Stone Tools and the Elite Political Economy at Epiclassic (A.D. 650-900) Xochicalco

Research Year: 2002
Culture: Aztec
Chronology: Epi-Classic
Location: State of Morelos, México
Site: Xochicalco

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Abstract

This project examined the flaked stone artifacts from the elite zone of Xochicalco to explore (1) whether stone tools were produced in elite contexts, and if so, (2) what kinds of items were produced and (3) what does this tell us about the structure of Xochicalco's stone tool craft economy? The technological analysis of these artifacts did not indicate that they were made in the elite zone. To the contrary, most of the artifacts in the collection were probably made in Xochicalco's commoner core-blade workshops. It is most likely that the elites acquired these items, predominantly for domestic uses, in the

central market or via tribute arrangements. Consequently, Xochicalco's stone tool economy was primarily oriented towards the production of utilitarian tools in workshops relatively independent of elite control. The size and character of the elite collection also supports earlier conclusions that obsidian was a scarce resource at the site. This may be why the elites did not invest in the production of non-utilitarian implements related to ritual or social status. In sum, the craft production of stone tools does not appear to have been an important component of the elite political economy at Epiclassic Xochicalco.

Resumen

Este proyecto analizó los artefactos de piedra lasqueada de la zona de la élite de Xochicalco para investigar (1) si se fabricaron herramientas de piedra en contextos de la élite, y si fue así, (2) qué tipo de herramientas se fabricaron y (3) qué nos dice esto acerca de la estructura de la economía artesanal de las herramientas de piedra en Xochicalco? El análisis tecnológico de estos artefactos no indicó que fueron hechos en la zona de la élite. Por el contrario, la mayoría de los artefactos en la colección se hicieron probablemente en los talleres plebeyos de núcleos poliédricos de Xochicalco. Es muy probable que la élite adquiriera estos artículos, predominantemente para usos domésticos, en el mercado central o por vía de arreglos tributarios. Por consiguiente, la economía de herramientas de piedra en Xochicalco se orientó primordialmente hacia la producción de herramientas utilitarias en talleres relativamente independientes del control de la élite. El tamaño y carácter de la colección de la élite también confirma las conclusiones anteriores de que la obsidiana era un recurso escaso en el sitio. Esto puede explicar el por qué las élites no invirtieron en la producción de utensilios no-utilitarios relacionados a usos rituales o estatus social. En resumen, la producción artesanal de herramientas de piedra no parece haber sido un componente importante en la economía política de la élite del Epiclásico de Xochicalco.

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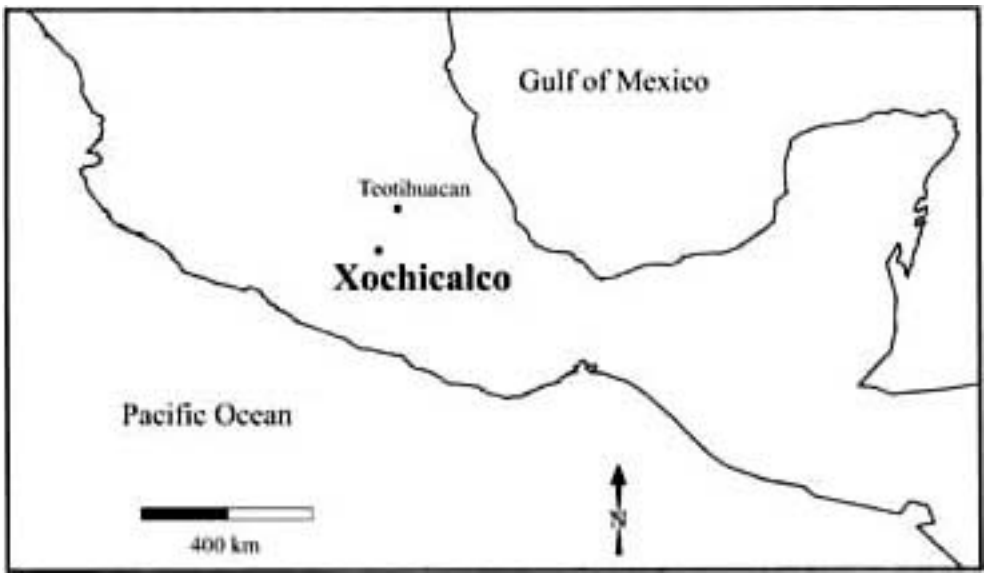

Figure 1. Location of Xochicalco in Mesoamerica.

