- IN THE SHADOW OF MAN -

The Neandertal and the Human Condition

Ann Iren Bratt

Mastergradsoppgave i Arkeologi

Det samfunnsvitenskapelige fakultet

Universitetet i Tromsø

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Summary

This thesis takes a critical look at the boundaries established between the Middle and Upper Paleolithic, and how these have, and continue to affect the research on Neandertals. It deals with both the biological and the social material in order to gain an understanding of how these have affected each other when constructing theories. It seeks to understand why the Middle and Upper Paleolithic are often studied in different ways, and ultimately what the difference between Neandertals and *Homo sapiens sapiens* are.

It concludes with an argument about how biases and myths are allowed to influence the way data is interpreted and distributed. Thus, at the present it is difficult to encounter any *real* difference between the Middle Paleolithic Neandertals and the successive *Homo sapiens sapiens.*

Forord

Jeg vil begynne med å takke min veileder Ericka Engelstad for all hjelp og tålmodighet med både meg og oppgaven min. Videre vil jeg takke Bjørnar Olsen og mine kjære medstudenter for alle nyttige innspill på seminarer og ellers. Til slutt vil jeg takke Mamma og Sigurd for all tålmodighet med papirer, bøker og ekstra dataskjermer i andre etasje. Nå er det over.

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INTRODUCTION

The Neandertals are *Homo sapiens sapiens* closest relatives, and the two populations coexisted in Europe and the Levant for several decades until the transition from the Middle Paleolithic to the Upper Paleolithic (40 kya-30kya), after which the Neandertal disappear from the archaeological record. Numerous scenarios and models have been constructed to explain this disappearance, almost everyone assuming a cognitive difference between the two. My aim is to find out which difference constituted the *actual* difference between Neandertals and *Homo sapiens sapiens* at the time of the transition.

I will first present the Neandertal in the context of the *evolution*; how he played a part in the process of legitimating Darwin's theory and how he was affected by it. After this I will present and discuss theoretical perspectives and outline what biological evolution is today and what social evolutionary theory has done for the Paleolithic. After this I will give short geographical and environmental description of the Neandertal world in the late Middle Paleolithic, before looking at a few archaeological sites – selected for yielding remains that has created debates and altered the view of how we see the Neandertal. In the next chapter I will go on to placing these sites into a broader framework of the debate over Neandertal behaviour, to see if the attitudes towards the Middle and Upper Paleolithic and subsequently, Neandertal and the *Homo sapiens sapiens* have changed over the last two decades. In the last and concluding chapter, I will discuss what I perceive as the actual difference between Neandertals and *Homo sapiens sapiens*.

Chapter 2

THE NEANDERTAL AND EVOLUTION

In order to gain an understanding of the major existing controversies about the behaviour and demise of the Neandertal, it is only natural to start with a retrospect of the well 150 year long history of Neandertal research. Only then can we fully understand the conclusions reached, as well as the controversies that the field is still struggling to overcome.

Here I will present a short summary of a long and complex history, and a few of the most important discoveries, scientists and theories belonging to the will be considered. The first part will begin with the history behind the most fundamental theory for studying the Neandertal, Darwin's theory of evolution, and how the Neandertal came to be recognised as a separate species. I will move on to look at some interpretations of Neandertal material which has had major implications on the Neandertal image, and lastly outline the two major theoretical camps which continue to shape the debate today.

2.1 The evolution of *evolution*

Thoughts about *social* evolution existed long before Darwin. The Enlightenment philosophers of the 18th century put the view of an ever progressive human history on the agenda in an effort to understand the past, but also to propose solutions to better the course of humankind in the future.

> "[They] believed that progress was the dominant feature of human history and occurred continuously rather than episodically (…) bringing about not only technological but also social, intellectual, and moral improvement. The principal motivation [being] constant desire of individual humans to improve their condition, especially by gaining greater control over nature" (Trigger, 1998:34).

According to enlightenment philosophy, observation and the capacity for reason was what separated humans from animals and abled humans to continually better their existence. Thus, humanity with its inherent capacity for change was separated from the static and unchangeable nature. God, seen as the creator of all things, was believed to have intentionally bestowed humankind with this ability for reason, and the ability to lift themselves out of the natural state.

> "(…) progress would lead to a perfection of the human condition that had not yet existed in any form. [This was] to be attained through the realisation of human potential in the application of reason. The perfect ordering of society and nature was not intrinsic in the universe, but would be a human achievement" (Thomas, 2004:32).

In this way, God's role changed from being the one and only universal force to being the creator. He was no longer considered to intervene directly into individual lives or to change the course of history; cultural progress generated by humans themselves now represented the realisation of the plans of a benevolent deity (Trigger, 1998:36). Since reason was considered to be homogenous and universal to no matter whom, where or when, all humans were considered as equals. But it was nevertheless an ethnocentric philosophy, with the western European society seeing themselves as representatives of the highest level of progress.

That it was not merely social relationships, but the whole fabric of creation that was in a state of constant fluctuation, first took hold in geology (Thomas, 2004:38). The perfect order of the natural world, with plants and animals in harmony with each other and their environment, had been taken for granted as God's great design. The *scala naturae*, or the Great Chain of Being, had been made to explain the natural order of the world with entities like rocks and minerals at the bottom and man at the top, only superseded by God. But scientific observations in the field of geology started to conflict with this vision of a static and unchangeable nature. Slowly it was realised that the age of the earth superseded the 6000 years theologians had suggested according to the biblical genealogy, and that bones from extinct animals found deep down in stratigraphic layers of the earth could not be sufficiently explained by biblical catastrophes.

In the eighteenth century the outlook on the world and ways of organising knowledge began to change and answers to the mysteries of the past were sought other places than in the bible. This brought with it new ideas and interpretations which:

> "(…) [led to a] shift of intellectual preoccupation from static classificatory order of nature to a developmental sequence of social forms, which eventually came to be applied to natural things as well (…) while nature and culture [previously] had been split apart into different domains, one ruled by natural law and the other an arena in

> which free will might operate, both were now conceived as subject to directional change" (Thomas 2004:37-38).

The French naturalist Lamarck was the first to articulate that just as the development of an individual organism leads from the fertilized egg to the fully adult individual, so did the organic world as a whole move from the simplest organisms to ever more complex ones, culminating in man (Mayr, 2001:8). He formed a thesis proposing that the characteristics acquired by an organism could be inherited by its progeny. Thus, the idea of biological species change and inheritance was born, although a directional one.

Charles Darwin (1809-1882) had been interested in natural history already as a little boy, but it was on a round-the-world biological collection trip with the ship HMS Beagle at the age of 22 that his ideas about nature matured (Mayr, 2001:10). With his well-written book *On the Origin of Species* published in November 1859, the concept and explanation of the evolution of species was officially introduced into the field of science. Darwin's theory included the aspect of natural selection and continual adaptation to the natural surroundings. The theory had a great impact on the society as a whole, especially when he in *The Descent of Man* (1871), suggested that humans and African apes were descended from a common ancestor.

2.1.1 The 'first' Neandertal

Despite discoveries of skeletal remains from something that resembled modern humans in Belgium in 1830 and Gibraltar in 1848, it was a discovery of a partial skeleton from Neander Valley near Düsseldorf, Germany in 1856, which is considered the first official discovery of the Neandertals. Today the Neandertals are the second most well documented group of prehistoric humans, only the *Homo sapiens sapiens* have produced more material.

At the time of the Neander Valley discovery, comparative anatomy had succeeded in establishing a broad framework for the resemblances among different species, and it was already agreed upon that the great apes were anatomically very similar to humans (Trinkaus & Shipman 1993:48). The Neandertal skeletal remains on the other hand, supplied an entirely novel type of evidence, for while they were obviously human in the broad sense, they were not like the modern humans (Trinkaus & Shipman 1993:48). William King, an Irish anatomist, was the one who in 1864 finally took the major step of

identifying the Neander Valley specimen as a whole new species of humans, *Homo neanderthalensis* (Stringer & Gamble, 1993:13). He argued that the species was so brutish and primitive it could not possibly belong to our own species. King felt the primitive features resembled those of a chimpanzee and proposed that this had to be an intermediate between the ape and man, a missing link.

To suggest that modern humans shared relatives of the ape seemed absurd to a lot of people at the time. Some scientists did not even believe in evolution yet. Among them was the leading German pathologist Rudolf Virchow who believed the unusual Neandertal morphology could be explained as pathology. He argued that the Neandertal bones came from a normal human being that was either a mongoloid or deformed by rickets, a theory which was supported by many until the end of the 18th century. But as Neandertal material steadily grew and the idea of evolution matured, it became harder to discount it as something strictly pathological.

The English archaeologist Sir John Lubbock, Darwin's neighbour in Kent, stressed a progressive tendency to be evident in prehistoric technologies, and in 1865 coined the term 'Palaeolithic' meaning 'old stone age' in his immensely influential book *Pre-Historic Times*, where he classified prehistoric technologies (Trinkaus and Shipman, 1992:97). Another archaeologist trying to make sense of the archaeological material was Gabriel de Mortillet. He proposed that cultural evolution, as shown by stone tools, and physical evolution, as shown by skeletal remains, proceeded hand in hand through a series of glacial and interglacial periods (Trinkhaus & Shipman 1992:106). He believed the evolution of stone tools exhibited an evolution in a progressive fashion, meaning along a straight line from something primitive to something more advanced, visible through the gradual refinement of stone tools in the Paleolithic. He divided the Paleolithic tools into phases based on hominid- and stratigraphic association; naming the traditions after the sites they were found. This resulted in (from oldest to more recent) Achulian, Mousterian, Aurignacian, Magdalenian among others, where he believed Achulian to be associated with Neandertals and the rest to be modern human accomplishments (Trinkaus and Shipman, 1992:107). After the discovery of a skullcap from Java in 1891, which we today recognise as a skullcap from *Homo erectus*, the Neandertals fitted neatly into de Mortillet's chronology of evolution from primitive ape to modern man (Stringer & Gamble 1993:15).

By the end of the nineteenth century, most scientists believed that the theory of evolution also applied to humans. The discussion now centred on the issue of whether or not the modern humans had evolved *from* the Neandertals. The Frenchman Marcellin Boule was among the scientists who refused to believe that the Neandertals were related to modern humans. In 1908 he got the opportunity to prove his point when he was asked to study and reconstructed a relatively complete Neandertal skeleton excavated from La Chapelle-aux-Saints in France that same year (Stringer and Gamble, 1993:16). In his results, published between 1911 and 1913, he described the Neandertal as bent-kneed with a slouching gait inhibiting rudimentary intellectual facilities, and concluded that this 'old man' from the La Chapelle-aux-Saints was an example of a 'typical' Neandertal. Boule's image of the Neandertal prevailed and dominated the field of paleoanthropology well into the twentieth century (Trinkaus & Shipman 1992:190).

About the time of the La Chapelle-aux-Saints find in France, pieces of a skull were dug out from a pit at Piltdown, in Sussex, England. When reconstructed in 1912, it revealed an almost modern looking, large-brained cranium with an apish jaw. It was believed to be a new species, *Eanthropus dawsoni,* and by 1915 the consensus in England was that the Piltdown Man, as it came to be called, was the rightful ancestor of modern humans (Tattersall 1995:49). It eventually came to be accepted also outside of England, except from American scientists who continued to be sceptic. Boule was, despite the fact that the discovery of the Piltdown man came from England, delighted by the find. This strengthened his theory, often called the 'pre-sapiens model', of how the big brained ancestors of modern humans had evolved somewhere in Asia and moved into Europe, out-competing the inferior Neandertals.

The Piltdown find kept puzzling scholars for years. Not knowing where to place it in the ever-growing human fossil record from Europe, Africa and Asia, the two 'reconstructions' slowed down and complicated the field of paleoanthropology for many years, especially with respect to the Neandertals. Eventually, since there were no additional discoveries of *Eanthropus dawsoni,* scepticism in Europe grew and it eventually came to be ignored.

2.1.2 The Neandertal image change

In 1939 the discovery of a skull in a cave in Monte Circeo, Italy, would mark the turn of the tide in Neandertal research. The skull was claimed to prove Neandertal ritual behaviour because it was discovered laying in a 'crown' of stones, upside down, and with visible breakage as though someone had extracted its brain (Trinkaus & Shipman 1992:254). Even though later studies of the material have given the impression that the description of the skulls placement was less than accurate, the Monte Circeo discovery combined with a scientific community open to change, spurred the Neandertals renaissance – and the Neandertals rebirth as humans (Trinkaus & Shipman 1992:255). That Neandertals buried their dead had been assumed for a long time, but none had really discussed what this meant until then. Suddenly, cannibalism, which had been proposed for the Krapina finds from Croatia excavated 1899-1906 and the remains from the la Naulette cave excavated in mid 1860's in Belgium, were both interpreted as signs of complex religious believes.

In accordance with new finds and a new generation of scientists, Neandertal material was re-interpreted and previous flaws, frauds and inaccuracies were revealed. In 1953 the Piltdown-forgery was finally uncovered. The skull proved to consist of an ape jaw and a modern human cranium, the teeth were filed down and the bone stained to look real before planted in the pit. The whole thing had been masterly done, and who was behind it still remains a mystery. The reason it was so easy to accept as a new species, was that this was how people imagined the 'missing link'; something half human and half ape. This shows how Darwin's evolutionary theory was gravely misunderstood for a long time. (Trinkaus and Shipman, 1992:290). Four years later in 1957, the 'old man' of La Chapelle-aux-Saints was re-examined and it became clear that the 30 year old Neandertal had suffered from a severe case of osteoarthritis, making his spine more curved and his joints different from a regular Neandertal (Lewin and Foley, 2004:396). It was realised that Boule's reconstruction of a stooped, brutish creature had been greatly influenced by his preconceptions. Boule had even given his reconstruction an opposable big toe as in the great apes, but there was no bone deformity that should or could have lead to this interpretation (Stringer and Gamble, 1993:26).

From that moment on, the Neandertals were studied in a whole different way and the current view of a big brained, robustly built fully bipedal hominid was created. Even

though morphological studies led to a more 'human' interpretation of the Neandertals, archaeological and behavioural studies increasingly argued behavioural differences from *Homo sapiens sapiens* and a contrast between the Middle and Upper Pleistocene as a movement from non-human to human behaviour – the so called 'cultural revolution' (Lewin and Foley, 2004:396), a view which has proven hard to shake.

2.2 Current models of human evolution

In this second part of the chapter I will give an outline of the two great models which much of the biological, but also the behavioural remains have been based upon. These two models, the Multireginal Contonuity Model (MCM) and the Out of Africa Model (OAM), seek to explain how *Homo sapiens sapiens* appears in Europe, and subsequently why the Neandertals disappeare from the fossil record. These two models exclude each other, but the current evidence does not exclude eighter of them. As a consequence, many scientists today support 'intermediate' theories that contain elements from both models. These are mainly models of the emergence of modern humans, but the Neandertal faith is a key element in each of them.

2.2.1 The multiregional continuity model

The multiregional continuity model of human origins holds that the biocultural transition from 'late archaic humans' to 'early modern humans' developed independently in several different places across several continents (Conroy, 1997:525). It became greatly influenced by the Evolutionary Synthesis of the 1940's which considered natural selection to transform a population gradually over time, eventually resulting in a new species by transformation of an entire population or by splitting into new ones as well as the persistence of the existing one (Lewin and Foley, 2004:50).

Before the Neandertal 'image' change, Boule's exile of the Neandertal from human ancestry went mostly untested by anyone but a few. Franz Weidenreich was the first of the opponents to get any appraisal for his idea. He did not feel Boule's pre-sapiens model could adequately explain the fossil record and stated his dissatisfaction: "…as more fossil material comes to light it becomes more and more evident that each morphological feature characteristic of modern man can be traced back to fossil forms to which recognition as human ancestors had been denied by somebody" (Weidenreich, 1947:222).

Though a few others shared his ideas, he became the first to propose an actual model of multiregional evolution in 1943. He believed in the existence of a worldwide distribution of early groups of hominids that evolved separately and at different paces into modern humans, but with sufficient breeding for them all to eventually reach the same 'goal' (Weidenreich, 1943). Weidenreich saw the Asian and European Neandertal, the 'Rhodesian Man' from Africa and the 'Solo Man' from Java as direct ancestors of more 'primitive' races in their respective regions (Weidenreich, 1943:43-44). As an example he compared the aborigines of Australia to the white European settlers and suggested that because the former showed more 'primitive' morphological characteristics than the latter, the aborigines may have evolved at a later stage or that the white Australians of European descent simply had evolved at a higher rate. No matter how inappropriate this theory may seem today, Weidenreich has been given credit for being one of the first to apply a model to human evolution that incorporated elements of breeding and gene flow.

Weidenreich's ideas, despite meeting harsh criticism, were developed further by a new generation physical anthropologists in the 1960's. The young Loring Brace pointed out what he saw as the greatest hinder in understanding modern human emergence in Europe:

> "Recently many physical anthropologists have been clinging to the old view of a sudden migration into Europe of Upper Paleolithic peoples, although they have been unconvinced by the skeletal evidence. According to them the proof is mainly archaeological. On the other hand, archaeologists have continued paying lip service to the sudden migration view with the feeling that the justification was largely based upon the supposedly clear-cut morphological distinctions made by the physical anthropologists" (Brace, 1962).

Brace supported the French archaeologist Bordes' work (chapter 3) that suggested a gradual transition from an essentially Mousterian to an essentially Upper Paleolithic tool tradition, and proposed that this weakened the evidence of a large scale migration and replacement (Brace, 1962). He later stated that changes in human behaviour in the late Pleistocene were responsible for the changes in Neandertal anatomy, driving them in the direction of modern humans. Thus, he combined culture with anatomy, a point which was to become a potent force in later anthropological thinking (Trinkaus & Shipman 1992:334).

In the article "Early Upper Paleolithic Man and Late Middle Paleolithic Tools" David Brose and Millford Wolpoff sought to test the sudden replacement hypothesis against the archaeological and palaeontological data to find out if there was an absolute association between anatomically modern *Homo sapiens* and Upper Paleolithic industries (Brose and Wolpoff 1971:1156). Based on their results they argued there were no *Homo sapiens sapiens* contemporary or before Neandertals; early modern humans, or 'transitional' populations as they believed they were, were found with Mousterian tools; the so-called 'classic' Neandertal, referring to the robust Neandertal population in Europe, were simply adapted to the cold climate; and changes in Neandertal facial morphology were due to a gradually specialised toolkit that came about in the Upper Paleolithic, which made the hominids less dependent on using their teeth as a tool. Thus, Brose and Wolpoff sought to combine biology and behaviour in order to explain the Neandertal material.

Today Wolpoff and the other multiregionalists are eager to point out that they are talking about Neandertals as being a *significant* part of the European ancestry, but not the unique or only ancestor of later Europeans. Rather, Neandertals "provided enough genetic contribution for their traits to be readily identifiable in later Europeans, some even found in Europeans today" (Wolpoff *et al*. 2004:528).

2.2.2 The population replacement model

The Out of Africa Model is the model of human origins proposing that the biological transition from archaic *Homo sapiens* to *Homo sapiens sapiens* (also called Anatomically Modern Humans, AMH) was restricted to Africa. From here *Homo sapiens sapiens* radiated out into the rest of the world gradually replacing all other existing archaic populations (Conroy, 1997:526).

Modern genetics and especially mithocondrial DNA (mtDNA) has played an important role in building up the arguments for the OAM. The mtDNA is found in the mitochondria in a cell's cytoplasm instead of in its nucleus. The main difference between the two is that mtDNA is matrilineal, which mean it is transferred only from mother to child and not admixed with the DNA from the sperm that only reside in the nucleus of the cell. Since there is no recombination and reassortment in mtDNA, any mutation that occurs will be recorded in generation after generation. (Trinkaus & Shipman, 1992:387). Because it

evolves about five to ten times faster than nuclear DNA, it allow more molecular changes to accumulate in less time making it possible to study more recent evolutionary events (Conroy, 1997:387).

Results from one of the first studies on mtDNA was published in 1979 and showed only a few mutations difference between the 21 women from diverse racial backgrounds whose placentas were the source of the mtDNA used in this study. Since mutation is believed to accumulate randomly at the same rate in any species, it is possible to 'count' backwards and find out at what time two species split apart, a method called the 'molecular clock'. This study suggested that the modern human variants had separated fairly recently, thus strengthening the theory of a common origin for all living humans.

