Elite Household Subsistence at Aguateca, Guatemala

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ABSTRACT

Horizontal excavations of six rapidly abandoned elite structures in the epicenter of the Late Classic site of Aguateca provided an unprecedented inventory of *in situ* artifacts, including ceramic and groundstone assemblages. These data not only allow an interpretation of the use of these structures and the composition of Late Classic Maya households, but also an assessment of food processing and food storage capacities. On a larger scale they may contribute to explaining the organization of the subsistence economy in the Maya lowlands in Late Classic times. Furthermore, these *in situ* assemblages may also provide material correlates that aid in the interpretation of the functions and use of structures at gradually abandoned sites.

Key words: Elite Maya subsistence, economic organization, food storage, food processing.

RESUMEN

Excavaciones horizontales realizadas en seis estructuras de élite rápidamente abandonadas del epicentro del sitio de Clásico Tardío de Aguateca han proporcionado un inventario de utensilios *in situ* sin precedentes, incluyendo cerámica y conjuntos de molienda. Tales datos no solo permiten una interpretación del uso de estas estructuras y de la composición de los conjuntos habitacionales del Clásico Tardío maya, sino también una evaluación del procesado de alimentos y la capacidad de almacenamiento de los mismos. En una escala mayor estos datos pueden contribuir a explicar la organización de la economía de subsistencia en las Tierras Bajas Mayas durante los tiempos del Clásico Tardío. Además, estos conjuntos *in situ* pueden asimismo proporcionar material comparativo que ayude en la interpretación de las funciones y el uso de estructuras en sitios abandonados de una forma gradual.

Palabras clave: Subsistencia de la élite maya, organización económica, almacenaje de alimentos, procesado de alimentos.

In addition to the production or procurement of foodstuffs, food storage, and food processing are basic subsistence activities. The storage of surplus food provides a buffer against famine, whereas food processing is often required to make food edible, digestible, palatable or to enhance its nutritional value. Although food storage and processing do not provide direct evidence of how food production was organized, they do contribute information about the economic and political organization of the people who are engaged in these activities (see Smyth 1989, 1991).

The ability to produce an agricultural surplus that is, food produced beyond immediate consumption needs, is seen as an important step in the development of complex societies (Adams 1966; Childe 1950; Sanders and Price 1968). Even though models vary as to cause and effect, depending on the theoretical bend of the researcher, most of them postulate that control over agricultural lands and surplus foods eventually leads to economic inequality, increasing power of fewer people, and ultimately social stratification (Blanton 1978; Carneiro 1970; Flannery 1972; Sanders 1973; Sanders and Price 1968; Sanders *et al*. 1979; Santley 1984). Storage is an important factor in this process, because it is the basis for maintaining and utilizing food surpluses for extended time periods.

Smyth (1989: 91-93) defines three storage systems for neolithic societies: domestic, community, and central storage. Domestic storage is household based and provides a buffer for food shortages. In some cases it may be used to fulfill a households' requirement to contribute to the generation of state surpluses (Smyth 1989:92-93) or to maintain non-food-producing elites. Community storage is a more centralized form of storage that may require the construction of substantial storage structures. Surpluses may be used to fulfill community obligations to local elites or to pay extra-community taxes or tributes (Smyth 1989: 92). They may also be used for local food redistribution in cases of food shortages. Central storage is a highly centralized form of storage. Large amounts of food and other goods are controlled and administered by government bureaucrats and stored in large government facilities that are often attached or close to administrative complexes (Smyth 1989: 91). These goods are extracted by various means of government coercion, such as tribute, taxation and labor.

In this model community and central storage, are linked to political centralization and power (Smyth 1989: 97). Domestic storage is the most basic storage system in societies that depend heavily on agricultural products for their subsistence. It is widely used to ensure household food supplies, to provide seeds for the next crop, to guard against unpredictable crop shortfalls and as an investment strategy where food can be sold or bartered after harvest, when prices are higher (Ashimogo 1995; Coulter and Magrath 1994; Smyth 1991). For instance, in the North American Southwest the Zunis, whose main subsistence crop was maize and who farmed in a marginal environment, stored enough maize to feed a household for about two years (Stevenson 1904: 353).

