

The Archaeology of War: A North American Perspective

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This article reviews recent archaeological research on warfare in prestate societies of native North America. This survey comprises six regions: Arctic/Subarctic, Northwest Coast, California, Southwest/Great Basin, Great Plains, and Eastern Woodlands. Two lines of evidence, defensive settlement behavior and injuries in human skeletal remains, figure prominently in archaeological reconstructions of violence and warfare in these regions. Burning of sites and settlements also has been important for identifying the consequences of war and investigating more subtle aspects of strategy and directionality. Weaponry and iconography have to date provided important but more limited insights. Although considerable disparities exist between regions in the archaeological evidence for intra- and intergroup violence, all regions show a marked increase after A.D. 1000. These findings suggest that larger forces may have been responsible for escalating violence throughout North America at this time.

KEY WORDS: bioarchaeology; North America; prehistory; warfare.

INTRODUCTION

Our knowledge of prehistoric warfare has advanced exponentially in the last decade as a result of renewed anthropological interest in war and the development of new methods for identifying and characterizing its practice and prevalence archaeologically. A growing body of literature now documents the existence of warfare in highly variable environmental and social contexts, leaving little doubt of its existence and prehistoric importance in many world regions (e.g., Billman, 1996; Haas and Creamer, 1993; Hassig, 1992, 1998; Keeley, 1996; Lambert, 1994; LeBlanc, 1999; Martin and Frayer, 1997; Maschner and Reedy-Maschner, 1998;

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Milner, 1999; Owsley and Jantz, 1994; Redmond, 1994; Rice and LeBlanc, 2001; Webster, 2000). The purpose of this article is to synthesize and evaluate the literature on warfare in prestate societies of North America, a region that has figured prominently in recent archaeological investigations of war origins and causation. This literature is particularly important to current debates on the causes of war (e.g., *Darkness in Eldorado* debate), because it pertains to a time before European contact and the forces hypothesized to have changed modern prestate societies at the heart of these debates (e.g., Ferguson, 1995; Ferguson and Whitehead, 1992). Emphasis is placed on major synthetic works and on prominent case studies that illustrate both the nature of war and the methods used by archaeologists to document and reconstruct this aspect of prehistoric human interaction.

Chroniclers of European history have long recognized the power and importance of war as a force of change in Western civilization. Homeric sieges, the conquests of Alexander the Great, the Napoleonic campaigns—all figure prominently in European history and in European and Euroamerican concepts of origin and identity (e.g., Ferrill, 1997; Keegan, 1993; Keen, 1999). The brief military history of the United States similarly suffers no shortage of historiography—over 50,000 books devoted to the Civil War alone (Keeley, 1996). Yet, despite oral histories, historic accounts, and abundant archaeological evidence of its prehistoric and historic prominence at different times and places (e.g., Haas, 1999; Haas and Creamer, 1993, 1996, 1997; Keeley, 1996; Lambert, 1994; LeBlanc, 1999; Maschner, 1997; Milner, 1999; Owsley and Jantz, 1994; Rice and LeBlanc, 2001), the importance of warfare in the development and configuration of indigenous New World societies has often been downplayed or explained, where present, in terms of Western contact. This may be due to a general bias among warfare scholars and military historians towards state-level warfare and the written records kept by or for state bureaucracies (e.g., Ferrill, 1997; Keegan, 1993; Keen, 1999; Turney-High, 1971; see also discussion in Keeley, 1996). The result, however, is a perception of human history and behavior that is not reconcilable with extant and emerging archaeological data.

As other scholars have noted or otherwise documented, the view of a peaceful past in North America is no longer tenable (e.g., Bamforth, 1994; Bridges *et al.*, 2000; Haas, 1999; Haas and Creamer, 1993; Keeley, 1996; Lambert, 1994; LeBlanc, 1999; Martin and Frayer, 1997; Maschner and Reedy-Maschner, 1998; Milner, 1999; Moss and Erlandson, 1992; Owsley and Jantz, 1994; Rice and LeBlanc, 2001; Wilcox, 1989; Wilcox and Haas, 1994; Willey, 1990). Many North American societies that make their appearance in written records only in the last few centuries have long and complex histories that clearly include violence and war. Assumptions of the preeminence of Western contact in the formulation of New World social process minimizes the importance of its unique landscapes, events, trajectories, and solutions even as they obscure recognition of convergent behaviors that might inform on the causes and consequences of human violence. Archaeology has an unparalleled capacity to reveal the extent and conduct of

violence and war precisely because it covers long periods and focuses on a time before Western European expansion, colonialism, and other processes that altered the character and trajectory of many indigenous American societies.

For purposes of this review, warfare is defined as “a state or period of armed hostility existing between politically autonomous communities” (as per Meggitt, 1977, p.10). This inclusive definition does not discriminate between small-scale forms of engagement, such as raiding, ambush, and surprise attacks, that tend to characterize tribal warfare (e.g., Boehm, 1984; Chagnon, 1992; Fadiman, 1982; Keeley, 1996; Meggitt, 1977; Rice, 2001), and the formal battles more typical of state-level warfare (Keegan, 1993; Keeley, 1996). It is important to include a consideration of the evidence for raiding and other strategies of limited engagement, because these might well have predominated in the prestate political landscape of North America (north of Mexico). From a practical perspective, the major concern with this inclusive definition is how to recognize potentially subtle material manifestations of small-scale war. The different lines of evidence used by archaeologists to identify and characterize prehistoric North American warfare are detailed in the following section.

To systematize the presentation of a diverse and not always comparable literature, the review is organized by region and time period. The survey begins in the western Arctic and moves southward to the Northwest Coast and California before turning east to the Southwest/Great Basin, Plains, and Eastern Woodlands. Data are examined chronologically for each region, from the earliest archaeological evidence of interpersonal violence to that of the early period of European contact. The type of data brought to bear on the issue of violence and warfare varies considerably by region, both in terms of the history of archaeological investigation and the archaeological record itself. Despite this variability, however, both shared and distinct practices and patterns of warfare emerge when regional data are compared, providing important insights into issues of proximate and ultimate causation.

ARCHAEOLOGICAL EVIDENCE OF WARFARE

Archaeological investigation of warfare primarily relies on four lines of material evidence: settlement data, injuries in human skeletal remains, war weaponry, and iconography (Lambert, 1994; LeBlanc, 1999; Vencl, 1984; Wilcox and Haas, 1994). The first of these, settlement data, is particularly useful for identifying both concern with defense and the consequences of failed (or absence of) defensive measures. The time and material resources people deem necessary for protection can help define perceptions of threat. Defensive behavior might include a shift in village location from a valley floor with ready access to agricultural fields to a steep slope or inaccessible rock shelter requiring greater energy expenditure for day-to-day living (e.g., Haas and Creamer, 1993). People might aggregate in larger, more compact settlements, trading other health concerns such as increased disease exposure and social tensions for safety in numbers (e.g., Haas and Creamer, 1993;

Maschner, 1992). Walls, forts, towers, moats, and other defensive structures require investment of labor and resources for construction and maintenance, so the appearance of these features should also correlate with a perceived need for defense sufficient to warrant reallocation of resources to these ends. The burning of structures, on the other hand, is a common consequence of war (e.g., Hoig, 1993; Kroeber and Fontana, 1986; Rice, 2001; Thomas, 1981). Archaeological evidence of burned structures and settlements can therefore help document actual attacks, although other possible causes of burning (e.g., accidental fires, intentional clearing) must also be considered.

Osteological evidence for warfare includes several classes of injuries that tend to occur in violent contexts: embedded projectiles or scars from spears, arrows, darts, or bullets; depressed skull fractures, nasal fractures, tooth fractures, broken ribs, and forearm parry fractures from clubbing implements; decapitation, scalping, dismemberment and other signs of trophy taking; more extensive bone breakage, cut marks, punctures, burning, and related perimortem damage suggestive of torture, corpse mutilation, and/or cannibalism; and more subtle evidence such as carnivore tooth marks or other signs of corpse exposure that suggest unnatural death. Victim profiles identifying those at risk may help sort out the nature of violence (e.g., Lambert, 1994; Milner *et al.*, 1991). Similarly, demographic profiles can reveal population-level impacts of war, such as the loss of young males killed in battle or young women captured by enemies (e.g., Hurst and Turner, 1993; Willey, 1990).

