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PERU

Macrobotanical Remains from the 2009 Season at Caylán: Preliminary Insights into Early Horizon Plant Use in the Nepeña Valley, North-Central Coast of Peru

David Chicoine (dchico@lsu.edu), **Beverly Clement** (bcleme7@lsu.edu), and **Kyle Stich**, all of the Department of Geography and Anthropology, Louisiana State University, Baton Rouge, report on taxonomic analysis of the macrobotanical remains from the first season of excavation at the Early Horizon site of Caylán, Peru.

In coastal Ancash on the north-central coast of Peru, the transition into the Early Horizon is associated with increasing intensification of farming practices and changes in botanical assemblages. This report examines patterns of plant exploitation and subsistence as viewed through the analysis of macroscopic botanical remains found at the site of Caylán in the Nepeña Valley. Since 2009, Chicoine has been directing a long-term excavation project at Caylán. Horizontal and vertical excavations have yielded information about the material culture, chronology, and spatial organization at the site. Caylán is currently interpreted as an incipient Early Horizon urban settlement with a significant permanent resident population (Chicoine and Ikehara 2010). This report presents and discusses preliminary results of macrobotanical studies carried out on the 2009 assemblage. Taxonomic and quantitative analyses of the macrobotanical remains were carried out by Clement and Stich in 2010 and 2011. In this report, we explore the presence of different types of plant remains across the areas excavated with the objective of investigating the relationship between socioeconomic activities, the use of plants, and their discard. Results shed

light on patterns of urban residency, trade, and the changing role of plant crops in local diets.

Background: Socioeconomic Transformations in Early Horizon Nepeña

Human-plant interactions are best explored in relation to broader political and economic transformations (Hastorf 1999). In Early Horizon Nepeña such transformations include the establishment of a major urban settlement at the site of Caylán, the reorganization of exchange networks following the demise of Chavín and Cupisnique influences, the intensification of animal husbandry (*i.e.* guinea pigs, camelids), and an increased reliance on maize.

In 2009, Chicoine excavated at the center of Caylán to investigate the development of Early Horizon societies and the impact of incipient urbanism on patterns of exploitation and use of natural resources. With a dense architectural core of fifty hectares and a settlement extension of more than eighty hectares, Caylán stands out as the largest archaeological site in Nepeña. Based on regional settlement data, the site is interpreted as the primary center of an urban polity linked to the satellite sites of Sute Bajo, Samanco, Huambacho, and perhaps Cerro Blanco during the Nepeña (800-450 cal BC) and Samanco (450-150 cal BC) phases. The lower valley polity contrasts markedly with communities established in the upper reaches of the drainage, around the area of Moro (Ikehara 2010). Here, a series of hilltop fortresses points towards competing communities of roughly similar sizes (Ikehara and Chicoine 2011:173-174).

Economically, both systems relied heavily upon irrigation farming, the cultivation of domesticated crops, and the exploitation of wild and semi-wild plants and trees. Upper valley

groups had special access to the *yunga* regions, areas with different ecological settings including greater possibilities for agriculture (Onuki 1985). Coastal groups, meanwhile, exploited marine and lacustrine ecosystems through fishing, as well as shellfish and algae collecting. Plant remains from Caylán bring preliminary insights into human-plant interactions in the lower portion of the coastal plain.

Macrobotanical Remains from Caylán

Caylán is on the northern margin of the Nepeña River, fifteen kilometers from the Pacific littoral. The site strategically sits in a dry pampa surrounded by hills and gullies on the southern and western edges, and a small lagoon to the southeast. Based on soil type data (ONERN 1972), the lagoon is likely to have been more extensive in the past. To the northeast, Caylán is bordered by canals and cultivated fields. Both the arable fields and marshlands provided critical plant resources to the Caylán residents during the Early Horizon.

This report focuses on the macrobotanical remains excavated in 2009 which represent about three kilograms of material. The analysis considers the taxonomic composition of the assemblage with the objective of defining the species processed and discarded on-site. Ultimately, plant remains can help build an understanding of the nature of Caylán's occupation, subsistence economy, and social organization.

Plant remains were found in three excavation units, five test pits, and one looter's pit. The recording of the excavations was realized through natural and cultural stratigraphic levels. All excavated materials were screened through three millimeter (one eighth inch) mesh. Flotation techniques have yet to be employed at Caylán. Hence, we need to be cautious with the results of this report. Quantification procedures favor weight and Number of Identified Speci-

mens (NISP) for general observations on the presence and absence of plant taxa. Where possible, a Minimum Number of plant Elements (MNE) was established in order to evaluate the ubiquity and relative frequency of plant elements used and discarded. MNE is defined as the minimum number of plant elements (*i.e.* seed, stem, exocarp) for each taxon. Of the total of 2,997 grams of plant remains, a total of 3,370 NISP and 849 MNE were identified, of which 2,488 NISP and 733 MNE were classified into meaningful taxa (Table 1). NISP/MNE values were attributed to species when possible and to genus or family or broader category otherwise. Archaeobotanical determinations were made based upon morphological consistency with modern and pre-modern examples of plant taxa.

The plants processed, used, and discarded at Caylán fall into different categories. Non-food industrial species, mainly represented by varieties of canes, reeds, gourd, wood, and cotton, were used for several tasks including the production of tools, containers, baskets, mats, and textiles; the construction of walls and roofs; as well as fuel and fill. There is no clear evidence of the consumption of industrial plants. Such grass roots were found with no trace of food processing or mastication. No gourd (*Lagenaria siceraria*) seeds were recovered, and while some of the cotton seeds recovered display breakage along their lateral axis, their damaged condition is consistent with natural taphonomic factors.

Meanwhile, edible species were used in the preparation of food and drink, and include cereals, tubers, fruits, and legumes. Besides the presence of a single fragment of *Erythrina* sp., little evidence exists for the presence of strictly non-dietary edibles such as medicinal and hallucinogenic plants. The assemblage recovered is indicative of intensive agriculture and consistent with a dual agronomic organization comprised of (1) plants that do well in disturbed landscapes with direct sunlight (*e.g.* maize,

cotton, squash), and (2) shade-producing plants more typical of arboriculture (e.g. avocado, lúcuma). At the moment, it is unclear how much effort, land, water, and other resources Early Horizon farmers devoted to each of these two production systems.

Taxa	NISP	%	Weight (g)	%	Sum MNE	%
Food Plants						
Maize (<i>Zea mays</i>)	895	78.65	610.0	78.27	402	76.43
Peanut (<i>Arachis hypogaea</i>)	100	8.79	5.7	0.73	32	6.08
Avocado (<i>Persea americana</i>)	45	3.95	113.8	14.60	38	7.22
Pacae (<i>Inga feuillei</i>)	34	2.99	6.5	0.83	8	1.52
Achira (<i>Canna</i> sp.)	15	1.32	28.8	3.70	10	1.90
Common bean (<i>Phaseolus vulgaris</i>)	12	1.05	1.8	0.23	8	1.52
Palillo (<i>Campomanesia lineatifolia</i>)	9	0.79	5.6	0.72	8	1.52
Squash (<i>Cucurbita cf. moschata</i>)	8	0.70	0.4	0.05	7	1.33
Lima bean (<i>Phaseolus lunatus</i>)	4	0.35	2.0	0.26	4	0.76
Lúcuma (<i>Pouteria lucuma</i>)	2	0.18	1.9	0.24	2	0.38
Cansaboca (<i>Bunchosia armeniaca</i>)	2	0.18	0.6	0.08	2	0.38
Jack bean (<i>Canavalia</i> sp.)	2	0.18	1.2	0.15	2	0.38
Cherimoya (<i>Annona cherimola</i>)	9	0.79	0.9	0.12	2	0.38
Chili pepper (<i>Capsicum</i> sp.)	1	0.09	0.2	0.03	1	0.19
Total food plants	1138	100.00	779.4	100.00	526	100.00
Nonfood Plants						
Bottle gourd (<i>Lagenaria siceraria</i>)	572	42.37	243.0	19.85	59	28.50
Caña brava (<i>Gynerium sagittatum</i>)	332	24.59	244	19.93	42	20.29
Caña guayaquil (<i>Guadua angustifolia</i>)	253	18.74	635	51.86	51	24.64
Charcoal	60	4.44	43.1	3.52	14	6.76
Junco (<i>Juncus</i> sp.)	42	3.11	4.9	0.40	3	1.45
Cotton (<i>Gossypium</i> sp.)	34	2.52	4.8	0.39	17	8.21
Bamboo (<i>Chusquea</i> sp.)	29	2.15	32.5	2.65	5	2.42
Junco (<i>Scirpus</i> spp.)	25	1.85	15.4	1.26	13	6.28
Horsetail (<i>Equisetum giganteum</i>)	2	0.15	0.3	0.02	2	0.97
<i>Erythrina</i> sp.	1	0.07	1.4	0.11	1	0.48
Total nonfood plants	1350	100.00	1224.4	100.00	207	100.00
TOTAL	2488		2003.8		733	

Table 1. Food and non-food plant taxa identified from the 2009 macrobotanical remains excavated at Caylán.

Food Plants

Maize (*Zea mays*) is the most abundant of the food plants, followed by peanut (*Arachis hypogaea*), and avocado (*Persea americana*). The over-representation of maize, peanut, and avocado is likely linked to taphonomic issues because cobs, peanut shells, and avocado pits survive well in the archaeological record. Pacay (*Inga feuillei*), squash (*Cucurbita cf. moschata*), Guava or palillo (*Campomanesia lineatifolia*), common bean (*Phaseolus vulgaris*), lima bean (*Phaseolus lunatus*), lúcuma (*Pouteria lucuma*), cansaboca (*Bunchosia armeniaca*) achira (*Canna* sp.), jack bean (*Canavalia* sp.), cherimoya

(*Annona cherimola*), and chili pepper (*Capsicum* sp.) are also present (Table 1).

The measurement of 64 complete maize cobs indicates that the Early Horizon maize from Caylán closely resemble varieties documented at neighboring sites in the Nepeña and Casma Valleys (Table 2; Pozorski and Pozorski 1987: 64, figure 41). Preliminary morphometric observations indicate the presence of different varieties of Early Horizon maize including a dark variety. The Caylán maize cobs average 51.55 by 14.66 millimeters with an average weight of 2.13 grams. A more detailed analysis of the ubiquity of plant remains will have to be carried out

based on excavated volumes, but suffice it to say that maize is present in all contexts except one test pit. Maize is the most ubiquitous food plant taxon at the site. In contrast, for instance, peanut remains are less common. It is perhaps significant that peanuts are considered by some scholars as a special food item, perhaps associated with elite snacks and other special gatherings.

Taxa	Complete	Mean weight (g)	Mean length (mm)	Mean width (mm)
<i>Zea mays</i> (cob)	64	2.13	51.55	14.66
<i>Campomanesia lineatifolia</i> (fruit)	7	0.85	11.88	15.25
<i>Cucurbita moschata</i> (seed)	3	0.05	22.33	13.83
<i>Arachis hypogaea</i> (legume)	1	0.60	25.50	12.00
<i>Canavalia</i> sp. (seed)	1	0.90	23.00	17.00
<i>Persea americana</i> (seed)	1	9.20	34.00	28.00
<i>Phaseolus lunatus</i> (seed)	1	1.60	26.00	14.00

Table 2. Average length, width, and weight of the complete specimens of plant taxa recovered at during the 2009 excavations at Caylán.

Caylán residents also consumed and discarded squash. Morphometric observations indicate that Early Horizon cucurbits are comparable to the *moschata* taxon. Meanwhile, beans from Caylán were varied and included common (*Phaseolus vulgaris*), lima (*Phaseolus lunatus*), and jack (*Canavalia* sp.) beans.

