

**THE ELABORATION OF BONE ARTIFACTS IN
DOMESTIC GROUPS OF THE MAYA ELITE AT
AGUATECA, PETEN**

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This work represents an attempt to provide an answer, through a multidisciplinary approach, to a number of questions regarding the crafts industry of animal remains. The investigation combines information on the worked animal remains and on the analysis of micro-wears shown in the lithic artifacts of Aguateca, Guatemala. This is correlated with information on products, residues and lithic implements used in the manufacture of bone and shell artifacts to accomplish a detailed distribution analysis of crafts activities in Late Classic elite residences. In most Maya cities, the collections of implements elaborated with animal remains are small and scattered, and their association with specific residences is not always too evident. This is not the case with Aguateca, a site that features a unique collection of artifacts as well as rich information on artifacts distribution within the Maya region (Inomata 1997, 2000, 2001a, b, 2003; Inomata and Houston 2001; Inomata and Stiver 1998; Inomata and Triadan 2000, 2003; Inomata *et al.* 2001, 2002).

Aguateca was one of the largest and most important places across the Petexbatun area. It was occupied from the Preclassic to the end of the Late Classic period, but most of the constructions date to this latter, at the end of which the defensive walls against the invasions were erected. In spite of these fortifications and the natural defensive situation resulting from its localization, the occupation of the place ended following a devastating attack in 810 AD. It happened so suddenly that the local elite abandoned their possessions on the floor and run away, leaving their homes to be burnt down by the invaders. Altogether, the effect of this rapid abandonment, the immediate massive action of fire and the absence of a secondary looting, makes the rescued information about the related activities inside the residences of Aguateca to be much more complete than that from other Maya cities. The distribution of the abandoned artifacts, both represented by animal parts or lithic artifacts, provides a detailed pattern per household based on the residues of bone and shell carvings, and of the lithic artifacts used in bone, shell, meat and skin processing.

Now, we shall try to provide an answer to elemental questions concerning the elaboration of bone artifacts, particularly in regard to the place where they were manufactured and by whom, all questions that could not be approached until this study was undertaken. It is of particular relevance to elucidate the role played by the elite in the elaboration of these crafts. Recent investigations suggest that the ancient Maya nobility was also integrated by craftspeople involved in the production of high

ranking goods ordered by rulers (Coe 2001; Coe and Kerr 1997; Fash 1991; Inomata 2001b; Reents-Budet 1994; Stuart 1993). Is this valid in the case of the elaboration of crafted products manufactured with animal parts? Which members of the ancient elite were involved in the elaboration of crafts? Was the elaboration of crafts a specialization? Were the Maya men and women equally involved in the elaboration of handmade products? (Ardren 2002; Hendon 1996; Joyce 2000).

METHOD OF STUDY

The Aguateca Archaeological Project is directed by Takeshi Inomata and Daniela Triadan. The materials collected between 1991 and 2001 were mostly originated in the extensive horizontal excavations conducted at the elite residences (Inomata 1995, 1997). All the excavations at Aguateca involved a detailed outline of the points of artifact distribution and their reconstruction, to facilitate a better insight of the activity patterns. The lithic and animal remains were analyzed between 1993 and 2003, and have to do with the level of rooms inside the structures. The identification of the modified animal remains was completed by Emery using comparative materials from the Royal Ontario Museum and the Florida Museum of Natural History (Emery 1998, 1999, 2002).

The animal remains modified for the elaboration of artifacts are classified using a hierarchy of reduction based on the analysis of over 10,000 carved remains of the nearby site of Dos Pilas in the Petexbatun region (Emery 1997, 2001). The analysis of micro-wears on lithic materials carried out by Aoyama is based on an experimental study on traces of wear, which includes 267 experiments creating replicas and an analysis of micro traces of use in over 3000 carved stone artifacts, thus establishing a theoretical framework for the interpretation of the use of stone artifacts by the ancient Maya (Aoyama 1989, 1995, 1999). For the study of Aguateca, Aoyama used a metallurgical microscope with a 50-500x magnification, together with an incandescent light connected to it that helped to document patterns of wear through an Olympus photo-micrographic system.

RESULTS

The epicenter of Aguateca features the ceremonial core of the elite, surrounded by massive defensive walls (Figure 1). The epicenter is integrated by the Palace Group, that is, the residences of the royal family, the causeway south of the palaces that connects with the main plaza, a secondary causeway, and several groups of houses on the final end. The majority of the remains were recovered at the central area of the elite, and the primary data of this study originate in the structures located at the sides of the main causeway. It is probable that the causeway functioned as a public space, connecting the Palace Group with the main plaza. On the edges there was a number of elite structures, both residential and non-residential, that were rapidly abandoned. The Palace Group had been abandoned previously and in a more gradual manner. The attackers completed their destruction with the ritual deposit of garbage of the Palace structures at Barranca Escondida (the *Hidden Ravine*) found in the crack, one that revealed a number of stela fragments that date to the earliest

periods of the Petexbatun occupation. The test pits conducted within the house group of Grenada, located at the end of the second causeway, suggest that it functioned as an additional important residential and ritual area of the elite.