As mentioned above, food processing often is a basic step to make food edible and digestible. Most studies of Classic Maya paleodiets have shown that during Late Classic times one of the main food sources was maize (Coyston *et al.* 1999; Reed 1999; White and Swarcz 1989; Whittington 1999; Whittington and Reed 1997; Wright 1997a, 1997b). Maize is deficient in two essential amino acids, lysine and tryptophan. This deficiency can be remedied by adding animal protein or legumes such as beans to the diet, which are a good source for both of these amino acids. Modern nutritional studies have shown that for adults about 70% maize and 30% beans in the diet provide the best high-protein mixture to avoid lysin/tryptophan deficiencies (FAO 1992: 117, 121). Today's Maya are heavily dependent on maize. The processing of the grain usually involves treatment with lime. Shelled maize is cooked in a solution of burned lime and water from 30 minutes to an hour. In most cases the mixture is then left to soak overnight. The next day the maize is washed in clear water to remove the excess lime and then ground. Traditionally this was done with a stone mano on a stone metate. The lime treatment helps to remove the hard outer shell of the kernels which increases intestinal iron (Fe) and zinc (Zn) absorption and improves the nutritional value of the maize by increasing the available amount of the deficient amino acids (Bressani and Scrimshaw 1958; Bressani *et al.* 1958). It also adds a significant amount of calcium (see Wright 1999: 206-209). It his highly likely that the prehistoric Maya used a similar process to prepare maize for consumption. They certainly used the same grinding implements.

One of the questions is, however, which segments of society engaged in domestic storage and food preparation. Was it only the peasant farmers, or did higher ranking households also store food surpluses and process their own food? With evolving political complexity elites may have gained control over food surpluses, but they also may have become more and more detached from everyday activities. They may have had retinues of servants who prepared their food away from living quarters. Also, food may have been stored in a more central place, maybe in the royal palace complex itself to allow the royal family control over dependent elites. In this case one would expect storage structures or rooms within the palace complex. However, those facilities, if found in the archaeological record could of course also mean domestic storage, albeit by the royal household. In the following section I will examine storage and food processing activities in elite households at Aguateca. These activities may contribute some information regarding these questions.

THE LATE CLASSIC CENTER OF AGUATECA

Aguateca is located in the Petexbatún region in the tropical lowlands of the southwestern Petén in Guatemala (Inomata and Sheets in this issue: Figure 1). It was a major center of that region and served, together with Dos Pilas, as the capital of the Dos Pilas/Aguateca polity (Houston 1993). The site sits on top of a steep escarpment that forms the eastern side of the Petexbatún horst. This naturally defensive position is augmented by a deep chasm that runs parallel to the escarpment through the site center.

The occupation at Aguateca dates mostly to the latter part of the Late Classic period, from about A.D. 700 to 830. By the end of that period Aguateca was heavily fortified, as its inhabitants built a series of concentric walls to protect the center and the elite residential areas (Inomata 1997). This, however, did not prevent the downfall of the city. In the early 9th century Aguateca was attacked, most of the buildings used by the elite were burned, and the site was abandoned. Because of this rapid abandonment, we encounter unprecedented assemblages of *in situ* domestic artifacts in these elite structures (Inomata 1995; Inomata and Stiver 1998; Inomata and Triadan 1999).

From 1990 until 1993 Takeshi Inomata directed excavations and survey at Aguateca as part of the Petexbatún Regional Archaeological Project of Vanderbilt University, directed by Arthur Demarest (Inomata 1995). Since 1996 the Aguateca Archaeological Project, directed by Inomata, Erick Ponciano and myself,

has continued research at the site (Inomata *et al.* 1996; 1997; 1998; Ponciano, Inomata and Triadan 2000).

