

MAIZE BEER PRODUCTION IN MIDDLE HORIZON PERU

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When the Spaniards marched into the Inka capital of Cuzco in 1533, chicha (maize beer) was the common, everyday beverage within the vast Inka empire. Recent archaeological research carried out at Marayniyoq, a Middle Horizon Wari site in the Ayacucho Valley in central Peru, uncovered a series of cut stones with hollow depressions. Several features of these artifacts indicate that they functioned as grinding stones. Confirming this observation is the finding in association with the cut stones of several rocker grinders or milling stones, which are the active elements of grinding equipment. While this evidence convincingly indicates that grinding was an important activity at the site, fieldwork also uncovered a large number of large vessels. Most of these vessels had been broken and then repaired in the distant past, a fact which suggests that they were used for storing dry products that perhaps were processed by means of the grinding stones. The evidence from Marayniyoq is very similar to artifacts associated with maize beer production during (later) Inka times, strongly indicating that during the Middle Horizon maize beer appears to have been produced in a fashion very similar to that of the Inka. At the same time, this evidence suggests that maize beer distribution was a function of the state, perhaps as part of reciprocal obligations between elites and commoners.

KEY WORDS: Brewing; Maize beer; Middle Horizon Peru

Archaeological evidence for the brewing of maize beer is, of course, less direct. We deal with the broken containers and abandoned equipment used by the Inca brewers, and when preservation is good, we may find some of the maize which was its raw material (Morris 1979:27).

THE ORGANIZATION AND MOBILIZATION OF LABOR is critical for state-level societies to provide for monumental infrastructure such as temples, as well as transportation, warfare, and agricultural production. In the Andes, this organization consisted of the labor tax, and state activities were facilitated by reciprocity involving the distribution of maize beer, *chicha* (*aq*a in Quechua) (Morris 1979:22). During Inka times,¹ production and consumption of maize beer was critical to the organization of labor for construction of monumental architecture, agricultural terraces, and the

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extensive infrastructure of roads and bridges that stretched from present-day Ecuador to Chile and northwest Argentina (Bray 2003; Costin and Earle 1989; D'Altroy 2002; Hastorf 1991; Morris 1978, 1979, 1988, 1991; Morris and Thompson 1985; Moseley 1992; Murra 1980, 1986; Rowe 1946). Such utilization of maize beer is still important in many parts of the Andes (Abercrombie 1998; Allen 1988; Cutler and Cárdenas 1947; Meyerson 1989). Just how old is this relationship between the organization of labor and maize beer?

This paper reports evidence of maize beer production in the Peruvian central highlands during the development of the Wari state (Isbell and Cook 1987, 2002; Isbell and Schreiber 1978; Lumbreras 1974; Menzel 1964; Schreiber 1992). The information comes from the site of Marayniyoq in the Ayacucho Valley, located only a short distance north of the main Wari capital city (Figure 1). Because maize beer production in the past, and also ethnographically, is associated with pottery vessels (Bray 2003; Goldstein 2003; Morris 1979), throughout this article major attention is given to the ceramic vessels from Marayniyoq. Likewise, because maize beer making implies the use of grinding equipment, equal attention is given to the grinding tools from this Wari site.

In order to familiarize the reader with the topic, first a short reference is made to the Middle Horizon Wari state. In the second section, I discuss the archaeological study of maize beer production. Available ethnohistorical and archaeological evidence with regard to chicha production and consumption during Inka times is briefly reviewed. Because maize beer making in the Andes implies above all the use of a variety of ceramic vessels, this discussion is followed by an assessment of ethnographic information concerning pottery production and its use in maize beer making. This ethnographic evidence—from the Ayacucho Valley (Arnold 1983, 1985, 1993; Valdez 1997)—is suitable for the purposes of explaining the significance of local archaeological data, although I want to emphasize that I do not necessarily imply historical continuity. Then I will present the pottery collection recovered from the Wari site of Marayniyoq and discuss its function in relation to the local ethnographic evidence. The importance of ceramic vessels is further discussed in conjunction with the grinding equipment from Marayniyoq, another critical aspect of maize beer production. Other information also connected with maize beer production coming from the same time period is provided and its implications are discussed in conjunction with the data previously considered.

MIDDLE HORIZON PERU

The Andean Middle Horizon (circa AD 550–900) is the time of the formation and expansion of Wari, a conquest state that, after emerging in the Ayacucho Valley, expanded and ultimately exercised political control over most of the Central Andes (Cook and Glowacki 2003; Glowacki 2002; Isbell 1988; Isbell and Cook 2002; Lumbreras 1960; McEwan 1996; Menzel 1964, 1968, 1977; Rowe 1963; Schreiber 1992; Williams 2001). Among other things, Wari expansion was accompanied by profound changes at various levels, which included the introduction of Wari-style artifacts, standardized architectural complexes—recognized as Wari administrative

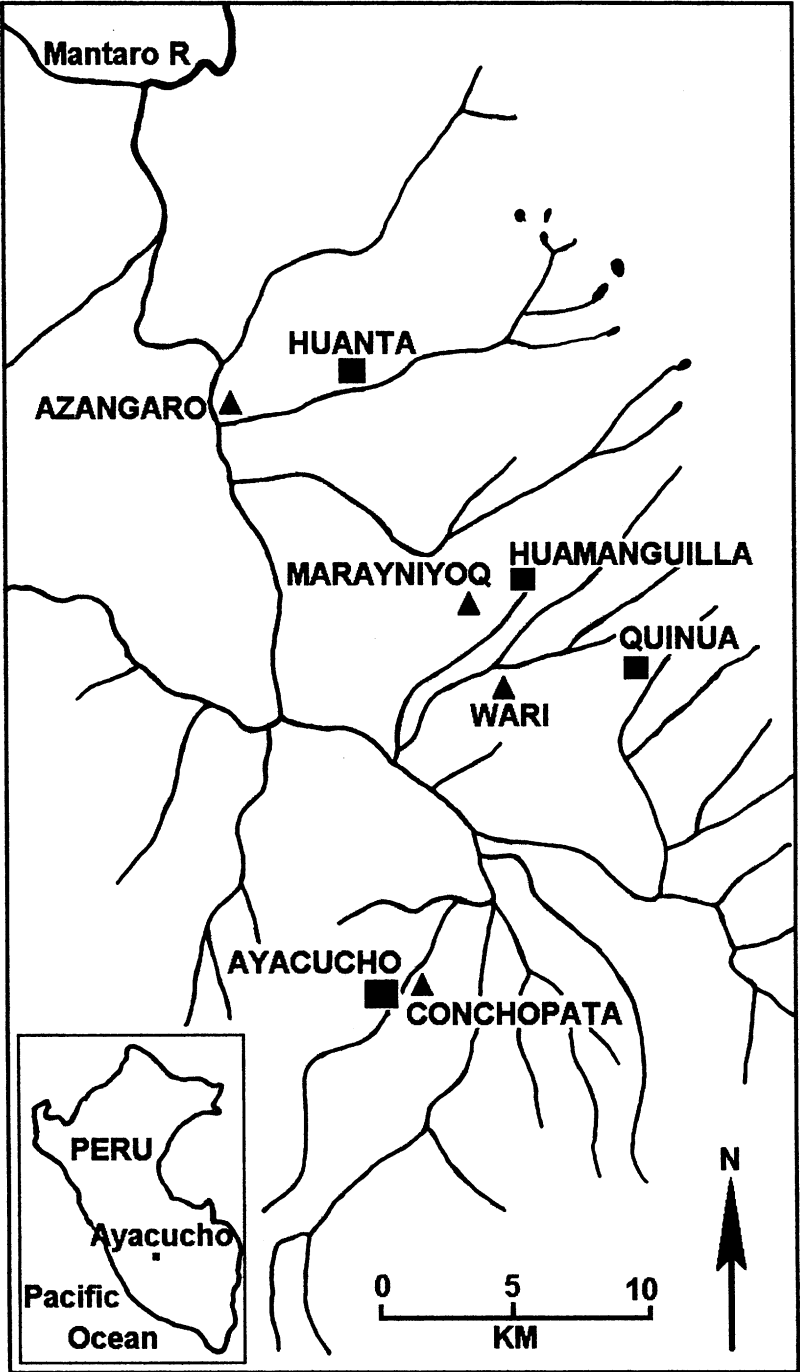


Figure 1. Location of the Wari site of Marayniyoq in the Ayacucho Valley, Peru (Valdez, Bettcher, and Valdez 2002:391, Figure 1).