The lithic collection of Aguateca includes 10.839 artifacts, most of which are carved stones, 6000 of them made of chert, and the other ones of obsidian. Aoyama analyzed the micro-wears of over 3000 lithic artifacts (Table 1). At least 88% of the obsidian artifacts presented evidence of use, and micro-wears were also observed and interpreted as such in 28% of the chert artifacts and in 38 of the 39 polished axes.

The fauna collection analyzed by Emery includes 9500 remains of bone and shell, and involves more than 4500 carved remains. The largest number of carved animal remains consisted of finished artifacts, including ornaments and artifacts such as perforators, etc, musical instruments and disguise-related features. Also, 100 samples of residues from bone carving and shell artifacts were collected.

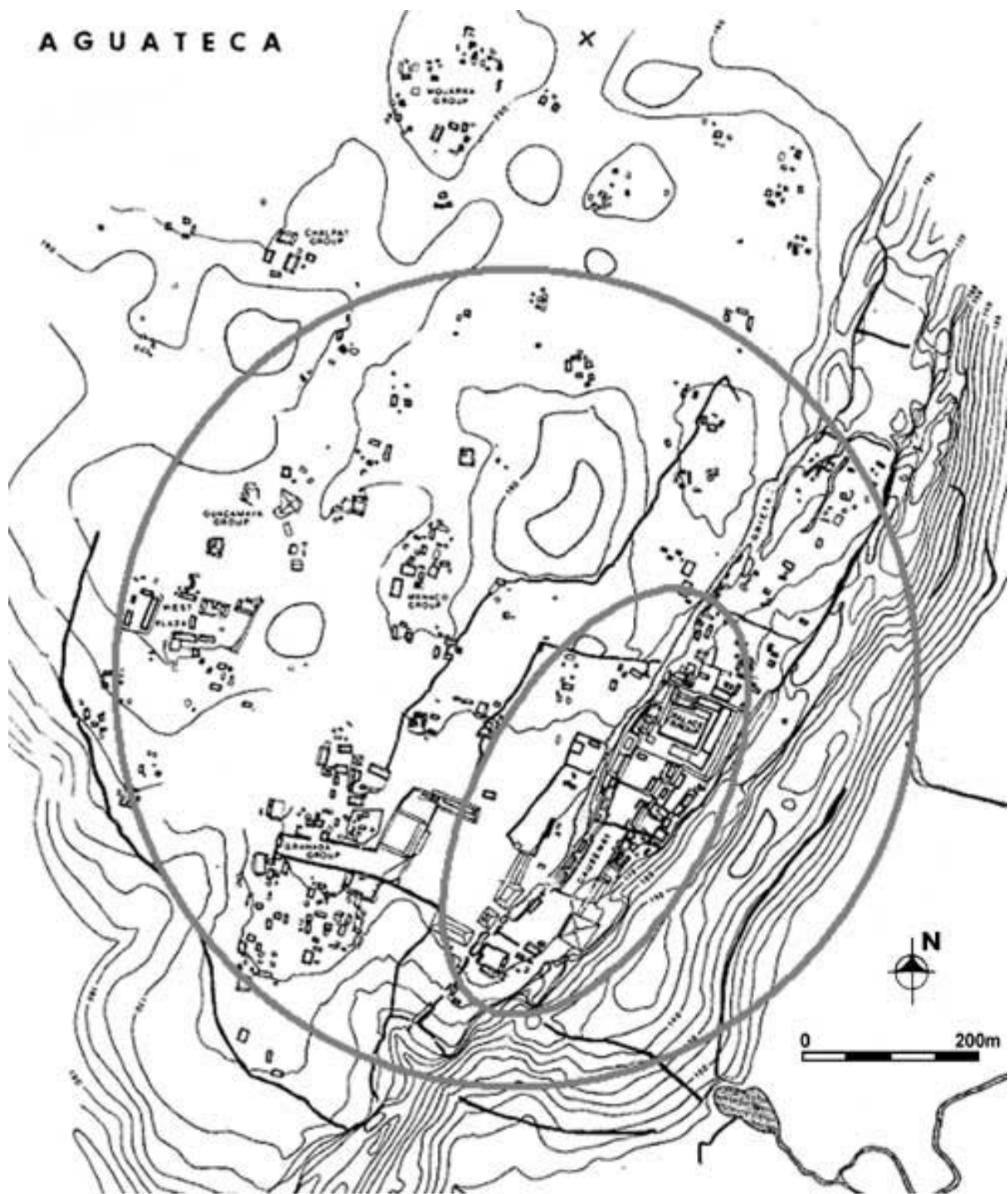


Figure 1. Map of the Aguateca center, with a circle around its epicenter and center (map drawn by Inomata).