The mere presence of violent injuries in archaeological assemblages is not sufficient to demonstrate intergroup aggression, but evidence such as multiple victims and trophy taking does strongly suggest lethal intentions and actions beyond domestic or civil arenas. On the other hand, the absence of such evidence does not necessarily imply an absence of war: skeletal material may be rare overall, or it may simply be that no one has looked for this evidence. Reexamination of extant osteological collections has significantly changed perceptions of prehistoric violence in several regions of North America (e.g., Bridges *et al.*, 2000; Lambert, 1994; Milner, 1999; Smith, 1997), so the absence of reported cases needs to be evaluated in light of efforts made to systematically investigate warfare in this way.

Weaponry can be more difficult to interpret in terms of warfare, because weapons used in human combat may also function in the performance of daily activities (LeBlanc, 1999; Milner, 1999). However, studied in conjunction with other lines of evidence, the design and specific use of implements for human-directed violence can often be ascertained. Weapons might be found embedded in human bone, for example, or matched by size and shape to injuries in human skeletons. A new and more powerful weapon like the bow and arrow (Blitz, 1988) may change military tactics and thus the nature and scale of warfare and all of its material manifestations, so the relatively sudden appearance of a new weapon in the archaeological record may also constitute a sign of increasing intergroup aggression.

Iconography has tremendous potential to provide more intimate and telling details such as battle scenes, head taking (Browne *et al.*, 1993; Verano *et al.*, 1999), and war paraphernalia (e.g., Crotty, 2001; Loendorf and Conner, 1993; Schaafsma, 1980, 2000). One problem with iconography, whether it be pictographic accounts on rock walls or carefully detailed war scenes on ceramic vessels, is interpretation: do scenes depict real life characters and events or do they represent mythological characters and sequences that have no basis in real life? Recently, bioarchaeology has played an important role in validating the historical reality of such scenes (e.g., Browne *et al.*, 1993; Verano *et al.*, 1999).

The study of war in different regions of North America has been influenced by a number of factors, including the local importance of warfare historically, the interest or disinterest of scholars working in the region, and the condition and nature of the archaeological record. Individual accounts of forts, palisades, projectile injuries, scalping, and other signs of intergroup aggression abound in the literature, but synthetic studies addressing larger issues of scale, chronology, and causation have only begun to emerge as sufficient data and the tools to analyze these data become available (e.g., Bridges *et al.*, 2000; Lambert, 1994; LeBlanc, 1999; Milner, 1999). What follows is a discussion of the current status of warfare studies in some of the major culture areas of North America: Arctic/Subarctic, Northwest Coast, California/Great Basin, Southwest, Great Plains, and the Eastern Woodlands. Emphasis is placed on what is known about warfare in each region, and on the methods and evidence that archaeologists have employed to identify and characterize its practice and prehistoric prevalence.

WESTERN ARCTIC AND SUBARCTIC

Archaeological studies of warfare in the western arctic and subarctic have emerged in the literature only in the last 10 years (e.g., Maschner, 2000; Maschner and Reedy-Maschner, 1998; Mason, 1998; Melbye and Fairgrieve, 1994; Schaaf, 1995), concurrent with reappraisal and recognition of significant warfare among the Yup'ik and other indigenous arctic societies of the historic period (e.g., Burch, 1974, 1988; Fienup-Riordan, 1994; Reedy-Maschner and Maschner, 1999). The most systematic work comes from the North Pacific Rim, where ongoing research on Kodiak Island (Fitzhugh, 1996) and on the lower Alaska Peninsula (Maschner, 2000; Maschner *et al.*, 1997; Maschner and Reedy-Maschner, 1998) has focused on settlement survey data. These studies have brought to light complex settlement systems where use and modification of the natural landscape for purposes of defense is clearly evident. Maschner and Reedy-Maschner (1998) identify five types of defensive sites on the North Pacific Rim: (1) rock islands used for defensive retreat or lookout, (2) the placement of villages in locations that are either defensible or (3) escapable, (4) construction of refuges or fortifications in association with

villages, and (5) the construction of refuge villages. On Kodiak Island, defensive behavior becomes evident in settlement systems around A.D. 300–1100, but most defensive sites in the region appear to postdate this time period (Maschner and Reedy-Maschner, 1998; Moss and Erlandson, 1992).

Skeletal evidence for violence in the western arctic is present but sporadic and disparately distributed in time and space (see Maschner and Reedy-Maschner, 1998). The oldest bioarchaeological evidence of serious violence dates between 1500 B.C. and A.D. 1000 and comes from two sites on Kodiak Island: Crag Point and Uyak (Hrdlicka, 1944; Simon and Steffian, 1994; Urcid, 1994) in the Gulf of Alaska. At these sites, disarticulated remains with cut marks, punctures, and other signs of extensive processing suggest mutilation and possibly cannibalism, although some deposits have been interpreted as mortuary behavior (see Simon and Steffian, 1994). Decapitation, scalping cut marks, and perforations at joint surfaces of postcranial skeletal elements also hint at trophy taking (Maschner and Reedy-Maschner, 1998; Simon and Steffian, 1994; Urcid, 1994).

Late prehistoric examples of violent injury are rare, but a couple have been identified in the Aleutian region: a male skeleton with an apparent projectile injury at Peterson Lagoon on Unimak Island (A.D. 1575) and a male mummy from the north coast of Unalaska Island with a crushing injury to the skull (Maschner and Reedy-Maschner, 1998). Far to the northeast on the MacKenzie Delta in the Northern Territories, the disarticulated, defleshed, and broken remains of a minimum of 35 people at the fourteenth-century Saunaktuk site bear witness to lethal violence on a very different scale (Melbye and Fairgrieve, 1994; Walker, 1990). Osteological evidence of knife cuts, slash wounds, piercing, gouging, and splitting of long bones accords well with modern oral tradition of Inuits in the Saunaktuk region. According to their accounts, at some unspecified time in the past, the Inuit settlement at Saunaktuk was attacked by Athabaskans while the men were away whaling. Old men, women, and children were tortured, murdered, and mutilated. Inuit accounts do not describe cannibalism, but body parts and bones do appear to have been treated in ways consistent with this interpretation (Melbye and Fairgrieve, 1994). These cases illustrate extremes in the bioarchaeological evidence for prehistoric violence in the arctic—isolated male victims versus a village massacre—but the dearth of systematic data makes conclusions of frequency and trends impossible at this time.

Weaponry also has been used to support an interpretation of intergroup violence in this region. Slender arrow points fashioned of basalt provide good evidence for the appearance of the bow-and-arrow after about A.D. 200 on the lower Alaska Peninsula. The atlatl has a long history of use in this region and is a superior weapon in hunting from boats. Terrestrial fauna that might be hunted with a bow is limited on the lower Alaska Peninsula, so the relatively sudden appearance and proliferation of this weapon here suggests its use against human targets (Maschner and Reedy-Maschner, 1998).

Western Thule expansion on the Alaska Peninsula after A.D. 1000 corresponds with village aggregation and other evidence for a changing political landscape. The association between the appearance of new cultural traditions, aggregation, increased use of defensive sites, and increased importance of a weapon generally ill-suited (relative to other available technologies) to most subsistence activities in the region suggest that territorial expansion and border disputes were important causes of late prehistoric war in the region. Indeed, an Alutiiq (Pacific Eskimo) arrow point found in the Unangan (Aleut) victim at Peterson Lagoon provides compelling evidence for prehistoric strife among historically known enemies (Maschner and Reedy-Maschner, 1998). Mason (1998) has argued that a complex of traits centered around bow-and-arrow warfare spread out of Asia into North America around A.D. 1150. In particular, the introduction of the sinew-backed bow, a more powerful and accurate weapon than previous bow technology, could have had a profound impact on the nature and levels of warfare throughout North America (LeBlanc, 1997; Maschner, 2000). The timing of events in Arctic cultures may herald a change in the way war was conducted that quickly spread from Alaska to other regions of North America.

