timespan, Neanderthals did produce different types of personal ornaments.

The pierced and grooved teeth from Grotte du Renne for example have been said to be the product of mixing of the layers in the deposit or that Neanderthals have merely copied the techniques of the moderns (Mellars 1996, 2010). Research has shown that the technique used to pierce the teeth was uniquely Neanderthal, bearing no resemblance to that of moderns (Zilhão and d'Errico 2000). Despite this, a canine from the Aurignacian of Vogelherd Cave does bear a striking resemblance to the basal circumincising technique of the Grotte du Renne Neanderthal produce.



From left to right:

6.3 Personal ornaments from Grotte du Renne made of perforated and grooved teeth (1-6, 11), bones (7-8, 10) and a fossil (9).

Adapted from Caron et al. 2011.

6.4 K19-3; A perforated upper half valve of *Pecten maximus* from Cueva Anton. Note the naturally red internal side (left) and the whitish external side that was painted with an orange colourant made of goethite and hematite. From Zilhão et al. 2010.

6.5 Pendant from the Aurignacian of Vogelherd, Germany. From White 2007.

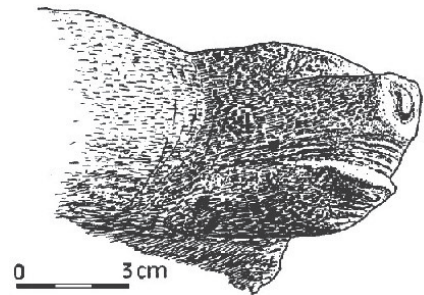
Neanderthals in Iberia have taken it upon themselves to combine two symbolically significant practices. Perforated *and* pigment-stained marine shells have been found at Cueva de los Aviones and Cueva Antón, both dated to ~50 000 BP. Cueva de los Aviones, in addition to the pigmented shell already mentioned above, proffers three umbo-perforated valves of *Acanthocardia* and *Glycymeris* found alongside lumps of red and yellow colourants. At Cueva Antón, 60 km inland, a *Pecten* shell painted orange on its white side and perforated near the umbo was discarded after breakage (Zilhão et al. 2010). Pierced mollusc shells are also known in the Uluzzian deposits in Italy (Peresani 2008).

In layers dating to 44 000 BP, evidence from Fumane Cave, Italy points to the human modification of avian bones outside the context of subsistence. Species found at the site (i.e. lammergeier, Eurasian black vulture, golden eagle, red-footed falcon, common wood pigeon, and Alpine chough) are not typical prey, nor are they especially connected to other utilitarian purposes. Rather, analysis of the bones suggest that the Neanderthals of Fumane were invested in the removal of feathers. One Eurasian black vulture bone shows clear cutmarks related to the disarticulation of the carpometacarpus, pointing to a removal of the entire wing. It is posulated that both feathers

and possibly whole wings were used by the Neanderthals to augment their physical appearance (Peresani *et al.* 2011).

### Art.

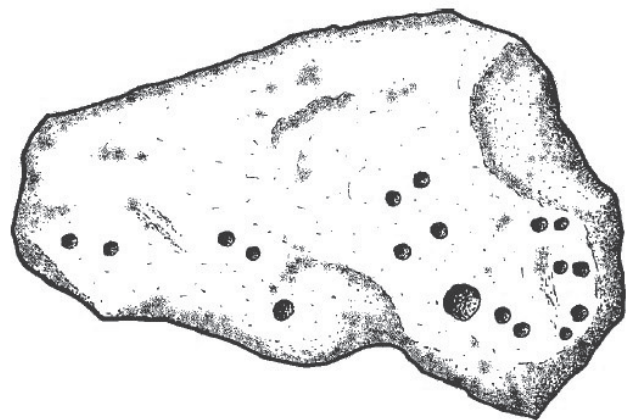
Iconic art has been hailed as one of the ultimate markers of non-utilitarian culture. The rock art of Chauvet Cave, dating to around 32 000 BP was discovered in 1994 (Clottes 2003a) and has since, along with the discovery of the famed ivory Lion man of Hohlenstein-Stadel and figurines like the mammoth and horse from Vogelherd Cave, become the standard by which we judge the modernity of other paleoart (Bednarik 2003).



6.6 A sculpture resembling the head of a bear on the vertebrae of a woolly rhinoceros, Tolbaga, southern Siberia. From Bednarik 2003.

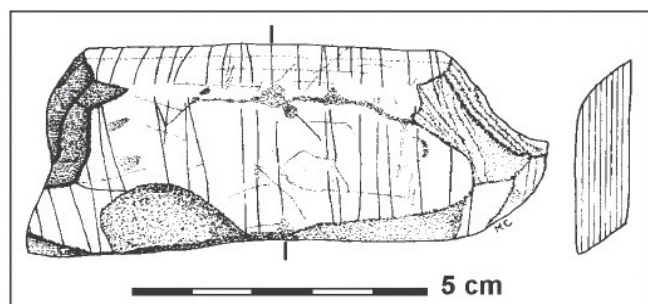
In company such as this, it is difficult to discern any evidence of iconic art in Neanderthal contexts. This negative space only seems to reinforce the vacuum and has served as a shroud, overshadowing the less visually impressive artistic attempts of other social groups. The bear's head made on a woolly rhinoceros vertebrae from Tolbaga, southern Siberia is an exception and with an age of possibly 35 000 BP, it may very well represent the oldest presently known iconic sculpture (Bednarik 2003).

Non-iconic art, on the other hand, is frequently found in Middle Palaeolithic contexts. A set of eighteen cupules (cup-shaped marks pecked out of a rock surface) were found on the underside of a limestone slab. The slab was placed over the burial of a Neanderthal infant at La Ferassie. Dating to ~60 000 BP, the cupules constitute the earliest rock art found in Europe (Bednarik 2003).



6.7 Limestone slab from La Ferassie, France bearing eighteen cupules, sixteen of which are in pairs. The cupules were fashioned before the slab was placed over a Neanderthal infant burial. From Bednarik 2003.