METHODS OF PRODUCTION OF BONE AND SHELL ARTIFACTS

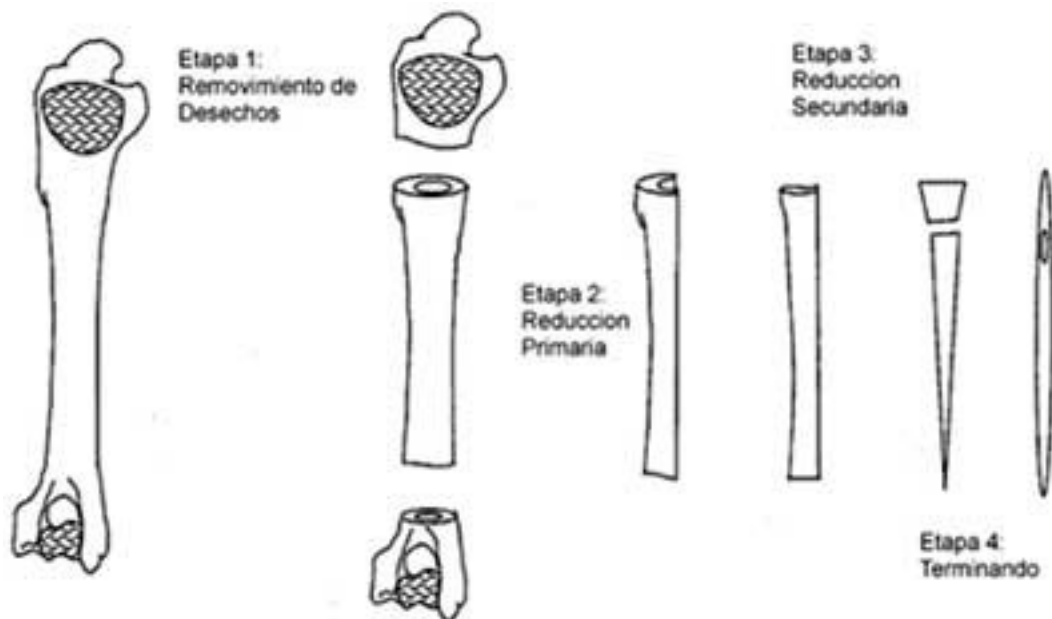


Figure 2. Production stages of bone artifacts (based on studies of production refuse from Petexbatun).

The basic model for the production of bone and shell artifacts in Aguateca includes four reduction stages (Figure 2). The first stage involves the elimination of irregularities through an intentional cut-breakage in the shape of a horizontal ring, followed by more complex cuts around the additional irregularities. A secondary edging and a preliminary polish were needed for the preparation of a "core". These "cores" were completed immediately to create bone tubes or rings, or either, sections were removed from them to create discs or ornaments. The shell rattles and the tooth pendants were perforated or cut anew so that they could be hung in this

preliminary stage. Bone perforators and spatulas, for example, were formed by means of a longitudinal mark and cuts on the core to create preforms that were subsequently molded by the final user.

Most production residues came from the final stage, that is, the completion of the artifact. Only 7% of the complete collection is formed by residues of the primary elimination of surface irregularities. The cuts of the secondary stage are more often found in bone "preforms", which may have been created in large quantities for distribution, and later completed by craftsmen devoted to the production of textiles and skins.

Until now there was little information available about the specific artifacts used in the elaboration processes of artifacts in the Maya world. Aoyama identified the traces of use associated with the carving of bone and/or shell in 95 lithic artifacts (Table 2). The distribution of wear in these artifacts suggests that bone and shell carving was not the primary activity for any of the different types of lithic artifacts, and that a variety of artifacts, made mainly with chert, were used for this crafts creation. Also, it was possible to identify marks of skins and/or meat. Event though all the lithic artifacts were used only occasionally for this activity, as opposed to bone and shell processing, that was frequently the main use that the artifacts were given.

SPATIAL ANALYSIS OF ANIMAL REMAINS AND OF MICRO-WEARS OF LITHIC OBJECTS

Our major interest was focused on the spatial distribution of production. The majority of the artifacts derived of animal parts were recovered in Structures M7-22, M8-8 and M8-4, but in a proportion relative to the total size of their inner quantity, Structures M7-22, M8-8 and M7-32 revealed the largest number of artifacts. The majority of the structures have some type of residue from the production of bone and shell artifacts, but in small amounts when compared to that of the finished artifacts (87-100%). The only exception is Structure M8-10, with a difference in proportion of only 19% between the finished artifacts and the production residues, and a remarkably high proportion of artifacts in the earlier phases of elaboration, compared to the other structures. Adjacent structure M8-13 shows a similar order. The lithic evidence of bone and shell carving was detected in six of the eight structures extensively excavated, mainly in Structures M8-13 and M8-4.

The meat and skins processing was identified by the analysis of micro-wears on the lithic artifacts of all the structures extensively excavated, mainly Structures 7-22, M8-8 and M8-4. Twenty six samples were found in the faunal collection, including marks made at the time of flaying, disarticulating and cutting. Seventy five percent of the flaying marks were found in an almost complete jaguar skeleton at Barranca Escondida, together with a large number of artifacts showing use wear and associated to the processing of meat and skins. This probably represents the specialized flaying and sacrifice of one single animal. Forty one percent of the butchery marks were found in M8-4, where the greatest proportion of remains of the elaboration of bone artifacts was located, although there was also evidence in the Grenada house group and in the small structures found in front of the Community

House of the Metate. Both these small groups also feature a wealth of evidence regarding the processing of meat/skins. These distributions would be established with a greater detail if all of this could be subjected to a house-to-house analysis.