NORTHWEST COAST

The Northwest Coast of North America, stretching from Yakutat Bay in the north to the central Oregon coast in the south (Maschner, 1997), has a more extensive history of warfare research than arctic regions, although again the record has improved significantly with contributions in the last decade or so (Ames and Maschner, 1999; Coupland, 1989; Cybulski, 1990, 1992, 1994, 1999; Donald, 1997; MacDonald, 1989; Maschner, 1992, 1996, 1997; Moss and Erlandson, 1992; Reedy-Maschner and Maschner, 1999). The ethnographic literature for the Northwest Coast is replete with accounts of raiding and other forms of warfare among the Tlingit and other indigenous groups (e.g., Ames and Maschner, 1999; de Laguna, 1972, 1990), so the prominence of war in this region has never been subject to the same scrutiny as in regions such as the American Southwest (see LeBlanc, 1999; but also Haas and Creamer, 1997).

Several sources of information have been used to reconstruct warfare patterns on the Northwest Coast. As in the lower Alaska Peninsula, the most important of these are settlement attributes such as refuge rocks, fortifications, and less-accessible village locations indicative of concern with defense (Ames and Maschner, 1999; MacDonald, 1989; Maschner, 1997; Maschner and Reedy-Maschner, 1998; Mitchell, 1990; Moss and Erlandson, 1992). In appearance, these sites are very much like those described for the lower Alaska Peninsula, with natural precipices, rock walls, and otherwise inaccessible prominences enhanced and/or used advantageously for defense against attacks by sea. Many of the Northwest Coast defensive sites have now been dated, so the chronology of their appearance

and use is well known (Maschner, 1992; Mitchell, 1990; Moss, 1989; Moss and Erlandson, 1992). Although bluff top site locations can be traced back to 2200 B.C. in Southeast Alaska (Ames and Maschner, 1999, p. 210; Maschner, 1997), sites more readily identifiable as defensive appear around A.D. 400–500 and are most prominent on the landscape between A.D. 800–1300 (Ames and Maschner, 1999; Maschner, 1997; Mitchell, 1990; Moss and Erlandson, 1992).

Using a GIS (Geographic Information System) to analyze more subtle parameters of settlement choice such as exposure and viewshed on Kuiu Island, Southeast Alaska, Maschner (1992, 1996, 1997; Maschner and Stein, 1995) has shown that late prehistoric settlements tend to be located along straight shorelines with enhanced visibility of open water, an apparent transition from previous preference for convoluted shorelines with good canoe haulouts and productive shellfish beds. Food remains and village location similarly indicate a change at this time from subsistence strategies emphasizing foods like herring and halibut obtained by small task groups to those such as salmon that concentrate at single locals and can be exploited by whole villages (Ames and Maschner, 1999, p. 216; Maschner, 1992, 1996, 1997; Maschner and Stein, 1995). These shifts are hypothesized to have minimized the risk of attack during performance of routine subsistence tasks (Maschner, 1992, 1997), the dangers of which are illustrated by high victim counts for vulnerable task groups at the entrenched Oneota settlement of Norris Farms in Illinois (Milner *et al.*, 1991). Both viewshed and subsistence data illustrate the more subtle lines of evidence that can signal warfare.

Skeletal evidence for warfare is present in the region, but due to a shift in mortuary practices from burial to aboveground interment on the coast after A.D. 200, the record is biased against late prehistoric burials and any information they might provide (Maschner, 1997). The earliest evidence of violent injury, perhaps in all of North America, dates to the eighth millennium B.C. and comes from the interior region of the Columbia Plateau near Kennewick, Washington. A projectile wound in the pelvis of “Kennewick Man” shows signs of healing and bears witness to at least one violent encounter during the life of this adult male (Preston, 1997; Slayman, 1997). Other Archaic (10,500–4400 B.C.) skeletons from the Columbia Plateau also show signs of violence, but small sample sizes make interpretation of nature and scale difficult (Ames and Maschner, 1999). However, several sites postdating A.D. 300 have yielded victims of violence, including two mass graves containing five individuals each, some with embedded stone arrow points (Chatters, 1989). These cases suggest more serious strife on the Plateau after this time.

On the coast, skeletal series analyzed by Cybulski (1990, 1992, 1994, 1999; see also Ames and Maschner, 1999) suggest a long history of violence in at least some locations. Violent injuries reported for Northwest coast remains include projectiles embedded in bone, skull and facial fractures, tooth fractures, forearm and hand fractures from parrying blows to the face and upper body, decapitation (Cybulski, 1990, 1992, 1994, 1999), and scalping cut marks (see Ames and

Maschner, 1999, p. 190). The earliest cases (3500–1500 B.C.) come from coastal sites in British Columbia, where violent trauma is evident in 21% of 57 observable individuals (Cybulski, 1994). Although most of these injuries are nonlethal, reported injuries include a projectile wound in a male dating to 2200 B.C. and several instances of decapitation dating to the end of this time period. Considerable disparities also exist between samples: violent trauma is almost nonexistent in remains from the Queen Charlotte Islands and common in those from the central mainland coast (Ames and Maschner, 1999, pp. 209–210; Maschner, 1997).

A similar rate of violent trauma (21.2%) is evident in remains dating between 1500 B.C. and A.D. 500 (Cybulski, 1994), but this figure also masks important regional differences (Ames and Maschner, 1999; Cybulski, 1990). Over 32% of individuals from north-coastal contexts, primarily Prince Rupert Harbor, show signs of violent trauma, whereas only 6% of those from contemporaneous sites to the south are thus affected (Ames and Maschner, 1999, p. 210; Maschner, 1997). Fractures from club blows predominate, but instances of decapitation also are present (Cybulski, 1999; Maschner, 1997). During those years, large villages began to form and war paraphernalia such as slate daggers and stone clubs appeared in north coast archaeological sites (Ames and Maschner, 1999; Fladmark *et al.*, 1990; Maschner, 1997), so alternative lines of evidence support the interpretation that intergroup violence was on the rise in some locations. After A.D. 500, human remains are rare (Ames and Maschner, 1999), but a small late prehistoric sample studied by Cybulski (1992, 1994) does exhibit a higher rate of violent trauma overall (28%), consistent with evidence for increased concern with defense after A.D. 800.

Weaponry also offers important insights into the conduct of war on the Northwest Coast. In coastal regions, violence antedating A.D. 500 appears to have primarily involved clubs, implying close hand-to-hand combat (Lowrey, 1999; Maschner, 1997). After A.D. 200–500, the appearance of small arrow points on the south coast and tapered bone points on the north coast likely heralds the arrival of the bow and arrow and a change in the way intergroup violence was conducted (Ames and Maschner, 1999, p. 200). Recent experimentation with artifact types found in Northwest Coast sites has shown that tapered bone points, while fragile, are better able to penetrate the various types of armor used historically by Northwest Coast peoples than points fashioned of slate or other stone. The latter are more durable, but tend to shatter on impact (Lowrey, 1999). The interpretation of bone points as war weapons is consistent with archaeological evidence of their co-occurrence with a subsistence technology dominated by more durable ground slate artifacts (Lowrey, 1999). Their appearance after A.D. 200–500 thus marks a change in the tactics of engagement, possibly including development of historically documented types of armor, that accords well with the settlement evidence of increased fortification and other signs of defensive behavior during the late prehistoric period (Lowrey, 1999; Maschner, 1997).

Several hypotheses have been proffered to explain Northwest Coast warfare. These include materialist explanations emphasizing food and other potentially

scarce resources (Ferguson, 1983, 1984) and Darwinian models emphasizing kin selection and reproductive fitness (Maschner, 1992, 1997). It is clear from the ethnographic literature that a wide range of proximate causes, including revenge, raiding for slaves and women (not mutually exclusive), status, food shortage, and competition for access to trade and trade routes could lead to war in this region (Ames and Maschner, 1999; Donald, 1997; Ferguson, 1983, 1984; Maschner, 1997; Mitchell, 1984). The origins of war are more obscure, but archaeological and ethnographic evidence from the northern Northwest Coast suggests that absolute food shortage was not paramount among them. On the other hand, status clearly was, at least during the historic period. Wars were often launched by the most powerful groups with resources to support slaving and other activities that had more to do with power and prestige than with the acquisition of food and other essential resources (Maschner, 1992, 1997). These are somewhat sobering findings for those seeking material evidence of war causation here and elsewhere, given the difficulty of identifying such causal factors archaeologically. Village consolidation and concomitant sociopolitical changes are more readily identified archaeologically as one of its consequences, however, and as on the Lower Alaska Peninsula, advances in war technology may have played an important role in this regard (Lowrey, 1999; Maschner, 1992, 1997; Maschner and Reedy-Maschner, 1998).

