

Anthropology, archaeology, and the origin of warfare

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Abstract

The main theories of the origin of warfare – from evolutionary psychology, materialism, and historical contingency – are examined. Their implications and their use of anthropological evidence, especially for the Yanomamö of the Amazon, are explored, then their relationship to the Palaeolithic and Mesolithic archaeological record. The early prehistoric evidence for conflict and warfare, mainly from Europe, is considered, from individual injuries, mostly from club wounds to the skull and death by arrowshot, to mass killings which could have destroyed a group. The enormous regional variation in this evidence is set against universal theories which imply uniformity and are thus found wanting.

Keywords

Warfare; Palaeolithic; Mesolithic; conflict; evolutionary psychology; materialism.

Introduction

Conflict is clearly a significant area of current study in both archaeology and anthropology, as the number of recent overviews and volumes of case studies attests (e.g. Keegan 1993; Redmond 1994; Reyna and Downs 1994; Keeley 1996; Martin and Frayer 1997; Carman and Harding 1999). Not only is it a subject of great importance in its own right, but it touches on several other major issues, such as the use by evolutionary psychology of archaeological evidence, the history and biases of archaeology as a discipline, and the nature of archaeological evidence. Origins are always attractive subjects, and the origin of war is no exception, having been considered recently from the viewpoint of biological anthropology (e.g. Wrangham 1999), social anthropology (e.g. Kelly 2000), military history (e.g. Keegan 1993), history (e.g. Dawson 2001), and archaeology (e.g. Keeley 1996). The greatest interest in early war has been shown by anthropologists, as it is central to that elusive quality, ‘human nature’. Archaeology has largely been an onlooker in this argument (with Ferguson (1997a) an exception).

Interest in ancient warfare has been stimulated by Keeley's polemical *War before Civilization: The Myth of the Peaceful Savage* (1996). He seeks to demolish a 'myth' promoted by archaeologists and anthropologists who have attempted to pacify the past. Keeley's broadside has been variously received, Kristiansen (1999: 188) describing it as 'inspirational', but others are highly critical (e.g. Ferguson 1997b; Otterbein 1997). From an American perspective, with the dramatic shift in interpretation of the Maya from peace-loving to war-like (Culbert 1988), Keeley's critique works, but European archaeologists have always seen the Bronze Age as a time of warriors, rendering his case far less persuasive.

The prime difficulty with Keeley's argument is that, although he rightly points to the high incidence of ethnographically recorded conflict and more formal inter-group warfare, and makes a good case that this is not 'ritual' but real war, with a high level of casualties, this does not in itself imply much about ancient warfare. For here we are in the realm of interpretation, unaided by participant accounts or direct outside observation.

Before considering the major schools of interpretation of the origins of conflict I should give a definition of warfare, as this has been a major debating point in the past – it is defined here as organized aggression between autonomous political units. I see no great value in too tight a definition (e.g. Kelly's (2000) seven-point scheme), however, since feuds (actions taken by individuals against members of another group (Otterbein 2000)) frequently escalate into war. As Koch puts it, 'linguistic distinctions between raids, feuds, and war tend to obscure rather than elucidate the problem of explaining why people resort to violent methods of confrontation in pursuit of their interests' (1974: 52–3). The majority of conflicts occur between closely related groups, with the warring parties frequently acting as exchange or marriage partners before and after. It is certainly the case that some past societies have distinguished between the two. Thus Redmond focuses on long-distance raiding in her important study of South American warfare (1994), as the Jívaro make a distinction between local feuding and true warfare, even though the former includes the assassination of individuals (Harner 1972). Jívaro true warfare consists of headhunting raids carried out against distant groups – a far more prestigious activity, as it involves expeditions into lands 'filled . . . with evil spirits' (Cotlow 1953: 144). So we are perhaps dealing here with high (long-distance) and low (local) status warfare.

Definitions of the opposing theorists have also long been a source of debate, with lines of thought which can be traced back to Thomas Hobbes' *Leviathan* (1651) and his 'State of Warre' and Jean-Jacques Rousseau's *The Social Contract* (1762) and his vision of a golden age of peace before the state.

Theories of war

Much of the current interest in conflict and warfare stems from the dominance of neo-Darwinian thought in society at large. From the sociobiology of the 1960s to the evolutionary psychology of the 1990s there has been a steady growth in the acceptance of a significant role for biology in human culture. The strand of evolutionary psychology most relevant to the study of early warfare is that which sees humans as shaped by an ancestral environment long past, dubbed the environment of evolutionary adaptation

(EEA). The EEA equates to the Palaeolithic and Mesolithic (e.g. Cosmides et al. 1992; Pinker 1998: 42), with the development of agriculture marking a crucial break. Thus the three main competing theories for warfare situated within evolutionary psychology – territorial, reproductive, and status competition – should all be susceptible to archaeological analysis from the evidence of early prehistory.

The territorial model originates in modern times with E. O. Wilson, who argued from the sociobiological strand of evolutionary psychology that ethnocentricity was a product of natural selection.

Our brains do appear to be programmed to the following extent: we are inclined to partition other people into friends and aliens, in the same sense that birds are inclined to learn territorial songs and to navigate by the polar constellations. We tend to fear deeply the actions of strangers and to solve conflicts by aggression. These learning rules are most likely to have evolved during the past hundreds or thousands of years of human evolution.

(Wilson 1978: 119)

The difficulties with this ‘rule’ are two-fold. It would also be adaptive to create good relations with neighbouring groups, perhaps especially so when hominins were the hunted rather than the hunters. Second, Cashdan’s wide-ranging survey (2001) did not find a correlation between ethnocentrism and xenophobia, undermining Wilson’s claims for universality.

More specifically, Wrangham (1999) has argued for continuity of a territorial instinct from the common ancestor of chimpanzees and humans. He argues that a territorial instinct exists in modern chimpanzees, with young male chimpanzee patrols of territorial borders leading to conflicts of extermination with neighbouring groups, improving the victors’ access to resources. These are compared with the territorial nature of modern American gang culture, with the link provided by comparisons with the Yanomamö of the Amazon as an example of primitive culture. Wrangham’s treatment of the Yanomamö evidence is considered below. A more general difficulty with the argument, however, is presented by the alternative perspective of Harrison (1993: 14–21). He suggests that, in Melanesia at least, the notion that groups make war is the wrong way round, and that it is actually the process of war which enables groups to form.

The reproductive theory of warfare is based on analogies with primate behaviour in which male-centred competition, over access to females, takes violent form (e.g. Wrangham and Peterson 1996). However, some detailed studies of warring societies suggest that no such reproductive success occurs, for example, Moore (1990) on Cheyenne war chiefs and Knauff (1987) and Kelly (2000: 20–35) on the !Kung, Mbuti, Central Eskimo, Semai, Hadza, and Gebusi. The most famous claimed case is Chagnon on the Yanomamö (1988), considered further below.

A more sophisticated approach sees warfare as the outcome of violent competition by young males striving for status and prestige (Maschner and Reedy-Maschner 1998), even when there is no prospect of territorial gain. While prestige is clearly a significant factor in the creation of warriors (Clastres 1994: 169–200), as with the reproductive theory, however, dubbing violence the business of men (e.g. Gilbert 1994; Van der Dennen 1995) avoids the considerable ethnographic evidence, especially from Asia (Rolle 1989) and the

Americas, of female warriors and even female war chiefs (Koehler 1997; Hollimon 2001). To comment that ‘women’s participation in warfare is rare’ (Maschner and Reedy-Maschner 1998: 23) merely sidesteps the issue.

A more general problem for all three evolutionary anthropology theories is the apparent need to produce an altered mental state before taking part in warfare, with fasting, possession by spirits, dances, special costumes, vows, rehearsals, and drug taking all recorded ethnographically (Kennedy 1971; Ehrenreich 1997). The dangers of this altered mental state are noted by Harrison for the Avatip of New Guinea. Avatip men were headhunters, with headhunting being a form of status competition, but they did not believe that violence, although potentially valuable, was innate:

Headhunting raids required special magic, which placed the fighters in a trance-like state of dissociation and relieved them of accountability for their actions; it was supposed to make them capable of killing even their own wives and children. That is to say, the ability to kill had to be imparted by magic and ritual, and deliberately removed at the end of raids.

(Harrison 1993: 27)

Any biological urging to kill therefore had to be heavily reinforced by cultural methods. In the Americas, even the famously aggressive Yanomamö use drugs to work themselves up to fighting chest-pounding duels against members of neighbouring villages (Chagnon 1990). These duels sometimes result in fatalities, which then precipitate a cycle of village raiding.