Casa de las Mascaras

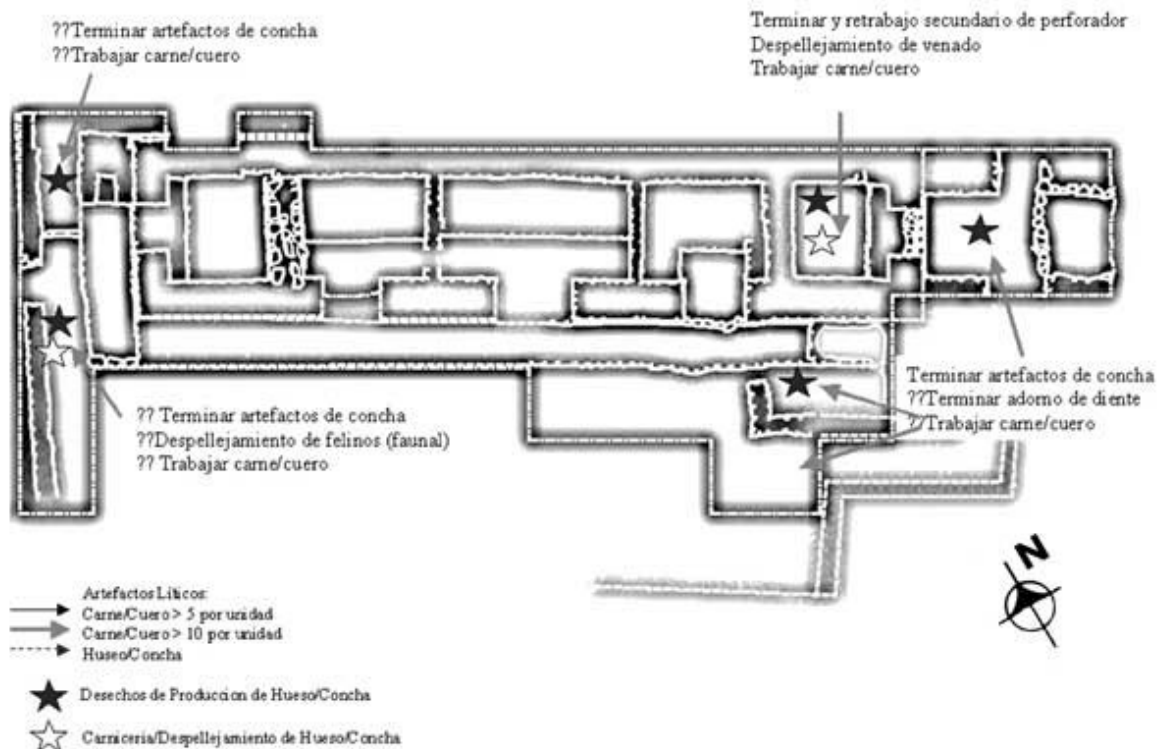


Figure 3. Location of modified remains of lithics, bones and shell at the House of Masks.

M7-22 – House of the Masks

Structure M7-22, the Royal Palace and the administrative complex, constitute the largest residential complex of Aguateca (Inomata and Triadan 2003; Inomata et al. 2001). Although most of the rooms were emptied before the attack, the easternmost room was sealed with abundant artifacts inside. The lithic artifacts recovered inside and around the sealed room include those used in meat and skin processing, but there was no evidence of shell and bone carving (Figure 3). All these areas revealed several deer bones with signs of flaying, as well as residues of secondary reduction and carvings with perforators, which may have been used in the processing of skins. This combination, together with the unfinished shell and tooth ornaments, suggests that the residents were involved in the decoration and creation of crafts based on skins.