CALIFORNIA/WESTERN GREAT BASIN

Research on warfare in prehistoric California has concentrated on the south coast (Kennett, 1998; Kennett and Kennett, 2000; King, 1982; Lambert, 1994, 1997; Lambert and Walker, 1991; Walker, 1989; Walker and Lambert, 1989), despite abundant osteological evidence of violent injury and death elsewhere in the region (e.g., Andrushko *et al.*, 2000; Courville, 1952; Jurmain, 1991; Loud, 1924; Nelson, 1993; Rackerby, 1967; Schenck, 1926; Tenney, 1986; Tyson, 1977; Wedel, 1941; Wiberg, 1988). Depressed cranial vault fractures and projectile injuries constitute the most common types of violent injury (e.g., Jurmain, 1991; Lambert, 1994; Nelson, 1993; Walker, 1989), but forearm parry fractures have also been observed (Jurmain, 1991, 2001; Lambert, 1994; Nelson, 1993), and forearm mutilation and trophy taking were recently reported for two samples from the San Francisco Bay area (Andrushko *et al.*, 2000). Defensive sites and structures so apparent in the late prehistoric record of the Arctic, Northwest Coast, and regions to the east are not so evident in either coastal or interior California settings, despite the high frequency of skeletal injuries in many samples (e.g., Jurmain, 1991, 2001; Lambert, 1994, 1997; Nelson, 1993; Walker, 1989). It may be that mobility itself constituted one important defensive strategy, one that would be difficult to document archaeologically. It also may be that defensive structures were somewhat flimsy and thus unrecognizable archaeologically. However,

historic and ethnographic accounts of California Indian peoples rarely mention defensive architecture, even where warfare is discussed (e.g., Heizer and Whipple, 1971; Kroeber, 1976), so it seems more likely that the cultural traditions in this region, as has been documented in the Basin of Mexico (see Hassig, 1998, 1999; Webster, 2000, p. 74; see also Milner, 1999, p. 122), simply did not call for construction of defensive works, even in times of war.

Recent research in the Santa Barbara Channel area suggests, however, that careful scrutiny of settlement choice can illicit subtle clues regarding possible defensive concerns here and perhaps elsewhere in California. Applying methodologies similar to those used by Maschner (1992, 1997) on the Northwest Coast, Douglas Kennett (1998) used GIS to evaluate settlement behavior on the Northern Channel Islands over an 11,000 year period. His diachronic settlement study revealed an increased tendency towards the establishment of permanent villages on headlands and sea cliffs, often with associated backcountry outposts, after A.D. 700. These settlements were apparently situated to maximize views of the coast and sea, while minimizing visual contact with adjacent coastal villages, thus suggesting increased concern with political autonomy, territoriality, and defense during the late prehistoric period. As did Arnold (1991) before him, Kennett also found evidence for settlement disruption and partial abandonment of the islands circa A.D. 1150–1300, a time period marked by severe drought (Kennett, 1998; Kennett and Kennett, 2000; Lambert, 1994; Raab and Larson, 1997).

Although settlement evidence from the Northern Channel Islands is provocative, the osteological record of violent injury for the Santa Barbara Channel area offers more direct evidence of conflict and temporal variation in levels and types of violence (Lambert, 1994, 1997; Lambert and Walker, 1991; Walker, 1989; Walker and Lambert, 1989). Data on over 1700 individuals spanning a 7500-year period from 30 archaeological sites provide a fine-grained diachronic perspective on violence and warfare in hunter–gatherer societies of this region (Lambert, 1994, 1997). Healed cranial vault fractures are present in crania from all time periods (128/753 or 17% affected), but are most common (25% affected) in those from sites dating between about 1500 B.C. and A.D. 1380 (Lambert, 1994, 1997; Walker, 1989). Typically small and round, these apparent club injuries affect more males than females in all time periods, suggesting some form of ritualized violence like the club fights of the Yanomamo (Chagnon, 1992; Walker, 1989). Healed cranial fractures were common long before lethal violence became prominent, demonstrating both a long history of social tensions but possibly also the effectiveness of sublethal mechanisms for constraining them (Lambert, 1994, 1997; Walker, 1989).

Injuries from projectile weapons also have a long history of occurrence in this region, first appearing in the fifth millennium B.C. Identified based on the presence of stone or bone spear, dart, and arrow points embedded in bone, bone scars attributed to these projectiles, or projectiles found lodged in body cavities, projectile injuries are more common in males than females overall (3:1)

and tend to affect those between the ages of 18 and 40 years. Victims are relatively uncommon in samples antedating A.D. 600, ranging in frequency from about 0 to 5% (Lambert, 1994). Projectile injuries are much more frequent in samples dating between A.D. 580 and 1380 (Lambert, 1994, 1997; Lambert and Walker, 1991; Walker and Lambert, 1989), affecting 10% (39/402) of the sample from this time period in frequencies ranging from 0 to 22% for individual sites (Lambert, 1994). Although clustering within and among graves is present (Lambert, 1994, pp. 141–147), mass graves are rare, suggesting constant but small-scale forms of engagement that nonetheless resulted in a high death toll over time (Lambert, 1994; see also discussions in Milner, 1999; Milner *et al.*, 1991). The concentration of victims in core areas rather than on major cultural (linguistic) boundaries and the predominance of local and sometimes restricted stone materials in victims with embedded points further suggests that conflicts primarily involved affiliated groups (Lambert, 1994). However, the apparent partial abandonment of the islands from A.D. 1150 to 1300 raises intriguing questions about the nature of island–mainland interactions at this time.

The causes of this late prehistoric escalation in violence are likely complex due to synergism among variables such as population size, resource availability, and political structure. As Kennett notes (1998; Kennett and Kennett, 2000), this was a time period of increasing consolidation, territoriality, and concern with defense on the Northern Channel Islands. Proxy measures of population size suggest a general increase through time in the region that positively correlates with increased lethal violence overall (Lambert, 1994). Highly unstable, drought-prone conditions between A.D. 450 and 1300 (Kennett, 1998; Kennett and Kennett, 2000; Lambert, 1994; Lambert and Walker, 1991; Raab and Larson, 1997; Walker and Lambert, 1989) may have been particularly devastating precisely because the population became too large to respond through settlement shifts and other nonviolent mechanisms for alleviating food and water shortage, a hypothesis supported by human skeletal evidence of unprecedented health stress (Lambert, 1993, 1994, 1997; Lambert and Walker, 1991; Walker and Lambert, 1989). Both paleoclimatic and osteological data thus support the interpretation that resource stress and perhaps mistrust engendered by the sheer unpredictability of annual wild food harvests (as per Ember and Ember, 1992) were important underlying causes of increased warfare during these years.

A shift from large to small projectile points in archaeological assemblages (Glassow, 1996; Moratto, 1984) and in wound contexts (Lambert, 1994) also documents the introduction of the bow and arrow into California after A.D. 500 (see also Blitz, 1988; Kennett and Kennett, 2000), and it is likely that this weapon changed how war was conducted here as elsewhere in North America. The decline in warfare after A.D. 1350 in the Santa Barbara Channel area corresponds with improving climatic conditions, the elaboration of trade systems, and the appearance of more complex social systems (Arnold, 1992, 1993; Kennett, 1998; Kennett and

Kennett, 2000; Lambert, 1994, 1997; Lambert and Walker, 1991) that may have functioned to mitigate disputes and suppress feuding.

Elsewhere in regions such as the San Francisco Bay area, there is abundant osteological evidence for violence and warfare (e.g., Andrushko *et al.*, 2000; Jurmain, 1991, 2001; Lambert, 1994). There also is considerable linguistic and archaeological evidence for population intrusions from several adjacent cultural regions (Moratto, 1984). A relationship between population movement and warfare is likely, but has not to date been systematically investigated. On the eastern California periphery, historic sources report very warlike behavior among indigenous desert peoples (e.g., Kroeber, 1980; Kroeber and Fontana, 1986; Stewart, 1947), but there appears to be very little archaeological evidence for such interactions. Given the mobility of peoples of this region, the absence of evidence may well be a product of the archaeological record rather than the absence of war.