In 1987 the result from a larger and improved research project on the subject was published. This time samples from 147 individuals representing Asians, aboriginal New Guineans, Caucasians, and Africans (mostly African-Americans) were collected and analysed. The result reinforced the preliminary work and took it several steps further (Trinkaus & Shipman, 1992:388). It revealed that there was greater variability within the populations than between them and that the mtDNA variation was greater within the African population than between Africans and any other geographical group (Conroy, 1997:388). This study implied that *Homo sapiens sapiens* arose first in Africa and a longer period of time to accumulate genetic diversity in this region. Using the genetic distance between African populations and others as a measure of time, it was suggested that *Homo sapiens sapiens* arose between 100 kya and 400 kya in Africa, which coincides with the appearance in the fossil record.

From these data a genealogical tree was constructed with the help of a computer program which revealed two primary branches, one leading exclusively to African mtDNA types, and the other to all the others *including* African types. Thus, this also suggested a common African origin for all modern humans. Through calculation of 'dated' migrations of people into secluded geographical areas, a general mutation rate of mtDNA was found to be about 2-4 percent per million years. Then, by using a figure of 0,75 percent for the average sequence divergence that has accumulated since the common human mtDNA ancestor, it

was claimed that a mitochondrial 'Eve', a single common female ancestor of all modern humans, existed in Africa around 200 kya. (Conroy, 1997:389).

In more recent studies mtDNA has been extracted directly from Neandertal remains such as the Feldhofer Cave specimen from Germany and a specimen from Vindija Cave, Croatia. These have been compared to modern humans and the results revealed a 6 percent difference between Neandertals and modern humans as opposed to 15 percent between modern humans and chimpanzees, and 2 percent between modern humans themselves. The 15 percent difference between chimpanzees and humans indicates a divergence between the two lineages about 5-6 million years ago and between Neandertals and moderns of about 740-317 kya (Persson, 2005:3). Thus, supporters of the OAM claim there are no indication that Neandertals are any part of our lineage. After careful analysis of particularly the mtDNA, but also some nuclear DNA, it is apparent that Neandertal DNA is very distinct from our own. In assessing the degree of difference between DNA in Neandertals and modern humans, it has been suggested that these two lineages have been separated for more than 400 ky.

Even though the supporters of the OAM believe in a total replacement of the archaic populations after the emergence of *Homo sapiens sapiens* species in Africa, the level of arrogance that just to be evident in favour of a superior modern human species sweeping all others away suggested early in the twentieth century have been replaced by a more modest outlook on Neandertal extinction. It is recognised that the change was more gradual, and that Neandertals and *Homo sapiens sapiens* co-existed in certain geographical areas. Some even believe that breeding between populations may have occurred, but that this was an exception rather than a rule. As Stringer and Gamble (1993) put it: "The Neandertals probably went with a whimper rather than a bang".

2.2.3 Disputes between the models

The dispute between the two opposite models is first and foremost on the basic level of the tempo and mode of human evolution. The supporters of the OAM believe the emergence of modern humans was the result of a 'punctuated equilibrium' (chapter 3). This means that a rapid speciation takes place in a small isolated subpopulation of the ancestral species and is then followed by a period of little change (Conroy, 1997:72-73). The

multiregionalists on the other hand argue that *Homo sapiens sapiens* followed from a 'phyletic gradualism' which means that a daughter species originates through a slow, but progressive series of small, gradual transformations of a parental species (Conroy, 1997:72). Thus, where phyletic gradualists simply sees discontinuities as gaps in the fossil record, the punctuationists regard the same thing as a rapid speciation event.

The multiregional model is often criticised because it adopted its principles from the 'Evolutionary Synthesis' developed by Dobzhansky, Mayr and Simpson in the 1930s and 1940s. The Synthesis became a part of paleoanthropology in its more fundamentalist form; Dobzhansky himself argued that no more than a single hominid species existed at any one time level, a claim which has been repeatedly falsified (Tattersall, 2000:3). The multiregionalists are thus being accused of separating hominids from other organisms on earth by suggesting a sense of inevitability to the arrival of *Homo sapiens sapiens* and for progression to be the underlying mechanism of change in human evolution (Tattersall, 2000:8).

The punctuationists' hardest evidence, the mtDNA, has also been a target for criticism, both from paleoanthropologists and biologists. First of all, the rate of mtDNA mutation may not be as constant as suggested, and the dates of the first human migrations into the geographically secluded areas that were used to 'pinpoint' the mitochondrial 'Eve', may well have been underestimated. With a divergence rate of 2-4 percent per million years, the humans and chimpanzees should have diverged about 2 mya, something which is clearly wrong. By assuming a split around 6,6 mya, thus getting a rate of 0,71 percent, it gives a divergence rate for modern human populations of about 850 kya, suddenly opening the possibilities for the multiregional model. (Conroy, 1997:394). Also, flaws were revealed about the computer program used to construct the genealogical tree, when it showed to construct different results depending on how data was entered. It is also important to note that mtDNA represents a single genetic locus that might or might not reflect the overall history of the genome (Hofreiter *et al*., 2001:354).

The studies made on DNA extracted directly from Neandertal bones have also been a target for scrutiny by experts on ancient DNA themselves. From the mid-eighties to mid-nineties many of these kinds of research projects were done on both ancient DNA from

animals and humans. But in the mid nineties the problems of this kind of research revealed itself. The risk of contamination by modern DNA is great, and research needs be done under extremely controlled conditions to have a chance of revealing correct results (Hofreiter *et al*., 2001:355).

2.2.4 Alternative models

Since there are obvious problems with these two contrasting models outlined above, both failing to sufficiently solve the disputes over the origin of *Homo sapiens sapiens*, several researchers have tried to explain the complicated fossil and cultural record by constructing alternative models, open to a more complex relationship between continuity and replacement.

Eswaran (2002) suggests a diffusion wave model out of Africa instead of one single wave of modern humans migrated out of Africa and replaced archaic humans. He believes that *Homo sapiens sapiens* migrated out of Africa several times, mixing with the archaic populations it encountered, thus explaining mosaic skeletal discoveries. Others support the assimilation model (AM) which posits that *Homo sapiens sapiens* emerged in Africa and radiated from there into Western Asia and later into the remainder of Eurasia, breeding with the indigenous archaic populations (Smith *et al*., 2005:9). Thus, both models proposing an Africa origin for the *Homo sapiens sapiens* anatomical form, but at the same time stress the fact that the genetic exchange between these and the archaic populations were more than 'incidental'.

2.3 Conlusion

In the first part I created a frame around how the concept of evolution emerged, a concept which does not only apply to biology, but to societies as well. I wanted to show how the Neandertal played an important part in establishing the reality of the human fossil record, and thus substantiating the implications of Darwin's theory of evolution (Lewin and Foley, 2004:395). We also see how the concept of evolution was misunderstood for a long time, until the Synthesis in the 1930's.

Early interpretations of the Neandertals were flawed due to the preconceptions created by Boule in his reconstruction of the man from La Chapelle aux Saints. That his view was

allowed to rule for so long shows how important scientific merit was in the study of evolution.

The two models of origin of the *Homo sapien sapiens* were both created with influence from the field of genetics, but from very different perspectives. The models exclude eachother, but none of them is excluded by the evidence, even though most people today support the notion that *Homo sapiens sapiens* evolved in Africa, they are both to simplistic. These models were first and foremost built on anatomical and fossil evidence, but also incorporated the cultural record, which will be the main focus during the rest of this thesis.

Chapter 3

IN PROXIMITY OF THE HUMAN CONDITION

The study of human evolution compared to the evolution of other animals, is complicated by the fact that it does not only deal with fossil remains, but also with a growing data of what we term as 'cultural' artefacts. In the case of the demise of the Neandertals and the success of the *Homo sapiens sapiens*; biological, cultural-technological and environmental arguments have been proposed. What many of these theories seem to have in common is the notion of *evolution*, either in its biological form, or as a means to explain the change or disappearance of cultures. In its social form, it borrows many ideas and expressions from the biological concept, but has a tendency to apply them as a form of progress. In the context of the Paleolithic the social studies often seek to find the origin of what has come to be known as 'the human condition'.

3.1 What is *biological evolution*?

When asked about evolution, many people instantly associate the concept with Darwin and his theories about evolving species in the natural world. When asked to give an example, the human evolutionary course - starting out as an ape on all fours in Africa evolving into today's computer-age 'man'- is a popular one. How this happened on the other hand seems to be more unclear.

What Darwin presented in the mid-eighteenth century was the argument that:

> "…in every generation, many more individuals are produced than ever survive to maturity and to reproduce themselves. Those that succeed – the 'fittest' – carry heritable features that not only promote their own survival, but are also passed along preferentially to their offspring. In this view, natural selection is no more than the sum of all factors that act to promote the reproductive success of some individuals (…). Add the dimension of time, and over the generations natural selection will act to change the complexion of each evolving lineage, as advantageous variations become common in the population at the expense of those less advantageous" (Tattersall and Schwartz, 2001:44).

Even though his idea that all living species originated from a common antecedent was quite rapidly absorbed and accepted by the scientific community, his idea of natural selection as the principal for evolutionary change was not. This idea did not return to

evolutionary theory until the 1930's and 1940's, when it was coupled with the idea of Mendelian heredity to form the new 'Evolutionary Synthesis'. The most important feature of this new Darwinism is that it includes genetics and rejects the theory of inheritance of acquired characteristics (Mayr, 2001:87).

To give a short definition of 'evolution' as we know it today is difficult, because it contain many elements which are studied separately. But put as simple as possible; evolution is "a process that results in heritable changes in a population spread over many generations" (http://www.talkorigins.org/faqs/evolution-definition.html); or "any change in the frequency of alleles within a gene pool from one generation to the next" (Curtis and Barnes, 1989:974). Or, as Mayr put it: "evolution is best understood as the genetic turnover of the individuals of every population from generation to generation" (Mayr, 2001:76). A fuller definition is given by Futuyma:

> "In the broadest sense, evolution is merely change, and so is all-pervasive; galaxies, languages, and political systems all evolve. Biological evolution ... is change in the properties of populations of organisms that transcend the lifetime of a single individual. The ontogeny of an individual is not considered evolution; individual organisms do not evolve. The changes in populations that are considered evolutionary are those that are inheritable via the genetic material from one generation to the next. Biological evolution may be slight or substantial; it embraces everything from slight changes in the proportion of different alleles within a population (such as those determining blood types) to the successive alterations that led from the earliest protoorganism to snails, bees, giraffes, and dandelions" (Futuyama, 1986 on http://www.talkorigins.org/faqs/evolution-definition.html).

Thus, we can see that evolution happens over a long time-span and only really has a cumulative effect on a *population*; "a local population (*deme*) consists of the community of potentially interbreeding individuals of a species at a given locality (…) "There are two sources of variation in a sexually reproducing population, superimposed on eachother: the variation of genotype (because in sexual species no two individuals are genetically identical) or variation of the phenotype (because each genotype has its own norm of reaction)" (Mayr, 2001:90).

Before we move any further in biological evolution, we need to distinguish between two concepts which are important for understanding interpretations in human evolution;

microevolution and *macroevolution.* Microevolution refers to how a population change under the influence of natural selection and other evolutionary forces; while macroevolution refers to how new species and higher taxa are created (Boyd and Silk, 1997:103). Let us first take a look at some species concepts.

3.1.1 The species concepts

All known living things in the world are classified in clusters from Kingdom to Species, species being "the smallest historically independent unit in a ramifying natural hierarchy that ultimately embraces all life" (Tattersall and Mowbray, 2005:372). To define a species and to establish how a species arose (speciation) are greatly debated issues in evolutionary science today. Several species concepts have been proposed, some very general covering many species and some very specific covering only to a few. A few of the more general ones are important in human evolution.

The 'typological species concept' was the traditional concept by which species used to be classified. According to this concept, the species was a constant type, separated from any other by an unbridgeable gap, and its status determined by the degree of phenotypic differences (Mayr, 2001:165).

The 'biological species concept' is the most widely accepted and used definition. It defines species as a "group of actually or potentially interbreeding natural populations, which are reproductively isolated from other such groups" (Mayr, 1963 in Lewin and Foley, 2004:47). Two animals are members of the same species if they produce offspring which are in turn capable of producing offspring of that species. Thus, since the offspring of a horse and donkey, or a tiger and lion, are sterile (almost all the time), horses and donkeys, and tigers and lions, are members of different species. It is also important to know that even though two members of the same species can not physically breed with eachother, e.g. because of size such as between a Greyhound and a Chihuahua, there is still the possibility for gene flow between these two types of dogs through intermediates, thus they belong to the same species. This is also a concept with significance to the question of interbreeding between Neandertals and *Homo sapiens sapiens*; if they were in fact able to produce viable offspring, as has been suggested (see chapter 4), they do in fact belong to the same species. Thus, Neandertals could be seen as a subspecies of *Homo sapiens*. This

is a geographical variation of a species which is sufficiently different to be recognised as a subspecies (Mayr, 2001:165). Many still believe that Neandertals were a geographical variation of archaic *Homo sapiens*, thus a 'subspecies', and call them *Homo sapiens neanderthalensis* instead of *Homo neanderthalensis*. As far as genetics go however, there has been no find to suggest such a connection between Neandertals and living humans.

The 'phylogenetic species concept' defines species as "the smallest diagnosable cluster of individual organisms within which there is a parental pattern of ancestry and descent" (Cracraft, 1983 in Lewin and Foley, 2004:47). "This definition neatly combines the genealogical (ancestry and descent) with the morphological (diagnosable) aspects of evolutionary process" (Tattersall and Mowbray, 2005:375).

The evidence for the occurrence of biological evolution lies in the fossil record; with the discovery of extinct organisms in older geological strata. This fossil record helps trace species change through time. But there are problems; the expectation of gradual change from one form to another is very rarely fulfilled. Indeed the fossil record is one of discontinuities, seemingly documenting jumps (*saltations*) from one type of organism to a different type (Mayr, 2001:14). This has been a problem for biologists and anyone working with classifying fossil species. Thus, how speciation happened has been under debate.

It was during the 1940's that people working in genetics and the naturalists-taxonomists came together and began to acknowledge each others work and eventually produced a synthesis containing elements from both fields (Mayr, 2001:175). According to this Modern Synthesis, gradual accumulation of new adaptations brings about the genetic separation of a daughter species from an ancestral species (Lewin and Foley, 2004:52). This *gradualism* was challenged in the early 1970's by the theory of *punctuated equilibrium,* a theory which holds that the fossil record represents an accurate view of the tempo and mode of evolutionary change, which means that species remain relatively static for long periods of time; when change comes it occurs rapidly ('rapidly' meaning a few thousand years) (Lewin and Foley, 2004:51). Thus, while the Modern Synthesis saw adaptation as the *cause* for speciation, punctuated equilibrium sees it as a *potential consequence*. These separate definitions lie at the core of the 'multiregional continuity

model' and 'out of Africa model' (see chapter 2). Now we will look at some specific theories of how speciation happens.

The theory of 'allopatric speciation' calls for the need to look not at the species as a single population, but expanding our view of the species to a multidimensional species taxon. When different populations of a species are separated from eachother, this can prevent gene flow and permit each isolated species to evolve independently. These are called *incipient* species. Because the isolated populations live in somewhat different biotic and physical environment from that of the parental species and is exposed to different selection pressure, the isolated population may gradually be reconstructed genetically and diverge sufficiently from the parental species to qualify as a different species. If they return to the range of the parental species, the incipient species is recognised as a neospecies. (Mayr, 2001:177-178). But Mayr points out that incipient species usually reunite with the parental species, only once in a while does an incipient species complete the speciation process. With this explanation not only are the gaps in the fossil record explained; but also why we should expect them to be there (Tattersall and Schwartz, 2001:46).

Other theories of speciation exist, but these usually explain speciation in certain plants, insects or asexual animals and are not relevant to this topic. Let us now turn to microevolution and the genes.

3.1.2 Genes

"Life as it now exists on Earth, including the simplest bacteria, was derived from the same origin. This is indicated by the genetic code, which is the same for all organisms" (Mayr, 2001:40). The genetic material is the genome (haploid) or the genotype (diploid), which controls the production of the body of an organism and all of its attributes – the phenotype (Mayr, 2001:89-91).

Schwartz has suggested a genetic basis for how we so often find that innovations appear so sudden in the fossil record, rather than being slowly fine-tuned by natural selection in the way the biological species concept argue. Every individual has a class of genes whose function is to regulate major developmental patterns in each individual; regulatory genes. Only slight changes in these "can have major consequences for the individuals and the

population bearing them" (Tattersall and Schwartz, 2001:48). Each individual possesses two copies of each gene; homozygote is if both copies are the same, and heterozygote, where the copies are different – one dominant and one recessive, the first will mask the effect of the other (Tattersall and Schwartz, 2001:48). It is known that "non-lethal mutations typically arise as recessives. Genes controlling new physical features likely emerge in a population through a slow process leading to the production of homozygotes for the mutation" (Tattersall and Schwartz, 2001:48). Thus, the features appearing seem like they appeared out of no-where, in a number of individuals at the same time. And after some time, the mutant recessive will be converted to the dominant state. Thus while natural selection can create regional variants of a species as a result of adaptation to local conditions, it "is not related to the part of speciation itself, which is caused by the genetic events that are random with respect to adaptation" (Tattersall and Schwartz, 2001:49). This is still a controversial hypothesis in the field of biology, where many are still clinging to the 'gradual' approach to speciation, but one of the most effective in accounting for some of the sudden changes seen in the fossil record, with no apparent intermediate. Thus, it gives scientists the opportunity to abandon the linear dictates of the Evolutionary Synthesis (Tattersall and Schwartz, 2001:51). This is in line with the model of punctuated equilibrium and it is suggested that this can be a potential explanation for the sudden appearance for the modern body form in the fossil record (Tattersall and Schwartz, 2001:49).

Another important method for studying human evolution is the 'cladistic' methods, developed in paleoanthropology during the 1970's and 1980's. It was pointed out that morphological characters (or *states* of characters) fall operationally into two categories: primitive (plesiomirphic), meaning those that were present in the common ancestor of a subsequently diversified group of organisms (a clade); and derived (aphomorphic), any departure from the primitive condition (Tattersall and Schwartz, 2001:52). To reveal patterns of common ancestry, the search for shared *derived* character states is the most useful, but one has to remember the problem of homoplasy (similarity of characters in two taxa not due to derivation from the same characters in the nearest common ancestor) (Mayr, 2001:287). The distribution of character states are expressed in simple cladograms; or, by including what kind of relationship is involved in two species, the phylogenetic tree;

and lastly the scenario, which would incorporate ecology, adaptation, and everything else you know or believe about the species involved (Tattersall and Schwartz, 2001:52).

Thus, we see that the debate over gradualism vs. punctuated equilibrium has greatly influenced the two basic models of the arrival of the *Homo sapiens sapiens*, ultimately influencing how one believes the Neandertal disappeared from the world and what status they should earn. This debate has further influenced the way the Paleolithic archaeological material has been interpreted, especially in respect to the transitional phase between the Middle and Upper Paleolithic in Europe, when *Homo sapiens sapiens* and Neandertals allegedly lived side by side for a period of about 10 ky. Let us now turn to the social theory.

3.2 Nature or Nurture

As seen in the previous chapter, it was early believed that culture and people evolved hand in hand through history in a progressive fashion. Thus, early classification, such as the one provided by de Mortillet opposed the Darwinian notion of evolution as a tree with branches and dead ends, it reflected changes on a universal scale. Pitt-Rivers on the other hand, suggested on the basis of ethnography that "however humans might be trying to improve material culture, specific innovations were rarely made on the basis of a clear understanding of even their short-term consequences" (Trigger, 1998:81-82). As the archaeological material grew, it became increasingly clear that geographical variation existed. This variation resulted in an "'ethnic' model of the prehistoric past in which regional differences were seen as relating to different peoples, and changes were largely explained in terms of their migration" (Shennan, 1997:39). This can be seen as a concern with Darwin's 'descent with modification', but without concern about the adaptive processes (Shennan, 1997:39).