Introduction

The objective of this project was to analyze the flaked stone artifacts recovered in the elite zone of Xochicalco (Figure 1, shown above) by the Proyecto Especial Xochicalco[1] (González Crespo and Garza Tarazona 1995). This analysis was structured around three questions: (1) were stone tools produced in elite contexts, and if so, (2) what kind of items were produced and (3) what does this tell us about the structure of Xochicalco's stone tool craft economy? The assemblage indicates that there is little evidence of stone tool production in the elite zone. In tandem with earlier research (Hirth 1998, 2002; Hirth et al. 2000), these findings imply that Xochicalco's stone tool craft economy was primarily oriented towards the production of utilitarian implements in commoner domestic workshops. It is probable that the elites provisioned themselves with such items via the market or tribute, or both. Furthermore, this analysis supports the interpretation of obsidian scarcity at Xochicalco (Hirth 2000). The following discussion describes the elite assemblage and then reviews what it indicates about life at Epiclassic Xochicalco.

The Assemblage

The elite flaked stone assemblage consists of 2,331 artifacts that were classified into items produced by core-blade, lapidary, and bifacial technologies (Table 1). Most of them are made of gray obsidian (89%, N = 2,080), but green obsidian (8%, N = 190), chert (3%, N = 59) and red obsidian (>1%, N = 2) are also represented. Michael Glascock at the Missouri Research Reactor also sourced 75 gray obsidian artifacts in the sample using neutron activation (Table 2). The results indicate that nearly 70% of

[1] The Proyecto Especial Xochicalco directed by Norberto González was carried out in 1993 and 1994.

the gray material came from the source of Ucareo, Michaocán located about 200 km northwest of the site.

Table 1. The Elite Zone Assemblage					
Technology	**Green**	**Grey**	**Red**	**Chert**	**Total**
Core-blade	116	1,804	0	0	1,920
Lapidary	0	16	0	0	16
Bifacial	68	190	2	48	308
Unknown	6	70	0	11	87
Total	**(8%) 190**	**(89%) 2,080**	**(>1%) 2**	**(3%) 59**	**2,331**

Table 2. Percentage Distributions of the Gray Obsidian Sourced with Neutron Activation	
Source	**Percent of Sample**
Ucareo, Michoacán	68% (N = 51)
Otumba, State of México	15% (N = 11)
Zacualtipán, Hidalgo	12% (N = 9)
Tulancingo, Hidalgo	3% (N = 2)
Zaragosa, Puebla	1% (N = 1)
Peredon, Puebla	1% (N = 1)
Total	**N = 75**

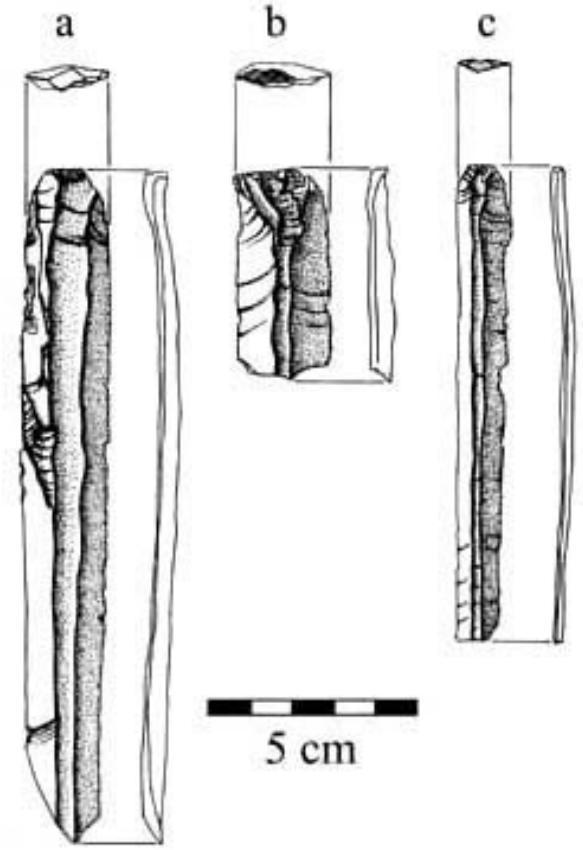

Figure 2. Pressure blades (sections with intact platforms): (a) segment with single facet platform, (b) segment with cortical platform, (c) segment with ground platform.