Arboreal fruits are represented by five species. This diversity suggests fruits were important in Early Horizon diets. Avocado is the most common and ubiquitous due to the durability and high visibility of the hard fruit seeds. Meanwhile, pacay seeds decay more rapidly. The archaeological visibility of pacay is increased by the discard of the long and thick fruit casings. Most pacay remains were excavated in an open air midden located outside the urban core at Caylán.

Non-food Plants

Industrial plants are mostly represented by fragments of wood, bottle gourd, bamboo, sedge,

and cane/reed. Wood served myriad functions including use as primary materials and fuel. Wood was also used to produce tools and artifacts such as spinning rods, lids, digging sticks, spears, and figurines. It also served as construction material, especially posts. Wood recovered is consistent with leguminous hardwoods from the *Fabacea* family (e.g. *Prosopis* spp., *Acacia* spp.) and members of the softer *Capparidacea* family (e.g. *Capparis* spp.). It is important to note that these assignments are tentative. A significant portion of the wood recovered is tentatively assigned to cf. *Pouteria lucuma* (NISP=204, 298.4 grams) and consists entirely of stems that might be obtained by pruning. This interpretation is hampered by the uncertainty inherent in identifying wood by external markings. Very little pyrolyzed wood was recovered (41.3 grams) and almost all of the wood recovered was used as construction material. The use of thin sections to determine arboreal taxa with reasonable confidence is extremely difficult without pyrolyzed remains, owing to the prevalence of dry rot on the Andean desert coast.

Affine species of marshland-dwelling grasses and sedges were critical to the fabrication of mats, baskets, and cordages. The Caylán canes and reeds pertain to several taxa including at least three species of *junco* (*Scirpus californicus*, *Scirpus americanus*, *Scirpus* sp.), *caña brava* (*Gynerium sagittatum*), *caña guayaquil* (*Guadua angustifolia*), and bamboos (e.g. *Chusquea* cf. *scandens*). Hereafter, bamboo is used to refer specifically to member of the *Chusquea* genus. *Caña brava* and *caña guayaquil* typically provided the principal material for roof superstructures. Young and flexible examples of *caña guayaquil* were used for ropes and cordages. One example of *Stipa* sp. of indeterminate function was recovered. It is morphologically consistent with the common roof covering, cordage, and fodder *ichu* (*Stipa ichu*). In addition, excavations have yielded several examples of sections of

mud mortar with reed imprints. This evidence suggests reed cordage was likely used in perishable material superstructures, especially the tying up and binding of roof structures. Grass cordage (*Poaceae* sp.) was recovered. It is similar in morphology and use to the common reed (*Phragmites australis*). However, we prefer to avoid assigning species name based on the non-diagnostic character of the remains.

Deposition of these plants is not uniform across the site. The roof structure of HP3, located along a major wall, is dominated by *caña brava*, while bamboo is overwhelmingly found in UE1 (Excavation Unit 1). Meanwhile, *caña guayaquil* is most common through UE2 (Excavation Unit 2) and UE3 (Excavation Unit 3). While this breakdown appears non-arbitrary, it is unclear whether it reflects differences in resource availability, access, or architectural strategies.

Domesticated bottle gourd is common. Fragments mainly came from broken containers and included stems and bodies. Elsewhere in coastal Peru, gourds were also used as covers for ceramic vessels and floating devices for fishing nets. Gourd containers can take many forms including deep bowls, spherical jars (*porongos*), and even so-called corn-poppers (*cancheros*). Most are interpreted as storing and serving devices for liquids.

Caylán residents were provided with cotton (NISP=34; MNE=19) which was used to produce fishing nets, as well as woven textiles. In Nepeña, Early Horizon textiles are mainly plainweaves made with beige cotton, and occasionally decorated with blue dyed fibers woven to create geometric designs.

Overall, the macroscopic remains align well with collections from neighboring Early Horizon sites in coastal Ancash (Chicoine 2006; Pozorski and Pozorski 1987), although several plants like

nightshades (*Solanum* spp.), and manioc (*Manihot esculenta*) are noticeably lacking. Ongoing detailed analyses of the 2010 plant remains combined with the study of soil samples and dried human feces recovered during fieldwork should help resolve the situation as we gain a more comprehensive understanding of Caylán plant-human interactions.

Discussion: Preliminary insights into Early Horizon plant production and use in Nepeña

The Caylán research represents a first attempt at unraveling the changing relationships between Early Horizon economics and plant exploitation in the Nepeña Valley. Recent research in coastal Ancash has shed light on the major reorganizations that marked the ninth and eighth centuries B.C., when late Initial Period ceremonial centers were deserted and populations realigned towards extensive enclosure settlements. For a few centuries, probably until the second half of the Early Horizon or Samanco Phase in Nepeña, farming groups extended irrigation networks and experimented more extensively with some crops, most saliently maize. The increased visibility of plant domesticates in Early Horizon trash deposits indicate an intensification of farming strategies combined with an extension of the areas under cultivation. In Nepeña, shifts in political economies and elite strategies are most visible in the innovations in feasting practices and communal gatherings. In the lower valley, groups clustered around the urban center of Caylán. Settlement pattern data point toward strong ties with smaller secondary satellites. The placement of these satellites near strategic locations to control irrigation canals confirms the relationship between Early Horizon settlement reorganizations and the intensification of irrigation practices.

The analysis of the 2009 macrobotanical remains from Caylán brings insight into the

plants processed, used, and discarded at an incipient Early Horizon urban center. Results indicate that Caylán dwellers relied heavily on wild trees, sedges, reeds, and canes. It is significant that the settlement is nowadays bordered by a lagoon. The recovery of large amounts of marshland-dwelling taxa suggests a dynamic exploitation of industrial species for the production of goods and the construction of habitation structures. Industrial plant materials also came from domesticates as evidenced by the discovery of cotton and bottle gourds. How specialized the farming of industrial species was in relation to food domesticates remains unclear.

Based on settlement patterns, architecture, and spatial organization, Caylán is preliminarily interpreted as an incipient urban center where co-residents merged to organize defense and build and maintain agglutinated stone-and-mud walled compounds (Chicoine and Ikehara 2010). Macrobotanics help to further test this working hypothesis. From a traditional standpoint, sustained urbanism and dense human occupation should be visible in year-round patterns of residence, intensive storage, the preparation, consumption, and discard of daily foodstuffs, as well as production activities related to socioeconomic segments detached from primary subsistence activities. The strong tendency towards botanical detritus associated with consumption (*e.g.* pits, cobs, pods) as opposed to storage or secondary use of locally-produced plants (*e.g.* stems, leaves, inflorescence) argues against the presence of residents in the site core intensively engaging in primary farming and plant processing activities. Biases in the recovery of specific plant elements may reflect differential consumption patterns or the increasingly complex nature of an incipient urban economy.

Preliminary results suggest that Caylán residents were engaging in a mixed economy that was based in large part on imported marine resources and intensive agriculture. Groups

utilized a variety of arboreal species including avocado, lúcuma, pacay, and *palillo*. These taxa are associated with a significant investment of time and resources, especially in relation to spatial allotment. No tubers were recovered during the 2009 season, but this is likely due to their low rate of preservation. Future field-work and botanical analyses should bring insights into tuber-based carbohydrate input. Peanuts were found in two-thirds of the excavation areas, but appear more commonly in public and ritual contexts. The exact dietary importance of maize is unclear, but its provenience indicates that it was highly significant politically. It served as a potentially major nutritional resource, and was likely a source of social capital. The disproportionate amount of maize recovered from Plaza A suggests that its consumption was either linked to feasting events or that it was preferred as construction fill relative to other taxa. The homogeneity of maize deposition in stratigraphic excavations indicates that maize was utilized from the earliest levels of occupation at Caylán, and is consistent with an increased prevalence over time. Morphometric variability across the Caylán sample points to the existence of more than one type of maize.

The deposition of botanical remains in urban systems is complex owing to processes of waste management, the tendency to recover evidence of food preparation, as opposed to production, and the difficulty in identifying imports and exports. The botanical remains recovered from Caylán are consistent with the intensification of agricultural process during the Early Horizon on the north-central coast of Peru. The development of urban lifeways is expected to be associated with changes in foodways and nutrition. At the site of Caylán, these shifts are manifested by an increased reliance upon trade, intensive agriculture, animal husbandry, and the likely importation of semi-processed botanical foodstuffs.

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OBSIDIAN TECHNOLOGY AT THE WARI SITE OF CONCHOPATA IN AYACUCHO, PERU

Catherine M. Bencic (Binghamton University/SUNY; email: catherinebencic@gmail.com) provides a lithic analysis based upon her dissertation (Bencic 2015).

From 1999 until 2003, the Conchopata Archaeological Project (CAP), directed by William H. Isbell, Anita G. Cook, José Ochato-ma Paravacino, and Martha Cabrera Romero conducted five seasons of field-work at the Wari¹ site of Conchopata in the city of Ayacucho in the central Peruvian Andes (Figures 1, 2). Although the site has a long history of research beginning in the 1940s, this project is the most extensive at the site to date, with over two hundred architectural spaces excavated and more cultural material recovered than ever before (see Burger *et al.* 2016, this volume for a summary of investigations at Conchopata). During 2003, Bencic analyzed lithic materials from all areas excavated by the CAP with the help of archaeology students from the Universidad Nacional San Cristóbal de Huamanga. The results of this analysis demonstrate that obsidian biface production did not occur in excavated areas, and that there is no evidence of lithic workshops in the architectural core.

¹ This report follows Isbell's (2002) convention of using the spelling "Wari" for the culture and materials associated with it and "Huari" for the archaeological site itself.



Figure 1. Aerial photo of Conchopata (from Bencic 2015: Figure 1.1; photograph courtesy of William H. Isbell).

A technological approach was employed to analyze the processes involved in the production and use of stone tools. Flaked stone was grouped into debitage or retouched implements. Small debitage from heavy fractions of flotation samples was analyzed separately using the same criteria. Because less than half of all loci excavated contained lithic artifacts, all flaked stone recovered from CAP excavations was analyzed. The site had been bulldozed in the late 1990s by landowners building on the site. This resulted in heavily disturbed surface strata. Only materials from these upper strata were excluded from the analysis, unless recorded as special finds.

A total of 5,262 lithic artifacts was analyzed, consisting of 2,371 retouched tools and fragments and 2,891 artifacts grouped as debitage. Cores with no visible edge wear are included in this latter category. Raw materials used for flaked tool production include andesite, obsidian, basalt, rhyolite, chert, chalcedony, quartzite, quartz, and unidentified raw materials. Obsidian is the second most common raw material present in the assemblage and constitutes 25.1 percent ($n=1,321$) of all artifacts. Andesite, which was used mainly for the production of hoes (also known as *azadas*), is highest in frequency and constitutes 37.3 percent ($n=1,964$) of the sample. Obsidian also com-

prises 34.6 percent ($n=999$) of all debitage, more than any other raw material, and 13.6 percent of all tools, second only to andesite (68.1 percent).

Obsidian type collection

A total of 322 retouched obsidian artifacts was recovered. These include 177 fragments too small to categorize, with 88 of these fragments exhibiting bifacial retouch. Diagnostic artifacts were classified into 8 main types: bifacial points with lanceolate bodies, triangular points, ovoid tools, possible biface preforms, retouched flakes, graters, unilaterally retouched tools and irregular bifaces. Some types were further classified into subtypes when appropriate.