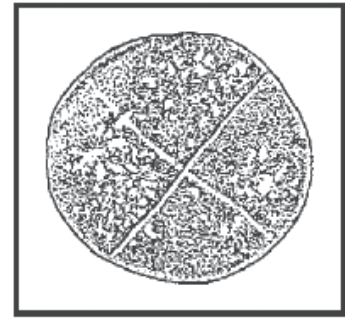
Examples of portable art can be found in France, Spain, Bulgaria, Italy, Belgium and in the Ukraine in the form of purposeful engravings on both lithics and bone (Bednarik 2003). The site of Prolom 2 in the Crimea, Ukraine has produced engravings on a bone splinter, a modified phalanx and a horse canine (Stepanchuk 1993) and at Temnata Cave, Bulgaria, a schist plaque presents with 43 incised sub-parallel lines (Cremades *et al.* 1995). The plaque dates to ca. 50 000 BP



6.8 Mousterian engraved schist plaque from Temnata Cave, Bulgaria. From Bednarik 2003.

and, according to Bednarik (2003) is one of the best examples of Mousterian paleoart.

A highly unique object is a silicified nummulite from Tata, Hungary. A natural fracture halves this artefact, visible on both sides of the semi-translucent fossil (Mellars 1996). The circular disc has been crossed at right angles to the fracture by engraved lines on both sides, thus forming crosses within the circular outline of the object. The level of conceptualization demanded to create this seemingly simple decoration is in fact rather complex (Bednarik 1995b, 2003).

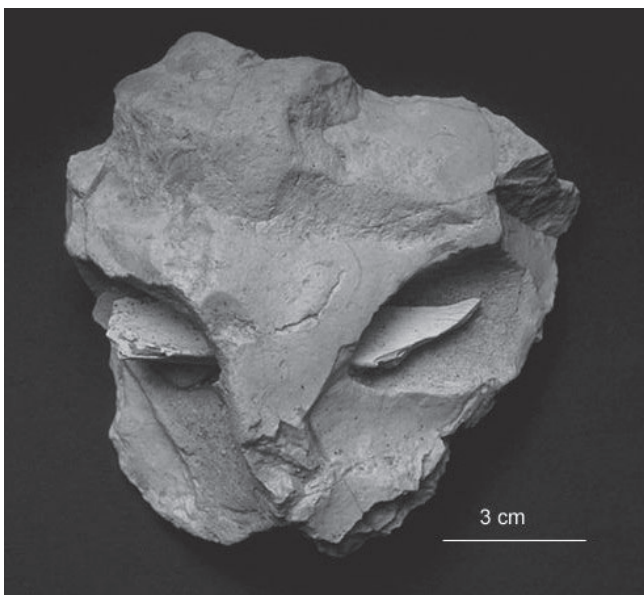


6.9 Mousterian engraved nummulite from Tata, Hungary. From Bednarik 2003.

Evidence of aesthetic appreciation is also available in Lower Palaeolithic contexts. Acheulian sites across the world are providing finds such as cupules, crayons and notched bone (Bednarik 2003), pushing the origins of art as we know it even further back in prehistory.

#### Manuports and Pierre's Artefacts.

Manuports are tiny crystals, fossil casts or stones found and brought to a site by human simply because the shape or form appealed to them. The earliest evidence of such a manuport is a red jasperite pebble from Makapansgat Cave, South Africa with distinctive natural markings reminiscent of a face. The site dates to 2.5-3 million years ago (Bednarik 1998b). Manuports are regular components in Neanderthal sites.



6.10 The mask of La Roche-Cotard from Langeais in Indre-et-Loire (France). From Pettit 2003/4.

At La Roche-Cotard, France, a worked piece of flint carrying a figurative image, enhanced by a splinter of bone has been interpreted as a pierre's artefact; an artefact that was collected and then intentionally modified by humans, or proto-figurine (Marquet & Lorblanchet 2003). The lithic features a natural tubular perforation which creates a 'bridge' dividing the artefact into two parts. The object has been worked to give it a more regular shape and the bone splinter inserted into the tubular feature was purposely blocked into place by the means of two small flint plaquettes. In completion, the artefact rather resembles a human face (Marquet &

Lorblanchet 2003). The cognitive capacity and artistic impulse required to recognize a potential human face in the original lithic, the leap of imagination it takes to see life in stone, and the depth of planning required to modify and finish the artefact clearly shows a cognitive modernity in the La Roche-Cotard Neanderthals.

### Interment of the dead.

Fifty eight putative burials are known from Middle Palaeolithic sites in Europe and the Near East, thirty five of which are connected to Neanderthals (d'Errico 2003). Burial as a practice has the effect of increasing the chances a fossil skeleton might survive, but has not always been accepted as a trait of modern human behaviour (Trinkaus and Shipman 1992). At sites across Eurasia like La Chapelle-aux-Saints. La Ferrassie, Krapina, Spy and Shanidar excavation contexts have



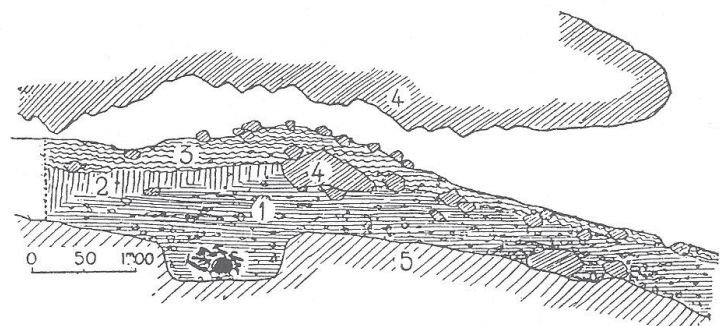
6.11 A recreation of the Neanderthal burial at La Chapelle-aux-Saints from Musée de l'homme de Neandertal La Chapelle aux Saints.

convinced excavators of Neanderthal burial practices (Gargett 1989). The current earliest evidence of possible deliberate interment hails from Simo de los Huesos at Atapuerca, Spain dating to around 350,000 BP, implying burial as a practice in the Homo heidelbergensis population of that time (Arsuaga *et al* 1997).

At la Chapelle-aux-Saints the Old Man was found in a large, rectangular depression, said to have been intentionally excavated. His body was flexed as if asleep. Where the initial excavators interpreted this context as an intentional burial (Bouyssonie *et al.*

1908), Gargett (1989) challenges that the Old Man crawled into the cave and then the depression of his own accord and died. Then he eventually became covered by natural processes. Likewise he challenges the infant's grave at Le Moustier, claiming that "*the remains of the infant had somehow found their way into a pit created by an unknown process for an unknown purpose*" and indeed other Neanderthal burials citing "fortuitous spatial placement" as an explanation of exceptional preservation.