The sample contains 1,920 core-blade[2] artifacts (Table 1). The remainder consists of 308 bifacial artifacts and only 16 lapidary artifacts. All of the core-blade artifacts are obsidian; 1,804 (94%) of them are gray and 116 (6%) are green (Table 1). The majority of these artifacts are standardized, parallel-sided blade segments (N = 1,314, Table 3) with prismatic cross-sections that were produced with pressure techniques (Figure 2). Examination with a 10x hand lens of a sample of segments (N = 830) revealed clear evidence of use-wear on 43% (N = 348) of them (Figure 3). The assemblage also contains formal tools such as projectile points and needle-tipped implements (Figure 4)

[2] The Mesoamerican core-blade technology involved shaping a large cylindrical core commonly made of obsidian to make parallel-sided blades that were used for numerous cutting tasks or made into tools. Although described briefly here, a more detailed treatment of the technology can be found elsewhere (Clark and Bryant 1997, Hirth and Andrews 2002). The initial part of the sequence involved percussion techniques. The first step was to make a single facet platform by removing a large flake and then remove a series of flakes to produce a macrocore. These items were then reduced to make relatively large blades with prismatic or triangular cross-sections. The reduction of macrocores eventually gave way to a polyhedral core that was subsequently transformed into a prismatic core using pressure techniques. This latter pressure phase of the sequence yielded smaller and more standardized parallel-sided prismatic blades. The pressure phase evident in Xochicalco's commoner workshops (Hirth et al. 2000) indicates the performance of one or more sequential platform rejuvenations designed to prolong the use-life of a core (Hirth et al. 2000). Data from the commoner workshops indicate that the single facet platforms entering Xochicalco were almost immediately rejuvenated with pecked and ground surfaces.

that were made from pressure blades (N = 464, Table 3). The remaining core-blade artifacts are cores, core fragments (N = 9, Table 3), and artifacts related to the rejuvenation of core platforms (N = 133, Table 3, Figure 5). Most of the core-blade artifacts appear to be items used for utilitarian tasks although a few of them like the needle-tipped segments may have had ritual significance (i.e. blood-letting).

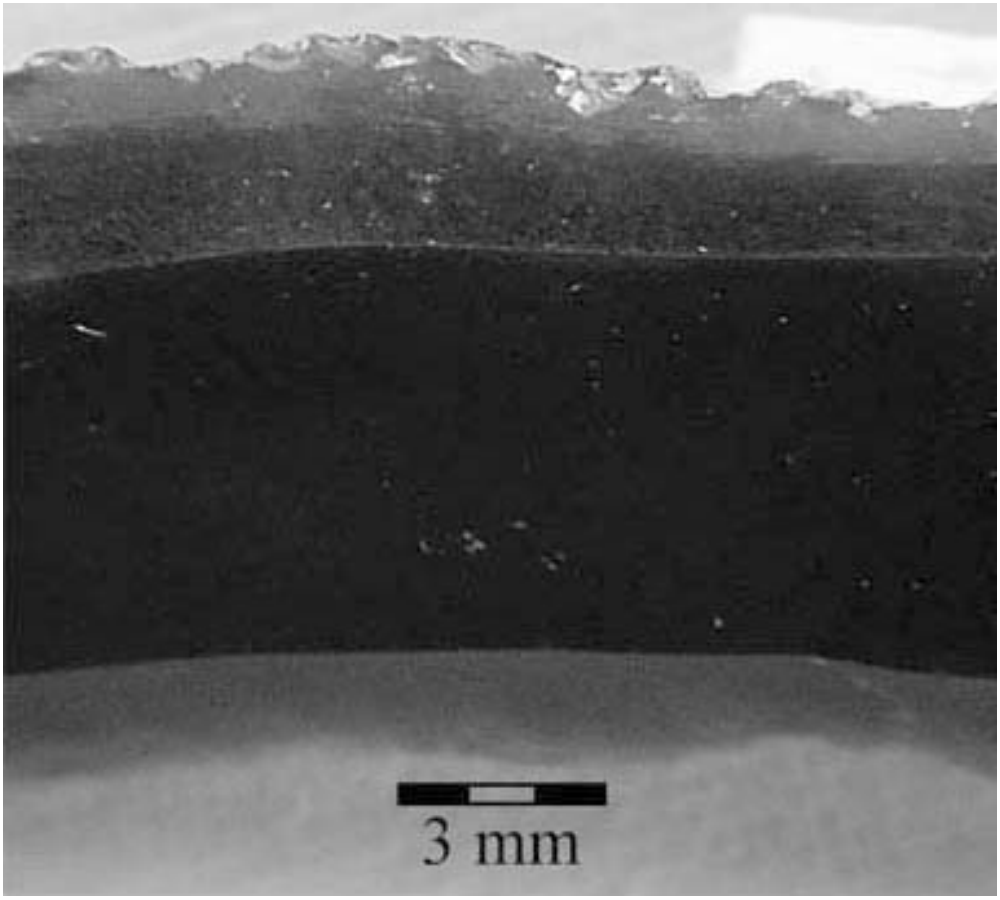

Figure 3. Magnified photo of a blade segment with clear evidence of use-wear (note chipping and light polished zone along upper edge).