To date the fieldwork undertaken by these projects has resulted in the excavation of 10 rapidly and several more gradually abandoned structures (Figure 1) (Inomata 1995; Inomata *et al.* 1996; 1997; 1998; Ponciano, Inomata and Triadan 2000). Eight of the rapidly abandoned structures (M7-34, M7-35, M8-2, M8-3, M8-4, M8-8, M8-10, and M8-13) were completely excavated. All of the rapidly abandoned structures are located along or near the Causeway, in the area between the escarpment and the chasm, close to the Palace Group; an area that was probably an elite neighborhood (Inomata 1995). Structure M8-17 is a square-shaped structure that may have been a shrine (Inomata 1995: 192, 194-195; Inomata and Stiver 1998: 433, 443). M7-34 and M8-11 may have been public or communal houses based on their architecture and artifact assemblages (Inomata 1995; Inomata and Stiver 1998: 442; Ponciano *et al.* 1998; Ponciano, Pinto and Monroy 2000). M8-2 and M8-3 were one-room structures that may have been used for special activities, such as food preparation (Triadan *et al.* 2000). The other five excavated, rapidly abandoned structures are long

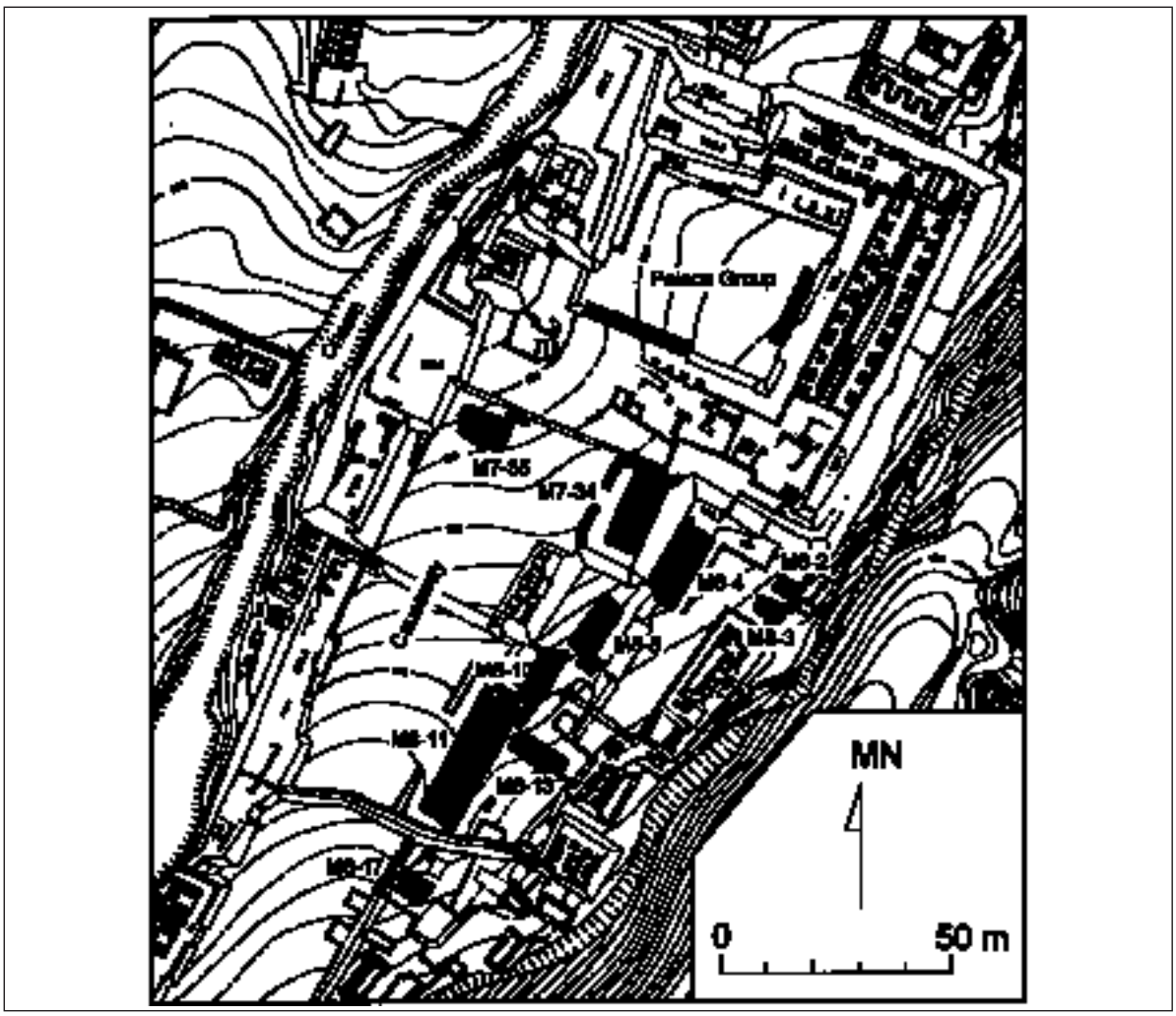

Figure 1. Location of excavated rapidly abandoned structures at Aguateca.

structures with multiple rooms in one row that were probably elite residences, each occupied by one household (Inomata and Stiver 1998; Inomata and Triadan 1999). In this paper I focus on these structures.