Under this dogma, the Paleolithic period did not contribute much other than as a 'starting point' for the advance of modern human cultures. It laid the basis for several racist theories, but not much else. As theories of sociocultural evolution of later prehistory evolved, early prehistoric societies was basically laid to rest. This is fairly obvious in Childe's 1951 assessment: "The archaeological record is found to be regrettably but not surprisingly deficient in indications of the social organisation or the lack of it in Lower

Paleolithic hordes. From the scarps available no generalisations are permissible" (Childe, 1951 in Gamble and Gittins, 2004:99).

After WWII, evolutionary models and the concept of adaptation were re-introduced into anthropology in the search for universal theories of cultural change. In the late 1950's, White proposed that culture was composed of three general phenomena's: technology, social organisation and philosophy, with technology as the primary class determining the content and the form of the two others (Gosden, 1999:88-89). Stewart operating around the same time, believed that "similar natural settings would produce similar cultural responses, and culture could be seen as clustered around sets of core features, deriving from the nature of subsistence activities, but involving economic, political and religious patterns" (Gosden, 1999:89). Another theory which had great implication was the 'band to tribe to chiefdom to state' - evolutionary sequence of society that was proposed by Sahlins and Service in the early 1960's (Gosden, 1999:90).

These neo-evolutionist theories were believed to be applicable to hominids all the way back to the Paleolithic. Especially the band-system described as a societies that "gather wild plant foods and hunt non-domestic animals [and have] a restricted range of material culture and an egalitarian social structure with institutionalised levelling mechanisms to guard against the accumulation of material wealth which might lead to personal aggrandisement" (Gosdon, 1999:90), was believed to be valid for the Paleolithic society. But it nevertheless failed to make any suggestions to the cultural dynamics of this period. Binford has received the honour for bringing these neo-evolutionary theories into the field of archaeology, creating what has come to be known as processual archaeology. He was a student of Whites' and inspired by this he proposed that changes in all aspects of cultural subsystems (such as the technological, social or ideological) was adaptations to alterations in the natural environment; population density; or adjacent and competing societies (Trigger, 1998:133), is still highly visible in the theories about Middle Paleolithic societies today. One example is the ecological perspectives applied to the disappearance of the Neandertals (Finlayson, 2004). Another example is that variations within tool assemblages can be explained by different activities being carried out at different sites as a consequence of the variation of the surroundings (Foley and Lahr, 2003:111). The creation of such assemblages as the Châtelperronian has been explained by pressure from the outside due to

competition between Neandertals and *Homo sapiens sapiens* (d'Errico and Goñi, 2003). One of the benefits of this evolutionary perspective, is that this "adaptive function approach sees homoplasies (convergent evolution brought about through a combination of selection and constraints) as being rife, and thus the phylogenetic signal from stone tools as being very low" (Foley and Lahr, 2003:111) Thus, the model is open to postulating the human capacity for being innovative, as long as they are challenged or influenced from the outside.

One debate which should be mentioned here, and serves as an illustration on the break which the approach is the 'Mousterian debate' between Bordes and Binford. It illustrates the break between the 'phylogenetic/historical approach', considering tools as population markers; and the Binfordian 'adaptive function' approach, interpreting tools as adaptive markers made after demands of the environment and social organisation (Foley and Lahr, 2003:110). Lubbock's introduction of the term 'Paleolithic', was over the years divided utterly into Lower and Upper Paleolithic, in recognition of a fundamental differences among types and sophistication, and subsequently Lower Paleolithic was divided into Lower and Middle for that same reason (Trinkaus and Shipman, 1992:346). In the 1950's Bordes began on the grand task of systematising and standardise the assemblage which had accumulated within the different categories over the years. Doing this "he factored in the shape of tools, the techniques by which they had been produced, and the percentages of various tool forms found in the different assemblages (…) he was one of the first to indulge in flint knapping, learning by experimentation which techniques were used" (Trinkaus and Shipman, 1992:347). He divided the Middle Paleolithic into different 'facies' which he believed to have been formed by ethnic lineages that either migrated or evolved (Trinkaus and Shipman, 1992:349). His work resulted in a synthesis in 1961 and has certainly remained useful to many an archaeologist, but has also become a major point of disagreement according to how one believes technological material can attribute information about the people who made them. His linking of tool-forms and ethnic groups obviously did not go unnoticed. Other suggestions were quickly made, such as that the different facies reflected different tasks; or that they showed development towards the Upper Paleolithic, but caused by progressive ecological changes rather than by any pattern of technological advance (Trinkaus and Shipman, 1992:349). "Concomitant with this view is the corollary that if the signal in the shapes of stone is function, it could not at the same

time be phylogenetic and historical" (Foley and Lahr, 2003:112). Binford suggested a 'functional facies' approach to the variation within the Mousterian complex. This debate has lead to a lot of research testing tools to look for "presence or absence of associations between these industrial variants and various aspects of lithic morphology and wear patterns, environment, and faunal exploitation" with little results (Rolland and Dibble, 1990:482). Rolland and Dibble (1990) instead feel that "other factors, namely raw material variability and intensity of reduction and use, exert a much more significant effect on artefact and assemblage variability". Rolland and Dibbles approach illustrates some of the critique against the neo-evolutionist interpretation of culture. Their approach reflects how, over the last twenty or so years, "Paleolithic archaeologists have tried to move away from an emphasis on the stone tool typologies, which focuses on tools as products, to an emphasis on the entire use-life of stone artefacts – from initial raw material acquisition to discard" (Wynn and Coolidge, 2004:473).

Gamble argues that social archaeology long failed to include the Paleolithic archaeology other than to make it serve "as a point of origin for different approaches to the interpretation and reconstruction of social life from the material remains of later prehistory and the historic, text-aided, periods" (Gamble and Gittins, 2004:97). Gamble argues the reason for this failure of including the Paleolithic, especially the Middle and Late Paleolithic, into the comparative framework of the social archaeological approach, was the relative scarcity of relevant material from the period, thus resulting in an "unnecessary conceptual problem concerning the nature of societies among different hominids at the Middle to Upper Palaeolithic transition" (Gamble, 1998:427). Gamble and Gittins point out that two important differences immediately stand out between the two periods when they are compared; first, the "difference in hominid anatomy, suggesting to many a biological basis for social and cultural difference"; and second, "a uniformity of material culture when compared to its complexity in the Late Paleolithic" (Gamble and Gittins, 2004:103). Thus, the displacement of the Paleolithic stems from the privilege of biology over culture or nature over nurture, and reliance upon notions of human development from simplicity to complexity (Gamble and Gittins, 2004:103). This condition is formed around the desire to find *logos*, meaning there is a desire for origin, which is deeply embedded in Western thought. The Paleolithic is thus merely a provider of an origin which we have created for ourselves by studying other cultures, which has privileged the biological or

technological realms. In this way, nature is opposed to culture, but at the same time acts as the location of our origin, our *logos* (Gamble and Gittins, 2004:107):

> "There is undoubtedly something special about us humans, Homo sapiens. We are language-using, symbolically reasoning beings, whose relationship to the rest of the living world is, so far as we know, totally unlike that of any of the millions of other living species with whom we share our planet. In some elusive though all too real way, we stand apart from the rest of Nature, seeking to explain it, and worse, to manipulate and change it. Yet there can be no doubt that our origins lie firmly within the natural world. We are, in other words, directly descended from an ancestor that was neither linguistic nor rational (or irrational!) in the way in which we are. We started well on the other side of the narrow but deep gulf that now separates us from even the closest of our living relatives" (Tattersall, 2004:19).

Put simply; Neandertals is often been regarded as being on the wrong side of the 'gulf' or associated with nature, while *Homo sapiens sapiens* is regarded as nurture with its roots in this nature. And it is the origin of this nurture or human condition which has been sought by contrasting *Homo sapiens sapiens* with Neandertals. This concern about finding the origin has greatly influenced interpretations of the Neandertal material. It has lead to an establishment of what could be regarded as typical human behaviour built on archaeological material which significantly emerged in the Upper Paleolithic, such as burials, art, diversifying tool kits etc. Thus, Gamble and Gittins note it is difficult to find much discussion of the Paleolithic which goes beyond foraging, hunting, symbolism, meaning, and modern cognition.

3.3 Conclusion

As we shall see in the next two chapters, the gap between Middle and Upper Paleolithic is closing in. The biological differences have all too often made people assume that the Neandertals were behaviourally inferior to *Homo sapiens sapiens*, that the latter's behaviour gave them the upper hand. We can admit there are some striking new components to the archaeological assemblage towards the end of the Middle Paleolithic and beginning of the Upper Paleolithic, the *transition*, but these happened among both hominids. This has lead to detailed studies into specific areas considered earlier to show striking differences between Neandertals and *Homo sapiens sapiens*, to see what exactly the signs of continuity are, and if they can be explained somehow. We are going to see

how this might have influenced the search for ‘origin’ and changed the status between the two groups of hominids.

Chapter 4

NEW AND OLD SITES – NEW INFORMATION

The Neandertals is the hominid species, apart from ourselves, who has left most proof of their existence and whereabouts. In this chapter we are going to look at some archaeological sites and material which has stirred debates around the Neandertals; from their disappearance to their cognitive capacities. The sites mentioned in this chapter are the most important in terms of the debates they have spurred about the position of the Neandertal in human evolution. They will be discussed further in the next chapter, put into the broader context of more 'typical' Neandertal material.

Before looking at specific sites, the geographical range of the Neandertal habitat and the climate of Oxygen Isotope Stage 3 (ca. 60 kya – 25 kya), also referred to as the Würm Interpleniglacial, will be considered. First of all, to give us a 'background' for the Neandertal sites, but also because it constitutes an important part of the debate considering the disappearance of the Neandertals around 30 kya.

4.1 The Neandertal site dispersal

In the ca. 200 ky of their existence, the Neandertals managed to leave remains for us to find from the British Isles and Iberia in the west, all the way to Uzbekistan in the east; from the edges of the Fennoscandian ice sheet in the north, to the Mediterranean and Levant in the south. Their sites can be found from low level plains; to mid-level plateaux and gentle slopes (ca. 200-500m above sea level); to high-level regions (over 500m above sea level), but most frequently Neandertal sites are found in the mid-level zones (Patou-Mathis, 2000:379). Thus, we know they inhabited many and diverse environments over a long period of time experiencing serious fluctuations in climate.

4.2 Climate in OIS3

To gain a broader image of prehistoric hominid mode of life, it is important to recognize how the climate and climatic changes interacted with the biosphere and thus with human activity; either directly or through paths leading from climate to plant cover to food animals. Therefore we are going to start this chapter by looking at how the climate

progressed in the OIS3 which covers the late Middle Pleistocene and early Upper Paleolithic.

Traditionally the disappearance of the Neandertals was painted "against a bleak background of a fully glacial landscape where the great Fennoscandian ice-sheet were separated from the smaller but nonetheless forbidding ice-caps of the Pyrenees, Alps and mountain ranges farther east by vast, cold tundra poor in resources" (Davies *et al*., 2000:1). In contrast to this grim image of the ice age, the marine oxygen isotope SPECMAP record, developed in the 80's, revealed a stable and relatively mild climate in the OIS3. This information has proven to be deceptive however, when studying Greenland ice core data. Because these ice cores have a time-resolution which is much higher than the SPECMAP, another image evolved; one of high-frequency series of alternating cold and warm spells on centennial to millennial time scales in the OIS3 (van Andel, 2002:3). The Hengelo, a warm/moist event about 43-40 kya, is a period of "particular interest in that the technological transition to the Upper Paleolithic seems to have occurred at this time" (Straus, 2005a:146).

In 1996 an interdisciplinary project was initiated by the Godwin Institute of Quaternary Research at Cambridge University called the Stage Three Project, reflecting its focus. They bravely set out to reconstruct how the middle pleniglacial conditions really were, with cold spells and warm spells, and how this might have affected flora, fauna, and landscape in general; and ultimately Middle- and Upper Paleolithic humans (http://www.esc.cam.ac.uk/oistage3/Details/OIS-3a.html). The goal of the project was (1) to describe with existing data and to simulate the climates and landscapes of typical warm and cold phases between 45 kya and 30 kya and (2) to compare the results with the spatial and temporal distribution of human beings in this context (van Andel, 2002:2). For archaeology, this resulted in two databases; one chrono-archaeological database for Europe that holds all dates from archaeological cave, abri and open-air sites in the interval from 60 to 20 cal ka BP that were published up to the end of the year 2000; and one demonstrating the temporal and spatial ecology and distribution of the mammalian fauna (http://www.esc.cam.ac.uk/oistage3/Details/OIS-3a.html).

4.3 Archaeological sites

This part will concentrate on a few selected sites and the material they have yielded which has broadened our perspective on Neandertal abilities and caused debates.

4.3.1 Subsistence

Information about Neandertal subsistence behaviour is mainly built on animal bones from their sites; the zooarchaeological material. From quantitative and qualitative studies on the zooarchaeological material we know they ate a lot of meat from big game. This has been pointed out as one of the great differences between the Middle- and Upper Paleolithic, where zooarchaeological remains reveal a more diverse diet, often including exploit of marine recourses. But in later years there have been a few discoveries which have unveiled that Neandertals occasionally took advantage of marine food:

> "Coastal Middle Stone Age sites [of southern Africa, e.g. Blombos Cave] show an intense exploitation of marine resources, which has been used to suggest the varied and modern character of these societies. Only a few examples of the use of marine resources exist at Middle Paleolithic sites in Europe. The late Mousterian levels of Figuiera Brava, Portugal, have yielded evidence of systematic collection of seashells, particularly *Mytilus* and *Patella*. Another case of Neandertal shellfish use, and probably seal-hunting, comes from Vanguard Cave, Gibraltar" (d'Errico, 2003:191).

Vanguard Cave, Gibraltar

Vanguard Cave and Gorhams Cave, Gibraltar have been excavated since 1995 by Barton and colleagues. At Vanguard Cave a number of "discrete and well-stratified occupation horizons containing hearths have been located within the 17 meters of cave deposits" (Barton, 2000:212). At the Vanguard Cave upper area the youngest Mousterian level at the site seemed to be rather unaffected by post-depositional disturbance and was dated to about 45 kya to 49 kya. In one of the hearths, about 80 x 80 cm wide, scattered marine shells of mussel (*Mytilus galloprovincialis*), limpet (*Patella vulgata, Patella caerula*), cockles (*Acanthocardia tuberculata*), veneracean bivalve (*Callista chione*), and barnackles (*Balanus sp.*) were found. The shells were overlapped by a small number of Mousterian artefacts such as quartzite flakes from sea pebbles, and two artefacts made of chert; one heavily damaged flake and one fire-cracked double side-scraper, which would have been ideal chucking knifes for mussels. Virtually the whole *chaîne opératoire* was represented. A number of small unburned coprolites were found in the hearth, possibly produced by a

young child. Thus, Barton believes these remains are the products of a short stop at the cave, maybe just for a few hours, by "one or two adults accompanied by their young", before the occupants took of again. (Barton, 2000:211-214).

4.3.2 Neandertal technology – more than Mousterian

The Neandertals are known primarily as the makers of the Mousterian culture. But around 45 kya they started making different looking tools often incorporating typical Upper Paleolithic technological features. Because of this, and because of the time they appear, these are often called *transitional* technologies. The most 'famous' and well-established of these is the Châtelperronian technology of south-western Europe. The others, such as Uluzzian from Italy and Szeletian of Central Europe, have not yet been sufficiently coupled with hominid remains to firmly establish who where the makers.

The Châtelperronian dispersion

Châtelperronian technology has been found several places in central and western France and in northern Spain. At Saint-Césaire, central-western France; and Arcy-sur-Cure, northern France, Châtelperronian tools have been found in direct association with Neandertal skeletal remains. (Trinkaus *et al*., 1998:5836). The technology contains traits from the Middle Paleolithic Mousterian and from the Upper Paleolithic Aurignacian tradition respectively. The main differences between these traditions are that whereas Middle Paleolithic assemblages were dominated by flakes, the early Upper Paleolithic assemblages were dominated by blades, especially those well-designed for hafting. The Upper Paleolithic material also includes more bone, antler and ivory as well as personal adornments and eventually art than the Middle Paleolithic assemblage does (Conroy, 1997:381). It is clear that Châtelperronian is rooted in the Mousterian complex, but in the Mousterian of western Europe which at one stage contained a lot of Upper Paleolithic elements including burins, end-scrapers, and especially, backed knives (such as the Châtelperron knife) (Churchill and Smith, 2000:75). The Châtelperronian assemblage also contains bone artefacts. Thus, these discoveries have led to considerable debate around the phylogenetic and culture-historical relationship between Neandertals and *Homo sapiens sapiens*, a debate which will be further outlined in the next chapter.

At La Roche à Pierrot, Saint Césaire, the Châtelperronian levels at the site (EJOP supérieur) were dated by thermoluminescence on six burnt flints, which revealed a mean calendar age of 36.3 $\pm$ 2.7 ky BP; while at Grotte du Renne, Arcy-sur-Cure, a temporal bone was dated by ^{14}C to 33.8 $\pm$ 0.7 ky BP. With the roughly 10% age underestimation by ^{14}C in this time range, the dates from the two sites are highly concordant (Churchill and Smith, 2000:76).

In the northern part of the Iberian Peninsula, Châtelperronian have been found in the stratigraphy at several sites, such as Morín and El Pendo. But in contrast to France, there are no human remains associated with the Châtelperronian in Spain. The stratigraphy is also unclear, with Châtelperronian sometimes neatly tucked in between levels of Mousterian and Aurignaciane.g. Morín, level 10). South of the river Ebro, which flows from Cantabria to the Mediterranean shore in Tarragona, the Mousterian seem to have lingered on until at least 30 kya before there seems to be an abrupt change in the stratigraphy from Mousterian tools to Aurignacian tools.

4.3.3 Hybridisation

When sites in the Levant revealed more gracile looking Neandertals than its robust Western European counterpart, and that there proved to be an overlap in habitation time between Neandertals and the *Homo sapiens sapiens* in this area, multiregionalists proposed transition between the two species in this area. One of the arguments is the great variability we can see in the Neandertal skeletal anatomy; the robustness in the Western European specimen is believed to reflect the cooler climate in this area. The multiregionalists believe the more gracile Neandertal's in Eastern Europe and Western Asia show the emergence of 'modern' features (higher foreheads, development of chins, and reduction of facial prognathism and brow ridges) over time and argue that this population was never static, but evolving gradually into modern humans. Neandertal skeletons with what is assumed to be an admixture of archaic and modern features have claimed to be found in both Europe and Asia.

Except from a few multiregionalists, few serious claims of evidence of hybridisation between Neandertals and *Homo sapiens sapiens* have been advanced, although many believe this could have happened occasionally. The question is rather if they could have

produced viable offspring's; which hinges on whether or not they belonged to the same species. The possible hybrid skeleton found in Lagar Velho of Lapedo Valley, Portugal in November 1998, is - claimed by Duarte *et al.* (1999) - able to answer both questions. The results from the study of the bones were published by Duarte *et al.* (1999), and tells us about a ca. 4 year old boy, buried on his back in a pitch where the sediment has been heavily stained with red ochre and a pierced shell have been given as grave good. From its context, the discovery was immediately classified as a typical early Upper Paleolithic Gravettian burial, known from several other sites in Europe. This assumption was further strengthened when the bones were dated to about 24,5 ky BP. But after intensive skeletal analyses, the research team discovered something strange about this little boy; they noticed that "the cranium, mandible, dentition, and postcrania present a mosaic of European early modern human and Neandertal features [indicating] admixture between regional Neandertals and early modern humans dispersing into southern Iberia" (Duarte *et al*., 1999:7604).

As a possible scenario for the origin of this boy, Duarte *et al.* (1999) propose that when early modern humans moved into Iberia they mixed with the local Neandertal populations that they encountered, not just 'once in a while' but extensively, which in order made it possible for the morphological mosaic to still be visible several millennia's after the supposed disappearance of the Neandertals from this area. They do not see any other solutions for how this individual could display some of the robust features that they observe, when the remains of all other *Homo sapiens sapiens* found in Europe had more gracile subtropical body proportions. "It establishes the complexities of the Late Pleistocene emergence of modern humans and refutes strict replacement models of modern human origins" (Duarte *et al*., 1999:7604).

This was certainly a courageous claim to make, and instantly received response both from others within the field (Tattersall and Shcwartz, 1999) and from the public and media. Even though Duarte *et al.*'s claim has not been widely accepted within their academic circles, many nevertheless find it an intriguing possibility since Portugal is one of the areas where Neandertals are believed to have survived the longest.