Bifacial points with lanceolate bodies. Although these artifacts are well-known from Wari sites, they were first systematically analyzed in Benjamin Vining's preliminary typology of bifacial tools from the predominantly Wari Middle Horizon site of Cerro Baúl near Moquegua (Vining 2005). Two subtypes of these bifaces were recovered at Conchopata: points with straight and with convex bases (Figures 3, 4). The subtypes are identical to Vining's provisional types D (bifacial points with lanceolate, or leaf-shaped bodies and straight bases) (*ibid.*: 55, figure 7.5) and F (points with lanceolate bodies and convex bases; *ibid.*: 56, figure 7.6).

There are 13 complete lanceolate points with straight bases and one proximal fragment in the Conchopata collection. These artifacts vary in size and range from 24.4 to 116.1 mm. in length, 24.8 to 59.5 mm. in width and 3.6 to 9.3 mm. in thickness. Lanceolate points with convex bases range from 39.2 to 83.0 mm. in length, 23.2 to 55.8 mm. in width and 4.3 to 8.0 mm. in thickness. There are 8 complete tools and 2 proximal fragments of this subtype. Two complete points of the second type have cortex

present, with one exhibiting a completely cortical face. Although the latter could be considered a unifacial tool, all other diagnostic characteristics place it in this subtype.

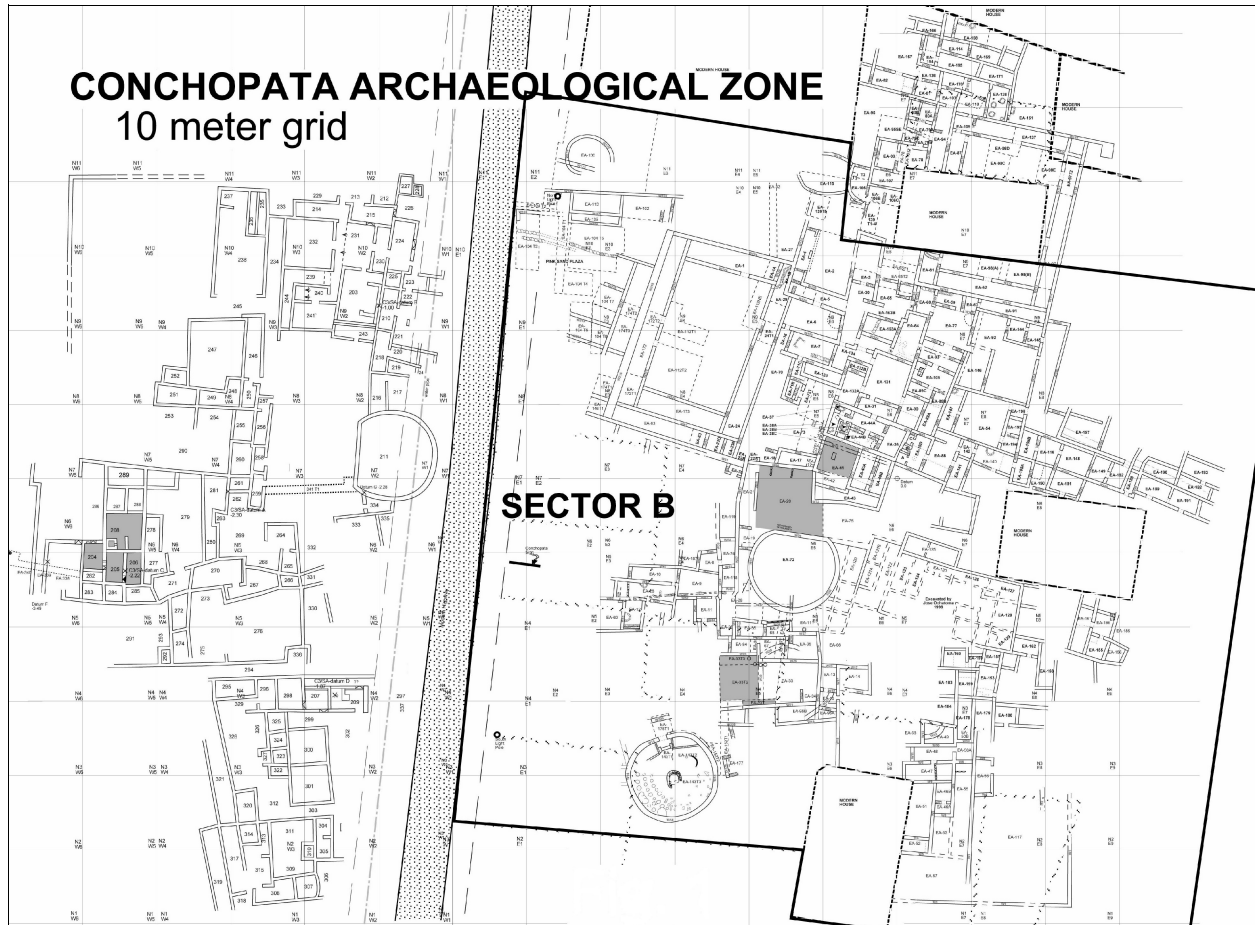


Figure 2. Map of Conchopata. Shaded areas indicate the locations of architectural spaces mentioned in the text.

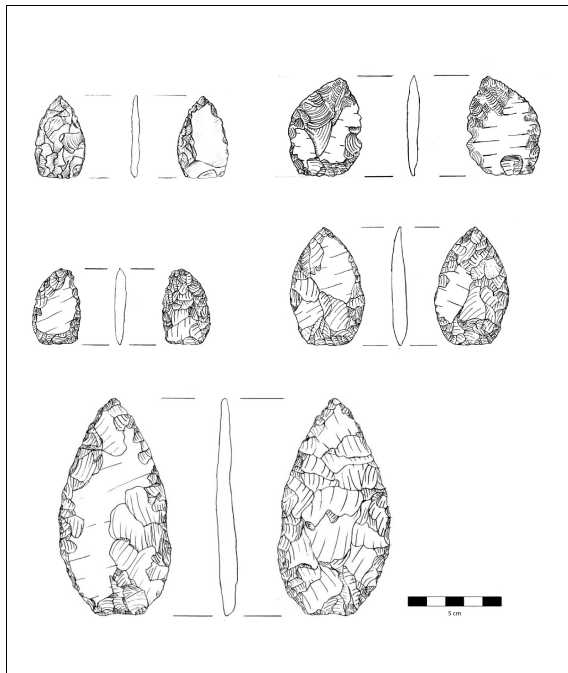


Figure 3. Obsidian bifacial points with lanceolate bodies and straight bases from Conchopata (from Bencic 2015: figure 4.1).

These points are generally consistent in shape and none exhibits retouch extending all the way across both faces of the tool. All are asymmetrically retouched, so it is unlikely that they were used as projectiles. They may have been used as knives.

It is interesting to note that obsidian points with lanceolate bodies and concave bases (Vining's provisional type B [*ibid.*: 53, figure 7.3]) are not present in the assemblage analyzed from Conchopata, although these points are frequently found at other Wari sites. There are also eleven distal fragments of lanceolate points in the assemblage that cannot be classified into a subtype due to missing bases.

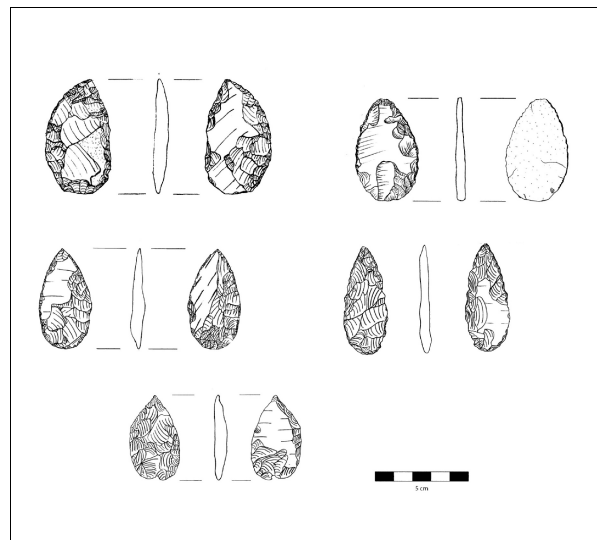


Figure 4. Obsidian bifacial points with lanceolate bodies and convex bases from Conchopata (from Bencic 2015: figure 4.3).

Bifacial triangular points. There are 12 obsidian triangular points (including 3 proximal fragments) in the Conchopata collection (Figure 5). All complete triangular points have straight bases, except one that is slightly concave. Complete triangular points range from 15.0 to 49.0 mm. in length, 10.0 to 28.0 mm. in width and 5.3 to 6.5 mm. in thickness. Two complete artifacts and the three fragments are symmetrical in shape and may have been used as projectiles. However, the majority of these points are asymmetrical. None exhibit the presence of cortex. Some triangular points from Conchopata are similar to Vining's provisional type C which he terms bifacial points with straight, triangular bodies and straight bases (*ibid.*: 54, figure 7.4), although the triangular points from Conchopata are more varied in size.

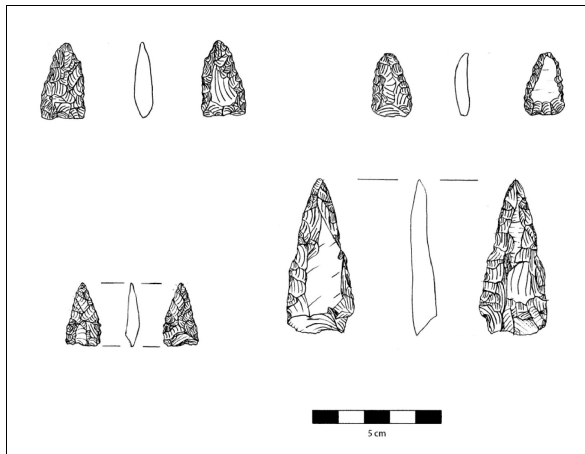


Figure 5. Obsidian bifacial triangular points from Conchopata (from Bencic 2015: figure 4.5).

Bifacially retouched ovoid tools. There are 3 complete bifacially retouched ovoid tools of obsidian and 10 fragments in the Conchopata collection. These tools are all round to oval in shape and relatively thin (Figure 6). One is slightly pointed. The 3 complete tools range from 68.9 to 101.4 mm. in maximum dimension and 7.1 to 19.2 mm. in thickness. None exhibit the presence of cortex, and retouch does not extend across the face of the tool. These tools are similar to what Vining calls “expedient bifaces” (*ibid.*:50, figure 7.1).

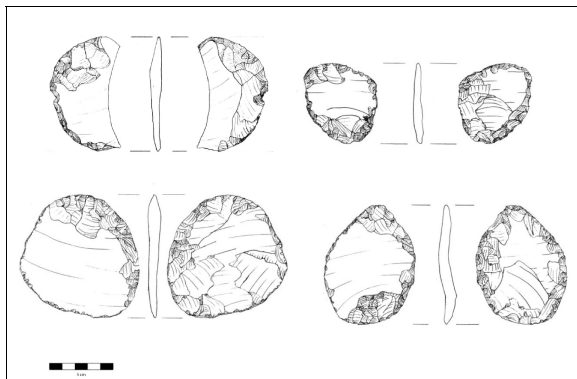


Figure 6. Obsidian ovoid tools from Conchopata (from Bencic 2015: figure 4.8).

Possible biface preforms. These obsidian bifaces are elongated and similar in size to excurvate-sided points but they are much more irregular in shape. There are 4 complete and 3 fragmented artifacts of this type in the assemblage. These tools correspond to provisional type J that Vining considers probable preforms (*ibid.*:57, figure 7.8).