Table 3. Gray and Green Obsidian Core-blade Artifacts

Core-blade Technology	Grey	Green	Total
Pressure blade segments	1,234	80	1,314
Blade tool artifacts (points, eccentrics, needle tips, etc.)	430	34	464
Blade cores and blade-core fragments	9	0	9
Core platform rejuvenation artifacts	131	2	133
Total	**1,804**	**116**	**1,920**

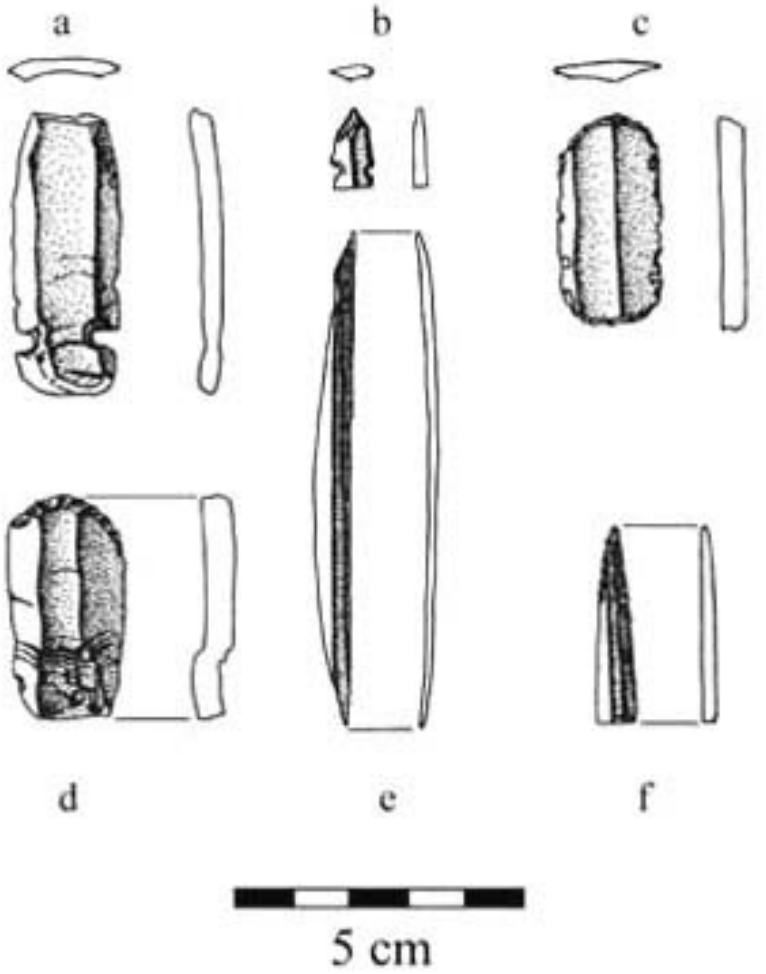

Figure 4. Formal tools made of pressure blade segments: projectile points (a & b), end-modified scrapers (c & d), needle-tipped segments (e & f).

The assemblage did reflect evidence that lapidary[3] techniques were used to make beads in the elite zone (Figure 5, g & h). This interpretation is supported by beads in various stages of production (some exhibit evidence of blade facets on their lateral sides, Figure 5, g). Two eccentrics and one small projectile point (Table 4) also exhibited grinding (Figure 6) that may have been applied in the elite zone.

The majority of artifacts made with a bifacial technology[4] are formal tools and implements (Table 5). Although the majority of these tools are made of obsidian[5] (84%,

[3] Mesoamerican lapidary technology consisted of the production of aesthetic items such as ear spools, lip plugs, and beads with pecking, grinding, and polishing techniques (Otis Charlton 1993).

[4] Bifacial reduction involves the manufacture of tools or ritual implements by removing flakes from two sides of a piece of stone. The same flaking techniques associated with this technology, however, can also be applied to only one side of a flake or blade to produce unifacial artifacts. Consequently, the unifacial tools in the assemblage that are not made from pressure blades are classified as bifacial artifacts.