4.3.4 Art and symbolism

Art and symbolism have become the hallmark of the behavioural revolution many believe occurred around 40 kya in *Homo sapiens sapiens.* But there have been several discoveries over the years which point to that these practises did not 'suddenly' happen after 40 kya, but were to a certain extent practised also in the Middle Paleolithic. Burials is by far the largest group of evidence in this category, but it is still unclear what the act of burials meant to the Neandertals.

Grotte du Renne, Arcy-sur-Cure

Grotte du Renne was excavated between 1949 and 1963, and have revealed archaeological layers attributed to Mousterian (XIII-XI), the Châtelperronian (X-VIII), the Aurignacian (VII), and the Gravettian (VI-IV) (d'Errico *et al*., 1998:4). A temporal bone from the level Xb was dated by ^{14}C to 33.8 $\pm$ 0.7 ky BP (Churchill and Smith, 2000:76). The Châtelperronian levels from this site has also revealed some typical Upper Paleolithic objects: (a) personal ornaments (36 in total), such as perforated or pierced animal teeth (canines and incisors of fox, wolf, bear, hyena, red deer, horse, marmot, bear and reindeer); small perforated beads made of ivory; a fossil shell (*Rynchonella*), vestigial phalanges, and a lateral metapodial of reindeer show grooves for suspension; a belemnite shows a broken perforation, and a fossil of crinoid, having a natural perforation, was brought to the site and possibly used as a pendant. (b) worked bone objects (142 in total) such as projectile points, awls, pins, burnishing tools, ivory *baguettes*, bird-bone diaphyses sectioned into tubular elements, large mammal ribs, and by products of bone and ivory manufacture. (d'Errico *et al*., 1998:4). It should be pointed out that it is the lowest Châtelperronian level (X) which contains the highest frequency of bone tools and personal ornaments, making intrusion from Aurignacian levels little plausible.

Grotte du Renne was a real eye opener about Neandertal behaviour. Not only did they make sophisticated stone tools; they made bone tools and personal ornaments. But despite placing Neandertals in a more nuanced light, this is one of the finds which truly spurred the discussion over acculturation, chronology, and ultimately Neandertal cognition (chapter 5).

4.3.5 Burials

There are recorded many possible burials from the Middle Paleolithic over the years and scholarly opinion converges on c. 32-36 convincing of burials, from both Neandertal and *Homo sapiens* burials recorded (Pettitt, 2002:3). Riel-Salvatore and Clark (2001) have made a detailed list of certain and possible burials, including sites, individual burials and possible grave goods (see appendix). Here I will mention a few of the most acknowledged of the certain burials.

La Chapelle-aux-Saints

A Neandertal man was found in a burial excavated into the limestone bedrock in the floor of a small cave near La Chapelle-aux-Saints, France in 1908. The find comprised a nearly complete skeleton including a well-preserved skull and mandible, most of the vertebrae, several ribs, most of the long bones of the arms and legs, plus some of the smaller bones of the hands and feet. The excavators, Bouyssonie, Bouyssonie and Bardon, believed their find to be the first secure evidence that Neandertals performed mortuary practice. They describe the pit where the Neandertal was laying as a large, roughly rectangular depression which had been intentionally excavated (Bouyssonie *et al*, 1908:516 in Gargett, 1989:161).

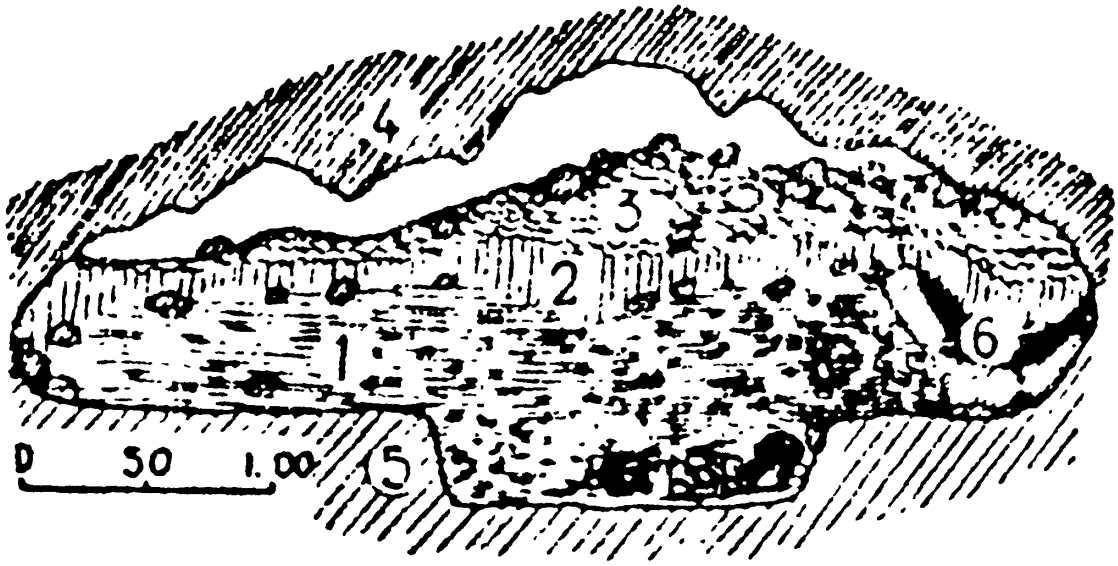

Fig. 4.1 La Chapelle-aux-Saints transverse section (Bouyssonie et al, 1908 in Gargett, 1989: 161).

They recognised six levels in the cave (fig. 4.1). The Neandertal was found in a depression 145x100 cm in plan and 30 cm deep dug into stratum 5 (Bouyssonie *et al*, 1908 in Pettitt, 2002:6). They interpreted the find as an intentional burial because; (1) the skeleton was lying in a flexed position and several pieces of material was found in the grave; (2) the presence of three or four large, flat pieces of bovid long bone above head, along with a bovid distal metatarsal, two first phalanges, and one second phalanx and, nearby, some reindeer vertebrae, articulated; (3) the discovery of two stone tools near the nasal aparature and numerous other flint artefacts throughout the grave fill; and (4) the occurrence of more bovid remains in a depression in the marl but nearer the mouth of the cave (Gargett, 1989:162). It is worth noticing that all of stratum 5 contained remains of Neandertal activity, thus what Bouyssonei *et al* perceived as grave offerings, might as well be remnants from this stratum. But the pit is still there with a fairly complete skeleton in it suggesting that this may in fact have been an intentional burial.

La Ferrassie

La Ferrassie, near Dordogne River in France, is one of the most important sites in respect of MP burials. Between 1909 and 1920, two nearly complete (La Ferrassie 1&2) and five fragmentary (La Ferrassie 3, 4, 4a, 5&6) Neandertal skeletons were excavated here by Capitan and Pyrony (Gargett, 1989:165). Five strata was identified, A-E, where C was the first level to contain any Mousterian artefacts. D is separated from C by a 'pavement' of calcareous blocks, and the two layers are 60 cm deep where La Ferrassie 1&2 was located and 20 cm deep at the eastern end of the excavation (Gargett, 1989:165). Stratum E consisted of red clay, mixed with calcareous elements and Mousterian and UP elements.

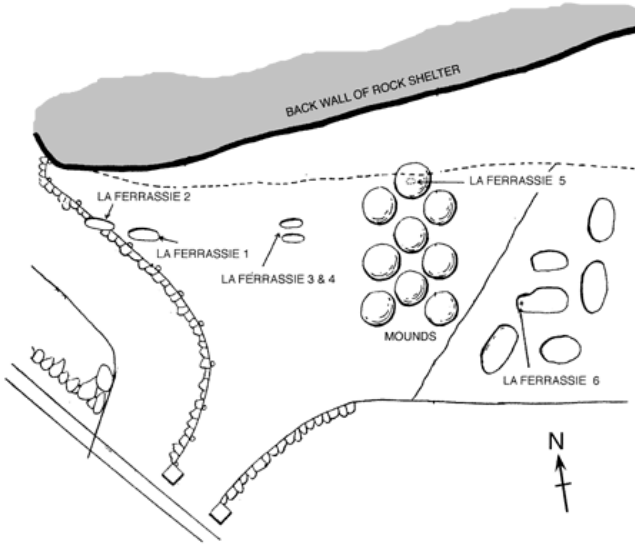

Fig. 4.2 Plan of La Ferrassierock shelter showing burials, pits and mounds (Pettitt, 2002:7).

La Ferrassie 1 (fig. 4.3) is the remains of a nearly complete adult male individual, and he was found at the contact between layer B and C. The excavators saw no signs of a grave pit, but note that he was placed near the back wall on sediments left by previous inhabitants and that three limestone blocks had probably been placed on his head and shoulders and the body been covered up (Gargett, 1989:166). Capitan and Peyrony rejected the idea that this was a natural burial, because they could find no signs of disturbance by predators or of any signs on the remains for slumping or collapse which usually is displayed in individuals decaying out in the open (Gargett, 1989:166).

A year later a La Ferrassie 2 was found 'head to head' with La Ferrassie 1. This was the skeleton of an adult female buried in the same strata, thus at about the same time inferred Capitan and Peyrony, as La Ferrassie1. That the burials seemed to be placed 'head to head' strengthened this theory. The other pits contained remains of the a ten-year-old boy (La Ferrassie 3); two individuals buried together, one foetus (La Ferrassie 4) and the other a neonate skeleton (La Ferrassie 4a); remains of a baby (La Ferrassie 5); and an individual of about three years (La Ferrassie 6) (Gargett, 1989:167).

Fig. 4.3 La Ferrassie 1 in situ 1909. Despite of the poor picture, it is possible to see the flexed position in which the individual was lying.

Another feature of the La Ferrassie which has stirred speculations about mortuary practices among Neandertals, are nine mounds found at the site. They are meter-sized 'cones' formed in the stratum C/D, and La Ferrassie 5 was found underneath one of them (fig. 4.2) in 1920 (Gargett, 1989:167). But it is quit possible that these have been formed naturally. Nevertheless, the importance of the site of La Ferrassier cannot be overstated with its great number of Neandertal remains of both sexes and of differing ages.

Shanidar

One of the most famous burials with much implication also outside the field of paleoarchaeology and paleoanthropology comes from the Shanidar cave in northern Iraq. The cave was excavated in the 50's and early 60's by Ralph S. Solecki, and yielded the remains of nine Neandertal individuals in total, seven which are fairly complete and two fragmentary. The sample consists of two groups from two different time periods, the earlier group (consisting of Shanidar II, IV, VI, VII, VIII and IX) has been dated to approximately 60 kyr, and a later group (Shanidar I, III, V) that has been estimated to date to approximately 46 kyr. Five cultural layers were recognised in the cave (A, B1, B2, C, D), and all of the individuals were found within layer D (Solecki, 1963:183).

One skeleton in particular caught the excavators interest; Shanidar IV. The skeleton was found during field work in the summer of 1960 and removed en bloc for T.D. Stewart to excavate. After examining and reconstructing the skeletal material, Stewart concluded that Shanidar IV was the remains of an adult male, around forty years of age at the time of his death. He was also convinced that Shanidar IV was a deliberate burial, because "the skeleton was seen to be laying on its left side with the legs partially flexed at the hips and knees, the trunk bent forward so that the head faced nearly west, the left hand resting in the vicinity of the face, and the right hand in the vicinity of the left elbow" (Stewart, 1977:154).

Other data strengthened the conclusion reached by Stewart. Solecki, unlike other excavators at the time, made sure to collect a large amount of soil-samples from his excavation at Shanidar, about 6000 all in all, for Leroi-Gourhan to examine. The Shanidar IV is also known as the Shanidar Flower burial because of the claim by Solecki and Leroi-

Gourhan for large amount of flower pollen in the sediment around the skeleton. She comments in her article (1975) that:

> "in 1968, two newly prepared samples (number 313 and 314) appeared, from almost the first glance, to be different from the others. The number of composites in these samples greatly exceeded those of the other samples. (…) many of them appeared to be clustered in groups which contained from two to more than 100 pollen grains. (…) another unusual trait manifested itself: of the 28 different plants identified in the samples, only seven was found in clusters. Some of these clusters contained two or three different species of agglutinated pollens. Thus we may conclude that complete flowers (…) had been introduced into the cave at the same time" (Leroi-Gourhan, 1975).

Leroi-Gourhan (1975) does not believe that the assemblage of flowers can be explained by animal activity (rodents, birds etc.). Solecki (1975) speculates if the Shanidar IV individual might have had a special status in his society, both because of the flowers themselves and because most of the flowers present in the samples are known for their medicinal powers.

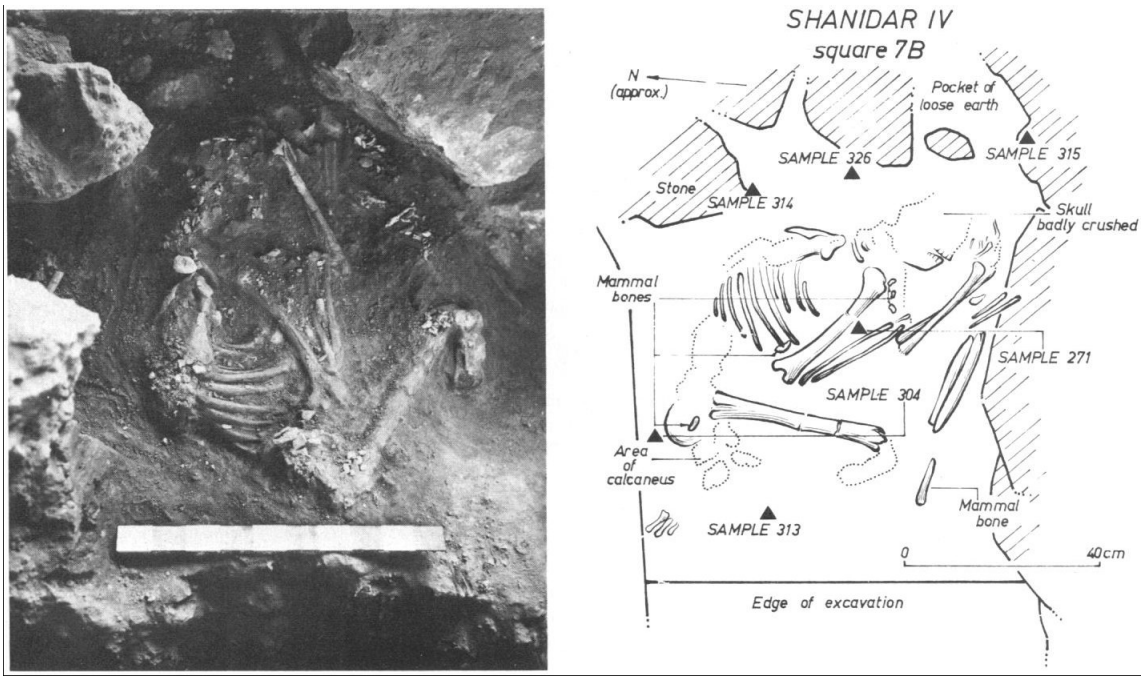

Fig. 4.4 Left: The Shanidar IV Neandertal viewed from the north. Right: Overview of where the six soil samples from the pit of Shanidar IV were taken (Solecki, 1975).

Kebara Cave

Another possible burial comes from Kebara Cave, first excavated in the 1930's. It was soon recognised that the cave yielded well-preserved deposits of the Middle- and Upper Paleolithic, both in terms of lithics, hearths and bones. During re-excavations from 1982-1990, a possible burial of a Neandertal was discovered in 1983. This individual (KMH2) was uncovered at a dept of 7.80 below datum, in unit XII (fig. 4.5) and was dated by thermoluminescence to 61-59 ky B.P. and by electron spin resonance to 64-60 ky B.P. (Bar-Yosef *et al*., 1992:527).

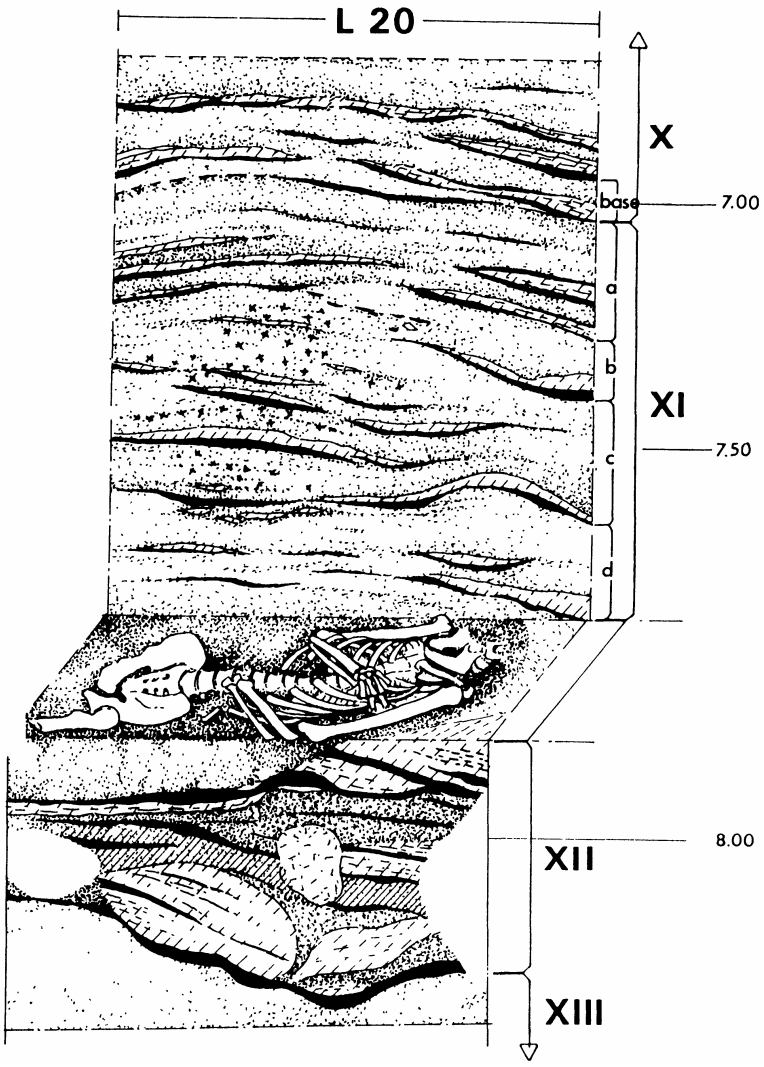

Fig. 4.5 Stratigraphic section, showing the location of the KMH 2 burial (after Bar-Yosef et al. 1992).

It was believed to be a burial because the "eastern and northeastern limits of the pit were clearly observable; the sediments inside the pit were yellow-brown while those outside were blackish" (Bar-Yosef *et al*., 1992:527). Also "the right humerus was turned inward with its lateral side facing up. The right innominate was in place, and the typical sideward collaps after the decay of the flesh had not occurred [which means] that the right side of the body was leaning against the northern wall of the burial pit, limiting the amount of bone movement which normally occurs with the decomposition of the soft tissue" (Bar-Yosef *et al*., 1992:527-528). The different coloured sediments and the signs of 'leaning' confirmed that the body was lying in a pit. The fact that "there was no displacement of the bones beyond the initial volume occupied by the body" and that "most anatomical connections were still intact", further confirmed this fact, suggesting "that the body decomposed in a filled grave" (Bar-Yosef *et al*., 1992:528).

One of the peculiar things about this buried individual is that its cranium has been removed. From the shape of the pit and the positioning of the atlas (the topmost cervical vertebra of the spine) between the branches of the mandible, it seems as if the skull might have been resting on a higher level than the rest of the body and the head had been tilting forward. Because no cranial fragments have been found and the position of the mandible, hyoid bone and the right upper third molar right next to the lower third molar exclude interference from animals, it has been suggested that this is a case of later intervention in a primary burial. (Bar-Yosef, 1992; Pettitt, 2002).

