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The Early Prehistory of Human Social Behaviour: Issues of Archaeological Inference and Cognitive Evolution

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Summary. Unlike the social behaviour of non-human primates, that of human foragers pervades all domains of behaviour. The natural world, material culture and spatial positioning all play an active role in the social interactions of humans. This pervasiveness of social behaviour is readily apparent in the ethnographic record and can be traced in the archaeological records of the Upper Palaeolithic and Mesolithic periods, for which archaeologists can reconstruct complex patterns of social behaviour. For the Early Palaeolithic, however, the archaeological evidence for social behaviour implies that groups were uniformly small and lacking in social structure. This conflicts with evidence from the fossil and palaeoenvironmental records which suggest social complexity and variability. A resolution of these contradictory lines of evidence is offered in terms of a high degree of domain specific mentality for the Early Humans of the Lower and Middle Palaeolithic. The Early Human mind appears to be one in which social behaviour was relatively isolated from interaction with the natural world and material culture. This is in marked contrast to the pervasiveness of social behaviour among behaviourally modern humans arising from a dramatic increase in cognitive fluidity that becomes apparent in the archaeological record at *c.* 50,000 years ago.

INTRODUCTION

ARCHAEOLOGISTS WHO STUDY EARLY PREHISTORY have the task of reconstructing the social behaviour of hunter-gatherers from the first appearance of stone tools, *c.* 2.5 million years ago, to the appearance of agricultural communities, originating *c.* 10,000 years ago in the Near East but not arriving in N.W. Europe until a mere *c.*5,500 years ago. As such, archaeologists are not simply concerned with reconstructing social behaviour at any one specific time and place in prehistory, but with exploring the process of long term change in human social behaviour. To do this, bridges must be built between behavioural ecology, the theories and models of which dominate research at the beginning of our chronological range, and social anthropology which deals with the uniquely human type of social behaviour that arises towards the end of our period of study. The continuing failure to find some integration between these two disciplines remains a major hindrance to our understanding of the evolution of social behaviour.

In this paper I will suggest that an integration can indeed be developed by drawing on the insights provided by evolutionary psychology and the character of the archaeological record. First I will consider the differences between the social behaviour of human foragers and that of non-human primates. I will then show how the distinctive features of human social behaviour can be traced in the archaeological record to at least 40,000 years ago, the timing of the transition from the Middle to the Upper Palaeolithic in Europe. I will then consider the evidence for social behaviour prior to this time, especially that of the Neanderthals in western Europe. By doing this I will identify a curious paradox between the evidence in the archaeological record, which implies a simple and uniform pattern of social behaviour, and that from the fossil and palaeoenvironmental records which imply social complexity and variability. I will argue that the resolution of this paradox, and indeed an understanding of early prehistory in general, can only be gained by addressing the evolution of the mind, an argument that I have made at greater length elsewhere (Mithen 1996).

THE SOCIAL BEHAVIOUR OF HUMAN FORAGERS AND NON-HUMAN PRIMATES

There is a yawning gulf between the character of social behaviour of human foragers and that of non-human primates. To admit this is not to deny evolutionary continuity but simply to recognize that there is at least 6 million years of evolution separating modern humans from our closest relatives, the chimpanzees. In this light, it would be surprising if the methods used by behavioural ecologists to explain the social interactions of baboons and chimpanzees could work equally well to explain the social behaviour of modern humans. We should expect an evolutionary approach to human social behaviour to involve a fundamentally different set of concepts and models to those which are sufficient for explaining the behaviour of non-human primates. In the same way, the study of human language requires a different set of tools to those used for studying the 'language'/vocalizations of non-human primates, although there must be an evolutionary continuity between these.

For the purposes of this paper there are two distinctive features of human social behaviour that I wish to highlight. The first is the degree of social complexity. Research during the last two decades has made it clear that there is nothing simple about the social behaviour of chimpanzees and other non-human primates. Primate social life is about building friendships and alliances, about manipulation and deception, about acquiring and exploiting social knowledge (Byrne & Whiten 1988; Cheney & Seyfarth 1990; Byrne 1995). Chimpanzees, and many other types of primates, live within a truly tangled social web.

Yet there can also be little doubt that the social behaviour of modern humans in hunter-gatherer societies is several orders of magnitude greater in its complexity and variability. As can be appreciated from many ethnographies, the amount of social knowledge a human individual possesses, the number and spatial extent of their social ties—often extending over many thousands of square miles—the time depth to social relationships, and the extraordinary variability in human social behaviour is in a dramatic contrast to the social behaviour of non-human primates (e.g. Lee 1979; Silberbauer 1981; Leacock & Lee 1982).

A second distinctive feature of human social behaviour is the limited extent to which it constitutes a discrete behavioural domain. When we consider a chimpanzee it appears relatively easy to identify whether it is, or is not, engaging in social behaviour at any one moment in time. Fishing for termites, for instance, does not appear to be have social significance. The skill may have been acquired in a social context (McGrew 1992) but in the actual process of termite fishing, or indeed ant dipping or cracking nuts, there is little of social significance. But when we see chimpanzees grooming, or displaying, or fighting, this is behaviour clearly within a social domain.

Moreover, for many primates the complexity of behaviour within this domain often appears greater than that in the non-social world. This has given rise to the idea of a relatively discrete domain of social intelligence (Humphrey 1976; Byrne & Whiten 1988, Cheney & Seyfarth 1988, 1990). We might indeed characterize the mind of a chimpanzee as in Figure 1, in which tool making and using, foraging and communication are largely controlled by domain-general cognitive processes, such as associative and trial-and-error learning, whereas there is a specialized and largely discrete domain of social intelligence for coping with the particularly challenging problems of the social world (Mithen 1996).

When we turn to human foragers the boundaries between social and non-social behaviour are much more fuzzy, if indeed they exist at all. It becomes impossible to designate behaviour as either social or non-social. This can be illustrated by briefly considering the interaction of human foragers with the natural world and the role of material culture in human social behaviour.

Continuity between the social and natural worlds

The most obvious manner in which the natural world is used by human foragers for social ends is by food sharing through which reciprocal obligations are constructed. The provisioning of women with meat by male hunters is a common feature among modern foragers and the appearance of this type of behaviour has been invoked as a critical feature for the evolution of human social behaviour (e.g. Isaac 1978; Soffer 1994). It has been shown that among the Ache of Paraguay the most efficient hunters, in terms of providing the greatest amount of food to the group, also have the highest reproductive success (Kaplan & Hill 1985). In contrast to modern humans, chimpanzees do not engage in provisioning and their 'food sharing' (e.g. Boesch & Boesch 1989) should be predominantly (if not totally) described as tolerated theft.

The social use of the natural world by human foragers, however, is more profound than simply using the provisioning, sharing and exchange of food as a medium for social interaction. It appears to be ubiquitous among human foragers that the concepts and thought processes which are used for thinking about the natural world, include those used for social interaction. Bird-David (1990), for instance, describes how forest dwelling foragers, such as the Mbuti of Zaire, conceive of the 'forest as parent', it is in effect a social being that gives. Similarly the Inuit living in the Canadian Arctic view their environment as 'imbued with human qualities of will and purpose' (Ridington quoted in Ingold 1993, 440). With regard to modern foragers in general, Tim Ingold argues that 'there are not two worlds of persons (society) and things (nature), but just one world—one environment—saturated with personal powers and embracing both human beings, the animals and plants on which they depend, and the landscape in which they live and move' (1992, 42).