N = 260), some are made of chert (16%, N = 48). Various corner-notched, side notched, and flat or concave base (N = 6) projectile points are represented (Table 5, N = 88, Figure 7). There are also numerous bifaces and large eccentric fragments that lack the notching and formal shaping associated with projectile points (Table 5, N = 198). In addition, a few unifacial implements (flaked on only one side) were identified in the assemblage (Table 5, N = 5). A few of these obsidian artifacts may have had ritual or status related significance (Figure 6, and Figure 8 & Figure 9), but the mundane characteristics of most of them indicate they were used primarily for utilitarian purposes. The remaining bifacial artifacts are made of chert and consist of an irregularly shaped flake core, a hammerstone, and several flakes (Table 5). These may represent limited production related to expedient use.

Table 4. Lapidary Artifacts

Lapidary Technology	Gray Obsidian
Beads-derived from "exhausted" blade cores	13
Ground eccentrics	2
Ground pressure blade hafted points	1
Total	**16**

Table 5. Bifacial Artifacts made of Gray, Green, and Red Obsidian and Chert

Bifacial Technology	Grey	Green	Red	Chert	Total
Projectile Points	46	14		28	88
Bifacial implements	136	54	2	6	198
Unifacial implements	4			1	5
Cores				1	1
Hammerstones				1	1
Flakes	4			11	15
Total	**190**	**68**	**2**	**48**	**308**

[5] Many of the obsidian bifacial artifacts (41%, N = 81) exhibit attributes indicating that they were fractured due to thermal stress. Such damage was probably incurred when the site was burned prior to abandonment (González Crespo and Garza Tarazona 1995:100). Although a few of the blade segments also exhibit this damage, it is more prevalent on the thicker biface artifacts because their interiors heat slower than their exteriors resulting in the thermal contraction responsible for crazing fractures.