Another discovery with significance from Kebara Cave was the Hyoid bone (fig. 4.6) which belonged to the Kebara 1 individual. The hyoid bone is the only free-floating bone in the human body and attaches to soft tissue of the larynx and anchors throat muscles important to speaking (Johanson and Edgar, 1996:106). Several other animals possess this hyoid bone, but the Neandertal one is close to indistinguishable from that of an anatomically modern human. This of course created enormous debate around the issue of Neandertal language capabilities, which had been pretty much quiet since Chomsky in the 1960's claimed that language evolution and its underlying brain mechanisms were "beyond serious inquiry" (Holden, 2004:1316). But the 'origin of language' controversy was far from over, as we shall see in the next chapter.

Fig. 4.6 Hyoid bone from the Kebara 1 indivdual (from Michigan State University homepages, http://www.msu.edu/~heslipst/contents/ANP440/neanderthalensis.html)

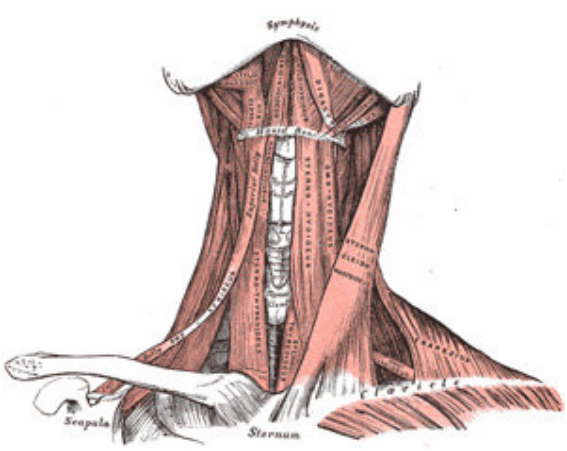

Fig. 4.7 Illustration of where the hyoid bone is situated in the throat. It forms the top of the 'T' seen in the picture.

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From the amount of evidence found of relatively complete skeletons found in pits, it seems safe to say that the act of burials did at least occasionally occur during the Middle Paleolithic. The proposed evidence of grave goods however, is not so convincing. Usually the artefacts included in the graves are of the sort who are randomly found in occupational levels from caves, such as lithic remains and animal bones, thus they probably found their way into the grave naturally. The most intriguing find is still the pollen from the burial of the Shanidar IV individual, even though this evidence is still seen as highly controversial.

Despite this relatively large amount of data, many still contest the idea that Neandertals had any capabilities for symbolic thought; hence denouncing the evidence as outcome of natural processes in caves, or calling into question the *meaning* behind the burials proposing that it might not have had anything to do with mortuary rites. These claims will be discussed further in the following chapter.

4.4 Neandertal Reconstruction

Based on the numerous Neandertal remains dug up on sites around Eurasia, one has been able to reconstruct the Neandertal morphology fairly well. On the basis of this Neandertals have been included into the group of 'archaic' Homo's, which also contain the 'archaic' *Homo sapiens.*

The morphological trademarks of an individual known as 'archaic' is a long, low cranium with a relatively big brain, large brow ridge, large, prognathic face with large teeth, and the lack of a chin which later evolved in the modern humans (McBrearty and Brooks, 2000:459). Physical features specific for the Neandertals are the large incisors with a peculiar shovel-shaped wear pattern which might result from using the front teeth as a helpful tool. Explanations of the Neandertal facial prognathism include an adaptation to cold climate, and/or as a response to increased anterior dental load from using their teeth as tool (Conroy, 1997:420). It has been suggested that the function of the brow ridge could have something to do with absorbing stress and strains from the action of the jaw and teeth (Stringer & Gamble, 1993:74).

The post-cranial part of the Neandertal body also bears some distinctive trademarks: their collar bones were much longer than in *Homo sapiens sapiens*, giving them a broad appearance; their ribcage was barrel-shaped in contrast to our cylindrical ribcage; their knee- and elbow joints were very big compared to the shaft of the bone; and last but not least, their hands were bigger and their fingertips broader than ours. (Stringer & Gamble, 1993). The features mentioned above are believed by many to be a consequence of evolving from an archaic population in an isolated geographical area, like Europe might have been at the time.

In 2003 anthropologist Sawyer and Maley, completed a reconstruction of a full Neandertal skeleton which was featured in the American Museum of Natural History exhibit "The First Europeans: Treasures from the Hills of Atapuerca". The reconstruction was completed by putting together many different pieces from different individuals, with La Ferassier 1 as the main skeleton (fig 4.8).

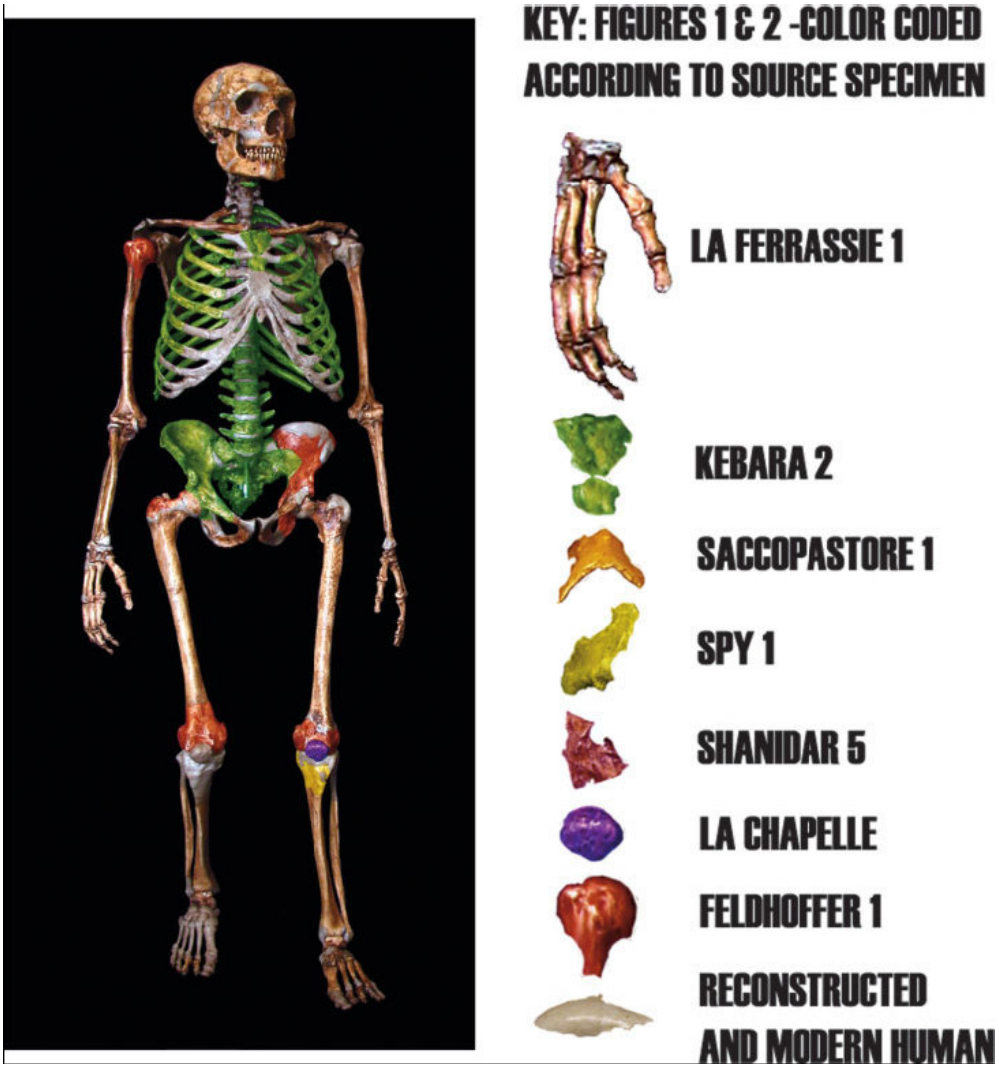

Fig. 4.8 Neandertal reconstruction with colour coding for specimen identification (from Sawyer and Maley, 2005:24).

4.5 Conclusion

The small selection of data described in this chapter illustrates the kind of evidence which has contributed to broaden the view and creating debates over Neandertal capabilities. As we shall see, accumulating evidence does not necessarily mean that another piece in the jigsaw puzzle of human origins research falls into place; on the contrary it rises new, and often more complicated questions to answer. The new evidence from climate research under the Stage Three Projects is one example of this, where they seem to have uncovered that *Homo sapiens sapiens* inhabited colder climate than the so-called 'cold-adapted'

Neandertals. Some of these ‘new’ questions raised by the evidence above will be discussed in the next chapter.

Chapter 5

BRIDGING THE GAP

In the case of behaviour, Neandertals were originally perceived as mainly static, both culturally and behaviourally, throughout their evolutionary time. Mellars has argued substantial differences across a whole suit of archaeological evidence between Neandertals and *Homo sapiens sapiens*; Mithen has argued neurobiological differences between the two species; Liebermann suggested they lacked language; and Binford suggested an inability to hunt efficiently (Lewin and Foley, 2004:396). The two scenarios explaining their disappearance were both built on this notion of inferiority to the intelligent and innovative *Homo sapiens sapiens* (*Homo sapiens*, "Cro-Magnons", Anatomically Modern Humans etc) on biological grounds. Either they were wiped out by the far superior modern humans, or they were simply an 'unfinished' sub-type of *Homo sapiens sapiens.* Even though these two ideas are still at the basis of the controversy today, most scientists on either side of the debate find the supposition of 'intelligent versus primitive' – idea to be overly simplistic, especially when we look at the relatively large body of evidence we have today. This chapter will look at the major issues and discoveries developing in the field the last couple of decades, and how this has affected the status of the Neandertal as behaviourally human.

Bratingham, Kuhn and Kerry (2004) ask some interesting questions about the *probability* of the emergence of what has come to be called the 'Upper Paleolithic': Was the Middle/Upper Paleolithic transition highly improbable, involving radical, unpredictable changes in the way that behavioural adaptations were organised; or was the transition highly probable, and involving small, predictable changes to existing adaptations? And what does this so-called 'behavioural modernity' believed to be in place with *Homo sapiens sapiens* really consist of?

It is the tempo and mode of this change between Middle and Upper Paleolithic which lies at the core of today's debate. There are those who believe that behavioural change happened gradually and at different times in differing geographical regions (McBrearty & Brooks, 2000; Straus, 2005a-b); those who believe that it was a 'behavioural revolution' occurring rapidly, intertwined with morphological changes within *Homo sapiens* in Africa

ultimately resulting in *Homo sapiens sapiens* (Klein, 2000; Tattersall & Schwartz, 1999; Tattersall, 2004; Mellars, 1999, 2005); and those who support the view of replacement of all archaic hominids by *Homo sapiens sapiens* from Africa, but does not agree that the anatomical differences had anything to do with the behavioural change in this transitional period (d'Errico *et al*., 1998; Stringer, 2002). What is important to remember is that "this disagreement do not necessarily stem from different categories of facts, but rather on the differing interpretation of essentially the same body of data" (Stiner, 1992:306). What seems to be clear however is that when we compare material culture from the Middle Paleolithic as a whole with material from the Upper Paleolithic as a whole, striking differences are revealed. But only by looking at the *transitional* phase, late Middle Paleolithicit and early Upper Paleolthic can we be able to gain some perspective on the *nature* of this change, and whether it happened in just *Homo sapiens sapien* as previously argued, or if this change included the Neandertals.

5.1 The 'hard evidence' of Neandertal behaviour

I choose to call the remains of technology and subsistence the 'hard evidence', because they are the most common features of Middle and Upper Paleolithic sites, often found in large quantities. Thus, most theories about behaviour and cognitive abilities have been based upon these groups of data. Recent studies have revealed some interesting results on both subjects which has created debates and reinterpretations of old views.

5.1.1 Subsistence – substantially broadened

The Upper Palaeolithic period has been associated with the development of 'modern' hunter gatherer life-ways and the spread of *Homo sapiens sapiens* in Europe – possibly at the expense of the resident Neandertal population (Burke, 2000:281). Neandertals used to be regarded as scavengers and opportunistic hunters, while *Homo sapiens sapiens* were believed to possess advanced hunting techniques, thus easily out-competing the Neandertals from the food chain. Subsistence strategies have thus been used as an argument for the Neandertals disappearance and for the success of the newcomers. Recent systematic analyses of zooarchaeological material from all over Europe however, have made it clear that not only did Neandertals hunt; they also occasionally took advantage of marine resources. Thus, the issue today is not *whether* Middle Palaeolithic people could hunt, but rather *when* and *how* they chose to hunt (Burke, 2000:281).

Direct evidence of *how* Neandertals acquired food is scarce, but zooarcaheological remains can give us a reasonable clue to what some of their diet consisted of. In addition, developments in technology have made it possible to find out more about their diet from teeth and bones. Thus, we are continually gaining a broader perspective on the Middle Paleolithic diet. Stiner (1993) points out that so far the definition of 'behavioural modernity' have largely been based along the lines of technological change, a change whose evolutionary significance is still unknown. Since recent studies have shown that patterns of human game use and foraging are among the kinds of information that do not necessarily coincide with the technological definition of the transition, Stiner (1993) believes the continually increase in knowledge of subsistence strategies of the Middle Paleolithic can potentially enrich the debate over modern human origins

Burke (2000) talks about how Middle Paleolithic faunal assemblages reflect either selective (prime-aged dominant) hunting of prey, the seasonal exploitation of prey aggregations, or a mixed strategy, which proves how Neandertals could occupy several niches in different geographical regions and was able to adapt to climatic changes and exploit resources strategically. Varied use of tools suggest that Neandertals were broad-based foragers who were capable of exploiting a wide range of resources rather than focusing solely on the acquisition of large mammals as some researchers have suggested.

In the last couple of decades technological methods have been developed which has given us new ways of analysing data and test hypotheses. Drucker and Bocherens (2004) have studied the isotopic composition of food recorded in collagen from Neandertal and early Upper Paleolithic hominid bones. This is possible because there is a quantitative relationship between the carbon and nitrogen isotopic composition of the tissue of a given terrestrial mammal and that of its average diet. Therefore, a comparison of the collagen in isotopic signatures of potential prey available to the predator and that deduced from the predator itself should lead to quantitative estimates of the consumption of different types of prey using mixing models or at least it should allow the consumption of given prey to be tested (Drucker and Bocherens, 2004:164). Numerous zooarchaeological data point to the existence of specialised hunting of large herbivores by Neandertals, and that this trend continued into the early Upper Paleolithic (Drucker and Bocherens, 2004:162). The results of their analysis agrees with the zooarchaeological material; early Upper Paleolithic *Homo*

sapiens sapiens and Neandertals both seem to have consumed protein provided by meat from large-bodied, terrestrial herbivores found in open environments. Drucker and Bocherens (2004) also tested to see if they could find traces of exploit of freshwater resources in the hominids, but from their sample this did not seem to have had any substantial place in the diet until well after the transition.

But we do know that Middle Paleolithic hominids took advantage of marine recourses occasionally. The findings of marine residues scattered around a hearth in Vanguard cave (chapter 4) are important because they throw light on two aspects of Neandertal behaviour: "First, it provides rare evidence for the early exploitation of these foods"; and second, "the size of the mussels allows us to say something about the collecting methods employed" (Barton, 2000:212). The size of the mussels excludes them from having been picked at the shoreline only about 2 km from the caves. They were more likely harvested from a river estuarine environment further away and selected for their larger size (Barton, 2000:213). Barton (2000) believes the remains are the result of a short occupation of the cave, because only a very small amount of lithic remains were scattered around the hearth. Other areas excavated in Vanguard Cave points to the same occupation pattern; in the northern alcove where charcoal from a hearth has been dated to >44.1 ky, only a few isolated flakes were found in the surrounding sand (Barton, 2000:216-217). Nevertheless, the discovery at Vanguard Cave is not unique, but supplements other discoveries made from Italy and Portugal in recent years.

Another part of the Neandertal body which can provide us with knowledge of their subsistence pattern are their teeth. By looking at buccal microware it is possible to suggest what the Neandertal diet consisted of and how the food was processed, which in turn indicates subsistence strategies. Perez-Perez *et al.* (2004) believe that a buccal microwear analysis applied to Pleistocene human teeth from different time periods and geographical areas should be able to provide us with some information about dietary modifications, as well as of shifts in dietary habits due to climatic conditions and food availability. They examined the microwear variability on a sample of Middle and Upper Paleolithic human teeth from different geographic areas and found that the microwear pattern of the specimens belonging to the warmer OIS tend to show fewer striations than those from colder OIS, especially for the span from OIS 2 to 5. They suggest from their result that

Neandertals ate more meat during warm periods, while consuming hard food, such as roots or bulbs, might have gained importance during colder periods. Even though these suggestions need further research with larger samples, the results propose that the dietary habits and food processing strategies of the Neandertals were highly variable and that they were capable of adapting and shifting their dietary strategies according to environmental constraints, in a way similar to the *Homo sapiens sapiens.*

So, were there in fact any great differences between Middle to early Upper Paleolithic subsistence techniques? Even though there does not seem to be any substantial changes in diet Bar Yosef (2002) propose the difference could have been between that of intercept hunting, which required getting close to the target, with that of the use of spear throwers or bows. Berger and Trinkaus (1995) studied the anatomical distribution of traumatic lesions among the European and Near Eastern Neandertals and found that they were:

> "(…) closely matched by the pattern seen in North American professional Rodeo athletes. Consequently, it is proposed that this overall pattern was the product of frequent close encounters of a dangerous kind with prey animals (promoted by a projectile technology which required proximity to those animals), combined with differential mobility and survival of individuals with severe lower limb injuries" (Berger and Trinkaus, 1995:850).

Even though similar analysis have not been done on *Homo sapiens sapiens*, there was probably some "improvements in hunting techniques in the early Upper Paleolithic involving the development of bone points and hafting and the production of standardized elongated blades and points which could be effectively hafted into projectile weaponry" (Berger and Trinkaus, 1995:850). They also propose that this high-energy activity might account for some of the postcranial robusticity visible in the Neandertals.

Stiner (1993) points out that it is not until about 20 kya that human components seem to exclude the presence of large carnivores dwelling in the same sites. Until then, animals and people seem to have taken turns occupying the same sites for thousands of years interchangeably. This disappearance of carnivores from hominid sites may reflect a shift in hominid resource ecology, making it more effective in terms of food-storage, -processing and –transport, thus out-competing the local carnivore population. This change which Stiner observe in the zooarchaeological record, does not match the timing of the

immigration of 'modern' stone tool technologies or *Homo sapiens sapiens* into Eurasia. Thus, differences between anatomically modern humans and their immediate predecessors probably did not involve the addition or loss of any of the most basic components of foraging such as hunting and scavenging or responses to local prey abundance, but are far more likely to have been manifested in how these basic behavioural components were integrated or organised as problem-solving strategies for living, just as they are in other behaviourally complex predators (Stiner, 1993:65). Could this mean that *Homo sapiens sapiens* and Neandertals came in competition with eachother? "Diet breadth is an important aspect of niche structure and therefore, an important indicator of the potential for competition between Neanderthals and early modern humans" (Burke, 2004:156).

Stewart (2004) uses the mammalian database developed under the *Three Stage Project* (downloadable from 'http://www.esc.cam.ac.uk/oistage3/Secure/OIS-3i.html') to "test the hypothesis that there was competition between Neanderthals and modern humans during the time that they coexisted, i.e. during Oxygen Isotope Stage Three (OIS 3) (ca. 60–20 ka BP) and that this competition led to the extinction of the Neanderthals" (Stewart, 2004:179). He found that "the biggest difference may have been the greater use by modern humans of both the largest (mammoths) and smallest (leporids) mammals of the period. He concludes that competition between species of humans is difficult to confirm using the present data and it seems that if there were competition, the modern humans, with their greater dietary breadth and resource base, may have avoided its pressure by diversifying" (Stewart, 2004:185). He further criticises the notion of an oversimplified competitive exclusion model and the power it has gained in the field of paleoanthropology and archaeology, where many still believe that the making of stone tools was part of the human niche and only possible in one species at a time. Thus, two species of hominin is not believed to be able to exist in sympatry, even though this has been proven several times (*Homo habilis* with *Paranthropus boisei* in Kenya; *Homo erectus* with *Australopithicus* in East Turkana; and among other animal species in general) (Stewart, 2004:186). Stewart call it an ill conceived hypothesis with a strict ecological species concept at its heart, used both by multiregionalists and proponents of the 'out of Africa' model to argue that if two members of the genus *Homo* come into contact they will necessarily compete (Stewart, 2004:186).