The other fundamental problem for evolutionary anthropology comes from archaeology. As critics have noted (e.g. Knauff 1991; Foley 1996), few archaeologists believe in an unchanging environment of evolutionary adaptation until the advent of agriculture. Instead, the pattern of conflict and warfare may well vary through time and across space.

The other main camp within anthropology is the materialist. Materialists believe that warfare is utterly irrational, and therefore one would risk one’s life in combat only when there was a desperate need for land or, more immediately, food (e.g. Ferguson 1990). Ferguson argues that motivations as stated by participants hide their real motives. However, New Guinean warfare analyses suggest that there is no simple relationship between land shortage and warfare, with some of the most warlike societies having fairly low population densities (Knauff 1990). In the case of the Dani (Heider 1970), wars against neighbouring villages mostly produce minor injuries, while individual killings result from stalking the enemy. Killings by the Dani are not motivated by land shortage, but by the need to appease the spirits of the war dead, who must be avenged lest they haunt the living. The practice of Dani warfare thus accords better with their own cultural understanding than with materialist theory.

Finally, the standpoint of historical contingency rejects any unifying theory in favour of the examination of the particular circumstances of each conflict, and, indeed, of each episode of peace (e.g. Otterbein 1997; Robarchek and Robarchek 1998; Clark 2000; Guilaine and Zammit 2001). In other models, a lack of warfare is certainly difficult to explain. In a general sense, the greater the degree of variability observed, both within a single society and between different societies, the more difficult it is to fit all warfare into any overarching structure, an issue which clearly troubles Dawson (1999: 97–8).

There are, however, models which take an intermediate course, arguing for significant breaks in the history of warfare. Anthropologists have argued that *War in the Tribal Zone* (Ferguson and Whitehead 1999), witnessed by travellers and ethnographers, was generated by colonialism. Although described by critics (e.g. Keeley 1996) as the ‘myth of the peaceful savage’, observing that patterns of warfare were affected by Western contact does not imply that earlier times were peaceful, as Ferguson himself has stressed (1997a: 321): ‘If there are people out there who believe that violence and war did not exist until after the advent of Western colonialism, or of the state, or of agriculture, this volume [*Troubled Times*] proves them wrong.’

Another attempt sees conflict as a consequence of settled agrarian communities (e.g. Leakey and Lewin 1992). Thus commentators seize on the walls of Jericho (for an alternative interpretation as a flood defence, see Bar-Yosef (1986)), one of the earliest towns, the attack on the Early Neolithic causewayed enclosure of Hambledon Hill, England (Mercer 1999), or Schletz in Austria (Windl 1994), an enclosure with multiple burials of individuals who met a violent end in the ditch. The most dramatic case is that of Talheim in Germany (Wahl and König 1987), c. 5000 BC, where a mass grave contained men, women, and children, killed by axe and adze blows to the head. Whatever the level of Neolithic violence (Schulting and Wysocki 2002), we cannot simply assume this appeared from nothing, and the evidence for both serious injuries and violent death from Mesolithic skeletons in Europe is steadily growing (Vencl 1999; Grünberg 2000; Thorpe in press). Such over-generalized historical models mask significant variation in the archaeological record.

Appropriate analogies?

Many of the studies within the framework of sociobiology/evolutionary anthropology are in essence models derived from observations of chimpanzee behaviour, in which it is assumed that chimpanzee behaviour is best interpreted in human terms. Too little consideration has been given to the question of whether a close relationship between chimpanzee and human behaviour can reasonably be assumed. Alternatively, is choosing common chimpanzees over pygmy chimpanzees or bonobos (de Waal 1989) a result of pre-determining the appropriate comparison? Bonobos show little sign of violence, do not hunt much, and are not dominated by males. The difference may relate to ecological factors, with bonobos occupying large, undisturbed rainforests.

The theories outlined above have all been applied to the Yanomamö, with varying degrees of success. Notions of xenophobia do not apply to Yanomamö conflict, for, as Chagnon (1996a) notes, the vast majority of fighting occurs between people who know each other well. Wrangham’s (1999) comparison between common chimpanzee behaviour and the Yanomamö is particularly inappropriate. The Yanomamö do not patrol territory, most of the fighting is done by older men, and those they kill are often relatives in closely related villages with whom they have good relations at other times (Ferguson 2001).

Chagnon’s (1988) reproductive success theory for the Yanomamö is also problematic. His raw figures for the number of children born to those who have killed another person

do suggest that successful warriors father more children. However, much of the reproductive success of killers at the time of his survey is simply a result of older men being killers. The difference in numbers of children recorded for men of the same age may actually reflect headmen having more children – headmen who are, by virtue of their position, cajoled into participating in raids (Chagnon 1997: 198). Moreover, as a snapshot, these figures could never demonstrate greater reproductive success over the lifetime. Chagnon himself notes that Yanomamö revenge attackers ‘always hope to dispatch the original killer’ (1988: 985), while others record the deaths of a number of multiple killers while they were still fertile (Albert 1990).

Chagnon’s data also provide a poor fit with the contention of Maschner and Reedy-Maschner (1998: 22) that it demonstrates ‘young males [aged 15–30] striving for status and prestige’. As Ferguson notes (2001: 109), the vast majority of killers were over 40, and possibly none below 25.

For Ferguson (1995) the Yanomamö fight for material resources, specifically steel axes to clear land, while the intensity of Yanomamö conflict relates to their position within the tribal zone. However, ethnographers of the Yanomamö do not recognize this picture (e.g. Peters 1998: 216), while the notion of Yanomamö groups controlling trade routes seems particularly far-fetched (Chagnon 1996b). The theory of a massive shift to warfare with the arrival of Europeans in South America in 1498 has also been questioned by Fausto (2000), who argues that flourishing war rituals observed in the sixteenth century imply that warfare was an important social component before the *conquistadores*’ arrival.

Fausto (2000), along with Albert (1989, 1990) and Lizot (1994), proposes a more localized interpretation of Yanomamö conflict, which situates itself within Amazonian belief systems and the statements of the Yanomamö themselves.

Conflict in early prehistory

Turning to the Palaeolithic and Mesolithic (focusing on Europe for reasons of space and familiarity with the material), there are three main areas of possible evidence – the existence of weapons, depictions of warfare, and skeletal remains demonstrating conflict.

Weapons may seem the most straightforward category, but here we encounter immediately the issue of symbolism. What past generations have termed weapons, for example battleaxes and daggers, need not have been used that way. Equally, axes, normally seen as workaday tools of forest clearance, may well be weapons (following Chapman (1999) these might be termed tool-weapons), while many weapons, such as wooden clubs, will survive only by chance in the archaeological record. With regard to weapons we need to demonstrate the actual use of objects to cause harm.

Levantine Spanish rock art (Beltrán 1982) is often presented as the most substantial body of evidence for conflict in the Mesolithic (e.g. O’Connell 1995; Nash 2000); and is sometimes argued to be a record of conflicts between racial groups (Beltrán 1982). Still, there are many who question the straightforward approach to interpreting rock art. A more fundamental difficulty, however, in the context of this paper, is the argument that the commonly suggested date of the Mesolithic is mistaken and that Levantine art is actually Neolithic (Beltrán 1982; Escoriza Mateu 2002).

Skeletal evidence is more reliable, in at least avoiding the issue of symbolic violence; even here, however, we need to stress the importance of care in interpretation. Thus Brothwell (1999) suggests that there may have been Neanderthal conflict on the basis of the frequency of traumatic injury, and that such injury cannot simply be accidental. However, other analysts have concluded that Neanderthals suffered a higher level of trauma, comparable in intensity and location to modern rodeo riders, than other hominids because of their practice of short-range hunting with spears (Berger and Trinkaus 1995). This could also be the cause of the weapon-like injuries from Shanidar (Iraq) and Skhul (Palestine) (Fig. 1) (Roper 1969; Guilaine and Zammit 2001: 72–3). The most recent claim of Neanderthal violence comes from re-analysis of the young adult, possibly male, from St. Césaire, France (Zollikofer et al. 2002). A healed skull fracture is argued to be the result of an attack. Similar evidence for an anatomically modern human from Klasies River, South Africa, dates to 90,000 years ago (Deacon and Deacon 1999: 103). The earliest possible skeletal evidence of violent attacks comes from Sima de los Huesos, Atapuerca, Spain, the enigmatic cave containing at least thirty-two human skeletons dating to c. 250,000 BC (Arsuaga et al. 1997). Several skulls have healed impact fractures, with Cranium 5 possessing thirteen. Whether this should be interpreted as evidence of conflict is not yet clear, as only preliminary information is available at present (Cervera et al. 1998: 143).

