

CLASSIC MAYA WARFARE AND WEAPONS

Spear, dart, and arrow points of Aguateca and Copan

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Abstract

To provide some insights into the nature and role of warfare in the rise, development, and decline of Classic Maya civilization, this article discusses spear, dart, and arrow points used by the Classic Maya elites at the rapidly abandoned fortified city of Aguateca, Guatemala, and their temporal and spatial distribution patterns in and around Copan, Honduras. Both the royal family and elite scribes/artists at Aguateca used spear and dart points for intergroup human conflict as well as for artistic and craft production under enemy threat. An important implication is that the ruler and elite scribes/artists were also warriors. The unusually high concentrations of identifiable weaponry at the Early Classic hilltop center of Cerro de las Mesas as well as the Acropolis and other Late Classic locations in the Copan Valley, along with other lines of evidence, indicate that warfare was critical in the development and downfall of Classic Maya civilization at Copan.

Thomas Gann and J. Eric Thompson stated in 1937, “The Maya, judging by the scenes depicted upon the stelae, were one of the least warlike nations who ever existed” (Gann and Thompson 1937: 63). Large-scale archaeological investigations, epigraphic decipherments, and iconographic studies in the 1960s and 1970s shattered the traditional perception of the Classic Maya as a basically peaceful people (Marcus 1974; Proskouriakoff 1961; Puleston and Callender 1967; Rice and Rice 1981; Webster 1976). The nature, variability, and role in the rise, development, and decline of Classic Maya civilization, nevertheless, have been debated intensively for the past several decades. One group of scholars emphasizes the casual direction from warfare to social and ecological conditions, while another group stresses that warfare was a result of demographic and ecological pressures (Chase and Chase 1989; Cowgill 1979; Demarest 1997; Freidel 1992; Martin and Grube 2000; Schele and Miller 1986; Webster 1977). Some of these discussions have centered on the “collapse” of the Classic Maya civilization. The large-scale multidisciplinary archaeological investigations of the Petexbatún Regional Archaeological Project have demonstrated that intensive warfare was certainly the direct cause of the fall of the Petexbatun kingdoms in the late eighth century and early ninth century (Demarest et al. 1997), although this process is not necessarily applicable to other parts of the Maya Lowlands.

Despite its ubiquity among the Classic Maya, war is difficult to demonstrate archaeologically. In addition to inscriptions and iconography, potentially useful evidence for warfare in the archaeological record includes weapons, fortifications, paleopathology, incidents of violent destruction, and sudden disruption of cultural patterns (Webster 1993:422–423). Unfortunately, the texts that

refer to war are not at all explicit about the motives for warfare or about its nature (Stuart 1993:333). Many Classic Maya sites lack either such inscriptions or art relating to the warfare process. Most Classic centers are located in easily accessible terrains without fortifications, and they generally lack clear evidence of destruction resulting from battles.

We still lack systematic studies of Maya weaponry. Both detailed analysis of the use of chipped stone weapons, particularly using the high-power approach developed by Lawrence Keeley (1980), and studies of temporal and spatial distribution of possible weapons in the regional settlement system remain to be conducted in Maya archaeology. This paper aims to fill that gap. We should note that in light of ethnohistoric and ethnographic data, the bow and arrow was used as a weapon of war as well as for hunting (Landa 1938:127–128; Nations 1989:453). Whether chipped pointed tools were used for human conflict or other purposes should be determined based on detailed microwear analysis and their recovery contexts. If there were a large number of possible weapons, particularly in public structures or elite residences (e.g., Sabloff 1992), and if these were documented along with other lines of evidence such as violent destruction of structures, then an archaeologist could make a stronger argument for warfare. Because most Classic Maya cities were abandoned gradually and the inhabitants usually carried away a large portion of their belongings, including weapons, to their next residences, identifiable Classic Maya weaponry is seldom recovered from primary contexts.

To provide some insights into the nature and role of warfare in the rise, development, and decline of Classic Maya civilization, this article discusses spear, dart, and arrow points used by the Classic Maya elites at the rapidly abandoned fortified city of Aguateca, Guatemala, and their temporal and spatial distribution patterns in and around Copan, Honduras (Figure 1). I conducted detailed use-wear analyses on these artifacts based on a high-

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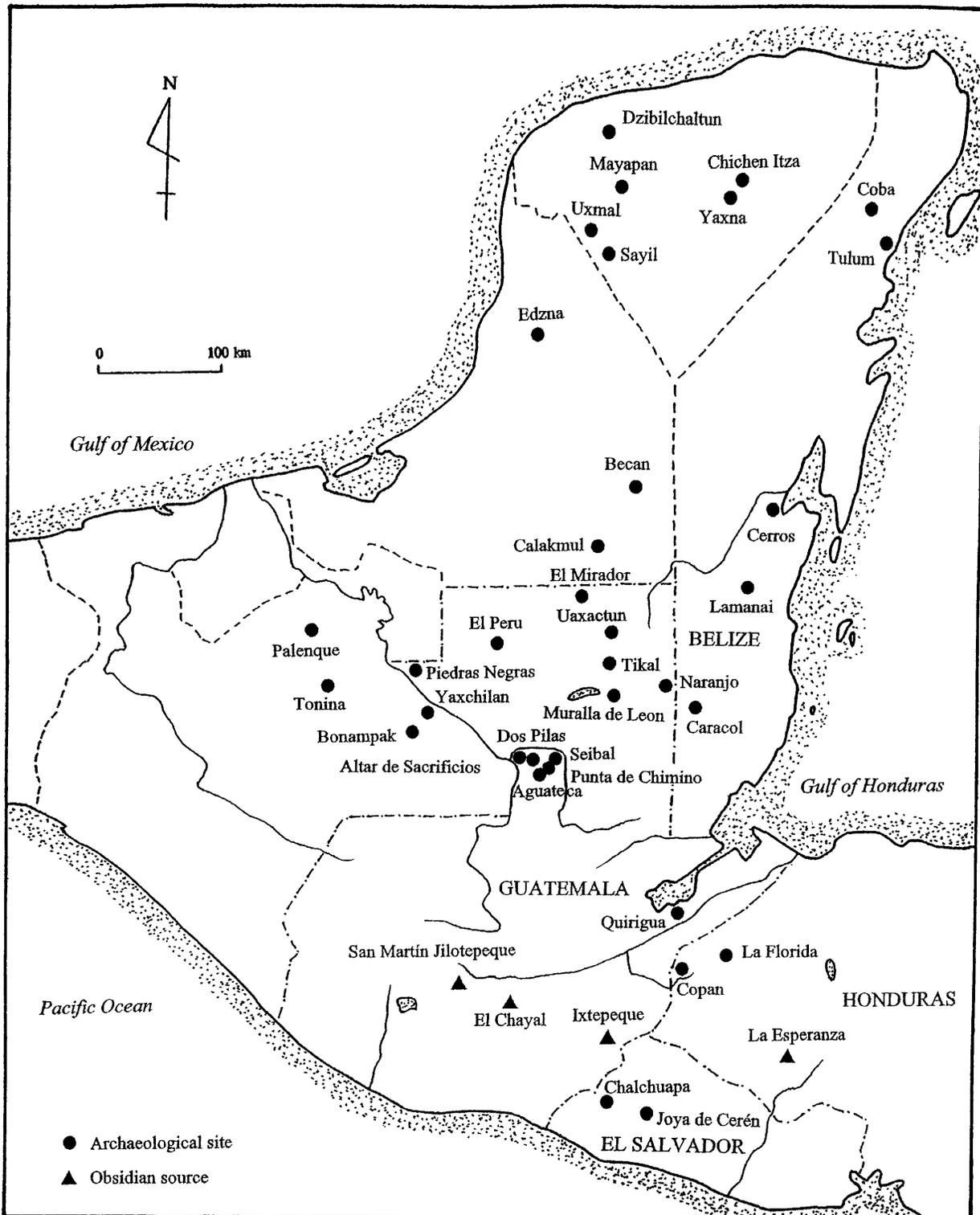