centers—and the intentional relocation of populations (Schreiber 1987, 1992) throughout much of the area that later became known as Peru. The introduction of Wari artifacts beyond the Ayacucho heartland and the processes that involved site relocation are interpreted as mirroring economic and social reorganizations forcefully imposed on local inhabitants by the Wari administration centered at its capital city in the Ayacucho Valley. For instance, a comparative study of Wari and Inka politics shows that the former exercised higher levels of control, suggesting that the “Wari Empire may have been a much more pervasive and totalitarian regime than the Inka Empire” (Schreiber 1987:280).

Menzel (1964:66) was among the first to argue that to understand the developments that took place during the Middle Horizon it was necessary to study sites in the Ayacucho area and, more specifically, around the ancient capital city of Wari. With the exception of the rescue excavations carried out at the Wari rural site of Aqo Wayqo (Ochatoma 1987; Ochatoma and Cabrera 2001, 2002) and the test excavations at Muyo Orqo (Berrocal 1999) and Ñawimpukio (Machaca 1996), however, Wari specialists have been reluctant to pay attention to the analysis of smaller sites, centers that perhaps functioned to sustain the larger settlements such as the urban capital itself. As a result, in its heartland, Wari continues to be assessed mostly from what archaeologists know about the urban center (Isbell, Brewster-Wray, and Spickard 1991), and the large sites of Azángaro (Anders 1989, 1991) and Conchopata (Isbell and Cook 2002; Knobloch 2000; Ochatoma and Cabrera 2001; Pozzi-Escot 1985, 1991). Analysis of the rural sites is crucial for understanding the organization of the Wari core and the relationship of the urban centers with the hinterland, especially with regard to the economic foundations of the Wari culture. I believe that the study of rural sites such as Marayniyoq adds insight critical to fully comprehending the nature of a society such as Wari (Valdez 2002a, 2003).

Marayniyoq is a rural Wari site located on the periphery of the main ancient urban center of Wari, in the Ayacucho Valley of the central highlands of Peru. At an elevation of 2,900 m above sea level, Marayniyoq is in dry, poor agricultural terrain but near the source of sandstones used in the grinding slabs. The site is also near the contemporary pottery making community of Quinua (Arnold 1993) and overall in a valley strongly identified with maize cultivation (Mitchell 1991; Valdez 1997). Several seasons of fieldwork at the site resulted in information that strongly suggests a specialized role for the site within the Wari state (Valdez 2002b; Valdez, Bettcher, and Valdez 2000a, 2002b; Valdez et al. 1999, 2001).

THE ARCHAEOLOGICAL STUDY OF MAIZE BEER

Because of the writings of Spaniards (Cobo 1956 [1643]; Pizarro 1965 [1571]) who witnessed the Inka empire before its final collapse, the best information as to how chicha was produced and consumed in the Andes is for the Inka state (Figure 2). Within Tawantinsuyo, as the Inka state was called (Murra 1962, 1983; Rowe 1946; Salomon 1986), chicha was produced under state administration and distributed as part of reciprocal obligations. It was by means of reciprocity,

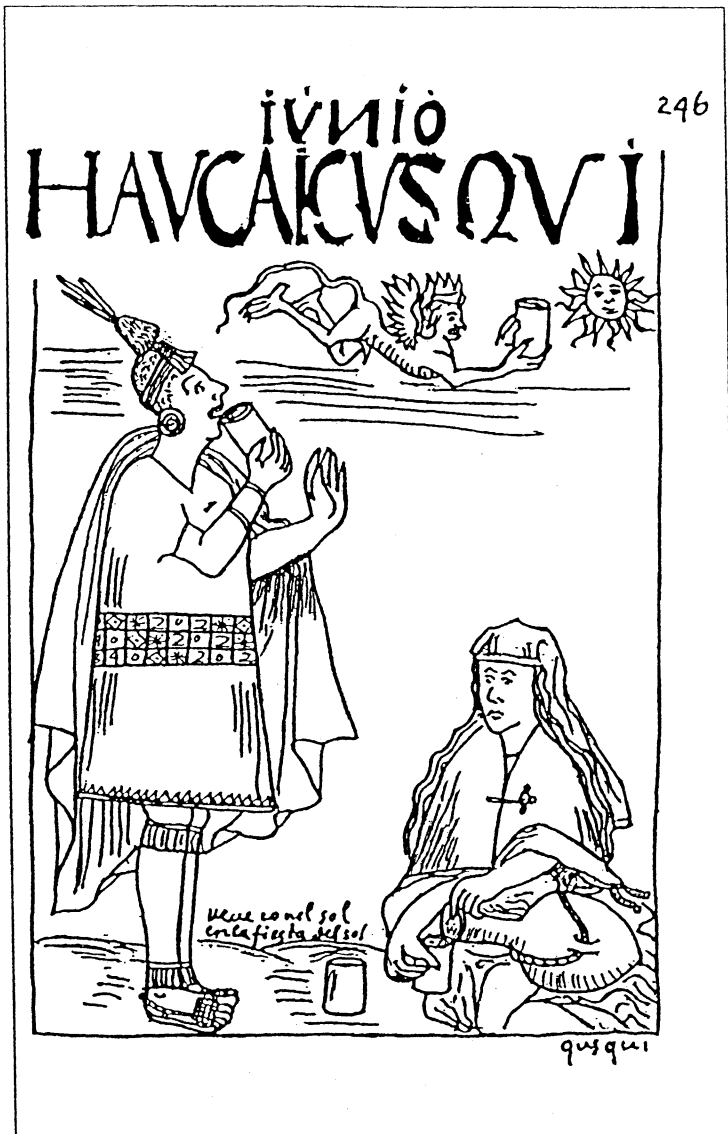


Figure 2. Felipe Guaman Poma de Ayala's 1615 illustration of the ritual drinking of chicha during Inka times (after Guaman Poma 1980).

wherein the commoners provided labor, and the state, chicha, that the administration carried out many state-sponsored and labor-intensive projects. In addition, chicha drinking was an integral part of the religious and political ceremonies; for instance, during imperial celebrations, the bodies of dead leaders, kept in special buildings, were dressed in fine clothing, brought into the plaza, and offered a toast of chicha (see Cobo 1956:218; Pizarro 1965:192). This fermented

beverage was of such political and economical importance that the royal capital city of Cuzco was recognized as *aqa mama*, “mother beer” (Espinoza 1987). Indeed, according to Cobo (1956), drinking water was a form of punishment. Cobo (1956:162, 267) asserts that fermented beer was made from different crops, including *molle* berries (see Note 1).