This cognitive fluidity between the social and natural world is exemplified in the phenomena of anthropomorphism and totemism, both being pervasive among hunter-gatherers (Willis 1990), as is particularly evident from their art (Morphy 1989). While chimpanzees may be proficient at attributing thoughts and desires to other individuals (Byrne 1995), it is highly doubtful that they attribute thoughts, desires and intentions to members of other species, as humans do when they anthropomorphize. And it is also highly unlikely that chimpanzees think that other members of their own species may share a common ancestor with animals such as snakes or leopards, as in totemic thought.

An important point to emphasize is that this social understanding of the natural world is not simply epiphenomenal among hunter-gatherers—something that can be safely ignored by those who wish to take an evolutionary approach to understanding human behaviour. For these attitudes to the natural world play a fundamental role in creating and manipulating social relationships. Consider, for instance, the attitude to the polar bear by the Inuit as described by Saladin D'Angular (1990). This animal is 'killed with passion, butchered with care and eaten with delight'. But at the same time it is thought of as another human being, or at least another adult male. When a bear is killed the same constraints apply as to what activities can be undertaken in a camp as when a hunter dies. The bear is thought of as a human ancestor and as a kinsman. Indeed, the Inuit believe that there was a time when polar bears and people could easily change from one kind to another. The important point is that by associating themselves with the polar bear, the Inuit males use the bear as a potent ideological tool to consolidate their domination of women. Indeed the use of nature as a means of establishing and maintaining power relationships is pervasive among hunter-gatherer groups.

In summary, while interaction with the social and natural worlds appear to be discrete domains of behaviour for chimpanzees and other non-human primates, no such distinction can be drawn for human foragers.

Material culture and social interaction

We find the same contrast when we consider the relationship between the domains of technical and social behaviour, which effectively do not exist as separate entities for modern humans (Ingold 1993). As the work of McGrew (1992) and the Boesch's (1983, 1990, 1993; Boesch 1993) have shown, chimpanzees make and use a diverse array of tools, many of which seem well designed for the tasks for which they are used. But the designs and manner of use appear to have no social significance, other than passively reflecting the cultural traditions of the group in some cases.

The tools of modern humans also display very effective designs for their functional tasks (e.g. Oswalt 1976; Torrence 1983; Bleed 1986; Churchill 1993). But at the very same time these tools are used in conducting social relationships. Polly Wiessner (1983) has documented this for the arrows of the Kalahari San. While these are very effective hunting weapons, the shape of the arrow heads also carries information about group affiliation. Their use in hunting the eland, an animal central to San mythology, results in the arrows also having considerable symbolic significance.

The use of material culture for social interaction by modern humans is most evident in body adornment, ubiquitous among modern humans. Randall White (1992, 1993) has stressed that body adornment is not simply a passive reflection of social categories or status, let alone mere decoration, but an active means of engaging in social behaviour. He quotes Strathern: 'what people wear, and what they do to and with their bodies in general, forms an important part of the flow of information—establishing, modifying, and commenting on major social categories, such as age, sex and status' (quoted in White 1992: 539–40). Similarly, Turner stated that 'the surface of the body ... becomes the symbolic stage upon which the drama of socialisation is enacted, and bodily adornment ... becomes the language through which it is expressed' (quoted in White 1992: 539).

Projectile points and body adornment are the most obvious candidates for the social use of material culture, but even the most mundane domestic items are used actively in social strategies (Hodder 1985). As Wobst (1977) argued, one cannot have a half-way house with some items but not others imbued with social information. For modern humans all material culture is actively used in social interaction; in contrast the material culture of chimpanzees plays no role in their social strategies and tactics. For instance while chimpanzees appear to be very concerned with the flows of social information and are adept at manipulating plant material, no one has ever seen a chimpanzee use plant material as body decoration.

The social use of space

The pervasiveness of social behaviour and thought among modern foragers is also evident from spatial behaviour within their camping sites. When modern foragers make their camp-sites, sit to cook food or repair tools, they are at the same time engaging in complex patterns of social interaction simply by their use of space. They do not place themselves randomly but use the spatial arrangements between themselves and others as a social strategy. This has been demonstrated in considerable detail by Whitelaw's (1991) studies of the spatial layouts of hunter-gatherer camps. To quote him 'spatial organisation is used by different individuals and in different cultures to generate, amplify, facilitate, manipulate and control social interaction and organisation' (1991: 181).

My impression from the literature about chimpanzees is that the spatial behaviour of chimpanzees when engaging in technical tasks is controlled by purely ecological factors, such as the locations of nuts and hammer stones in the Taï forest (Boesch & Boesch 1983, 1984). Similarly, it appears that the spatial positioning of individuals within a group passively reflects pre-existing social relationships, rather than being actively used to manipulate those relationships as among modern humans, although specific studies of the spatial behaviour of chimpanzees and other primates appear to be lacking.

The all-pervasiveness of human social behaviour

In summary, when we look at modern foragers we cannot identify a discrete domain of social behaviour. Interaction with the natural world, the production, the form and the use of tools, the building and placing of hearths and huts are as much social as non-social behaviour. We can perhaps summarize this argument by quoting Ernest Gellner (1988: 45–46): 'The conflation and confusion of functions, aims and criteria, is the normal, original condition of mankind ... it is important to grasp this point fully. A multi functional expression is not one in which a man combines a number of meanings because he is in a hurry and human language has offered him a package deal: on the contrary, the conflated meanings constitute for him, a single and indivisible semantic content'. Gellner was writing about verbally expressed statements; but precisely the same interpretation must hold for the actions and the material culture of hunter-gatherers.

The fact that one action of a human forager may be simultaneously accomplishing ends in multiple domains of activity confounds those who wish to take an ecological approach to hunter-gatherers in which the pigeon-holing of behaviour as either concerned with acquiring food, or making things, or social interaction is desirable so that the costs and benefits of any particular behaviour can be measured. When the consequences of any one activity simultaneously reverberates in multiple domains of behaviour, trying to measure costs, risks and benefits becomes extremely difficult.

While this all pervasiveness of human social behaviour may make life miserable for the behavioural ecologist, it is, however, a godsend to the archaeologist of prehistoric hunter-gatherers. This is because when we try to reconstruct social behaviour in the past we cannot see alliances or kinship groups, let alone deception and social manipulation. All we can see in the archaeological record is the junk that was left behind such as the debris from the animals that were butchered, and the waste from the tools that were made. Yet because human social behaviour is so deeply embedded in, and indeed created by, all activities we can indeed reconstruct some aspects of past social life from such material.

MESOLITHIC FORAGERS IN EUROPE

As the first of two brief case studies which explore this pervasiveness of human social behaviour we can consider the Mesolithic communities of Europe—the prehistoric foragers who lived in the temperate forests of the early post glacial between the end of the Pleistocene, 10,000 years ago and the appearance of Neolithic farming communities (see Mithen 1994a for a review of this period).

Of particular interest during this period is the presence of cemeteries, appearing for the first time in prehistoric Europe. These contain varying number of individuals, many of whom were buried with items such as beads, pendants, stone artefacts and parts of animals (Clark & Neeley 1987). The distribution of grave goods in the cemeteries of southern Scandinavia, Vedbaek (Albrethsen & Petersen 1976) and Skateholm (Larsson 1983), suggests that wealth was acquired during an individual's lifetime, rather than inherited. In contrast at Hoëdic and Téviec in Brittany (Péquart *et al.* 1937; Péquart & Péquart 1954) young children were found with abundant items, suggesting that wealth and status were inherited. At Oleonovstrovski Mogilnik in Karelia, it appears that institutionalized social positions had arisen, as we find the burial of what appears to be a shaman (O'Shea & Zvelebil 1984).

