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NEANDERTAL SOCIAL STRUCTURE?

Summary. *The cognitive and social capacities of Neandertals have been questioned by a number of authors, while others suggest that such capacities did not differ markedly from those of anatomically modern humans in the last 30,000 years. What does the material evidence indicate? The information that can be gleaned from Middle Palaeolithic sites indicates that there were Neandertal bands of about 12–24 people that formed alliances with 10–20 other bands and had enemy relationships as well. Rituals probably helped hold alliances together. These conclusions indicate that there were language or dialect groups that were probably ethnically self-conscious. Some of the postulated band ranges and population densities in the literature appear unrealistic. Sexual division of labour was probably pronounced and Neandertals appear to have used rudimentary status markers, including predator pelts, bird wings or claws, colorants, and a range of speciality items.*

I see very little difference [in Neandertal social organization] from other higher primates.
(Pettitt 2000, 361)

Robert Davies and Simon Underdown (2006) have chronicled a litany of claims concerning the limited social organization and cognitive abilities of Neandertals, especially as propounded by Gamble (1999), Stringer (2002; Stringer and Gamble 1993), Mithen (1996), Pettitt (1997; 1999; 2000), Wynne and Coolidge (2004) and Mellars (1996; 2005). In sum, various of these authors suggest that for Neandertals there were minimal cognitive abilities; no conception of time; no equivalent of modern speech; no symbolic abilities or even words for tools (therefore no tool typologies and no resulting techno-complexes); minimal or no innovation capacity; an inability to work 'natural' materials such as bone or antler; an inability to establish long-distance social relations; minimal social organization; no complex site structure; no ritual frameworks; and a lack of sexually integrated communities (males and females were supposed to have lived in separate groups). These are damning claims with shades of Marcelin Boule's concepts of Neandertals from a century ago (Fig. 1). Such claims are controversial and questioned by other scholars (Davies and Underdown 2006; Zilhão 2007; Langley *et al*. 2008;

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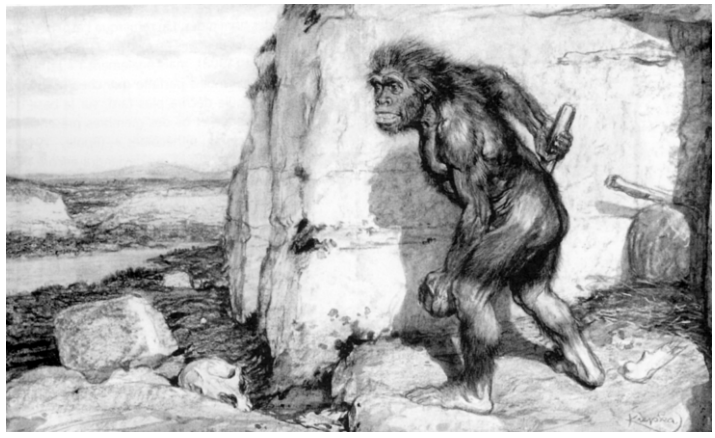

Figure 1
According to Moser (1992), Marcelin Boule's concept of Neandertals was represented in Kupka's illustration published in 1909 in *L'Illustration*.

D'Errico 2003; McBrearty and Brooks 2000; Hayden 1993). Does the archaeological evidence support such minimalist claims for Neandertal abilities? At least in the realm of social structure, there are now sufficient observations on Neandertal behaviour and settlement patterns to be able to address some of these issues.

The kinds of evidence that can be used to address the question of Neandertal social organization include: site size, intra-site patterning, remains from kill sites, deep cave features, burial patterns, indicators of status differences, and the transport distances of lithic or other materials. By using some of these kinds of data, the question of everyday group size can be addressed and is perhaps the most fundamental issue to deal with initially.

LOCAL BAND SIZES

In his overview of Neandertal lifestyles, Pettitt (1997) argued that sites were only occupied by very small groups, perhaps, he repeatedly intimated, by single individuals, and that social organization was not much different from that of chimpanzees. In a similar vein, Rolland and Dibble (1990, 492) argued that the low site densities and small living-floor sizes indicated that Neandertal populations 'had not attained the sociodemographic density and structure threshold that would allow for the coexistence of several "nucleated," identity-conscious communities and the formation of mating networks'. They, like others, interpret the lack of identity-related symbols in Neandertal material culture as confirmation of the lack of group social identities, and, like Wobst (1974; 1975), this is viewed as representing a lack of coherent mating networks. The extreme portrayals of Neandertal social groups as composed of single individuals or small separate groups of males versus females, wandering about the landscape, occasionally joining with other individuals for mating or combat, can probably be rejected in view of recent evidence of group organization.

While it is undoubtedly true that some Middle Palaeolithic sites were used by single individuals or perhaps groups of two or three individuals (e.g. nuclear families or task groups), this is entirely to be expected as a normal camp-site pattern within the range of variation of

contemporary hunter/gatherers. Solitary hunters are more efficient at procuring meat except under special conditions, and their hunting trips could sometimes last for days (Hayden 1981), during which they would establish solitary camps that did not reflect the normal composition of the bands to which the hunters belonged. Thus, it is the larger sites that are more likely to represent normal band sizes. Due to repeated and overlapping occupations that blur the boundaries of group uses of space, there are few Middle Palaeolithic sites for which an estimate of group size can be formulated, but the few that exist provide valuable insights. One way of estimating the number of occupants of sites is through the examination of floor areas used.

Floor areas

There appears to be a fairly consistent pattern of occupational floor areas for some of the most extensively excavated Mousterian sites. Burke (2006, 518) noted that in the Crimea, the size of many Middle Palaeolithic sites is 35–50 sq m. A similar pattern can be detected in European and Middle Eastern sites based on published floor plans. At Molodova I, the floor area of the Middle Palaeolithic structure was about 40 sq m – Klein 1973, 69–70). Similarly, the early Middle Palaeolithic site of Lazaret yielded evidence of a structure that extended 3.5 m from the cave wall and covered about 36 sq m during a winter occupation (Lumley 1969a). In other Middle Palaeolithic caves with what appear to be sharply bounded occupation floor areas indicative of structures, the anthropogenic soils similarly extend about 3.5 m from the cave walls, indicating similar occupation floor areas to that at Lazaret (e.g. at Baume Bonne and Baume des Peyrards – Lumley 1969b; Lumley and Bottet 1965). The Tor Faraj rockshelter in Jordan contained about 45 sq m of excavated living floor extending out about 4 m from the shelter wall, with another possible 45 sq m of unexcavated floor area in the rockshelter (D. Henry 2003; D. Henry *et al*. 2004). The more completely excavated rockshelter of Abric Romaní in Spain had about 70 sq m of occupation floor, extending about 4 m from the wall (Vallverdú *et al*. 2010).

If we use estimates of the floor space per person derived for winter habitations of other hunter/gatherers such as those on the American Northwest Plateau, there should have been about one person for every 2.5–3.0 sq m of floor area (Hayden *et al*. 1996). Floor area per person tends to be tightly constrained in winter occupations so as to conserve the maximum amount of warmth, and people tend to sleep close to walls. In contrast, warm weather occupations have no such constraints and are likely to be much more variable depending on other factors such as defence or wind. In the Middle Palaeolithic cases reported, the rockshelter occupations and the presence of warming hearths indicate cold weather use; and their floor area per person would result in group sizes of between 12–28 people (Table 1). This is very similar to the estimate for group sizes used by Burke (2006, 518) to model Middle Palaeolithic group sizes and ranges in the Crimea. She used the procurement areas for lithic materials as proxy measurements for group ranges, where the principal lithic sources could be 25 km from base camp sites but generally averaged 10–12 km away. She then used estimates of the resulting territory sizes (300–450 sq km) to determine how many individuals could occupy those areas, based on work by Steele (1996). Burke arrived at a *maximum* of 25 people per band territory, similar to band sizes of groups reported in other environments with low resource extraction potentials.