In general, the domestic assemblages in these elite residences are fairly similar. Among other objects, we found large inventories of reconstructible ceramic vessels, as well as different groundstone in and around the structures. However, we also found evidence of specialization in a score of different arts and crafts in every structure (Inomata 2000; Inomata and Triadan this issue).

The frequencies of large-volume storage vessels should give us an idea of the storage capacity for each household who occupied one of the structures (see Christakis 1999: 11-14). Because this is an ongoing analysis we have not yet calculated the actual volume for each of these vessels and we have complete ceramic data only for two structures (Strs. M7-35 and M8-10), preliminary frequencies for one (M8-13), and partial frequencies for another (M8-8) [1]. Thus, at this point I am only using the distribution of different vessel types to assess what potential quantities of food elite households stored in or around their houses and the results should be viewed as preliminary. Of course, this does not account for the possibility that people may have stored additional food, especially ear maize, in perishable structures such as cribs (Smyth 1991). The distribution and presence or absence of different types of *manos* and *metates* should give us an idea about the food processing capabilities of each household. (Inomata has analyzed the groundstone for all residences). Although the residents of the elite structures may have carried some small, valuable objects off to their next home, if they survived the attack on Aguateca, they probably left their storage vessels and grinding stones behind. Both are large and heavy, and thus the quantities that we find in and around the structures should be close or identical to those of the original inventories at the time of abandonment.

Storage Capacity

Associated with the elite residences we typically find a variety of jars that were most likely used as storage containers [2]. The first type are Cambio Unslipped jars (Figure 2a) (Foias 1996: 435-453, Figures 6.15-6.19; Sabloff 1975:153-155, Figures 287-289). These jars are wide-mouthed and can be large to medium-sized. They were probably used for the storage of foods or liquids (Inomata 1995: 546, Table 7.7). The second type are Encanto Striated jars, which belong to the same ceramic group as the Cambio Unslipped vessels (Figure 2b) (Foias 1996: 453-460, Figures 6.21-6.23; Sabloff 1975: 155-158, Figures 293-295). These jars are generally wide-mouthed and of medium size. They were probably also used for the storage of foods or liquids (Inomata 1995: 546, Table 7.7), but some may also have been used for cooking. Some Encanto jars have round bases, a form that may be conducive to more efficient heating of the vessel's content (Rice 1987: 241-242). The third category are jars of the Tinaja Red and Pantano Impressed type (Foias 1996: 468-474, 489-497, Figures 6.29-6.31; Sabloff 1975:158-160, 164-168, Figures 297, 303, 311-320). These jars have narrow openings and occur in a variety of sizes, from miniatures to medium-sized. The medium-sized ones were probably used as water carrying and storage jars or for the storage of other liquids (Figure 2c) (Inomata 1995: 546, Table 7.7). The narrow neck of these vessels prevents spilling and their concave base facilitates carrying them on the head. In fact, these jars are remarkably similar in form and size to ceramic and plastic water carrying jars that are used today (see Deal 1998: 84; Reina and Hill 1978).

Even though some dry foods, such as maize and beans, may have been stored in baskets or containers made of other perishable materials [3], the assemblages of the ceramic storage vessels provide unprecedented data on the storage capacity of Classic Maya households. In Str. M7-35 there were three Cambio/Encanto jars and nine Tinaja Red jars and in Str. M8-10 nine Cambio/Encanto jars and 24 Tinaja Red jars. Preliminary quantities for Str. M8-13 are six Cambio/Encanto jars and 18 Tinaja Red jars (Table 1). These numbers are preliminary because even though typing of the ceramics from this structure has been completed we are still determining how many vessels are reconstructible and thus were probably in

[1] The frequencies and distributions of reconstructible vessels for Strs. M7-35 and M8-10, were analyzed by Inomata (1995), type designations for these vessels are based on analyses by Foias (1996).