Figure 1. Map of the Maya area showing the location of Aguateca, Copan, other archaeological sites, and obsidian sources.

power microscopy approach to bring to light more empirical data relevant to Classic Maya warfare. Rich assemblages of objects left in burned structures at Aguateca represent the closest parallel in the Maya Lowlands to the situation at Pompeii and provide a

unique synchronic dataset that allows closer access to the types, number, and function of chipped-stone weapons of Classic Maya elites in higher resolution than the smaller number of remaining artifacts at gradually abandoned sites. The chipped-stone artifacts

from the Copan Valley and nearby region of La Entrada pertain to the Early Preclassic through to the Early Postclassic period (1400 B.C.–A.D. 1100) and can serve as sensitive indicators for reconstructing one aspect of long-term changing patterns of the warfare process in and around Copan. This paper contributes to the relatively undeveloped studies of the function of Classic Maya weapons as well as their temporal and spatial distribution patterns in the regional settlement system and provides important implications for understanding Classic Maya warfare as well as offering suggestions from the line of evidence in the context of a conjunctive approach (e.g., Taylor 1983 [1948]).

BACKGROUND

Aguateca was a fortified Classic Maya city located in the Petexbatun region of Guatemala (Inomata 1997; Inomata and Stiver 1998). It occupied a highly defensible location on the top of a steep, 90 m escarpment. Archaeological, epigraphic, and iconographic studies show that the Dos Pilas/Aguateca dynasty expanded its power through warfare in the eighth century (Houston 1993). Aguateca probably served as the primary dynastic center after the fall of its twin capital, Dos Pilas, at a time of endemic regional warfare in the late eighth century (Palka 1997). This warfare was not caused by malnutrition or ecological catastrophe (Dunning et al. 1997; Wright 1997). More than 4 km of defensive walls were constructed in a hasty manner in Aguateca toward the end of the Late Classic period (Inomata 1995:836). They were arranged in a roughly concentric pattern mainly to defend the Palace Group, which was probably a residential complex of the royal family. Its epicenter was burned down during an attack by its enemy around A.D. 810 (Inomata et al. 2004). Elite residents of the central part of the site fled rapidly or were taken away while leaving most of their belongings behind (Inomata 1997; Inomata and Stiver 1998). The enemy probably conducted the termination rituals of the Palace Group but did not stay long at Aguateca. The areas outside the epicenter were abandoned shortly after the destruction of the epicenter. Thus, the aim of the enemy was not to conquer or subjugate this city but to terminate it as a political and economic power (Inomata 2003). The data at Aguateca indicate that warfare was fought primarily by elites.

The investigations of the Aguateca Archaeological Project, First Phase, directed by Takeshi Inomata and his colleagues, focused on the extensive excavation of rapidly abandoned structures in the central part of the city from 1996 to 1999, with the objective of examining domestic and political lives of Classic Maya elites. The excavations revealed the richest floor assemblages ever found at a lowland Classic Maya city (Inomata et al. 2002). Structures M8-4 and M8-8, for example, were residences of high-status scribes. Tools related to scribal work, such as palettes, mortars, and pestles, were recovered from these structures. Each residence was used for a wide range of domestic work, including the storage, preparation, and consumption of food, with a relatively clear division of men's and women's spaces. The central rooms of these buildings seem to have served to receive visitors and to hold political meetings, among other uses. It appears that administrative functions of the royal court were spatially dispersed among various houses of high courtiers (Inomata 2001a). Although they were under the pressure of external threat, a significant portion of Maya elites, both men and women, engaged in artistic creation and craft production at the Classic Maya city of Aguateca, and they were often involved in independent and attached production (Aoyama

2003; Inomata 2001b). Artistic and craft production appears to have been a common pursuit among Classic Maya elites at Aguateca, including courtiers of the highest rank and even members of the royal family.

A series of large-scale international archaeological projects conducted in the Copan Valley since 1975 has made it one of the most intensively studied regions in the Maya Lowlands (Baudez 1983; Fash 2001; Sanders 1986; Willey et al. 1978). It is situated above a tributary of the Motagua River in a section of western Honduras. The pre-Columbian occupation of the Copan Valley began during the Early Preclassic Rayo phase (1400–1200 B.C.). Beginning at the Late Protoclassic Bijac 2 phase (A.D. 150–400), and continuing into the Early Classic Acbi phase (A.D. 400–600), truly significant changes in society took place in the Copan Valley. A royal dynasty was founded on 8.19.10.10.17 (A.D. 426) by Yax K'uk' Mo', and a new royal center was established in a thoroughly indefensible place, in the center of the valley bottomlands; this royal line was to persist until the death of the sixteenth ruler in A.D. 820. Copan was characterized by common Classic Maya cultural elements.

During the eighth century, there were 20,000 inhabitants in the valley, clearly showing demographic and agricultural pressure (Fash 2001:154). There are two competing hypotheses about the nature and extent of the “collapse” at Copan. Based on an extensive (more than 2,000) series of obsidian-hydration dates, David Webster and AnnCorinne Freter (1990) have proposed a model showing a gradual demographic decline, with Late Classic Coner-phase ceramics lasting until A.D. 1250. William Fash and Robert Sharer (1991), however, see the pattern at Copan as a three-stage process involving, first, the weakening of political and religious power in the eighth century; second, the demise of centralized dynastic authority in the ninth century, and third, a rapid depopulation, with Coner-phase ceramics ending at A.D. 900, followed by the eventual abandonment of the valley by A.D. 1100 (Viel 1998). As we will see later, the lithic evidence strongly supports the latter hypothesis.

The region of La Entrada is located 40 km to the northeast of the Copan Valley, constituting a portion of the southeastern periphery of the Maya Lowlands. The regional survey of the La Entrada Archaeological Project located 635 pre-Columbian sites in some 150 km² (Inomata and Aoyama 1996; Nakamura et al. 1991). The politics in the region of La Entrada reached their apogee during the Late Classic period and actively interacted with the Copan state.

The lithic data base of Copan and its hinterland consists of 91,916 chipped-stone artifacts that I studied from 1986 to 1995 and that were recovered from a stratified random sample and extensive excavations of Phases I and II of the Copan Archaeological Project, Copan Acropolis Archaeological Project, the Carnegie Institution of Washington, and the La Entrada Archaeological Project (Aoyama 1999). The artifacts were selected from the full range of settlement types and contexts from various periods. Of these, 67,210 chipped-stone artifacts were manufactured from obsidian, while the remaining 24,706 artifacts were made from local chert. From 1998 to 2003, I classified 10,845 lithic artifacts recovered by the Aguateca Archaeological Project, First Phase. Of these, 8,322 artifacts were from a chipped-stone industry, while the remaining 2,523 pieces were polished stone and other kinds of stone artifacts. A total of 6,153 chipped-stone artifacts were manufactured from chert, while 2,169 artifacts were made from obsidian. Virtually all sediment was screened through $\frac{1}{4}$ mesh, and all

chipped-stone artifacts were saved during the course of the investigations in both the Copan region and Aguateca. Hence, comparable samples of chipped stone were available from these projects so that I could make meaningful quantitative comparisons.