Atapuerca also offers the earliest possible case of cannibalism: the Gran Dolina cave has produced the remains of six individuals (Fernández-Jalvo et al. 1999) identified as the victims of cannibalism on the basis of the use of analogous butchering techniques in

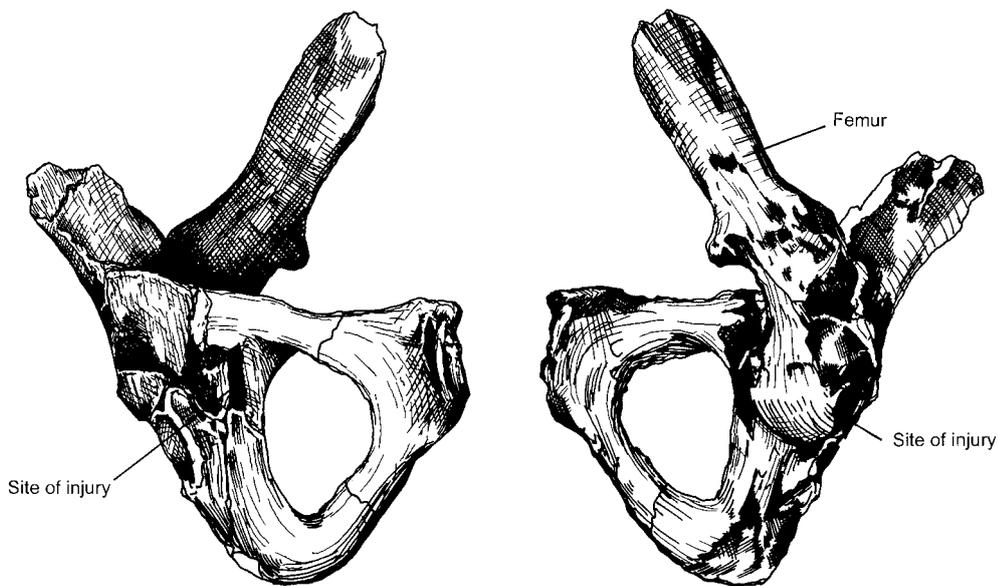


Figure 1 Possible weapon injury in the pelvis of the Neanderthal from Skhul (Palestine) (after Guilaine and Zammit 2001).

humans and animals, similar breakage patterns to extract the marrow, and identical patterns of discard for human and animal bone. However, like claimed Neanderthal examples, such as Moula-Guercy in France (Defleur et al. 1999), the Gran Dolina case is believed to represent 'gastronomic cannibalism', the consumption of members of the group after their death, rather than the result of murder or massacre. Certainly at Gran Dolina the vertical spread of human bones suggests occasional consumption over a long period rather than a massacre.

From the Upper Palaeolithic, four lines of evidence have been followed: the development of weaponry; possible depictions of violence in cave paintings; mass burials; and skeletal evidence. The earliest bows may have appeared in the Late Upper Palaeolithic, but definitive evidence in the form of arrows is missing. There are some seven depictions of anthropomorphs apparently pierced by projectiles from European cave art (Guilaine and Zammit 2001: 85–9): whether they depict actual killings, wished-for killings, or magical killings cannot be determined. A number of multiple burials have been located from this period, most notably that at Predmostí in Moravia, where twenty individuals (eight adults and twelve children) were interred. Keeley has concluded that, considering 'the improbability of alternative explanations' (1996: 37), these must have been the victims of a lethal conflict. However, as Kelly notes (2000: 157), high levels of death from disease and starvation are recorded for gatherer-hunter groups. Introduced diseases may seem to be a thing of the modern world, transferred to devastating effect from Europe to the Americas, but the Upper Palaeolithic sees the movement of raw materials over hundreds of kilometres (Gamble 1998), movements which may well have involved individuals making contact with new groups far distant from their own territory.

In terms of skeletal evidence, there are two final Upper Palaeolithic bodies with flint points lodged in the bones, both from Italy (Bachechi et al. 1997). One, from San Teodoro cave in Sicily, was a woman with a flint point in her pelvis. The other was a child with a flint point in its backbone, found in the Grotta dei Fanciulli (usually known as the Grotte des Enfants), Grimaldi, on the Italian mainland. Whether the points were spear-tips or arrowheads is unclear. The excavators in both cases thought they were arrows. In the less clear-cut case of Wadi Kubbaniya, Egypt (Wendorf and Schild 1986), two bladelets found between the ribs and backbone may have been the cause of death. The poorly dated cave site of Montfort Saint-Lizier, where a quartzite blade was embedded in a human vertebra (Bégouën et al. 1922), may also belong here, if it is not Early Mesolithic.

Without doubt, the most remarkable discovery of this period comes from Jebel Sahaba, in the Sudan (Wendorf 1968). A cemetery containing fifty-nine burials was located on a knoll overlooking the Nile some 12,000 years ago; of these, twenty-four had chert projectile points either embedded in the bones or found within the grave fill (Fig. 2). Altogether, 110 chert points were found during the excavations, 'almost all in positions which indicate they had penetrated the body either as points or barbs on projectiles or spears' (Wendorf 1968: 959). Slightly more males than females show traces of violence, and several children were also apparently killed by projectiles. There were a number of multiple burials, presumed to be contemporary interments, some with no traces of projectile injuries. The pattern of multiple wounds (up to a dozen in the case of an adult female) may indicate either close combat or revenge attacks by a group. Several of the adult males were interred alone, which may imply they were killed away from the settlement. Environmental pressure is suggested

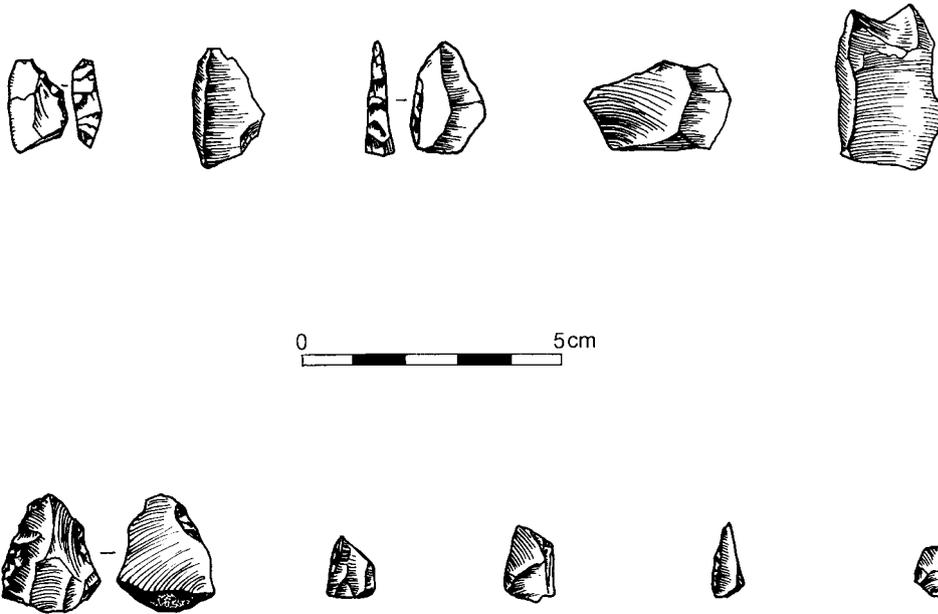


Figure 2 Chert points found with Burial 20 (top row) and Burial 29 (bottom row) (after Wendorf 1968).

by Wendorf (1968: 993) as the cause of the violence, but no analysis of the skeletons has been undertaken to attempt to confirm this. While some of the burials are clearly contemporary, the absence of radiocarbon dating makes the duration of use of the cemetery impossible to determine, and it is at least possible, given the absence of traumatic injuries at the only contemporary burial site in the vicinity (Wendorf 1968: 993), that this was a special-purpose burial place for those who had died untimely deaths – a common feature of the ethnographic record (Kamp 1998).

Turning to the Mesolithic, and beginning with the Mediterranean and the Near East, remarkably little trace of violence can be detected here in terms of skeletal trauma (Cordier 1990; Vencl 1991; Grünberg 2000). For the central and eastern Mediterranean the relatively small sample size (Grünberg 2000) may be a factor, with just a single example of violent death from Franchthi Cave, Greece (Cullen 1995). This is not so for the western Mediterranean, where some 400 burials have been found in Portuguese shell middens such as Moita do Sebastião (Lubell et al. 1989). A projectile wound in the foot at Moita do Sebastião and a skull wound at Cabeço da Arruda are the only clear traces of violence here. Parry fractures have been reported from Portuguese sites (Grünberg 2000: 190) – these are usually interpreted as resulting from an attempt to fend off a blow directed at the head or upper body. However, recent examinations of prehistoric American material show no link between the frequency of head injuries thought to result from attacks and parry fractures (Larsen 1997: 112). There are actually a large number of accidents which can result in parry fractures (Lovell 1997).