The presence of beads and pendants within these graves illustrates the use of body adornment for social strategies. As these are predominantly made from the teeth of red deer and wild boar we also see the exploitation of the natural world for social ends. This is also evident at Oleonovstrovski Mogilnik where the graves appear to form two clusters, associated with effigies of snakes and elk respectively, suggesting a totemic social structure (O'Shea & Zvelebil 1984). The cognitive fluidity between the social and natural worlds is also evident from the cemetery of Skateholm where dogs were buried with the same type of ritual and grave items as used for people (Larsson 1983, 1990).

While figurative art is not common in the Mesolithic, some of the examples which do exist, such as the faces carved on boulders from Lepenski Vir in the Danube (Srejovic 1972), are anthropomorphic in character. This again reflects the absence of any cognitive barriers between the social and natural worlds.

The use of the natural world for social ends can also be inferred from the hunting practices of Mesolithic groups, especially those in coastal regions where resources were relatively abundant. An analysis of the animal bones from late Mesolithic sites in southern Scandinavia suggests that the hunting of red deer and wild boar was undertaken as much for social prestige as for the supply of food (Mithen 1990). By using a computer simulation of Mesolithic hunting I have argued that the composition of faunal assemblages in terms of the frequencies of different species of terrestrial game imply Mesolithic hunting goals which preferentially killed large animals, notably red deer and wild boar. This hunting pattern is likely to have frequently failed with the Mesolithic hunters returning to their base camps empty handed. This strategy is likely to have been feasible due to the abundance of plant foods and small game, especially fish, caught by untended traps and facilities. Consequently the hunting of large terrestrial game in southern Scandinavia appears to have been principally geared to acquiring prestige and constructing social obligations by providing large carcasses for food sharing. The faunal assemblages from southern Germany, in contrast, indicate that hunting focussed on the small types of game, notably roe deer. These would have been the most reliable to acquire but can be assumed to have carried relatively low social prestige. In this interior region of Europe alternative food resources were less abundant than in coastal regions, requiring the hunting of large game to provide regular supplies of meat. And we have no evidence for the type of social developments that are seen in southern Scandinavia. Mesolithic cemeteries, for instance, are absent from southern Germany.

The hunting of terrestrial game during the Mesolithic was largely undertaken by the use of arrows with tips and barbs made from chipped flint blades, referred to as microliths. While experimental replication and use of such weapons have demonstrated their effectiveness at piercing thick animal hide (e.g. Fris-Hansen 1990), many of these microliths are also likely to have been imbued with social information (Gendel 1984), in a similar manner to the arrow heads of the Kalahari San, as described by Wiessner (1983). Similarly, other types of artefacts display distinct spatial distributions which cannot be explained in purely ecological terms. For instance in Eastern Denmark, flint axes made to different, but functionally equivalent, designs are found in discrete spatial clusters. There are also marked differences in the material culture on either side of the strait separating Eastern Denmark and southern Sweden, even though the environments were broadly comparable (Vang Petersen 1984). These examples seem to reflect the active use of material culture in social strategies, in terms of creating social boundaries between groups. As such, they complement the use of beads and pendants, actively used for the social strategies of individuals within a group.

It is extremely difficult to draw inferences about the social use of space, in terms of the placement of hearths, huts and activities, during the Mesolithic. When a number of dwellings or other features are found on a site it is difficult to determine whether these were precisely contemporary with each other, or indeed to infer the specific form of past constructions. Similarly, while archaeologists have methods to estimate the approximate numbers of people occupying a site (e.g. O'Connell 1987), the methodological tools to infer their social and biological relationships are elusive. This type of data has been critical to Whitelaw's (1991) studies of the social use of space by ethnographically documented foragers. It is nevertheless evident from the archaeological record that it is characteristic of the Mesolithic period that a range of features are found on settlements in spatial relationships which appear similar to those found in the ethnographic record. Sites such as Mount Sandel in Ireland (Woodman 1985) or Vaenget Nord in Denmark (Petersen 1989), provide the remains of dwellings, postholes, pits, hearths and scatters of knapping debris which would appear to reflect a social use of space similar to that documented for modern foragers by Whitelaw, although this cannot be formally demonstrated.

We can see in the Mesolithic period, therefore, the use of nature, material culture and space in the social behaviour of prehistoric foragers. From such data, we can recognize considerable variability in Mesolithic social behaviour across the continent and during the period itself. In southern Scandinavia, for instance, it is likely that during the latter part of the Mesolithic period, the Ertebølle, there were permanently based social groups probably consisting of many hundreds of people who were concerned with marking and defending territories (Price 1985). This is a very different pattern of social behaviour to that commonly associated with foragers: small, egalitarian and highly mobile groups. Such groups may nevertheless have been present in other regions of Europe during the Mesolithic. This returns us to the first difference between the social behaviour of human foragers and non-human primates that I remarked upon above: a veritable gulf in the degree of social complexity and variability.

UPPER PALAEOLITHIC FORAGERS IN EUROPE

For a second brief case study exploring the pervasiveness of human social behaviour we can consider the Upper Palaeolithic communities of Europe, 40–10,000 BP (for a general review see Mellars 1994). This period constituted the final stages of the late Pleistocene including the late glacial maximum at 18,000 BP. Consequently, we are now dealing with prehistoric foragers living in open tundra environments, and a period of climatic deterioration up to 18,000 BP followed by gradual amelioration until the extremely rapid global warming at 10,000 BP. Within these general trends, however, there were many environmental fluctuations, as demonstrated by recent ice cores (e.g., Johnsen *et al.* 1992). There would also have been considerable environmental variation with latitude and the degree of continentality. Whereas the Mesolithic foragers generally stalked individual animals within the thick forests of the postglacial, we are now dealing with foragers who hunted large migratory herds of animals, notably reindeer (Mithen 1990).

The Upper Palaeolithic in Europe is renowned for its art, clustered in south west France and Northern Spain, and predominantly created after 20,000 years ago. The florescence of this art appears to be related to the environmental and economic conditions of the period of the late glacial maximum (Jochim 1983; Mithen 1989, 1991). Several of the images within the art are anthropomorphic, such as the 'sorcerer' from Les Trois Frères, which appears to be a human figure with a bison face and antlers (Bahn & Vertut 1988) and the man/lion figure from Hohlenstein-Stadel, which dates to at least 33,000 years ago (Marshack 1990). Such images indicate a similar cognitive fluidity between the social and natural worlds as we have seen in the Mesolithic and among ethnographically documented foragers. Indeed, although it cannot be demonstrated, it is most likely that the predominance of animal imagery within the art of the Upper Palaeolithic reflects a totemic structure to society.

Material culture appears to have played a major role in social interaction during the Upper Palaeolithic. Gamble (1982, 1991) has argued that items such as Kostienki points and Venus figurines, which show the same basic form across vast expanses of Eurasia and are chronologically restricted to the period of climatic deterioration, were used in the construction of alliance networks. Such networks were critical to the continued occupation of Europe as the glacial maximum approached and constitute a spatial scale of social relations very different to that we see in the Mesolithic. The use of material culture for mediating group interaction is also evident from the discrete distributions of specific motifs in the cave paintings, possibly indicating social territories (Sieveking 1980), and the diversity of imagery on carved bones at sites such as Altamira which appear to have been used for group aggregations (Conkey 1980). The projectile points of the Upper Palaeolithic are widely accepted as having been invested with considerable amounts of social information, in light of the distinct morphologies and their spatial and temporal distributions (Mellars 1994). In some regions, items of material culture are likely to have been exchanged in trade networks, such as amber and fossil sea shells on the Central Russian Plain (Soffer 1985).