Because of its importance, in every single Inka settlement within the large empire maize beer was produced under direct state management. For instance, at Huánuco Pampa, there were specialized areas dedicated to chicha production (Morris 1979:27; Morris and Thompson 1985:70), as the finding of large ceramic vessels and grinding equipment used in chicha making indicates. At these places, chicha production was a responsibility of the *aqllas*, or chosen women, who worked for the state (Cobo 1956:232; D’Altroy 2002:251; Hastorf 1991:50). Upon arrival at a site within the vast empire, individuals, army parties, and state officials were offered—in addition to food and a place to rest—plenty of chicha. Moreover, drinking was a social event and a ritual display, where the individual offered the first toast to “father Sun” or Inti, “mother earth” or Pachamama, and the sacred mountains or *apus* (Cobo 1956:204; Guaman Poma 1980:172).

The Spanish, far from understanding the role of chicha in native Andean politics and economics, made unsuccessful attempts first to limit its consumption and then to eradicate it once and for all. However, the immediate consequences of this restriction were obvious in a matter of a few days (see Morris 1979:26; Moore 1989:685). Because of its powerful role in obtaining group labor and its capacity for facilitating the completion of labor-intensive projects, the natives were allowed by the Spaniards to continue drinking chicha, a tradition which interestingly has survived until our time (Allen 1988). Indeed, across the highland region of the Andes, chicha still forms part of every social event, most notably during communal celebrations (*fiestas*) (Abercrombie 1998:362; Arnold 1993:120; Meyerson 1989:49).

Before Tawantinsuyo, many other states flourished in the Andes, some of them lasting for several more centuries than the Inka state did (see Lumbreras 1974; Moseley 1992). One such state was Wari (Isbell and Cook 2002; Lumbreras 1974, 1980; McEwan 1996; Menzel 1964; Schreiber 1992). A growing number of scholars argue that many aspects of Inka sociopolitical organization are analogous to Middle Horizon Wari, and some even note that Inka institutions “may be rooted there” (Glowacki and Malpass 2003:437). This apparently included the use of chicha. Indeed, archaeologists have long argued that chicha was used during Wari times; such claims were based on the finding of oversized vessels and drinking cups (Anders 1991:187, 190–91; Cook 2004:156; Cook and Glowacki 2003; Glowacki 2002:276, 279; Isbell and Cook 1987:28, 2002:277; Isbell et al. 1991:43–44; Knobloch 2000:398; Ochatoma and Cabrera 2002:236). Largely supporting earlier assessments, the recently excavated site of Marayniyoq provides the best signature of chicha production and consumption in the Andes during Wari times.

The Ethnographic Record

The archaeological study of fermented beverages is not straightforward. Indeed, the archaeological evidence is made up mostly of the broken vessels and abandoned equipment (such as grinding tools) used by ancient brewers (Morris 1979:27–28); recovery of the raw materials, including sprouted kernels, occurs only under certain conditions. It is from indirect information that one must assess the whole process of the production of fermented beverages. Again, the Inka case is a rare exception, but few will disagree that without the accounts left by the Spaniards, our knowledge about chicha making and drinking during Inka times would be far more obscure than it is currently.

In addition to ethnohistorical sources, ethnographic records consistently indicate that maize beer production in the Andes implies the use of a variety of ceramic vessels. For example, Dean Arnold's study of the pottery-making community of Quinoa (Mitchell 1976, 1991), a short distance from Marayniyoq, shows that the morphology of vessels is "largely influenced by technological and utilitarian variables" (Arnold 1983:57). Elsewhere, Arnold (1985:150) asserts that vessel shapes are often "tied to economic values," indicating that certain vessels are manufactured for specific activities (Arnold 1993:117). In a region such as the Ayacucho Valley that is closely associated with maize agriculture (Mitchell 1976, 1991; Valdez 1997), ceramic vessels—in particular, utilitarian shapes—are produced more for "cooking and preparing maize than for any other single crop" (Arnold 1985:150). This certainly includes chicha production. Table 1 summarizes the different vessel types manufactured in the Ayacucho Valley and their respective functions (see Arnold 1993:80).

Likewise, ethnoarchaeological studies, such as Arthur's (2003) in Ethiopia, show that there are various ways of identifying the processing of fermented beverages. Among these, the size and morphology of certain ceramic vessels have a "strong association with the production and consumption of beer" (Arthur 2003:522). This is because vessel size and morphology are determined by their function (Arthur 2002:332; Morris and Thompson 1985:74). For the Ayacucho Valley, Arnold (1985:150, 1993:120) associates large ceramic vessels, such as *maqma* (wide-mouth vessel) and *urpu* (narrow-mouth jar), with brewing chicha. Arnold (1985:150, 1993:82) also notes that chicha is transported in tall, narrow-mouthed jars that he calls *tumin*. Such vessels are actually called *qipiri* (Valdez

TABLE 1
Large and medium-size vessel shapes traditional to the Ayacucho Valley

| Wide-mouth | | Narrow-mouth | |
|------------|-------------------------|----------------|--------------------------|
| Vessels | Association with Chicha | Vessels | Association with Chicha |
| maqma | fermenting and storing | urpu | fermenting and storing |
| tinaja | fermenting and storing | qipiri | transporting and storing |
| manka | boiling | puyñu or tumin | transporting |
| toqto | | lluku puyñu | transporting |

2002a)—*qipiy* means “to carry on one’s back.” These observations show that at least from ethnographic data certain vessel shapes are linked with specific activities.

An additional signature for the production of fermented beverages, as Arthur (2003) points out, is the presence of more grinding stones than are normally found at a settlement, particularly considering that most raw materials used for tool making need to be processed. Maize beer production certainly requires the processing of maize. For the Inka, Morris (1979:28) mentions rocker grinders as evidence of chicha production. Shimada (1994:222) also reports the use of grinding tools in chicha making on the Peruvian north coast. The archaeological evidence from Marayniyoq (see below) is identical to the above outline, wherein the main artifact types are large ceramic vessels (ideal for storing, fermenting, and transporting) and cut stones with modified surfaces identified as grinding stones, perfect for large-scale production. The occurrence of these artifacts in the same context is an unmistakable signature of chicha production at this Wari site. With this introduction, I now turn my attention to the main evidence from Marayniyoq: the ceramic vessels and the grinding equipment.

The Ceramic Vessels from Marayniyoq

Archaeological excavations carried out at Marayniyoq uncovered a well-preserved, highly compacted floor made of a mixture of diatomite and volcanic ash that covered most of the excavated area (Figure 3). The artifacts found on this floor consist of large concentrations of broken vessels. Figure 4 illustrates the area of excavation, and Figure 5 shows the different vessel shapes defined for Marayniyoq. Tables 2 and 3 provide the frequency of each vessel type with regard to each provenience. Other, smaller concentrations of broken ceramics, representing a few pots, were also uncovered.



Figure 3. View (looking west) of excavated area in northern portion of site showing well-preserved floor and grinding stones.