In 1987, I conducted an intensive experimental study of use wear on obsidian and chert in Honduras to establish a framework for interpretation of Maya stone-tool use (Aoyama 1989). The results of 267 replication experiments conducted with a range of worked materials permitted identification of use-wear patterns based on the high-power-microscopy approach. I then analyzed microwear on a total of 3,232 chipped-stone artifacts from the Copan Valley and the region of La Entrada, Honduras (Aoyama 1995, 1999). I used this framework as the basis for the use-wear studies on 2,961 lithic artifacts from Aguateca (Figure 2). The instrument used in the study was a metallurgical microscope of 50–500× magnification with an incident-light attachment (Olympus BX60M). Magnification of 200× was the most frequently used. Use-wear patterns were documented with an Olympus photomicrographic system PM-10M attached to a camera (Olympus C-35DA-2). To identify projectile-impact damage in lithic assemblages, I also examined macroscopic forms of damage associated with microscopic traces, such as longitudinal macrofracture, lateral macrofracture, distal break, distal crushing, and “spin off” fractures (Dockall 1997). Following Vaughan (1985:56–57), each portion of a lithic artifact with interpretable use wear was counted as an independent-use zone (IUZ).

WEAPONS OF LATE CLASSIC MAYA ELITES AT AGUATECA

Of 8,322 chipped-stone artifacts, possible weapons include chert bifacial points ($N = 235$), chert small points ($N = 4$), obsidian bifacial points ($N = 2$), and obsidian prismatic blade points ($N = 18$). Local chert was used much more frequently than imported obsidian to manufacture these tools (Figure 3). Bifacial points are pointed tools shaped from large flake blanks by collateral bifacial percussion and pressure flaking. Small points are small laurel-leaf points modified by marginal bifacial retouch rather than bifacial flaking and have two pointed ends. A chert small point from Structure M8-4 was side-notched, while the others were not. Small quantities of both stemmed, tapered and stemless prismatic blade points were manufactured from blade segments of El Chayal obsidian at Aguateca at the end of the Late Classic period. The blade edges were laterally retouched from both dorsal and ventral sides for shaping the margins. Retouch is usually limited to the shaping of a distal point and/or to the fashioning of the base.

The results of microwear analysis indicate that both obsidian prismatic blades and chert small points were mainly used as arrowheads. Eight analyzed obsidian prismatic blades were used for piercing, and only one was used for cutting meat or hide. It is important to note that none of them were used for wood or bone carving. All three analyzed chert small points were also used for piercing. While some complete arrow points appear to have been stored in elite residences, because for the final battle the object was to leave the point behind, including in the body of an enemy, it is not surprising that archaeologists today find only a few arrowheads left in each house. Moreover, some arrowheads probably were used in hunting, as well.

Based on the presence of small side-notched obsidian points, some scholars contend that the bow and arrow was introduced into the Maya Lowlands later than the Late Classic period, either by

Mexican mercenaries from Tabasco during the Late Postclassic period (Porter Weaver 1981:407) or by the Chontal Maya during the Terminal Classic period (Rice 1986:340). Nevertheless, obsidian stemmed, tapered, and stemless prismatic blade points as well as chert side-notched and unnotched small points were present at Aguateca by the end of Late Classic period. Moreover, as we will see later, we do have both notched and unnotched prismatic blade points in the Copan Valley during the Early and Late Classic periods. We should also note that notched prismatic blade points made from Pachuca green obsidian were present in the Valley of Oaxaca beginning in the Middle Formative period (Parry 1987: 43, 44). Takeshi Inomata (1995:563) notes that the bow and arrow was not a major weapon for the Classic Maya. First, prismatic blade points constitute very small portions of obsidian assemblages in the Classic Maya Lowlands. Second, their depiction is virtually absent from Classic Maya art. Both the percentage of prismatic blade points among all obsidian chipped-stone artifacts (0.8%) and that of small points among all chert artifacts (.1%) are extremely low at Aguateca. Instead, spear or dart points appear to have been more important in Classic Maya warfare.

The production of chert bifacial points and oval bifaces took place intensively at the epicenter of Aguateca. The percentage (17.9%; $N = 1,100$) of bifacial thinning flakes among all chert chipped-stone artifacts at the site core of Aguateca is considerably higher than that of the Copan Valley during the Late Classic period (4.1%; 109/2,652), where although chert bifacial points were produced, oval bifaces were not (Aoyama 1999:Table 8.1), indicating the diversity of Maya lithic-tool production. A concentration of small bifacial thinning flakes associated with a failure in bifacial point manufacturing on the floor of the west side of Structure M7-22 represents bifacial-point-manufacturing debris. The results of microwear analysis on a random sample of 215 chert flakes from this area reveal that only 1.9% of flakes were used, indicating that the great majority of them were bifacial-tool-manufacturing debris. Based on the raw-material analysis, the chert artifacts from the west side of Structure M7-22 include those of whitish gray chert ($N = 154$), bluish brown chert ($N = 84$), yellowish red chert ($N = 21$), and light blue chert ($N = 20$). A member of the departing royal family or of the remaining elites who was sitting on the bench of the west side may have manufactured bifacial points under enemy threat. Similar concentrations of small bifacial thinning flakes were from both the north and south rooms of Structure M8-4. Moreover, it is noteworthy that all obsidian bifacial thinning flakes included in this study were recovered from royal contexts—that is, the royal palace of Structure M7-22 and the Structure L8-8 temple. Because of the lack of bifacially retouched eccentrics of obsidian at Aguateca, these flakes were most likely bifacial-point-manufacturing debris. In any event, it is safe to say that at least *some* nobles, including scribes/artists at Aguateca, were stone knappers who manufactured weapons on a part-time basis.

Based on the presence of microscopic traces in association with projectile impact damage, many chert bifacial points were used as darts or spears. Some of them were also used as tools for the artistic and craft production of shell and bone ornaments, wood carving, and other domestic activities at Aguateca. A total of 166 IUZ were identified. Distal tips of bifacial points ($IUZ = 58$) were used in piercing or boring unidentified material (75.9%), meat or hide (22.4%), and shell or bone (1.7%). Lateral edges were used for a wider range of activities ($IUZ = 108$). Cutting meat or hide (51.9%) was the most common activity, followed by cutting wood (23.1%), cutting shell or bone (13.9%), cutting Gramineae (4.6%),