Casa de los Huesos

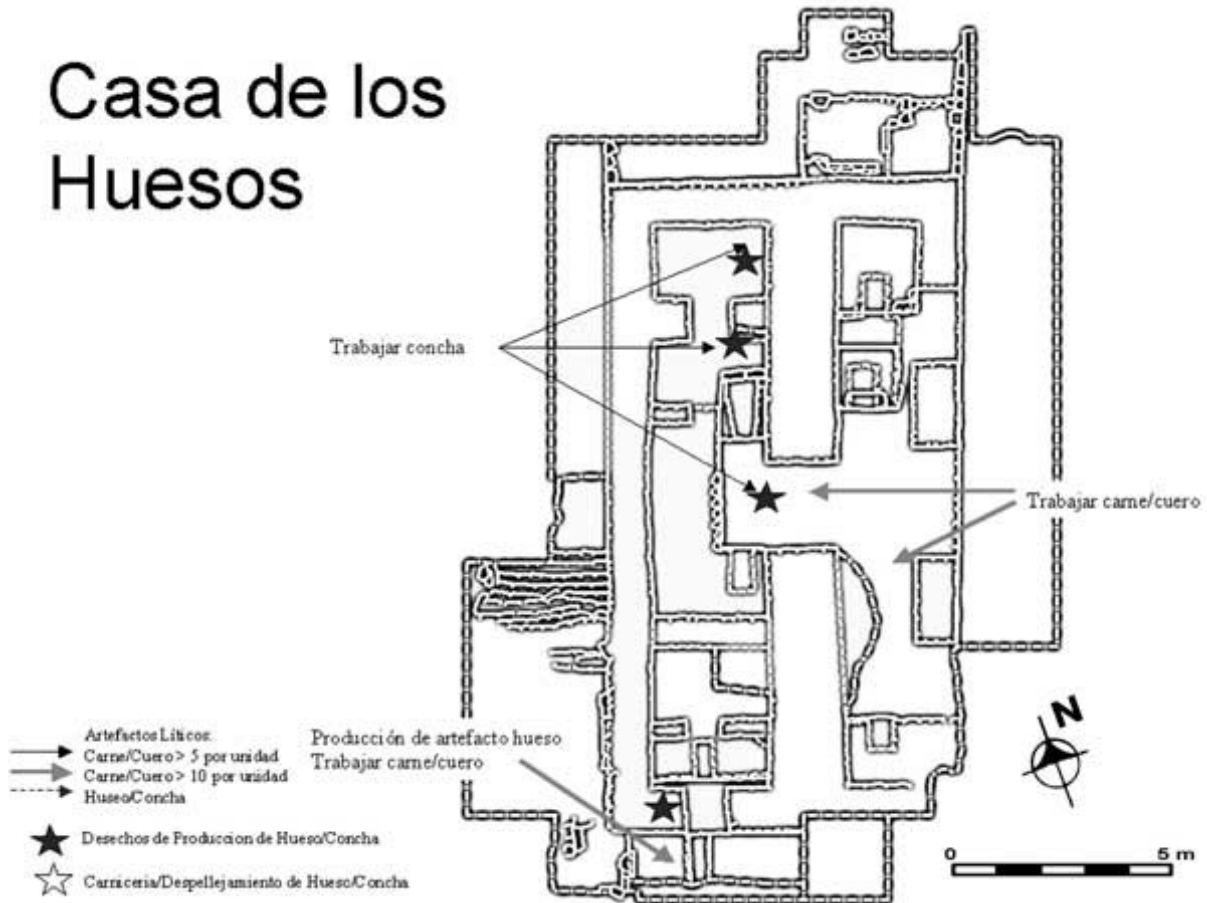


Figure 4. Location of modified remains of lithics, bones and shell at the House of the Bones.

M8-4 House of the Mirrors

In the southern room of Structure M8-4 a royal adornment was found consisting of several parts and in an unfinished condition, suggesting that the residents of this structure were involved in the manufacture of royal insignia (Inomata et al. 2002: 310-318). The structure offers the most abundant sample of elaboration material of bone and shell artifacts, in correlation with the lithic artifacts used for the carving and processing of bone and/or shell, and meat and/or skins (Figure 4). In fact, the percentage of use wear of shell and bone artifacts in this southern room is the highest one in the deposit. This is correlated with the finishing residues of shell ornaments (at the front), the reduction and finishing of bone plates (on the bench itself), and the residues of production and finishing of shells (at the back of the structure). It is possible that when the craftsman was forced to run away, he were engaged in the process of finishing several bone plates to ornament the insignia found there. The chert artifacts used to modify shell and/or bones, or meat and/or skins, were also found in the room located at the northern part of the structure and at north of the structure itself. Together with these artifacts, there was evidence of fauna corresponding to the elaboration of shell artifacts, to the reduction of horns and deer bones, and evidence of the butchery and flaying of a large mammal.



Figure 5. Location of the modified remains of lithics, bones and shell at the House of the Mirrors.

M8-8 – The House of the Axes

There is limited evidence of bone and shell carving in Structure M8-8, but there is plenty of more evidence regarding meat and skins processing. The lithic artifacts used to cut and carve shells and bones were found in the North Annex, at north of the structure and in front of the north room, together with shell residues, suggesting that some kind of production activity was taking place there (Figure 5). At the back of the central and north rooms there were lithic artifacts used to cut shell and bone, as well as evidence of the secondary elaboration of bone and deer horn artifacts, together with finishing residues (mainly from the elaboration of bone perforators). This suggests that the carving of bones and shells was accomplished at the back and in front of the storage room of the North Annex.



Figure 6. Location of the modified remains of lithics, bones and shell at the House of the Axes.

M8-10 – The House of the Scribe

Structure M8-10 was the residence of an elite scribe with strong connections with the royal family (Inomata and Stiver 1998:441). The rich garbage pit found at the side of the structure includes lithic artifacts used for cutting and carving bones and shells (Figure 6). Adjacent to them, there was a large amount of residues originated in the elaboration of bone perforators. Very surprisingly, all the bone carving remains and two shell remains are production residues. This collection of production residues includes samples of the four production stages (which is a rather unusual distribution compared to that of the other structures). In fact, all residues deriving from the production of bone artifacts originated in the primary elaboration of perforators. Like most of the other structures have (proportionally) large quantities of examples of the different stages involved in the production of perforators, it is possible that the craftsman of this structure was responsible for the primary elaboration of preforms of bone perforators, and that the finishing and final use took place somewhere else.