The absence of direct evidence is especially striking for the Natufian of Palestine

(Roper 1975), where a large skeletal sample (over 400 inhumations, most from large cemeteries) exists, yet only a single suggested act of violence (a depressed fracture of the skull at Nahel Oren (Ferembach 1959)). Moreover, population pressure has often been suggested as a factor in the Natufian development of an agricultural economy, yet there is no trace in the archaeological record that this led to conflict.

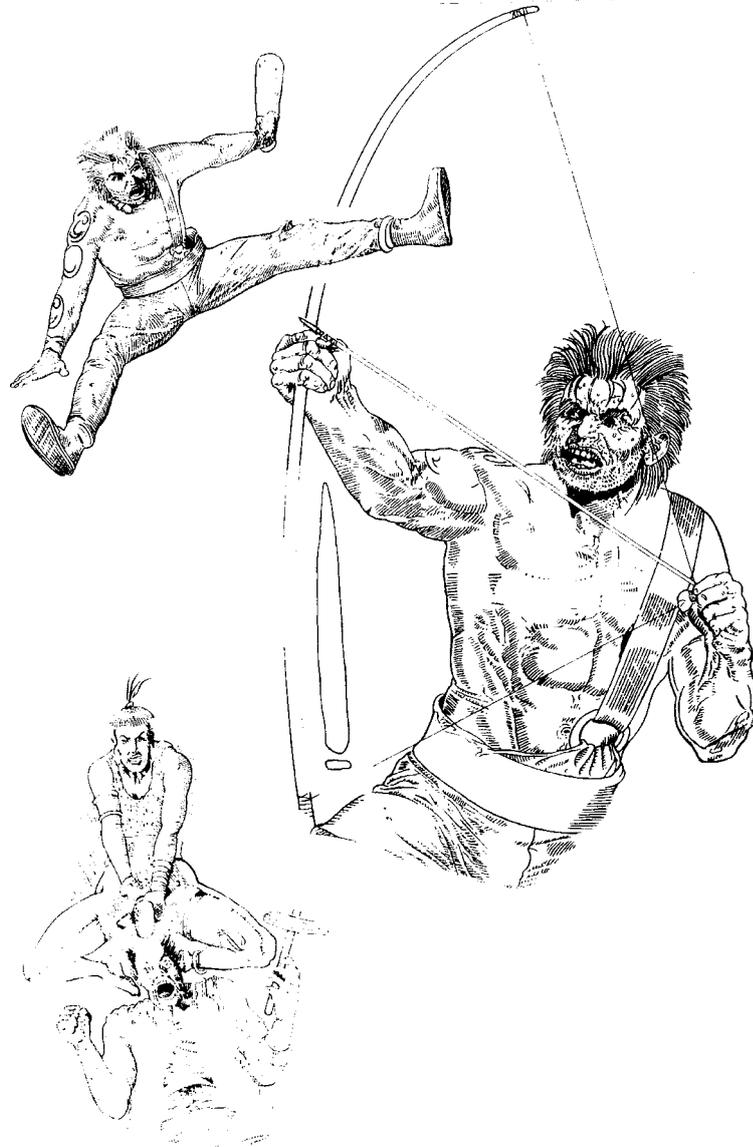


Figure 3 Possible weapons used on Mesolithic sites on the banks of the Danube: top left, antler pick (Vlasac); right, bone projectile point (Schela Cladovei); bottom left, antler axe (Vlasac) (from Chapman 1999).

Moving away from the Mediterranean, projectile injuries apparently causing death are reported from Vlasac and Schela Cladovei on the Danube (Fig. 3) (Radovanovic 1996; Chapman 1999). At Schela Cladovei the level of violence appears to be very high among the fifty-six skeletons excavated, with six cases of projectile injuries (four male, one female, one unsexed, mostly from bone points) along with some half a dozen examples of cranial injuries (mostly not healed before death), so that about one third of all adults from the site had traumatic injuries. However, within the region's Mesolithic cemeteries as a whole Schela Cladovei and Vlasac appear to be exceptional – the latest overall figures are eight projectile injuries out of 400 skeletons, and roughly ten individuals with fractures. They thus provide the vast bulk of cases from one-fifth of the total examined burial population, suggesting that significant cultural variability existed in the level of conflict within this relatively small area.

In northern Europe we have the oldest definite evidence for arrows and thus bows, at Stellmoor in Germany, c. 8500 BC, along with a significant level of well-recorded skeletal trauma in the form of projectile wounds (Cordier 1990; Vencl 1991). More than anything else, this justifies descriptions of the Mesolithic as the period when true warfare began in northern Europe, with examples from Atlantic France and Denmark to the Ukraine of individuals suffering fatal wounds from weapons (Chapman 1999; Dolukhanov 1999; Vencl 1999; Thorpe 2003).

From southern Scandinavia, at the Ertebølle period Skateholm I 'cemetery' in southern Sweden, an arrowhead was lodged in the pelvic bone of an adult male (Grave 13) (Larsson 1989), and a bone point was found with another male (Grave 34) (Vencl 1991). At the Ertebølle period Vedbæk 'cemetery' on Zealand, one of the individuals (an adult, probably male (Bennicke 1985: 102)) in a grave containing three bodies had a bone point through the throat (Fig. 4) (Albrethsen and Brinch Petersen 1976). The apparently simultaneous burial of the man, woman, and child has led to the suggestion that all three died suddenly and violently (Albrethsen and Brinch Petersen 1976). Bone points may also have been found in the chests of burials at Bäckaskog (an adult female) and Stora Bjers (an adult male) in Sweden (Albrethsen and Brinch Petersen 1976), although the circumstances of discovery are less clear.

At Tévéc in Brittany a male burial had two flint points embedded in his spine (Péquart and Péquart 1931). Further east, several projectile injuries apparently causing death (Cordier 1990; Alekšin 1994; Vencl 1991, 1999; Lillie 2001) are reported from Volos'ke and Vasylivka I in the Ukraine; also in the Ukraine the Vasylivka III cemetery produced four burials with arrow injuries and several with apparently crushed skulls.

More indirect evidence of injuries also exists where large-scale studies of skeletal material have been undertaken. Bennicke's examination of cranial trauma in Denmark (1985: 98–101) shows that during the Mesolithic there were a high number of injuries in the form of fractures and impressions. The best-known example is the male burial (aged 30–50) from the Ertebølle period Korsør Nor harbour settlement site on the coast of Zealand (Norling-Christensen and Bröste 1945; Schilling 1997), possibly in a bark boat, who has a deep healed wound caused by a club. Six other burials were present at the site although these had all been disturbed by wave action. Two further skulls (an elderly male and an unidentified adult) also showed healed wounds (Bennicke 1997). Several more examples have appeared since Bennicke's general survey was conducted, including the