Through systematic studies of zooarchaeological remains, tool-residue analyses, and collagen- and tooth research, our perception of Neandertals has been changed. They did not just scavenge and hunt big game; they were capable of exploiting a vide range of resources, a fact that seem plausible considering the vast geographical area that they inhabited over some 300 ky.

5.1.2 Technology

The stone tools constitute the biggest part of the archaeological record from the Middle and early Upper Paleolithic period. It is thus natural that many of the theories that deal with the nature of the 'transition' and behaviour are built on the technological record. The idea that tool technologies can provide valuable information about the people who made them is an old one.

But many archaeologists and anthropologists feel that it is about time to discuss the way concepts like *Mousterian* and *Aurignacian,* and similarly *archaic* and *modern* have become 'shorthand' for Neandertals and *Homo sapiens sapiens.* This growing criticism of the simplified classification-scheme has been parallel with the feeling that the Upper Paleolithic 'revolution' might not have been a revolution at all. One started to see serious problems with basing theories about the Middle to Upper Paleolithic transition on clear cut distinction between these two periods as a whole, because this cannot be readily recognised when considering the earliest Upper Paleolithic assemblages and their immediate Middle Paleolithic predecessors (Tostevin, 2000). The move to a greater emphasis on adaptation and, more recently, raw-material constraints, has greatly altered the way Palaeolithic archaeology has been done and how the past is interpreted (Foley and Lahr, 2003:117).

5.1.2.1 The significance of the Châtelperronian

When the Châtelperronian technology was finally established as a Neandertal technology (chapter 4) in 1979, the break between Mousterian and Aurignacian, Neandertals and *Homo sapiens sapiens* and Middle to Upper Paleolithic suddenly did not seem as clear anymore. Because it includes elements from both Mousterian and Aurignacian tool tradition, and occurs around the time of the shift from a Neandertal to a *Homo sapiens sapiens* population in Europe, the tradition has been labelled as *transitional*. Other tool-types from around Europe belonging to this period have been claimed transitional also, but

only Châtelperronian has been securely linked to the Neandertals. The dispute is now regarding whether this technology was a result of cultural contact between indigenous populations and the immigrating *Homo sapiens sapiens*, or if the Neandertals developed this technology on their own; thus it is down to a question of chronology.

Mellars (2000) has looked specifically at the Châtelperronian and early Aurignacian industries in France and Northern Spain and believes that the Châtelperronian industry was always predated by the Aurignacian in the region they were found and that these cultures overlapped for several thousand years in these areas. On this basis he believes that the Châtelperronian was made by Neandertals influenced by cultural contact with the neighbouring modern human populations; he does not believe that it was a separate invention by the Neandertals. He also argues that since the Aurignacian and Châtelperronian industries are clearly identifiable and at the same time sharply separated for several thousand years, it implies some fundamental barrier to communication and interbreeding between the two populations which prevented total assimilation and integration over this span of time. Other researchers (d'Errico and Goñi, 2003; Zilhão and d'Errico, 1999), however argue that the assumption that Aurignacian was in place in northern Spain from ca 40 kya is based on incorrect interpretation of stratigraphy, hence they argue that the chronology Mellars bases his argument on is wrong. They argue instead that wherever sample context is archaeologically secure, the occurrences of the Aurignacian technology in western Europe shows up no earlier than 35,5-37 kya, and that this new complex developed later than the Châtelperronian and possibly equivalent technocomplexes of central and eastern Europe.

Straus (2005) believes both Mellars and d'Errico to be wrong. He points out the complexity of the Châtelperronian chronology in Spain:

> "Neither the model of autonomous Neandertal Châtelperronian development of Zilhão and d'Errico nor the Aurignacian acculturation model of Mellars is unambiguously supported by the Cantabrian evidence. But there is considerable evidence of regional adaptive continuity, irrespective of which forms of humans may have been present in the area in late isotope stage 3" (Guy-Straus, 2005:150).

This complexity has also been noted by Cabrera *et al*. (2001), who in addition see marked continuity in zooarchaeological remains between late Middle and early Upper Paleolithic in this area.

By organising tools into technocomplexes such as Mousterian, Châtelperronian and Aurignacian and at the same time associate them with either Neandertals or *Homo sapiens sapiens*, it gives of an image of a stone technology which progresses neatly through time. However, as we see above this may not be entirely true. The technological 'shift' from Middle to Upper Paleolithic operate with different dynamics in different regions; for example, even though Châtelperronian stone tools presumably made by Neandertals appear in the North Iberian Peninsula, Neandertals in the South and West kept making Mousterian until what seems to be an abrupt shift to Aurignacian as late as 30 kya (Straus, 2005). Thus, a growing number of archaeologists find the phylogenetic and historical approach to be simplistic, and feel the adaptive and functional approaches to be more fruitful (chapter 3) (Foley and Lahr, 2003:110). This has the benefit of allowing different elements of technology to have their own private histories and be more regionally and chronologically specific. Thus, technology in general may not provide a single line of evidence and information, but separate ones relating to different evolutionary events - some to speciation, some to dispersal, some to behavioural grade shifts, some to cognition, and some to ecology (Foley and Lahr, 2003:117).

Coolidge and Wynn (2004) have attempted to develop a model of how Châtelperronian technology came about, based on long term working memory and the scenario that Neandertals and *Homo sapiens sapiens* overlapped in space and time the way Mellars has suggested. They believe the ultimate demise of the Neandertals may have resulted from something more than simply a slightly more efficient tool technology or hunting strategy on behalf of the *Homo sapiens sapiens*; they believe in a *cognitive* difference between these two populations. They suggest that Neandertals possessed working memory, but not to the same extent as that of the *Homo sapiens sapiens*. They explain how Neandertals acquired the blade technology from the Aurignacian by reconstructing the procedure based on examination of the finished products, a form of social learning termed *emulation*. Emulation is a form of observational learning in which the subject understands the goal but applies his or her own procedure for achieving it:

> "This scenario would not even require a direct interaction between Neandertals and modern humans. Neandertals might have surreptitiously observed modern humans in action or visited these production sites long after modern humans had left. Because they had expert cognition, Neandertals could have easily reconstructed the entire knapping technology from examination of the discarded cores and debitage. All of the perceptual cues would have been in place to allow them to "reverse engineer" the procedure" (Coolidge and Wynn, 2004:68).

Thus, Coolidge and Wynn suggest that even if Neandertals did not have *direct* contact with *Homo sapien sapiens,* they still could have copied their ideas. Several theories of development of brain functions have been proposed, but the debate over the timing of what is believed to be a mutation in the brain of *Homo sapiens* logically follows the same lines as the 'gradual vs. revolution' – debate of human behaviour. Such attempts to climb into the mind of Neandertals based on technological residues are speculative. But there is an increasing tendency to do so, because of the growing equivocal material evidence.

The issue of whether or not Châtelperronian was an independent invention is further complicated by problems with 14C-dating during the period in question. There is evidence of an irregularity in the 14C abundance in the atmosphere in the OIS3 which can cause temporal offsets of more than 6 ky to 10 ky between 50 kya to 30 kya (Conard and Bolus, 2003:356), a dating anomaly which will tend to exaggerate the period of coexistence between archaic and modern humans in Europe and underlines the need for independent chronological control of radiocarbon dates in this time range.

The bone tools of the Châtelperronian stratigraphic layer at Grotte du Renne (chapter 4) are almost unique in the Neandertal record. Whether this might stem from poor preservation at Middle Paleolithic sites is unclear, but due to the fairly extensive record within the Aurignacian technology already in the earlier Upper Paleolithic, it seems plausible that Neandertals at least did not take advantage of this raw-material to the same extent as the *Homo sapiens sapiens* did. But we do know they used wood as a material. Residue samples from tools and the discovery of six wooden spears found at the Lower Paleolithic site of Schöningen, Germany, dated to as early as ca. 400 kya, confirm this (d'Errico, 2003:193).

Thus, we see that the Châtelperronian industry and as I mentioned in the opening, possibly others, form a reason to believe that tool making and possibly tool-use was changing. We should be careful however to see these assemblage as a hybrid on its way to becoming Aurignacian. It seems to be firmly rooted in the Mousterian tradition, and may well be a

result of contact between Neandertals and *Homo sapiens sapiens.* Another important point is that even though Châtelperronian was found with Neandertals in France, it does not mean that Neandertals exclusively made them.

5.1.3 Summing up

In this first part of the chapter I have attempted to give an overview of the most abundant material found on Middle Paleolithic sites, and to demonstrate how the previous notion of a distinct break between the Middle and Upper Paleolithic is not valid on the basis of the present evidence. But from the increasing notion of some form of continuity, new questions arise. If there were no substantial differences in technological or subsistence abilities between Neandertals and *Homo sapiens sapiens*, why did the former disappear?

A different group of evidence which might give some answer in this respect is the evidence of symbolic behaviour. This includes religious beliefs, language and art – all elements of what is traditionally considered as the 'human condition'. Let us now move to part two.

5.2 The "controversial" evidence for Neandertal behaviour

This second part of the chapter is going to revolve around the issues which we long ago defined as unique within our own species; burials, language, and art – or; evidence of symbolic behaviour. Since these subjects are often seen as 'hallmarks' of modern behaviour, they have become essential to the debate over whether Neandertals were behaviourally inferior to *Homo sapiens sapiens.* The discussion also revolves around what can be *defined* as a burial or as a piece of art.

5.2.1 Neandertal burials – grave evidence?

The claimed burials at localities like La Chapelle-aux-Saints, La Ferassie, and Shanidar (chapter 4) have been criticised by many, especially by those who believe in a replacement of Neandertals by *Homo sapiens sapiens* from Africa. The fact that the majority of them were excavated many years ago, before the appearance of modern excavation- and dating methods, is often used against them. The last few years however, there has been a tendency to accept that the phenomenon of burial did occur among Neandertals, but the debate around what they *mean* is still raging. Was it simply a form of getting a decaying body out of the way, or were there complex rituals involved?

As one of the most eager proponents against Middle Paleolithic burials, and Middle Paleolithic symbolic behaviour in general, Gargett has established himself at the extreme end of the behavioural revolution - supporters. In two major articles (1989, 1999) he systematically goes through the records of claimed Middle Paleolithic burials, dismissing one by one as results of natural depositional- and taphonomic processes in caves. He looks specifically at the burial pits and the state of the skeletal remains and concludes that "the specimens fall roughly into two groups: (1) those that occur along with evidence for rockfall or tectonism, or both; (2) those that occur in low spots as I have defined them" (Gargett, 1999:80), 'low spots' meaning naturally formed grooves in the cave floor caused by erosional unconformity or fortuitous product of depositional circumstances. He believes a "new stratum is the key to discerning unequivocally that purposeful burial has occurred", implying the necessity of a new stratum on top of the filling of the grave (Gargett, 1999:33-34). He does not believe it to be a burial if the pit is covered with the same sediment as the rest of the cave; this instead suggests a natural fill.

This is one of his main arguments against the burial at La Chapelle-aux-Saints. Another one is that the cave is too small for anyone to be buried in, an argument which he contradicts by explaining the objects found in the grave-sediments as being remnants of living debris. I can agree that the artefacts seem a bit random, thus the evidence of depositions of grave goods is not so strong. But it seems odd that this old man died naturally in this pit and was allowed to lay there undisturbed, if people were living nearby. First of all, living next to a decaying body cannot be pleasant; and second, one would imagine that if people were living right next to a skeleton in a pit, this would have become considerably fragmented as a result of the surrounding activity and the gradual filling of the pit with their living debris the way Gargett has suggested. He also believes the 'pit' was made naturally, even though it was described by the excavators as being rectangular, straight walled and flat bottomed, which is highly unlikely to have happened in a karstic shelter (Frayer and Montet-White, 1989:180). It is just difficult to imagine that the old man of La Chapelle-aux-Saints could have been preserved in the way he was without anyone filling his grave rapidly after his death.

In the case of the Kebara 2 individual (KMH2), Gargett is again questioning the nature of the burial pit, and in this case he might be right in his assumptions that the pit has been

made naturally. It is visible in the stratigraphy (fig. 4.5) that pits like the one KMH2 was found in, have might have existed naturally in the cave floor both before and after this burial. But should this be an adequate reason to dismiss this material as a natural burial? On the contrary it seems logical to take advantages of natural depressions in the floor.

Although several researchers feel there is a need to focus on and find out more about how natural processes operate in caves (Riel-Salvatore and Clark, 2001; Pettitt, 2002), Gargetts attempts to explain *all* possible burials from the Middle Paleolithic as results of natural sircumstances has been met with some scepticism. He has been accused of being selective in his appliance of principles to burials, and several researchers point out that if the same criteria by which Gargett (1989, 1999) operates to dismiss Middle Paleolithic burials were to be applied to Upper Paleolithic or even historical societies, several would come of as not having any mortuary rites at all. It is also pointed out by d'Errico (2003) that animal skeletons are so rare in Near Eastern and European caves, as to make it "unlikely that interment were produced by causes other than cultural processes".

Riel-Salvatore and Clark (2001) take a somewhat different approach to the question of burials. First of all, they feel the need to concentrate on the *early* Upper Paleolithic material associated with Châtelperronian-, Aurignacian- or Gravettian technology confined from 40 kya to about 20 kya (32 alleged burials), and compare it to the Middle Paleolithic material associated with the Mousterian assemblage (45 alleged burials) (see appendix). They divided the burials into 'certain' and 'probable' by emphasising skeleton position, the presence of a pit or some kind of burial structure, and presence of objects intentionally deposited in the grave. They also looked for some kind of conformity within regional and temporary clusters, but found that both the Middle and Upper Paleolithic burials seemed to be "random accumulations of burials over long periods of time" with little indication of any formal cemeteries (Riel-Salvatore and Clark, 2001:458). They further note a higher occurrence of grave features with the Middle Paleolithic burials, such as mounds; but an increase in grave goods with the early Upper Paleolithic burials. They suggest however that this not necessarily indicates a behaviourally departure, but rather a continuity of Middle Paleolithic practises of grave features and inclusion of lithics and bones in a different form. Thus, they feel their result "reinforce those of studies of lithic and faunal assemblages" (Riel-Salvatore and Clark, 2001:460).

Even though their study and results are intriguing, some of the items they have interpreted as grave goods, especially for the Middle Paleolithic graves, could easily have been accidentally included in the graves. This makes it difficult to see the 'obvious' progression which they propose to this subject. But does the lack of grave goods or funerary markers mean that burials did not take place? This actually seems like a bizarre question to ask when we see the diversity of mortuary practices present today; many with no grave goods or grave markers at all. Thus, a lack of obvious grave goods cannot exclude the possibility of a burial. And the sheer magnitude of relatively complete skeletons found in some kind of pit, excavated or natural, should be enough to confirm the existence of the practice. The appearance of the grave goods could mean a change in social structure or as Pettitt (2002) suggests:

> "The placement of anthropogenic objects in grave cuts need not relate at all to this dialogue between the living and the dead body. Grave goods may or may not relate to metaphysical notions of an afterlife or bodily extension; they probably speak more of self-expression and concepts of ownership. It may well be that neither existed in Neanderthal societies" (Pettitt, 2002:18).

The next question follow naturally; is the act of burial itself necessarily proof of complex symbolic behaviour, such as beliefs and notions about afterlife, or simply a way of disposing a decaying body for fear of predators? This is of course an impossible question to answer since we do not yet understand their capabilities for reflective thought, but we do know there probably existed some emotional attachment between Neandertal individuals, as shown in the number of individuals who survived traumas that made them crippled much of their lives, such as Shanidar IV individual. Thus, a feeling of loss when a companion died was probably present, but whether this resulted in any kind of mortuary ritual and thoughts about afterlife is impossible to know.

What is interesting to note however, is the general unwillingness to acknowledge not only Middle Paleolithic burials, but Middle Paleolithic *Neandertal* burials specifically. "Within the group of Levantine Middle Paleolithic burials, the anatomically modern Quafzeh/Skhul hominids have been credited with some symbolic behaviour, e.g. intentional burial, whereas Neanderthal skeletons in comparable settings are not seen as reflecting mortuary practices" (Roebroeks and Corbey, 2001:69).

5.2.2 Language

Language is probably the most complicated issue in human evolution since "speech does not fossilise" (Holden, 1998:1455). As mentioned in chapter 4, the issue of a language *origin* was markedly absent from the general linguistic debate until fairly recent when the hyoid at Kebara Cave was found and evolutionary theories were re-introduction into the field of linguistics. Since then it has again become a hotly debated issue among linguists, archaeologists and paleoanthropologists alike.

From this has sprung a new trend in linguistic studies enabled by modern technology, which involves a 'breakdown' of the evolution of language into many small episodes of change instead of the search for one 'sudden' point of origin, since this probably never happened (Holden, 2004:1316). One example of this new trend is the identification of the FOXP2 gene made by a team of researchers in Britain in 2002. They found that the FOXP2 gene have the power to affect language ability and speech and thus contain clues to how language evolved, which subsequent led to a study of the gene in great apes, monkeys, mice and humans. The study showed that two changes had occurred in this gene in the human lineage quite recently, about 200 kya that might have made it possible to produce the facial expressions and tong movements necessary for articulating clear speech. But the researcher's stress that this is just *a* gene which effects language, and that there are probably many more still not discovered.

Many are also looking to the field of paleolithic archaeology for answers. The belief that the degree of complexity of tool technology may be used as a marker for the level of cognitive ability is an old one. But it has proven difficult to extrapolate the need for a sophisticated system of communication from tool technology alone. One reason is that the ability to manufacture complex tools can be learned from observation and imitation without explicit tutoring requiring the use of language; one of the basic claims for the acculturation-hypothesis for the appearance of the Châtelperronian complex. Thus the search for a point in which language was needed is ongoing. When taking the archaeological record of symbolic behaviour into account (possible burials and artistic expressions), many believe that unequivocally fluent language was in place at least by 50 kya. If the claims for traces of humans in Australia from about 60 kya is right, this strongly suggests that language was fully operational already by then; sea faring requiring a greater

reliance on linguistic communication. Complex hunting strategies is another issue where language probably was crucial.

But the sea-farers of Australia were *Homo sapiens sapiens*, and hunting strategies from the Middle Paleolithic are only scarcely known, thus the question of Neandertal language capabilities are still unknown. Even with the hyoid bone from Kebara Cave (chapter 4), we know that modern speech depends on several other anatomical components, such as the position of the tongue, breathing and a unique organisation of the vocal tract, for being able to produce the sounds we utter today. Looking at the linguistic issue from an anatomical perspective, Holden (2004) believes that speech of some sort has been around for a long time before the Upper Paleolithic:

> "(…) for actually producing the sounds of words, or phonemes, skeletal studies reveal that by about 300,000 years ago, our ancestors had become more or less "modern" anatomically, and they possessed a larynx located at the top of the trachea, lower than in other primates. This (…) increase the sounds humans can make, [but] makes it easier for food going down (…) to be misdirected into the windpipe, leaving us more vulnerable (…) to choking" (Holden, 2004:1316).

Holden's point is that this higher risk of choking would not have been there for any reason. This is of course a risky argument since there are several things about the body which does not seem to have any obvious reason for existing, or being constructed in the way it is; the appendix being the most widely known example.

Following the argument of the 'punctuated equilibrium' on the other hand (chapter 3), the capacity of language can be seen as something which suddenly appeared. Thus, because of the great uncertainties around the evolution of language in hominids, it is perhaps the most probable; but also the most hotly debated argument for how the *Homo sapiens sapiens* might have gained an upper hand, or rather – an Upper Paleolithic on the Neandertals.

5.2.3 Art and symbolism

This constitutes one of the continuing debates about the issue of the appearance of 'modern' behaviour. When did art first appear? And what can qualify as art? The latter is actually at the core of the debate. External memory devices demonstrate the emergence of a 'cognitive fluid mind' able to develop powerful metaphors and analogies which form the

basis of modern scientific thought (d'Errico *et al*., 2003:32). So, when was the first appearance of art? The answer to this depends on the eyes that see. A 250 ky old 3,5 cm small volcanic rock from Golan Heights in the Middle East have been claimed to fall in this category (Appenzeller, 1998:1452). Its natural lines seem to have been deepened to make it look like a woman-figurine, before it got buried by a volcanic eruption. But who this piece can be accredited to is unsure and many would not even see this as art; rather as "doodling" as Mellars suggests for all decorated pieces predating 40ky (Appenzeller, 1998:1452).