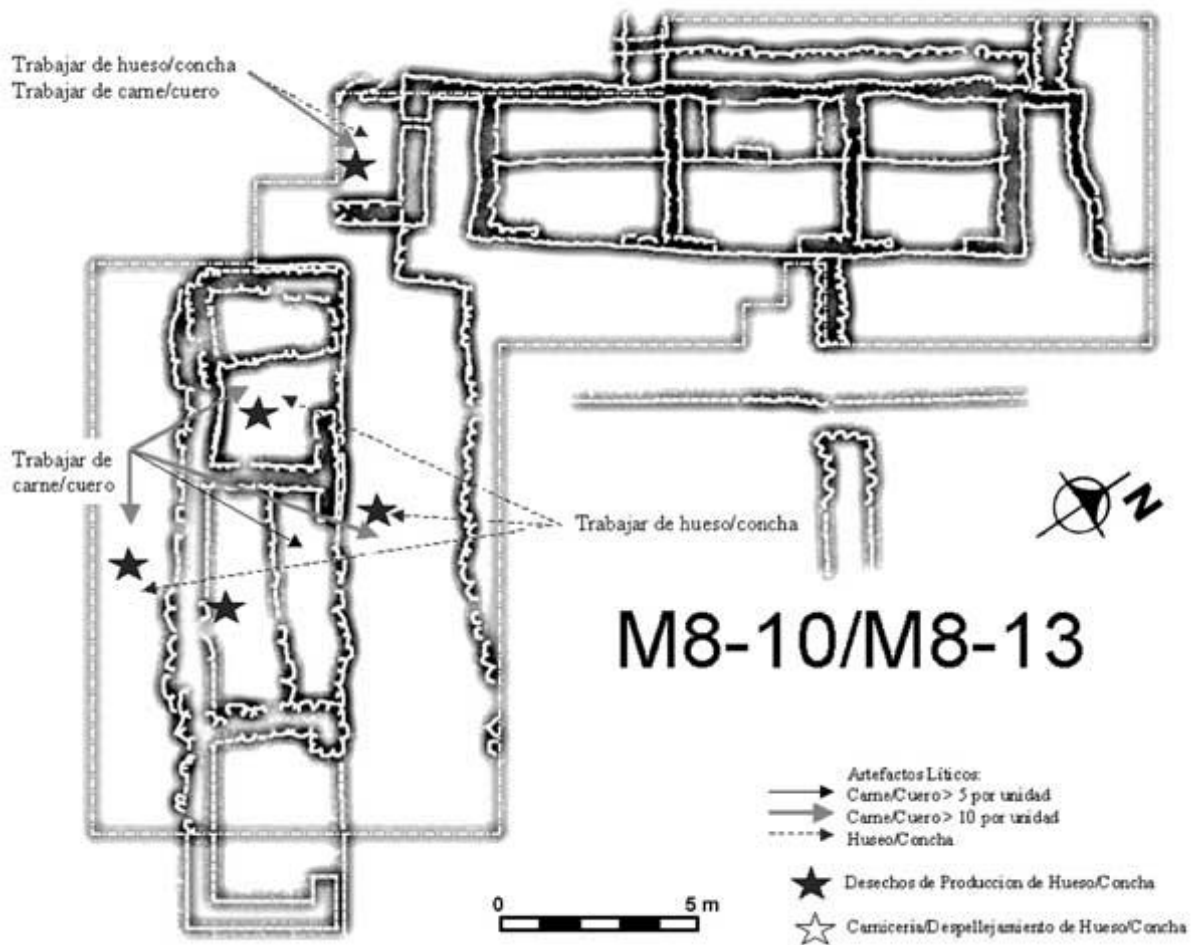


Figure 7. Location of the modified remains of lithics, bones and shell at M8-10/M8-13.

M8-13

Structure M-13 is smaller and of a poorer status than that of the other residences along the causeway, and in spite of being associated with M8-10, it was the residence of a separate family group (Inomata and Triadan 2003; Inomata et al. 2002:321). The traces of use found on the lithic artifacts of this structure suggest that the processing of meat or skins, the carving of bones and shells and other additional activities involved in subsistence, including cutting the grass and the excavation of earth, took place there. The distribution of lithic artifacts suggests that the carving of bone and shell was carried out in the east room, at the front of the structure, and possibly at its back (Figure 7). The animal remains, including those corresponding to reduction and to primary and secondary completions (mainly of perforators and preforms), show a perfect correlation. One example of the reduction of a shell ornament found in the central room suggests production activities not associated with the elaboration of bone artifacts. The distribution suggests that most likely the residents of these structure were also involved in the manufacture of bone artifacts, since the earliest and to the final stages of their production.



Figure 8. Location of the modified remains of lithics, bones and shells at the House of the Metates.

M7-34 – The House of the Metates

The House of the Metates has been defined by Inomata as a community house. There is little relation here between the lithic evidence and that of faunal remains (Figure 8). The sole carved animal fragment found around the structure was a segment of deer horn that had been recently removed from a skull found at the north of the structure. However, the evidence of wear of shell/bone, and of meat/skins carvings in lithic artifacts is abundant and is scattered around the structure. Notwithstanding the limited faunal evidence related to butchery works observed in this structure, there is abundant lithic and faunal evidence in the small front structure M7-91 and M7-92.