SOUTHWEST AND PERIPHERY

The American Southwest has been a primary focus of archaeological research on warfare in the last decade, and several major synthetic works have recently appeared in the literature (Haas and Creamer, 1993; LeBlanc, 1999; Rice and LeBlanc, 2001; Schaafsma, 2000; Turner and Turner, 1999; Wilcox and Haas, 1994). However, despite abundant archaeological and ethnohistoric evidence of its presence (Haas and Creamer, 1997; Kroeber and Fontana, 1986; LeBlanc, 1999; Linton, 1944), the identification and interpretation of warfare in this region remains a contentious subject, at least in part due to perceptions based on modern Puebloan culture (see Haas and Creamer, 1997; LeBlanc, 1999, p. 22).

Several different lines of evidence have been important in reconstructing warfare in the Southwest, providing a somewhat richer and more complete picture than that available for regions described previously. The archaeological record of the Southwest is particularly amenable to settlement studies of defensive behavior because preservation is excellent and nonperishable materials such as rock and adobe were used in construction of buildings, walls, and other structures. Hilltop site location, stockades, and *trincheras* (dry-laid rock walls; Wilcox, 1979, 1989; Wilcox and Haas, 1994) dating to the first millennium A.D. (LeBlanc, 1999) establish a long history of apparent defensive settlement behavior in at least some regions of the Southwest, although such evidence is not universally accepted (see Fish and Fish, 1989; Haas, 1999). A hiatus of approximately 250 years in the construction or use of defensive systems is evident beginning around A.D. 900 (LeBlanc, 1999). Settlement evidence for serious strife is most abundant from A.D. 1250 to 1400, during which all regions of the Southwest (Hohokam, Mogollon, Anasazi) appear to have been fully embroiled in warfare (Billman *et al.*, 2000; Haas and Creamer, 1993, 1996; LeBlanc, 1999; Rice and LeBlanc, 2001; Wilcox, 1989; Wilcox and Haas, 1994).

Some of the best settlement evidence for the transition to full scale warfare after A.D. 1150 comes from Haas and Creamer's extensive survey work in the Kayenta Anasazi region of northern Arizona (Haas, 1999; Haas and Creamer, 1993, 1996). Archaeological evidence for warfare during this time here and elsewhere in the Southwest (see also LeBlanc, 1999; Wilcox and Haas, 1994) includes settlements shifts from valley floors to inaccessible rock shelters, mesa tops, and other defensible natural land forms; the creation of no-man's lands; the construction of walls, towers, moats, or other features suggesting concern with defense; the aggregation of people into larger pueblos or settlement clusters associated with a defensible pueblo; the protection of potable water sources; and line-of-sight visibility between clusters. Burning of settlements or portions of settlements is also evident in some contexts and provides more direct evidence of actual attack (Haas, 1999; Haas and Creamer, 1993; LeBlanc, 1999; Rice and LeBlanc, 2001).

Recently, Wilcox *et al.* (2001b) have taken a unique approach to the study of warfare patterns during this time period at Perry Mesa on the Hohokam periphery in central Arizona. Assessing the defensive potential and use of natural geography from a military science perspective, they make a provocative case for the existence of a unified, strategic defense system on Perry Mesa in the early thirteenth century A.D. Their larger study of settlement patterns and the local and regional distribution of structural burning in central Arizona places Perry Mesa within a larger confederacy, one of a number of "polities" that settlement systematics suggest were at war during this time of strife throughout the Southwest.

Osteological evidence also has provided a changing perspective on violence and warfare in the Southwest (see discussions in LeBlanc, 1999; Turner and Turner, 1999; Wilcox and Haas, 1994). The osteological record of violence extends back at least 2000 years and includes cut marks from scalping (and a few scalps), other signs of trophy taking, projectile wounds, cranial fractures, body mutilation, and unburied bodies (e.g., Allen *et al.*, 1985; Baker, 1990; Billman *et al.*, 2000; Dice, 1993a,b,c; Farmer, 1997; France, 1988; Howard and Janetski, 1992; Lambert, 1999, 2000; LeBlanc, 1999; Luebben and Nickens, 1982; Malville, 1989; Martin, 1997; Martin and Goodman, 1995; Turner and Turner, 1999; White, 1992; Wilcox and Haas, 1994; Wilcox *et al.*, 2001a). Before A.D. 900, unburied bodies and other possible or clear signs of violent death are most apparent in the Anasazi region (Farmer, 1997; Howard and Janetski, 1992; LeBlanc, 1999). LeBlanc (1999, pp. 142–143) identifies 32 sites with such evidence; while most of these cases involve a relatively small number of individuals and not all include clear evidence of violence, others are hard to dispute.

Two of these early sites stand out in terms of number of victims and injury types: Wetherill's Cave 7 in southeastern Utah (Farmer, 1997; LeBlanc, 1999; Hurst and Turner, 1993; Turner and Turner, 1999) and Battle Cave (LeBlanc, 1999; Morris, 1939; Turner and Turner, 1999) in northeastern Arizona. Wetherill's Cave 7, a Basketmaker II (A.D. 400?) site in Cottonwood Wash yielded the remains of at least 92 individuals from a single interment event. Some of the recovered

bodies have projectile or knife wounds. Many heads and jaws show signs of bludgeoning, and cut marks on some crania suggest trophy taking of heads, scalps, and ears. Age and sex biases further suggest the capture of some women and children (Hurst and Turner, 1993; Turner and Turner, 1999, pp. 59–65), a common practice worldwide among warring groups (e.g., Chagnon, 1992; Fadiman, 1982; Hasenstab, 2000; Otterbein, 2000). The collection from Battle Cave is smaller and consists of the remains of 11 individuals from a Basketmaker II (ca. 500 B.C.–A.D. 500) cist deposit (LeBlanc, 1999; Turner and Turner, 1999, pp. 133–141). Remains include men, women, and children, many exhibiting perimortem cranial trauma (primarily fracturing). Both cases strongly suggest massacre and document at least episodic outbursts of serious violence in the northern Southwest early in the Anasazi sequence.

From A.D. 900 to 1250, various types of injuries are apparent in human remains (e.g., Lambert, 1999, 2000; Martin, 1997; Martin and Goodman, 1995; Wilcox *et al.*, 2001a, Appendix 6.3), but one type of trauma prevails in the literature: disarticulated bodies with cut marks, extensive perimortem fracturing, percussion scars, and burning (Billman *et al.*, 2000; Turner and Turner, 1999; White, 1992). The relationship between this evidence and warfare is the subject of continued debate. Settlement data suggest a hiatus in warfare from A.D. 900 to 1150 (LeBlanc, 1999). However, as many as 40 assemblages of broken and butchered human remains, each containing one to 35+ individuals, have now been identified and most date between A.D. 900 and 1200 (see summaries in Baker, 1990; Billman *et al.*, 2000; Turner and Turner, 1999; White, 1992). These assemblages have variously been interpreted as evidence of cannibalism (e.g., Billman *et al.*, 2000; Dice, 1993c; Lambert *et al.*, 2000a; Malville, 1989; Marlar *et al.*, 2000a; Nickens, 1975; Turner and Turner, 1999; White, 1992), violent mutilation without cannibalism (e.g., Bullock, 1998; Dongoske *et al.*, 2000), witch killing (Darling, 1998), and mortuary behavior (e.g., Bullock, 1998).

Recent biochemical verification of cannibalism at a twelfth-century site in southwestern Colorado (Billman *et al.*, 2000; Lambert *et al.*, 2000b; Marlar *et al.*, 2000a,b) lends credence to the cannibalism interpretation for at least some of these sites and demonstrates a methodology that may ultimately elucidate behaviors at many other sites of purported cannibalism. Both LeBlanc (1999) and Turner and Turner (1999) argue that cannibalism was a strategy used by an expansionist polity centered at Chaco Canyon to intimidate and control its populace. However, this explanation has yet to be reconciled with evidence such as the early (A.D. 880–910) appearance of cannibalism in southeastern Utah (Cottonwood Wash; see Turner and Turner, 1999, p. 269; White, 1992) before the northerly expansion of Chacoan influence (Varien *et al.*, 1996), and the concentration of mutilated assemblages in the Mesa Verde region (Billman *et al.*, 2000; Turner and Turner, 1999, Fig. 3.292) after the depopulation of Chaco Canyon in the early twelfth century (see Frazier, 1999; Stuart, 2000; Varien *et al.*, 1996). On the southern piedmont of Sleeping Ute Mountain in southwestern Colorado, corpse mutilation, cannibalism, and

community abandonment around A.D. 1150 strongly suggest that serious intergroup violence was important in the formation of at least some of these “cannibalism” assemblages (Billman *et al.*, 2000a; Lambert *et al.*, 2000a; Marlar *et al.*, 2000a).