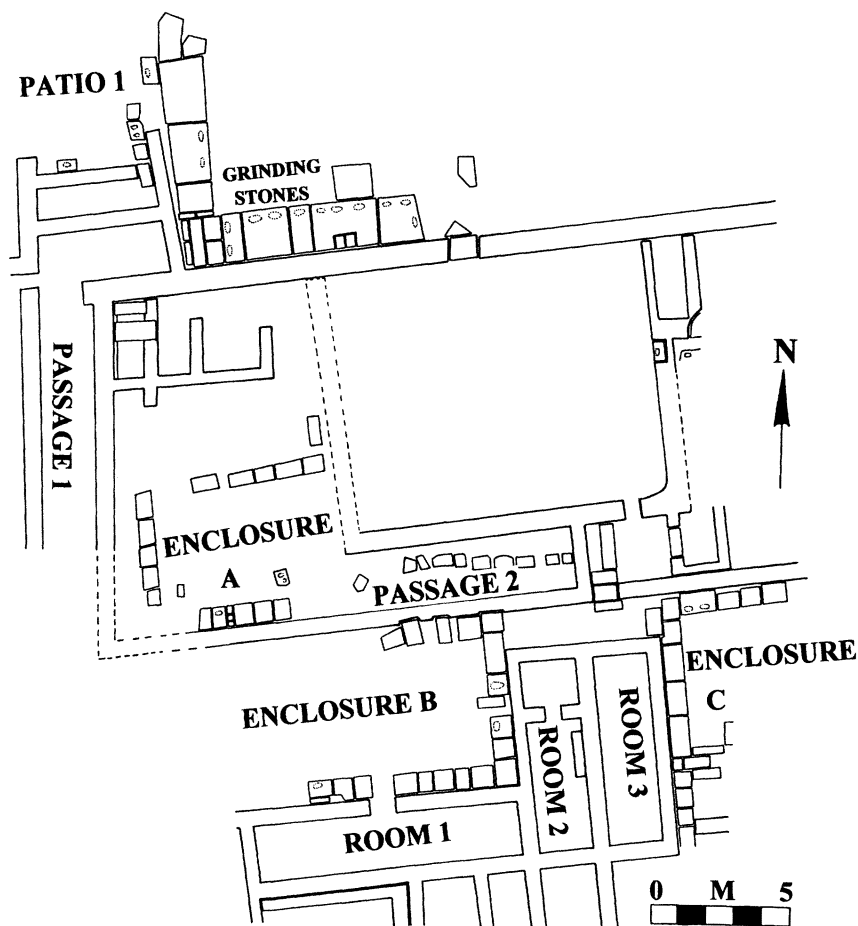


Figure 4. Map of the excavated area of Marayniyoq.

In order to gain a better understanding of the functional significance of the broken ceramics, an attempt was made to restore the vessels. Working, if possible, with complete or substantially complete pieces enabled form to be determined more accurately. Consequently, the function of securely defined forms could also be determined with reference to the ethnographic example. This principle is simple and considers that shape and size are “the best indicator(s) of vessel use” (Morris and Thompson 1985:74). Although the process of vessel restoration was only partially accomplished (see Table 2), the refitted pieces (32 in all) were crucial for identifying the kinds of vessels present at the site. On the basis of the partially restored vessels, the morphology of other pieces that could not be restored was assessed. Results are presented below.

Although the ceramic collection from Marayniyoq includes a variety of forms and sizes, the overwhelming occurrence of oversized vessels is apparent. Overall,

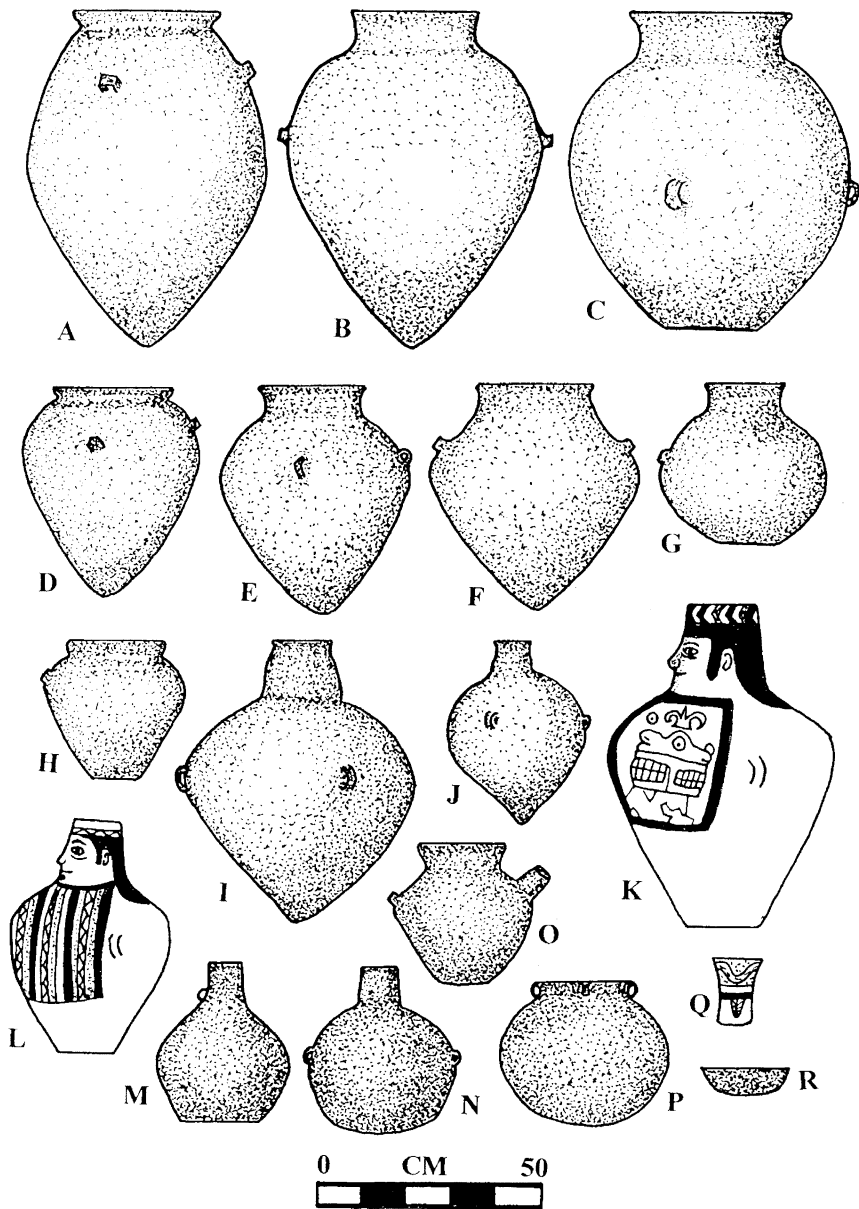


Figure 5. Vessel forms from Marayniyoq.

TABLE 2
Spatial distribution of the partially restored vessels

| Location | Narrow-mouth vessels | | | Wide-mouth vessels | | | Tinaja |
|-------------|----------------------|-------------|----------------|--------------------|------------|------------|--------|
| | L Qipiri | M Qipiri | Lluku puyñu | Maqma A | Maqma B | Maqma C | |
| Patio 1 | 4 | 1 | — | 2 | — | — | 1* |
| Passage 1 | 1 | — | — | 2 | 1 | — | 1 |
| Enclosure A | 4 | 3 | — | 2 | — | 1 | 2 |
| Enclosure C | 1 | — | 1 | — | — | — | 1 |
| Room 3 | — | 2 | — | 1 | — | — | — |
| Total | 11 | 6 | 1 | 7 | 1 | 1 | 5 |

* This one-handed pitcher would be ideal for pouring beverages (used differently from tinajas)

these vessels fall into two main categories: wide-mouth and narrow-mouth jars (see Table 3). The most common type is a plain, large and wide-mouth vessel with an uneven surface, known locally as *maqma* (Arnold 1985:150, 1993:82; Valdez 1997:68–69). On the basis of additional attributes and body shape, this category can be divided into three subcategories (see Table 2). The first variant, Maqma A (Figure 5A), is neckless, with an ovoid body form and a conical base. Some vessels have two horizontal strap handles, placed asymmetrically, while others have no handles at all. The second variant, Maqma B (Figure 5B), has a short neck, ovoid body form, conical base, and two horizontal strap handles placed symmetrically below the shoulder. The third variant, Maqma C (Figure 5C), has a short neck, globular body, and a flat base. In the middle section of the body, two vertical strap handles are placed asymmetrically. These vessels are, at least as documented ethnographically, ideal for storing grains as well as for cooling and fermenting chicha (Arnold 1985:150, 1993:82; Isbell et al. 1991:44; Valdez 2002a:78). Their size and conical base suggest that these vessels were set into holes in the floor, likely indoors. Vessels of this type represent a significant 45% of all the ceramics from Marayniyoq. Smaller versions of this type also exist. Based on neck, body, and base shapes, five variants are distinguishable (Figure 5D–H). Functionally, these are also ideal for storing grains and fermenting beverages. Overall, these smaller versions represent 19% of the vessels found at the site.