Retouched flakes. A total of 29 obsidian artifacts are categorized as retouched flakes (19 complete flakes and 10 fragments). All of these flakes exhibit intentional retouch on at least one edge, although some of this retouch may be attributed to trampling damage. These artifacts are expediently produced and vary greatly in size and shape. Measurements range from 15.2 mm. to 115.8 mm. in length, 14.4 to 58.8 mm. in width, and 3.5 to 17.1 mm. in thickness.

Gravers. There are 6 complete and 3 fragmented obsidian tools of this type in the Conchopata assemblage. Because the exact function of these artifacts is unknown, the terminology used here is based solely on morphology. They were expediently produced and all have a pointed projection indicating that they may have been used as gravers or drills. These tools range from 17.7 to 27.2 mm. in maximum dimension.

Unifacial tools. There are 7 complete and 7 fragmented obsidian unifacial tools in the collection. These tools were expediently produced and are irregular in shape, ranging from 24.5 to 82.8 mm. in maximum dimension. Some of these tools may have been used as scrapers based on the presence of a steep working edge.

Irregular bifaces. A total of 15 complete and 11 fragmented irregular bifaces of obsidian was analyzed (Figure 7). These implements are all bifacially retouched but are not standardized in shape, and they measure 18.3 to 48.8 mm. in maximum dimension. Some of these artifacts,

especially the smallest specimens, may be heavily worn points or ovoid tools that were retouched/recycled for other uses.

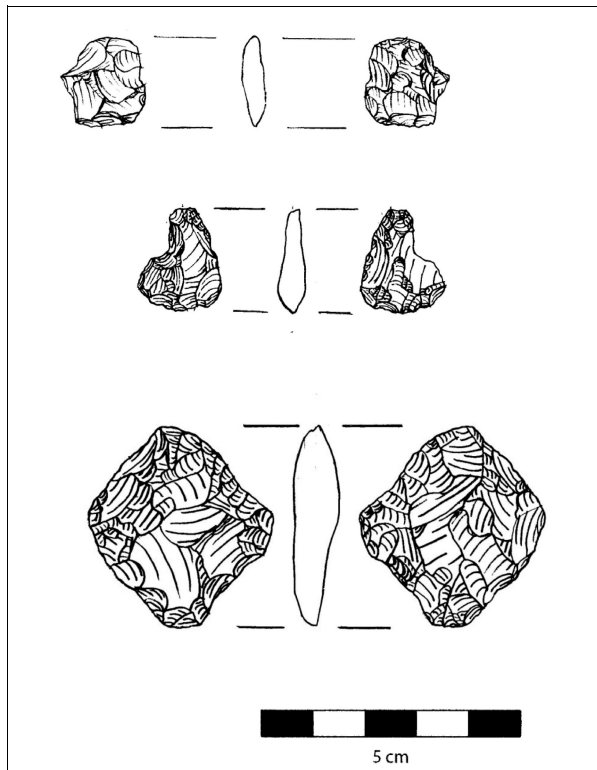


Figure 7. Irregular obsidian bifaces from Conchopata (from Bencic 2015: figure 4.16).

Obsidian debitage

A total of 985 macroartifacts categorized as obsidian debitage were analyzed, including 477 flakes and 508 pieces of shatter (unretouched angular fragments with no flake characteristics). Fourteen additional artifacts were classified as cores. Debitage attributes discussed here include size grade, the presence/absence of cortex, flake termination, and striking platform. The majority of obsidian flakes analyzed (70 percent, $n=332$) are complete, with proximal, medial and distal fragments comprising the rest. Though they are incomplete, these broken flakes are useful for the information they provide on types of striking platforms and flake terminations.

Size grade categories based on maximum dimensions were recorded for all flakes and shatter. Ranges used were 6.35 to 12.7 mm., 12.7 to 25.4 mm., and greater than 25.4 mm. The virtual absence of artifacts smaller than 6.35 mm. reflects the use of 6.35 mm. screens in the field during excavations. Generally flakes tend to decrease in size throughout the process of tool production and greater amounts of small-size debitage tend to be produced in later phases, particularly during biface manufacture. Also, all types of reduction strategies result in the predominance of small-size debitage (Ahler 1989; Magne 1989; Maudlin and Amick 1989). Assuming that waste produced from biface production remained undisturbed, on-site tool production would be expected to result in the majority of debris falling into the smallest size category used in the analysis—between 6.35 and 12.7 mm. At Conchopata, 5 percent ($n=49$) of obsidian debitage is smaller than 12.7 mm., and the majority falls into the larger size categories. Because 100 percent of excavated sediment was screened from all contexts, it is unlikely that any debitage smaller than 12.7 mm. in size would not have been recovered. The scarcity of debitage from the smallest size range suggests that most obsidian biface production was probably carried out elsewhere.

The presence/absence of cortex was recorded for all flakes and shatter. For flakes, the dorsal surface was examined and for angular fragments, any cortex present was recorded. Although the production of certain types of stone tools results in lower frequencies of dorsal cortex than others, cortical pieces are usually more frequent in earlier phases of core preparation and blank production (Kooyman 2000:60; Magne 1989; Maudlin and Amick 1989; Odell 1989). Cortex alone, however, is not reliable for distinguishing reduction stages because the amount of cortex cover on detached pieces can vary considerably throughout the tool manufacturing process (Andrefsky 1998:114; Bradbury

and Carr 1995; Odell 2004:127). Of the obsidian analyzed, 10 percent (n=28) of flakes measuring from 12.7 to 25.4 mm. and 21 percent (n=36) of flakes larger than 25.4 mm. exhibit cortex. The presence of cortex on a substantial amount of obsidian debitage suggests that raw material with little to no modification may have been accessible to Conchopata residents. Remaining cortex on several finished bifaces also indicates that its removal may not have been a priority in tool production.

Flake termination was recorded for complete flakes and distal fragments. Flakes with feathered terminations are the desirable outcome for most reduction strategies (including biface production), while other types are generally considered errors (Odell 2004:57). Non-feathered terminations create irregular surfaces on the core which affect the formation of subsequent detached flakes, eventually rendering the core unusable for producing flakes with predictable forms (*ibid.*) and, from a technological perspective, leading to greater waste of valuable raw material. Experienced knappers make fewer mistakes and possess knowledge that allows them to use raw materials for tool production in an efficient manner. Only 56 percent (n=262) of obsidian flakes exhibit a feathered termination, while 44 percent (n=206) have stepped, hinged or plunging terminations. The high proportion of flakes with undesirable terminations suggests that Conchopata people were not highly skilled specialists in biface manufacture.

Striking platform type was recorded for all complete flakes and proximal fragments. Of the intact platforms, 16 percent (n=65) are cortical, 33 percent (n=129) are flat, and 44 percent (n=173) are complex. Complex, or faceted, platforms are generally associated with later phases of biface production (Magne 1989; Carol Morrow 1984; Johnson 1989). Abraded platforms indicate the preparation of a surface for detaching flakes during tool production,

strengthening the edge and allowing the toolmaker to control the size and shape of the flakes removed (Andrefsky 1998:95-96). Although it can be difficult to distinguish abrasion in platform preparation from abrasion resulting from use (Sheets 1973), when not taken in isolation it is a useful attribute for indicating later stages of biface production. Abraded platforms are associated with biface thinning techniques and have been documented in Clovis lithic technology (Juliet Morrow 1995; Toby Morrow 1997). Only 2 percent (n=8) of the obsidian flakes from Conchopata have abraded platforms. As complex and abraded platforms are found on less than half of all complete flakes and proximal fragments, it is unlikely that much biface production was carried out in the site center.

There are 25 thinning flakes (larger than 6.35 mm. in size) in the assemblage which are associated with bifacial tool production. Although bifacial thinning flakes are scarce at the site, their presence suggests that this technology was familiar to Conchopata residents. These flakes come from 23 loci in 19 architectural spaces. The contexts are varied and include different types of fill, floors, ceramic smashes, a pit, and a burial. The flakes are not concentrated in any particular area which might indicate possible biface manufacturing activity.

Fourteen obsidian artifacts were classified as cores, ranging from 24.1 to 88.8 mm. in maximum diameter. All cores exhibit multi-directional flake scars and are not associated with biface manufacture but were possibly used for expedient flake tool production. The presence of these artifacts at Conchopata suggests that some obsidian was obtained in the form of cores, although this raw material may also have been imported to the site as nodules, blanks, preforms, and/or finished tools.

Epoch	Start	End	Approximate duration
Early Intermediate Period	A.D. 400/500 (at Conchopata)	A.D. 550/650	150-250 years
Middle Horizon 1A	A.D. 550/650	A.D. 650/750	100 years
Middle Horizon 1B	A.D. 650/700	A.D. 800/850	100-200 years
Middle Horizon 2	A.D. 850/900	A.D. 1000	100-150 years

Table 1. Absolute chronology for Conchopata.

Soil samples for flotation were also collected from most levels and features excavated. Lithic material from heavy fractions was analyzed from floor contexts excavated from 1999-2003. A total of 132 additional pieces of obsidian debitage (flakes and shatter) was present in the analyzed samples, with no contexts containing concentrations of small debitage. Only 4 bifacial thinning flakes were recovered from these samples. The scarcity of small debitage further suggests that most obsidian tool production did not occur in excavated areas.

The distribution of debitage was also examined spatially by epoch in order to identify possible activity areas related to lithic production and changes in obsidian manufacture, use, and discard over time. The results of this analysis revealed that few architectural spaces (also abbreviated here as “EA” for *espacios arquitectónicos*) contained concentrations of obsidian. Of 133 architectural spaces that contained obsidian debitage from any era, the majority (n=83) had fewer than 6 artifacts, and 81.2 percent (n=108) had 10 artifacts or fewer.

Table 1 is derived from Wolff (2012: table 5.6) and presents the Conchopata chronology. Wolff conducted a stylistic analysis of 17,940 individually analyzed CAP ceramic artifacts and determined that radiocarbon dates from Conchopata corroborated this stylistic chronology. She was able to assign an epoch to 1,637 of the 2,689 loci excavated by the CAP (including “modern” for surface loci) (2012:111-117). Wolff’s chronology was used for the lithic analysis.

Early Intermediate Period loci that contained obsidian are present in only 15 architectural spaces across the site, and there were no concentrations in any of these spaces. The highest quantity dating to the EIP yielded only 17 artifacts from two different contexts: ceramic fill (5 artifacts) and ashy fill (12 artifacts), likely deposited in the process of room closure. The distributions of obsidian in Middle Horizon 1 (unknown subepoch), Middle Horizon 1A, and Middle Horizon 1B loci showed patterns similar to that of the EIP obsidian. The majority of MH1 architectural spaces contained only one to five pieces of debitage for this time period; the highest quantity is 17 pieces of debitage in one locus classified as disturbed fill. There are also 21 architectural spaces containing MH1A loci with obsidian and 29 spaces with MH1B loci that had obsidian. No MH1A EA had more than 5 total artifacts, and no MH1B EA had more than 10 artifacts.

The MH2 pattern differs slightly from that of earlier eras. Of 93 spaces with MH2 loci with obsidian, 69.9 percent (n=65) contained 1 to 5 artifacts, and 82.8 percent (n=77) had a maximum of 10 pieces of debitage. There are more spaces, however, with higher quantities. These spaces consist of rooms, patios, and trash disposal areas and vary in size with each containing several different levels and features. Excavations were conducted using the locus system following natural strata and features; thus the depths to which the areas were excavated are irregular. The dimensions of these areas (discussed below) are given in Table 2, and their locations are indicated in Figure 2.

Architectural space	m ²	Maximum depth excavated (m)
20	64.00	0.63
41	20.60	1.16
204	6.53	1.47
205	7.50	0.93
206	8.00	1.05
208	22.60	1.00
33T	9.90	0.94
33T2	28.60	1.18
33T3	6.50	0.61

Table 2. Dimensions of architectural spaces mentioned in the text.