Some researchers, while accepting the presence of Neanderthal burials, deny the symbolic content inherent in the practice. Mellars emphasizes that "...at the very least [in Neanderthal societies] the act of deliberate burial implies some strong social or emotional bonds ... which dictated that the remains of relatives or other close kin should be carefully protected, and perhaps preserved, in some way after death", but he



6.12 The burial of the "Old Man" at La Chapelle-aux-Saints. Bouyssonie *et al.* 1908. From Mellars 1996a.



concludes that the symbolic component in Neanderthal burial practices remains unproven, due to the lack of grave offerings (1996b). This statement in itself seems to carry a degree of contradiction because as Hovers *et al* (2003) comments “*even this cautious, minimalist view a symbolic component is implied, for the bones of dead kin are at least iconic of the living person in that they point to their referent by physical resemblance*”.

The partial burial of a Neanderthal at Kebara Cave, Israel, shows somewhat of an anomaly. The upper mandible and cranial vault has been removed after an interment with the head left over the soil. Pre-depositional decapitation can be out-ruled due to the presence of 2 vertebrae *in situ* that would usually be removed in such actions (Pettitt 2002/1). Finds like this incite the opinions of those who believe that Neanderthal burials bear evidence of the earliest rituals and religions, a cult of the ancestors.

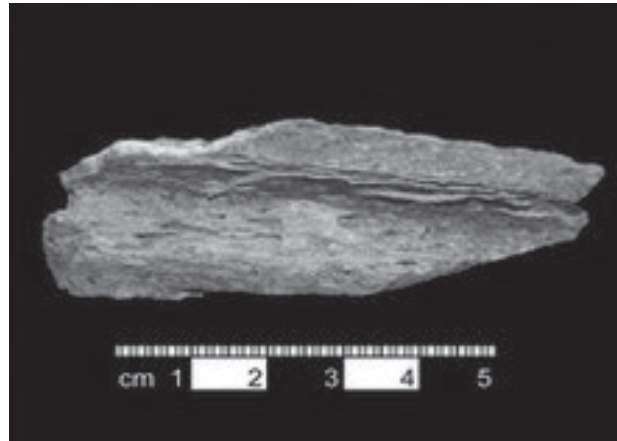
Grave offerings are not well documented in the Middle Palaeolithic. There has also been some discussion as to the validity of implied grave goods in Neanderthal contexts. While the articulated reindeer vertebrae and bovid longbones found at Chapelle-aux-Saints were discovered above the level of the head in the grave/depression, the circle of goat horns placed point down around the shallow grave of a 12 year old male Neanderthal at Teshik-Tash suffers criticism due to a lack of visual records of the grave (Gargett 1989). Shanidar IV with its high levels of sedimentary pollen supporting floral grave goods has given life to the idea of rituals involved in burial. The pollen descends from no less than 8 species of wild flowers; members of the daisy family, the yarrow, St Barnaby's thistle, groundsel, grape hyacinth, joint pine, and hollyhocks (Solecki 1971). Despite this, Mellars claims that only two fully convincing examples of intentional grave offerings are documented in the Middle Palaeolithic – a large fallow deer antler from Qafzeh and a complete boar's jaw from Skhul, both associated with modern humans. D'Errico has criticized the demand for grave goods. He adds to the discussion the point that even though the burial practices of modern humans (e.g. the Gravettan) seem more complex, it cannot be used to suggest that Neanderthals invested less in symbolism (2003).

Interestingly, burials do not seem to be a common practice among early AMH in Europe where remains are often found to be fragmentary, more often than not showing signs of dismemberment or disposal in unoccupied sites, e.g. Mladeč and Peștera cu Oase (Davies 2005). Indeed, many religious communities of the present bury their dead without grave offerings without having their modernity questioned. The argument that Neanderthal burials were purely a functional way of disposing of corpses or merely the accidental depositions of dead bodies (Stringer and Gamble 1993) seems far fetched. Especially in view of the large number of burials at some sites and the fact that there are much simpler ways in which to dispose of a body (Mellars 1996ab). In all, the evidence of burials in the Middle Palaeolithic must serve to show symbolic behaviour, independent of grave offerings.

Though some researchers doubt the symbolic significance of Neanderthal intra-site spatial patterning, the organized use of living space is evident in several Neanderthal sites. The issues regarding the stratigraphic integrity of symbolic artefacts and pigment in Châtelperronian contexts at Grotte du Renne have been debated and refuted. Even if this result is contested again in the future, the discoveries of perforated marine shells with and without pigment staining in Spain and Italy are well enough documented to stand alone. Though there is a seeming lack of iconic art in Neanderthal sites, the presence of manuports and pierre's artefacts along with evidence of cupules and linear design on lithics and bone does display an ability to project and store an idea outside the mind. The possibility that Neanderthals utilized perishable materials in their production of more elaborate art forms should not be overlooked. This, along with the overwhelming evidence of deliberate and symbolically loaded interment of the dead gives an image of a Neanderthal population with the aptitude to understand symbols and project this understanding on their natural surroundings. The conclusion of this chapter must be that Neanderthals were capable of symbolic thought and expression.

## Chapter 7

### Decoding the Neanderthal genome; Implications.



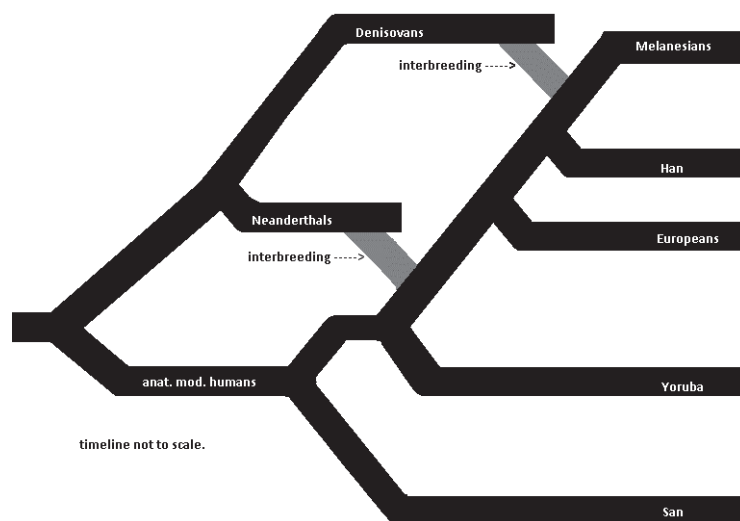
7.1 Vi33-16. The bone fragment from which the Neanderthal genome was mapped.