TABLE 1
Middle Palaeolithic floor areas and estimates of numbers of occupants

Site	Floor area (sq m)	Estimated people	Distance from wall
Lazaret	36	12–14	3.5
Baume Bonne	–	12–14	3.5
Baume des Peyrards	–	12–14	3.5
Molodova I	40	14–16	–
Abric Romaní	70	23–28	4.0
Tor Faraj	45 (90?)	15–18 (30–36?)	4.0–4.5

Ethnographic group sizes

Most bands observed in the Australian Western Desert ranged between 10–20 people (about 2–4 nuclear families). Basedow (1914, 147, 162, 173) reported meeting groups of 9, 11 and 15 individuals as well as a single family foraging alone, while Evans and Long (1965; Long 1964a; 1964b) encountered groups of 12, 12, 14, 16, 16, 17 and 22 as well as several nuclear families. Gould (1969a, 6) also reported encountering a group of 13. Davenport *et al*. (2005, 13, 63–4, 113) reported maximum local band sizes of 21 people (including those temporarily missing). The same band sizes characterized a number of Algonkian and Inuit groups in the Canadian Boreal Forest (Kelly 1995, 211). In terms of local band composition and size, it is also significant that Mania (1995, 240) identified three dwelling structures at the Middle Pleistocene site of Bilzingsleben, all of which were 3–4 m in diameter which is about the same diameter as sleeping structures used by nuclear families of Australian hunter/gatherers (Hayden 1979). Thus, ethnographic observations of band sizes in some of the harshest environments in the world, and ethnographic estimates of floor space per capita of hunter/gatherers in cold environments, both indicate that Neandertal band sizes in periglacial Eurasia were probably in the 10–25 person range.

Sleeping areas

The same general number of people per band also results from estimates based on the number of sleeping (warming) hearths at some of these sites. At Abric Romaní (Vallverdú *et al*. 2010), there are eight relatively evenly spaced hearths aligned against the rockshelter wall (with another possible one or two hearths in the unexcavated stratigraphic column). These hearths are interpreted as hearths used to help keep warm while sleeping (Fig. 2). Basedow (1914, 164) similarly observed that Australian desert Aborigines slept ‘with a little glowing camp fire on either side and a brushwood windbreak at the head of them’, and that ‘If several individuals sleep side by side, a fire is made between each pair of bodies . . . This alternate position of fire and man is economical, as each fire serves to warm two natives, one on either side’ (Basedow 1904, 29). These are similar to the warming hearths used in cold weather that I witnessed being used in Australia (Fig. 3). If one person slept between (or on the outside of) each of the archaeologically recorded hearths that were less than a metre apart, and if two people slept between hearths that were spaced out more than this, there would have been about 13 or more occupants at the Abric Romaní. If the central domestic activity hearths were also used for sleeping (e.g. by lower ranking, unmarried or younger band members), then the shelter might have had as many as 20 occupants.

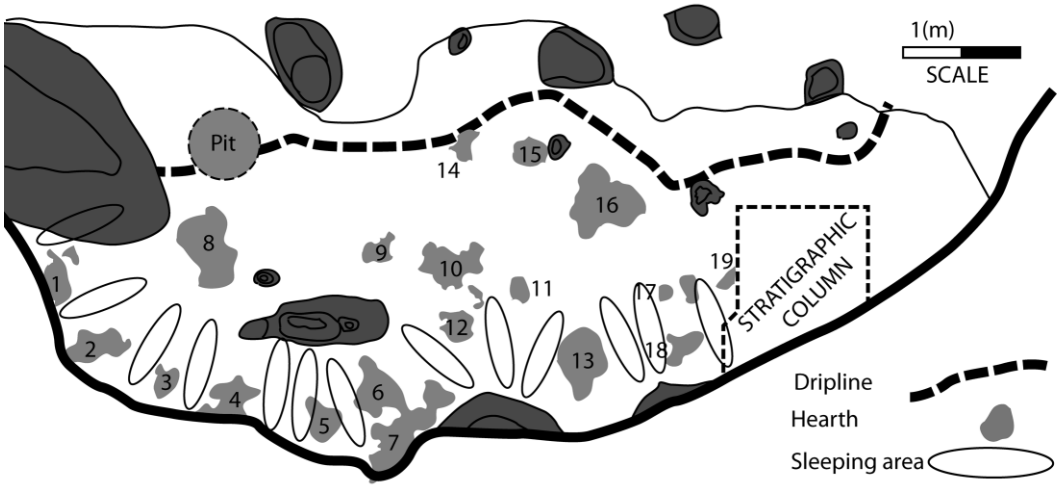

Figure 2
Floor plan of Abric Romaní showing the location of hearths and postulated (added) sleeping areas that could accommodate 13 individuals. If the more central hearths were also used, another 4–5 people may have used the shelter (adapted from Vallverdú *et al*. 2010, 51, 138. Copyright, The Wenner-Gren Foundation for Anthropological Research. All rights reserved).

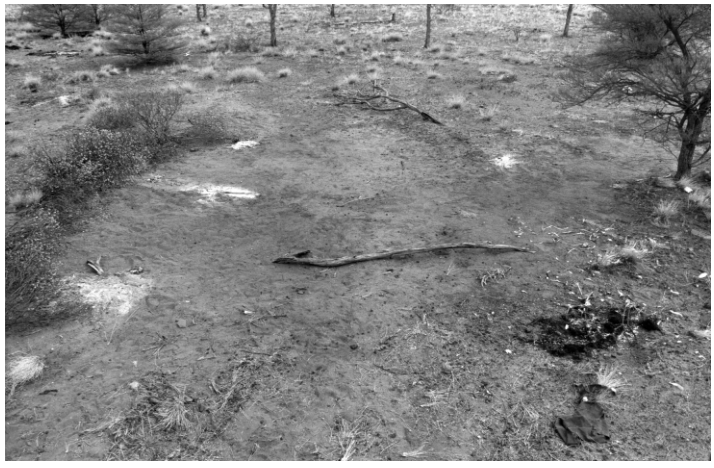

Figure 3
Sleeping hearths (whitish areas near the brush windbreak) and a cooking hearth (centrally located) used by two Pintupi men and the author while camped in the Western Desert. Note the similar positioning compared to Middle Palaeolithic hearths in Figures 1, 3 and 4 (photo by B. Hayden).

Similarly, at Tor Faraj (Fig. 4), there were six identifiable hearth areas against the rockshelter wall considered as sleeping areas, an interpretation reinforced by the recovery of grass phytoliths in the same areas which the excavators interpreted as bedding materials (D. Henry 2003; D. Henry *et al*. 2004). Using the spaces between these hearths, the shelter could

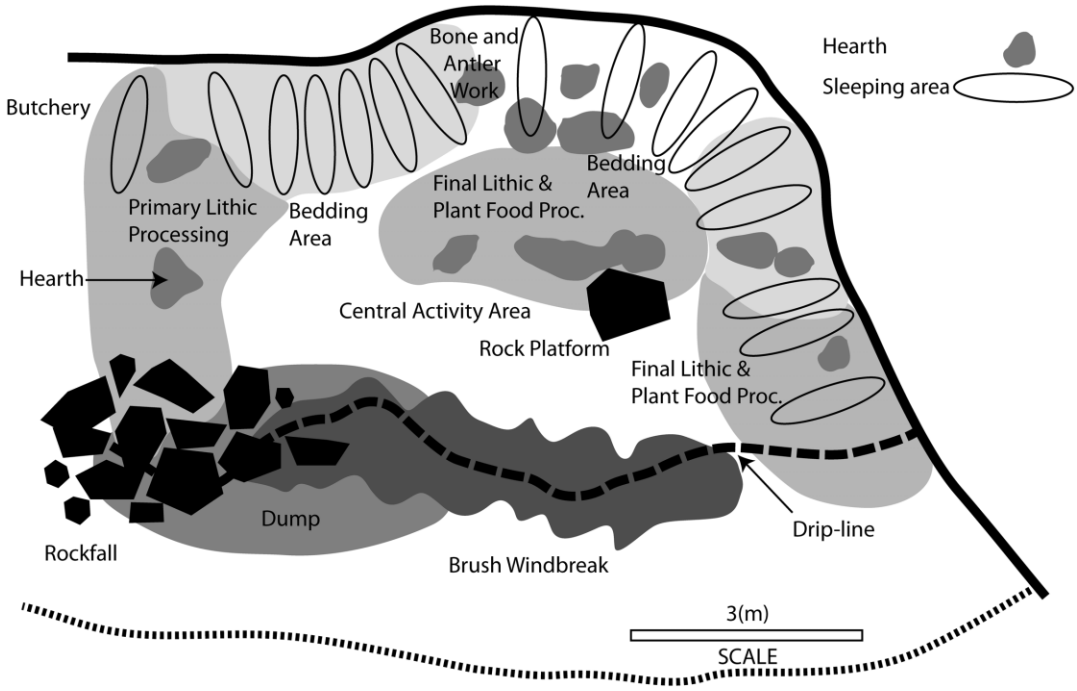

Figure 4
Floor plan of Tor Faraj showing the location of hearths and postulated (added) sleeping areas that could accommodate 16 individuals. If the more central hearths were also used, several more people could have been present (D. Henry 2011, 8).

have accommodated sleeping positions for about 16 people, tightly packed. If the central domestic activity hearths were also used for sleeping, the total could have been about 20 people. The lower of these estimates compares remarkably closely to Donald Henry's (2003, 260–2) estimates of 12–15 people occupying Tor Faraj, considering that his estimate and my estimate were made completely independently, using completely different background data and calculation methods for obtaining the respective number of occupants.