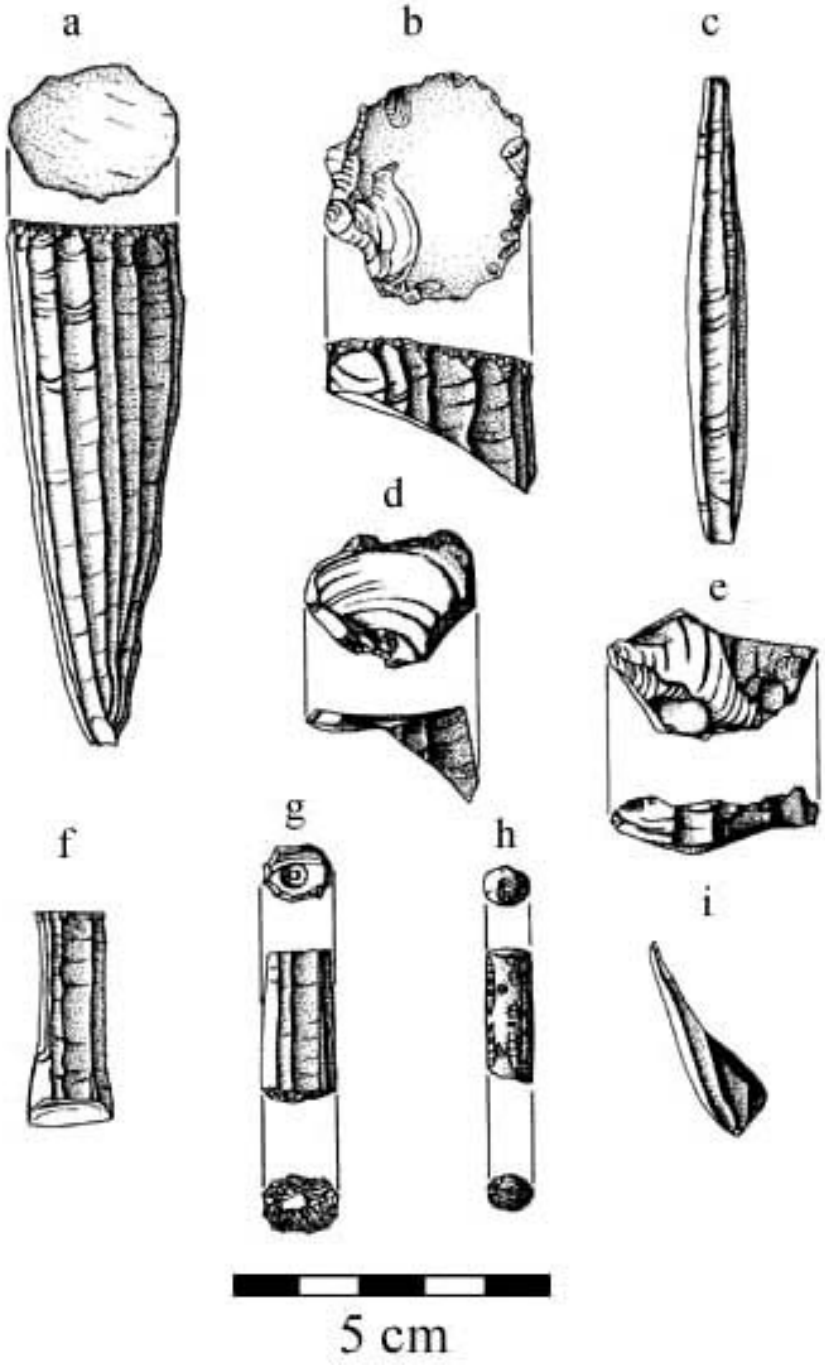

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Figure 5. Core artifacts: core with single facet platform (a), core top with single facet platform (b), "exhausted" core with ground platform (c), core section flakes (d & e), core top with ground platform (f), beads made of core sections in process of production (g & h), distal orientation flake (i).

Figure 6. Large eccentric ground with lapidary techniques.

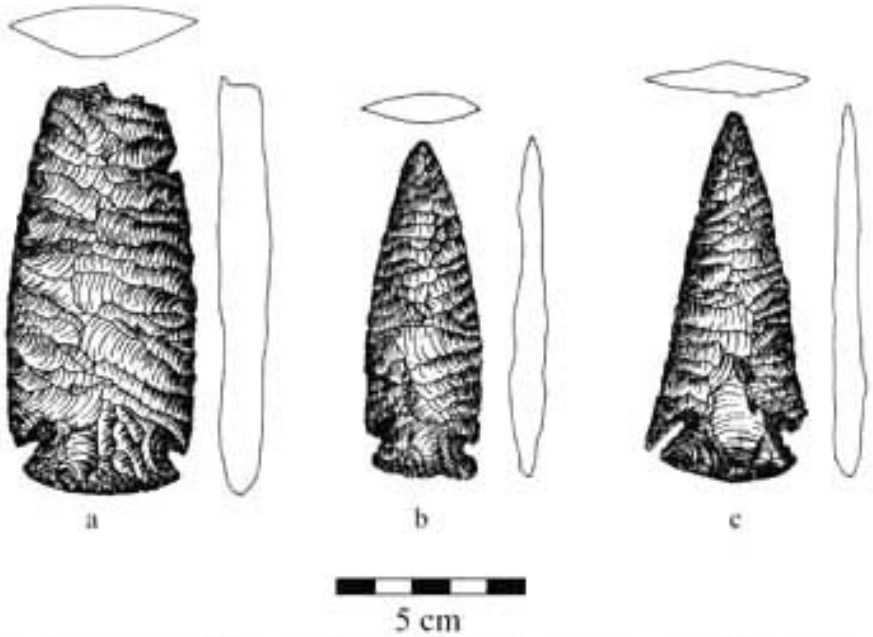

Figure 7. Obsidian projectile points made with bifacial flaking techniques: corner-notched (a & c), side-notched (b).

Figure 8. Large bifacially worked "sacrificial" knife.

Figure 9. Large bifacially worked eccentric.

Discussion

The stone tool assemblage from the elite zone of Xochicalco supports at least two interesting inferences relating to (1) the organization of its stone tool craft economy, and (2) the availability of obsidian raw material at the site. The production of stone tools appears to have been primarily organized and carried out in commoner workshops, not in the elite zone of the site. The elite artifacts do not reflect much production because they are predominantly (90%, N = 2,099) informal blade-derived tools and various formal tools. In PreColumbian Mesoamerica, pressure blades were snapped into smaller segments and used for many utilitarian and ritual tasks. As such, they represented the most important informal cutting tool for at least 2000 years (Hirth and Flenniken 2002). The use of blade segments as informal tools by Xochicalco's elite is supported by the observation of use-wear on 43% (N = 348) of a sample of 830 of them.

Since this sample was examined with a 10x hand lens, the real percentage of segments with use-wear is undoubtedly much higher.

The formal tools in the elite assemblage include pressure blade and bifacially derived projectile points, modified blades, bifaces, unifaces, a core, and a hammerstone that were all flaked or shaped into specific forms. Beads produced using lapidary techniques also represent formal implements. The remaining 10% of the assemblage is core and core rejuvenation artifacts (N = 130), flakes primarily indicating chert reduction (N = 15), and a few un-diagnostic artifacts (N = 87) consisting of flake fragments, chunks, and shatter (Table 6).