Material culture was also used for social interaction in terms of beads, pendants, and bracelets made from ivory, animal teeth and sea shells. Indeed the very start of the Upper Palaeolithic in south west France is marked by a sudden abundance of such items, found in what appear to be domestic and manufacturing contexts (White 1989). Elsewhere such items are found adorning bodies in graves, such as at Dolni Vestonice in Czechoslovakia (Kilma 1988). Perhaps most notable are the remarkably rich graves from Sungir in Russia dating to 28,000 years ago. It is worthwhile here to summarize White's (1993) description of these as they demonstrate the importance of the natural world and material culture for social strategies. There were three particularly rich graves at Sungir. One grave contained an old man (*c.* 60 years) who was buried with no less than 2936 beads which had once been sewn onto his clothing. He wore painted mammoth ivory bracelets on his arms and a pendant from his neck, painted red with a single black dot. In an adjacent grave there were two adolescents, a boy aged 13 and a girl aged 7–9 years. The body of the boy was covered with 4903 beads. Around his waist there were at least 250 canine teeth of the polar fox which had once formed part of a belt. At his throat there was an ivory pin and under his left side a large ivory sculpture of a mammoth; he also had an ivory disc with a central hole and carved lattice work. On his left side was part of a human femur, which had been polished and packed with red ochre, and on his right side a massive ivory lance, 2.40 m in length. The girl had 5274 beads and fragments. Like the boy, she had a beaded cap, although there were no fox teeth associated with her body. She had small ivory lances at her side and two pierced antler batons. She also had three ivory discs similar to that found with the boy. Both Dennell (1983) and White (1993) have stressed the time investment required to make the beads at Sungir, estimated to have been 2000 hours for the man and 3500 for each of the children.

With regard to making inferences regarding the social use of space, Upper Palaeolithic archaeologists face the same dilemma as those studying the Mesolithic. There are some extremely well preserved settlements, especially from the late glacial period (*c.* 12–10,000 BP) from which detailed reconstructions of spatial behaviour, such as the seating of flint knappers around hearths and the location of different butchering activities, can be reconstructed (e.g. Pigeot 1990; Enloe *et al.* 1994; Koetje 1994). But as with the Mesolithic, the specific social and biological relationships between the occupants of these sites are elusive.

Upper Palaeolithic sites on the Central Russian Plain provide the most promising data sets with which to explore the social use of space. Soffer (1985) has argued that the spatial relationships between mammoth bone dwellings and storage pits played an active role in social interaction. At some sites, such as Radomysh'l, there is a single large storage pit surrounded by dwellings. Soffer interprets this as reflecting equal and open access by the inhabitants of the site to stored foodstuffs. At sites such as Dobranichevka, however, approximately equal numbers of pits are found surrounding each dwelling, implying that access was restricted to members of that household. At further sites, such as Mezin and Eliseevichi, storage pits are clustered around one single dwelling, suggesting that a single household controlled access to the stored foodstuffs of the whole group. Moreover, Soffer argues that these three patterns of resource control constitute a chronological sequence reflecting the emergence of a hierarchically structured society during the latter part of the Pleistocene. Whether or not this interpretation is correct, it is readily apparent from the type and distribution of features on Upper Palaeolithic sites that the social use of space was as complex and sophisticated as that seen in the ethnographic record.

In summary, while the specific forms of social behaviour that can be reconstructed for the Upper Palaeolithic in Europe contrast with those for the Mesolithic, both are characterized by the pervasiveness of social behaviour in all domains of activity. In both periods material culture, whether in the form of items for body adornment, hunting weapons, or the positioning of dwellings played an active role in social behaviour. Similarly, while hunting and gathering provided food and raw materials, the acquisition and consumption of these were as much social as non-social activity. Moreover, the anthropomorphic images that we find in both periods suggest the same cognitive fluidity between the social and natural world as we see in the ethnographic record.

SOCIAL BEHAVIOUR DURING THE EARLY PALAEOLITHIC OF EUROPE

I now wish to move to a third case study in which we see a dramatic contrast in the character of the archaeological record and the nature of our inferences about prehistoric social behaviour. This concerns the Early Palaeolithic period in Europe, dating to between the time of first colonization, most probably *c.* 500,000 years ago (Roebroeks & van Kolfschoten 1994), and the start of the Upper Palaeolithic (see Gamble 1994 for a general review). The term 'Early Palaeolithic' combines both the Lower and Middle Palaeolithic, the distinction between which has now become so blurred as to have little utility (Gamble 1986; Stringer & Gamble 1993). My principal concern in this case study will remain with Europe, but practically all of the remarks and interpretations I will be making below are equally applicable to the Old World in general for the period prior to 60–35,000 years ago. This is a period of a global change in the character of the archaeological record, described as the Middle/Upper Palaeolithic transition.

The Middle/Upper Palaeolithic transition

While the transition to the Upper Palaeolithic is well defined in Europe at 40–35,000 years ago, most notably by the appearance of the first art objects, systematic blade technology and bone tools (Mellars 1973, 1989; White 1982) it is rather more fuzzy elsewhere in the world. In the Near East, for instance, there is a clear technological transition at *c.* 40,000 years ago resulting in the production of blade technologies similar to those found in the Upper Palaeolithic in Europe (Bar-Yosef 1994). But art remains extremely rare until after 20,000 years ago. Similarly in Africa, while the first art objects do indeed date to after 40,000 years, such as the painted slabs from Apollo cave at 27,500 BP, these also remain rare and the technological transitions remain poorly defined (Wadley 1993). In East Asia there are now pieces of art dated to 18,000 BP from China (Bednarik & Yuzhu 1991), although technological changes, if any, are particularly poorly understood (e.g. see Zhonglong 1992). In south east Asia, the colonization of Australasia, most likely prior to 50,000 BP (Roberts *et al.* 1990, 1994; Allen 1994; Bowdler 1992) is interpreted as an 'Upper Palaeolithic' type behaviour, and it is most likely that art dates to that initial colonization (Bowdler 1992; Davidson & Noble 1992). The stone tools industries of Australia are lacking, however, in any attributes that could be characterised as Upper Palaeolithic in a European sense. In summary, there can be little doubt that there is a global transition in the character of the archaeological record between 60–35,000 years ago which is nevertheless manifest differently in different regions. The most appropriate description for the transition is a cultural mosaic.

In Europe, the transition to the Upper Palaeolithic appears to correlate broadly with the replacement of *H. neanderthalensis* by *H. sapiens sapiens*, although the Chatelperronian industry, which has Upper Palaeolithic attributes, has been claimed to be a product of Neanderthals (Mellars 1989; Harrold 1989; Stringer & Gamble 1993). But this correlation between hominid anatomy and material culture appears to be the exception rather than the rule. In the Near East, for instance, the earliest anatomically modern humans were manufacturing stone industries essentially the same as those produced by Neanderthals (Bar-Yosef 1994), although subtle distinctions in hunting behaviour can be identified (Lieberman & Shea 1994). Similarly in south and north Africa, anatomically modern humans dating to soon after 100,000 years ago appear to remain associated with Middle Palaeolithic technologies until the start of the Upper Palaeolithic (Hublin 1992; Grün & Stringer 1991).