At Molodova I (Fig. 5), there were minimally about seven hearths in proximity to the structure wall (i.e. in analogous positions to the hearths near the rockshelter walls at Abric Romaní and Tor Faraj), and these were presumably similarly used for warmth while sleeping. The spacing of these hearths indicates that about 16 people could have been accommodated around the inside periphery, with possibly another four people sleeping around the more central, presumably domestic, hearths. Thus, the inferred sleeping patterns at Abric Romaní, Tor Faraja and Molodova all indicate that 13–16, or perhaps even 20, people occupied these sites, assuming that the areas excavated fully represent the areas occupied at any one time.

Butchering patterns

In an exceptional study of the Middle Palaeolithic bison kill site at Mauran, Farizy *et al*. (1994, 241; Farizy 1994, 157) detailed the butchering of an estimated 4000 animals. Using

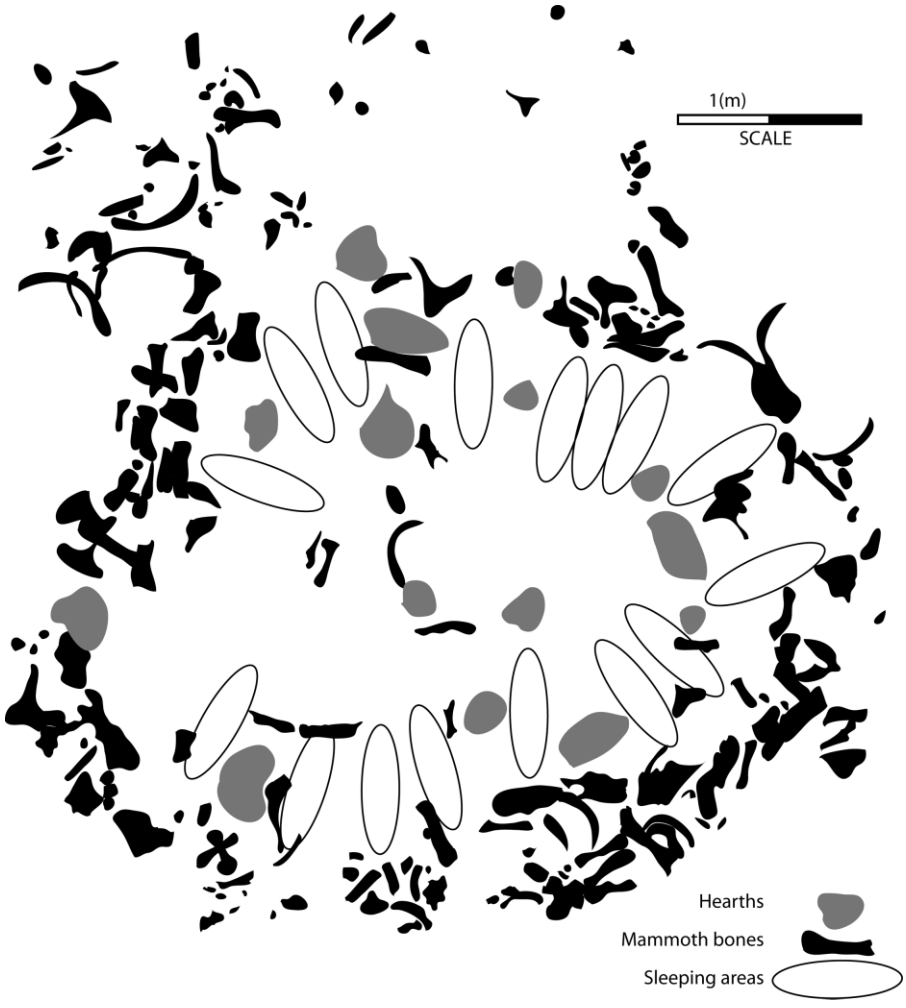

Figure 5
The floor plan at Molodova I showing the location of hearths and the postulated (added) sleeping areas that could accommodate 16 individuals. Again, if several central hearths were also used as sleeping locations, another two or four individuals could have been present (adapted from Klein 1973, 69–70. Copyright by University of Chicago Press. All rights reserved).

ethological and ethnographic analogues together with the spoilage times of meat and marrow and the relatively complete processing of the animals, Farizy *et al*. thought that there was probably only one adult bison killed per hunting event, with such events recurring on a seasonal basis over centuries or millennia. However, they also admitted the possibility that kills of entire small herds of about ten bison could have created the same pattern of faunal remains. The consumption of entire small herds would have necessitated groups with hundreds of individuals which Farizy *et al*. thought unlikely. Based on the amount of meat available before spoilage from single kills, they estimated that the group size could not have been much smaller than 30 people.

Discussion

Thus, multiple lines of archaeological evidence (ethnographic band sizes in harsh environments, occupation floor areas, number of sleeping hearths, exploitation ranges and patterns of meat consumption) all indicate the existence of local bands with about 12–25 people. Band members were probably organized into nuclear families as indicated by the size of habitation structures at Bilzingsleben, which are comparable to the size of family huts in contemporary hunter/gatherer societies. This reconstruction of band size is consistent with what is known about Neandertal technology, subsistence and population densities. It is fairly clear that Neandertals possessed controlled use of fire and had 'home bases' (Rolland 1996; 1999; Mellars 1996). However, they apparently lacked long-term storage strategies (Soffer 1989) or transport aids such as sleds or canoes. The development of these technological features may have been critical to the formation of the much higher population densities exhibited by succeeding Upper Palaeolithic groups. In the Upper Palaeolithic, the ability to harvest seasonally abundant resources and store them for use during seasons of scarcity would have been particularly important in increasing population densities and group sizes (Testart 1982). The density of Neandertal sites and the small extent of most of these sites argue strongly for very low population densities in most regions, as expressed in a number of population graphs (Fig. 6). Population estimates for Neandertals usually range around one person or fewer for every 100 sq km, similar to those for the Australian Western Desert and Canadian Boreal Forest.

Hence, far from the lone nomadic wanderers suggested by Pettitt (or even single families), band sizes of Neandertals appear to be comparable to those of recent hunter/gatherers in similar low-productivity environments. Comparisons between ethnographic foragers and Neandertals in terms of band sizes and social structures from these areas may be insightful. Indeed, Vaquero and Pastó (2001, 1218) and D. Henry *et al*. (2004, 28–9) conclude that the site

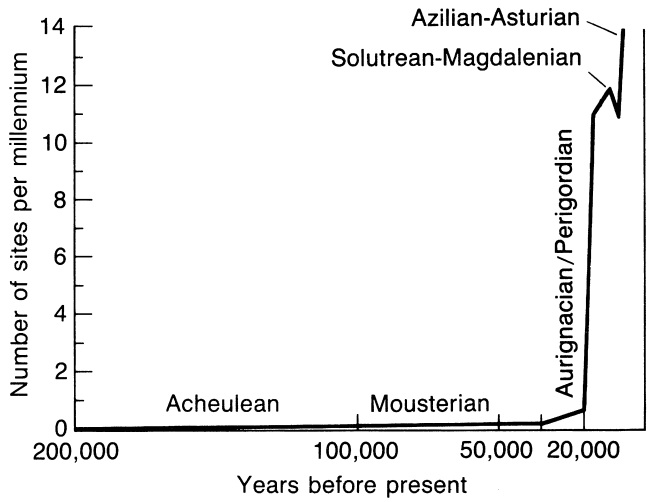

Figure 6
Palaeolithic population estimates for the Lower, Middle and Upper Palaeolithic in Europe (from Hayden 1993, 200, fig. 6.13).

structure at Abric Romaní and Tor Faraj was no different from that recorded from Upper Palaeolithic sites or among ethnographic hunter/gatherers – bearing even 'uncanny' resemblances to ethnographic use patterns. The same conclusions can be drawn from Galanidou's (2000) ethnographic cross-cultural analysis of the use of caves and rockshelters. On the basis of material remains, she especially emphasized the difficulty, or impossibility, of identifying discrete activity areas in caves and rockshelters used by ethnographic groups beyond basic sleeping, general activity and refuse disposal areas.