In 1997, Krings *et al.* published their analysis of mitochondrial DNA recovered from the Feldhofer Neanderthal. Comparison to modern human mtDNA showed that Neanderthals had not contributed to the present day mtDNA pool and that modern human and Neanderthal lineages had split from each other between 550 and 690 kyr BP (Krings *et al.* 1997). Though the results did not explicitly mean that Neanderthals and anatomically modern humans had not interbred, it was taken to mean as much in layman's terms. Neanderthals were now effectively excluded from the human line of descent. Over the next few years, several other partial Neanderthal mtDNA sequences were mapped; Feldhofer 2 (Schmitz *et al.* 2002), Mesmaiskaya (Ovchinnikov *et al.* 2000), Vindija 75, 77 and 80 (Krings *et al.* 2000, Serre *et al.* 2004), Engis 2, La Chapelle-aux-Saints, Rochers de Villeneuve (Serre *et al.* 2004), Scladina (Orlando *et al.* 2006), Monte Lessini (Caramelli *et al.* 2006) and El Sidrón (Lalueza-fox *et al.* 2005).

In 2006, researchers from the Max Planck Institute for Evolutionary Anthropology announced their intention to map the Neanderthal genome after achieving a result of one million base pairs from a 38 000 year old fossil from layer G3 of Vindija Cave, Croatia (Green *et al.* 2006). Through an analysis of the base pairs already recovered Green *et al.* concluded that "Neanderthal genetic differences to humans must therefore be interpreted within the context of human diversity" and also touched upon the possibility of gene flow between Neanderthal and anatomically modern human populations (2006). In 2008 a complete Neanderthal mitochondrial genome sequence confirmed that Neanderthal mtDNA falls outside the variation of extant modern human mtDNA (Green *et al.* 2008) once again providing no evidence of interbreeding.

Two years later the first draft sequence of the Neanderthal genome was announced and published (Green *et al.* 2010). Analysis was performed using Neanderthal remains from Vindija were first compared to DNA from other Neanderthal specimens (El Sidrón, Feldhofer and Mezmaiskaya) to examine regional variation in the Neanderthal genome, and then compared to DNA sequences from five present day humans of varied descent; one San from southern Africa, one Yoruba from West Africa, one Han Chinese, one Papua New Guinean and one French European. The result was conclusive; Neanderthals and anatomically modern humans had interbred, the former having contributed to 1-4% of the DNA sequence of present day non-Africans. Visible gene-flow between the species had occurred prior to the divergence of Europeans, East Asians and Papuans and had predominantly flowed from Neanderthals into the anatomically modern human lineage, concurrent with the hypothesis that “*when a colonizing population (such as anatomically modern humans) encounters a resident population (such as Neanderthals), even a small number of breeding events along the wave front of expansion into new territory can result in substantial introduction of genes into the colonizing population ... detectable gene flow is predicted to almost always be from the resident population into the colonizing population, even if gene flow also occurred in the other direction*” (Green *et al.* 2010). It was also established that the majority of genetic divergences in Neanderthals also overlapped those of modern humans “*reflecting the fact that Neanderthals fall inside the variation of present-day humans*” (Green *et al.* 2010).

Results from the Max Planck Institute have been questioned in regards to the reliability of current methods (Wall and Kim 2007, Green *et al.* 2009) and in regards to the extent and significance of this interbreeding (d’Errico, pers. comm.). Reservations based on the presumed rarity of breeding encounters and skirting the issue of such behaviour being considered mainstream should be satisfied by results from Denisova Cave, Russia where a third contemporary human type was discovered during DNA analysis This hominid, dubbed a ‘Denisovan’, was found to have interbred with anatomically modern humans too (Krause *et al.* 2010, Reich *et al.* 2010) The Denisovans have left their genetic footprint as ~5% of the DNA of current day Melanesians (Reich *et al.* 2011).



7.2 The Human Family Tree so far.

### Interbreeding.

Conclusive evidence of admixture between anatomically modern humans and Neanderthals leaves no doubt that interbreeding did indeed occur. Whether on a large or small scale, anatomically modern humans did meet and breed with the indigenous Neanderthal population during their influx into Eurasia. This inter-mixture is to have found place before modern human populations diverged into Europeans, East Asians and Papuans beginning around 50 – 80 kyr BP (Green *et al.* 2010). Compared to the Eurasian archaeological record, this seems to fit well with the evidence of Middle Palaeolithic anatomically modern humans at Qafzeh Cave 100 000 years ago and their succession by Neanderthals during the next 50 000 years (Green *et al.* 2010).

The skeleton of a child found at Abrigo de Lagar Velho, Portugal has often been mentioned in relation to Neanderthal and anatomically modern human admixture. The child was around 4 years old when buried alongside a pierced shell and red ochre and displayed a mosaic of morphological features attributable to Neanderthals and anatomically modern humans. The remains were dated to ~24 500 BP (Duarte *et al.* 1999). Though this child has since proven to be associated with a Gravettian industry (Tattersall and Schwartz 1999) and to have the dental morphology of an anatomically modern human (Bailey *et al.* 2009) it is still possible it's heavy build is due in part to relatives of a Neanderthal descent (Zilhão 2001).

The early anatomically modern specimens found in Europe tend to be rather robust, presenting with a patterns of traits attributable to both anatomically modern and Neanderthal descent (Zilhão *et al.* 2007, Soficaru *et al.* 2006). Examples of anatomically modern humans presenting with a mosaic of Neanderthal morphological traits are known predominantly in Central and eastern Europe. The lateral extension of the occipital bun in Mladeč 5 and 6 displays an affinity to the Neanderthal condition (Churchill and Smith 2000b, Wild *et al.* 2005). The Peștera cu Oase specimens also display a mosaic of Neanderthal-like traits. These include bridging of the mandibular foramen, a broad ramus, wide dental arcades and exceptionally large molars (Zilhão *et al.* 2007). The intrusion of traits is also visible in the other direction. The Vindija Neanderthals exhibit a more gracile morphology than their western European relatives, though they are still diagnostically Neanderthals (Churchill and Smith 2000b). Given the recently published DNA evidence indicating interbreeding in the Middle East 50 – 80 000 BP (Green *et al.* 2010) it is not too difficult to imagine that the transitional nature of these fossils might reflect this admixture. The so-called Classic Neanderthals of western Europe reside at a distance from the proposed mixing zone. It makes sense that groups further from the point of initial admixture should retain the strongest traits of their ancestral line.