Archaeological evidence for social behaviour in the Early Palaeolithic

The archaeological record for the Early Palaeolithic appears to lack any evidence for complex social behaviour of a type that pervades the archaeology of the Upper Palaeolithic and Mesolithic periods. This is a consistent pattern irrespective of whether it is associated with *H. erectus*, archaic *H. sapiens*, *H. neanderthalensis* or anatomically modern humans.

No objects of art were produced during the Early Palaeolithic. Although a few artefacts are known from this period which have marks of no apparent utilitarian value (Bednarik 1992), these are most likely to be no more than unintended by-products of activities such as cutting grass on a bone support, or products of post-depositional processes, or carnivore gnawing (Davidson 1992; Chase & Dibble 1987, 1992). There is no figurative art, and no regularly repeated images which may have constituted a symbolic code, as found at the start of the Upper Palaeolithic in southwest Europe (Delluc & Delluc 1978). Arguments that the absence of art objects can be explained on taphonomic grounds (e.g. Bednarik 1994) are unconvincing in light of the massive quantities of data from the Early Palaeolithic, and the presence of numerous well preserved sites.

While Neanderthal burials from the Early Palaeolithic are known (such as from Kebara, Bar-Yosef *et al.* 1992), there is no reason to attribute these with social significance. These burials lack grave goods and may simply represent a hygenic means of corpse disposal rather than having the ritual and social significance that is apparent in later periods (Gargett 1989; Gamble 1989). The burials of early anatomically modern humans from the Near East, in the caves of Qafzeh and Skhūl, appear to be similar. These lack any evidence for body adornment. The best candidates for grave goods are the skull and antlers of a large deer buried with a child at Qafzeh (Stringer & Gamble 1993), the significance of which is discussed in Mithen (1996).

With regard to the stone tools of Early Humans, we must first note that these were technically demanding to manufacture. To create items such as the 500,000 year old symmetrical handaxes from Boxgrove (Roberts 1986), or the 60,000 year old levallois points from Kebara (Bar-Yosef *et al.* 1992) technical skills equivalent to those used for the blade technologies of the Upper Palaeolithic were required. This is readily apparent when the manufacture of such tools is replicated (e.g. Pelegrin 1993) or detailed technological studies of lithic assemblages are made (e.g. Bar-Yosef & Meignen 1992). While it is clear that specific forms were being imposed onto some artefacts, such as by producing handaxes in specific shapes and sizes, there is no evidence that these forms carried social and symbolic information in the manner of Upper Palaeolithic and Mesolithic stone tools (Chase 1991; Mithen 1994b; Wynn 1995).

Evidence for complex social behaviour is also lacking from the features and spatial patterns of debris on Early Palaeolithic archaeological sites. As Gamble (1994; Stringer & Gamble 1993) has stressed, the familiar attributes of hunter-gatherer campsites such as hearths, postholes and pits are simply absent from sites of the Early Palaeolithic. This is not simply a factor of preservation, as there are several sites such as Boxgrove (Roberts 1986) and Mastricht-Bélvèdere (Roebroeks 1988) at which large areas of undisturbed knapping and butchery debris survive intact. Yet this debris appears to be distributed in isolated behavioural episodes, lacking the spatial relationships which characterizes modern behaviour at campsites (Farizy 1994). The Early Palaeolithic record lacks, therefore, any evidence for a social use of space as is found in later periods and in the ethnographic record, just as it lacks evidence that material culture and the natural world were used actively in social strategies.

The conventional, indeed practically unanimous, interpretation of this data is that complex social behaviour was indeed absent among these Early Palaeolithic humans. As Mellars (1989: 358) has stated, the most widely held view by archaeologists of social behaviour at this time is that 'local communities ... were generally small ... and largely lacking in any clear social structure or individual social or economic roles'. Similarly, Binford (1989: 33) described Middle Palaeolithic groups as 'uniformly small and with very high mobility whatever the environmental form and dynamic'. Gamble (Stringer & Gamble 1993: 156) characterized the Early Palaeolithic of Europe as a '15 minute culture that lasted in Europe for at least half a million years'.

In effect, the archaeological record implies that social behaviour was not only much less complex than in the Mesolithic or Upper Palaeolithic, but also less complex than that found among chimpanzees, or indeed many other primates, among whom groups are certainly *not* uniformly small, social structure is certainly *not* lacking, mobility *is* responsive to environment and behaviour has a time depth far greater than 15 minutes.

Evidence for social behaviour from the fossil and palaeoenvironmental records

While the archaeological evidence appears to tell us that Early Palaeolithic social behaviour lacked the complexity that is apparent from the archaeological record from the Upper Palaeolithic onwards, this appears to conflict with the evidence from the fossil and palaeoenvironmental records.

With regard to hominid fossils the most significant feature is the large brain size of Neanderthals, and indeed archaic *H. sapiens*. This was not significantly different to the brain size of modern humans (Stringer & Gamble 1993; Aiello & Dunbar 1993). The social implication of this lies in the fact that among primates in general there appears to be a correlation between brain size, as measured by the neocortex ratio, and group size which is a measure of social complexity (Dunbar 1992). Aiello & Dunbar (1993) extrapolated from this correlation to argue that Neanderthals and archaic *H. sapiens* lived in group sizes with a mean of 148. The details of the statistical relationship between brain size and group size may be questioned (Steele 1996), together with the logic of so great an extrapolation (Mithen 1996). Nevertheless, the brain size of these Early Humans implies a degree of social complexity equivalent to that observed among anatomically modern humans such as those of the Upper Palaeolithic or those documented in the ethnographic record. Moreover, the possession of such a large brain has substantial implications for the life history parameters of Early Humans suggesting complex social links between members of the same and different sexes (Foley & Lee 1989).

This is supported by the evident linguistic capacities of Neanderthals and archaic *H. sapiens*, as inferred from their brain size, brain shape and the reconstruction of their vocal tract (Schepartz 1993). The hyoid bone from the Kebara II Neanderthal (Arensburg *et al.* 1989, 1990) and recent reconstructions of the vocal tract (Houghton 1993) indicate that Neanderthals are unlikely to have been constrained to the limited range of vowel sounds as was argued by Lieberman & Crelin (1971). On the contrary, they appear to have had as wide a range of vocalizations as used in modern language. As Aiello & Dunbar (1993; Dunbar 1993) have argued, language is primarily used to communicate social information among modern humans and the need for more efficient exchange of social information is likely to have been the selective pressure for the evolution of the linguistic capacity. Consequently, as with brain size in general, the linguistic capacities of Neanderthals appears to conflict with the inference of a simple and uniform social organization based on small group size as drawn from the archaeological record.