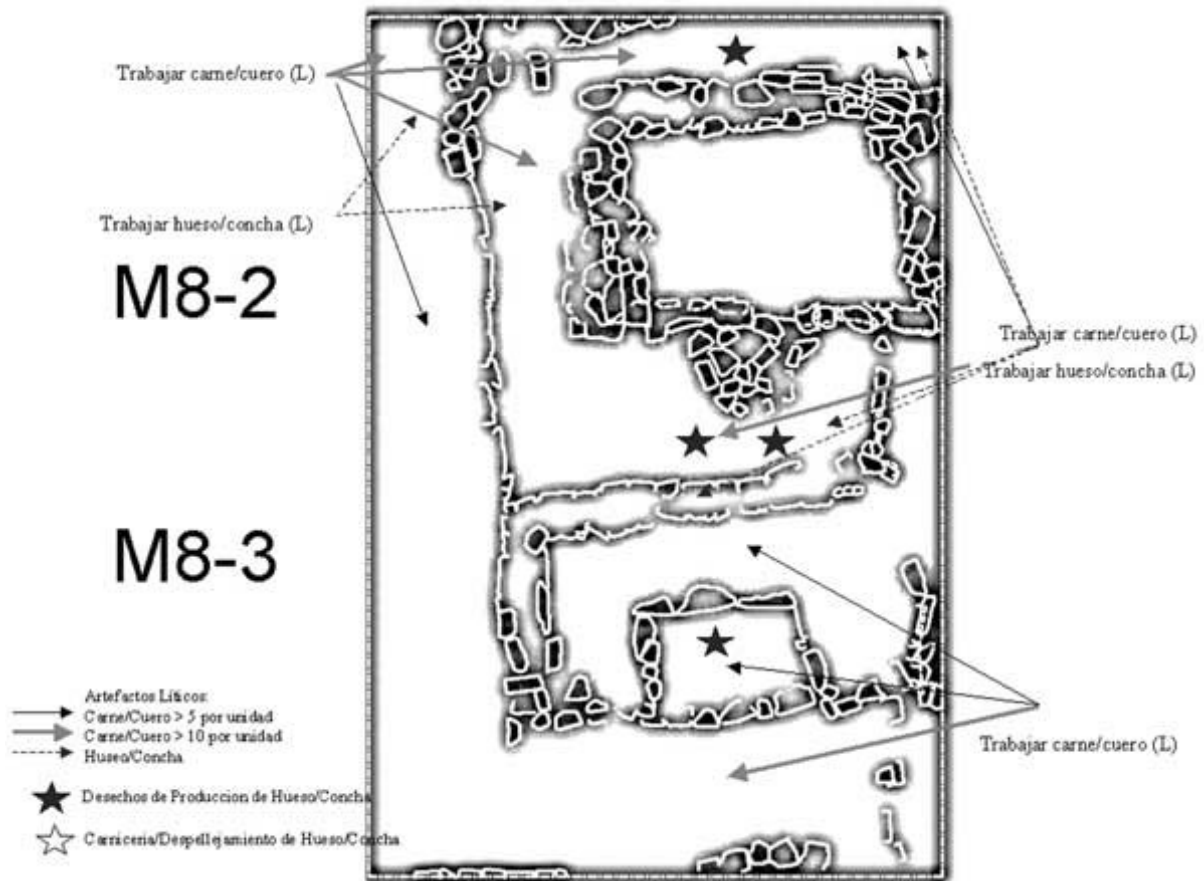


Figure 9. Location of the modified remains of lithics, bones and shell at M8-2/M8-3.

M8-2 and M8-3

Structures M8-2 and M8-3, small non-residential structures with one single room (Inomata and Triadan 2003), also revealed limited lithic evidence connected with the manufacture of bone and shell artifacts, though they featured an excellent correlation between the faunal and lithic evidence. Evidence of the finishing of shell artifacts was found inside Structure M8-3, and at the back of M8-2 (Figure 9). The evidence the finishing and reduction of bone artifacts was located at the front of Structure M8-2. The evidence of the production of lithic artifacts used to cut meat/skins and bone/shell was located at the back of Structure M8-2, and at the front of both structures.

DISCUSSION

The combined information of our analysis in Aguateca leads to posing several questions that are relevant to the crafts creations of the Maya elite. Were all social groups involved in the manufacture of crafts? In the first place, we should ask whether the elite members were craftsmen themselves. The answer derived from the study of wear traces on the artifacts considering animal parts and lithics, is that the

Maya elite residing there was involved in the elaboration of bone artifacts, skins and other textiles, as well as in the elaboration of shell ornaments. It is also clear that all courtiers and elite members, perhaps with the exception of the royal family, were involved in some type of crafts manufacture. However, not all residents were involved to the same degree. Despite the fact that there is good evidence of animal butchery works in the smaller structures, there is little evidence pointing to the elaboration of crafts.