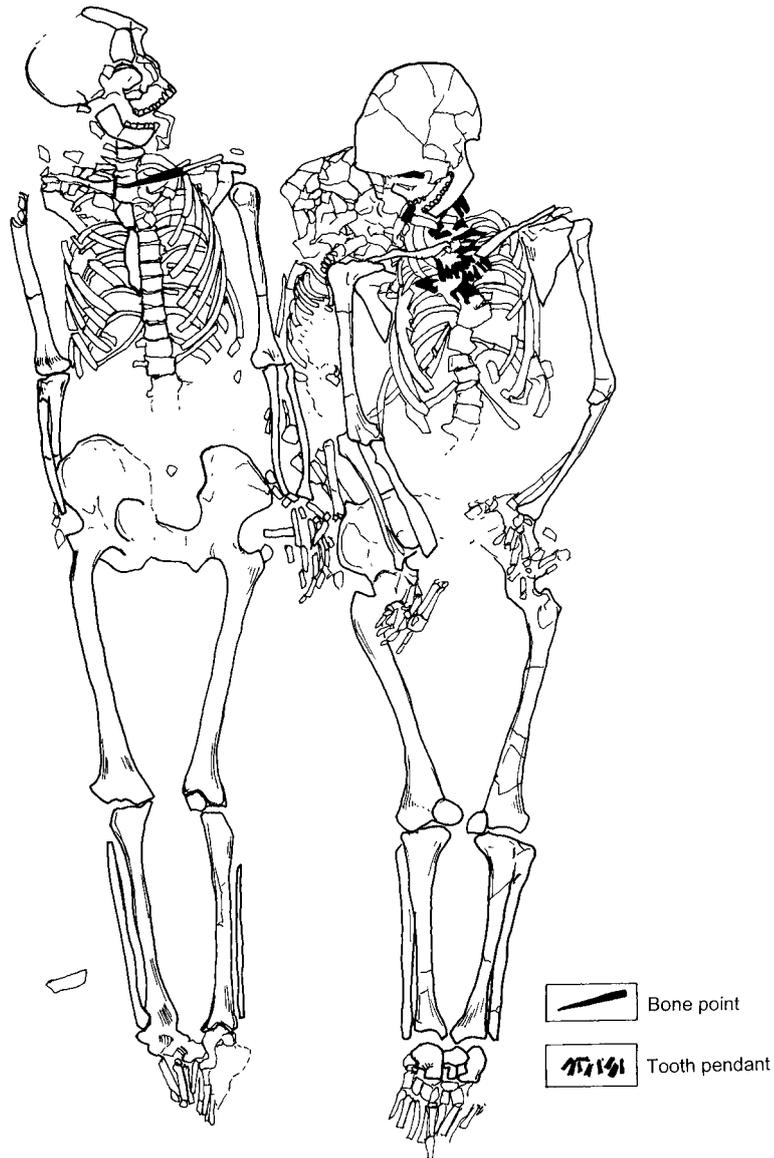


Figure 4 Vedbæk Bøgebakken, Grave 19: triple burial with a bone point lodged in the throat of the adult male (left) (after Albrethsen and Brinch Petersen 1976).

probable male with two healed wounds from the famous Ertebølle period underwater site of Tybrind Vig on Fyn (Andersen 1985) and the Ertebølle period young male (c. 25 years of age) boat burial from Møllegabet Site II on Ærø (Grøn and Skaarup 1991), with a healed axe-blow on the skull. That not all the victims of conflict were male is shown by the Ertebølle period female burial from Gøngehusvej, Vedbæk (Brinch Petersen et al. 1993). This 40-year-old woman, found in a double grave with a 5-year-old child, was buried with a decorated cap, attempting to conceal the impression of a blunt instrument in a healed fracture.

A similar pattern of cranial injuries has been detected by Lambert (1997) among prehistoric gatherer-hunter communities in California (where it mostly occurs among adult males, as do projectile injuries), and among the Yanomamö, where these generally non-lethal wounds result from fighting duels with heavy wooden clubs (Chagnon 1997). One might suggest, therefore, that two forms of conflict coexisted in Mesolithic southern Scandinavia – ritualistic fighting with clubs and actual warfare with projectiles.

Certainly in the Ertebølle case sedentism and territoriality are highly likely (Thorpe 1996: 63–93, 2003). The Eastern Woodlands of the United States of America provides a significant parallel in the burial of most individuals who had suffered violent deaths in shell mounds and midden heaps (Milner 1999). Given the contacts with Linearbandkeramik farmers in Germany one might also suggest status competition over imports, or indeed a materialistic interpretation of fighting to control trade with the outside world. However, these imports are few in number, and, with the possible exception of stone adzes and copper beads, do not seem to be clear status goods (e.g. they are not used as grave goods) and were certainly not essential to the material well-being of Ertebølle communities. Moreover, these conditions all apply equally to the Natufian and the Portuguese Mesolithic, yet with vastly lower levels of conflict.

Skeletal material also points to the existence of conflicts occurring on a much larger scale. At Ofnet cave in Bavaria two pits contained the skulls and vertebrae of thirty-eight individuals, all stained with red ochre, dating to around 6500 BC (Fig. 5) (Frayer 1997; Orschiedt 1998). Most were children; two-thirds of the adults were females. Peter-Röcher (2002) argues that the Ofnet burial group was not a plausible demographic community for the Mesolithic and that this is therefore not a massacre, but a temporary absence of males may have been the precipitating cause of the attack. Finds of deer teeth and shells were associated only with adult females and children. Half the individuals were wounded before death by blunt mace-like weapons, with males and females and children (even infants) all injured, but males having the most wounds (Fig. 6) (Frayer 1997). Several skulls had cut marks, but these were not related to cannibalism or removal of the brain; there were also cut marks on the vertebrae of one in three of all individuals, relating to the removal of the head. The scale of the massacre suggests an attempt to wipe out a whole community, followed by the ceremonial burial of ‘trophy skulls’ (Keeley 1996: 102). Certainly, there are many accounts in the ethnographic record that demonstrate the very careful curation of skulls taken in warfare (e.g. Sterpin 1993). It should be noted, however, that Orschiedt (1998) has recorded lower injury counts than Frayer (although this probably relates to a smaller available sample), and he suggests that not all the skulls were deposited at the same time, although the skulls he does accept as definitely injured are found together. We should also note that none of the conditions of sedentism, territoriality, and status competition attributed to the Ertebølle have been claimed for the German Mesolithic (Jochim 1998).

A similar story may lie behind the discoveries at Dyrholmen in Jutland, where the bones of at least nine individuals were discovered (Degerbøhl 1942). There are traces of cut marks and fractures of long bones and mandibles apparently to reach the marrow, with cut marks on the skull of a 10-year-old child suggesting scalping (Anger and Dieck 1978: 166–7). At Møllegabet Site I on Ærø bones were also broken open to reveal the marrow and a male jaw broken to remove the front teeth (Skaarup 1995).

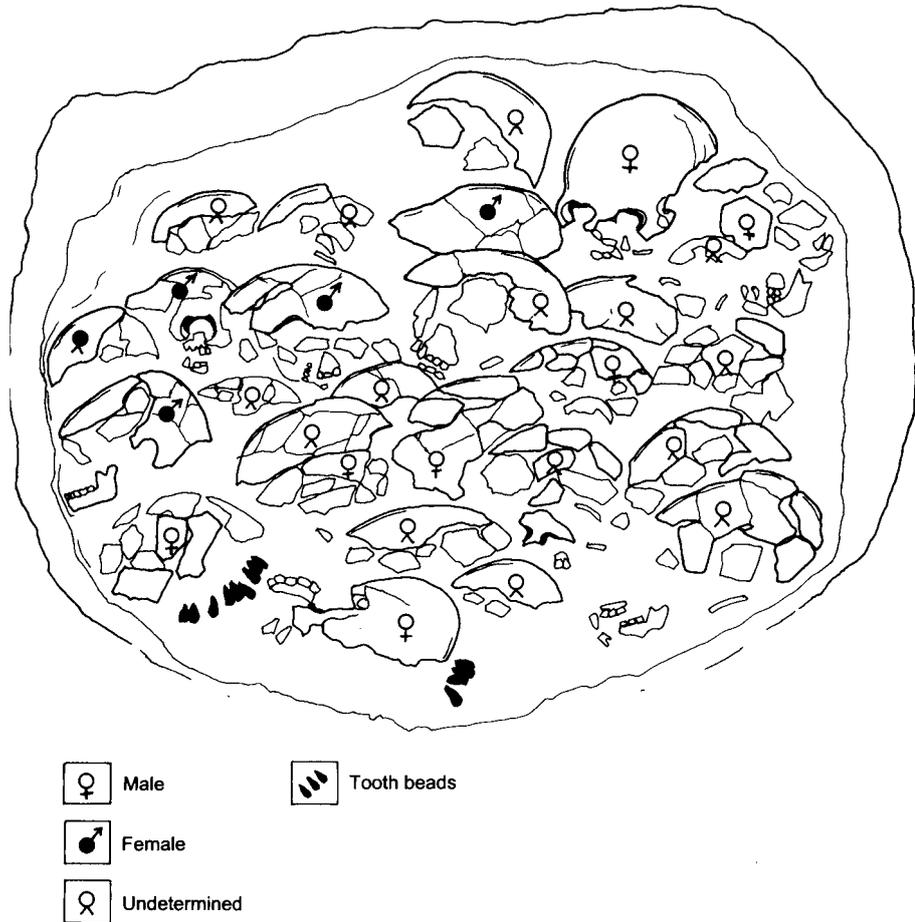


Figure 5 Ofnet skull deposit number 1 (after Peter-Rocher 2002).

If these are cases of cannibalism, then they could be linked to warfare through a common explanation given by historically recorded groups who practise cannibalism – that the vital energies or personal attributes of the enemy would be absorbed by the cannibals. Cannibalism is also sometimes used in South American societies as a way of disrespecting the enemy, eating their flesh ‘like animal meat’ (Conklin 1995). If head-hunting is involved, then this simultaneously deprives the enemy of the benefit of the strength provided by reincorporating the dead into the group and unleashes the anger of the dead on their community unless the death can be avenged (e.g. Boès and Sears 1996). In the case of the Møllegabet jaw, the excavator argued that the teeth were being removed to ‘become part of an ornament with which the victor could adorn himself’ (Skaarup 1995: 399).