A further source of concern about the inference of a 'simple' social organization for the Neanderthals lies with the diversity of environments which they and their immediate ancestors in Europe inhabited. It is apparent from the marine sediment and ice core records that Europe experienced a continuous sequence of marked environmental changes during the Pleistocene, with no less that eight glacial-interglacial cycles (Shackleton & Opdyke 1973). For the majority of this time, Europe was in neither a full glacial nor interglacial state and Neanderthals inhabited open tundra-like environments (Gamble 1986, fig 3.12). The faunal assemblages from Pleistocene Europe, reviewed by Chase (1986, 1989) and Gamble (1986), indicate that Neanderthals shared these landscapes with a diverse set of carnivores which would have been both competing with Neanderthals for herbivores, and preying on Neanderthals themselves. Moreover, resource distributions in these landscapes are likely to have been extremely patchy and coming in large packages, especially during winter months when early humans may have been dependent upon scavenging carcasses of large herbivores (Gamble 1987). These ecological conditions—high predator risk and patchy food supply—are precisely the conditions which are known to promote large group sizes among primates (Clutton-Brock & Harvey 1977; van Schaik 1983; Dunbar 1988). Moreover, it would contradict much of what we understand about primate social behaviour if Binford was correct and Neanderthals varied neither their social behaviour nor mobility patterns as the Pleistocene environments went through such radical changes as documented in the palaeoenvironmental records.

In effect the evidence from the archaeological record, or at least our interpretation of it, blatantly contradicts our inferences about Neanderthal social behaviour drawn from their fossil remains, the environments they were living in, and what we understand about primate social behaviour in general. We have a palaeoanthropological paradox, not just for Neanderthals but for all types of Early Humans prior to about 50,000 years ago, whether these be archaic *H. sapiens* in Africa or the early anatomically modern humans in the Near East. The archaeological evidence tells us that social behaviour was simple and uniform, the fossil and palaeoenvironmental evidence tell us the opposite, that social behaviour was complex and varied. How can this paradox resolved?

Resolving the paradox: The domain-specific mentality of the Early Human Mind

I think that the answer lies in the nature of the Early Human mind. My contention is that while Neanderthals possessed essentially modern cognitive capacities in the domains of social, technical and natural history intelligence these remained relatively isolated from each other (Mithen 1993; 1994c; 1996). This 'domain-specific mentality' is in marked contrast to the cognitive fluidity characteristic of the modern mind, as I have described above. If we use the terminology of Gardner (1983) we could characterize Neanderthals as having multiple intelligences, which nevertheless lacked the smooth and seamless integration which he argues is characteristic of the modern mind. Indeed Rozin (1976; Rozin & Schull 1988) argued that the evolution of accessibility between cognitive domains/multiple intelligences is critically important for the evolution of the advanced intelligence of the modern mind. Elsewhere I have argued that this is precisely what occurs at the Middle/Upper Palaeolithic transition (Mithen 1993, 1996).

My notion of a cognitive domain is of a bundle of closely related cognitive processes which might themselves be described as 'Darwinian algorithms' (Cosmides & Tooby 1987) or micro-domains (Karmiloff-Smith 1992). Some of these may be innately hard-wired, such as an intuitive knowledge about certain attributes of physical objects (Spelke *et al.* 1992) or psychology (Whiten 1991). It is clear, however, that the type and character of cognitive domains which arise within a mind are heavily influenced by the context of development (Gardner 1983; Karmiloff-Smith 1992). Consequently those living a hunter-gatherer lifestyle are likely to have a different set of cognitive domains to those of us who live in a western industrial society, although we may share a number of core cognitive building blocks. But the cognitive domains of all behaviourally modern humans appear to have high degrees of accessibility. In contrast, those of Early Humans (i.e. prior to the Middle/Upper Palaeolithic transition) appear to have been relatively isolated, a domain-specific mentality.

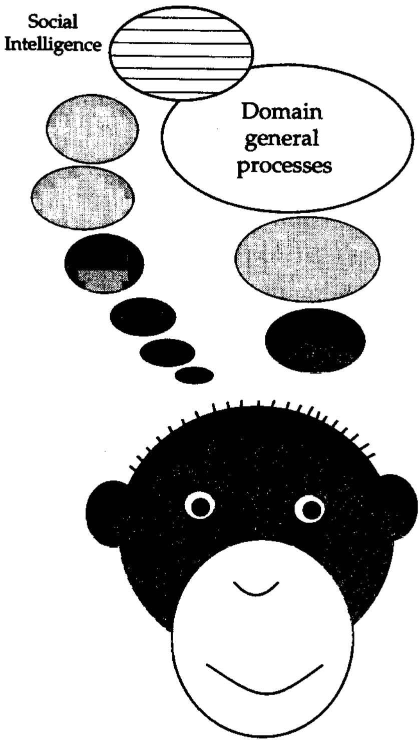

Figure 1. Social intelligence as a cognitive domain in the chimpanzee mind (for full discussion of this and other figures see Mithen 1996).

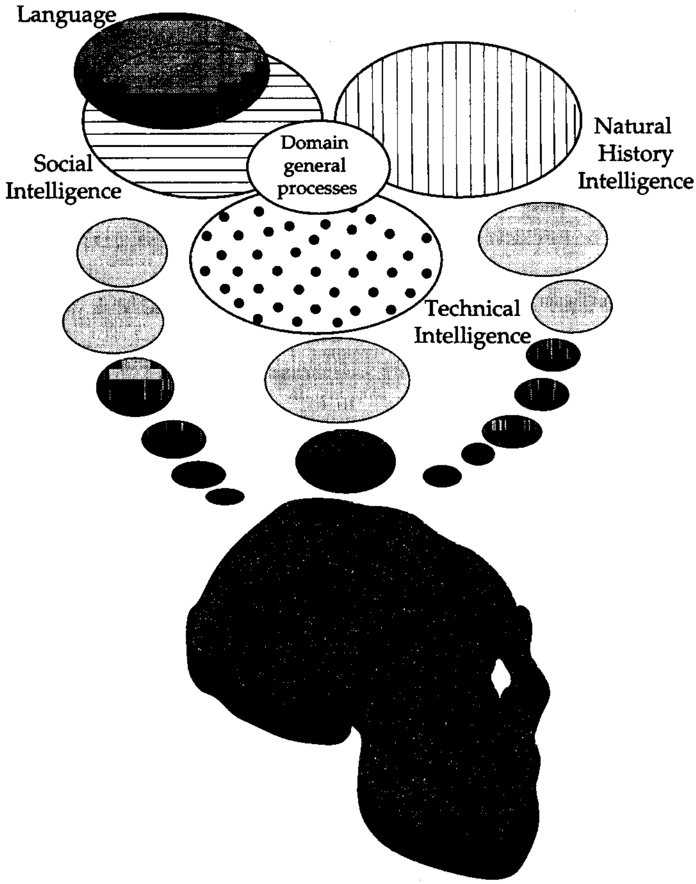

Figure 2. The Early Human Mind *c.* 100,000 BP.

To support this contention, and to explain how it effects our interpretation of the archaeological record regarding social behaviour, we must momentarily return to the mind of the chimpanzee (Figure 1). As I noted above, an argument can be made that the chimpanzee has a discrete domain of social intelligence which complements a powerful general learning ability. Now this type of mind may well be similar to the mind of the common ancestor of modern humans and apes which lived about six million years ago (Byrne 1995). By the time we reach Neanderthals, say at 100,000 years ago, the archaeological record implies that we have not one but multiple specialized cognitive domains, as illustrated in Figure 2.

In this figure I have proposed a cognitive domain of social intelligence that is more powerful that likely to have existed in the mind of the common ape/human ancestor 6 million years ago. I have appended to this a linguistic capacity. In doing so I have followed Dunbar's (1993) arguments and characterized Early Human language as used predominantly for social purposes, rather than for the wide range of functions for which we use language today.