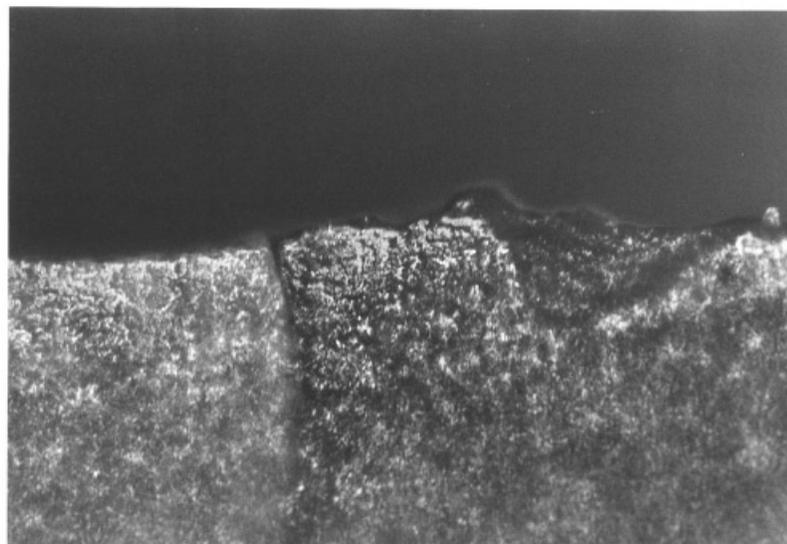
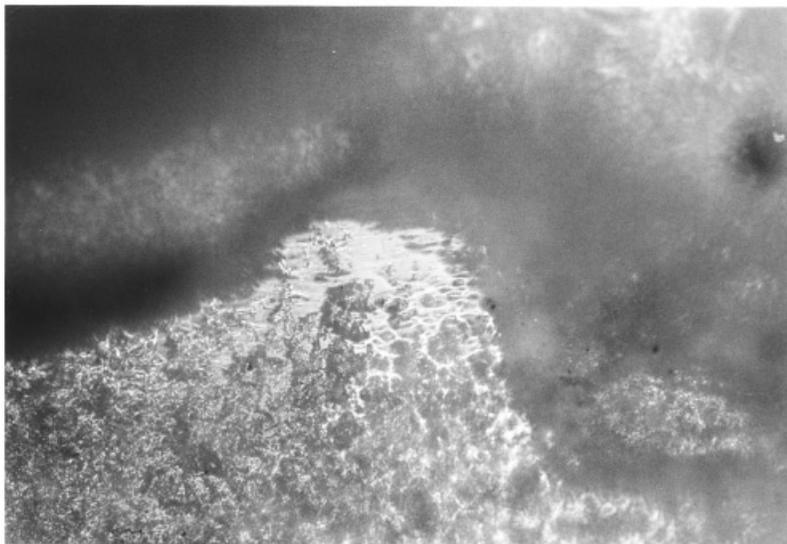
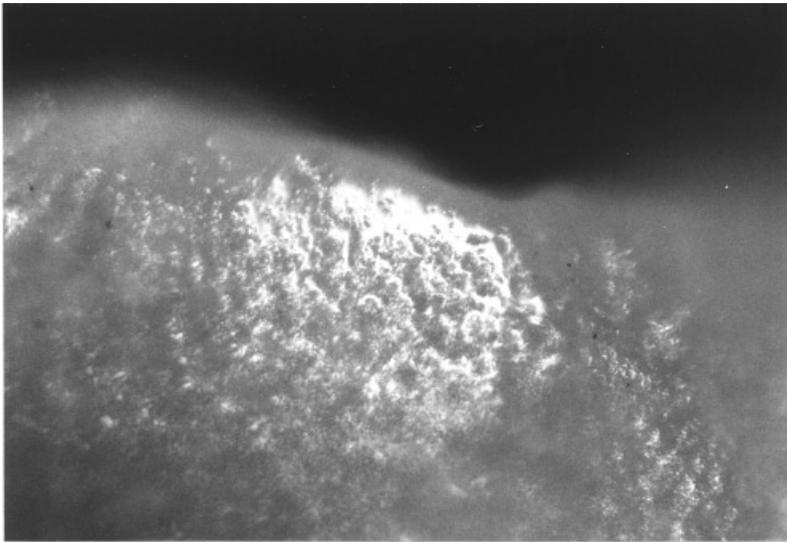


Figure 2. Examples of use wear on chert bifacial points from Aguateca, Late Classic period (200 \times). Top: B-type polish and parallel striations on a lateral edge used to cut wood; middle: D2C-type polish and parallel striations on a lateral edge used to cut shell or bone; bottom: E1-type polish and parallel striations on a lateral edge used to cut meat or hide.

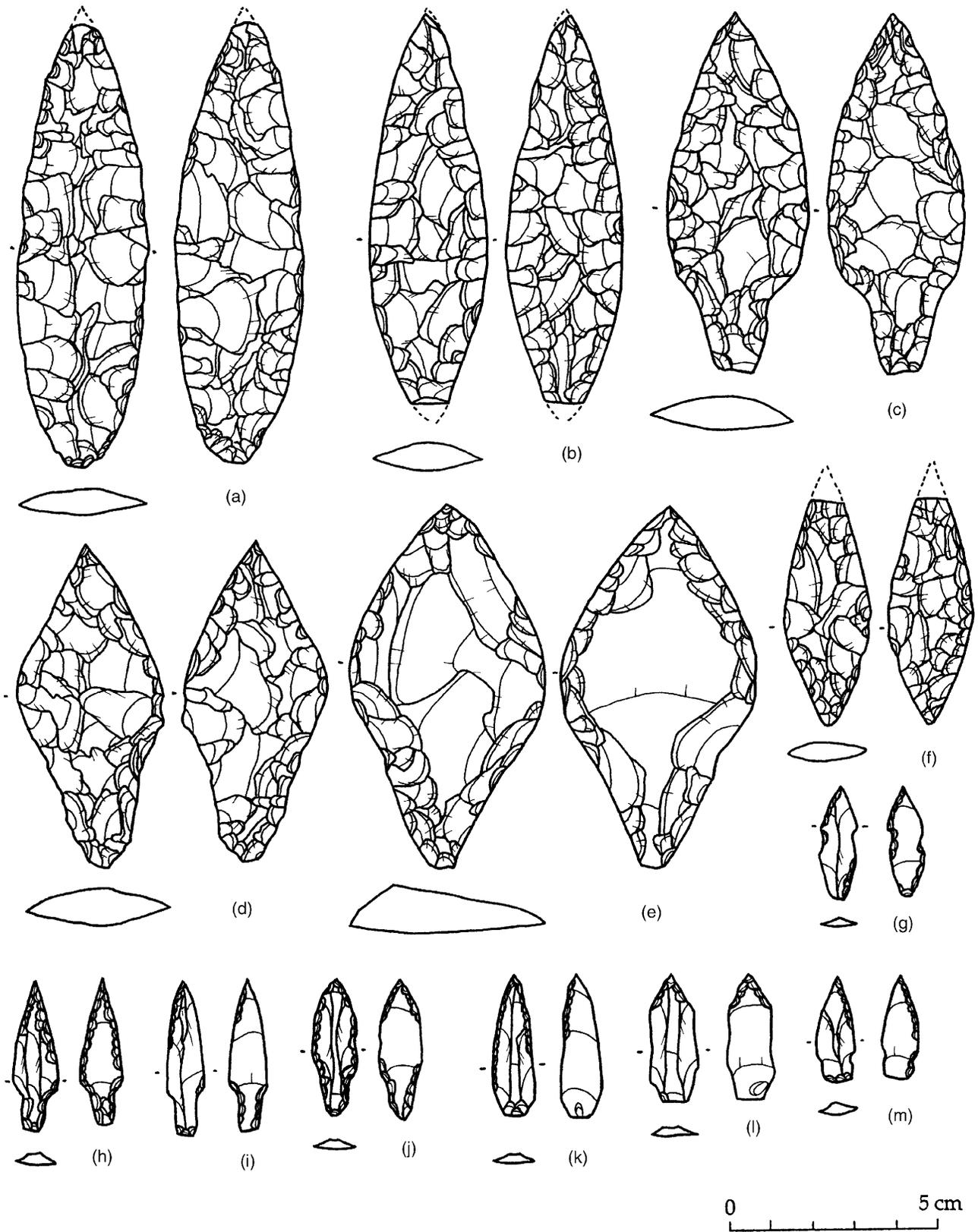


Figure 3. Chert and obsidian points from Aguatega, Late Classic period: [a–g] manufactured from chert, while the others were manufactured from El Chayal obsidian; [a–f] bifacial points; [g] small point; [h–m] prismatic blade points. Note projectile impact damage, such as longitudinal macrofracture on [a]; lateral macrofracture on [b]; distal break on [f]. Drawings are in Japanese technical style. Each illustration shows the sequence of flake-scars detachment. Flake scars, fissures, and ripple marks demonstrate the relationships of adjacent flake scars.

cutting unidentified material (3.7%), grooving shell or bone (1.9%), and whittling shell or bone (.9%). Weeding or cutting Gramineae was identified on the bifacial points from Structure M8-13 (a residence of a lower-status household) and Structure M8-3 (a residence of low-status individuals or manufacturing area) but not on those from the royal palace (Structure M7-22) and residences of elite scribes/artists (Structures M8-4 and M8-8). This may relate to a lower status of the occupants of Structures M8-13 and M8-3. In sum, the royal family, elite scribes/artists, and lower-status individuals used bifacial points as darts or spears as well as for artistic and craft production and other domestic activities.