[2] Large ceramic jars have been used prehistorically as storage containers in Mesoamerica, as well as in other parts of the world (Christakis 1999; Young 1996; Manzanilla 1988; Sheets 1992).

[3] Such containers have been found at Cerén (Sheets 1992: 87) and in the Palace Group of Aguateca (David Lentz, personal communication 2000).

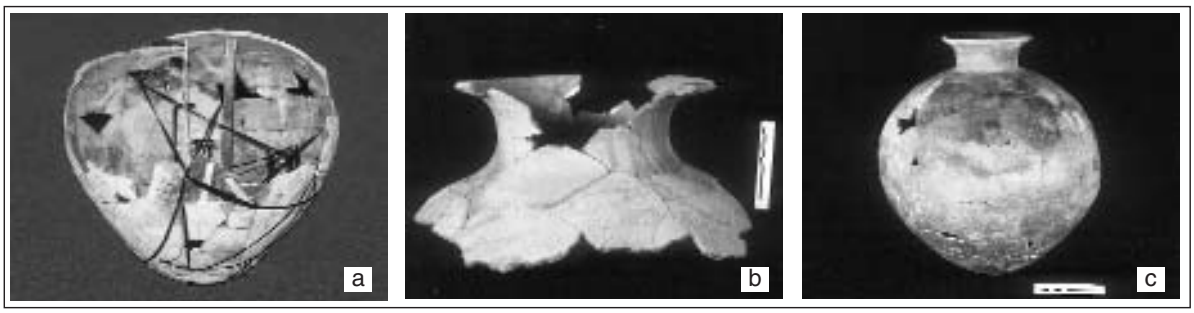

Figure 2. Types of storage vessels found at Aguateca: (a) Cambio Unslipped jar, maximum diameter *ca.* 89 cm. (b) Partial Encanto Striated jar. (c) Pantano Impressed jar.

use at the time of abandonment. Also, these numbers only include ceramics found in the western and central room. A possible eastern room that was badly disturbed was excavated by a Guatemalan restoration project. As I mentioned above, analyses of the assemblages of the other two excavated elite residential structures, M8-8 and M8-4, are not yet completed. However, preliminary frequencies of reconstructible vessels from Str. M8-8 are 18 Cambio/Encanto jars and 13 Tinaja Red jars. All ceramics of this structure have been analyzed except for those found in the exterior area south of the structure and the southern annex (see Triadan *et al.* 1998). There are probably three or four more storage jars in the southern annex, but no reconstructible vessels in the southern exterior area. In all of the structures, the majority of the storage vessels were in and around one of the side rooms and a significant amount of space was taken up by such vessels (Figure 3) (Inomata 1995).

The assemblages of three of the excavated structures (M8-8, M8-10, and M8-13) are similar, ranging from