The second most common oversized vessel type found at Marayniyoq has a plain, uneven surface, narrow neck (closed rim), globular body, and conical base (Figure 5I). Arnold (1985:150, 1993:82, 120) recognizes these types of vessels as *urpu*, but because of the particularity of their vertical strap handles, which are repeatedly found placed asymmetrically on their sides—suggesting that these vessels were used for transporting beverages—I call them *qipiris* (Valdez 1997:72, 2002a:78). Smaller versions of this kind of vessel are also present (Figure 5J). As illustrated by Gade (1999: Figure 2.3), jars of this type were manufactured for carrying beverages on one's back (Figure 6; Valdez and Valdez 2006). Indeed, the primary function of these vessels may have been for transporting beverages, which may have included chicha (Valdez 2002a:78).

TABLE 3
Spatial distribution of specific vessel rims and bases

| | Narrow-mouth Vessels | | | Wide-mouth Vessels | | | | Bases | |
|-------------|----------------------|-------------|-------|--------------------|---------|--------|-------|---------|------|
| | Qipiri | Lluku puyñu | Puyñu | Maqma A | Maqma B | Tinaja | Manka | Conical | Flat |
| Patio 1 | 2 | — | — | 3 | 2 | 1 | 2 | 4 | — |
| Patio 2 | 6 | — | — | 4 | — | 5 | — | — | — |
| Patio 3 | 7 | 1 | 2 | 19 | 5 | 19 | 5 | 2 | 4 |
| Enclosure 1 | 9 | — | — | 2 | 7 | 9 | — | 1 | 1 |
| Patio N | 12 | 1 | 1 | 24 | — | 3 | — | — | — |
| Passage 1 | 6 | — | — | 2 | 3 | 1 | — | 1 | 1 |
| Enclosure A | 12 | — | — | 12 | 12 | 1 | — | 2 | — |
| Passage 2 | 1 | — | 4 | 1 | — | 1 | 2 | — | 1 |
| Enclosure 2 | 10 | — | 2 | 9 | — | 5 | 3 | — | — |
| Room 1 | 4 | — | 1 | 5 | 1 | 6 | 1 | — | — |
| Room 3 | — | — | — | 1 | 2 | — | — | 6 | 1 |
| Enclosure C | 3 | 3 | 3 | 1 | 3 | 4 | — | 2 | — |
| Total | 72 | 5 | 13 | 84 | 45 | 55 | 13 | 18 | 8 |
| Percent | 28.09 | 1.74 | 4.53 | 29.27 | 15.68 | 19.16 | 4.53 | | |
| | | | | (44.95%) | | | | | |

Vessel forms were determined by comparing the samples tabulated here with the partially restored pieces listed in Table 2.

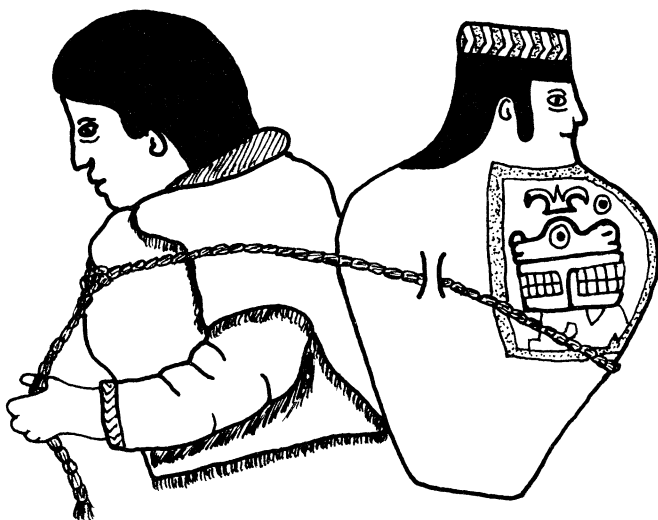


Figure 6. Illustration of the way qipiri vessels are carried.

The above-mentioned jars were manufactured, or rather finished, with little care, but other versions of similar jars were clearly better finished and also decorated. As with the former group, some of the better-finished vessels were larger (Figure 5K), while others were smaller (Figure 5L). Despite these size variations, and in sharp contrast to the former group, the surface of the finer vessels was smooth, painted and decorated, and some even had models of a human face on the vessel neck. Another noteworthy difference is their flat bases. They have two vertical strap handles placed asymmetrically, suggesting that they too were meant for carrying. Qipiris represent a significant 28% of the excavated vessels.

Finally, various small vessels of different forms are also present in the ceramic collection from Marayniyoq (Figure 5M–Q). Among these are narrow-neck jars or bottles as well as a vessel with a short neck, round body, and flat base, with a strap horizontal handle and a spout; various cups; and dishes in general (Figure 5R) decorated in the local Wamanga style of the Wari culture.

Of particular interest is a vessel that must have been used for pouring beverages (Figure 5O), found next to a drinking cup (Figure 5Q) in the area labeled Patio 1. Next to these vessels were four large, narrow-neck and conical-base vessels that probably contained chicha. Anders (1989:10, Figure 3d) illustrated a similar vessel from the Wari site of Azángaro and suggested that it may have been used for serving beverages. Thus, drinking likely took place at this particular location. Large cooking vessels ideal for boiling large quantities of maize beer are not as common as one might expect (only 4.5%). This, of course, could be a matter of sampling, and the fact that the process of restoring the broken vessels has only been partially completed. Nonetheless, blackened sherds with clear evidence of long exposure to fire are present in the Marayniyoq collection. Smaller variants of this type of vessel are definitely also present (Figure 5P).

The above vessel forms are not unknown for Wari contexts, at least in the Ayacucho region. Narrow-neck vessels similar to those from Marayniyoq have been reported from Conchopata (Pozzi-Escot, Alarcón, and Vivanco 1993: Figure 10a, 1994: Figure 8A). Large vessels with conical bases have also been found at other Wari sites, including Jincamocco (Schreiber 1992: Figure 7.1c and d) and Azángaro (Anders 1989: Figure 3b). However, the overwhelming presence of large vessels at Marayniyoq is undisputed. The archaeological implications of these findings are further considered below.

Unfortunately, the evidence is not conclusive about the differential spatial use of the various vessel types found at this site. Vessels of different forms and sizes were often found in the same locations, and many broken vessels had been restored and reused in antiquity. After being repaired, the functions of the recycled vessels clearly changed from their original uses (Valdez and Valdez 2006). Indeed, no matter how careful the repairing process may have been, there can be little doubt that once jars broke or cracked, they could not have been useful for transporting or even for storing beverages. The stored goods must have been dry products, such as grain. As discussed in the following section, there is tantalizing evidence for large-scale grinding at Marayniyoq, strongly suggesting that a major activity at the site was the processing of products that were stored in the vessels discussed above, both before and after being ground. In this context, the occurrence of large repaired vessels at this particular site is meaningful.