Were they specialists? Perhaps it would be more important to ask ourselves whether each one of these craftsmen produced specific items for the use of the king or the community. Additional archaeological evidence suggests that each household had a specialization (as wood carvers, cutters of stelae, or scribes), but that these crafts specializations at times were coincident (Figure 10). Even though our evidence suggests that the majority of the residents had something to do with one stage or the other in the creation of crafts, using bone or shell, the subtle difference among the collections is important. If we only observe Structure M8-10 and 13, we see a significant number of examples of all the production stages, and particularly of the first stage of residues disposal. It is therefore hypothesized that the residents of these structures were specifically involved in the elaboration of preforms and bone perforators, for their subsequent reduction by other craftsmen. The collection of Structure M8-8 points to the elaboration and decoration of skins and textiles. Bone perforators in the second stage of finishing were found, but they were not formed as of bone cores. The collection of Structure M8-4 points to more generalized activities, and probably represents the elaboration of complex royal insignia.



Figure 10. Distribution of evidence of crafts specialization at Aguateca.

At the time of defining the craftsmen, this information leads to the question: who was the individual craftsman and where did he carry out his work? Inomata has suggested that the central rooms were used for ceremonies and gatherings, and that the other main rooms were used for domestic activities, for the manufacture of crafts, and to rest. Some other additional patterns were revealed in this study.

In many structures, most of the evidence of butchery activities, flaying, and bone reduction was located in the rooms and outer spaces left in the central room, as seen from the bench of the central room. Other artifacts found in these rooms point to the preparation and storage of food, as well as to textile elaboration. It is possible that the disorderly creation of crafts –as well as flaying, the initial elaboration of bone artifacts and the elaboration of skins – found in this room at left, was associated with the elaboration of food. Storage and some degree of production may have taken place in the annex at the left of the center, as well as some production at the front of the structure. Additional disposal of refuse and probably some storage activity may have taken place at the right of the center outside the structure, or either in the more distant annex. The elaboration of fine crafts may have taken place in the room at the right of the center, the one that was generally associated with resting and storage, and the one that probably was kept relatively clean.

Is it at all possible to infer the gender of these craftspeople? Would it be possible to assign them a gender? The ethnographic and ethnohistoric documents reflect an association between the Maya females and the preparation of food and the elaboration of textiles. If these activities were accomplished in association with the non-organized crafts manufacture, it would be possible to suggest that the slaughter of animals, the flaying and the initial reduction of bone may have been also accomplished by females. Aoyama's investigation suggests a wider sphere of female crafts production based on associations with the same points of localization of food production and textile elaboration. They not only include the crafts manufacture of bone and shell artifacts, but also the elaboration of pottery, wood crafts, and possibly stone carvings.

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Lithic materials from Aguateca	Lithic materials	Analyzed Micro-Wears	Interpretable Micro-Wears
Carved lithics (chert)	6.148	1.771	495
Carved lithics (obsidian)	2.168	1.153	954
Carved lithics (total)	8.316	2.924	38
Polished lithics	2.523	39	38
Total	10.839	2.963	1.487

Fauna at Aguateca	Total Group of Fauna	Group of Artifacts
Bone/Shell remains	9.510	0
Remains in the study areas	9.494	4.451
Finished artifacts	-	4.351
Production residues	-	100

Table 1. Total numbers of lithic materials and fauna at Aguateca.

Independent Use Zones (IUZ) of Lithic Artifacts	Meat/Skin Processing
Obsidian prismatic blades (IUZ 2192)	Cut/scrape 33.4% (#1 activity)
Chert (IUZ 722)	Cut/scrape/chop 46.1% (#1)
Chert flakes not retouched (IUZ 218)	Cut/scrape/drill/chop 54.6% (#1)
Bifacial thinning chert flakes (IUZ 118)	Cut/scrape 51.7% (#1)
Oval bifacial cherts (IUZ 130)	Cut/scrape 17.3% (#2)
Bifacial chert points (IUZ 162)	Cut/scrape 54.1% (#1)

Independent Use Zones (IUZ) of Lithic Artifacts	Bone/Shell Processing
Obsidian prismatic blades (IUZ 2192)	Cut/carve 0.1% (#4 activity)
Chert (IUZ 722)	Cut/saw/carve/engrave 17.5% (#2)
Chert flakes not retouched (IUZ 218)	Carve/cut/engrave 22.9% (#2)
Bifacial thinning chert flakes (IUZ 118)	Cut/carve/engrave 32.2% (#2)
Bifacial oval cherts (IUZ 130)	Cut 2.9% (#4)
Bifacial chert points (IUZ 162)	Cut/engrave/drill 11.5% (#3)

Table 2. Distribution of lithic evidence for meat/skin and bone/shell processing at Aguateca.

- Figure 1 Map of the Aguateca center, with a circle around its epicenter and center (map drawn by Inomata).
- Figure 2 Production stages of bone artifacts (based on studies of production residues in Petexbatun).
- Figure 3 Localization of modified remains of lithics, bones and shell at the House of the Masks.
- Figure 4 Localization of modified remains of lithics, bones and shell at the House of the Bones.
- Figure 5 Localization of modified remains of lithics, bones and shell at the House of the Mirrors.
- Figure 6 Localization of modified remains of lithics, bones and shell at the House of the Axes.
- Figure 7 Localization of modified remains of lithics, bones and shell at M8-10/M8-13.
- Figure 8 Localization of modified remains of lithics, bones and shell at the House of the Metates.
- Figure 9 Localization of modified remains of lithics, bones and shell at M8-2/M8-3.
- Figure 10 Distribution of evidence of craft specialization at Aguateca.