Patrilocal tendencies reflected in the mtDNA of a Neanderthal family group from El Sidrón (Lalueza-Fox *et al.* 2011), Spain show an exchange of females from group to group. Given that mtDNA only passes through the female line, an anatomically modern female with a Neanderthal mate would pass down her mtDNA to the next generation while a Neanderthal female with an

anatomically modern mate would need to produce daughters to avoid an end to her mtDNA line. Given the small size of the Neanderthal population (Green *et al.* 2008), this could help explain why Neanderthal mtDNA is not visible within the variation of present day modern humans.

### Language.

Symbolic behaviour is viewed as a strong marker for the presence of a composite language in a population. Words sewn together systematically into statements with specific meaning to be read in a specific order, dictated by a set of grammatical standards witness a leap of cognitive prowess and an advance in behaviour implicit to cultural modernity. Language creates a cognitive fluency, signifying the capacity for analogy and metaphor which are considered the foundations of art, science and religion (Mithen 1996a). Language is as vital a part of social structure today as it must have been in the past. It is a medium for individuals to express opinions, share happiness and worries, plan activities, delegate responsibilities and pass on knowledge to children and apprentices alike.

Morphologically, Neanderthals have been proven possess the same proportions in the hypoglossal canal and thoracic vertebrae as anatomically modern humans, accommodating an equal aptitude of motor control of the tongue and breathing (Mithen 2007). A hyoid bone recovered from Kebara, Israel also supports Neanderthal linguistic ability as it displays no morphological distinction from the hyoid bones in anatomically modern humans (Arensburg *et al.* 1989). *Homo heidelbergensis* skulls from Sima de los Huesos, Spain have shown that by 300, 000 BP, auditory capacity in Neanderthals was indistinguishable from that of anatomically modern humans today (Martínez 2004). Even further back in time, evidence in the form of a spinal column from Dmanisi, Georgia also points towards language capability in a nearly 1.8-million-year-old hominin, supporting the possibility that the original hominid inhabitants of Europe spoke to one another (Bower 2006).

Some researchers believe that Neanderthals did not possess the cognitive prerequisites to compose and utilize a composite language. The presumed rarity of artefacts, both modified and unmodified, has been named as a reservation towards Neanderthal linguistic skill because basing a theory on such little evidence is an unscientific approach (Mithen 2007). Mithen (2005, 2007) also lists the stability of Neanderthal culture as a marker of the lack of composite language, citing the long-lived stability in culture and a dearth of evidence regarding innovation through the Neanderthal era as proof. He dismisses all cultural and morphological evidence supporting an equal linguistic capacity, presenting his theory of 'Hm-mmm'-speech; Holistic, manipulative, multi-modal, musical, mimetic. A holistic approach implies language to have appeared as a system where every utterance conveyed a message rather than a single word, this is in contrast to a compositional approach which asserts that early language consisted of specific words but with little or no grammatical structure to utterances. According to Mithen (2007), holistic language evolved in Neanderthals in Europe while compositional language evolved in Africa with anatomically modern humans, possibly as the result of a sudden, fortuitous genetic mutation.

In mapping the Neanderthal genome, researchers also discovered the presence of the FOXP2 gene in Neanderthal DNA (Green *et al.* 2010). The FOXP2 gene “*is involved in the developmental process that culminates in speech and language*” (Lai *et al.* 2001) and was located in Neanderthal DNA bearing the same selective mutations as that of present day humans (Krause *et al.* 2007). The discovery that the Neanderthal FOXP2 gene shares two evolutionary changes with that of modern humans, indicates that this gene was already in place in both populations before their divergence ~500 000 years ago (Krause *et al.* 2007, Green *et al.* 2010).

The technological skill required to make Neanderthal tools had to have somehow been transmitted successfully from generation to generation. Likewise, forward planning has been proved through studies of Neanderthal subsistence strategies. Neanderthal language skills are evident not only in their genes, but in the interaction now proven between them and their contemporary anatomically modern neighbours. In this situation, the meeting of two peoples, Neanderthals have shown the capacity to not only to speak, but also the to overcome a language barrier considering it is unlikely that, given their widely divergent environmental backgrounds, both groups spoke the same language upon meeting. This circumstance alone should have huge relevance to the debate. Undoubtedly, cultural and genetic exchange of the level apparent in the transitional phase between the Middle and Upper Palaeolithic in Eurasia, along with complimentary morphological traits implies a spoken language in Neanderthal societies.

### Acculturation?

The greatest argument against the validity of Neanderthal modern behavioural markers is the concept of acculturation (Mellars 1996, 2007, Stringer and Gamble 1993). Proponents of this model believe that Neanderthals borrowed or copied the traits from anatomically modern humans without really understanding the concepts innate in each marker. They base their conviction on evidence of Upper Palaeolithic technologies appearing in Neanderthal assemblages during the Middle to Upper Palaeolithic transition in Europe and the presumed unclear stratigraphic sequences at some sites containing both Neanderthal and anatomically modern occupational levels (Mellars *et al.* 2007, Zilhão *et al.* 2006, Zilhão *et al.* 2008, Riel-Salvatore 2008). The hypothesis of acculturation has been debated thoroughly (Stringer and Gamble 1993, Mellars 1996, d’Errico *et al.* 1998, Chase 2007). Researchers wishing to refute the hypothesis have sought to disprove contemporaneous inhabitation of the same areas by the two hominids (e.g. Grotte des Fées, Zilhão *et al.* 2006, Zilhão *et al.* 2008). With the announcement of Neanderthal contribution to the modern human gene pool, the question of whether co-habitation took place is no longer valid.

Setting aside the arguments pertaining to the ‘coincidence’ of modern human behaviours rising as anatomically modern humans advanced into Neanderthal homelands, it is interesting to examine the cognitive prerequisites necessary to learn and adopt such behaviours as have been shown present in the Uluzzian, Châtelperronian and Szeletian industries of the late Neanderthals. Acculturation, as mentioned, implies that Neanderthals were inferior in intelligence to anatomically

modern humans and unable to independently develop the skills and cognitive innovations necessary to be behaviourally modern (Mellars 1996, 2005, 2007).

Chase (2007) argues that the cognitive implications assigned to the practice of acculturation are not predetermined but rather depend on how one defines culture itself. As seen in chapter 2, defining culture can be a laborious and complicated business. In evolutionary biology, Culture is transferred between groups and individuals in the form of behavioural particles called memes. Memetic learning ability is visible in the transmission of e.g. flint-knapping procedures. If acculturation is taken to mean the transmission of memes from one hominid to another, then the diffusion of anatomically modern human technological or economic innovations into Neanderthal traditions implies that Neanderthals both had the capacity to recognize advantageous innovations and the ability to learn them (Chase 2007). The capacity to learn and recognize such technological advance in itself witnesses some cognitive modernity.