Interestingly, the two obsidian bifacial points in the present study were found in final occupation layers of two structures belonging to Ruler 5 of Aguateca, Tahn Te' K'inich, possibly the last king of this city—that is, a royal palace (Structure M7-22) and a temple (Structure L8-5). The former was recovered from the easternmost room of Structure M7-22, which was sealed and contained numerous objects in situ, including two thin ceramic ceremonial masks, possible regalia of Ruler 5 of Aguateca (Inomata 2003). The results of microwear analysis indicate that the complete obsidian point from the temple was used as a spear or dart point and knife. The distal tip was used for piercing unidentified material, and its lateral edges were used for cutting unidentified material. The obsidian points were most likely part of his weaponry and probably had important implications for the distinction of the ruler from the rest of society.

POINT FUNCTION AND FORM

A total of 233 chert bifacial points recovered from final occupation layers at Aguateca were classified into tapered bifacial points ($N = 48$), stemmed bifacial points ($N = 23$), laurel-leaf bifacial points ($N = 9$), and undiagnostic fragments of bifacial points ($N = 153$). I made my best effort to rejoin point fragments to identify the minimum number of individual bifacial points present in the collection. Tapered bifacial points are tapered based bifacial points, and the term *tapered* refers to the proximal base of the bifacial point. Stemmed bifacial points refer to any bifacial points having a variety form of protrusion that tapers from “shoulder” elements at the base of the tool. The outline of laurel-leaf points is bipointed excurvate, and each point is usually equidistant from the center point of the piece.

The functions of the bifacial points determined by the results of microwear analysis do not absolutely correspond to the major morphological types defined in the Aguateca collections. While some 50% of tapered stem points and stemmed points were used exclusively as dart or spear points, the others were used as spear points and knives. In case of laurel-leaf points, more examples were used as spear points and knives (62.5%) than as dart or spear points (37.5%).

According to David H. Thomas (1978:470), arrow and dart points can be differentiated based on the maximum width of the point. Following Thomas, Irwin Rovner and Suzanne Lewenstein (1997:27–28) have proposed three broad functional categories of Maya points from Río Bec and Dzibilchaltún—that is, narrow “arrow points” (usually lightweight, small points), medium-width “dart points” (mostly stemmed bifacial points), and wider “spear points and knives” (most frequently leaf-shaped bifacial points). I tested their typology against use-wear analysis on the pointed stone artifacts of Aguateca.

According to the maximum width and morphology alone, one can reasonably separate arrow points from dart or spear points, but one cannot separate between those points used exclusively as dart or spear points and those used as spear points and knives. While virtually all narrow points were used as arrow points, most medium-width points and wide points did not have the proposed functions. Many more medium-width “dart points” were actually used as spear points and knives (65.6%) rather than as dart points (34.3%). A larger number of wide “spear points and knives” were used exclusively as spear points (65.4%) than as spear points and knives (34.6%). The bottom line is that the function of chipped-stone artifacts cannot be determined without detailed microwear analysis.

One can more confidently distinguish between arrow points and dart or spear points by combining microwear analysis and attribute measurements. The difference in mean width between arrow points (1.18 cm; Standard Deviation [S.D.] = .36 cm) and dart or spear points (3.6 cm; S.D. = .80 cm) has extremely high significance (Student's $t = 12.56$; Probability [p] < .001). The difference in mean width between dart or spear points and spear points and knives (3.31 cm; S.D. = .63 cm) is moderately significant, however ($t = 1.50$; $p = .14$). Leland Patterson (1985) has proposed other criteria for distinguishing between arrow and spear points, such as point thickness and weight. These attributes work very well for the points of Aguateca. The difference observed in mean thickness between arrow points (.27 cm; S.D. = 0.09 cm) and dart or spear points (0.75 cm; S.D. = .22 cm) is highly significant ($t = 9.85$; $p < .001$). Similarly, the difference in mean weight between arrow points (0.84 g; S.D. = .54 g) and dart or spear points (18.62 g; S.D. = 10.82 g) has high significance ($t = 7.00$; $p < .001$).

WARRIORS AND BROKEN SPEARS AND DARTS

Some 30–40 chert bifacial points were found in both the royal palace and the residences of elite scribes/artists. While some complete and nearly complete points appear to have been stored in the royal palace, elite residences, and other structures, it is important to note that most chert bifacial points were snapped or otherwise broken. The broken points were scattered more or less evenly across the structures, as one would expect as if they had been shot in and around the structures. I argue that the residents of Aguateca, including elite scribes/artists, shot most of the chert bifacial points used not only as weapons but also for craft production and domestic activities, although the attackers may have shot some of the points used exclusively as weapons. Without exception, every excavated structure in the epicenter of Aguateca was found to have burned to the ground at the time of abandonment. Together, these data strongly suggest that many broken spears and darts were deposited in battle. An important implication is that the ruler and elite scribes/artists at Aguateca were also warriors. The lithic evidence of Aguateca perfectly matches Kevin Johnston's (2001) iconographic study on Classic Maya scribe capture and their finger breaking custom during warfare of destruction. In other words, both the ruler of Aguateca and elite scribes/artists/warriors who produced texts through which the ruler asserted and displayed power were targeted by the enemy. We know from Classic Maya art that Maya elites were involved in warfare with projectile points, especially spears and, to a smaller degree, atlatl darts (Miller 1999). The large number of bifacial points used as spear or dart points by elite scribes/artists/warriors strongly indicates that they did en-

gage fiercely in endemic warfare, including hand-to-hand combat and touching, but then finally fled or were taken as captives.

The wife of the high courtier/scribe seems mainly to have used the north room of Structure M8-4 and engaged in bone or shell and wood carving and other craft production in addition to food preparation and textile production. It is interesting to note that 11 of 36 chert bifacial points recovered from the structure were found in this room. The results of microwear analysis indicate that at least one complete and two nearly complete bifacial points were used as spears or darts. The male scribe/artist may have used all of them. Alternatively, a larger number of bifacial points found in the north room suggest the possibility that the wife of the scribe used some bifacial points for defense of the city or for other purposes.

It should be noted that the percentage of bifacial points among all chert chipped-stone artifacts (both formal tools and irregular flakes) at Aguateca (3.8%) is considerably higher than for any reported Maya Lowland centers. The percentage is even higher for the artifacts from the final occupation layers of eight extensively excavated structures (5.5%). In the Copan Valley, for example, the percentage is .5% (13:2,652 [Aoyama 1999: Table 8.1]), while that of the region of La Entrada, Honduras, is .6% (19:3,291 [Aoyama 1999: Table 8.3]). Although the higher ratio of bifacial points at Aguateca is partly due to its rapid abandonment, I argue that this is another line of evidence indicating that Aguateca declined due to the intensification of warfare toward the end of the Late Classic period.

WARFARE AND WEAPONS IN COPAN AND ITS HINTERLAND

Of 74,614 chipped-stone artifacts recovered from the Copan Valley, possible weapons include obsidian bifacial points ($N = 354$), obsidian prismatic blade points ($N = 80$), and chert bifacial points ($N = 119$). Imported obsidian was more frequently used than local chert for the production of these tools (Figure 4). Nearly all of the obsidian came from the closest source, Ixtepeque, during the entire pre-Columbian sequence. The straight-line distance from Copan to Ixtepeque (80 km) is considerably shorter than for most Maya Lowland areas, including Aguateca. Because of their sharper cutting edges, obsidian bifacial points should have been more valuable than those made from chert. In the words of one modern Lacandon Maya, "Obsidian makes a wound that causes heavy bleeding. A chert point will usually kill, but an obsidian point always kills" (Nations 1989:454). In the region of La Entrada, obsidian bifacial points ($N = 20$), obsidian prismatic blade points ($N = 5$), and chert bifacial points ($N = 35$) were found among 16,382 chipped-stone artifacts.