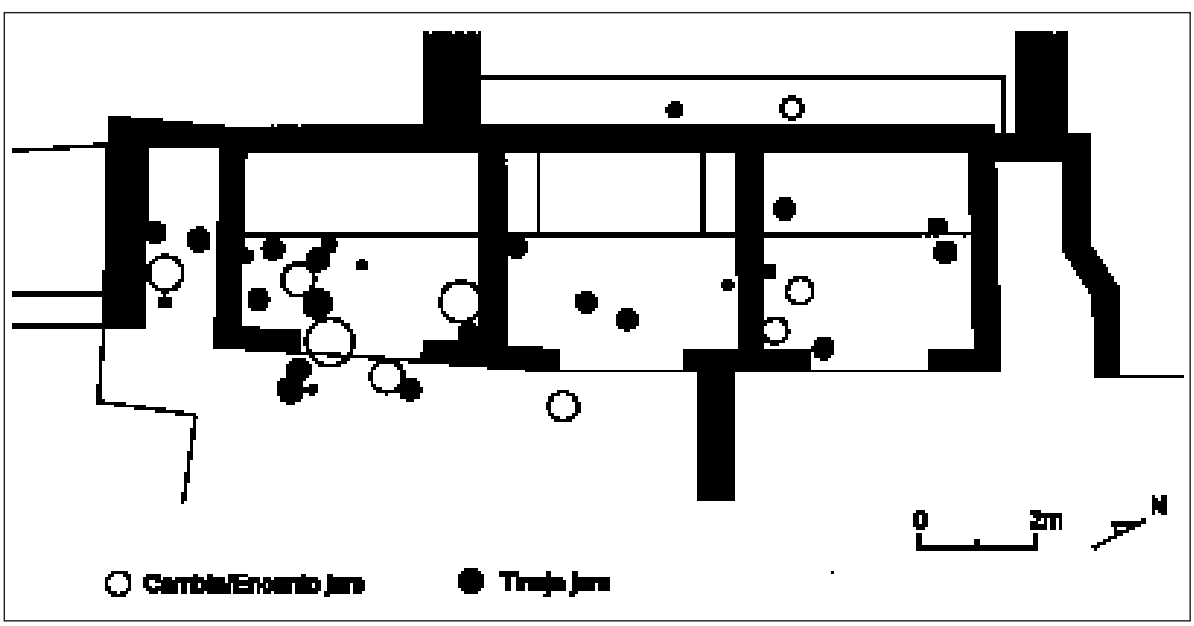

Figure 3. *In situ* location of storage jars in Str. M8-10 (Source: Inomata 1995).

Tabla 1. Frequencies of Storage Vessels and *Metates* in Excavated Elite Residences.

Structure[a]	Storage Jars			Metates		
	Cambio/Encanto	Tinaja[b]	**Total**	Basin	Flat	**Total**
M7-35[c]	3	9	**12**	1	0	**1**
M8-8[d]	18	13	**31** (34-35)	3	3	**6**
M8-10[c]	9	24	**33**	3	2	**5**
M8-13[d]	6	18	**24**	2	0	**2**
Total	**36**	**64**	**100**	**9**	**5**	**14**

[a] Data for Str. M8-4 are not available.
[b] Frequencies of all Tinaja jars except miniatures.
[c] Source: Inomata 1995.
[d] Frequencies for storage vessels and *metates* are preliminary. The final total for Str. M8-8 is expected to be 34 or 35 storage vessels.

24 to 34 or 35 storage vessels (Table 1) [4]. The three structures are also fairly similar in architectural layout and size. Based on these quantities the three households that occupied the three structures seemed to have had similar food storage capabilities. However, as I mentioned above, the frequencies of storage vessels are only a rough measure of household storage capacity. An analysis of the volumes of these jars will eventually provide a more accurate reconstruction of each households' storage capability. One structure, M7-35, had a markedly smaller assemblage of storage jars, a total of 12. This difference in storage capacity in comparison with the other three structures may reflect a difference in the size of households. Strs. M8-8, M8— 10, and M8-13 may have been occupied by a household, consisting of a nuclear family. On the other hand, Inomata (1995) suggests that Str. M7-35 may have been occupied by a single individual, such as a priest or elected official. This idea is not only based on the smaller number of storage containers, but also on the floor plan of the structure which is different from those of the other elite residences and its location with regard to the Palace Group (see Figure 1) (Inomata 1995; Inomata and Stiver 1998: 442).

Food processing

Two types of *metates* that were probably used to process different types of food and/or other materials are associated with the elite residences (Inomata 1995: 572-573, Table 7.27, Figure 7.23; Inomata *et al.* 1996; Inomata *et al.* 1997:6-8; Triadan 2000; Triadan *et al.* 1998). The first type are large basin-shaped *metates*, made from local limestone (Figure 4a). We find these *metates* with *manos* that were also made from limestone. These *metates* were most likely used to grind corn. The second type are flat *metates* with three supports, made from basalt or sandstone (Figure 4b). Both of these materials are nonlocal to the Petexbatún region. We often find them together with *manos* made from the same material. These *metates* may have been used to grind other foods or other materials, including pigments and clay. We also have a few miniature *metates* and palettes that were probably used for grinding small amounts of pigments.

Str. M7-35 had one large basin metate and none of the flat *metates*, Str. M8-10 had three basin and two flat *metates* (Inomata 1995: Figures 8.9, 8.57), Str. M8-8 had at least three basin and three flat ones, and Str. M8-13 had two basin and no flat *metates* (Table 1). These frequencies include only complete or almost complete specimens, and the frequencies for Strs. M8-13 and M8-8 should be seen as preliminary, as analyses to establish their use context are ongoing. Most of the large basin-shaped limestone *metates* (Figure 5) are associated with side rooms or exterior spaces around the structures (Inomata 1995).