Symbolic artefacts however, pose a different conundrum. Symbols are not memes but rather codes that govern human behaviour, created through social interaction and therefore cannot be accounted for in a memetic model of culture. Chase defines these as the material manifestations of culture and “nexus of social agreement”, postulating that “a symbol exists only as, and only because of, a social agreement. It cannot be transferred from one individual to another except as part of a social agreement” (2007). In short, a person cannot understand the meaning of a symbol if that person does not understand the cultural codes that govern its symbolic value. Given this definition, it is of no relevance cognitively whether Neanderthals were taught how to produce artefacts of a symbolic nature or developed the practise independently. Either option would mean that Neanderthals had the ability to create and utilize cultural codes, including symbols and language; and that Neanderthal cognition was structured to allow an expanse in culture into an all-inclusive system encompassing practically all aspects of their behaviour (Chase 2007). In light of the genetic and circumstantial evidence attributable to a Neanderthal language it seems the question of whether Neanderthals developed their symbolic culture independently or were inspired by the material culture of migrating anatomically modern humans is obsolete in the discussion of Neanderthal behavioural capacity

### Aurignacian Origins.

The earliest Aurignacian assemblage currently known in Europe is found in southern Germany and dates to around 38 000 BP (Terberger and Street 2003), but the industry does not present with any secure diagnostic human remains for another 7 000 years (Wild *et al.* 2005).

Modern human skeletal remains from Mladeč have been directly dated to ~31 000 BP <sup>14</sup>C (Wild *et al.* 2005). Artefacts attributed to the Aurignacian have been recovered from a wide spatial area around the cave, but may not be connected to the remains (Conard *et al.* 2004, Svoboda 2000). Only the mandible dated to >35 000 <sup>14</sup>C BP from Peștera cu Oase, Romania, is securely older



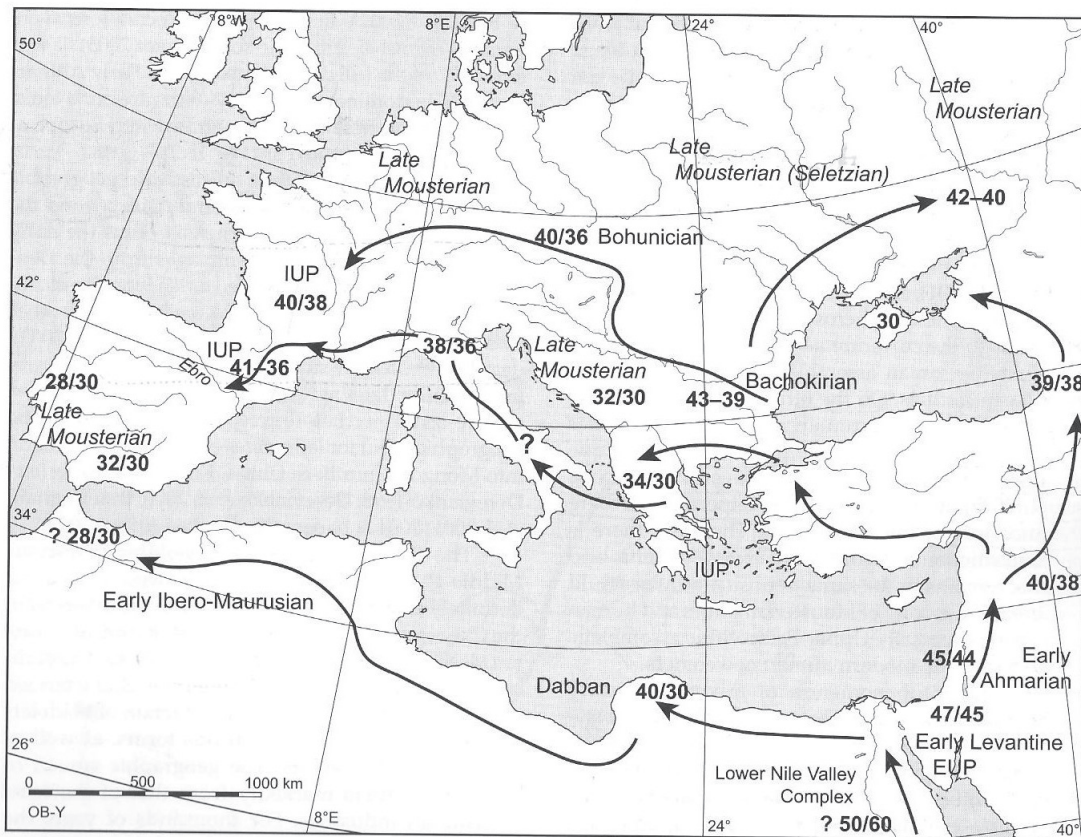
among European anatomically modern humans (Wild *et al.* 2005). Though another fragment of human bone dating to ~29 000 <sup>14</sup>C BP was also recovered from this well-preserved cave bear site, excavations have failed to produce any artefacts. There are no cutmarks to be found on the plethora of faunal remains and no traces indicative of human activity have been detected (Zilhão *et al.* 2007). Peștera cu Oase may boast the earliest fragmentary remains of an anatomically modern human in Europe, but without a cultural context, it cannot be considered affiliated to the Aurignacian industry based solely on assumption. Two other sites in Romania have also produced anatomically modern human skeletal remains that have been subject to direct dating. Peștera cu Muierii (Soficaru *et al.* 2006) and Peștera cu Cioclovina (Soficaru *et al.* 2007) dating to ca 30 000 <sup>14</sup>C BP and ca 29 000 <sup>14</sup>C BP, respectively are both cave bear sites and the remains present without conclusive cultural affiliations.

Remains from the sites of Vogelherd, Germany (Churchill and Smith 2000a) and Velika Pećina, Croatia (Smith 1976) were formerly considered to be the strongest evidence of anatomically modern humans in an Aurignacian cultural context. Direct dating (Velika Pećina:Smith *et al.* 1999, Vogelherd:Conard *et al.* 2004) has since revealed that these specimens, along with remains from Hanöferstrand, Germany (Terberger *et al.* 2001) are intrusive burials from well within the Holocene epoch. Fossil remains from Koněprusy, Czech Republic (Svoboda *et al.* 2002) have also been subject to direct dating and are now assigned to the Magdalenian period. Dates acquired from the human remains of Cro-Magnon and La Rochette, both in France, resulted in their reallocation to the Gravettian period (Wild *et al.* 2005 and references therein).