Unburied bodies with and without obvious trauma are prominent at some locations after A.D. 1250 (LeBlanc, 1999; Rice and LeBlanc, 2001), but evidence for cannibalism is at present less common (Billman *et al.*, 2000; Turner and Turner, 1999). At Castle Rock, a fortified thirteenth century village in southwestern Colorado (A.D. 1256–1285), the unburied and frequently mutilated remains of 41 individuals were deposited within and outside of structures during a massacre that terminated site occupation (Lightfoot and Kuckelman, 2001). At Sand Canyon Pueblo, a contemporaneous fortified pueblo in the vicinity, 20 bodies also were recovered from nonburial contexts (Bradley, 1992; LeBlanc, 1999; Lightfoot and Kuckelman, 1995). Four of eight individuals recovered from 5MT9943, a small village on the southern piedmont of Sleeping Ute Mountain, also appear to have died violently, as attested to by perimortem cranial trauma and nonformal body disposal (Lambert, 1999, 2000). These cases are stark testimony to the reality of a threat so apparent in the extreme defensive measures—population aggregation in sites and clusters, fortification, village relocation to inaccessible/defensible land forms—that people begin to take throughout the northern San Juan Basin after A.D. 1250 (Haas and Creamer, 1993, 1996; LeBlanc, 1999; Lightfoot and Kuckelman, 2001). Massacre may also account for the demise of Casas Grandes in northern Mexico, a large and important cultural center during the fourteenth century. Here, the skeletal remains of 127 unburied bodies have been recovered (DiPeso, 1974) from what LeBlanc (1999, p. 252) estimates may have been a massacre of over 1000 residents. If this extrapolation is correct, then Casas Grandes may represent the largest prehistoric massacre in the American Southwest (LeBlanc, 1999) and possibly all of native North America.

Weaponry has not been as important in documenting Southwest warfare. Potential weapons are plentiful, but those specific to war are not as obvious (LeBlanc, 1999; Wilcox and Haas, 1994). According to LeBlanc (1999), fending sticks, dating to at least A.D. 450, may be one exception. Ethnographic studies indicate that these clublike, grooved wooden implements were used in conjunction with the atlatl and permitted the shooter to fend off oncoming darts with one hand while simultaneously launching spears with the other (Heizer, 1942; LeBlanc, 1999). Thus fending sticks appear to have functioned primarily if not exclusively in contexts where return fire was expected, which would make them more readily identifiable as weapons of war.

The potential for iconography to elucidate more elusive aspects of prehistoric warfare in this region has only recently begun to be realized (e.g., Crotty, 2001; Farmer, 1997; Schaafsma, 2000). Decapitation and its results first make their appearance in Basketmaker II rock art of the Four Corners region (Farmer, 1997). Such themes are later apparent to the south in Mimbres pottery (A.D. 1000–1130)

(LeBlanc, 1999, p. 88). Warfare scenes and shield-bearing motifs in kiva and rock art appear toward the end of the period of intense violence in the Anasazi region (Crotty, 2001; Lightfoot and Kuckelman, 2001; Schaafsma, 2000), and may have been inspired by the artistic traditions of the Fremont to the north (Crotty, 2001). These iconographic images are more readily acceptable as evidence for war, given the abundance of archaeological evidence for violence at this time. For example, a rock art portrayal at Castle Rock pueblo of three human figures engaged in bow-and-arrow conflict and defense accords well with archaeological and skeletal evidence for fortification and violent death at the site (Lightfoot and Kuckelman, 2001).

In the eastern Great Basin on the northern Anasazi periphery, evidence for war exists but has not been systematically assembled. A partial skull from a Fremont site on the eastern shore of the Great Salt Lake has scalping cut marks on the frontal bone and documents trophy taking of scalps around A.D. 650–990 in northern Utah (Larsen and Lambert, 2001; Simms, 1999; Simms *et al.*, 1991). Three skulls and associated upper cervical vertebrae from the Hysell site, a Fremont village in central Utah, provide osteological and contextual evidence of violence and trophy taking at a slightly later date (A.D. 960–1180) (Owsley *et al.*, 1998; Rood, 2001). Perimortem fracturing from decapitation is present on one skull and mandible, and on cervical vertebrae of both children and the adult female. The latter also has cut marks on the face and mandible (Owsley *et al.*, 1998). This material was discovered below a collapsed pithouse roof, suggesting that the heads were centrally placed or hung for display (Rood, 2001). To the east at the Turner-Look site in east central Utah, seven human bone fragments with perimortem damage suggest the existence of cannibalism in Fremont territory around A.D. 1075 (Turner and Turner, 1999, p. 170–172). Shield images in Fremont rock art overlap in time with this osteological evidence (A.D. 900–1200; Loendorf and Conner, 1993; Madsen, 1989; Schaafsma, 1980, 2000), and Fremont defensive sites appeared on the southeastern Fremont periphery during the twelfth century A.D. (LeBlanc, 1999, p. 192). This evidence raises intriguing questions about the nature of Fremont interactions and of intergroup relations on the northern Anasazi frontier.

As in California, environmental explanations for warfare are prominent in the Southwest, tied to climatic anomalies ca. A.D. 1100–1300 (influencing rainfall and other growth-season parameters) that impacted corn production and may have contributed to the abandonment of the northern San Juan by Puebloan peoples around A.D. 1300 (Billman *et al.*, 2000; Dean, 1996; Haas and Creamer, 1993, 1996; LeBlanc, 1999; Peterson, 1988; Varien *et al.*, 1996). LeBlanc (1999) posits the Little Ice Age as the overarching cause of escalating warfare here and elsewhere in North America at this time (for climate data, see also Peterson, 1988). As elsewhere, one consequence of war appears to have been the evolution of more complex social institutions (Haas and Creamer, 1993). Warfare continued into the historic period, but improved climatic conditions, defensive construction, and

depopulation may explain why it did not again reach the magnitude characterizing earlier years (Haas, 1999; LeBlanc, 1999).

GREAT PLAINS

Numerous descriptions and accounts attest to the prevalence of Plains Indian warfare in the centuries following European contact (e.g., Axelrod, 1993; Biolsi, 1984; Brown, 1971; Ewers, 1975, 1994; Goodrich, 1997; Grinnell, 1910, 1956; Hoig, 1993; Neihardt, 1932; Owsley, 1994; Owsley and Berryman, 1975; Robarchek, 1994; Secoy, 1953; Smith, 1989; Taylor, 1975). Until recently, however, studies of prehistoric and protohistoric warfare in this region have been more limited (e.g., Caldwell, 1964; Owsley and Berryman, 1975; Willey, 1982; Willey and Bass, 1978; Zimmerman *et al.*, 1981), leaving questions of the antiquity and causes of Plains warfare open to debate.

Human remains provide some of the best archaeological evidence for intergroup violence in this region, including most notably scalping and other forms of mutilation, projectile injuries, and skewed sex ratios (e.g., Miller, 1994; Neiburger, 1989; O'Shea and Bridges, 1989; Owsley and Berryman, 1975; Owsley *et al.*, 1977, 1999; Owsley and Jantz, 1994; Willey, 1982, 1990; Willey and Bass, 1978; Willey and Emerson, 1993; Williams, 1991; Zimmerman and Bradley, 1993). Defensive settlement features, including ditches, earthen embankments, palisades, and lookouts also are common in some areas and time periods (e.g., Bamforth, 1994; Brooks, 1994; Holliman and Owsley, 1994; Michlovic and Schneider, 1993; Willey and Emerson, 1993; Zimmerman and Bradley, 1993), and structure burning and site abandonment are notable at massacre sites (Bamforth, 1994; Holliman and Owsley, 1994; Zimmerman and Bradley, 1993).