The largest quantity of obsidian debitage from MH2 loci comes from EA 41 with 56 pieces from 6 different loci. Four floors contained MH2 obsidian debitage. One floor contained the highest concentration of obsidian debitage from any locus excavated by the CAP with a total of 34 pieces, including one bifacial thinning flake. Flakes exhibit flat and complex platforms and 4 different types of flake terminations. This locus also contained an obsidian point, other lithic materials, and many tools associated with ceramic production such as molds. Other artifacts include ceramic figurines, turquoise, copper *tupus* (women's clothing pins), and shell beads. The artifacts found on this floor may be the remains of an activity area. It is also possible that artifacts associated with the function of the room were intentionally placed as ritual deposits before building later floors. Although this is the highest quantity of obsidian from any one locus, 34 pieces is a very small amount of debitage in terms of tool production, especially when the brittle nature of obsidian is considered.

EA 208, an open patio that may have been used by the adjacent rooms (Groleau 2011:208), contained 52 pieces of debris from MH2 loci consisting of both flakes and shatter (from fill, the floor, the subfloor, and a pit leading into a tomb). Flake platform and termination types are mixed, and 9 of the artifacts exhibit cortex. The

subfloor in this space included many small finds such as shell beads, figurines, and *tupu* fragments. The artifacts in this context may have been ritually placed before the construction of the floor (*ibid.*). Thirty pieces of the obsidian come from room fill. All the adjacent rooms also contained obsidian debitage from fill, the floors, a burial, and a subfloor (EA 204=21 pieces; EA 205=29 pieces; EA 206=9 pieces) along with ceramic offerings and many high-value items such as a gold fragment, copper pins, and figurines (*ibid.*).

Large areas possibly used for trash disposal had very little obsidian. EAs 33T, 33T2, and 33T3 are adjacent excavated spaces forming the same public patio which contained large quantities of ceramic sherds. EAs 33T and 33T3 had almost no debitage and EA 33T2 contained 28 pieces, the majority from disturbed fill. The debitage consists of shatter and flakes with cortical, flat and complex platforms, and feathered, stepped, and hinged terminations, and is a very low quantity for such a large area. EA 20, another large public patio likely used for trash disposal, contained 21 pieces of obsidian debris from various MH2 loci and a vast amount of ceramic sherds, andesite hoe fragments, and other cultural material. These patios are larger than most rooms, and more debitage would be expected if it had been discarded as waste.

Spatial analysis of obsidian tools revealed that for loci dating to the EIP through the MH1B, 100 percent of loci contained 5 artifacts or fewer, and 97.5 percent of MH2 loci yielded 1 to 5 artifacts. However, complete and broken tools were recovered from all types of contexts at Conchopata, including fill, floors, burials, and various types of ritual contexts such as small pits and ceramic smashes. Based on its presence in all types of offering contexts, obsidian in all forms appears to have been frequently used in ritual activity at the site from the EIP through to MH2.

Domestic areas at Conchopata have been defined by Wolff, who based her categorization on architectural features in conjunction with the work of other researchers (2012:255). The presence of obsidian debitage in domestic areas was examined by epoch to determine whether any production activities occurred in domestic areas, and whether there were any changes in these patterns over time (Table 3). More than 50 percent of loci containing debitage in the Early Intermediate Period are classified as domestic. This number slightly decreases over time until Middle Horizon 1B, during which the majority of loci containing debitage are non-domestic. From MH1B to Middle Horizon 2, the percentage of loci with debitage in domestic areas increases again to over 50 percent. The decrease in obsidian in domestic areas during MH1B may reflect a possible change in access to and/or use of obsidian by Conchopata residents during this time.

Era	Total Loci with Debitage (n=)	Loci in Domestic Groupings (n=)	% of Loci in Domestic Groupings
EIP	21	12	57.10%
MH1	33	17	51.50%
MH1A	21	11	52.40%
MH1B	41	15	36.60%
MH2	214	116	54.20%

Table 3. Loci with obsidian debitage in domestic architectural spaces.

Conclusions

The analysis of Conchopata obsidian demonstrates that biface production did not occur in areas excavated by the CAP, although Conchopata people had access to high-quality raw material and may have used obsidian cores to produce simple expedient tools. I had previously suggested that Conchopata stone tools were manufactured at the site based on a high proportion of obsidian debitage relative to other raw materials; the preliminary analysis consisted of sorting a much smaller sample of artifacts, in which obsidian and other raw materials were separated into modified implements and debitage (Bencic 2001). The data presented here

provide multiple lines of evidence indicating that throughout the occupation of Conchopata, obsidian bifaces were either imported into Conchopata or produced in areas of the site that have not been excavated. Debitage analysis demonstrates that production of standardized tools did not occur at the household level, implying formal control over obsidian tool production and raw material use—perhaps by the state. Stone’s analysis of surface obsidian from Huari also found no evidence of biface production at the nearby capital site (1983). CAP excavations were concentrated in Conchopata’s center, however, and areas where intense specialized stone tool production took place would leave hazardous areas of very sharp obsidian debitage. Thus, lithic workshops might be expected to be located away from heavily populated areas.

Wolff’s analysis of ceramic production at Conchopata demonstrates that the intensity of non-domestic ceramic production under elite supervision peaked during MH1A and especially MH1B. Elite control lessened during MH2 (2012). Changes in the distribution of obsidian at the site over time reveals a possibly related pattern and may indicate that access to obsidian was increasingly controlled by the state until MH2, during which time the presence of this material in domestic areas became more widespread. The trend possibly results from decreased state control over lithic as well as ceramic production during MH2. This pattern supports the assertion that obsidian biface production at Conchopata was not household-based, and that standardized tools were produced by skilled specialists.

The types of spaces in which small concentrations of obsidian are found appear to have had different functions, and obsidian is found in both domestic and public areas of the site. Areas with the highest concentrations, however, contained many exotic artifacts and these

artifacts, including obsidian, may have been intentionally placed in these contexts because they had special meaning. Obsidian is commonly found in ritual pit deposits and burials throughout the site from the EIP through MH2. Also, most rooms at Conchopata were ritually filled and closed as part of the abandonment process. Artifacts found on floors and the composition of fill in the rooms is more likely to reflect room closure practices rather than *in situ* activity areas (Groleau 2011). It is possible that some obsidian debris was produced not necessarily as a by-product of tool production, but perhaps for the inclusion of the highly valued raw material in deposits reflecting ritual activities. The importance of stone and its symbolic meanings in Andean societies has been well documented (see Giesso 2000:36-59). The final deposition of obsidian at Conchopata, including debitage, may inform us not only about lithic technological organization but also about obsidian's symbolic importance and the ritual role that it played in Wari culture.

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Incahuasi, Cañete

Alejandro Chu (Proyecto Arqueológico Incahuasi; email: alejandrochu@gmail.com) reports on his 2013 excavations at Incahuasi in Peru's Cañete Valley.

The Incas represent the pinnacle of the development of autochthonous Andean societies before the Spanish invasion of 1532. The Inca empire, or Tawantinsuyu, included a territory that stretched more than five thousand kilometers, extending from the present border of

Colombia and Ecuador to the center of Chile, and included Northwest Argentina and much of what is now Bolivia. This extensive territory was settled with imperial administrative centers linked by a road network to Cusco, its capital.

The archaeological site of Incahuasi in the middle Cañete Valley on the Peruvian Central Coast is a clear example of the urbanism, militarism, and high degree of organization of the Inca empire. The particular situation of Incahuasi, constructed as a base of operations during the war against the Guarcos, is reflected in its architectural design and in its location.

Incahuasi, the new Cusco

Incahuasi is on the south bank of the Cañete Valley, twenty-seven kilometers from the sea, at an altitude of 370 m.a.s.l., at the beginning of the *chaupiyunga* or middle valley. Politically, it is in the Paullco Annex of the Lunahuana District in the Cañete Province of the Lima Region (Figure 1).

The chronicler Pedro Cieza de León (1995, 1996 [1553]) provides the earliest mention of Incahuasi and the Inca campaign against the Huarcos. We find references both in the first part of Cieza's account (Chapter 73) as well as in the second part (Chapter 60) of his *Crónica General del Perú*. It is believed that Cieza's chronicle is based on reliable first-hand information (Hyslop 1985:8). Cieza (1995 [1553]:215) mentions the construction of a new Cusco by Inca Tupac Yupanqui because the war against the Huarcos lasted between three and four years. This new Cusco reproduced the streets and neighborhoods of the imperial capital and once the military campaign ended, it was abandoned.

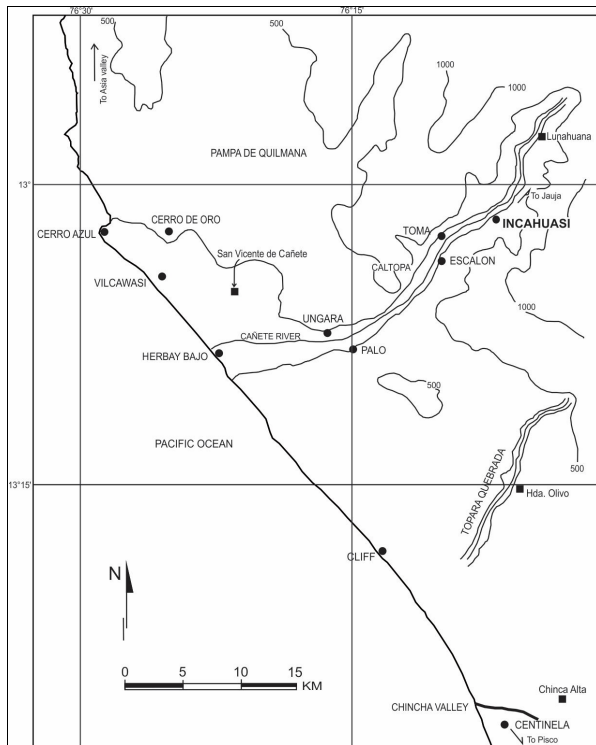


Figure 1. Map of the Cañete Valley showing the location of Incahuasi and other Late Horizon sites (after Hyslop 1985:3). Circles indicate archaeological sites. Squares indicate communities occupied at present.

Later the site was the object of visits and studies of its surface remains by various researchers (e.g. Harth-terré 1933; Larrabure 1904; Strong and Willey 1943; Villar Córdova 1935; Williams and Merino 1974; and, more recently, Rivas 2011). The archaeologist John Hyslop (1985) is the only researcher who made a detailed study of the site, but just of its surface, taking aerial photographs of the whole site with a balloon, and dividing it into eight sectors (Sectors A through H), correlating the architecture with astronomical alignments, and making a systematic collection of the ceramics. Hyslop's research (1985:76) determined that more than just reproducing Cusco, Incahuasi replicated the symbolic and ideological concepts that were expressed in Inca architecture, confirming that which Rostworowski (1978-1980:190) had sug-

gested earlier: that is, that the site reproduces Inca mythical space.

During 2013 the research of the Incahuasi Archaeological Project allowed the first scientific excavations at the site, concentrating on Sectors A, C, and E as defined by Hyslop. These sectors correspond to the areas known as Qolqawasi (Sector A) and the palace (Sector E) (cover, this volume). It was considered appropriate to employ Hyslop's sector divisions because they are the most precise and are based on the morphological and functional characteristics of the sectors. The Incahuasi Archaeological Project was included in the conservation plan for the site (*puesta en valor*) which permitted excavation in both sectors, exposing almost all the architecture in these sectors, enabling the identification of the extent of the enclosures and of the construction phases.