How art came about is very difficult to explain though. Klein believes something happened in the brains of the *Homo sapiens sapiens* population of Africa about 50 kya which triggered the ability to create art; while others do not believe this 'sudden' explosion of art has anything to do with biology, but rather that it was an invention, like agriculture, perhaps spurred by social changes adapting to a changing environment (Appenzeller, 1998:1452-1453).

The material from Grotte du Renne (chapter 4) is inevitably mentioned whenever the topic of art is raised in the discussion around Neandertal behaviour. This because it yielded such a large assemblage of artefacts usually only associated with the Upper Paleolithic. It contained several grooved animal teeth and bone. But this is about the only clear evidence we have of anything called art among Neandertals. Thus, Mellars believe this is another result of acculturation, such as with the Châtelperronian assemblage. Many are willing to accept Mellars arguments for timing in relation to the arrival *Homo sapiens sapiens,* but does not believe these artefacts to be direct imitations of what the newcomers made. They emphasise that the Neandertals at Arcy-sur-Cure chose different kinds of animal teeth and used different techniques to work them, in this way drawing inspiration from their neighbours rather than simply mimicking them (Appenzeller, 1998:1454). If it indeed was a completely separate invention, is hard to establish.

5.2.4 Summing up

It is striking how after the appearance of what Speth (2004) call the 'meat and potato' of artistic and symbolic expression in the Upper Paleolithic, almost *anything* that has been slightly altered by human hands can be interpreted as having a higher meaning without

very much protest. While rocks and bone modified with lines and carvings, or proposed burials without definite signs of grave goods (such as ochre, beads etc. typical for the Upper Paleolithic) belonging to the Middle Paleolithic, are received with great scepticism. These are examples of the kind of 'double-standards' which we see people operating with when handling material according to preconceptions about the Middle and Upper Paleolithic transition.

Why, how and when symbolic acts occur remains unsolved. It often comes down to personal believes and interpretations. It has been suggested on several accounts that the capacity for art did somehow lie within our lineage for a long time, but was only occasionally expressed before the beginning of the Upper Paleolithic. Burials on the other hand, seem to have happened on a number of occasions, their meaning is a different issue.

In general, the subject of art and symbolism among Neandertals is especially tricky; first, there are hardly any clues to follow; second, because the material is open to so many interpretations; third, we have to remember that many forms of symbolic behaviour and acts can be carried out without being dug up in the future. Thus, symbolism does not only always have to have manifest itself in objects.

5.3 Two Decades of mythbusting

Klein is one of the most eager opponents against any kind of manifestation of modern behaviour until it evolved in *Homo sapiens sapiens* 50-40 kya; "prior to that time, geographically far-flung populations progressively anticipated living people in their behaviour, but they remained uniformly nonmodern in many important, detectable respects, including their relative unstandardized (informal) artefacts, the remarkable uniformity of their artefacts assemblages through time and space, their failure to produce unequivocal art or ornaments, the simplicity of their burials, their failure to build structures that retain archaeological visibility, and their relative limited ability to hunt and gather" (Klein, 2000:17). This statement contains virtually all the prejudices possible to have against the Middle Paleolithic material. What is this 'modern' everyone seems to be looking for? If the typical Upper Paleolithic material is evident in the Middle Paleolithic as we have seen above, but in an 'informal' way does that mean its complexity was not yet developed? Burials, but with no meaning; art, but just doodling – they make it seem as if

the Middle Paleolithic was a hotbed for 'unfinished' modern behaviour which ultimately came to be complicated in the brains of *Homo sapiens sapiens,* creating a behaviour we recognise today. This view goes hand in hand with the classic notion of the Paleolithic as moving from the simple to the complex: "… the traits used to identify behavioural modernity are no more than a list of the major archaeological features that characterize the Upper Paleolithic in Europe" (d'Ericco, 2003:199), thus the Middle Paleolithic assemblage is not seen as anything more than simply an origin for this.

It is increasingly recognised that the supposed Upper Paleolithic 'revolution' seems to be greatly exaggerated; and that there was no Upper Paleolithic 'package'. This does not mean however, that there is any clear substantial evidence to claim that Neandertals evolved into modern humans or that they were behaviourally similar to them; they did after all disappear. But we need to stop comparing them to these Upper Paleolithic standards, because their standards might have been very different. The biggest problem is that there is no consensus among the different 'sub-fields' that I have described in this chapter, to what actually constitutes 'modern behaviour', and no unity within them about when this might have happened. This makes it hopeless to try and find the yardstick in ones own field and expect it to simply be transformable into the others. This is what has happened with the technological and paleontological perspective, as Stiner (1993) so rightfully points out:

> "Zooarchaeologists who study the Paleolithic periods have worked long and hard under the yoke of tool-based and human paleontological chronologies (…) By focusing on the places where, and times when, we expect to find sudden change or points of origin, we deny ourselves the opportunity to witness contradictions – and contradictions do exist" (Stiner, 1993:75).

There is no *a priori* reason for why, first of all, these should follow eachother; second, why all the other material from the Middle Paleolithic should fall neatly along these lines which they have created for themselves. I do not think that the so-called 'doodling' from the Middle Paleolithic or the almost 100 ky old burials from the Levant should be denounced as behavioural coincidences.

As a consequence of this growing body of data and new ways of analysing them, the behavioural gap between Neandertals and *Homo sapiens sapiens,* or Middle to Upper Paleolithic seems to be closing. As a result it has become increasingly complicated to

reconstruct scenarios of Neandertal extinction. The ones proposed however, tend to put larger emphasis on outside forces, such as climate, insufficient amount of recourses, competition etc, than necessarily to the old idea of cognitive differences. It is no longer sufficient to simply assume a cognitive gap between Neandertals and *Homo sapiens sapiens*.

Chapter 6

JUST DYING TO BECOME *HOMO SAPIENS SAPIENS*?

During the course of this thesis I might have given of the impression that I believe Neandertals to have exhibited the same behavioural characteristics that people of the Upper Paleolithic came to express. This was not my intention; the intention was to shed some light on the complexity of the material from Europe during the 'transitional' phase, and from this discover the answer to the questions I posed in the introduction to this thesis, to find out what constitutes the *actual* difference between Neandertals and *Homo sapiens sapiens* during the transitional phase and by this hopefully shed some light onto why they disappeared. What I have increasingly come to understand is that the difference lays not so much in the material evidence itself as in how it is interpreted.

During the first part of the thesis I highlighted two of the big 'scandals' of Paleoanthropological research, the Piltdown-incident and Boule's La Chapelle-aux-Saints reconstruction. This I did to illustrate how the understanding of evolutionary processes and preconceptions one have can potential inflict on the work. These were of course extreme examples and new generation of researchers learned from those mistakes. But I believe some difficult preconceptions are still operative today, such as the sharp contrast made between the 'archaic' and 'modern', Middle and Upper Paleolithic, nature and nurture and ultimately Neandertal and *Homo sapiens sapiens*. This has often lead to a sort of 'double-standard' where the material from each side of these gaps is being interpreted in a different manner, such as we have seen in terms of the act of burial. Gargett's (1989, 1999) attempts to denounce all known burials from the Middle Paleolithic is a good example of this. If his principles were to be applied to the Upper Paleolithic burials of France and Italy, burials which he does not have any problems recognising, then 22 out of 28 of them would not be classified as burials at all (Roebroeks and Corbey, 2001:68).

Another problem is that conclusions about a whole body of material are often reached on the basis of only one component of this material, with the most obvious example being technology. Because Middle Paleolithic technology has been perceived as rather uniform compared to that of the Upper Paleolithic, it reflected on the whole Middle Paleolithic society as being one of little capacity for change. This notion had to be re-thought with the

recognition of such assemblages as the Châtelperronian belonging to the Neandertals. This 'trend' of deducing from one component of the assemblage to the whole, I think stems from the way many scholars imagine the arrival of the 'human condition' as some sort of package. McBrearty and Brooks (2000) who believe this 'modern condition' in *Homo sapiens sapiens* is the result of a long and varied process of ecology, population growth and changes in social relationships in Africa, point out that "by stressing human uniqueness, proponents of the 'human revolution' effectively remove the origin of H. sapiens from the realm of normal scientific inquiry". This 'package' of behaviour one imagined emerged with the 'revolution' is often termed 'modern', a term which has come to contain 'nurture', Upper Paleolithic, and *Homo sapiens sapiens* all in one.

The term 'modern' is used in rather confusing ways. First of all, it is used in the term to describe anatomical form in *anatomically modern humans* (AMH), described in chapter 2 as referring to the group of *Homo sapiens sapiens* emerging from archaic *Homo sapiens* about 130 kya in Africa, *archaic* being the opposite of *modern.* Anatomically modern human is "the only taxon everybody currently agrees upon as being in some sense essentially human" (Cartmill, 2001:104), but as Cartmill (2001) points out, "it is simply a scientific-sounding way of evading the fact that there is no agreement on the list and distribution of the defining autamorphies of the human species". Second, it is used about the behavioural package. But after it was realised that *Homo sapiens sapiens* and Neandertals stratigraphically overlapped eachother in the Levant for thousands of years after 100 kya, using the same technology and following the same subsistence patterns, the issue of behavioural modernity had to be re-evaluated. Thus, it has been suggested that this is a classic case of 'form preceding function', which the supporters of the punctuated equilibrium model have proposed as an explanation for the appearance of the modern body form (chapter 3), opening up to the possibility that behavioural modernity came later than modern anatomy, but at the same time 'locking' it within the *Homo sapiens sapiens*.

In such a way the term 'modern', whether used in the context of behaviour or biology, indirectly enhances the idea of Neandertals as the separate species *Homo neanderthalensis* and thus strongly supporting the Out of Africa Model - a model that has been challenged by Duarte *et al*'s discovery in Portugal in 1998 (see chapter 4). In the course of this I suggest that the terms 'modern' and 'archaic' in the way they are used today, have gained a

'mythic' status and should be abandoned or at least re-evaluated, so that people realise the biases of these terms. We need to realise how such simple terms can affect and influence an argument, especially when they get established in the way they have been in human evolutionary studies. 'Modern' started out as a tool for simple categorising of derived morphological traits within *Homo sapiens sapiens* and ended up loaded with meanings affecting everyone who did not have these characters.

As it is increasingly realised that the archaeological material does not reflect such a progressionist shift from simple to complex, discussions around such fixed terms with mythical status are sure to continue. As a consequence of this realisation, lately a growing emphasis has been placed on local patterns and the way the nature of the transition operated differently in different regions. In this way, we can see a sort of return to the historical approach of the first half of the pre-WWII period, but with an increasingly ecological and social approach to explain changes.

New approaches are being tried in an effort at getting rid of the 'top-down' perspective (Gamble and Gittins, 2004; Roebroeks and Corbey, 2001), meaning an approach where the adaptive system or band comes first and only then the individuals (Gamble and Gittins, 2001:103). Gamble and Gittins (2004) argue that "the task of social archaeology [is to move] away from defining institutions, for example, Band society, and their relative condition as measured by the degree of complexity they exhibit [and instead find out] how individuals are constituted through their bodies, culture, self, and personhood, because these issues relate to the creation of society through interaction". Thus a bottom–up approach suggests observing and documenting what Paleolithic people actually did and how their behaviour changed over time, not just whether or not they where 'modern' in our definition of the word. In this way the focus is also allowed to change from a 'universal' to a 'regional' perspective, and we might eventually understand some of the various processes occurring in the Paleolithic transition apparently leading to us being here and Neandertals not.

Then, finally I am going to answer the question which started this whole thesis: Which difference constitutes the *actual* difference between Neandertals and *Homo sapiens sapiens*? Here I run the risk of ending up doing exactly what I have been criticising

throughout my thesis; seeking differences which seem to be more in our minds than in the archaeological record. I have proposed that the break between the Middle and the Upper Paleolithic records has been grossly overstated, and tried to illustrate how interpretations of old and new data the last two decades have unveiled continuities and breaks in a complex regional pattern, urging for a new way of interpreting material by understanding the societies from within. The study of our biological origin might also benefit from being more open to regional interpretations, since Neandertals still have not been sufficiently excluded from our species – or vice versa - on the account of genetics. The child from Lagar Velho might be a testimony to this. Thus, my answer to the question is that there are no apparent answers at the present time that can go beyond morphological descriptions.

The Neandertals have long been victims of our search for origins; they have been living in the shadow of 'man'. Now it is about time we pull them out into the light and let them have a history of their own and maybe in the end we will gain some new perspectives on our history as well.

APPENDIX 1: Possible and confirmed burials, Middle Paleolithic

TABLE 1
Middle Paleolithic Mortuary Data

Burial	Status	Sex[a]	Age	Age–Class	Pathology[b]	Physical Type[c]	Body Position[d]	Orientation[e]	Features[f]	Grave Goods
La Chapelle-aux-Saints	Certain	M	±50	41–50	N	Ne	D/C	W–E	P	Bones, lithics?, nearby pits (lithics, bone shards)
Le Moustier 1	Probable	M	Young adult	16–30?	N	Ne	R/F?	?	–	Bone shard + lithic "pillow"
Le Moustier 2	Probable	J	Child	2–10	N	Ne	?	?	P	Lithics?, nearby pits (lithics, bone shards)
La Ferrassie 1	Certain	M	40–45	41–50	N	Ne	D/F	W–E	P	Bone shards, rocks
La Ferrassie 2	Certain	F	25–30	16–30	N	Ne	R/C	E–W	P	–
La Ferrassie 3	Certain	J	±10	2–10	N	Ne	?	?	P	Lithics, nearby pits (lithics, bone shards)
La Ferrassie 4a*	Certain	J	Foetus	Foetus	N	Ne	?	?	P	Lithics, rock over grave
La Ferrassie 4b*	Certain	J	1 mo.	0–1	N	Ne	?	?	P	Lithics, rock over grave, three nearby pits
La Ferrassie 5	Certain	J	Foetus	Foetus	N	Ne	?	?	P/M	Lithics
La Ferrassie 6	Certain	J	±3	2–10	N	Ne	?	E–W	P	Lithics, rock over grave
La Ferrassie 8	Probable	J	±2	2–10	N	Ne	?	?	–	–
La Quina	Certain	F	?	16–30	Y	Ne	R/?	?	–	Spheroid, bone shards, sediment covering?
Le Régourdou	Certain	?	?	31–40	N	Ne	L/C	W–E	P/M/H	Lithics, bear bones, rock over skeleton
Le Roc-de-Marsal	Certain	J	±3	2–10	N	Ne	L/F?	N–S	P	Sandstones, bone shard "pillow," antlers, sediment covering?
Spy 1	Certain	M	?	31–40	N	Ne	?	E–W	–	–
Spy 2	Probable	F	?	16–30	N	Ne	?	?	–	–
Tabūn	Certain	F	±30	16–30	N	Ne	D/F	W–E	P	–
Skhūl 1	Certain	J	Child	2–10	Y	AMH	K	?	P	–
Skhūl 4	Certain	M	40–50	41–50	N	AMH	R/C	SE–NW	P	Lithics?
Skhūl 5	Certain	M	30–40	31–40	N	AMH	D/C	W–E	P	Boar mandible
Skhūl 6	Probable	M	?	31–40	N	AMH	?	?	–	–
Skhūl 7	Certain	F	±35	31–40	N	AMH	R/C	?	–	–
Skhūl 9	Probable	M	?	41–50	Y	AMH	?	?	–	–
Qafzeh 3	Certain	F	?	41–50	N	AMH	L/E?	?	–	–
Qafzeh 8	Certain	M	Adult	31–40	N	AMH	R/F	E–W	P	Lithics?, ochre, stones over skeleton, double grave
Qafzeh 9*	Certain	F	Young adult	16–30	Y	AMH	L/F	N–S	P	–
Qafzeh 10*	Certain	J	±6	2–10	N	AMH	L/C	E–W	P	–
Qafzeh 11	Certain	J	13–14	11–15	N	AMH	D/C	N–S	P	Ochre?, bone shards, trophies, rocks over skeleton
Qafzeh 15	Probable	J	8–10	2–10	N	AMH	?	?	P	–
Shanidar 1	Certain	M	30–40	31–40	Y	Ne	D/?	W–E	P/M	Sediment covering?
Shanidar 2	Probable	M	20–30	16–30	N	Ne	?	?	M/H	Lithics?
Shanidar 3	Certain	M	40+	41–50	Y	Ne	R/?	E–W	P/M	–
Shanidar 4	Certain	M	30–40	31–40	N	Ne	L/C	SE–NW	P/M	Flowers, sediment covering?
Shanidar 5	Certain	M	40+	41–50	Y	Ne	?/C	?	M/H	Large mammal bones?
Shanidar 7	Certain	J	9 mos.	0–1	N	Ne	R/C	N–S	H	–
Amud 1	Certain	M	Adult	16–30	N	Ne	R/C	N–S	–	–
Amud 7	Certain	J	10 mos.	0–1	N	Ne	R/E	NW–SE	P	Red deer maxilla on pelvis
Kebara 1	Probable	J	7 mos.	0–1	N	Ne	?	?	–	–
Kebara 2	Certain	M	Adult	16–30	N	Ne	D/?	E–W	P/H	–
Dederiyeh 1	Certain	J	1–3	2–10	N	Ne	D/E	S–N	P	Limestone slab over head, triangular flint flake over heart
Taramsa 1	Certain	J	8–10	2–10	N	AMH	S/C	E–W	P/M	–

TABLE 1
(*Continued*)

Burial	Status	Sex[a]	Age	Age–Class	Pathology[b]	Physical Type[c]	Body Position[d]	Orientation[e]	Features[f]	Grave Goods
Kiik-Koba 12	Probable	M	Adult	31–40	N	Ne	?	?	P	–
Kiik-Koba 2	Probable	J	±1	0–1	N	Ne	?	?	P	–
Teshik-Tash	Certain	J	8–10	2–10	N	Ne	?	?	P	Circle of goat horns
Staroselje	Probable	J	±2	2–10	Y	Ne	D/E	W–E	P	–

*Multiple burial.
[a]M, male; F, female; J, juvenile (impossible to determine sex).
[b]Y, present (injury, disease, malformation); N, absent.
[c]Ne, Neanderthal; AMH, anatomically modern human.
[d]D, dorsal; L, lying on left side; R, lying on right side; V, ventral; F, flexed; C, contracted; K, "kneeling"; E, extended (based on head-feet axis); S, "seated."
[e]W, west; E, east; N, north; S, south; SE, southeast; NW, northwest.
[f]P, pit (visible or deduced); M, mound; H, hearth.