The lack of site 'structure' in the Middle Palaeolithic is often touted as an indication of the cognitive deficiencies of Neandertals (Pettitt 1997, 219; see also citations in D. Henry *et al*. 2004, 28, Davies and Underdown 2006, and Henshilwood and Dubreuil 2011, 373), but many Middle Palaeolithic sites like those mentioned above display the basic divisions of space that characterize ethnographic hunter/gatherers (see also Cabanes *et al*. 2010 for more evidence of bedding areas). As among ethnographic Australian groups, Neandertals seem to have used warming hearths near walls for sleeping or snacking, and more centrally located hearths several metres from the walls (or equivalents) for more general cooking and day-time use (compare Fig. 3 with Figs. 2, 4 and 5), as well as using separate areas for refuse, butchering and other waste-producing activities. Beyond these basic distinctions, it is difficult to identify much structuring of space, either for Neandertals and Upper Palaeolithic occupations, or for more modern uses of caves and rockshelters. Donald Henry (2003; D. Henry *et al*. 2004) has documented as much complexity in the Neandertal occupation at Tor Faraj as seems to exist at any other residential sites during the later Palaeolithic.

MACROBANDS AND MATING NETWORKS

Having reviewed the evidence for the existence of relatively small Neandertal local bands in Europe, the Near East and the Ukraine, it is possible to address issues of larger-scale social organization involving social ties between bands and fluidity of band membership. Farizy *et al*. (1994, 241) rejected the possibility that entire small herds of bison were killed in single events at Mauran because 'the gathering of more than 100 people for a communal hunt, in the spring or autumn, bringing together several tribes to feast, exchange and reconfigure the groups is difficult to imagine for the Middle Paleolithic'. As Féblot-Augustins (1993, 251) has emphasized, 'visiting' with bands 'outside the exploitation area of a subsistence unit . . . is rarely contemplated for the Middle Paleolithic . . . Indeed, alliance networks are supposed to have developed only in the Upper Paleolithic (Gamble 1986).' Yet, she concluded that there was no fundamental difference between Middle Palaeolithic and Upper Palaeolithic material transport patterns aside from the longer transport of bulk material in the Upper Palaeolithic (Féblot-Augustins 1997a, 80–1), especially nodules and pre-cores which, I think, were probably carried via transport aids in the Upper Palaeolithic, whereas Neandertals probably lacked such transport aids. In both Middle and Upper Palaeolithic periods, the vast majority of raw materials (both tools and debitage) came from within 5 km of sites and the items transported beyond that distance were largely finished tools.

If we are to contemplate the possibility of intergroup alliances in the Middle Palaeolithic, it will be useful to consider why bands should be expected to create alliances. Wobst (1974; 1975) has argued that local band sizes of most hunter/gatherers are not self-sustaining in the long run and will eventually die out due to vicissitudes of births and deaths and sex ratios. Wobst proposed that the minimum reliable, self-sustaining population should be about 500

people. This would necessitate the interaction and mating between a number of local bands. This, in fact, is the same *average* size population that Birdsell (1953; 1968) found to characterize dialect/language groups with identified boundaries in Australia, although these group sizes varied from 200–800. Tindale (1974, 31) later revised this estimate down to an average of 450 people.

With local band populations in the 15–25 person range, this would require the interaction of anywhere from 8–53 local bands of Neandertals (assuming macroband sizes of 200–800). However, given the low population densities that seem to characterize most of the Middle Palaeolithic, the lower end of this estimate is probably most realistic. In fact, Tindale (1974, 10) notes that 20 or more bands often considered themselves as 'one people' ('one countryman' in Myers 1986) that formed dialect, or linguistic, 'tribes'. Wobst argued that Neandertal population densities were too low for these mating networks to be effectively closed, or to create distinct groups of connubia with distinct cultural identities that might be symbolized by different material styles. Instead, he postulated multiple series of overlapping mating networks that were not mutually exclusive in the Middle Palaeolithic, and therefore did not develop distinct cultural identities or material styles (in theoretical contrast to the Upper Palaeolithic hunter/gatherers who had higher population densities, shorter interaction distances, and some distinctive art or artefact styles).

As noted by Féblot-Augustins (1997a; 1997b) and Davies and Underdown (2006), some authors deny that Neandertal local bands interacted much with any other bands since almost all their lithic materials were from local sources, usually less than 20 km distant. However, both the demographic perspective argued by Wobst and basic ecological principles in which alliances between bands would have been highly adaptive for coping with times of severe resource scarcity (Wiessner 1982; Yengoyan 1976; Hayden 1987) provide compelling reasons for assuming that Neandertal local bands must have had cooperative social ties with other local bands. If a band had distant allies, members could avoid starvation by 'visiting' allied bands just as ethnographic hunter/gatherers have done in recent times. Gilman (1984, 122) even goes so far as to maintain that the low population densities and limited, unreliable resource base of Neandertals required that they maintain cooperative alliances with *all* their surrounding neighbours, echoing the overlapping interaction and mating networks postulated by Wobst. Burke (2006, 518) adopted a similar interpretation for Neandertal groups inhabiting the Crimea, stating that the 'maximum group, or regional population, of Crimea is unlikely to have existed as an entity as such but rather as the sum total of social interactions between individuals as their paths intersected'.

There are several problems with the 'diffuse' interaction model of Neandertal social networks postulated by Wobst, Gilman and Burke. First, in some of the harshest environments in the world inhabited by hunter/gatherers without transport aids such as the Western Desert of Australia where resource and population densities were very low and were comparable to those of Neandertals, distinct interaction networks of about 200–500 people *did* nevertheless form; and they created group identities with distinct languages or dialects and distinct group names. These larger groupings must have represented preferential interaction networks with recognized (although permeable) boundaries. In fact, Tindale (1974, 32) determined that 86 per cent of Australian Aborigine marriages took place *within* these tribal dialect boundaries, which would seem to constitute fairly closed connubia. To be sure, interaction and movement between local bands as well as between other dialect macrobands was high in order to maintain alliances, resulting in widespread homogeneous technology and material culture across macrobands throughout the Western Desert. Thus, to some extent, the mating and alliance networks

overlapped and were not completely 'closed connubia'. But to argue that the low population densities of the regions could have excluded the formation of distinct cultural identities, dialects, local cultural traditions or preferential mating networks is as unrealistic for the Australian Western Desert as it is for Eurasian Neandertal groups. Such claims are based on contrived theoretical suppositions rather than empirical reality. What cultural homogeneity over large areas represents is simply high interaction rates between bands, probably for subsistence alliances, not a lack of social identities, preferential mating networks or symboling abilities.

Moreover, contrary to Gilman's suggestions, in Australia, there was no dire imperative to maintain alliances with *all* surrounding bands. Rather, typically, there were at least a few neighbouring or distant bands that were considered mortal enemies with which reciprocal raids periodically took place. A similar situation seems to be represented in Middle Palaeolithic sites where indications of cannibalism are hardly lacking (Fernández-Jalvo *et al*. 1999; Carbonell *et al*. 2010; Maureille 2008; Defleur *et al*. 1999; Le Mort 1988; Lumley *et al*. 1972, 615–20). It is difficult to imagine that there would not have been linguistic terms to refer to 'enemies' such as these versus friendly 'allies'. Such distinctions, almost by definition, provide a basis for 'ethnic' self-consciousness. That the richer and more reliable resources exploited in the Upper Palaeolithic, together with the increased subsistence security provided by storage practices, could have resulted in lower levels of interaction between local bands or more closed macro mating bands seems possible for average individuals (but probably not elites in the complex hunter/gatherer societies of the Upper Palaeolithic – see Hayden 2001; 2008; Hayden and Schulting 1997), but with uncertain consequences for any distinct cultural identities.

Thus, on theoretical and ethnographic grounds, it is possible to envisage periodic aggregations in order to maintain alliances by Middle Palaeolithic local bands at least at times when resource conditions provided predictable abundances, such as appears to have been the case at Mauran and a few other sites like Coudoulous. The size of such gatherings could have varied between 50 people (2–3 local bands) to several hundred people (10–20 local bands). As previously noted, Farizy *et al*. (1994, 264) entertained the possibility that the kills at Mauran could have been organized and exploited by groups of about 200 people. However, they rejected this in favour of single animal kill events undertaken by smaller local bands simply on the basis of low regional population density estimates and existing assumptions about Neandertal abilities. Yet, the ethnographic record of the Western Desert of Australia once again indicates that periodic aggregations of 200–300 people were recurring periodic features of social life even in some of the lowest population densities in the world where transport aids were lacking. In 1934, Tindale (1935, 199) recorded an aggregation in the desert involving 270 people. Similarly, Bates (1938, 121–2), Strehlow (1947, 65), Gill (1968, 122) and Gould (1969a, 102–3) all reported aggregated groups in the desert of 130 to several hundred people. Any large groups such as these, or even the aggregations of 80–100 individuals in desert Australia such as those documented by Basedow (1914, 113, 121, 133), could have engaged in the communal hunting drives postulated as necessary for killing one or more bison or other large game in the Middle Palaeolithic. Such communal hunts of large herbivores like bison would have provided far more food than the paltry rabbits, marsupial moles and rabbit bandicoots used to sustain the 270 people gathered for the initiation ceremonies in Australia that Tindale observed. Therefore, it seems entirely possible to me that Mauran could have been a locus where a number of Neandertal bands came together in temporary aggregations of 200 people or more. While communal hunting tactics may have been used when large numbers of people came together at aggregation sites like Mauran or Coudoulous, communal hunting of large game probably would not have been feasible or

effective if undertaken by individual local bands with total memberships of only 12–25 people, including women, children and aged adults but only a few hunters in their prime. This may have been a critical difference from larger-sized Upper Palaeolithic local bands that may have been able to conduct communal hunts for large game on a more regular basis.