Peter-Röcher (2002) may be correct to argue that a statistical examination of Grünberg’s database (excluding Ofnet and the similar deposit of three injured skulls from the nearby site of Hohlenstein-Stadel) shows the relatively slight evidence for warfare.

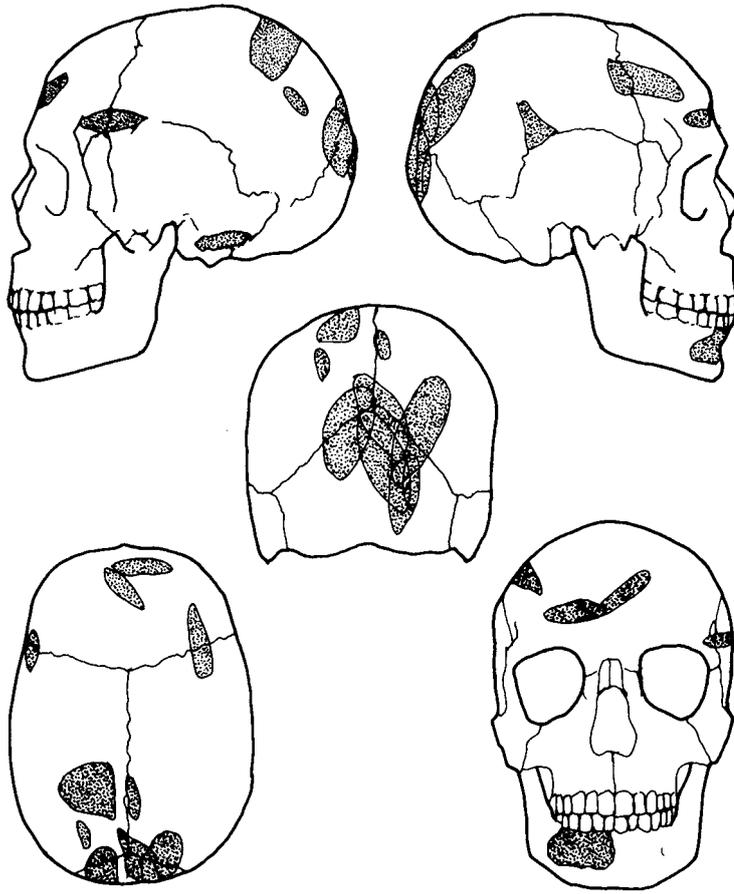


Figure 6 Pattern of trauma at Ofnet, composite drawing showing location of blows on skulls (after Frayer 1997; Orschiedt 1999).

However, two points need to be made. First, Grünberg's database is not complete, with less than half the Danish examples of Mesolithic violence represented, for example, which renders any statistical manipulation of such small datasets doubtful. More generally, I would argue that the variation between sites and areas is significant in assessing the value of general theories, and that a statistical approach masks crucial cultural variability.

It should be clear that the Palaeolithic and Mesolithic evidence cannot be fitted neatly into any one of the over-arching explanations. The biological theories imply a constant level of violence, not supported by the archaeological evidence, which demonstrates significant variations in evidence for conflict from virtually none to apparent massacres. The materialist theory would be far more convincing if there were a significant increase in conflict with the adoption of agriculture. We therefore need to turn to historical factors and considerations of the specific societies concerned. Mesolithic conflict need not have been over economic resources, as Haas (2001: 338) notes, but a strong degree of internal territoriality would certainly be consistent with other indications (Layton and Barton 2001).

However, many other causes of wars among gatherer-hunters have been noted. Warfare in early prehistory may well have arisen from matters of personal honour – such as slights, insults, marriages going wrong, or theft. In a small community, everyone is related. An attack on one group member is an attack on the whole family. A personal feud may quickly involve the whole community. From there it is a small step to war. For an example among recent gatherer-hunters, we may turn to Hart and Pilling's (1960) record of the Tiwi of northern Australia. A series of personal grievances felt by various men among two Tiwi bands led them to recruit their relatives, arm themselves, physically with weapons and psychologically with the white paint of war, and set out for a confrontation with the band containing their enemies. The elders led the insults directed at the other side and urged a general attack. Fortunately, the younger men limited the spear throwing to the individuals involved in the feud, but a single misplaced spear could have resulted in war.

Acknowledgements

I wish to thank those who have discussed the topic or who have supplied me with information during the writing of this paper, especially Dr Jörg Orschiedt, Neanderthal Museum, Germany, Dr Chris Meiklejohn, University of Winnipeg, Professor Keith Otterbein, State University of New York, and the anonymous referees.

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References

- Albert, B. 1989. Yanomami 'violence': inclusive fitness or ethnographer's representation? *Current Anthropology*, 30: 637–40.
- Albert, B. 1990. On Yanomami warfare: rejoinder. *Current Anthropology*, 31: 558–63.
- Albrethsen, S. E. and Brinch Petersen, E. 1976. Excavation of a Mesolithic cemetery at Vedbæk, Denmark. *Acta Archaeologica*, 47: 1–28.
- Alekšin, V. A. 1994. Mesolithische Gräberfelder der Ukraine (chronologische, kulturelle und soziologische Aspekte der Interpretation). *Zeitschrift für Archäologie*, 28: 163–89.
- Andersen, S. H. 1985. Tybrind Vig. *Journal of Danish Archaeology*, 4: 52–69.
- Anger, S. and Dieck, A. 1978. Skalpiere in Europa seit dem Neolithikum bis um 1767 Nach Chr.. *Bonner Hefte zur Vorgeschichte*, 17: 153–240.
- Arsuaga, J. L. et al. 1997. Sima de los Huesos (Sierra de Atapuerca, Spain): the site. *Journal of Human Evolution*, 33: 109–27.
- Bachechi, L. et al. 1997. An arrow-caused lesion in a Late Upper Palaeolithic human pelvis. *Current Anthropology*, 38: 134–40.
- Bar-Yosef, O. 1986. The walls of Jericho: an alternative explanation. *Current Anthropology*, 27: 157–62.
- Bégouën, H. et al. 1922. Vertèbre humaine traversée par une lame en quartzite. *Revue anthropologique*, 32: 230–2.

- Beltrán, A. 1982. *Rock Art of the Spanish Levant*. Cambridge: Cambridge University Press.
- Bennicke, P. 1985. *Palaeopathology of Danish Skeletons*. Copenhagen: Akademisk Forlag.
- Bennicke, P. 1997. Death in the Mesolithic: two old men from Korsør Nor. In *The Danish Storebælt since the Ice Age* (eds L. Pedersen, A. Fischer and B. Aaby). Copenhagen: A/S Storebælt Fixed Link, pp. 99–105.
- Berger, T. D. and Trinkaus, E. 1995. Patterns of trauma among the Neanderthals. *Journal of Archaeological Science*, 22: 841–52.
- Boès, E. and Sears, S. 1996. Les Crânes trophées Marquisiens (XVIII^e et XIX^e siècles). interprétation des interventions anthropiques. *Bulletins et Mémoires de la Société d'Anthropologie de Paris*, n.s. 8: 275–88.
- Brinch Petersen, E., Alexandersen, V. and Meiklejohn, C. 1993. Vedbæk, graven midt i byen. *Nationalmuseets Arbejdsmark*, 61–9.
- Brothwell, D. 1999. Biosocial and bioarchaeological aspects of conflict and warfare. In *Ancient Warfare* (eds J. Carman and A. Harding). Stroud: Sutton, pp. 25–38.
- Carman, J. and Harding, A. (eds) 1999. *Ancient Warfare*. Stroud: Sutton.
- Cashdan, E. 2001. Ethnocentrism and xenophobia: a cross-cultural study. *Current Anthropology*, 42: 760–5.
- Cervera, J. et al. 1998. *Atapuerca: Un millón de años de historia*. Madrid: Plot.
- Chagnon, N. 1988. Life histories, blood revenge, and warfare in a tribal population. *Science*, 239: 985–92.
- Chagnon, N. 1990. Reproductive and somatic conflicts of interest in the genesis of violence and warfare among tribesmen. In *The Anthropology of War* (ed. J. Haas). Cambridge: Cambridge University Press, pp. 77–104.
- Chagnon, N. 1996a. Chronic problems in understanding tribal violence and warfare. In *Genetics of Criminal and Antisocial Behavior* (eds G. R. Bock and J. A. Goode). New York: Wiley, pp. 202–36.
- Chagnon, N. 1996b. Review of *Yanomami Warfare: A Political History*. *American Anthropologist*, 98: 670–2.
- Chagnon, N. 1997. *Yanomamö*, 5th edn. Fort Worth, TX: Harcourt Brace.
- Chapman, J. 1999. The origins of warfare in the prehistory of Central and Eastern Europe. In *Ancient Warfare* (eds J. Carman and A. Harding). Stroud: Sutton, pp. 101–42.
- Clark, J. E. 2000. Towards a better explanation of hereditary inequality. In *Agency in Archaeology* (eds M-A. Dobres and J. E. Robb). London: Routledge, pp. 92–112.
- Clastres, P. 1994. *Archeology of Violence*. New York: Semiotext(e).
- Conklin, B. A. 1995. Thus are our bodies, thus was our custom – mortuary cannibalism in an Amazonian society. *American Ethnologist*, 22: 75–101.
- Cordier, G. 1990. Blessures préhistoriques animales et humaines avec armes ou projectiles conservés. *Bulletin de la Société Préhistorique Française*, 87: 462–81.
- Cosmides, L. et al. 1992. Introduction: evolutionary psychology and conceptual integration. In *The Adapted Mind* (eds J. Barkow et al.). Oxford: Oxford University Press, pp. 3–15.
- Cotlow, L. 1953. *Amazon Head-Hunters*. New York: Henry Holt.
- Culbert, T. P. 1988. The collapse of Classic Maya civilization. In *The Collapse of Ancient States and Civilizations* (eds N. Yoffee and G. L. Cowgill). Tucson, AZ: University of Arizona Press, pp. 69–101.
- Cullen, T. 1995. Mesolithic mortuary ritual at Franchthi Cave, Greece. *Antiquity*, 69: 270–89.