The Grinding Equipment from Marayniyoq

Although the pottery collection recovered from Marayniyoq is truly interesting, the most salient findings of the archaeological research carried out at this site are the cut stones. Lying on an unprepared surface at the same level as the well-compacted floor, and at times near the concentrations of broken vessels, several cut stones were uncovered at Marayniyoq (Valdez 2000a, 2002b, 2003; Valdez et al. 2001). While most are relatively small, measuring on average 60×50 cm, others are massive slabs that measure on average 120×60 cm. Despite their size and weight, the slabs abutted one another. In three cases, the cut stones were set in groups, precisely fitted, forming U-shaped enclosures (see Figure 4). These layouts are intriguing and give the impression that each of these enclosures functioned, or was intended to function, as a courtyard or meeting place. The interior section of each enclosure had a highly compacted floor on which—except in one case—large concentrations of broken ceramics were found. Charcoal samples collected from inside the southern end of the third enclosure (enclosure C) produced a date of AD 780 (all dates are calibrated). In the northern section of the excavated area, which is separated from the southern end by a large wall, another group of cut stones was uncovered (see Figure 4). Most of these cut stones consist of massive slabs, also set together, and forming an L-shaped enclosure. Charcoal samples collected in the immediate area of these slabs yielded a date of AD 905. Another charcoal sample collected 5 m to the east of the easternmost slab produced the same result (AD 905). Similar cut stones have not been found at other Wari sites in the valley. The stones excavated by Benavides (1991) in the Cheqo Wasi sector

of the main Wari site are part of megalithic mortuary chambers and do not exhibit evidence of grinding. Nonetheless, the evidence from Marayniyoq clearly indicates that Wari engineers were familiar with stone cutting.

Although the stone source is located about a kilometer to the south, the effort involved in cutting, transporting, finishing, and carefully placing the massive stones clearly shows that great skill and enormous labor were invested in this site. Such investment also suggests that initially Marayniyoq was perhaps a different kind of site than what has been inferred from the excavated artifacts representing the later phases of occupation. Originally, perhaps the site was intended to play a role linked with the social elite. Because some of the cut stones were never completely finished, it also appears that the initial plan was never completed; consequently, the site likely never accomplished the initial role for which it may have been planned. This is a very speculative argument, and it assumes that only the socially important sites required massive investments of labor. The paucity of evidence for domestic activities (pottery sherds, a few animal bones, some stone tools) also points toward a specialized role played by the site. Future research may reveal the initial purpose of this unique site, but until that kind of information becomes available, the function of Marayniyoq will be discussed on the basis of the artifacts found by our excavations.

The grinding surfaces of the shaped stones are about 40 cm above the floor, and with few exceptions, most of the stones have a flat surface (Valdez 2002a:76; Valdez et al. 2001:557). A salient feature of a number of slabs is the presence of a small ridge at one end of the flat surface, found near existing room walls. If the cut stones had been laid down as part of the floor, there would likely be no ridge since such unevenness is not ideal for a floor, making the possibility that these stones were part of a floor remote. A second important feature of most of the cut stones is the presence of a series of depressions (some shallow and others deeper). In the larger slabs the depressions are found in front of the ridge, whereas in the smaller stones they are in the center. While these depressions are unmistakable, other cut stones exhibit smooth, polished areas. On the larger slabs, these areas are also located on the opposite side of the ridge, near the edge, whereas the polished areas are located in the center on the smaller stones. Thus, the depressions and the polished spots are likely the outcome of the same activity, but with varied intensity (see below). The distance from the front edge of the slab to the center of the depressions and/or polished sections is about 20 cm. The depressions, except in one instance, run parallel to the front and back edges of the slabs.

Ever since the slabs were first discovered in 1999 (see Valdez et al. 1999, 2001), one of the main concerns of research at this site has been to explain these depressions. What kind of activity (or activities) took place on the cut stones? The following is an interpretation largely based on artifact associations and complemented with ethnographic analogies. Although one does not expect that all or even most of the artifacts found during the excavations were lying exactly where they were last used, some of the artifacts uncovered during the fieldwork were probably functionally associated with the cut stones. One such artifact type—perhaps the most important in understanding the role of the site—is represented by

several rocker grinders, also known as milling stones. Indeed, right above the slabs in the northern portion of the site, a group of four of these artifacts was found (Valdez et al. 1999: Figures 14–15). A similar artifact was uncovered just outside (north) of enclosure A (charcoal samples collected near this finding produced a date of AD 900), and another such artifact was uncovered inside enclosure A and in association with a cut stone (Figure 8). More importantly perhaps was the finding—in the area known as Patio 1—of a similar artifact in association with four broken plain large pottery vessels, a pouring jar, and a cup decorated in the Wari style (Valdez 2002a:77) that dates on stylistic grounds to Middle Horizon 2.



Figure 7. Cut stones uncovered in the northern portion of the excavated area.

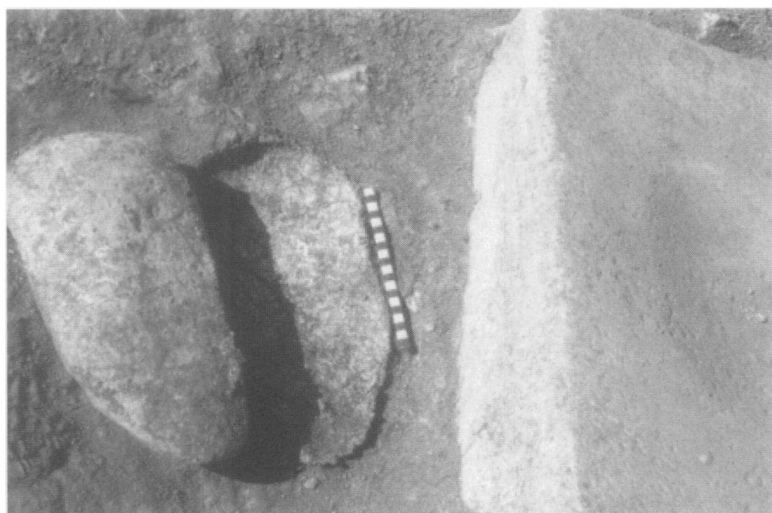


Figure 8. Close-up of cut stone showing grinder (tunay) associated with depression (maray).

The fact that these two artifact types are often found together strongly indicates that they are functionally related, with the stationary stone blocks functioning as passive elements and the rockers as active elements (Hastorf and Johannensen 1993:126–27). In the Ayacucho Valley and the surrounding region, similar stones are still used to grind and crush grains such as maize (see Weismantel 1988:137–38). Hence, the finding of these two artifact types in association strongly indicates that one of the main activities carried out at Marayniyoq was the processing of some type of grain. Further ethnohistoric and ethnographic accounts (Rowe 1946:221; Cobo 1956:243) corroborate the above interpretation. In light of such accounts, the depressions and polished sections of the cut stones are understood to result from the use of these two types of artifacts (David 1998:31). Indeed, Adams (1999) and David (1998) assert that one of the main signatures of grinding stones is the depressions of varied depth. Those that were not used for a considerable period of time only exhibit polishing. Rock type, the intensity of the grinding process, and perhaps the kind of products being ground may have been additional factors in the formation of these depressions.

In the Central Andes, artifacts associated with grinding have two basic elements: one passive and one active. It is the active element that rocks over the base (Hastorf and Johannensen 1993:126; Weismantel 1988:137). Because in the Andes the active element is rocked with both hands from side to side over a limited surface area, this section of the slab becomes very smooth, eventually resulting in a depression that mirrors the shape of the rocker grinder. This motion is rather different from the ones discussed by Adams (1999) and David (1998), where the active element is moved back and forth, and usually remains flat end-to-end (Adams 1999:482). Thus, in the Andes, the smooth spot and/or depression resulting from grinding is formed parallel to the edge, and both ends of the depression are the same distance from the slab's edge. In the cases discussed by David (1998:20), the proximal and distal ends of the depressions can be differentiated. At Marayniyoq only one cut stone has a flat end-to-end depression.