Thus, as Gilman (1984, 119–20) and Binford (1968) have suggested, the critical difference between Neandertal and Upper Palaeolithic groups may have been differing social organization (specifically smaller Neandertal bands). An effective storage technology developed in the Upper Palaeolithic would have been a key element that enabled groups to live in larger-sized local bands that could engage in communal hunting drives for much of the year and store the surplus thus generated for lean periods of the year. This stored surplus would also maintain higher population densities, and provide Upper Palaeolithic groups with the competitive advantages of sheer numbers.

In sum, aggregated Neandertal macrogroups of 80–300 people appear to have been capable of mounting drives that netted a few animals only during aggregation times. They probably could have killed many more animals if they had any use for greater quantities of meat. However, all indications are that they only killed as many animals as they could immediately use (Farizy *et al*. 1994). They had not developed the technology needed to store food for long periods, and this was probably a critical factor constraining local band sizes and population densities, but this lack of storage technology would not have constrained brief aggregations.

ANNUAL SUBSISTENCE RANGES FOR BANDS

In identifying Neandertal local and macroband social groups in the archaeological record, determining realistic annual subsistence territorial sizes for bands becomes an important concern. My own work in the Australian Western Desert indicated that band ranges were about 1000 sq km for groups *without transport aids* (Hayden 1981, 382) while Gould (1969b) and Davenport *et al*. (2005, 64) reported ranges of *c*.2000–2500 sq km. I think that it is highly unlikely that Neandertals had transport aids like canoes or sleds, or that without such aids their exploitation ranges could have been much more than 2500 sq km, or that their population densities could have been much lower than 1 person/100 sq km. Tindale (1974, 10, 31) places the *absolute maximum* area that a full *macro*band (see below) could occupy at about 120,000 sq km (a territorial diameter of 400 km). With approximately 20 constituent bands (Tindale 1974, 10), this would yield average local band territories of about 6000 sq km. However, this is the most extreme case, and most band territories in the Western Desert were much smaller as indicated by simply taking Tindale's (1974, 31) and Kelly's (1995, 222–3) lowest estimates for overall population density for Western Desert groups (0.5–1.0 person/100 sq km), and multiplying this by the number of people in a local band (10–25). This yields a range of 1000–5000 sq km (i.e. local band territorial radii of about 18–40 km) for the absolute worst environments. More normal values for extreme environments were considerably less than 5000 sq km. And, undoubtedly, it is always possible that Neandertal population densities were even higher than these extreme estimates resulting in much smaller band territories, especially in refugia like the Perigord or the Crimea, or during warmer interglacial/interstadial periods. There are no indicators that I know of for any groups lacking transport aids being able to survive over the long term at densities lower than 0.5–1.0 person/100 sq km. These would appear to be the minimum sustainable population densities for any hominin populations *lacking transport aids*, otherwise there would be no reason why anatomically modern humans would not have occupied even more marginal environments,

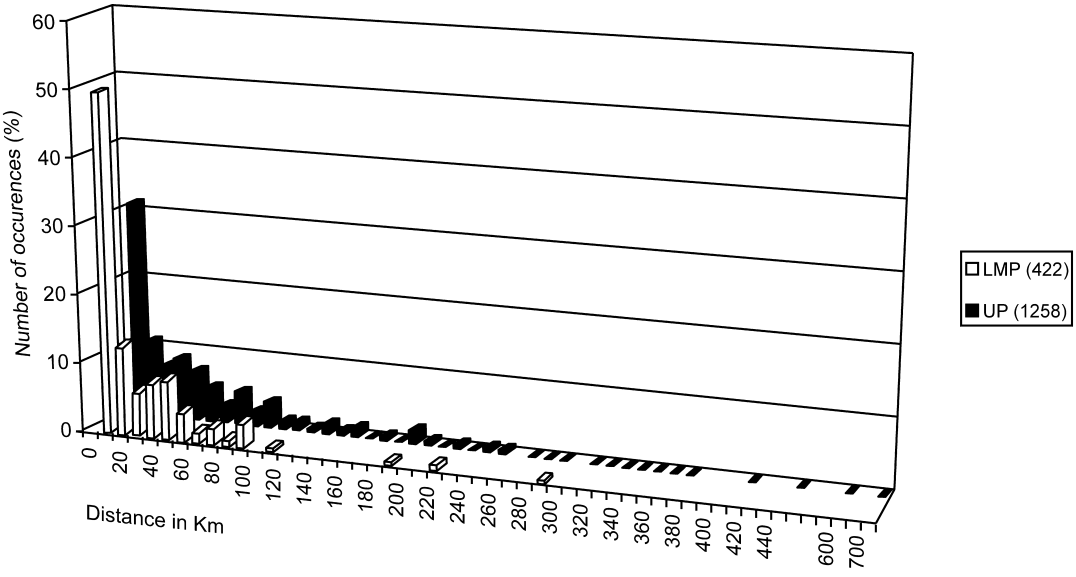

Figure 7
Frequencies of individual artefact distances to lithic sources from Middle Palaeolithic sites showing the great bulk of raw material derived from within 5 km of sites (suggested as the site catchment area), as well as a lower but significant number of artefacts derived from 20–30 km of the sites (suggested as local band ranges), and a small number of artefacts derived from distances up to 300+ km (suggested as the extent of alliance networks between bands) (from Féblot-Augustins 1997a, 62, fig. 3).

especially with the use of better technologies. The lower limit of Neandertal population densities may even have been higher if their energetic requirements were greater than anatomically modern humans, as suggested by Macdonald *et al*. (2009, 217), since these authors argue that Neandertals would have moved less distance in their yearly round than anatomically modern humans. Thus, population densities that are postulated to be significantly lower than those recorded ethnographically should be viewed with extreme scepticism.

When we turn to archaeological indicators of band movements, we find that there were three tiers, or plateaux, of distances represented according to Féblot-Augustins' (1993, 217; 1997a, 61) studies of distance to raw material sources from Middle Palaeolithic occupation sites (Fig. 7):

1) 60–98 per cent of all lithic materials including cores and blanks came from within 5 km of all the sites;
2) usually 1–2 per cent (but always less than 5 per cent) of materials came from 5–20 or 30 km distance from the sites and they consisted mainly of tools and blanks;
3) A few entirely finished tools consistently were made on materials from 20 or 30 to 100 or even 300 km away (see also Slimak and Giraud 2007, and Fernandes *et al*. 2008 who report similar patterns).

Féblot-Augustins (1993, 214) interpreted almost all of these distances in terms of seasonal moves within band subsistence exploitation ranges (up to 250 km), and she postulated local band territories of 13,000 sq km, reserving intergroup interactions only for materials transported

300 km or more (Féblot-Augustins 1993, 217, 251; 1997a, 77). However, I think such large subsistence ranges (and even the ranges of *c*.5000 sq km postulated by Fernandes *et al*. 2008) are unrealistic based on the likely lack of transport aids in the Middle Palaeolithic and the ethnographic evidence reviewed above. In fact, at population densities of 0.5–1.0 person/100 sq km for the European Middle Palaeolithic, subsistence ranges of 13,000 sq km would mean *local* band sizes of between 65 and 130 individuals, which is difficult to conceive of and for which no supporting data exist.