- Dawson, D. 1999 Evolutionary theory and group selection: the question of warfare. *History and Theory*, 38: 79–100.
- Dawson, D. 2001. *The First Armies*. London: Cassell.
- Deacon, H. J. and Deacon, J. 1999. *Human Beginnings in South Africa*. Walnut Creek, CA: Altamira Press.
- Defleur, A. et al. 1999 Neanderthal cannibalism at Moula-Guercy, Ardèche, France. *Science*, 286: 128–31.
- Degerbøhl, M. 1942. Et Knoglemateriale fra Dyrholmen-Bopladsen, en ældre Stenalder-Køkkenmødding: Med særligt henblik paa Uroksens Køns-Dimorphisme og paa Kannibalismen i Danmark'. In *Dyrholmen: En Stenalderboplads paa Djursland* (eds T. Mathiassen, M. Degerbøhl and J. Troels-Smith). Copenhagen: Det Kongelige Danske Videnskabernes Selskab, Arkæologisk-Kunsthistoriske Skrifter, Vol. 1, No. 1, pp. 77–135.
- de Waal, F. B. M. 1989. *Peacemaking among Primates*. Cambridge, MA: Harvard University Press.
- Dolukhanov, P. M. 1999. War and peace in prehistoric Eastern Europe. In *Ancient Warfare* (eds J. Carman and A. Harding). Stroud: Sutton, pp. 73–88.
- Ehrenreich, B. 1997. *Blood Rites*. New York: Metropolitan Books.
- Escoriza Mateu, T. 2002 Representations of women in Spanish Levantine rock art. *Journal of Social Archaeology*, 2: 81–108.
- Fausto, C. 2000. Of enemies and pets: warfare and shamanism in Amazonia. *American Ethnologist*, 26: 933–56.
- Ferembach, D. 1959. Note sur un crane brachycephale et deux mandibles du Mesolithique d'Israel. *Israel Exploration Journal*, 9: 65–73.
- Ferguson, R. B. 1990. Explaining war. In *The Anthropology of War* (ed. J. Haas). Cambridge: Cambridge University Press, pp. 26–55.
- Ferguson, R. B. 1995. *Yanomami Warfare: A Political History*. Santa Fe, NM: School of American Research Press.
- Ferguson, R. B. 1997a. Violence and war in prehistory. In *Troubled Times* (eds D. L. Martin and D. W. Frayer). New York: Gordon & Breach, pp. 321–55.
- Ferguson, R. B. 1997b. Review of *War before Civilization: The Myth of the Peaceful Savage*. *American Anthropologist*, 99: 424–5.
- Ferguson, R. B. 2001. Materialist, cultural and biological theories on why Yanomami make war. *Anthropological Theory*, 1: 99–116.
- Ferguson, R. B. and Whitehead, N. L. (eds) 1999. *War in the Tribal Zone: Expanding States and Indigenous Warfare*, 2nd edn. Santa Fe, NM: School of American Research Press.
- Fernández-Jalvo, Y. et al. 1999 Human cannibalism in the Early Pleistocene. *Journal of Human Evolution*, 37: 591–622.
- Foley, R. A. 1996. An evolutionary and chronological framework for human social behaviour. *Proceedings of the British Academy*, 88: 95–117.
- Frayer, D. W. 1997. Ofnet: evidence of a Mesolithic massacre. In *Troubled Times* (eds D. L. Martin and D. W. Frayer). New York: Gordon & Breach, pp. 181–216.
- Gamble, C. 1998. Palaeolithic society and the release from proximity: a network approach to intimate relations. *World Archaeology*, 29: 426–49.
- Gilbert, P. 1994. Male violence: towards an integration. In *Male Violence* (ed. J. Archer). London: Routledge, pp. 352–89.
- Grünberg, J. M. 2000. *Mesolithische Bestattungen in Europa*. Rahden: Verlag Marie Leidorf.

- Grøn, O. and Skaarup, J. 1991. Møllegabet II: a submerged Mesolithic site and a 'boat burial' from Ærø. *Journal of Danish Archaeology*, 10: 38–50.
- Guilaine, J. and Zammit, J. 2001. *Le Sentier de la Guerre*. Paris: Éditions du Seuil.
- Haas, J. 2001. Warfare and the evolution of culture. In *Archaeology at the Millennium* (eds G. M. Feinman and T. D. Price). New York: Kluwer/Plenum, pp. 329–50.
- Harner, M. J. 1972. *The Jivaro: People of the Sacred Waterfalls*. Garden City, NY: Natural History Press.
- Harrison, S. 1993. *The Mask of War*. Manchester: Manchester University Press.
- Hart, C. W. M. and Pilling, A. R. 1960. *The Tiwi of North Australia*. New York: Holt, Rinehart & Winston.
- Heider, K. 1970. *The Dugum Dani*. Chicago: Aldine.
- Hollimon, S. 2001. Warfare and gender in the northern plains: osteological evidence of trauma reconsidered. In *Gender and the Archaeology of Death* (eds B. Arnold and N. Wicker). Walnut Creek, CA: Altamira Press, pp. 179–93.
- Jochim, M. A. 1998. *A Hunter-Gatherer Landscape: Southwest Germany in the Late Paleolithic and Mesolithic*. New York: Plenum.
- Kamp, K. A. 1998. Social hierarchy and burial treatments: a comparative assessment. *Cross-Cultural Research*, 32: 79–115.
- Keegan, J. 1993. *A History of Warfare*. London: Hutchinson.
- Keeley, L. H. 1996. *War before Civilization: The Myth of the Peaceful Savage*. Oxford: Oxford University Press.
- Kelly, R. C. 2000. *Warless Societies and the Origin of War*. Ann Arbor, MI: University of Michigan Press.
- Kennedy, J. 1971. Ritual and intergroup murder: comments on war, primitive and modern. In *War and the Human Race* (ed. M. N. Walsh). Amsterdam: Elsevier, pp. 40–61.
- Koch, K-F. 1974. *The Anthropology of Warfare*. Reading, MA: Addison-Wesley.
- Koehler, L. 1997. Earth mothers, warriors, horticulturalists, artists, and chiefs: women among the Mississippian and Mississippian-Oneota peoples, A.D. 1000 to 1750. In *Women in Prehistory: North America and Mesoamerica* (eds C. Claassen and R. A. Joyce). Philadelphia, PA: University of Pennsylvania Press, pp. 211–26.
- Knauff, B. M. 1987. Reconsidering violence in simple human societies: homicide among the Gebusi of New Guinea. *Current Anthropology*, 28: 457–500.
- Knauff, B. M. 1990. Melanesian warfare: a theoretical history. *Oceania*, 60: 250–311.
- Knauff, B. M. 1991. Violence and sociality in human evolution. *Current Anthropology*, 32: 391–428.
- Kristiansen, K. 1999. The emergence of warrior aristocracies in later European prehistory and their long-term history. In *Ancient Warfare* (eds J. Carman and A. Harding). Stroud: Sutton, pp. 175–89.
- Lambert, P. M. 1997. Patterns of violence in prehistoric hunter-gatherer societies of coastal southern California. In *Troubled Times* (eds D. L. Martin and D. W. Frayer). New York: Gordon & Breach, pp. 77–110.
- Larsen, C. S. 1997. *Bioarchaeology*. Cambridge: Cambridge University Press.
- Larsson, L. 1989. Late Mesolithic settlements and cemeteries at Skateholm, southern Sweden. In *The Mesolithic in Europe* (ed. C. Bonsall). Edinburgh: John Donald, pp. 367–78.
- Layton, R. and Barton, R. 2001. Warfare and human social evolution. In *Ethnoarchaeology and Hunter-Gatherers: Pictures at an Exhibition* (eds K. J. Fewster and M. Zvelebil). Oxford: British Archaeological Reports, International Series 955, pp. 53–63.