Sector C

Sector C of Incahuasi is composed of four sub-sectors differentiated by their architectural components and their possible functions as suggested by John Hyslop (1985). Sub-Sectors 1, 2, and 3 were excavated by the Incahuasi Archaeological Project. Sub-Sector 4, known as the Guard House (*Casa del Guardián*) was not excavated.

Sub-Sector 1 is on the north of Sector C and occupies the entire northeastern corner of the sector. It is bounded on the south by Sub-Sector 2, on the west by Sub-Sector 3, on the north by Sector D, and on the east by the edge of the quebrada which also is the edge of Sector B.

Sub-Sector 1 consists mostly of a trapezoidal plaza running west to east, and accessible only at the extreme northwest. For the purposes of the present project, the structures located beyond the north side of the plaza are part of this sub-sector because they are apparently

associated with the plaza. According to Hyslop:

The trapezoidal plaza is evidence for ceremonial activities. . . . Inka astronomical sight lines define the shape of the plaza. This plaza is secondary to the main plaza of Sector E, and it is notable that, like the secondary plazas at the Inka cities of Cuzco and Huánuco Pampa, it is located to the east of the main plaza (Hyslop 1985: 19).

This plaza gives access to Sub-Sectors 2 and 3, the only access to Sector C. Among the most distinctive elements of the plaza is a four meter wide platform about 40 centimeters high which surrounds the plaza, except that it is incomplete on the east side. At the center of the north platform there is a bench 0.8 meters wide and 20 centimeters tall, which widens to 2 meters in its central part, aligned with the access to Sub-Sector 2, forming a sort of dais.

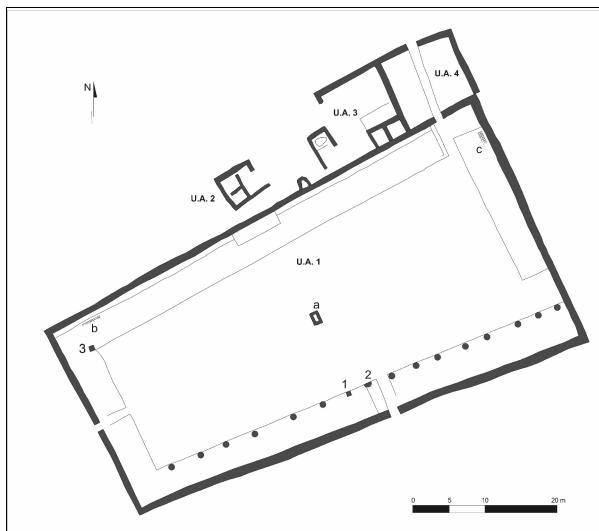


Figure 2. Plan of the trapezoidal plaza (Sector C, Sub-Sector 1) after excavation, showing its division into four architectural units: (a) *ushnu*, (b) remains of the quadrangular floor, (c) remains of the square floor, (1) square column, (2) semicircular column, (3) square column.

Due to the nature of the sub-sector it is considered to be divided into four architectural units (Unidades Arquitectónicas or UA) described below (Figure 2):

Architectural Unit 1: Corresponds to the trapezoidal plaza, being the largest architectural unit in the sub-sector. The plaza is 67.40 meters long and 27.56 meters wide on its short side and 37.30 meters wide on its long side.

Architectural Unit 2: This is composed of a structure with a rectilinear plan of 5.12 by 5.16 meters, comprising three rooms. It is outside the plaza.

Architectural Unit 3: A series of domestic structures located outside the plaza (Architectural Unit 1) and associated with Architectural Unit 2.

Architectural Unit 4: Corresponds to the entrance to the plaza. It is composed of a central corridor flanked by rectangular platforms. This Architectural Unit has a square plan, eleven by eleven meters.

Methodology

A series of categories were defined that were used generally in the areas of intervention. These categories permitted us to standardize our terms and to define analytic units at different scales. The term “Sector” was used for the most general unit. The site is composed of eight sectors according to Hyslop (1985). Each sector received the same letter as assigned by Hyslop in 1985. At the same time, a sector is composed of sub-sectors, defined as spaces which had a definite social use and which are delimited by the structural elements that constitute them. A sub-sector can contain various architectural complexes. Sub-sectors are defined according to the architectural complexes they contain and the spacial relationships of the architectural

complexes. An architectural complex is defined as a series of interconnected components or architectural units which can be grouped together as a unit. The second unit in terms of scale is the architectural unit. This is, in turn, composed of architectural elements which generally are delineated in very specific areas as can be the case with rooms, patios, corridors, etc. In our classification the architectural unit is the basic unit in terms of recording and descriptions of the excavations are made at the level of this unit.

The excavation was intended to provide contexts to let us understand the nature of the Inca occupation of the site and define the characteristics of the occupation in the sectors excavated. Excavation was done in areas used to establish a system of five by five meter squares along arbitrary north-south and east-west axes. This system of coordinates was laid out to cover all of Sector C. The object was to allow an efficient and orderly identification and recording of the various architectural complexes, architectural units, and the stratigraphy during the process of archaeological intervention in Sub-Sectors 1, 2, 3 of Sector C.

The removal of layers was done by following cultural and natural deposits. Strata and finds were recorded in three dimensions. The strata, both natural and cultural, were designated as "stratigraphic units" (*unidades estratigráficas*). They were numbered by assigning the abbreviation "U.E." and the number of the unit, using Arabic numerals, starting at the surface, and going until the end of the excavation. Substrata, elements, or other contexts identified received consecutive U.E. numbers. During excavation both horizontal stratigraphy (floors, flattened areas, fill, etc.) and vertical stratigraphy (walls) were considered. In the case of walls, these were coded with a different numeration system established by the area of conservation and restoration of structures. It is relevant that

walls received a unique code valid both in terms of excavation and conservation and, in that way, duplication of codes and confusions were avoided.

The method of nomenclature employed during excavation has the advantage of avoiding interpretations of the excavated contexts because the U.E. only implies the numeration of contexts with the goal of orderly recording.

Results

The excavation of Sector C, Sub-Sector 1 focused on defining the space of the trapezoidal plaza and determining whether the space of the plaza was occupied prior to the plaza's construction. The work entailed the removal of large quantities of rubble, the product of collapsed walls which, once removed, allowed the determination of the nature of the walls of the Sub-Sector. The interior of the plaza was found to be covered only by a surface layer that was the product of wind transport, erosion, and the movement of people and livestock.

In the center of the plaza there was the base of a rectangular basin which had been sealed by the clay floor of the plaza. Excavation revealed it to be an *ushnu* (Figure 4). On the south side of the plaza against the bench sixteen columns were identified, fourteen cylindrical ones, one that is square in cross-section (Figure 2), and one that is semicircular in cross-section (Figure 2). Likewise, in the northwest corner of the plaza a second square column was found (Figure 2). The circular columns apparently had astronomical and ceremonial functions, because the square columns were found aligned perfectly with the sides of the *ushnu* and the semi-circular column on a small platform fulfills the functions of a gnomon, just as has been reported for the plazas of Cusco.

Another important detail encountered consists of the remains of quadrangular floors which, due to erosion and modern interference, are only preserved in the extreme northeast of the plaza (Figure 2). These rectangles are composed of 20 to 24 centimeter blocks (Figure 3) and must have formed checkerboards of three or four quadrangles running longitudinally along the surface of the platform, very similar to those reported for Sector A (Urton and Chu 2015). As with the quadrangle of Sector A, the remains that we found on the platform show traces of having been made with ropes.



Figure 3. Remains of the quadrilateral floor discovered in the northeast corner of the plaza platform.

In the central part of the plaza, excavations revealed a highly eroded mud floor which covered a gravel fill. One notes large stones that emerge from the floor and which were not removed during the construction of the plaza. In the central part of the plaza a line of stones was identified at the beginning of work, so it was

decided to excavate a 3 by 3 meter test pit in this area. Excavations permitted the definition of a structure with a 2 meter by 1.25 meter rectangular plan and a 16° north orientation. The structure consisted of a double-faced wall 40 centimeters wide (Figure 4).

This structure was built directly on sterile soil, and was adjusted to the original terrain in which one can see large rocks of the alluvial terrace. It is because of this that the floor of the plaza is found at a higher level than the *ushnu*. In the interior of a basin one finds an evenly distributed concentration of small, dark gray, round stones. The stones show a soft, fine-grained, dark brown soil which we believe corresponds to the remains of liquids poured into the basin. Samples were taken so that future analysis can determine its composition. At some point in the use of the plaza it was decided to close the *ushnu* and it was dismantled to the floor level of the plaza (leaving its base intact), a mud seal was put in place that covered the round stones and leveled the space to that of the floor of the plaza.

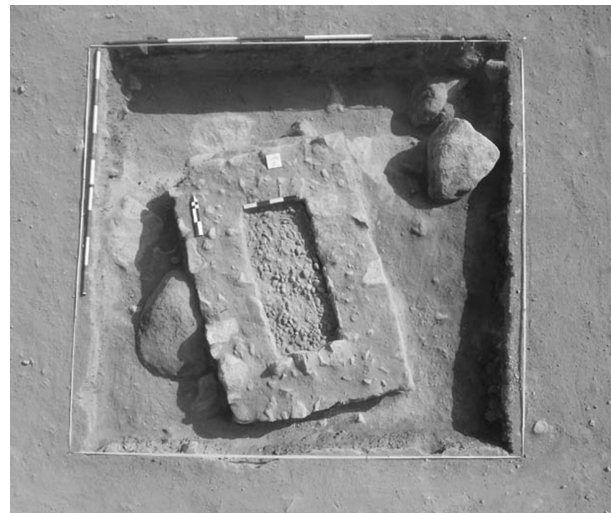


Figure 4. View of the *ushnu* after excavation. Note the fill of small round stones in its interior.

Through the excavation of this pit, as well as in the others dug into the plaza, we were able

to determine that the area was leveled using at least two types of fill—a compact fill composed of coarse sand and angular stones lacking in cultural material and another with abundant cultural material intermixed with coarse sand, small stones, and sand of a semi-loose consistency. Some parts of this fill yielded large quantities of botanical remains due to the depth of the floor and the platform in the northeast corner of the plaza. Equally, we observed that the double-faced walls of the plaza were filled with loose material instead of with mud, and, in some cases, with garbage, which created unstable walls that collapsed during seismic events. This reflects carelessness in the construction of this space, a response to the haste with which building was carried out, or perhaps reflects construction by non-specialists.

Finally, the work conducted outside the plaza in Architectural Units 2 and 3 revealed a local post-Inca occupation. This occupation was of a domestic character and included areas of food preparation and consumption, storage, sleeping areas, and a guinea pig pen. The architecture of these structures, in spite of being made with the same materials as the Inca architecture, differed in that its walls were narrower and less straight, its stones were irregularly laid, and its parameters were not as well elaborated. Excavations recovered abundant local ceramics and subsistence remains. Maize, *pacay*, *lucuma*, and *guanábana* (soursop) were among the botanical remains, camelids and fish were among the animal bones, and crayfish were among the crustacean remains.

Conclusions

The work in the trapezoidal plaza of Sector C has allowed the identification of at least two occupations of the sector. The first corresponds to the Inca occupation when the trapezoidal plaza was constructed. It was necessary to level the ground. For this a thick contention wall was

constructed at its northern edge. The wall had a gravel fill without cultural material and with a compact and homogeneous texture, that was quarried from the site's quebrada. In some parts of the plaza another type of fill was used. This has cultural material mixed with gravel and rubble. In this fill, subsistence remains dominate. The plaza with its clay floor and central *ushnu* was built above this fill. The *ushnu* was later demolished and sealed. The sealing of the *ushnu* was apparently done during the Inca occupation and is associated with the construction of other *ushnus* at the site (e.g. the *ushnu* in Sector E, and the *ushnu* in Sector F, the *acllawasi*) and a change in the *axis mundi* of the site. The plaza did not function in isolation. It articulated with Sub-Sector C2 and Sub-Sector C3.