Instead of Féblot-Augustins' very large subsistence ranges, I would suggest: 1) that the 5 km radius from which the vast bulk of raw material was obtained corresponds to the normal subsistence exploitation range for bands while they occupied a given site, as is consistent with ethnographic observations of hunter/gatherers' usual foraging ranges of up to 5 km (per Higgs and Vita-Finzi 1972; Hayden 1981, 379–81); 2) I would interpret the tools and blanks (generally without bulk raw lithic material) from the 5–20 km radius (and possibly up to 50 km – as seems to be the pattern in Figure 7) as curated tools carried from site to site by individuals belonging to a single local band and travelling within the full band's normal subsistence territory (i.e. *c*.1250–2800 sq km); 3) I would view the very small but consistent number of finished lithics derived from more than 50 km, even up to 300+ km, as most likely representing curated tools transported, used and discarded in the course of episodic interactions between bands, e.g. during multi-band aggregations or alliance visits. Band ranges of 1250–2800 sq km within a 13,000 sq km interaction network would result in 5–10 or more small local bands forming a larger 'macroband' or mating network as previously discussed.

In sum, I think there are very good reasons for thinking that there were linguistically distinctive Neandertal groups of about 200–500 that preferentially interacted and intermarried with each other and maintained some sort of group identity, which also distinguished them from enemies whom they occasionally killed and cannibalized. Neandertals may not have used lithic materials to express relationships or interactions, but it is difficult to imagine that they were as cognitively impaired or as socially isolated as some archaeologists would have us believe.

SOCIAL ROLES AND STATUSES

The sexual division of labour

At a very basic level, Pettitt (2000, 361) and Kuhn and Stiner (2006) have questioned whether there was any significant sexual division of labour among Neandertals or even many age differences, thereby contrasting Neandertal behaviour with the almost universal existence of a strong sexual and age division of labour among anatomically modern hunter/gatherers. Kuhn and Stiner argued that European Neandertals were heavily dependent on meat resources and that the cooperation of *all* band members would have been necessary to procure meat reliably on a daily basis, with women and children acting as drivers in hunts leaving little time for other activities such as gathering plant foods. In contrast, they portrayed Upper Palaeolithic groups as having had a much more pronounced sexual division of labour, which enabled women to exploit plant resources, thus widening the subsistence breadth and adapting groups more effectively to the environment, and resulting in higher population densities.

While this is an intriguing idea, it should be pointed out that Inuit groups that rely almost exclusively on meat exhibit just as strong a sexual division of labour as groups in more temperate or tropical environments. Arctic women are responsible for tanning hides, making clothes,

cooking and providing warmth, while men construct dwellings, hunt and fish. In fact, cross-culturally, the more important that hunting is in forager diets, the more strongly developed the sexual division of labour tends to be (Hayden 1981, 405). On this basis alone, Neandertals should have had a strongly developed sexual division of labour.

Moreover, in contrast to Kuhn and Stiner's claims that the Middle Palaeolithic environments held little prospect for worthwhile exploitation of plant foods with Mousterian technology (nuts and grass seeds being dismissed as too costly to exploit), in fact there are indications that the calorie-rich inner bark of some trees was being used for food in the Middle Palaeolithic (Sandgathe and Hayden 2003), while grasses and a wide range of plant phytoliths have been preserved in the calculus of Neandertal teeth (A. Henry 2009; A. Henry and Piperno 2008; A. Henry *et al*. 2011). Couplan (2009) has also documented hundreds of plant species that could have been used in the Middle Palaeolithic. A. Henry *et al*. have concluded that Neandertals ate a similar range and a similar proportion of plant foods as Upper Palaeolithic individuals. Starch-rich roots such as those of various lily species, cattails and seeds of rushes could have been prime targets for use as plant foods in the Middle Palaeolithic (Hardy 2010). Evidence from Near Eastern Middle Palaeolithic sites like Tor Faraj and Kebara also indicates that Neandertals were not neglecting plant foods (Madella *et al*. 2002; Cabanes *et al*. 2010).

Thus, if later European groups had higher population densities and larger group sizes than Neandertals, it does not appear to have been because they had developed a sexual division of labour or been able to use plants, but simply because Upper Palaeolithic groups had developed improved technological means (probably including transport and storage techniques) for exploiting new resources or exploiting resources more intensively. In contrast to Kuhn and Stiner, there seems to be no good reason for assuming that Neandertals lacked a sexual division of labour, especially given the well documented pattern throughout the hunter/gatherer world of adult males specializing in hunting and defence of the group. One can also postulate, as has Isaac (1978), that such a division of labour created an important foundation for the establishment of relatively long-lasting male : female bonds that formed the basis of nuclear families from Lower Palaeolithic times until the ethnographic present.

SOCIOECONOMIC STATUS

Few archaeologists have broached the topic of differential statuses within Neandertal band societies. Pettitt (2000, 362) thinks that any status distinctions would have been based on physical characteristics such as size, strength and agility, or the ability to avoid trauma – more shades of Marcelin Boule's concepts of brutish Neandertals that dominated others by force. In Pettitt's view, the physical body was the basis of society, much as in the animal world. However, the possibility of more elaborate status differences is worth considering, given a number of material indicators. These include burials, care of certain aged or infirm individuals, prestige items, personal decoration, and evidence of exclusive ritual practices.

While some writers question the reality of intentional Neandertal burials, the consensus among most Old World archaeologists is that there were at least a limited number of *bona fide* intentional burials (20–30 as estimated by Langley *et al*. 2008; also by Pettitt 2000, 358). Some of these may have been relatively shallow graves (Pettitt 2002), while others (e.g. Régourdou, Kebara, St. Césaire, La Ferrassie, Shanidar) may have been more substantial interments. What is clear from the available evidence is that there were remarkably few intentional burials and that

these sometimes were concentrated in specific locations. This same pattern also characterizes Upper Palaeolithic burials.

How can the rarity of Neandertal burials be explained? One possibility is that only the most important individuals or families may have been given burial treatment. Even in the nineteenth century, not all individuals were buried among the Northwest Coast hunter/gatherers. Dead slaves were simply tossed into the ocean or left on refuse heaps. Traditionally, most Tibetan families left their dead on the ground surface as well, although high-ranking monks were treated differently. Probably the best case for Neandertal burial being used for individuals of unusual status is the burial at Régourdou. This individual was accompanied by an interred bear enclosed in a dry stone wall, capped by a massive thin limestone slab 2 m long (Bonifay 1964; 1965; 2002). A smaller, but similar limestone slab with cup marks covered a child burial at La Ferrassie (Peyrony 1934, 34–5).

A further possible indication of elevated status is the fact that the skull was missing from the burial at Régourdou, as well as at Kebara. Much later in the Neolithic, skull removal was associated with ancestor worship (Kuijt 1996) but may also have been due to trophy-taking in violent conflicts (Testart 2008). There are also some instances of cranial deformation in Neandertal skeletons (Trinkaus 1982) which among most ethnographic groups, including Northwest Coast Indians, signified elite status. One must also wonder if the few instances of caring for elderly and infirm individuals (e.g. Shanidar 1 and 5 – Trinkaus and Zimmerman 1982) might not reflect a special status different from normal people who might be simply left to die when they became incapacitated (as proposed by Pettitt (2000, 357) and as practised among the Eskimo in the form of senilicide). Such individuals, as well as the interred infants, would have been incapable of using force to maintain dominance or status. It may also be significant that the most elaborate graves, at Régourdou and La Ferrassie, were in areas of unusually abundant resources during the Würm glaciation. In fact, Régourdou is only a few hundred metres from Lascaux and both were located near very productive hunting areas of the Vézère River during glacial periods.

Other indicators of the special status of individuals include the recovery of the skull, phalanges and tail vertebrae of a leopard in the Middle Palaeolithic deposits of Hortus (Lumley 1972). Marshack (1988, 71) pointed out that these bones were most likely from a leopard skin worn as personal decoration which probably indicated higher social status. In addition, Soressi and d'Errico (2007; d'Errico 2009) have shown that the shaped manganese oxide 'crayons' that occur in a number of Middle Palaeolithic sites appear to have been used to draw lines on soft materials like skin or hides, which presumably would have been a way of communicating information (such as status) as proposed by Kuhn and Stiner (2007, 46–7 – see also Zilhão 2007). Raptor wings, feathers and claws appear to have been used by Neandertals in a similar fashion (Peresani *et al*. 2011).

Bednarik (1992, 34–5), too, chronicles a long list of personal ornaments from Middle Palaeolithic sites, including perforated animal teeth (mainly from carnivores) and perforated bones and shells, as well as shaped, engraved, transported and/or ochred shells, minerals (pyrites, quartz crystals) and other objects, most of which were probably personal items reflecting some prestige. Langley *et al*. (2008) present a similar list (see also Zilhão *et al*. 2010). The occurrence of these objects seems to indicate the possible initial appearance of some status differences within groups in favoured locations. It can be assumed that any such status differences would have been relatively underdeveloped compared to later manifestations in the Upper Palaeolithic such as the burials at Sungir. Since status differences reflecting socioeconomic inequalities

appear to have been closely associated with abundant resources among ethnographic hunter/gatherers (Hayden 2001; 2008; Hayden and Schulting 1997), it may be that Neandertal status distinctions also emerged primarily in areas of more abundant resources and higher population densities, such as the Vézère Valley, and were based to some degree on control over resources and/or labour.