Evidence for warfare in archaeological sites antedating A.D. 950 is minimal (Blakeslee, 1994; Brooks, 1994; Owsley, 1994). A few cases of scalping have been reported, including two from Archaic sites on the northern Plains (Owsley, 1994; Tiffany *et al.*, 1988; Williams, 1994). Although these hint at an early origin for practices such as counting coup, fortification and other signs of warfare are largely absent at this time (Blakeslee, 1994; Brooks, 1994). Fortification, village abandonment, and evidence of violent injury are much more apparent in the archaeological record after A.D. 1200, particularly on the northern Plains at major cultural boundaries (Bamforth, 1994, 2001; Owsley and Jantz, 1994). The movement of populations both southward (Extended Middle Missouri) and northward (Initial Coalescent), perhaps in consequence of drought in the thirteenth century that threatened the livelihood of agriculturalists in a way it never had their foraging and horticulturalist forebears, appears to have brought several groups into contact and competition with each other and with the resident population (Initial Middle Missouri) during the late prehistoric period (Bamforth, 1994, 2001; Blakeslee, 1994; Holliman and Owsley, 1994; Owsley, 1994).

Although the scale of engagement appears to have varied considerably, evidence for the massacre of whole villages attests to the virulent nature of some late prehistoric warfare on the northern Plains. At the Fay Tolten site, a fortified Initial Middle Missouri (A.D. 950–1250) village on the Missouri River in central South Dakota, limited data recovery suggests such an attack. Of five unburied bodies recovered from the floor or features of the only two houses excavated at the site (6%), two had been partially burned while fleshed, one had a perimortem projectile injury, and one (a child) had been scalped a short time before the final attack (Holliman and Owsley, 1994). Although most of the village remains unexcavated, the sampled portion extrapolates to a massacre of some note.

At Crow Creek, a large Initial Coalescent village in South Dakota with a terminal occupation around A.D. 1325,² such extrapolation is unnecessary (Willey, 1990; Willey and Emerson, 1993; Zimmerman and Bradley, 1993; Zimmerman *et al.*, 1981). Here, a mass deposit containing the remains of a minimum of 486 men, women, and children was discovered in 1978 in a fortification ditch that partially surrounded the entrenched village. Most of these bodies had been mutilated, and many showed signs of exposure before interment. At least 89% of 415 identified frontal bones had cut marks indicative of scalping, and 41% of 101 identified skulls had round or ellipsoid depression fractures from round and axelike clubbing implements. Decapitation and possible tongue removal by humans also was evident by anatomical placement of cut marks on occipital bones, cervical vertebrae, and mandibles. Hands and feet may also have been purposefully removed, although carnivore damage also suggests scavenger activity. Isolated bones and body parts in various other contexts (Willey, 1990; Willey and Emerson, 1993), as well as burning of all identified structures (Bamforth, 1994), support the annihilative intent of the attack. However, a pronounced bias against 15–24 year old females, as well as the act of burial itself, suggests that some people may have survived through capture or escape (Willey, 1990; Willey and Emerson, 1993). In scale, the Crow Creek massacre is unparalleled anywhere in prehistoric North America, except possibly that at the broadly contemporaneous center at Casas Grandes described above.

Contemporaneous sites on the southern Plains in Oklahoma and the Texas panhandle have not produced evidence for similar levels of strife, although there is both archaeological and osteological evidence for violence during the late prehistoric period, particularly on the western frontier of this region (Bovee and Owsley, 1994; Brooks, 1994; Owsley *et al.*, 1999). Evidence of conflict includes possible lookout sites and burned structures, and skeletal injuries such as healed and unhealed perforations, embedded arrow points, scalping cut marks, and depressed cranial

²Bamforth (2001) has recently pointed out that tree-ring dates from the Crow Creek site cluster in the early 1400s, suggesting that the massacre may have occurred a century later than generally believed. Two other tree-ring dates fall in the early 1500s, further indicating a later, postabandonment occupation. Bamforth notes that, unlike A.D. 1325, the fifteenth century date corresponds to a period of drought in the Dakotas and may help explain why the Crow Creek massacre happened.

vault fractures. Some osteological evidence in contemporaneous populations of central Oklahoma also suggests violence, but the victims are fewer in number. Overall, the archaeological evidence for late prehistoric violence on the southern Plains suggest small-scale raiding, with some evidence for intertribal conflict in frontier regions of northern west Texas (Brooks, 1994; Bovee and Owsley, 1994).

Osteological evidence indicates that violence continued into the protohistoric and historic periods on the northern Great Plains and involved both Indians and Euroamericans (Bamforth, 1994; Gill, 1994; Owsley, 1994). Lack of evidence for large-scale loss of warrior-age males and small victims counts overall compared to sites like Crow Creek are consistent with small-scale raiding as the primary form of engagement (Owsley, 1994). However, more serious violence continued to erupt on the frontier, as archaeological discoveries at the Larson site (1750–1785) in South Dakota reveal. Remains of 71 people were found on house floors and scattered about this village, and musket balls, metal arrowheads, and extensive burning attest to the nature of their demise (Bamforth, 1994; Owsley *et al.*, 1977). As at Crow Creek, there was evidence of crushing blows to the head and face, scalping, decapitation, missing hands and feet, and disembowelment (Owsley *et al.*, 1977). Intergroup violence also escalated on the southern Plains at this time, but was not as pronounced (Brooks, 1994).

During the historic period, proximate causes of Plains Indian warfare included prestige, revenge, competition, and European-induced impacts such as the introduction of the horse and gun (Biolsi, 1984; Robarcheck, 1994). Explanations for warfare in the prehistoric period emphasize drought and population movement that brought distinct tribal peoples into contact, resulting in ethnic tensions and competition for essential resources (Bamforth, 1994, 2001; Blakeslee, 1994; Brooks, 1994; Owsley, 1994). As described above, there is good archaeological evidence for territorial warfare. At Crow Creek, osteological evidence of poor health suggests that intertribal competition may have been motivated by resource stress, not simply by distrust or prestige seeking (Bamforth, 1994, 2001; Zimmermen and Bradley, 1993).

EASTERN WOODLANDS

The Eastern Woodlands, the vast region east of the Mississippi River, may offer the most profuse and diverse archaeological record of North American warfare outside of Mesoamerica (Haas, 1999; Milner, 1999). With a few notable exceptions (e.g., Larson, 1972), however, this disparate literature has only recently begun to be incorporated into regional overviews and evaluated in terms of broad trends and causal explanations (Bridges *et al.*, 2000; Milner, 1999; Smith, 1997; Steinen, 1992; Steinen and Ritson, 1996). In a recent *JAR* review, Milner (1999) has synthesized and analyzed numerous individual accounts of violent trauma and archaeological evidence of stockades to portray broad temporal and geographic trends throughout the region.

Using counts of sites with embankments, ditches, and linear arrangements of postmolds to quantify defensive construction, Milner (1999) demonstrates a rapid transition during the eleventh century from unfortified to fortified villages throughout the Eastern Woodlands. This occurred several hundred years after the introduction of the bow and arrow into the region (Blitz, 1988), so it cannot be tied to a change in weapon technology, although wound frequencies do indicate that fighting increased after its appearance (Milner, 1999). Fortification strongly correlates with population aggregation and the appearance of buffer zones, features of emergent chiefdoms that characterized Eastern Woodland society during the late prehistoric period (e.g., Anderson, 1994; DePratter, 1991; Hudson, 1997; Milner, 1999).

Osteological evidence of intergroup violence long predates the appearance of stockades and other signs of fortification. Evidence for some form of war has been reported at a number of Archaic sites (e.g., Bridges *et al.*, 2000; Milner, 1999; Smith, 1997; Walthall, 1980). In western Tennessee, for example, projectile wounds, scalping, and/or limb dismemberment in 2.3% (all males) of 439 interments from Archaic contexts (6000–1000 B.C.) strongly suggest intergroup aggression (Smith, 1997). In northern Alabama, embedded spear points in 2.7% of individuals (four males and three females) at the late Archaic (4000–1000 B.C.) Perry site similarly imply intergroup hostilities (Bridges *et al.*, 2000). Violent trauma appears to have declined after this time (but see Seeman, 1988), but increased again after A.D. 500 and peaked during the millennium preceding sustained European contact (Milner, 1999).