Later, on the exterior of the north side of the plaza, a series of domestic structures were built which, according to the cultural remains recovered, pertained to a local post-Inca domestic unit.

The work at Incahuasi contradicts the ethnohistoric data that talks about a short period of occupation (three or four years) and an abandonment after the conquest of the Guarcos. Continuing research will reveal new data that will help us understand this complex Inca site in the Cañete Valley.

Translated from the Spanish by Monica Barnes

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LUIS BARREDA MURILLO'S EXCAVATIONS AT HUÁNUCO PAMPA, 1965

Monica Barnes (*Andean Past* and American Museum of Natural History; e-mail: monica@andeanpast.org) discusses Luis Barreda Murillo's 1965 excavations at Huánuco Pampa.¹

In 1965 Luis Barreda Murillo excavated and reconstructed some of the most spectacular portions of the monumental sector of Huánuco

Pampa, a large Inca site in Peru's central highlands. This work has remained unpublished until now.

Luis Barreda Murillo's background

Barreda was born in Ñuñoa, Peru in 1928. He died in 2009. Barreda undertook his secondary schooling at the Colegio Mateo Pumacahua in Sicuani. There, his history and geography teacher was Manuel Chávez Ballón, who later himself became famous as a Cusco archaeologist. Together Barreda and Chávez visited Maucallacta, a site near Ñuñoa already known to Barreda. This visit confirmed Barreda's interest in his country's pre-Hispanic past.

After qualifying as a secondary school teacher in the late 1940s, Barreda returned to Maucallacta to excavate five *chullpas* or burial towers. His career in archaeology was launched. Apart from his contact with Chávez, Barreda was self-instructed in archaeology. He, nevertheless, established and taught that subject at the Universidad Nacional de San Antonio Abad in Cusco while excavating more than eighty sites in the Cusco area and beyond.² In 1965 Barreda joined John Victor Murra's "A Study of Provincial Inca Life", a multidisciplinary project centered on Huánuco Pampa. Thus, Barreda brought some twenty years of experience in highland archaeology to Murra's project.

"Cleaning" and "consolidation" of Huánuco Pampa

Murra was under political pressure at the time. The senator from Huánuco, Carlos Showing Ferrari, practically forced Murra to accept 70,000 soles from the Peruvian national government's Patronato Nacional de Arqueología, the government's agency then in charge of archaeology. This was to be used to make Huánuco

¹ A version of this paper was presented at the 33rd Northeast Conference on Andean Archaeology and Ethnohistory at the University of Vermont, 18–19 October 2014.

² <http://luisbarredamurillo.galeon.com/aficiones2170542.html> (consulted 10 June 2015).

Pampa more comprehensible and attractive to visitors (Barnes 2013:556). Murra accepted the funding, and the concomitant tasks, albeit with reluctance.

Murra agreed to undertake a “cleaning” (*limpieza*) and consolidation of monumental portions of Huánuco Pampa. The cleaning amounted to small-scale excavation. Although the grant was given to Murra as project leader, and Murra and Gordon J. Hadden signed and submitted the final report to the Peruvian government (Murra and Hadden 1966), Murra was not physically present at Huánuco Pampa during most, if not all, of the time the work was undertaken (personal communication, Mahlon A. Barash, 30 June 2014). Rather, he transferred responsibility to archaeology graduate students including E. Craig Morris and Daniel Edward Shea, to Luis Barreda Murillo, and to Peace Corps volunteers including Mahlon A. Barash, Gordon J. Hadden, Peter S. Jenson, and James Stanton, who were assisted by Delfín Zúñiga Díaz, and local farmers (Figure 1). The grant officially supported work from 20 July to 23 November 1965 (Murra and Hadden 1966:129-130). Field operations began on 12 August 1965 and terminated on 21 October of the same year (Barnes 2013:558).

Daniel Shea concentrated on the excavation of the *ushnu* for his master’s thesis (Barnes 2015: figure 6; Shea 1968: figures 9-17). In addition Shea excavated a human skeleton found between two of the monumental portals leading from the Inca palace to the *ushnu* plaza (Barnes *et al.* 2012) and several buildings in the *ushnu* plaza itself. Luis Barreda Murillo took charge of other areas between the monumental portals. He also excavated a portion of the bath, or fountain complex (*phajcha* in Quechua) and a building dubbed the Unfinished Temple. Craig Morris excavated the North Kallanka or great hall (Barnes 2013: figure 1), as well as about twenty percent of the *collcas* or storehouses

(Morris 1967:89). In addition to the limited excavations, restorations of the stonework of the *ushnu*, the North Kallanka, the monumental portals, the bath or fountain, the Unfinished Temple, and a *collca* were undertaken by the team as a whole (Barnes 2013:556-568).

Luis Barreda Murillo’s work at Huánuco Pampa

Very little can be recovered at present from Barreda’s work at Huánuco Pampa. Forty-two rolls of black and white film were shot for Murra’s “A Study of Provincial Inca Life” project and the Patronato Nacional de Arqueología during the cleaning and consolidation. These were retained by John Murra and transferred in 1998 to the Junius Bird Laboratory of South American Archaeology in the Anthropology Division of the American Museum of Natural History (AMNH). Barreda was a good photographer and made his own photographic record, but the location of his negatives is unknown. However, he gave six 35 mm contact sheets to John Murra and Murra also transferred these to the AMNH. Color slides were taken by Barash and are retained by him. The AMNH has none of Barreda’s written excavation records, assuming he made any. The artifacts recovered during this phase of work at Huánuco Pampa have been definitively lost (Barnes *et al.* 2012:268). However, the AMNH does possess two unpublished plans by Barreda, one of the bath or fountain (Figure 2) and one of the Unfinished Temple (Figure 3).³

In their monograph, *The Plaza and Palace Complex at Huánuco Pampa*, Craig Morris, R. Alan Covey, and Pat Stein (2011) mention Barreda’s work only in passing (*ibid.*: 10). The “. . . unusual structure on a platform in the

³I was in error when I stated previously (Barnes 2013:565) that no plans were made during the time John Murra had overall direction of archaeological work at Huánuco Pampa.

easternmost part of the administrative palace” that they note as having been excavated by Barreda is the so-called Unfinished Temple. They include a photograph of the bath, or fountain pool (*ibid.*: reproduced as figures 5.7 and 10.2), but this was taken *before* Barreda excavated and reconstructed it, and, thus, does not represent the present condition of the structure. Their photograph of the Unfinished Temple (*ibid.* figure 5.6) is not labeled as such, and was taken after Barreda excavated and restored it.

All we know of Barreda’s excavations is derived from the visual record. Although this is less than desirable, I believe that it is important to know where early work at Huánuco Pampa was undertaken. In addition, Shea’s plan of the *ushnu* platform (reproduced as Barnes 2015: figure 6) and Barreda’s plans of the bath and the Unfinished Temple are among the very few plans of Huánuco Pampa buildings that show architectural details such as niches.⁴

The monumental portals

At present six monumental portals connect Huánuco Pampa’s Inca palace in the sector of the site that Craig Morris and Donald Thompson designated Zone IIB (Morris and Thompson 1985: figures 11, 13)⁵ with the central *ushnu* plaza. Barreda and Shea excavated the deposits around those portals and in the buildings between them. A colonial plan suggests that in the past there may have been as many as nine of these gateways (Sobreviela and Sierra 1786: items 5, 11, 14, 17) but Huánuco Pampa has long served as a stone quarry (Barnes 2015:69-71) and up to three of these may have been

removed. Deposits around the portals were exceptionally thick, probably because of the site’s use as a cattle ranch (Barnes 2013: figure 6; Vázquez de Espinosa 1942 [1628]: item 1361, p. 486). In addition to photos, the AMNH has Shea’s notes on his excavation of the human burial that had been placed in a canal running between Portals 5 and 6 as designated by John Murra’s team (Barnes *et al.* 2012). There is no indication that either Shea or Barreda sieved deposits, or that radiocarbon or environmental samples were taken from areas around the portals, or that sections or plans were drawn (*ibid.*: 268, note 3). However, the John Murra archive at the AMNH preserves several rolls of black and white negatives documenting this phase of work at Huánuco Pampa and Barash retains others in his private collection.

The bath (or fountain)

One of the features of Huánuco Pampa that has attracted the attention of many visitors to the site is a ritual bath or fountain in the Inca palace portion, and thus also in Zone IIB. This may have continued to function as late as the eighteenth century, to judge from the fact that Manuel Sobreviela and Alonso de la Sierra indicate its water flow on their measured and hand-drawn plan of the site (Sobreviela and Sierra 1786; Figure 4). Padre Sobreviela, a skilled map-maker, visited Huánuco Pampa in the course of a project that attempted to find a combined land and water route from the Pacific Ocean to the Atlantic. Thus, Sobreviela had a particular interest in water management. From their colophon, it is clear that Sobreviela and Sierra considered the main feature of the Inca palace at Huánuco Pampa to be its bath. Morris and colleagues comment that the part of the site that contains the bath or fountain, Zone IIB-4, yielded Spanish artifacts including an iron nail (Morris *et al.* 2011: figure 10.4), a glass sherd (*ibid.*: figure 10.5), glazed ceramic sherds (*ibid.*: figure 10.13), a horseshoe fragment, three

⁴ Among the others are Harth-terré 1964: figure X; Morris *et al.* 2011: figures 6.2, 8.13; and Sobreviela and Sierra 1786 (Figure 3).

⁵ Known as “sector IIB” in Spanish language publications.

colonial knives, a pendant, and a ring, but relatively few Inca remains (*ibid.*: 199). This evidence of occupation reinforces Sobreviela and Sierra's hint that the bath was functioning in the late eighteenth century.⁶

Today most observers think of the bath or fountain as a small two-level pool made of fine Inca ashlar and once fed by twin water spouts. However, Sobreviela and Sierra's 1786 plan suggests that this was only one of several bath chambers. This idea is reinforced by photographs taken during the course of Barreda's excavation and reconstruction. These accord fairly well with Sobreviela and Sierra's plan, thus supporting the idea that in Inca times the bath was not a single pool fed by a reservoir, but was a complex of several rooms, corridors, and plazas.

Aided by local workmen, Barreda excavated the portion of the bath or fountain that includes the surviving pool and its surround (Figure 5; Murra and Hadden 1966:134-135, unnumbered plates). The same limitations face us in evaluating the work undertaken here as with Barreda's excavations of the portals. The finds have been lost. Any field-notes that may have been made remain unlocated, and there is no suggestion that samples were taken. However, photographs made when the work was in progress are preserved in the John Murra Archive. These indicate that not only was the bath or fountain excavated, but a partial reconstruction was made. A good 1:20 scale plan of the bath or fountain was made by Barreda and is preserved among John Murra's papers. Unfortunately, it shows the stonework after it was reconstructed, so we are largely dependent upon Barreda's interpretation in understanding the bath's

architecture (Figure 2). However, this plan is very useful because it shows the areas where he excavated, indicates the underground canals that fed and drained the pool, and shows the interior and exterior niches in the walls surrounding the pool.