APPENDIX 2: Possible and confirmed burials, Upper Paleolithic

TABLE 2
Early Upper Paleolithic Mortuary Data

Burial	Status	Sex[a]	Age	Age–Class	Pathology[b]	Physical Type[c]	Body Position[d]	Orientation[e]	Features[f]	Grave Goods
Balzo della Torre I	Certain	M	25–30	16–30	N	AMH	D/E	NW–SE	–	Headdress, necklace, bracelet, armband, ochre cover, bone point, ochred split bear canine, animal hide?
Balzo della Torre II	Certain	M	Adult	16–30	N	AMH	D/E	NW–SE	H	Necklace, armband, "kneecap," flat unifacial blade, ochred flint pebble
Balzo della Torre III	Certain	J	15	11–15	N	AMH	V/E	NW–SE	–	–
Grotta del Caviglione I	Certain	M	Adult	16–30	N	AMH	L/F	N–S	S, H	Headdress, "kneecap," ochre cover, 2 blades, ochre-filled "canal," animal hide?
Grotta dei Fanciulli I*	Certain	M	Young adult/17	16–30	N	AMH	R/C	?	P, S	Ochre cover (thick on skull), blade, "headdress"
Grotta dei Fanciulli II*	Certain	F	Older adult/40	31–40	N	AMH	R/C	?	P	Ochred bracelets, 2 scrapers, 2 serpentine pebbles on forehead
Paglicci II	Certain	M	Teen/13	11–15	N	AMH	D/E	SW–NE	S	Headdress, necklace, bracelet, "anklet", ochre cover (thick on head), many "good" lithics
Paglicci III	Certain	F	18–20	16–30	N	AMH	D/E	S–N	P	Two diverse fill types, ochre cover (thick on head) and bed, chunks of ochred stone over grave, lithics, "diadem"
Veneri Parabitta I*	Certain	M	>25	16–30?	N	AMH	F/L	?	P	–
Veneri Parabitta II*	Certain	F	>25	16–30?	N	AMH	D/E	?	P	Ochred pebble, headdress, ochre over head
Agnano	Certain	F	±20	16–30	N	AMH	?/C	?	–	Ochre, headdress, bracelet
Dolní Věstonice III	Certain	F	38–42	30–40	N	AMH	R/F	?	P	Ochre, 2 incised mammoth shoulder blades as cover, 10 fox canines
Dolní Věstonice XIII*	Certain	M	17–23	16–30	N	AMH	D/E	S–N	P	Ochre on head, mammoth ivory stake through pelvis, "diadem," mammoth ivory pendant
Dolní Věstonice XIV*	Certain	M	17–23	16–30	N	AMH	V/E	S–N	P	Ochre on head, "diadem"
Dolní Věstonice XV*	Certain	F?	17–23	16–30	Y	AMH	D/E	S–N	P	Ochre on head and between thighs, "diadem," piece of deer or horse rib in mouth
Dolní Věstonice XVI	Certain	M	40–50	41–50	Y	AMH	R/F	E–W	P, H	Ochre on head, chest and pelvis, 4 pierced canines, belt?
Pavlov I	Certain	M	40–50	41–50	N	AMH	?/C	?	P	Incised mammoth shoulder blade as cover

TABLE 2
(*Continued*)

Burial	Status	Sex[a]	Age	Age–Class	Pathology[b]	Physical Type[c]	Body Position[d]	Orientation[e]	Features[f]	Grave Goods
Brno II	Probable	M	Middle-aged	31–40	N	AMH	?	?	P	Ochre, necklace, bone/ivory discs and rings, various bone/stone tools
Brno III	Probable	F	Middle-aged	31–40	N	AMH	R/C	?	–	Ochre
Předmostí 22	Probable	J	9–10	2–10	N	AMH	?	?	–	Hare teeth on forehead
Předmostí 27	Probable	?	Adult	?	N	AMH	D/E	?	–	Traces of defleshing
Předmostí 1–18	Certain	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	P	Multiple grave (different times)
Sungir 2	Certain	M	55–65	50+	N	AMH	D/E	NE–SW	P	Headdress, lithics, necklace, bracelets, armbands, "suit"
Sungir 3*	Certain	J	7–9	2–10	N	AMH	D/E	SW–NE	P	Ochre bed, medium mammoth tusk spear, 8 javelins, 2 knives, disc near right temple, beaded clothes, headdress, bracelets, pins, rings, 2 bone ornaments on chest, 2 "bâtons de commandement"
Sungir 4*	Certain	J	12–13	11–15	N	AMH	D/E	NE–SW	P	Ochre bed, long mammoth task spear, 3 javelins, 1 knife, disc near right temple, beaded clothes, headdress, bracelets, pins, rings
Combe Capelle	Certain	?	Adult	?	N	AMH	D/E	N–S	P	Pierced shells, tooth on right wrist
Les Cottés	Probable	M?	50–60	50+	Y	AMH	?	?	–	–
Saint-Césaire	Probable	M	Adult	–	N	Ne	SB?	?	–	–
Cro-Magnon 1*	Probable	M	50+	50+	N	AMH	?	?	–	Shells? Pendant?
Cro-Magnon 2*	Probable	F	20–30	16–30	Y	AMH	?	?	–	Shells?
Cro-Magnon 3*	Probable	M	30–40	31–40	N	AMH	?	?	–	Shells?
Cro-Magnon 5*	Probable	I	1 mo.	0–1	N	AMH	?	?	–	Shells?
Lagar Velho 1	Certain	J	±3	2–10	N	Hybrid	D/E	E–W	P, H	Ochre, wrap, stones and red deer bones lining, single pierced shell

*Multiple burial.
[a]M, male; F, female; J, juvenile (impossible to determine sex).
[b]Y, present (injury, disease, malformation); N, absent.
[c]Ne, Neanderthal; AMH, anatomically modern human.
[d]D, dorsal; L, lying on left side; R, lying on right side; V, ventral; F, flexed; C, contracted; K, "kneeling"; E, extended (based on head-feet axis); S, "seated."
[e]W, west; E, east; N, north; S, south; SE, southeast; NW, northwest.
[f]P, pit (visible or deduced); M, mound; H, hearth.

REFERENCE LIST

Appenzeller, Tim. 1998. Art: Evolution or Revolution? In: *Science* 282:1451-1454

Bar-Yosef, Ofer. 2002. The Upper Paleolithic Revolution. In: *Annual Review of Anthropology* 31:363–393.

Bar-Yosef, O.; Vandermeersch, B.; Arensburg, B.; Belfer-Cohen, A.; Goldberg, P.; Laville, H.; Meignen, L.; Rak, Y.; Speth, J. D.; Tchernov, E.; Tillier, A-M.; and Weiner, S. 1992. The Excavations in Kebara Cave, Mt. Carmel. In: *Current Anthropology* 33 (5):497-550.

Barton, Nick. 2000. Mousterian Hearths and Shellfish: Late Neanderthal Activities on Gibraltar. In: *Neanderthals on the Edge*. Stringer, Christopher; Barton, Nick; and Finlayson, Clive (eds.). Oxbow Books, Oxford.

Berger, Thomas D.and Trinkaus, Erik. 1995. Patterns of Trauma Among the Neandertals. In: *Journal of Archaeological Science* 22:841-852.

Boyd, Robert and Silk, Joan B. 1997. *How Humans Evolved*. Norton and Company, Inc. London.

Brantingham, J. T.; Kuhn, S. L.; and Kerry K. W. 2004. On the Difficulty of the Middle-Upper Paleolithic Transitions. In: *The Early Upper Paleolithic Beyond Western Europe.* Brantingham, P. Jeffrey; Kuhn, Steven L.; Kerry, Kristopher W. (eds.). University of California Press.

Brose, David S. and Wolpoff, Milford H. 1971. Early Upper Paleolithic Man and Late Middle Paleolithic Tools. In: *American Anthropologist* 73:1156-1194.

Burke, Ariane. 2000. Preface: Hunting in the Middle Paleolithic. In: *International Journal of Osteoarchaeology* 10: 281-285.

Burke, Ariane. 2004. The Ecology of Neanderthals: Preface. In: *International Journal of Osteoarchaeology* 14:155-161.

Cabrera, Victoria; Pike-Tay, Anne; Lloret, Mercedes; and deQuiros, Federico Bernaldo. 2000. In: *Neanderthals on the Edge.* Stringer, Christopher; Barton, Nick; and Finlayson, Clive (eds.). Oxbow Books, Oxford.

Churchill, Steven E. and Smith, Fred H. 2000. Makers of the Early Aurignacian of Europe. In: *Yearbook of Physical Anthropology* 48:61-115

Conard, Nicholas J.; Bolus, Michael. 2003. Radiocarbon Dating the Appearance of Modern Humans and Timing of Cultural Innovations in Europe: New Results and New Challenges. In: *Journal of Human Evolution* 44:331–371.

Conroy, Glenn C. 1997. *Reconstructing Human Origins: A Modern Synthesis*. W.W. Norton & Company, New York.

Coolidge, Frederick L.; Wynn, Thomas. 2004. A Cognitive and Neuropsychological Perspective on the Châtelperronian. In: *Journal of Anthropological Research* 60:55-73.

Davies, William; Stwart, John and van Andel, Tjeerd H. 2000. Neandertal Landscapes – A Preview. In: *Neanderthals on the Edge.* Stringer, Christopher; Barton, Nick; and Finlayson, Clive (eds.). Oxbow Books, Oxford.

D'Errico, Francisco. 2003. The Invisible Frontier. A Multiple Species Model for the Origin of Behavioral Modernity. In: *Evolutionary Anthropology* 12:188–202.

D'Errico, Francesco and Goñi, María Fernanda Sánchez. 2003. Neandertal Extinction and the Millennial Scale Climatic Variability of OIS3. In: *Quaternary Science Reviews* 22:769-788.

D'Errico, Francesco; Zilhao, Joao; Julien, Michele; Baffier, Dominique; and Pelegrin, Jacques. 1998. Neanderthal Acculturation in Western Europe?: A Critical Review of the Evidence and its Interpretation. In: *Current Anthropology* 39 (supplement):s1-s44.

Drucker, D. and Bocherens, H. 2004. Carbon and Nitrogen Stable Isotopes as Tracers of Change in Diet Breadth during Middle and Upper Palaeolithic in Europe. In: *International Journal of Osteoarchaeology* 14:162–177.

Duarte, Cidália; Maurício, João; Pettitt, Paul B.; Souto, Pedro; Trinkaus, Erik; van der Plicht, Hans; and Zilhão, João. 1999. The Early Upper Paleolithic Human Skeleton from the Abrigo do Lagar Velho (Portugal) and Modern Human Emergence in Iberia. In: *Proceedings of the National Academy of Science of the United States of America* 96:7604-7609.

Eswaran, Vinayak. 2002. A Diffusion Wave out of Africa: The Mechanism of Modern Revolution? In: *Current Anthropology* 43 (5):749-775.

Finlayson, Clive. 2004. *Neanderthals and Modern Humans: An Ecological and Evolutionary Perspective*. Cambridge University Press, Cambridge.

Foley, Robert and Lahr, Marta Mirazón. 2003. On Stony Ground: Lithic Technology, Human Evolution, and the Emergence of Culture. In: *Evolutionary Anthropology* 12:109-122.

Frayer, David W. and Montet-White, Anta. 1989. Comment to Gargett. In: *Current Anthropology* 30 (2):180-181.

Gamble, Clive. 1998. Paleolithic Society and the Release from Proximity: A Network Approach to Intimate Relations. In: *World Archaeology* 29:426-449.

Gamble, Clive and Gittins, Erica. 2004. Social Archaeology and Origins Research: A Paleolithic Perspective. In: *A Companion to Social Archaeology*. Meskell, Lynn and Preucel, Robert W. (eds.). Blackwell Publishing, Oxford.

Gargett, Robert H. 1989. Grave Shortcomings: The Evidence for Neandertal Burial. In: *Current Anthropology* 30 (2):157-190.

Gargett, Robert H. 1999. Middle Palaeolithic burial is not a dead issue: the view from Qafzeh, Saint-Césaire, Kebara, Amud, and Dederiyeh. In: *Journal of Human Evolution* 37:27-90.

Gosden, Chris. 1999. *Anthropology and Archaeology: A Changing Relationship*. Routledge, London.

Hofreiter, Michael; Serre, David; Poinar, Hendrik N.; Kuch, Melanie; and Pääbo, Svante. 2001. Ancient DNA. In: *Nature Reviews* 2:353-359.

Holden, Constance. 1998. No Last Word on Language Origins. In: *Science* 282:1455-1458.

Holden, Constance. 2004. The Origin of Speech. In: *Science* 303:1316-1319.

Johnson, Donald and Edgar, Blake, 2001. *From Lucy to Language.* Cassell Paperbacks, London.

Klein, Richard G. 2000. Archaeology and the Evolution of Human Behaviour. In: *Evolutionary Anthropology* 9:17-36.

Leroi-Gourhan, Arlette. 1975. The Flowers Found with Shanidar IV, a Neanderthal Burial in Iraq. In: *Science* 190:562-564.

Lewin, Roger and Foley, Robert A. 2004. *Principles of Human Evolution*. Blackwell Publishing, Oxford.

Mayr, Ernst. 2001. *What Evolution Is*. Basic Books, New York.

McBrearty, Sally and Brooks, Alison S. 2000. The Revolution that Wasn't: A New Interpretation of the Origin of Modern Human Behaviour. In: *Journal of Human Evolution* 39:453-563.

Mellars, Paul. 1999. CA Forum on Theory of Anthropology: The Neanderthal Problem Continued. In: *Current Anthropology* 40 (3):341-364.

Mellars, Paul. 2000. Châtelperronian Chronology and the Case for Neanderthal/Modern Human 'Acculturation' in Western Europe. In: *Neanderthals on the Edge*. Stringer, Christopher; Barton, Nick; and Finlayson, Clive (eds.). Oxbow Books, Oxford.

Mellars, Paul. 2005. The Impossible Coincidence. A Single-Species Model for the Origins of Modern Human Behaviour in Europe. In: *Evolutionary Anthropology* 14:12-27.

Nöel Haidle, Miriam. 2000. Neanderthals-Ignorant Relatives or Thinking Siblings? A Discussion of the "Cognitive Revolution" at around 40,000 B.P. In: *Neanderthals and Modern Humans – Discussing the Transition: Central and Eastern Europe from 50 000 – 30 000 B.P.* Jörg Orschiedt, Gerd-C. Weniger (eds.). Wissenschaftliche Schriften, 2:275-286.

Patou-Mathis, Maryléne. 2000. Neanderthal Subsistence Behaviours in Europe. In: *International Journal of Osteoarchaeology* 10:379-395.

Pérez-Pérez, Alejandro; Espurz, Vanesa; María Bermúdes de Castro, José; de Lumley, Marie Antoinette; and Turbón, Daniel. 2003. Non-occlusal dental microwear variability in a sample of Middle and Upper Pleistocene human populations from Europe and the Near East. In: *Journal of Human Evolution* 44: 497–513.

Persson, Per, 2005. Neandertalarna DNA testas. In: *Populär Arkeologi* 1.

Pettitt, Paul B. 2002. The Neanderthal Dead: Exploring Mortuary Variability in Middle Paleolithic Eurasia. In: *Before Framin*g 1 (4):1-19.

Riel-Salvatore, Julien; Clark, Geoffrey A. 2001. Grave Markers: Middle and Early Upper Paleolithic Burials and the Use of Chronology in Contemporary Paleolithic Research. In: *Current Anthropology*. 42 (4):449-479.

Roebroeks, Wil and Corbey, Raymond (eds.). 2001. Biases and Double Standards in Palaeoanthropology. In: *Amsterdam Archaeological Studies 6*. Amsterdam University Press, Amsterdam.

Rolland, Nicolas and Dibble, Harold L. 1990. A New Synthesis of Middle Paleolithic Variability. In: *American Antiquity* 55:480-499.

Sawyer, G. J. and Maley, Blaine. 2005. Neanderthal Reconstructed. In: *The Anatomical Record* (PART B: NEW ANAT.) 283B:23–31.

Shennan, Stephen J. 1997. Biology and Archaeology. In: *Human by Nature: Between Biology and the Social Sciences*. Weingart, Peter; Mitchell, Sandra.D.; Richerson, Peter J.; and Maasen, Sabine (eds.). Lawrence Erlbaum Associates, London.

Smith, F. H., Janković, I. & Karavanić, I. 2005. The assimilation model, modern human origins in Europe, and the extinction of Neandertals. In: *Quetarnary International*. Article in press.

Solecki, Ralph S. 1973. Prehistory in Shanidar Valley, Northern Iraq. In: *Science* 139:179-193.

Solecki, Ralph S. 1975. Shanidar IV, a Neanderthal Flower Burial in Northern Iraq. In: *Science* 190:880-891.

Speth, John D. 2004. News Flash: Negative Evidence Convicts Neanderthals of Gross Mental Incompetence. In: *World Archaeology* 36:519-526.

Stewart, T. D. 1977. The Neanderthal Skeletal Remains from Shanidar Cave, Iraq: A Summary of Findings to Date.In: *Proceedings of the American Philosophical Society* 121:121-165.

Stewart, J. R. 2004. Neanderthal-Modern Human Competition? A Comparison between the Mammals Associated with Middle and Upper Palaeolithic Industries in Europe during OIS3. In: *International Journal of Osteoarchaeology* 14:178-189.

Stiner, Mary C. 1993. Modern Human Origins – Faunal Perspectives. In: *Annual Review of Anthropology* 22:55-82.

Straus, Lawrence Guy. 1996. Continuity or Rupture; Convergence or Invasion; Adaptation or Catastrophe; Mosaic or Monolith: Views on the Middle to Upper Paleolithic Transition in Iberia. In: *The Last Neandertals, the First Anatomically Modern Humans. Cultural Change and Human Evolution: The Crisis at 40 ka BP*. Carbonell, Eudald and Vaquero, Manuel (eds.).

Straus, Lawrence Guy. 2005a. The Upper Paleolithic of Cantabrian Spain. In: *Evolutionary Anthropology* 14:145–158.

Straus, Lawrence Guy. 2005b. A mosaic of change: the Middle–Upper Paleolithic transition as viewed from New Mexico and Iberia. In: *Quaternary International*. 137:47–67.

Stringer, C. and Gamble, C. 1993. *In Search of the Neanderthals: Solving the Puzzle of Human Origins.* Thames and Hudson Ltd., London.

Tattersall, Ian. 1995. *The Fossil Trail: How We Know What We Think We Know about Human Evolution.* Oxford University Press, New York.

Tattersall, Ian. 2000. Paleoanthropology: The Last Half-Century. In: *Evolutionary Anthropology* 9 (1):2-16.

Tattersall, Ian. 2004. What Happened in the Origin of Human Consciousness? In: *The Anatomical Record (Part B: New Anat.)* 276B:19-26.

Tattersall, Ian and Mowbray, Kenneth. 2005. Species and Paleoanthropology. In: *Theory in Bipsciences* 123:371-379.

Tattersall, Ian and Schwartz, Jeffrey H. 1999. Hominids and Hybrids: The Place of Neanderthals in Human Evolution. In: *Proceedings of the National Academy of Science of the United States of America* 96:7117-7119.

Tattersall, Ian and Schwartz, Jeffrey H. 2001. *Extinct Humans*. Westview Press, Oxford.

Tattersall, Ian. 2004. What Happened in the Origin of Human Consciousness? In: *The Anatomical Record (Part B: New Anat.)* 276B:19-26.

Thomas, Julian. 2004. *Archaeology and Modernity*. Routeledge, London.

Tostevin, Gilbert. 2000. The Middle to Upper Paleolithic Transition from the Levant to Central Europe: In Situ Development or Diffusion? In: *Neanderthals and Modern Humans – Discussing the Transition: Central and Eastern Europe from 50 000 – 30 000 B.P.* Orschiedt Jörg and Gerd-C. Weniger (eds.) Wissenschaftliche Schriften 2

Trigger, Bruce G. 1998. *Sociocultural Evolution: New Perspectives on the Past*. Blackwell Publishers, Oxford.

Trinkaus, E. and Shipman, P. 1993. *The Neandertals: Changing the Image of Mankind.* Alfred A. Knopf, New York.

Trinkaus, Erik; Ruff, Christopher B.; Churchill, Steven E.; and Vandermeersch, Bernard V. 1998. Locomotion and Body Proportions of the Saint-Césaire 1 Châtelperronian Neandertal. In: *Proceedings of the National Academy of Sciences of the United States of America* 95:5836-5840.

van Andel, Tjeerd H. 2002. The Climate and Landscape of Middle Part of the Weichselian Glaciation in Europe: The Sage 3 Project. In: *Quaternary Research* 57:2-8.

Weidenreich, Franz. 1943. The “Neandertal Man” and the Ancestors of “Homo Sapiens”. In. *American Anthropologist, New Series* 45 (1):39-48.

Weidenreich, Franz. 1947. Facts and Speculations Concerning the Origins of Homo Sapiens. In: *American Anthropologist* 49:2.

Wolpoff, Milford H.; Mannheim, Bruce; Mann, Alan; Hawks, John; Caspari, Rachel; Rosenberg, Karen R.; Frayer, David; Gill, George W.; and Clark, Geoffrey. 2004. Why *not* the Neandertals? In: *World Archaeology* 36:527-546.

Wynn, Thomas and Coolidge Frederick L. 2004. The Expert Neandertal Mind. In: *Journal of Human Evolution* 46:467-487.

Zilhão, João and d'Errico, Francisco. 1999. The Chronology and Taphonomy of the Earliest
Aurignacian and its Implications for the Understanding of Neandertal Extinction. In: *Journal of World Prehistory* 13:1-68.

Internet resources:

http://www.talkorigins.org/faqs/evolution-definition.html

http://www.msu.edu/~heslipst/contents/ANP440/neanderthalensis.html

http://www.esc.cam.ac.uk/oistage3/Secure/OIS-3i.html