The results of microwear analysis indicate that the obsidian prismatic points from Copan were also mainly used as arrowheads. The distal tips of the prismatic blade points were exclusively used for piercing unidentified material. Lateral edges of two prismatic blade points were used for cutting meat or hide. Most bifacial points from Copan were used as dart or spear points. Some of them were also used as knives. Activities performed with bifacial points (IUZ = 94) included cutting, scraping, and boring meat or hide (19.1%); cutting and whittling wood (13.8%); cutting, grooving, and whittling shell or bone (7.4%); cutting Gramineae (4.3%); and piercing and cutting unidentified material (55.3%). In what follows, I will discuss temporal and spatial distribution patterns of these tools and other lines of evidence for warfare in Copan and its hinterland.

Preclassic Period (1400 B.C.–A.D. 50)

There is no evidence for manufacture and use of bifacial points and prismatic blade points either in the Copan Valley or the region of La Entrada during the Preclassic period. On the basis of the overall low percentage of prismatic blades among all obsidian chipped-stone artifacts and the high percentage of cortex among all Ixtepeque obsidian artifacts, it appears that the unspecialized production of informal flakes from large flake spalls or small nodules was predominant (Aoyama 2001:349). There is no clear evidence for warfare or conflict in these regions during this period.

Protoclassic Period (A.D. 50–400)

During the Late Protoclassic Bijac 2 phase (A.D. 150–400), the archaeological record does indicate that the valley's population grew substantially. Based on architectural differences and funerary offerings, William Fash (2001:74) argues for at least two different socioeconomic levels in the Copan Valley. The procurement of Ixtepeque obsidian blade cores and local production of prismatic blades began as the result, rather than the cause, of sociopolitical development in the Copan Valley during the Protoclassic period (Aoyama 2001:351). At Group 10L-2 south of the Acropolis of Copan, there is evidence of local production of obsidian bifacial points during the Protoclassic period (Braswell et al. 1996). At the site of La Florida, a Protoclassic center in the region of La Entrada, the existence of both chert bifacial points and bifacial thinning flakes indicates on-site production of bifacial points during this period (Figure 4a). Consequently, the manufacture and use of bifacial points goes with a rise in population and a more complex sociopolitical level in the Copan Valley and the region of La Entrada.

Early Classic Period (A.D. 400–600)

The Copan Valley hilltop site of Cerro de las Mesas was founded at the beginning of the Early Classic period 2 km northwest of the Principal Group (Fash 2001:89). William Fash and Barbara Fash (2000:447–448) speculate that Yax K'uk' Mo' and his followers established themselves on this fortress-like site and unified the diverse, competing noble lines. They subsequently established the Principal Group in the center of the Copan Valley. It is important to note that the percentage of Pachuca green obsidian tools among all obsidian chipped-stone artifacts at Cerro de las Mesas (6.7%) is the second highest in the Early Classic Copan Valley (indicating its possible ties with Teotihuacan), only after that for the Yax Structure of the Principal Group, which Yax K'uk' Mo' commissioned (Aoyama 1999:105). Other Early Classic hilltop sites in the Copan region include Group 9 (where the modern town of Copan Ruinas stands), the site of Cerro Chino, and the site of Los Achiotos. None of the last three hilltop sites mentioned has Late Classic occupations of any magnitude. This hilltop settlement pattern is in striking contrast to Late Classic practice, in which the vast majority of the settlements were on or very near the alluvial bottomlands. It has been suggested that the severe parry fracture of the right forearm of the man in the Hunal tomb might be a battle wound. This is consistent with the depiction of Yax K'uk' Mo' as a warrior portrayed on the front of Altar Q, in which he is depicted holding a small rectangular shield protecting his right forearm (Sharer 2003:151–152).

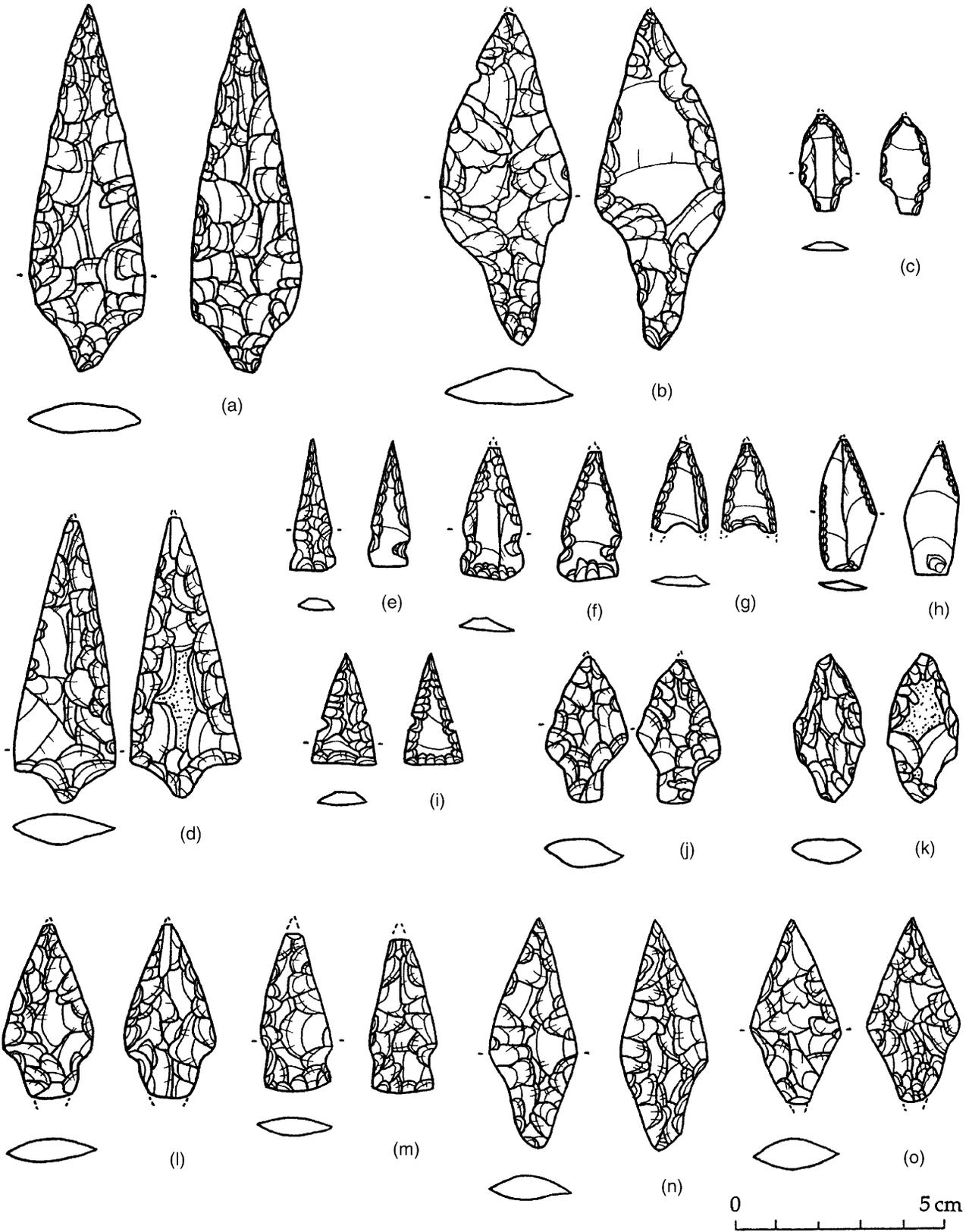


Figure 4. Obsidian and chert points from the Copan Valley and the La Entrada region, Honduras: (a, d, l, m) were manufactured from chert; (c) was manufactured from Pachuca green obsidian; (k) was manufactured from La Esperanza obsidian. The others were manufactured from Ixtepeque obsidian. (a) La Florida, Protoclassic period; (b–c) Copan, Early Classic period; (d–h, j–k) Copan, Late Classic period; (i) La Entrada region, Late Classic period; (l–o) Copan, Early Postclassic period. (a, b, d, j–o) are bifacial points; (c, e–i) are prismatic blade points. Note projectile impact damage on (b–d, f–h, j, l–m). Drawings are in Japanese technical style.