- Leakey, R. B. and Lewin, R. 1992. *Origins Reconsidered*. New York: Doubleday.
- Lillie, M. C. 2001. Mesolithic cultures of Ukraine. In *Ethnoarchaeology and Hunter-Gatherers: Pictures at an Exhibition* (eds K. J. Fewster and M. Zvelebil). Oxford: British Archaeological Reports, International Series 955, pp. 53–63.
- Lizot, J. 1994. On warfare: an answer to N. A. Chagnon. *American Ethnologist*, 21: 845–62.
- Lovell, N. C. 1997. Trauma analysis in palaeo-pathology. *Yearbook of Physical Anthropology*, 40: 139–70.
- Lubell, D. et al. 1989. Archaeology and human biology of the Mesolithic-Neolithic transition in southern Portugal: a preliminary report. In *The Mesolithic in Europe* (ed. C. Bonsall). Edinburgh: John Donald, pp. 632–40.
- Martin, D. L. and Frayer, D. W. (eds) 1997. *Troubled Times*. Langhorne: Gordon & Breach.
- Maschner, H. D. G. and Reedy-Maschner, K. L. 1998. Raid, retreat, defend (repeat): the archaeology and ethnohistory of warfare on the North Pacific Rim. *Journal of Anthropological Archaeology*, 17: 19–51.
- Mercer, R. J. 1999. The origins of warfare in the British Isles. In *Ancient Warfare* (eds J. Carman and A. Harding). Stroud: Sutton, pp. 143–56.
- Milner, G. R. 1999. Warfare in Prehistoric and Early Historic Eastern North America. *Journal of Archaeological Research*, 7: 105–51.
- Moore, J. H. 1990. The reproductive success of Cheyenne war chiefs: a contrary case to Chagnon's Yanomamö. *Current Anthropology*, 31: 322–30.
- Nash, G. 2000. The power and the violence of the archers. *Archaeological Review from Cambridge*, 17: 81–98.
- Norling-Christensen, H. and Bröste, K. 1945. Skeletgraven fra Korsør Nor. *Nationalmuseets Arbejdsmark*, 19–33.
- O'Connell, R. L. 1995. *Ride of the Second Horseman*. Oxford: Oxford University Press.
- Orschiedt, J. 1998. Ergebnisse einer neuen Untersuchung der spätmesolithischen Kopfbestattungen aus Süddeutschland. In *Aktuelle Forschungen zum Mesolithikum* (ed. N. Conard). Tübingen: Urgeschichtliche Materialhefte 12, pp. 147–60.
- Orschiedt, J. 1999. *Manipulationen an menschlichen Skelettresten*. Tübingen: Urgeschichtliche Materialhefte 13.
- Otterbein, K. F. 1997. The origins of war. *Critical Review*, 11: 251–77.
- Otterbein, K. F. 2000. Five feuds: an analysis of homicides in eastern Kentucky in the late nineteenth century. *American Anthropologist*, 102: 231–43.
- Péquart, J-F. and Péquart, M. 1931. Sur une vertèbre humaine mésolithique percée d'une fleche. *Association Française pour l'Avancement des Sciences*, 55: 321–4.
- Peter-Röcher, H. 2002. Krieg und Gewalt: Zu den Kopfdepositionen in der Großen Ofnet und der Diskussion um kriegerische Konflikte in prähistorischer Zeit. *Prähistorische Zeitschrift*, 77: 1–28.
- Peters, J. F. 1998. *Life among the Yanomami*. Orchard Park, NY: Broadview Press.
- Pinker, S. 1998. *How the Mind Works*. London: Penguin.
- Radovanovic, I. 1996. *The Iron Gates Mesolithic*. Ann Arbor, MI: International Monographs in Prehistory 11.
- Redmond, E. M. 1994. *Tribal and Chieftly Warfare in South America*. Ann Arbor, MI: Memoirs of the Museum of Anthropology, University of Michigan Number 28.
- Reyna, S. P. and Downs, R. E. (eds) 1994. *Studying War: Anthropological Perspectives*. New York: Gordon & Breach.

- Robarchek, C. and Robarchek, C. 1998. *Waorani: The Contexts of Violence and War*. Fort Worth, TX: Harcourt Brace.
- Rolle, R. 1989. *The World of the Scythians*. London: Batsford.
- Roper, M. K. 1969. A survey of the evidence for intrahuman killing in the Pleistocene. *Current Anthropology*, 10: 427–59.
- Roper, M. K. 1975. Evidence of warfare in the Near East from 10,000–4,300 B.C. In *War: Its Causes and Correlates* (eds M. A. Nettlehip et al.). The Hague: Mouton, pp. 299–343.
- Schilling, H. 1997. The Kørсор Nor site: the permanent dwelling place of a hunting and fishing people in life and death. In *The Danish Storebælt since the Ice Age* (eds L. Pedersen, A. Fischer and B. Aaby). Copenhagen: A/S Storebælt Fixed Link, pp. 93–8.
- Schulting, R. J. and Wysocki, M. 2002. Cranial trauma in the British Earlier Neolithic. *Past*, 41: 4–6.
- Skaarup, J. 1995. Hunting the hunters and fishers of the Mesolithic: twenty years of research on the sea floor south of Funen, Denmark. In *Man and Sea in the Mesolithic* (ed. A. Fischer). Oxford: Oxbow Books, pp. 397–401.
- Sterpin, A. 1993. La Chasse aux scalps chez les Nivacle du Gran Chaco. *Journal de la Société des Americanistes*, 79: 33–66.
- Thorpe, I. J. N. 1996. *The Origins of Agriculture in Europe*. London: Routledge.
- Thorpe, I. J. N. 2003. Death and violence: the Later Mesolithic of southern Scandinavia. In *Peopling the Mesolithic in a Northern Environment* (eds L. Bevan and J. Moore). Oxford: British Archaeological Reports, International Series.
- Van der Dennen, J. 1995. *The Origin of War: The Evolution of a Male-Coalitional Reproductive Strategy*. Groningen: Origin Press.
- Vencl, S. 1991. Interprétation des blessures causées par les armes au Mésolithique. *L'Anthropologie*, 95: 219–28.
- Vencl, S. 1999. Stone Age warfare. In *Ancient Warfare* (eds J. Carman and A. Harding). Stroud: Sutton, pp. 57–72.
- Wahl, J. and König, H. G. 1987. Anthropologisch-traumatologische Untersuchung der menschlichen Skelettreste aus dem Bandkeramischen Massengrab bei Talheim, Kreis Heilbronn. *Fundberichte aus Baden-Württemberg*, 12: 65–193.
- Wendorf, F. 1968. Site 117: a Nubian Final Palaeolithic graveyard near Jebel Sahaba, Sudan. In *The Prehistory of Nubia*, Vol. 2 (ed. F. Wendorf). Dallas, TX: Southern Methodist University Press, pp. 954–1040.
- Wendorf, F. and Schild, R. 1986. *The Wadi Kubbaniya Skeleton: A Late Paleolithic Burial from Southern Egypt*. Dallas, TX: Southern Methodist University Press.
- Wilson, E. O. 1978. *On Human Nature*. Cambridge, MA: Harvard University Press.
- Windl, H. 1994. Zehn Jahre Grabung Schletz, VB Mistelbach, NÖ. *Archäologie Österreichs*, 5: 11–18.
- Wrangham, R. W. 1999. Evolution of coalitionary killing. *Yearbook of Physical Anthropology*, 42: 1–30.
- Wrangham, R. and Peterson, D. 1996. *Demonic Males: Apes and the Origins of Human Violence*. London: Bloomsbury.
- Zollikofer, C. P. E. et al. 2002. Evidence for interpersonal violence in the St. Césaire Neanderthal. *Proceedings of the National Academy of Sciences*, 99: 6444–8.