The depressions and polished spots in the slabs are about 20 cm from the edge of the cut stones. This, in agreement with Cobo's (1956) description regarding the use of grinding stones in the Andes, may indicate that the process of grinding was carried out in a kneeling or sitting position, just as today Andean women will kneel or sit before the *maray* while grinding maize. For back and forth grinding, David (1998:47) considers the possibility of determining the gender of the person who is grinding by evaluating the length of the depressions, with larger depressions hypothesized to result from the participation of males, who usually have longer arms. In the Andean context, where grinding is done with a side-to-side motion, establishing gender is not as simple because the length of the depressions is determined not so much by body size as by the size of the rocker. It is plausible that larger and therefore heavier rockers may have been used by men, although in the Andean context there is not a clear-cut division when it comes to the use of rockers since women are able to work with heavier rockers as well.

In summary, various aspects of the artifacts discussed in this section resemble the grinding stones still in use in the Ayacucho region. On the basis of this

information, the cut slabs and the rockers found at Marayniyoq are interpreted as grinding equipment (Valdez 2003). The occurrence of several of such artifacts at this particular site strongly suggests that grinding was one of the main activities carried out at this location. In the following section, the ideas discussed up to this point are further considered to assess their significance in the context of the Wari culture.

RELATIONSHIP TO THE CENTER OF WARI

Rocker grinders and their respective grinding slabs are found at many other central Andean archaeological sites (Valdez and Riddell 2001:9), including Wari sites (Bencic 2001:112; Glowacki 2002:279). However, such findings consist only of isolated artifacts, suggesting an activity carried out at the household level rather than at an “industrial” scale. Indeed, ethnographically it is known that each Andean household owns a grinding slab and its active element for processing food (Escobar 1976: Figure 3.1A; Meyerson 1989:49, 50; Weismantel 1988:137). At Marayniyoq, in contrast, there are seven isolated grinding bases and fifteen massive slabs with depressions, and many others with polished surfaces. Their size clearly indicates that considerable labor was invested in the preparation as well as in the transportation and final setup of the slabs. The only similar evidence from the Ayacucho Valley or the entire Central Andes for any time period, including the Inka empire, appears to be the finding of “large rocker flattening stones used to crack the *jora* [malated maize] open” at the Inka center of Huánuco Pampa (Morris 1979:28). Morris argues that such grinding equipment was linked to chicha production. Compared with that of Marayniyoq, however, the grinding equipment from Huánuco Pampa is modest. The Spaniards, such as Father Cobo (1956:243), provide detailed descriptions regarding the use of grinding equipment during the Inka period, but these simply do not match the evidence from Marayniyoq. Although the Inka state promoted the establishment of specialized facilities for the manufacture of cloth (Spurling 1992), pottery (Hayashida 1999; Murra 1978), and metalwork (Rowe 1946:201), it appears that nothing comparable to the grinding facilities at Marayniyoq was built.

If the original focus of the site was grinding, why was so much energy and labor invested in establishing a grinding facility, particularly when such an activity normally occurred at household level? It is difficult to answer this question definitively, although this level of effort strongly suggests that the facility, if planned for this purpose from (or at least not long after) its inception, was intended to operate for a long period of time, and probably did, as the deep depressions attest. Moreover, it appears that this facility was laid out in order to process food on a large scale, much like a factory, and that the deep depressions must be the outcome of sustained grinding. Finally, it is possible that a substantial number of persons worked side-by-side at the site, perhaps on a daily basis, conceivably responding to a major demand for processed food in the region during this particular time. Once again, the absence of evidence for domestic use of the site strongly supports this interpretation as a specialized work site. Thus, Marayniyoq represents a

significant departure from traditional domestic grinding, arguably representing a situation in which efficiency and enhanced production were crucial.

The scale of production was probably even greater than indicated by the stones uncovered during our excavation, particularly given the fact that the excavated area is quite small relative to the overall size of the site. During the past several decades, Marayniyoq has been a mine for cut stones. Local informants report that the former landowner searched for cut stones to pave some building floors, while others were reused as grinding stones. During a visit to the abandoned Spanish hacienda, we saw several stones, some with clear depressions, in front of the residence. We also cleared one of the rooms and found several large slabs, thus confirming the locals' report.

There is no doubt that grinding occurred at Marayniyoq and apparently on a scale beyond the demands of the household. The occurrence of grinding stones at other Wari sites indicates that small-scale grinding continued at other locations. In the context of such a scenario, it appears that basic food items were processed at the household level, much as occurred during the Inka period. If this reasoning is correct, perhaps the site was reserved for the processing of some specific type or types of products. Based on the amount of energy and labor invested in its establishment, Marayniyoq may have been a state facility built to provide a specific processed food required by the state in order to accomplish state-sponsored projects.

If the above suggestion is correct, what product would have required such an extensive and elaborated grinding center? Soil removed during the excavations was dry-screened through 2 mm mesh, but no macrobotanical remains were found. Soil samples were also processed by flotation, but our efforts were again fruitless. Thus, there is still no botanical identification of what was processed at this site; future study with a focus on starch and phytolith analyses should provide the means to confirm the role of the stones. Although there are several indigenous Andean grains and processed foods that require crushing and grinding prior to consumption, to the best of my knowledge, no indigenous Andean crop other than maize would have necessitated a processing center such as Marayniyoq. Of course, maize can be, and is, consumed without crushing (Arnold 1985:150, 1993:120; Hastorf and Johannessen 1993:121; Skar 1981:141, 143), but it is crushing and grinding that enables a greater variety of meals (Skar 1981:144; Weismantel 1988:139) and improves food quality (Stahl 1989:171).

An extensive grinding center such as Marayniyoq would have been ideal for the grinding of *qora*, malted maize used for making chicha (Moore 1989; Morris 1979). Chicha production usually requires large amounts of crushed *qora* (Allen 1988:140; Bray 2003:97; Meyerson 1989:49; Moore 1989:686; Morris 1979:28). If chicha consumption during Wari times was as important as it was during Inka times (Morris 1978, 1979; Murra 1980; Valdez 2002a; Williams et al. 2005), and if the Wari state carried out large projects that required the massive participation of workers, similar to the Inka *mita* system, the building of a center such as Marayniyoq may have been crucial.

Recall that several previously repaired vessels found in the vicinity of the grinding slabs could only have been used for storing dry goods, such as *qora*. *Qora*

was likely stored in this type of vessel before and after being crushed. Because large pots ideal for boiling large amounts of chicha have not been found at Marayniyoq, the crushed qora may have been transported from Marayniyoq to the places where chicha was produced and consumed. Again, the absence of similar grinding equipment at sites such as Conchopata and the urban capital itself, where there is indirect evidence for chicha consumption, leaves open the possibility that crushed qora used at these sites was processed at Marayniyoq. In my view, this is the only reasonable explanation for the finding of repaired vessels at the site (Valdez and Valdez 2006). Originally, however, the vessels likely functioned for brewing, storing, and transporting beverages. The occurrence of a one-handed pitcher and drinking cups also suggests that drinking took place at the site.