Most Eastern Woodland sites with evidence of violent trauma contain only a few victims, mostly males (112 of 140 adult victims examined in Milner's survey), suggesting a pattern of warfare that emphasized feuding and small-scale raiding (Milner, 1999). There are some exceptions, however. At Pinson Cave in Alabama, the remains of 44–100 people deposited in the cave around A.D. 1040 suggest the possibility of massacre, although the evidence—7 projectile points embedded in bone and 50 scattered throughout the remains—is more circumstantial (Bridges *et al.*, 2000). At Koger's Island, a smaller Mississippian center in northern Alabama, four mass graves containing 5–8 individuals each also indicate more serious intergroup aggression. Six individuals from these graves had perimortem scalping cut marks and one had an unhealed depression fracture, supporting the hypothesis that all of the associated individuals in these mass graves died violently. High rates of trauma (cranial and postcranial fractures, scalping) here and at other small to mid-sized settlements in the Deep South suggest that risk of violent injury and death was greater at these locations than at large centers like Moundville (Bridges *et al.*, 2000).

To the north on the Mississippian periphery in west-central Illinois, the high toll of constant albeit small-scale raiding is evident at the Norris Farms site. At least 16% (43) of 264 inhabitants of this fourteenth century Oneota settlement died violently, as indicated by embedded projectile points, scalping cut marks ($n = 14$), decapitation ($n = 11$), and carnivore damage ($n = 30$) from corpse exposure prior

to interment (Milner *et al.*, 1991; Milner and Smith, 1990). The relatively equal sex ratio of victims and the frequent association of same-sex individuals in multiple graves, coupled with evidence for preexisting debilitating conditions in many, suggest that these were opportunistic killings of vulnerable adults (Milner *et al.*, 1991). Presumably, this constant onslaught reflects efforts of resident Mississippians to oust Oneota intruders from the north (Milner, 1999; Milner *et al.*, 1991; Milner and Smith, 1990). Although there is no evidence for a massacre on the scale of Crow Creek, Norris Farms appears to represent another form of deadly intergroup violence in indigenous North America.

The archaeological record also provides some evidence of hostile interactions between natives and early European intruders to the south in *La Florida*. Although osteological evidence of sword injuries at the sixteenth century King site in Georgia (Blakely and Matthews, 1990) has recently been disputed (Milner *et al.*, 2000), good evidence of such wounds is present in an early historic sample from the Tatham Mound in northern Florida (Hutchinson, 1996; Larsen, 1997). A gunshot wound in a male from Mission San Luis de Talimali (A.D. 1656–1704) is additional, albeit rare, osteological evidence of conflict involving European weapons and probably European perpetrators during early years of Spanish contact in the Southeast (Larsen *et al.*, 1996).

Proximate causes invoked for indigenous warfare in the Eastern Woodlands include revenge, status, political struggles, and competition for productive farmlands, deerskins, and other essential or valuable resources (e.g., Gramley, 1977, 1988; Hasenstab, 2000; Larson, 1972; Milner, 1999; Steinen, 1992). Climatic factors such as cooler temperatures associated with the Little Ice Age about A.D. 1400 may also have played a role, particularly as these would have impacted larger, more sedentary agriculturalist populations in more risky environments. Whatever its causes, however, both settlement and osteological data strongly suggest that warfare was important in the formation and maintenance of chiefdom societies in the late prehistory of this region (Milner, 1999).

CONCLUSION

Perceptions of prehistoric warfare in the Americas are rapidly changing as archaeological research aimed at elucidating patterns and prevalence of war focus increased attention on this aspect of life in prestate societies. In the last 10 years, regional studies aimed at generating systematic data and/or synthesizing extant case studies have begun to be conducted for regions throughout North America. These studies are providing new perspectives on temporal and geographic patterns of war and peace through the quantification of evidence for settlement defense and burning, violent injury, war weaponry, and iconographic representations of war.

What warfare patterns are currently discernible in the archaeological record of North America? It is clear that people participated in some level of warfare

in all major regions covered in this review. How war was conducted appears to have varied in accordance with local traditions, technology, economy, and political system. Various parameters of the physical environment, such as topography, resource distribution, and rainfall likely also influenced when, where, and how war was conducted. Most of the archaeological and osteological evidence suggests that relatively small-scale engagements predominated, involving a limited number of aggressors and resulting in relatively few victims per encounter. Quantitative analysis of victim frequencies reveals, however, that even this low-level warfare could result in very high death tolls overall, particularly for certain sex and age classes (e.g., Bridges *et al.*, 2000; Jurmain, 2001; Lambert, 1994, 1997; Milner *et al.*, 1991). In addition, mass graves and/or large numbers of unburied bodies showing signs of trauma are known from several regions and document outbreaks of highly lethal, genocidal violence. Large-scale massacre is best known at sites on the northern Great Plains (Crow Creek, Fay Tolten, Larson), but apparent massacres also have been identified at sites in the northern Southwest (Wetherill's Cave 7, Battle Cave, Castle Rock, Sand Canyon Pueblo) and southern Southwest (Casas Grandes), the Canadian Arctic (Saunaktuk), and possibly in the Southeast (Pinson Cave). As Milner notes (1999), it is likely that other such outbreaks occurred, but were not preserved because no one survived to bury the dead.

Chronological evaluation of the North American data highlights some important temporal trends. Violent injuries are present in many skeletal assemblages antedating A.D. 500 and include projectile wounds, fractures from clubbing implements, and scalping. There is considerable variability within and between regions in the frequency of these injuries, however, which suggests that variability in local social and environmental conditions may be key to understanding outbreaks of violence and war in these early years. Defensive settlement systems are not as obvious before A.D. 500 if they are present at all, a pattern that is likely meaningful in terms of levels of war and/or the way in which it was conducted. This situation began to change around A.D. 500 with the appearance of defensive sites and an increase in the frequency of injuries attributable to violence in some regions. Fortification and other signs of defense are most evident throughout North America between A.D. 1000 and 1400 (see also Haas, 1999). The relative frequency of violent injuries shows a corresponding increase, and most of the massacres listed above date to this period.

Posited explanations for this pan-North American escalation in warfare include critical population threshold (e.g., Haas, 1999), global impacts of the Little Ice Age (e.g., LeBlanc, 1999), and technological innovations such as the introduction of the bow and arrow (e.g., Blitz, 1988) and sinew-backed bow that changed the way war was conducted (e.g., Maschner, 1992, 2000; Mason, 1998). As described above, all find some evidence in the archaeological record of North America. We know that technological innovation accompanied increasing warfare overall. However, it is difficult to determine if new weapons led to increased warfare

or spread in consequence of existing strife. At some level, it seems likely that the continent-wide escalation was related to changes in the relationship between human populations and the resources on which they depended. We know population density and absolute population size had increased in at least some areas, and climatic indicators further suggest that major climatic anomalies (Medieval Wurm/Little Ice Age) well documented in Europe (Lamb, 1995) may have had profound impacts on North America as well (LeBlanc, 1999). Major warming or cooling, coupled with changing patterns of precipitation, would certainly have changed the abundance and distribution of resources, although it is important to keep in mind that impacts on different areas could have varied significantly. Even if some populations fared well, however, negative impacts on others could have had far-reaching consequences through population displacement and/or the adoption by some groups of more aggressive strategies for resource acquisition. In any event, if larger forces such as these were ultimately responsible for escalating violence during the late prehistoric period, then it is important to recognize that cultural boundaries typically used to define research projects and objectives may obscure rather than facilitate a complete understanding of war in any given region.

With the growing recognition of war as an important force in population dynamics and political transitions in prestate societies has come a recognition that both the presence *and* absence of war needs verification. Neither can be assumed, and good methodologies can and should be used to assess both. Clearly, answers to questions of the causes and consequences of human violence reside in a proper understanding of when and how it occurred and, most importantly, why.

Productive avenues of future research include programs directed at further elucidating temporal and geographic patterns of prehistoric war in the Americas, ideally constructed to test hypotheses derived from current theories on war and its practice in ancient North America and elsewhere. As demonstrated by studies discussed in this review, increasingly sophisticated and usable GIS technology offers a powerful means for characterizing both larger patterns of war and more subtle aspects of strategy, and we likely will see greater applications in these areas. A major philosophical hurdle has been overcome: the lack of recognition of war as an important social process in prehistoric North America. We are now in the position to creatively investigate the history and practice of indigenous North American warfare and, more importantly from the perspective of larger significance, to seek out its causes and the role it played in the development of New World social process.

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