It is clear that each household possessed at least one pair of a large basin metate and mano. Thus, we

[4] Str. M8-13 had the smallest assemblage, however, the total number of storage vessels may have been slightly higher if there were some vessels in a possible eastern room.

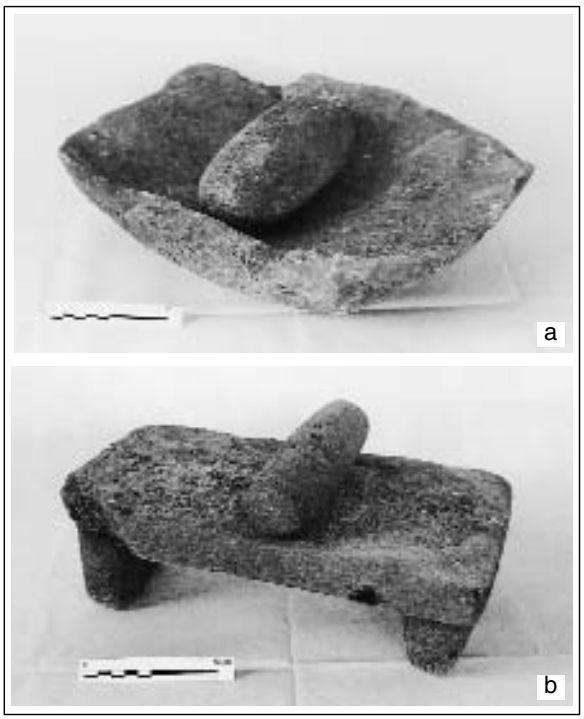

Figure 4. Types of *metates* found at Aguateca: (a) Basin-shaped limestone metate. (b) Flat metate with three supports.

have evidence that each household probably processed its own food. Interestingly, the difference in frequencies of the groundstone mirrors that of the storage vessels, which supports the inference of differences in household size between Str. M7-35 and the other three analyzed structures (M8-8, M8-10 and M8-13).

CONCLUSIONS

The most important result of this preliminary analysis is that at Aguateca elites stored and processed their own food in and around their houses. In fact, substantial space in their residences was taken up by storage containers, which facilitated the control over the maintenance and use of their food supplies [5]. Thus, rather than detached from mundane everyday activities the elite seemed to have been directly involved in them. At Aguateca one elite household probably occupied a single multi-room structure (see Inomata and Stiver 1998). If elites had servants to carry out this work, they may have lived with the household.

Interestingly, we have not found structures dedicated solely to food storage, either within elite residential groups or the royal palace, which indicates that food storage was not centralized or controlled above the household level (Smyth 1989: 91-93). One might argue that the domestic storage behavior of the Aguatecan elite was the result of a possible siege situation that forced them to have food in their houses rather than at other locations. As I mentioned above, during the last phase of occupation the inhabitants of Aguateca had erected defensive walls to protect the center of the city, and they eventually did get defeated by enemies. However, the fact that we did not find permanent storage structures in more central locations suggests that domestic storage was the common mode of food storage. This apparent absence of substantial, central storage facilities also implies that food surpluses were produced or extracted on an individual household basis.

Even though all of the analyzed elite households were involved in managing their food supplies, there are some differences in food storage capacity and food processing. These differences may reflect differences in household size. They may also indicate differences in the economic status or the access to food resources of individual households.

Implications for Gradually Abandoned Sites

The ceramic and groundstone assemblages found in and around residential «range» structures at Aguateca provided some preliminary insights into the subsistence behavior of Late Classic elites. Granted the situation at Aguateca is very unique for the Maya lowlands, an analysis of artifacts from different contexts may provide material correlates that could help to investigate subsistence activities such as food storage and processing of households at gradually abandoned sites in the lowlands. The most promising artifact category is pottery. Data from the whole and reconstructible vessel assemblages from resi-

[5] This scenario is very similar to that for «peasant» households at Cerén (Sheets 1992) and high status elite households at Copán (Hendon 2000).