Table 6. Assemblage Composition According to Tools and Production Debitage

Artifact Categories	Total
Informal and formal tools	2,099
Core and platform rejuvenation artifacts	130
Flakes (bifacial production?)	15
Unidentifiable artifacts	87
Total	**2,331**

In contrast, collections from the commoner core-blade workshops excavated by Hirth (1995) are strikingly different. They have much lower percentages of informal and formal tools and a higher percentage of artifacts related to core rejuvenation (Hirth 2002). They also contain thousands of unidentifiable flake fragments, chunks, and shatter that are always ubiquitous in collections reflecting stone tool production. Finally, a high magnification study of blades from these workshops indicates that only 10% show evidence of use-wear (Costanzo 1997).

What is interesting about the core and core rejuvenation artifacts in the civic-ceremonial assemblage is that it reflects the same technology that is found in the commoner workshops.[6] Accordingly, limited core-blade production may have occurred in the elite zone. It is doubtful, however, that the quantity of production-related artifacts from this area is high enough to infer the presence of resident craftsmen. It is more reasonable to suggest that craftsmen from the commoner workshops occasionally went to the elite

[6] The artifacts in the commoner core-blade workshops excavated by Hirth (1995, 2002; Hirth *et al*. 2000) indicate that relatively small single facet cores entered the site and then underwent multiple platform rejuvenations in which they were resurfaced with pecked and ground platforms. This process produced numerous unique artifacts including core tops (Figure 5 b), split platform flakes, core section flakes (Figure 5 d & e), platform preparation flakes, and what are referred to as distal orientation flakes (Figure 5 i). The frequency and character of these artifacts represent a technology that is presently considered unique to Epiclassic Xochicalco.

precinct to make blades for the elites. This would have been similar to the labor levies imposed in the commoners by Aztec nobles (Carrasco 1978; Hicks 1976; Zorita 1963) and in line with the precinct model of production that has been suggested for Classic period (A.D. 150-700) Teotihuacán (Spence 1981).[7] The percentages of the different types of core rejuvenation artifacts in the elite assemblage, however, are not the same as those in the commoner workshops so I believe that blades were probably not made in this part of the site.

Alternatively, the limited obsidian core and core rejuvenation artifacts in the elite assemblage may have been obtained in the marketplace. These artifacts could have facilitated specific uses because of their unique shapes (Figure 5, b, d, e, & i).[8] Research has revealed that the market was a firmly established institution at Epiclassic Xochicalco and probably was where most of the city's citizens acquired the tools made in the city's commoner workshops (Hirth 1998). The array of artifacts in the elite assemblage suggests the elites may have done the same.

Evidence for the production of the few large formal bifacial tools (Figure 7) at Xochicalco has not been documented at the site. It is possible that the handpicked collection strategy used during the Proyecto Especial Xochicalco missed the smaller flakes[9] generally associated with bifacial production. This seems unlikely, however, because measurements taken on 1,768 artifacts in the elite assemblage indicate that 19% (N = 328) of them have maximum dimensions of 2 cm or less. Artifacts from Xochicalco's commoner workshops also do not indicate bifacial production.[10] The working hypothesis is that these implements were made elsewhere and imported into Xochicalco (Hirth *et al.* 2000).

Consequently, the overall composition of the elite assemblage suggests that the Xochicalco elites provisioned themselves with obsidian tools primarily in the market or the exaction of tribute. This indicates that the production of stone tools at Xochicalco was an integrated system whereby commoner craftsmen supplied the needs of the entire society.[11] These needs were predominantly utilitarian; evidence for the production or use of ritual or status-related flaked stone implements is extremely limited.

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[7] Michael Spence has suggested that the evidence for stone tool production in the elite contexts Teotihuacán was conducted as a form of labor tax by commoner craftsmen who did most of their knapping in commoner workshops scattered throughout the city.

[8] Some of the core rejuvenation artifacts in the elite assemblage show clear evidence of use-wear and/or retouch.

[9] It is important to point out that bifacial thinning flakes are not always small. Regardless of their size, however, they also have distinct technological attributes that were identified on only a very small percentage of the artifacts from the elite zone and the commoner workshops.

[10] Thousands of small flakes were collected during the excavations of Xochicalco's commoner core-blade workshops by screening all the material through 1/8" mesh; few of the flakes reflected bifacial reduction (Hirth 1995).

[11] The spatial organization of Xochicalco's commoner core-blade workshops also may be consistent with the urban structure of the site. All four workshops are situated in separate areas that appear to have been occupied by distinct kin-groups (Hirth 1989). If so, then this may indicate that certain households in these larger kin units specialized in the production of certain items. Similar evidence of this organization has been reported for Teotihuacán (Sheehy 1992; Spence 1981) and may hold true for other areas of Mesoamerica. The nucleated grouping of larger kin units that maintained strong ties with hinterland communities may be one of the outstanding hallmarks of New World urbanism (Hirth 2000). This type of system may have also exerted a strong influence on how specialized production was spatially organized in Mesoamerican urban centers.