The strongest current indication that anatomically modern humans produced the Aurignacian industry is a dental study from 2009 conducted by Bailey *et al.* They concluded that a number of previously non-diagnostic, isolated teeth found in transitional and Upper Palaeolithic sites could be species-determined through non-metric traits. Their results suggest that 85% of dental specimens found in Aurignacian contexts can be attributed to anatomically modern humans, while 93% of specimens from Châtelperronian contexts can be attributed to Neanderthals (Bailey *et al.* 2009). These data may seem conclusive, but the lack of secure dates placing any of these teeth within the context of the initial Aurignacian expanse in Europe means they cannot be accepted as final proof. As stated by Soficaru *et al.* (2006), anatomically modern humans can't be found by diagnostic and well-dated fossil remains west of the iron gates of the Danube before ~32 kyr BP.

So where does the Aurignacian come from and who made it?

All evidence points towards the western expanse of the Aurignacian from eastern Europe. Thinking in line with the projected migration of anatomically modern humans from Africa through the Levant to Europe (Mellars 2007). Problems arise with this theory in the archaeological record both morphologically (see above), technologically and chronologically (Belfer-Cohen and Goring-Morris 2007).



7.2 Anatomically Modern Human advance and Upper Palaeolithic technologies in Europe and North Africa. From Bar-Yosef 2007.

A conceptual refinement over time of the Levantine Mousterian notion of pre-planned, prepared core technology is evident in the Early Ahmarian industry of the southern Levant indicating an *in situ* evolution from the Middle to Upper Palaeolithic in that area (Kuhn *et al.* 2001, Belfer-Cohen and Goring-Morris 2007). The Early Ahmarian presents at around 38 000 BP (Shea 2007) with a blade/bladelet-based lithic technology featuring el-Wad points, flat-end scrapers, burins and abundant marine shell ornaments (Zilhão *et al.* 2007, 2007). Though no absolute dates are available at the site of Ksar ‘Akil, Lebanon, affinity to the assemblages of Üçağızlı, Turkey and the Early Ahmarian place it securely in an Early Upper Palaeolithic context (Kuhn *et al.* 2001).

The Early Ahmarian pre-dates the later Levantine Aurignacian Industry which arrives from the North between 32 000 and 30 000 BP, several millennia after the European Aurignacian arrives in southern Germany and France (Belfer-Cohen and Goring-Morris 2007). The Levantine Aurignacian contains ornaments, points, bones and antler tools, carinated scrapers, but less blades than the early Ahmarian. Shea (2007) comments that it bears resemblance to penecontemporaneous assemblages in eastern Europe. Zilhão *et al.* (2007) agree with this assessment, furthering the comparison to encompass the European Aurignacian too. They believe that the composition of the Aurignacian can be traced to Early Upper Palaeolithic industries, referring to the *Dentalium* tubes of the Italian Uluzzian and pierced animal teeth and beads of bone, ivory and soft stone from Franco-Cantabrian Châtelperronian in Europe and the basic lithic technology, stone points and marine shell ornaments of the Early Ahmarian. They also comment on the similarity of el-Wad and Font-Yves points (Zilhão *et al.* 2007).

Since the Aurignacian exhibits this conglomerate of traits derived from diverse local histories and circumstances, is it possible that as two populations met and mixed genetically, so did their technologies? Perforated animal teeth recovered from layer 11 at Bacho Kiro, Bulgaria have led many researchers to consider the contained assemblage as early Upper Palaeolithic in nature, despite the absence of bone points in the Bachokirian industry (Churchill and Smith 2000b), furthering the concept of mosaic-like beginnings for the Aurignacian as regional differences in behaviour would have led to the presence of certain traits in some areas while they were absent in others. The ambiguous status of the Bacho-Kirian human remains, which also exhibit some Neanderthal morphology (Churchill and Smith 2000b) indicates genetic as well as technological and symbolic exchange active in this region during the early Upper Palaeolithic. In fact, it seems only natural to assume that they did.

So what does this mean? Who did make the Aurignacian? According to Zilhão et al. (2007) the answer might very well be taxonomically divided into Neanderthals in the West, anatomically modern humans to the East and a varied mix of both in between. Further research will inevitably augment current comprehension of this issue.

At the end of the day, it is possible that the Aurignacian did enter the western European record along with anatomically modern humans, but if so it is important to remember that on a genetic level those new modern humans were almost certainly already part Neanderthal themselves.

## Chapter 8

### Concluding Thoughts

*So were they cognitively modern?*

Neanderthals have never had it easy. In their lifetime they survived on an Ice Age continent in small family groups, hunting and gathering their local resources across Eurasia. In their afterlife they have been subject to unfair scrutiny and prejudice rooted in the personal and social beliefs of those who initially classified them. As times have changed, so research has also changed and like the Shanidar burial made scholars pause to consider whether the Neanderthals were capable of symbolic actions, the mapping of the Neanderthal genome now has opened a new door in the study of man's closest relative.

Through several chapters, this thesis has offered many examples of Neanderthal cognitive expression. The presence of markers of modern human behaviour in Neanderthal populations, and even in their predecessors have been evidenced. Standardisation of artefact types through the Levallois tradition, the composite hafting of Levallois points and the wooden spears of Schöningen and Clacton-on-Sea all pre-date the rise of what we distinguish as classic Neanderthals. Upper Palaeolithic traditions arising prior to the Aurignacian across Europe and western Asia show a widespread movement towards blade-based industries like the Châtelperronian and diverse tool sets like those found in the Italian Uluzzian. The evidence pointing towards transitional industries having evolved *in situ* from the local Mousterian traditions only reinforce the Neanderthals as a people capable of technical innovation and teaching. Bone tools too proliferate in the millennia leading up to the end of the Neanderthal era, some so finely crafted that there can be no doubt that the manufacturer took pride in his or her work and purposefully sought to express that pride in the end product through polishing and colouration.

In practise, the hafted points and organic spears functioned as part of a highly conceptualized survival strategy. Neanderthals focussed their energy on the hunting of large game, supplementing their diet with avian, marine and vegetable resources. They lived in small family groups and displayed a patrilocality in their breeding strategy, exchanging females between social groups, a behaviour that likely gave rise to the exchange of other resources. Their radiating mobility strategy served them well through many millennia of changing climates and oscillating temperatures and cannot be considered a primitive trait. It is one of many conscious choices made by the Neanderthals as they adapted to their surroundings and evolved to make the harsh environment of Ice Age Eurasia their home.