In terms of obsidian bifacial point production in the Copan Valley, the percentage of bifacial points among all Early Classic obsidian artifacts at the fortified center of Cerro de las Mesas (4.4%) is considerably higher than the mean percentage of obsidian bifacial points in the valley (.4%; S.D. = .9). The existence of bifacial thinning flakes manufactured from Ixtepeque obsidian at Cerro de las Mesas indicates that there was on-site production of bifacial points. This might be taken as evidence for intra- and/or inter-valley conflict. Because Cerro de las Mesas was not abandoned rapidly as was Aguateca, and its human occupation lasted until the Late Classic period, this high percentage of bifacial points is significant. An important implication is that warfare may have played an important role in the development of complex society in the Copan Valley during the Early Classic period.

Local production of obsidian prismatic blade points began in the Copan Valley during the Early Classic period, albeit in small quantities. These prismatic blade points were manufactured from Ixtepeque obsidian prismatic blade blanks. They had straight and unthinned bases and were not side-notched. Based on contextual and microwear data, these prismatic blades points could have been used as arrow points. Moreover, it should be emphasized that not all hafted tools were side-notched (e.g., Keeley 1982). If, for battles, the object was to leave the point behind, then a warrior might not have wished to produce a finely chipped arrowhead. Similar obsidian prismatic blades were found both at Chalchuapa (Sheets 1978:15–16) and the Zapotitan Valley (Sheets 1983:203), El Salvador, but they date to the Late Classic and Postclassic periods. Payson Sheets (1983:201) believes that obsidian prismatic blades were most likely used as arrow points because low-power microscopic examination revealed no evidence of use either as drills or as perforators. None of the 39 obsidian prismatic blade points recovered from Chalchuapa (Sheets 1978:15) and only three of 24 obsidian prismatic blades from the Zapotitan Valley (Sheets 1983:203) were side-notched.

We also have a prismatic blade point made from Pachuca green obsidian (Figure 4c). This point was recovered from a secondary context of the Early Classic-period at Group 9M-19, located 300 m northeast of the Principal Group in the Las Sepulturas ward. This is the only green obsidian prismatic blade point present among all the lithic samples included in the present study. The form of this green obsidian prismatic point is different from that of Ixtepeque obsidian specimens. Although retouching was performed bifacially only along the sides, as was done for Ixtepeque obsidian prismatic blade points, the green obsidian prismatic blade point was corner-notched. The presence of a stem indicates that it was attached to the end of a thin shaft. Consequently, the green obsidian prismatic point may have been used as an arrow point. In sum, the bow and arrow would have existed in the Maya Lowlands earlier than has been previously suggested.

Late Classic Period (A.D. 600–900)

Small quantities of both side-notched and unnotched prismatic blade points were manufactured from Ixtepeque obsidian in the Copan Valley during the Late Classic period (Figure 4e–h). Although the sample size is smaller, side-notched and unnotched prismatic blades made from both Ixtepeque and La Esperanza obsidian were present in the region of La Entrada during the Late Classic period (Figure 4i). In this region, we have not found any major concentrations of bifacial points or prismatic blade points at any site during the Late Classic period. This spatial distribution

indicates that warfare may not have played an important role in the decline of the complex society in the region of La Entrada. However, the pattern may result from sampling error.

The present chipped-stone data from the Principal Group of Copan do not indicate either a gradual increase in obsidian or chert weapons during the Late Classic period or their sudden increase during or immediately after the reign of Ruler 13, Waxaklajuun Ub'aah K'awiil. The overall low percentage of possible weapons among all chipped-stone artifacts may support Webster's (1993:431–432) contention that the capture and decapitation of this ruler by Cauac Sky of Quirigua in A.D. 738 was simply an elite coup. However, the lack of such evidence may be due merely to sampling error.

The study of chipped-stone artifacts provides important data on the process of Late Classic “collapse” at Copan (Aoyama 2001:355–356). On the basis of the obsidian data from the middens of the Principal Group of Copan, the overall obsidian availability appears to have decreased dramatically in the second half of the eighth century. The last rulers had more difficulty in administrating the intra- and interregional exchange systems than their immediate predecessors at Copan's height of power. Such evidence might suggest that the Late Classic was a period of great internal instability. The obsidian data reinforce epigraphic, iconographic, and other archaeological evidence that suggests the weakening of centralized political authority at Copan in the eighth century (Bau-dez 1994; Fash 1992; Fash 2001; Stuart 1992).

Bifacial points and prismatic blade points were widely scattered across the landscape in the Copan Valley, with some exceptions. A small hilltop site, Group 10H-1, located 2 km west of the Principal Group, may have been a minor defensive site during the Late Classic period. The sample size is very small ($N = 13$), but bifacial points make up 23.1% of obsidian artifacts. We need further excavations to obtain more representative lithic samples. Structure 11L-124 of Group 11L-13, located 200 m south of the Principal Group, appears to have been a residence of an elite warrior. A total of 12 pieces of obsidian bifacial points, 11 made from Ixtepeque obsidian and one from La Esperanza obsidian, make up 19% of the obsidian artifacts ($N = 63$). In addition, despite a small sample size ($N = 16$), two chert bifacial points constitute 12.5% of the chert artifacts. Two obsidian bifacial thinning flakes and one chert bifacial thinning flake are present, suggesting on-site production of bifacial points.

The production of Ixtepeque obsidian bifacial points and prismatic blade points appears to have increased toward the end of the Late Classic period. Especially, we note an extremely high percentage of bifacial points (7.5%, all manufactured from Ixtepeque obsidian) in a total of 440 obsidian artifacts from Structures 10L-26-1st and the temple annex attached to its south side (Structure 10L-230) at the Acropolis in the Principal Group. Also, the percentage of Ixtepeque obsidian prismatic blade points is 1.1%, well above the mean percentage of prismatic blade points among all obsidian artifacts in the Late Classic Copan Valley (.09%; S.D. = .5). Moreover, the percentage of bifacial points (17.9%) in a total of 112 obsidian artifacts from Structure 10L-22A, which Barbara Fash and colleagues (1992) have interpreted as a Classic Maya *popol nah* (council house), is unusually high. These artifacts were uncovered in final-phase occupation debris laid down in the first half of the ninth century. The unusually high percentages of bifacial points are not only well above the mean percentage of obsidian bifacial points in the Copan Valley during the Late Classic period (.9%; S.D. = 3.5), but they also are even higher

than that of the Early Classic hilltop fortified center of Cerro de las Mesas in the same valley mentioned earlier.

The unusually high percentages of Ixtepeque obsidian bifacial points and prismatic blade points at the Acropolis of Copan during the late Late Classic period support the hypothesis suggested by E. Wyllys Andrews V and Barbara Fash (1992:86) that the end of centralized rule here was not peaceful. The chipped-stone data are in accordance with the mosaic-facade stone sculptures that decorated Structures 10L-26-1st and 10L-230, which were related to warfare and sacrifice (Fash 1992). Rulers seated on the Hieroglyphic Stairway were dressed as warriors carrying shields. Six warriors were seated in the roof comb of Structure 10L-26-1st. In addition, Structure 10L-230 was decorated with stone sculptures of more than 100 fleshless human long bones and numerous skulls. Moreover, the chipped-stone data are consistent with the evidence of the violent destruction of several buildings of central Copan, such as Structure 10L-22A (Fash et al. 1992:427), Structure 10L-22 (Triak 1939), and two of the vaulted buildings on Plaza A and probably one on Plaza B of Group 10L-2 (Andrews and Fash 1992), as well as Structure 9N-82 of Group 9N-8 in the Las Sepulturas ward (Webster et al. 1986:190). In sum, the large concentrations of obsidian bifacial points and prismatic blade points at the Acropolis, along with other lines of evidence for warfare, indicate that either conflict between the dynasty and local noble lines or inter-valley conflict, or a combination of both brought about the demise of centralized dynastic rule.