Additional, equally important information from Marayniyoq suggests that, during Wari times, chicha was produced by women. First of all, Andean ethnography repeatedly demonstrates that grinding and making chicha are activities strongly associated with women (Allen 1988:140; Bray 2003:97; Hastorf 1991:134; Meyerson 1989:49); as noted, this was also the case within the Inka state. Morris (1979:28; also see Morris and Thompson 1985:70) states for Huánuco Pampa that “along with the large jars, and other evidence suggesting brewing, were numerous spinning and weaving tools.” Several spindle whorls were found in the area around the slabs at Marayniyoq as well. In the highland regions of Peru, spinning continues to be associated with women (Gero 1990:54; Murra 1962:711, 1983:107; Rowe 1946:241). These convincing indications testify to the association between women and grinding, suggesting likewise that, perhaps in similar fashion to the aqllas, it was women at Marayniyoq who were responsible for grinding qora and subsequently for producing chicha (Morris and Thompson 1985:70). If grinding was also a women’s activity in the past, Marayniyoq may be a pre-Inka state production center with a distinctive female orientation. Glowacki (2002:276) argues that feasting and drinking during Wari times probably involved the participation of women.

The consumption of chicha during the time of Wari has already been considered by several archaeologists (including Valdez 2002a). Many Wari sites of the highlands are near or in grain-producing zones, strongly indicating a major reliance on maize cultivation during this particular period (Browman 1976:474; Raymond 1992:22; Schreiber 1984:76, 1992:149–51). This settlement pattern was emphasized by the Wari state when conquered populations were being relocated. The fact that Wari iconography often displays maize (Lumbreras 1980:44; Menzel 1964:26) may be another indication of the importance of maize and maize beer during this period.

Finally, the role of Marayniyoq as a large maize-grinding facility and its relationship to Wari should be pondered (Cook and Glowacki 2003; Isbell and Cook 2002; Lumbreras 1974; Menzel 1964; Rowe 1963; Schreiber 1992). For instance, the state must have supplied provisions for the army as well as for *corvée* workers involved in state projects, such as the building and maintaining of roads and canals, terracing and cultivating of fields (Schreiber 1992:262), and building of public facilities. For example, Hyslop (1984:273) has shown that segments of

the Inka royal highway already existed before the Inka state came to power (Schreiber 1984:89). Perhaps chicha was also provided by the Wari state for road building and other state-sponsored projects in a fashion similar to what the Inka state did centuries later (Hastorf 1991:132). Ceremonial activities and other reciprocal obligations between the elite and the commoners probably involved chicha consumption, thus increasing the vital role of Marayniyoq within the sociopolitical context of the Wari state (Knobloch 2000; Glowacki 2002).

CONCLUSION

In fact, one wonders how history would ever have progressed without fermented beverages to toast successes, dull the pain of failure, and in general ease the establishment of interpersonal relations. Whatever the varying nutritional qualities and clinical effects may have been, their special socioeconomic significance is widespread in ancient and modern human societies (Morris 1979:21).

As recently argued by Jennings et al. (2005), fermented beverages are one of the most widely accepted drugs around the world. Alcohol, produced from a variety of products, including maize, is legally consumed in almost all cultures. In addition to having religious and social significance, alcohol is consumed to celebrate victory, to deaden emotions, and to build personal alliances; occasions to toast with a cup of alcohol are plentiful (Dietler 1990; Heath 2000). Its current worldwide acceptance and inclusion in almost every social event are to some degree paralleled by archaeological indications that many ancient civilizations around the world also produced and consumed fermented beverages.²

As reported by the Spaniards, the Inka state was definitely one of those early civilizations that deliberately produced and distributed fermented beverages. Subsequent archaeological research has documented evidence of chicha production and consumption by other, earlier Andean civilizations (Gero 1990; Goldstein 2003; Moore 1989; Shimada 1994; Valdez 1994; see also Burger 1992:108). Human bone isotope analyses of burials from the pre-Inka and Inka periods in the Mantaro region confirm the use of maize in the form of chicha (Hastorf and Johannessen 1993:128, 132). Therefore, in the Andean region there is a long tradition of the use of fermented beverages—in particular, maize beer.

As discussed in this paper, the archaeological evidence from the Middle Horizon site of Marayniyoq is comparable to, if not more conclusive than, the evidence for chicha production and consumption during Inka times. The overwhelming presence, first, of vessels ideal for transportation and chicha fermentation, in addition to repaired pottery vessels perfect for grain storage, and, second, of grinding equipment ideal for large-scale grinding, indicate that the storage and processing of the raw material used in chicha production occurred at the site. Moreover, there are significant parallels between the information from Marayniyoq and the Andean ethnographic data. Thus, much of what is known of chicha production in the Inka state seems to be applicable to earlier states, such as

Wari. One such case appears to be the association of women with chicha production, leaving open the possibility that institutions such as the *aqllas* perhaps already existed during Wari times. As noted, during Inka times chicha consumption was also part of religious ceremonies, when the bodies of dead leaders were offered chicha. Along similar lines are suggestions that the mortuary structures at Marayniyoq (Valdez, Bettcher, and Valdez 2002a; Valdez, Valdez, and Bettcher 2005) provide evidence for the connection of ancestors with chicha production.

Although previous studies in the Ayacucho Valley and elsewhere had hinted at the likely use of chicha during the Middle Horizon, the data from Marayniyoq are more specific with regard to the production of this beverage. The depressions in the stones must be the outcome of intensive grinding activity, and that intensity must have been as a response to, or a result of, a major demand for chicha. Ultimately, such a demand may have emerged from the widespread use of chicha within the Wari realm, in particular in ritual and other public activities in which the state participated (Glowacki 2002; Isbell and Cook 2002; Knobloch 2000; Valdez 2002b, 2003; Williams et al. 2005). On the basis of this new evidence, it is evident that chicha was not an Inka invention, nor was its widespread acceptance in the Andean region (Valdez 2002a:96). Instead, the evidence strongly indicates that chicha use in the Andes goes back at least to the Early Intermediate period (circa AD 1–500) (Gero 1990; Valdez 1994) and continued during (Goldstein 2003) and after (Hastorf and Johannensen 1993; Moore 1989) Wari times. A site such as Marayniyoq, seemingly built to operate for a long period of time, is the best archaeological signature of the critical role of chicha during the time that the Wari state flourished in the Central Andes.

Finally, the functional analysis of the archaeological remains uncovered from the Wari site of Marayniyoq strongly suggests that the Wari state was behind the building of centers focused on chicha production. This emphasis may signal the importance of fermented beverages for the Wari state, which, perhaps in similar fashion to the Inka state, participated in large-scale, labor-intensive projects. Such facilities leave unmistakable archaeological signatures of chicha production, which in the Andean scenario are best represented by ceramic vessels and grinding equipment used in processing, brewing, and transporting. Its analysis, combined with ethnohistorical and ethnographic records, provides a clear understanding of how chicha was made by ancient political organizations.

NOTES

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1. In addition to maize beer, sources such as Cobo (1956 [1653]:267) make mention of chicha made of molle (*Shinus molle*) berries, which according to Cobo was even “stronger than maize beer.” Whereas maize beer requires grinding and boiling, the production of molle beer (*molle aqa*) does not require such procedures (Cook and Glowacki 2003:180). In the Ayacucho region, molle berries are simply soaked in plenty of water for about three hours; afterwards the sweetened water is separated and stored in large, narrow-neck vessels for fermentation. This information is not consistent with the observations made by Goldstein and Coleman (2004:527), who argue that the making of molle aqa implies boiling. Botanical remains of molle do not occur in regions such as the south coast of Peru prior to Wari expansion, suggesting that the plant was introduced later on, likely by Wari.

2. In addition to maize, the products most widely used in alcohol production constitute the staple crops for many cultures around the world. This association leaves open the possibility that perhaps alcohol production was an important or even the main reason for the initial domestication of these plants.

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