A final indication of special status consists of the existence of difficult-to-access ritual areas with space for only a few people. The best example of this occurs at Bruniquel Cave. At Bruniquel, 200 m from the cave entrance – which I found unusually difficult to access – in total darkness, Neandertals built a fire and constructed an oval of broken stalagmites and stalactites with an enclosed floor area of about 14 sq m (Fig. 8; Rouzaud *et al*. 1996). Using the same estimates of floor space per person employed previously, this 'structure' would have been able to accommodate 4–5 people. It seems certain that this could not have been a normal habitation structure, and the most plausible alternative is that it was the meeting place for some type of ritual group. Such a group could plausibly have consisted of higher ranking members of a local band (e.g. the adult initiated men or the heads of local nuclear families), or, as seems more likely to me, the group may have consisted of important members from several neighbouring local bands who engaged in common rituals in order to strengthen bonds of cooperation between bands, just as was the case with Aboriginal bands in the Australian Western Desert (Hayden 2003, 32, 99–103). Gilman (1984, 122) similarly argued that in order to maintain cooperation in alliance networks, ritual sanctification of such alliances would have been important, in much the same way that totemic ancestors sanctified cooperative and alliance relationships in Australian rituals. In the Upper Palaeolithic, it is common to view deep caves as having been used by a privileged minority for conducting exclusive rituals (Lewis-Williams 1994; 1995a, 150; 1995b, 19; Beaune 1995, 238), and this was probably true as well for those who ventured into deep caves in the Middle Palaeolithic.

Other occurrences of small occupation areas deep inside caves have been reported from Middle Palaeolithic sites (see Hayden 2003, 102), perhaps the most striking being the Galérie Schoepflin at Arcy-sur-Cure, where the sharply demarcated occupation floor remained intact on the ground surface just as Neandertals had left it. Neandertals probably did not use this small, narrow passage for normal habitation since it was in an area of complete darkness, barely a metre in height at its centre with walls that sloped down even lower (Leroi-Gourhan 1956; Girard 1976, 53; Farizy 1990, 307; 1991; Baffier and Girard 1998, 18–19). From the published photographs, it is difficult to conceive of more than four or five people at most using such a space, yet they managed to drag into it a variety of materials and food, including a mammoth tusk which, one would assume, was for symbolic reasons.

If meetings in dark caves such as Bruniquel and Galérie Schoepflin were used ritually to affirm and sanctify alliance relationships between local bands, such events would most likely take place during seasonal or episodic aggregations of several local bands, as was the case in Australia. At these aggregations, enough people would have been present to make communal hunting drives of bison or other animals possible and effective, as at Mauran. However, these would undoubtedly have been episodic events. During most of the year, the small size of local bands would probably preclude the effective use of communal drives and the reliable harvesting of large amounts of meat that could be dried and stored.

The selective (occasionally elaborate) burials, head deformations, special treatment of some older or young individuals, skull removals, indications of special clothing or painted decoration, personal adornments or prestige items, and privileged use of deep caves for exclusive

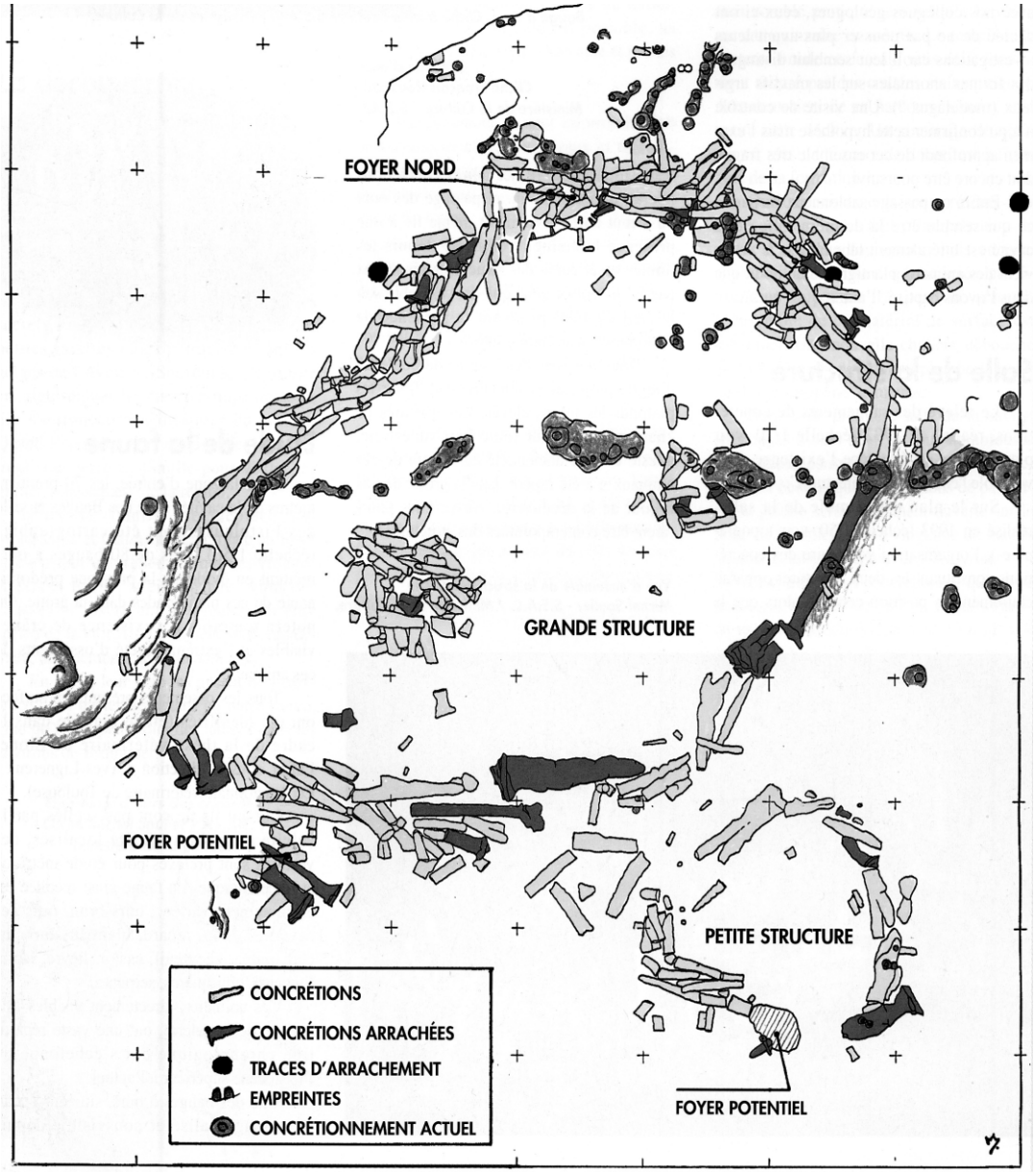

Figure 8
The 'structure' of broken stalagtites arranged in two circles and containing a hearth (dated to 50,000 BP) 200 m inside Bruniquel cave (Rouzaud *et al*. 1996). Such an occurrence seems to indicate secret rituals held by small exclusive groups of Neandertals.

rituals seem to suggest that some individuals or families in some Neandertal societies had more elevated statuses than others. What might this status have been based on besides brute force (the exercise of which would not require these kinds of symbolic material status displays)? Possibilities that immediately come to mind are: kinship (family or lineage heads), ritual (shamans or similar roles), political roles (in establishing alliance relationships with other bands), warfare (powerful warriors or raid organizers), and economic production (the production and use of some surpluses in the most favourable areas for possible use in a variety of aggrandizer strategies – see Hayden 2001; 2008). At this point, it is not possible to identify which of these factors may have been involved in the development of elevated status among Neandertals. A number of these sources of special status may even have been combined or used jointly. In any case, it is tempting to see the occurrence of many status indicators clustering in specific geographical areas such as Arcy, the Vézère Valley or Shanidar as providing some link between food production potentials and status differentiation, although status was undoubtedly expressed in other terms as well.