Early Postclassic Period (A.D. 900–1100)

Recent investigations by Kam Manahan (2003) do not support the model of gradual demographic decline, with the Late Classic Coner phase lasting until A.D. 1250 (Webster and Freter 1990). He has documented the Early Postclassic Ejar-phase utilitarian ceramics and imported ceramic wares such as Tohil Plumbate, Fine Orange and Las Vegas Polychrome, as well as drastic changes in settlement pattern and construction method in a small community established 200 m southwest of the Principal Group of Copan in ruins during the late tenth century A.D. Manahan also discovered dressed stone blocks and sculptures reused from collapsing buildings in the Principal Group. It is important to note that, based on ceramic chronology and obsidian-hydration dates (Aoyama and Freter 1991:Table VI-59), the neighboring region of La Entrada was completely abandoned by A.D. 950. Throughout pre-Columbian history in the region of La Entrada, the population never approached its local carrying capacity. It is very unlikely that purely local factors would have led La Entrada polities into declines. I believe that the demise of centralized dynastic authority at Copan may have caused a “chain reaction.”

There were also radical changes in obsidian exchange and chipped-stone production, and in tool use, in the Copan Valley during the Early Postclassic period (Aoyama 1999:187–195). First, the procurement and intraregional exchange system of Ixtepeque obsidian blade cores broke down, resulting in a concomitant decline in prismatic blade production in the Copan Valley. The Early Postclassic residents of the Copan Valley returned to the nonspecialized Preclassic mode of Ixtepeque obsidian procurement and tool production. Second, they imported small quantities of central Mexican obsidian prismatic blades with ground platforms from Pachuca and Ucareo. Third, and more important, both obsidian and chert bifacial points were manufactured intensively in domestic contexts.

Greater reliance on local chert for bifacial point production, in comparison with the Late Classic period, may indicate the craftsmen trying to overcome a scarcity of suitable obsidian blanks for bifacial points. The percentage of bifacial thinning flakes among all chert chipped-stone artifacts (7.4%) is much greater than that of bifacial thinning flakes among all obsidian artifacts (2.9%) during the Early Postclassic period. A relatively high percentage of bifacial thinning flakes in the chipped-stone assemblages indicates intensive production of both obsidian and chert bifacial points in domestic contexts. In fact, the total number of chert bifacial points ($N = 27$) recovered from complete excavation of a single Early Postclassic residence (Structure 11L-77) far exceeds that from primary Late Classic contexts included in this study ($N = 13$). Moreover, a total of 72 obsidian bifacial points were recovered from Structure 11L-77 alone.

Bifacial points from the humic layer and the surface of Structure 11L-77, both of obsidian (3.9%) and chert (3.1%), form an unusually high percentage of chipped-stone artifacts in comparison to less than .7% (obsidian) and .5% (chert) of the Late Classic residential assemblages. This very high percentage of bifacial points at Structure 11L-77, combined with the evidence of violent destruction of its superstructure by fire (Manahan 2003), suggests that warfare was among the several causes that led to demographic “collapse” of Copan.

SUMMARY AND CONCLUSIONS

Although spear or dart points were more important than the bow and arrow in Classic Maya warfare, both notched and unnotched obsidian prismatic blade points were present in the Copan Valley during the Early and Late Classic periods, as well as at Aguateca and the region of La Entrada during the Late Classic period. The results of high-power microwear analysis indicate that these points were mainly used as arrowheads. The bow and arrow was present in the Maya Lowlands earlier than has been previously suggested.

Each elite household at Aguateca had chipped-stone weapons and/or tools for hunting or craft production, including chert spear, dart, and arrow points, as well as obsidian arrow points. In addition, Ruler 5 of Aguateca, Tahn Te' K'inich, appears to have possessed a couple of obsidian bifacial points. Both the royal family and elite scribes/artists at Aguateca used spear and dart points for human conflict as well as for artistic and craft production under enemy threat. An important implication is that the ruler and elite scribes/artists were also warriors. Although the higher ratio of weaponry at Aguateca is partly due to its rapid abandonment, I believe that it reinforces epigraphic, iconographic, and other archaeological evidence indicating that Aguateca declined due to the intensification of warfare.

Current evidence suggests that the production of bifacial points began during the Protoclassic period in the Copan Valley and the region of La Entrada. It is noteworthy that we have not found any evidence for the production and use of bifacial points in the Preclassic contexts. If this pattern is not due to sampling errors, warfare may have played a role in the rise of complex societies in these regions.

An unusually high percentage of bifacial points among all obsidian artifacts at the fortified center of Cerro de las Mesas, along with other lines of evidence, such as iconography, fortifications, and paleopathology, might indicate that intra- and/or inter-valley conflict was critical in the development of complex society in the Copan Valley during the Early Classic period. Importantly, such

warfare was not caused by demographic and ecological pressures and did have fundamental effects on the society.

Chipped-stone evidence indicates that conflict between the dynasty and local noble lines, inter-valley conflict, or a combination of both may have played a significant role in the downfall of Classic Maya civilization at Copan. The percentages of bifacial points and prismatic blade points among all obsidian artifacts recovered from the final-phase occupation debris at the Acropolis are even higher than that of the Early Classic hilltop center of Cerro de las Mesas, mentioned earlier. The unusually high concentrations of obsidian bifacial points and prismatic blade points at the Acropolis, as well as the notable presence of bifacial points at the small hilltop site of Group 10H-1 and Structure 11L-124 of Group 11L-13, along with other lines of evidence, indicate that

the demise of centralized dynastic authority was accompanied by destructive activities.

Finally, the lithic data from the Early Postclassic Copan Valley, as well as the evidence of the violent destruction of structures, suggest an escalation of intra- and/or inter-valley conflict. The total number of obsidian ($N = 72$) and chert ($N = 27$) bifacial points recovered from the complete excavation of a single Early Postclassic residence (Structure 11L-77) at Copan exceeds that of any residential structures at Aguateca. Warfare may have been one of several causes that led to the demographic “collapse” of Copan, through both death and out-migration. In sum, warfare may have played a more important role in the development and decline of Classic Maya civilization in the Copan Valley than previously believed.

RESUMEN

El presente artículo discute lanzas y puntas de flecha entre las élites mayas clásicas en la ciudad fortificada rápidamente abandonada de Aguateca, Guatemala, y sus patrones de distribución temporal y espacial en y alrededor de Copan, Honduras, con el fin de proporcionar algunas revelaciones sobre la naturaleza y papel de la guerra en el surgimiento, desarrollo, y decaimiento de la civilización maya clásica. Tanto la familia real como los escribanos/artistas élites en Aguateca usaron lanzas y puntas de flecha para la guerra sino también para la producción artística y artesanal bajo la amenaza de sus enemigos. Una implicación importante es que el gobernante y escribanos/artistas élites fueron también guerreros. Un porcentaje muy alto de puntas bifaciales en los artefactos de obsidiana en el centro fortificado del clásico temprano de Cerro de las Mesas, junto con las otras

líneas de evidencias, sugiere que el conflicto intra- y/o inter-valle pudo haber sido importante en el desarrollo de la sociedad compleja en el Valle de Copan durante el período clásico temprano. Las concentraciones extraordinariamente altas de armas identificables en la fase final de ocupación en la Acrópolis, así como la notable presencia de lanzas y puntas de flecha en otros lugares del clásico tardío en el Valle de Copan, junto con las evidencias iconográficas, epigráficas, y arqueológicas, sugieren que la guerra pudo haber sido uno de los factores críticos en el decaimiento de la civilización maya clásica en Copan. La guerra pudo haber jugado un papel más importante en el desarrollo y decaimiento de la civilización maya clásica en el Valle de Copan que se ha creído anteriormente.

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