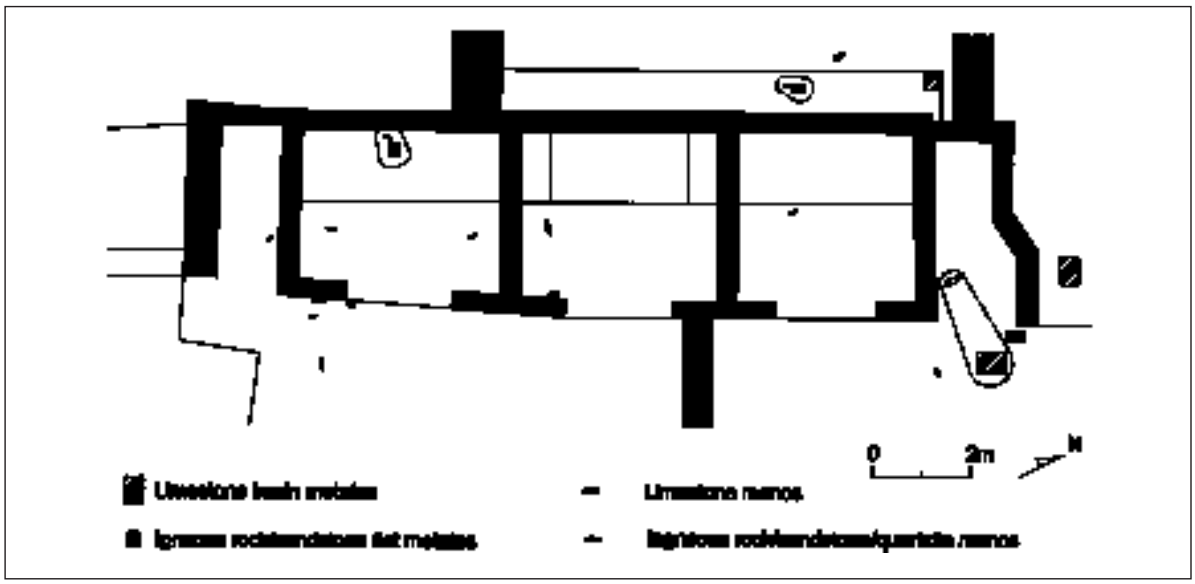

Figure 5. *In situ* location of *manos* and *metates* in Str. M8-10 (Source: Inomata 1995).

dences at Aguateca have been and will continue to be compared with frequencies of particular pottery types found in middens associated with these houses (Inomata 1995). The occupation at Aguateca is fairly short, maybe only 100 to 150 years, thus we have fairly tight temporal control over the accumulation of these middens and it also explains why middens at Aguateca are not very extensive or deep [6]. This comparative analysis can be used to see how the frequencies of ceramic types found in the middens correlate with the assemblages found in and around the houses (Inomata 1995) and will provide important data on the use life of different vessel types [7]. Ideally these data could then be used to interpret ceramic assemblage from contemporary, gradually abandoned sites that predominantly derive from midden contexts, and by extrapolation it may be possible to reconstruct original household assemblages (Lightfoot 1993). An important issue, however, is temporal control. The residential occupation at many gradually abandoned sites was longer than at Aguateca and often it is not clear how long specific structures were occupied. Thus, ceramics could have been discarded over very long periods of time, possibly by different households. Even if one takes differential use life into account by using ethnoarchaeological data (see Deal 1998; Foster 1960) it may not be possible to reconstruct a «typical» domestic ceramic assemblage for these sites. Another issue is that even if our analyses confirm that the elite domestic ceramic assemblages at Aguateca are fairly homogenous this does not necessarily imply that they were similar in other areas of the Maya lowlands. Thus, extrapolating ceramic data from Aguateca may be completely erroneous.

The data that *in situ* artifact assemblages provide can never be equaled by gradually abandoned sites (see Brown and Sheets in this issue), which are the majority of the archaeological cases. However, rapidly abandoned sites have some potential to establish material correlates for gradually abandoned ones, which may allow us to address questions such as the organization of the Classic Maya subsistence economy on a broader scale.

[6] Most middens associated with the elite residential structures are shallow sheet middens.

[7] Typically water jars and serving vessels are more mobile and have higher breakage rates than large, stationary storage jars (see Arnold 1985: 152-155; Deal 1998; Rice 1987: 298-299).

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