Symbolic thought has perhaps been the greatest argument against a conclusion of modernity in Neanderthal contexts, but again this thesis brings forth solid examples of Neanderthal behaviour encompassing the conceptualisation necessary to convert abstract thought into material artefact. Neanderthal homesteads proffer a clear focus on the regular building of hearths and the assignment of certain areas to certain tasks. The use of colourant, symbolic in any measure, personal ornamentation and secure evidence of a deliberate funerary practise all support Neanderthal modern cognitive capacities. Perhaps in the question of art, there is a marked difference between what we see before and after the transition to the Upper Palaeolithic, but the absence of iconic art should not be used as an excuse to overlook the artistic traits visible in non-iconic art such as cupules and engraved bone, stone and pigments.

All in all, from the material record alone, it seems almost obvious that Neanderthals did indeed display a cognitive modernity in every facet of their lives.

It is in the implications of this conclusion, along with the support it finds in the May 2010 DNA results, that the future path of Neanderthal research lies. The question of how, when and where interaction first took place and the mapping of the following diffusion of traits should be the focus of scholars moving forward. Too much time has already been spent debating what is now obvious in the Neanderthal genetic footprint non-Africans bear with them to this day. Discussions regarding the nature of the interaction between Neanderthals and anatomically modern humans have been given clear direction. Neanderthals and anatomically modern humans did meet. They did interact. They did communicate. They did interbreed. They were not so foreign to each other that they did not recognize one another as of the same stock. So why should we say any different 80 000 years later?

Anatomically modern individuals sporting more robust and archaic-like traits along with a more gracile trend in the morphology of central European Neanderthals has been speculated as evidence of admixture between the two populations in the past. In light of the confirmation offered through DNA, this theory has gained substance beyond assumption. The next step undoubtedly lies in the investigation of this period of interaction and exploration of the extent to which ideas, ideals and innovations as well as genes were exchanged between the two populations.

The concept of language capability should now be laid to rest. To successfully navigate their environment and achieve the degree of social consensus visible in Middle Palaeolithic tool standardisation alone, a consensus between manufacturers that these tools are optimal in their specific form must have been in place. To keep this consensus alive, the traditions would have had to be passed down from generation to generation and discussed from social group to social group, something that could only be the result of a composite language. In the initial meeting between Neanderthals and the migrating anatomically modern population, language would have been a key feature. Not only would these hominids have had to communicate, but also overcome a language barrier. Only a fully cognisant brain could process the wealth of information that is necessary to

merge two languages, two cultural codes of audible symbols, into one.

It is an undeniable fact that the influx of gracile, anatomically modern humans may have prevailed in most arenas, but the genetic footprint of Neanderthals they carried within them, visible even today in our own DNA, is a manifestation of two equally intelligent populations, with the capacity to communicate and exchange ideas and innovations, meeting and facing a common future. It is time to stop dissecting the European record into 'Them' and 'Us'. Setting one population up against the other in an effort to distinguish between them falls obsolete when both provide equal proof of full modernity. Including Neanderthals in the larger picture, within the sacred image of the 'same' can only add fibre to research as scholars continue to search for the origins of Modern Human Behaviour on a Global scale. Further investigations into early Eurasian behaviours will undoubtedly proffer volumes of information to better our understanding of life during the transition to the Upper Palaeolithic and beyond.

It is the conclusion of this thesis that the concept of Neanderthal modernity is evident both in the cognitive implications of their surviving genetic footprint and in the material manifestations of their behaviour recovered from sites across Eurasia.

#### *The Implications of DNA on the Archaeological Record.*

The study of ancient DNA brings with it several prospects. It opens to the possibility to decode the human genetic record alongside the material our ancestors left behind. It can shed light on aspects of migration and admixture, like in the Eurasian Palaeolithic, and it can answer questions pertaining to the origins of mankind. It will be nothing but interesting, if not fascinating, to follow the future of DNA as a tool in the archaeological field. Perhaps results will provide us with a host of new relatives to plot into our genetic family tree. Perhaps we will find out that we are all part Hobbit (*H. floresis*). Perhaps Eve herself came from an Eve before her and an Eve before her again. Perhaps.

What is important as we move forward into an archaeology where more and more complicated scientific methods are contributing to our image of human prehistory is that archaeologists do not lose focus. The excitement induced by the wealth of information available through the study of ancient DNA must not shadow the importance of the material recovered from sites. This material is what allows archaeologists to see how people applied their mapped genetic aptitudes to their surroundings. DNA analysis, like dating, still only mirrors a punctuated event or individual in the expanse of Prehistory. Placing this science into context and filling in the 'blanks' between events through an educated assumption is and must still be the archaeologist's foremost goal.

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All maps by Amanda Coburn: [acoburn@kcai.edu](mailto:acoburn@kcai.edu)

## Norwegian Summary

Overgangen fra mellom- til sen paleolitikum i Europa og Vest-Asia er preget av forvandling. Mens noen anser endringene i materiell kultur som bevis på at anatomisk moderne mennesker bragte med seg nye ideer og hadde en mere avansert oppførsel. Trekk som definerer kognitiv modernitet kan leses i de teknologiske, økonomiske og symbolske handlinger utført av datidens mennesker og etterlatt som materiell kultur.

Neandertalerne levde i Europa og vestlig Asia i perioden mellom 200 000 og 27 000 år siden for deretter å forsvinne fra det arkeologiske kartet. Tidligere har dette vært brukt som argument mot deres kognitive kapasitet og påstander om deres manglende modernitet har floreret.

Nye DNA data publisert i mai 2010 viser derimot at 1 - 4 % av DNA hos mennesker som lever idag stammer fra Neandertalerne, altså en genetisk utveksling har funnet sted. Dette møtet fant sted mellom 80- og 50 000 BP, mest sannsynlig i Midtøsten før den anatomiske moderne populasjon delte seg for å befolke Europa, Østen og Australia. Dette har innvirkning på synet av Neandertalere som primitive og mindre intelligente.

En gjennomgang av de materielle spor etter Neandertalernes teknologi, økonomi og symbolsk bruk viser at de fleste moderne trekk er tilstede allerede i sen mellom paleolitikum. Dette, sammen med den nye DNA-dataen har implikasjoner for konsepter som interaksjon, språk og 'acculturation' i tillegg til røttene av Aurignacian teknokomplekset.