The elite assemblage is also consistent with previous conclusions about the availability of obsidian at Xochicalco (Hirth 2002). A total of 2,331 flaked artifacts from the large elite area are small for an impressive site like Xochicalco. The hand picked recovery strategy used during the Proyecto Especial Xochicalco undoubtedly missed some flaked stone artifacts. However, even if only 10% of them were retrieved, then the elite zone would have had around 20,000 artifacts. This pales in comparison to the more than 500,000 obsidian artifacts retrieved from the commoner core-blade workshops.

Obsidian appears to have been scarce because of the distance it traveled to the site and technology that was used to reduce it. The majority of obsidian in the commoner workshops came from Ucareo, Michoacán (64.7%) and Zacualtipán, Hidalgo (21.1%), both about 200 km away (Hirth 2002:83). The elite assemblage also shows a predominance of Ucareo obsidian (68%, Table 2).[12] We know from the artifacts in the commoner workshops that obsidian arrived as partially reduced pressure cores, not large "macro-cores." This suggests that its movement across the landscape was restricted. Hirth (2002:88) has inferred that itinerant, blade-producing merchants traveling throughout central México may have brought these cores to the site. Besides making blades wherever they stopped, they also could have exchanged used cores that they longer wanted to reduce any further. This would explain why the core-blade technology at Xochicalco involved the reduction of small cores. Furthermore, the platforms of many cores were rejuvenated many times to extend their use-lives. This suggests obsidian was scarce and was intensively processed to produce as much cutting edge as possible. A general raw material scarcity, therefore, would be consistent with numerically limited assemblages of obsidian regardless of whether the users were elites.

Another thing worth considering is why there are so few flaked stone implements related to ritual or prestige. The assemblage has few impressive artifacts (Figure 6, Figure 8, and Figure 9) especially compared to those known from Teotihuacán (Parry 2002). This indicates that flaked stone implements were not a prominent medium of symbolic capital for the Xochicalco elites. This interpretation fits the inference of obsidian scarcity because large bifacially produced artifacts require a great deal of raw material. The constraints limiting the availability of obsidian at Xochicalco may be one good reason the elites were not involved in the production of obsidian artifacts that could have been used to reinforce their social status.

[12] The neutron activation analysis of artifacts from the elite assemblage shows Otumba obsidian from the State of México as the second most prevalent type of gray obsidian. This is a sampling bias. We still do not know where the large bifacial artifacts at Xochicalco were made. Therefore, 15 biface fragments were selected for sourcing in order to begin exploring this issue (10 of these turned out to be made of Otumba). Given the percentage of bifacial artifacts in the assemblage, it is likely that a more stratified sample would have indicated that Zacualtipán obsidian was the second most prevalent variety in the collection.

Conclusion

The chipped stone tools found in Xochicalco's elite zone reflect their use primarily for utilitarian purposes. There is little evidence indicating that they were made in this area of the site. Consequently, the Xochicalco elites do not appear to have exercised any direct control over stone tool production. Rather, they provisioned themselves with tools produced in the commoner workshops. Commoner craftsmen may have come to the elite precinct to make tools but it seems more likely that the elites acquired their tools in the market like everybody else. These conclusions indicate that stone tool production was not part of the elite political economy at Xochicalco. This finding is important from a comparative perspective because data from other Highlands sites like Teotihuacán (Santley 1983) and Monte Albán (Blanton 1978) indicate more elite involvement in this type of craft production. Things may have been different at Xochicalco in large part because of the scarcity of obsidian at the site. Further analysis of these data will permit a more detailed exploration of these issues.[13]

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[13] A more detailed description of the elite assemblage is being prepared for the journal Arqueología published by the Instituto Nacional de Antropología e Historia, México City (*La herramienta lítica de Xochicalco: las implicaciones del conjunto élite*). An in depth comparison of the elite assemblage and the commoner workshops is being done to see what it tells us about stone tool production and the organization of Xochicalco's urban economy. This is being prepared for journal submission and presentation at the SAA meetings in April 2003 (*Altepetl Economics: The Integrated Stone Tool Economy of Epiclassic Xochicalco*).

Figure 4. Formal tools made of pressure blade segments: projectile points (a & b), end-modified scrapers (c & d), needle-tipped segments (e & f).

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