CEMETERIES

Another feature of the Middle Palaeolithic archaeological record that has implications for social organization is the occurrence of what appear to be cemetery locations, or at least focal burial areas. A great deal has been made of the lack of symbolic material culture in Middle Palaeolithic sites, supposedly indicative of a lack of socially self-aware groupings. However, such claims ignore the implications of locations repeatedly used for burials. La Ferrassie provides the best example of a Neandertal cemetery with at least six or seven burials that appear to have been arranged in spatial patterns, directionally oriented and apparently placed in relation to a series of nine mounds, a number of pits and various depressions (Fig. 9; Peyrony 1934, 25). Among ethnographic groups, the occurrence of cemeteries is often interpreted as reflecting the existence of corporate groups (usually kinship-based) that controlled access to resources or other important rights, such as trading or manufacturing rights (Chapman 1981a; 1981b), and that maintained distinct social identities as corporate groups. Most prehistorians appear reluctant to extend this degree of social organization to Neandertals, but in the spirit of opening up discussions of Neandertal social organization, we might ask, 'Why not?'

La Ferrassie is also situated in the Vézère watershed, one of the richest animal migration routes and Ice Age refugia anywhere in Europe during the Pleistocene. White (1985) postulated that naturally sited fording locations along the river would have been ideal for harvesting animals in herds migrating through the valley during the Upper Palaeolithic. In other hunting and gathering societies, especially lucrative resource exploitation locations such as these could be owned by individual families or corporate kinship groups (e.g. Romanoff 1992). Could the same have been true of some particularly productive resource locations in the Middle Palaeolithic? If not, what was the social basis for the cemetery at La Ferrassie? Minimally, it would appear that this was the burial ground for selected individuals from a local band, including selected children. Minimally, the grouped burials seem to symbolize membership in a consciously identified social group. If there were consciously self-identified social groups at the local band level, there seems little reason to assume that this would not also have been true of alliances with friendly bands speaking similar dialects or that enemy bands would not have been identified as constituting different social groups. The multiple

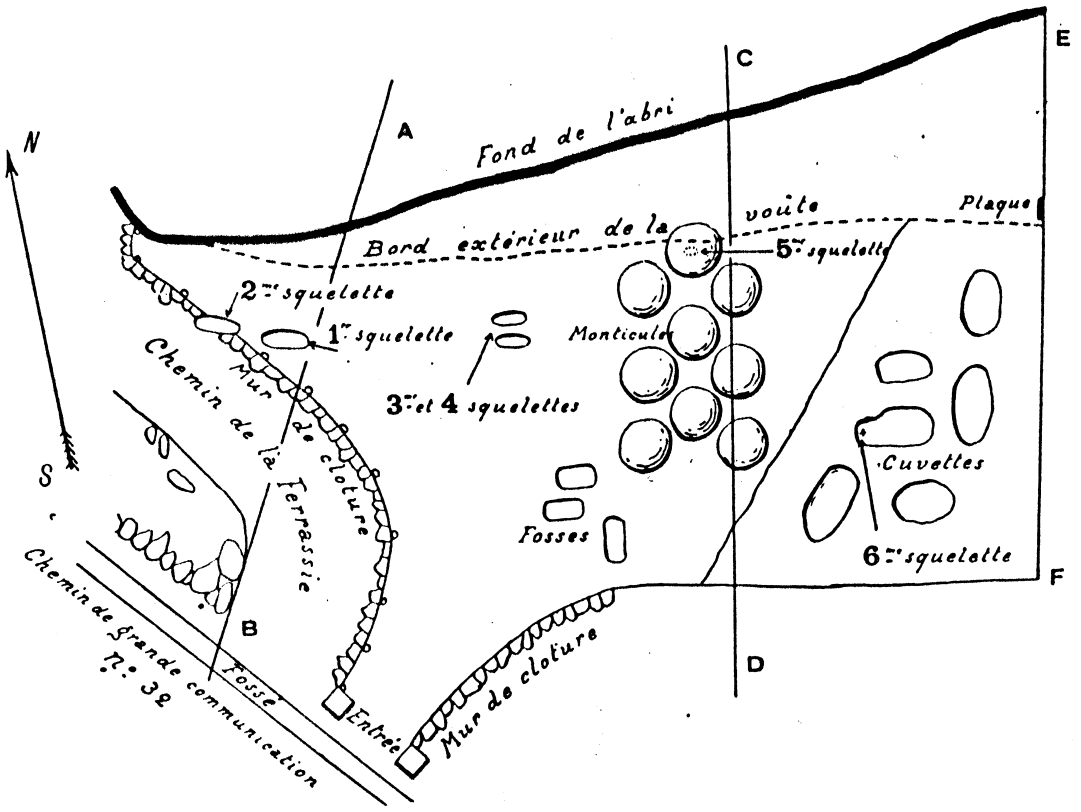

Figure 9
The Neandertal cemetery at La Ferrassie (Peyrony 1934, 25). Note the grouping, orientations of burials, and their relation to mounds and pits which seem indicative of an arranged burial area used for community or corporate group burials reflecting some level of socially self-conscious group.

burials at Shanidar Cave and other sites may represent similar cemetery practices to those at La Ferrassie.

SUMMARY

A number of sites from Europe, the Near East and the Ukraine all exhibit occupation floor areas and hearth patterns that indicate the existence of local bands as the basic, year-round social units with about 12–25 members, including children and the aged, probably organized into nuclear family groups. The use of some sites by smaller hunting or task groups, or even by occasional individual families foraging temporarily on their own, is probably also represented in the archaeological record, especially by isolated or palimpsest hearths. Estimates of band territories on the basis of raw material distributions over the landscape and on the basis of meat consumption at kill sites corroborate the interpretation of local band sizes in the 12–25 range.

The need for alliances between a number of local bands seems apparent in order to contend with periodic local food shortages and to ensure adequate mating opportunities for

demographic continuity. In fact, it is difficult to imagine how local bands could have survived for long without such alliances for either subsistence or mating purposes. Thus, visiting between bands, fluidity in band membership between allied bands, preferential intermarriage between allied bands, and periodic aggregations of a number of allied bands probably involving ritual sanctifications, all make good sense in the European Middle Palaeolithic. The transport of stone tools beyond 30–50 km from sources appears to reflect periodic visiting with other bands or the aggregation of several allied bands. Kill sites such as Mauran, representing over 1000 tons of meat butchered over a few centuries or millennia, and ritual sites such as Bruniquel may reflect such aggregation and social bonding events between local bands or their representatives.

There is clear evidence of enemy relationships among Neandertals in terms of cannibalism, and it seems most likely that there were conscious social distinctions between allied local bands and enemy bands, probably also expressed in terms of dialectical or linguistic differences, similar to those exhibited among the low-density ethnographic populations in Australia and Boreal North America. Thus, there are compelling reasons to conclude that there were, indeed, ethnic identities among Neandertals somewhat as François Bordes imagined in the 1960s, although these may not always have been expressed in distinctive styles of lithic artefacts.

There are also indications of the elevated status of some individuals in Neandertal communities, including preferential treatment in life of some aged or infirm individuals, preferential burial treatments, skull deformation, skull removal, special clothing or painted body designs, personal adornments or prestige objects, and the use of small exclusive ritual spaces. Elevated statuses may have been related to economically productive areas and control over productive resources as indicated by the geographical clustering of the above status indicators; however, status was probably also linked to one or more other domains such as ritual, war, kinship or intergroup relations. While some researchers have questioned whether Neandertals had a significant sexual division of labour, there are good reasons for assuming that such divisions were just as strongly developed, if not more so, as those among ethnographic hunter/gatherers.

Cemeteries, although rare, seem to have existed in the most productive environments and may reflect corporate kinship groups that owned specific resource locations, or, more conservatively, may have simply symbolically expressed membership in a consciously recognized social group such as the local band. Overall, the cognitive and social differences between Neandertals and anatomically modern humans that are highly touted by some researchers seem relatively insignificant, if they existed at all, at the level of basic cognitive and sociopolitical faculties. In this respect it is worth drawing attention again to the ‘uncanny’ resemblance of the Neandertal use of the Tor Faraj rockshelter to ethnographic patterns of site uses (there are no differences), the similar hunting abilities, similar use of plants, and the intimations of ritual activities similar to those of later Upper Palaeolithic and ethnographic hunter/gatherers. The main differences that are apparent between Middle and Upper Palaeolithic groups seem to be related to the development of complex hunter/gatherer social organization and economies in *some* areas of the Upper Palaeolithic versus the simpler hunter/gatherer economies and societies of the earlier Palaeolithic (aspects of which continued to characterize ethnographic hunter/gatherers in resource-poor environments). These economic and social differences do *not* appear to result from biological factors but appear to arise from different technological adaptations and strategies. In light of these observations, we can ask: ‘Were Neandertals really that different from us?’

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