It is also likely that Early Humans possessed a discrete domain of technical intelligence. Now while domain-general processes such as associative learning appear sufficient to account for the technical abilities of chimpanzees, the complexity of Early Human stone technology implies specialized cognitive processes (Mithen 1996). Generalized learning abilities would have been inadequate to attain the knapping skills required to make artefacts such as handaxes and levallois points. To make these, cognitive process for creating mental templates, planning sequences of knapping actions and mental rotations of artefact form would have been required. I have bundled these together to constitute a domain of technical intelligence.

We must add a further specialized cognitive domain of natural history intelligence to this model of the Early Human mind. Perhaps beginning as early as 1.8 million years ago (Swisher *et al.* 1994) Early Humans moved out of Africa to colonize a vast array of environments demonstrating a capacity to rapidly learn about new types of landscapes and resources. The Neanderthals in Europe, for instance, successfully exploited harsh ice age landscapes without the sophisticated technology used by modern foragers in glaciated landscapes and this suggests that they had a profound understanding of the habits of their game. The archaeological evidence of their subsistence activities, which includes that for big game hunting (Mellars 1989; Chase 1986, 1989), implies abilities to read inanimate secondary cues, such as animal tracks and trails, to build classifications of animals and plants on ecological criteria, and to draw on that understanding for building hypotheses about future resource distribution (Mithen 1996). As with the cognitive processes required to make their stone tools, domain-general learning mechanisms would have been inadequate to such tasks.

Recognising that Early Humans had intellectual abilities in the social, technical and natural history domains of thought little different to those of modern humans is essential for understanding their behaviour and the archaeological record. But of equal importance is to recognize the limited degree of accessibility between these cognitive domains, which constitutes a dramatic contrast to the mind of modern humans. Early Humans appear to have been unable to integrate their thought and knowledge from these multiple cognitive domains.

There was, of course, some degree of cognitive connection; tools were required to exploit the natural world, and hunting is likely to have involved social co-operation. But the archaeological record indicates that the behaviour at the domain-interfaces was markedly less complex and sophisticated than that within the domains themselves. This is most effectively illustrated by Early Human technology. As I have noted above, we cannot doubt that Early Humans had the cognitive skills to make complex artefacts in light of the character of their stone tools; similarly we cannot doubt that they had a profound understanding of the habits of the animals they exploited. Yet we have no evidence that they combined their technical and natural history knowledge to make hunting weapons or traps specialized for specific types of game in specific situations. We find no fine grained correlations between artefact types, environments and faunal assemblages of the kind found in the Upper Palaeolithic (e.g. Clark *et al.* 1986; Peterkin 1993) while Mousterian points, which probably served as spear tips, show a monotonous consistency in form across the Old World (Kuhn 1993). The foragers described in the ethnographic record, and those of the Upper Palaeolithic and Mesolithic, were dependent upon such specialized and dedicated tools, but to make these requires a degree of cognitive fluidity that appears absent from the Early Human mind. And consequently Early Humans were unable to integrate their undoubted technical and natural history intelligences to make specialized hunting weapons. Similarly the absence of beads, pendants and tools carrying social information about ownership or group affiliation can be attributed to an inability to integrate their technical and social intelligences (Mithen 1996).

Perhaps the most compelling piece of evidence for this cognitive constraint is that from the fossil record which indicates that Neanderthals were under severe adaptive stress—90% of Neanderthals were dead by the age of 40 (Trinkaus 1995). In such situations it would seem to have made great ecological sense to have applied their technical skills to making beads and pendants to facilitate social interaction, or to have made specialized and dedicated hunting weapons to have improved foraging efficiency. But they didn't. They appear to have possessed a domain-specific mentality: not for them the confusion and conflation of aims and criteria, but a clear sightedness, and a single mindedness absent from the modern mind.

The presence of this domain-specific mentality appears to resolve the paradox between the degree of social complexity and variability we can infer from the archaeological and the fossil/palaeoenvironmental records. The most accurate picture of Neanderthal social behaviour is likely to come from the second of these. We find no traces of social complexity in the archaeological record not because this was absent, but simply because material culture, the natural world, and space were not actively used in social strategies due to the domain-specific mentality.

THE EVOLUTION OF THE MIND

This domain-specific mentality possessed up to 50,000 years ago by all types of Early Humans, whether they be Neanderthals, archaic *H. sapiens* or anatomically modern humans (but see Mithen 1996: 178–184), appears to be the end point of an ever increasing specialization in cognition that began early in the hominid line (Figure 3). In this figure I have suggested that the long term evolution of the human mind has involved an alternation between a type of mind that can be described as 'specialized' and one that can be described as

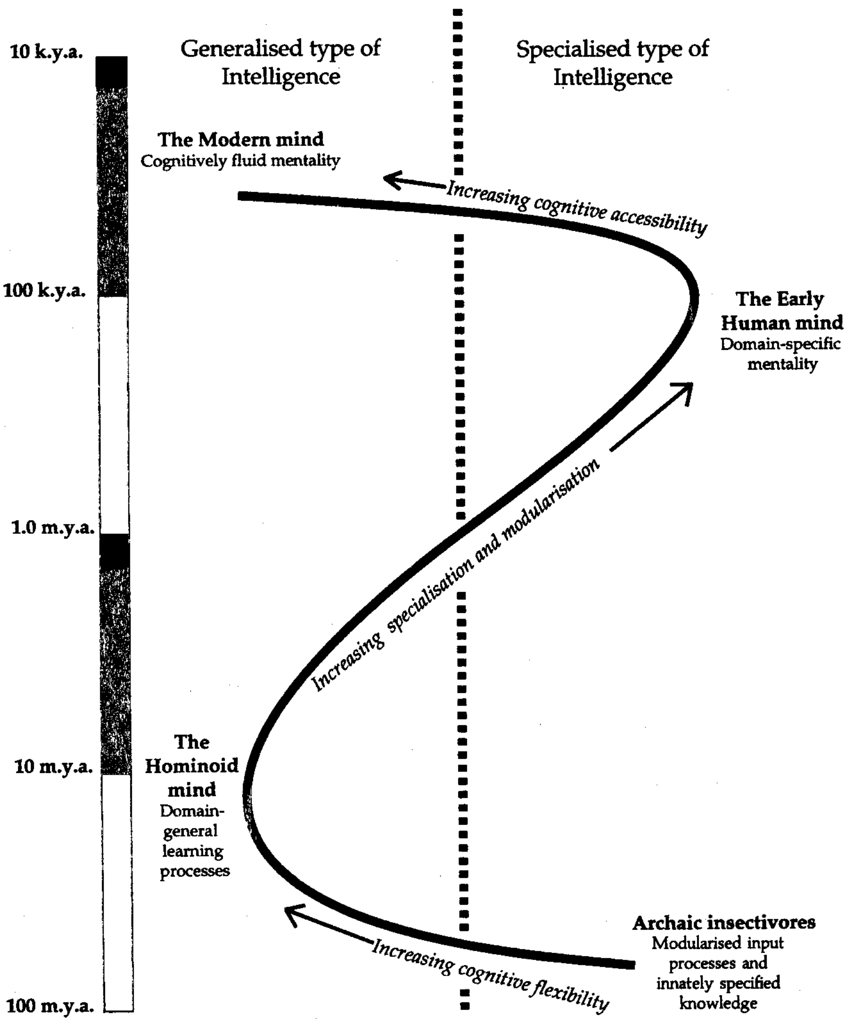

Figure 3. Alternating types of intelligence during 100 million years of human evolution.

'generalized'. If the very earliest primates had a mind composed of specialized hard wired modules for perception and fixed action responses, then it is likely that by 50 million years ago domain-general processes, such as those for associative learning, had evolved providing a new degree of behavioural flexibility. We then begin a period of ever increasing cognitive specialization. As Byrne & Whiten (1992) have argued, soon after 35 million years ago specialized cognitive processes for social interaction had appeared, and then the fossil and archaeological records suggest that specialized cognitive domains for stone technology and natural history appeared about 1.5 million years ago—the timing of the start of the Acheulean and biface manufacture (Asfaw *et al.* 1992)—and a linguistic capacity perhaps 250,000 years ago (Aiello & Dunbar 1993). In effect an ever increasing specialization of the mind.

This process had ended by 40,000 years ago with a return to a generalized type of intelligence. By this time, the Upper Palaeolithic had begun and the archaeological evidence indicates the cognitive fluidity that is so readily apparent when we consider ethnographically documented hunter-gatherers. I suspect that this transition from a domain-specific to a cognitively fluid mentality was related to the transition of the linguistic capacity from one concerned with social information alone, to one that communicates information about all domains of thought and behaviour, an argument I have expanded upon elsewhere (Mithen 1996). Although we only see this archaeologically at the start of the Upper Palaeolithic, quite when the cognitive architecture for cognitive fluidity arose is unclear. Its universality among all humans today would suggest that the potential for cognitive fluidity was in place prior to the spread of *H. sapiens*, and consequently at least by 100,000 years ago, *if* a replacement scenario for the origins of modern humans is correct. But this leads us into the much debated issue of replacement versus multi-regional evolution which goes beyond the remit of this paper (for these debates see Aiello 1993; Frayer *et al.* 1993, 1994; Templeton 1993; Stringer & Bräuer 1994). All that is required for my argument is that by 40,000 years ago, all humans possessed a cognitively fluid mentality that can be represented by Figure 4—a mind capable of complex behaviour at the domain interfaces, the mind that has a conflation of aims and criteria into a single and indivisible semantic content.

The mind as software, natural selection as the blind programmer

This long term pattern of cognitive evolution makes sense from our understanding of natural selection and biological evolution. Consider the analogies of the mind as software, a computer program, and natural selection not as a blind watchmaker (Dawkins 1986), but as a blind computer programmer. How could the relatively simple program of the

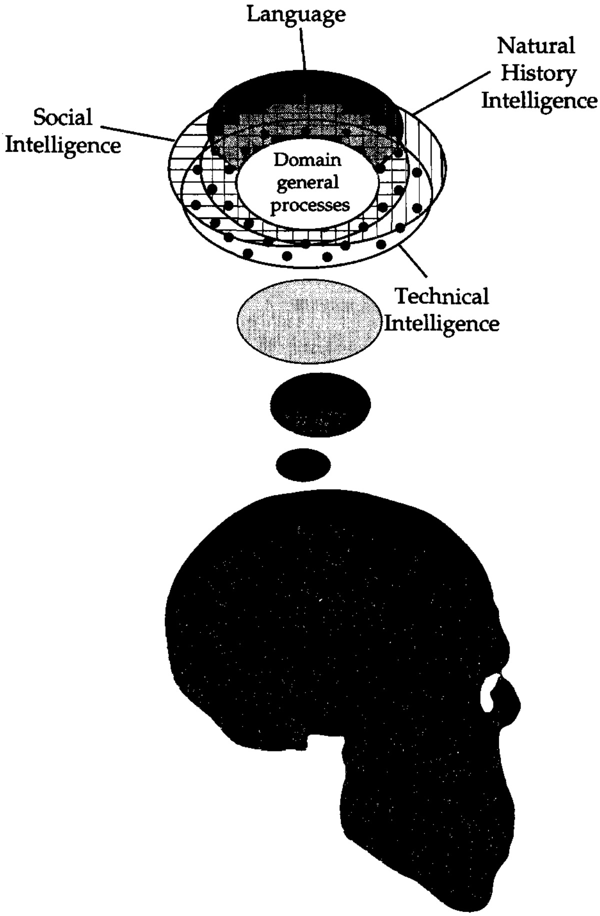

Figure 4. Domain integration of the modern mind.

mind of an early hominoid ancestor be developed to the vastly complex computer program of the modern mind? Note that, as illustrated in Figure 3, both of these have a generalized type of intelligence. Consider how a programmer would do this. Trying to add complexity to all parts of the program at once—which would be represented by moving in a direct vertical line from 'The Hominoid mind' to 'The Modern mind' in Figure 3—would end in a series of untraceable bugs throughout the system. It couldn't be done. A good programmer would follow the curve of Figure 3, i.e. take each routine separately, specialize its function, add the complexity, and test it independently from the other specialized routines. Only finally would these be put back together to make a single complex computer program. This appears to be precisely what natural selection has done when building the modern mind: gradually adding specialized cognitive domains, only to glue these together using language at a very recent date in human evolution. As a consequence it is not surprising that the chimpanzee is often assumed to be so close to humans, such as in the character of its material culture (McGrew 1992) or 'linguistic' capacities (Savage-Rumbaugh & Rumbaugh 1993) because both the chimpanzee and modern humans have a generalized type of intelligence. But these are nevertheless fundamentally different since that of modern humans is based upon an evolved cognitive architecture of specialized cognitive domains.

THE EVOLUTION OF SOCIAL BEHAVIOUR

Attributing Early Humans with a domain-specific mentality is, of course, no more than a hypothesis. Yet it is one that appears to solve the puzzles and paradoxes of the Early Palaeolithic archaeological record, which I have merely touched upon in this paper. It is also a hypothesis which appears compatible with current ideas in evolutionary psychology (e.g. see Barkow *et al.* 1992; Hirschfeld & Gelman 1994). But the domain-specific mentality of Early Humans makes life miserable for archaeologists when trying to reconstruct early prehistoric social behaviour.

With no imposition of social information on tools, no use of body adornment, no use of the natural world for social ends we cannot 'see' social behaviour in the material of the archaeological record before about 50,000 years ago. We can only catch very occasional and blurred glimpses of social variability as this is likely to have been passively reflected in the character of early stone technology (Mithen 1994b).

As a consequence both Mellars (1989) and Binford (1989) appear to be correct: Early Human social groups do indeed look as if their are 'uniformly small'; social structure does indeed appear to be absent. But this is only because the archaeological is interpreted as if Early Humans had cognitively fluid minds. The contradictory inferences about social behaviour that can be drawn from the archaeological and fossil/palaeoenvironmental records suggest that this was not the case, and consequently the nature of Early Human social behaviour remains unclear. All we can be sure of is that Early Human social behaviour must have been something very different from that which we see today among non-human primates, because of the much larger body and brain sizes of Early Humans; it must also have been something very different to that of the hunter-gatherers documented in the ethnographic record, because of the domain-specific mentality of Early Humans. It was a unique type of social behaviour, but one forever lost to us in the darkness of prehistory.

In contrast, our reconstructions of social behaviour during the Upper Palaeolithic and Mesolithic periods are likely to become increasingly refined as further sites are excavated, analyses of existing material undertaken and new methodologies introduced. Similarly, our explanations of the inferred patterns of social behaviour are likely to progress as we understand more fully the relationships between social behaviour and environmental variables, and the specific historical trajectories of social change, and bring theories and models from both behavioural ecology and social anthropology to bear on the data. Bridges between these disciplines can be developed, but the key to this is understanding the major cognitive transition at the start of the Upper Palaeolithic from a domain-specific to a cognitively fluid mentality.

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