The Unfinished Temple

Also in Zone IIB is a small building that was left incomplete when Huánuco Pampa was abandoned by the Incas (Figures 3, 6, 7). Well-finished and shaped stone blocks had not yet been put into their final positions and a line of shaped stones on the Pampa de Huánuco connects this building with a quarry (Morris and Thompson 1985:60). Morris and Thompson note that "In terms of care of construction and elaboration of detail, it was to have been the finest building in the city. The stones are precisely cut and joined, and its exterior was to have included several tall niches in its facade" (*ibid.*: 60-61). They point out that the location of this building would also have enhanced its importance. Although its function is unknown, Murra's team followed local traditions in dubbing it the "Unfinished Temple" or the "Incomplete Temple". Morris and Thompson published two photographs of this building (*ibid.*: plates 32 and XI), but they do not mention that it was excavated, partially reconstructed, and planned by Luis Barreda Murillo in 1965 (Murra and Hadden 1966:137, unnumbered plate).

In considering the Unfinished Temple we face the same limitations as with the bath or fountain. Artifacts have been lost and field-notes have not been found. However, as with the bath or fountain, in addition to photographs made before, during, and after Barreda's work on the building, we have the measured ground plan he made, in this case to 1:50 scale. This plan was also drawn after the partial reconstruction. By comparing it with photographs taken before Barreda began work, I consider it to be a

⁶ However, Sobreviela and Sierra depict the bath buildings as roofless, in contrast to the hacienda structures on their map. On this map, rooflessness seems to indicate a ruinous state.

plausible, but not necessarily reliable, representation of the original building. That is, we can add it to the known corpus of Inca architecture, but with the caveat that Barreda's plan may not fully reflect Inca intentions. However, the plan has the virtue of showing clearly where Barreda excavated, the new drainage he created, and the walls he built to protect the building, as well as the walls he considered to be original.

Conclusions

Even though little can be said about Luis Barreda Murillo's excavations at Huánuco Pampa, it is important to know that he conducted them. Although Huánuco Pampa is often thought of as almost untouched, many changes have been made at the site over the centuries (Barnes 2015). One must, therefore, know as much as possible about these changes in order to form solid interpretations of what remains at the site. It would be a mistake to consider parts of the site to be unexcavated when, in fact, their deposits had been removed decades previously, and soil formation processes had restarted. It would also be a mistake to assume that walls are standing exactly as they were when the Inca left them when, in fact, they have been restored by previous workers. Since John Murra's team excavated at Huánuco Pampa in the mid-1960s, and Craig Morris excavated there in the 1970s, there have been at least four campaigns of archaeological work at the site. These have been led by Alfredo Bar Esquivel in 2006-2007 (Monteverde 2010: note 11; Ordóñez Inga 2015:7) and later by José Luis Pino Matos beginning in 2007 (Ordóñez Inga 2015:8; Pino 2004), who was succeeded by Carlo José Alonso Ordóñez Inga in 2013 as director of operations at Huánuco Pampa. In 2015 Luis Enrique Paredes became director.

Bar Esquivel's team re-erected the east wall which had collapsed since its repairs by John Murra's team. Pino's team re-excavated the

ushnu, digging in some of the same areas that had previously been exposed by Shea. Fortunately, Shea's plan of the *ushnu*, and Luis Barreda Murillo's plans of the bath and the Unfinished Temple indicate where some mid-twentieth century excavations occurred. Before and after photographs allow us to estimate the extent to which deposits were removed, and which buildings were reconstructed. The photos and plans that resulted from Barreda's work can be added to the archaeological record of Huánuco Pampa.

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Figure 1. Luis Barreda Murillo at Huánuco Pampa, October 1965 during the reconstruction of one of the collcas (storehouses). Barreda is the figure pointing with raised arm. The crouching figure on the viewer's left is Gordon D. Haddon. John Victor Murra Archive, Junius Bird Laboratory of South American Archaeology, Division of Anthropology, American Museum of Natural History, Rollo 39, foto 5.

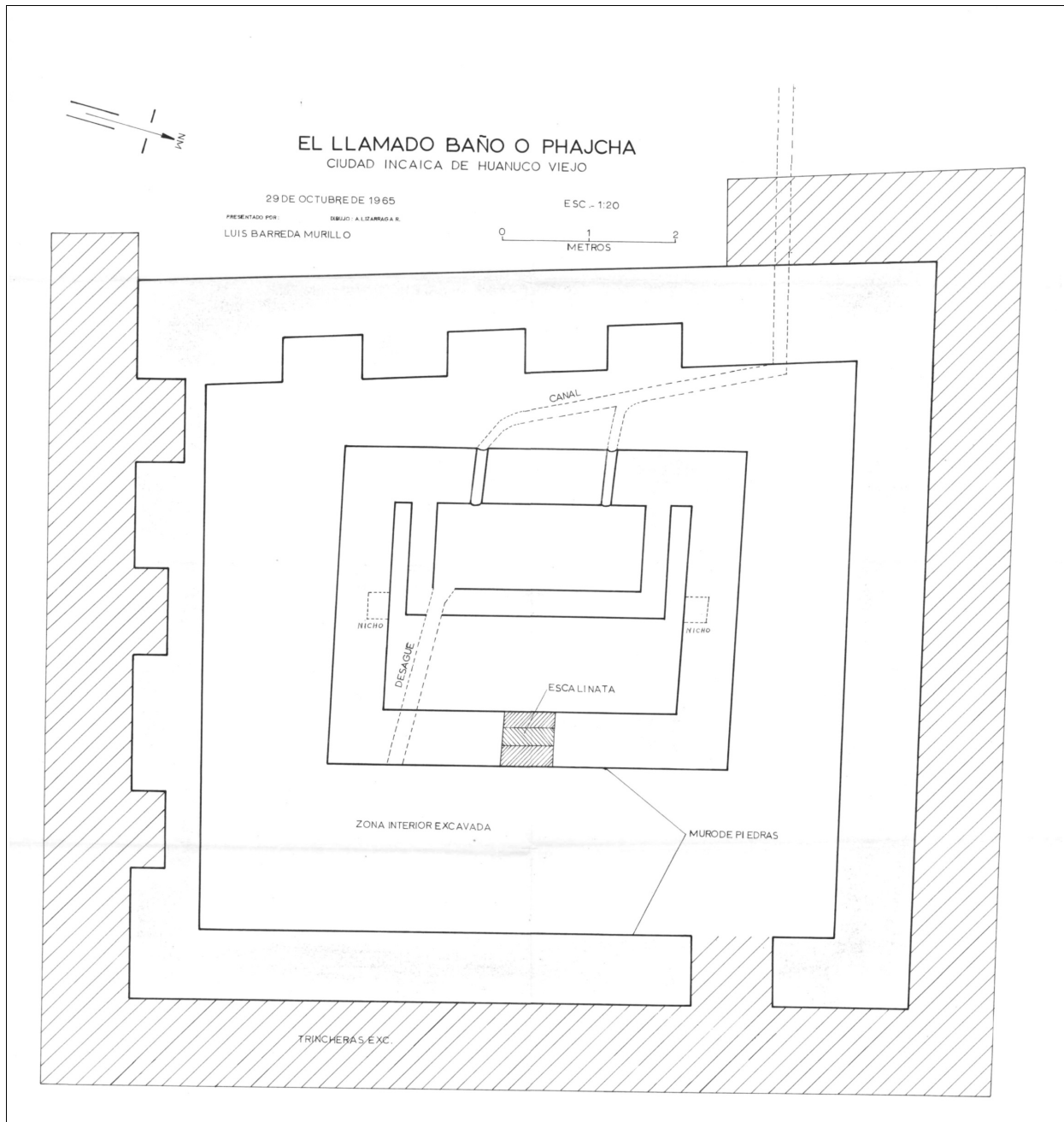


Figure 2. Luis Barreda Murillo's plan of the bath or fountain, Huánuco Pampa. Reproduced courtesy of the Junius Bird Laboratory of South American Archaeology, Division of Anthropology, American Museum of Natural History.

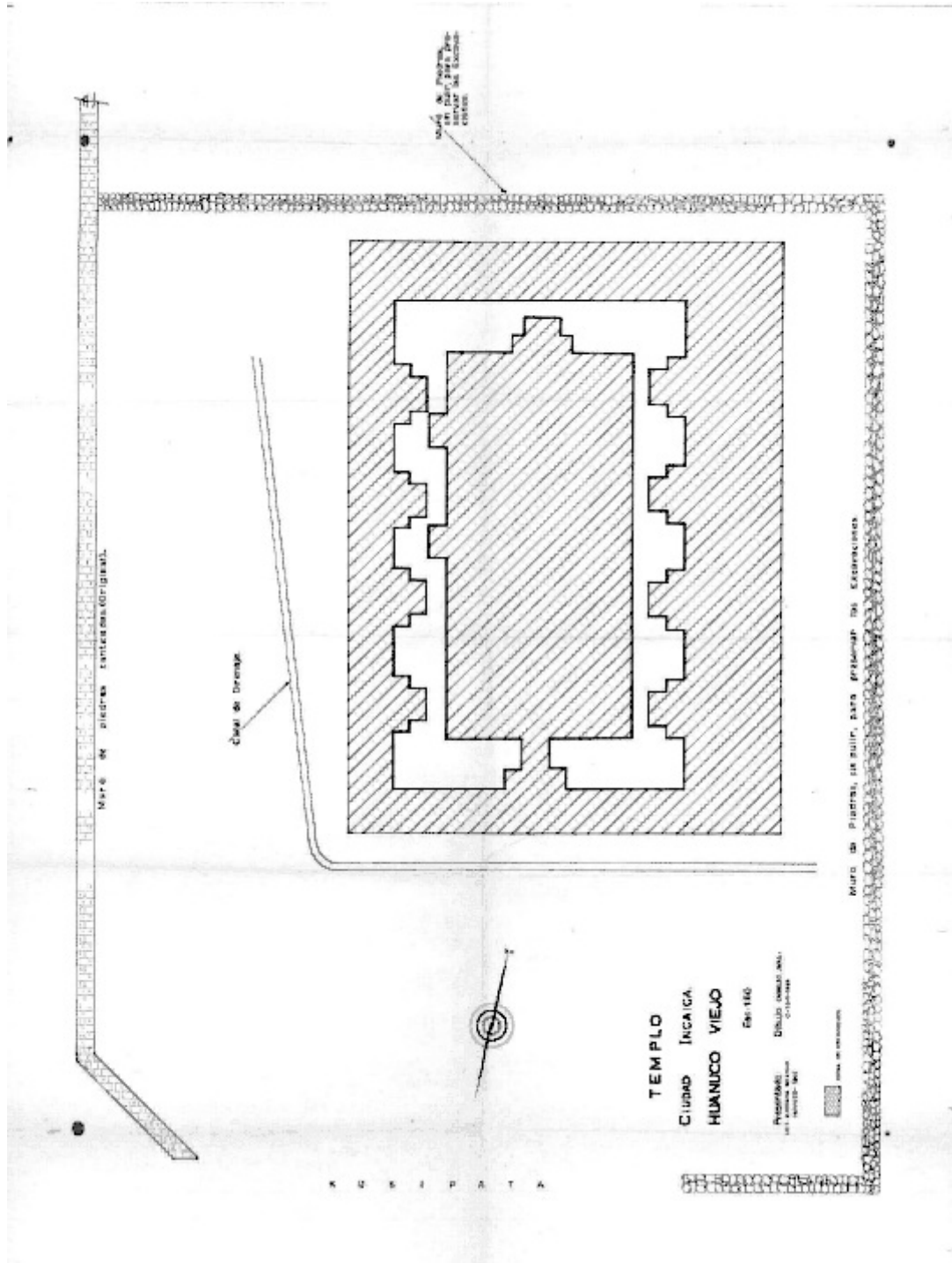


Figure 3: Luis Barreda Murillo's plan of the Unfinished Temple, Huánuco Pampa. Reproduced courtesy of the Junius Bird Laboratory of South American Archaeology, Division of Anthropology, American Museum of Natural History.

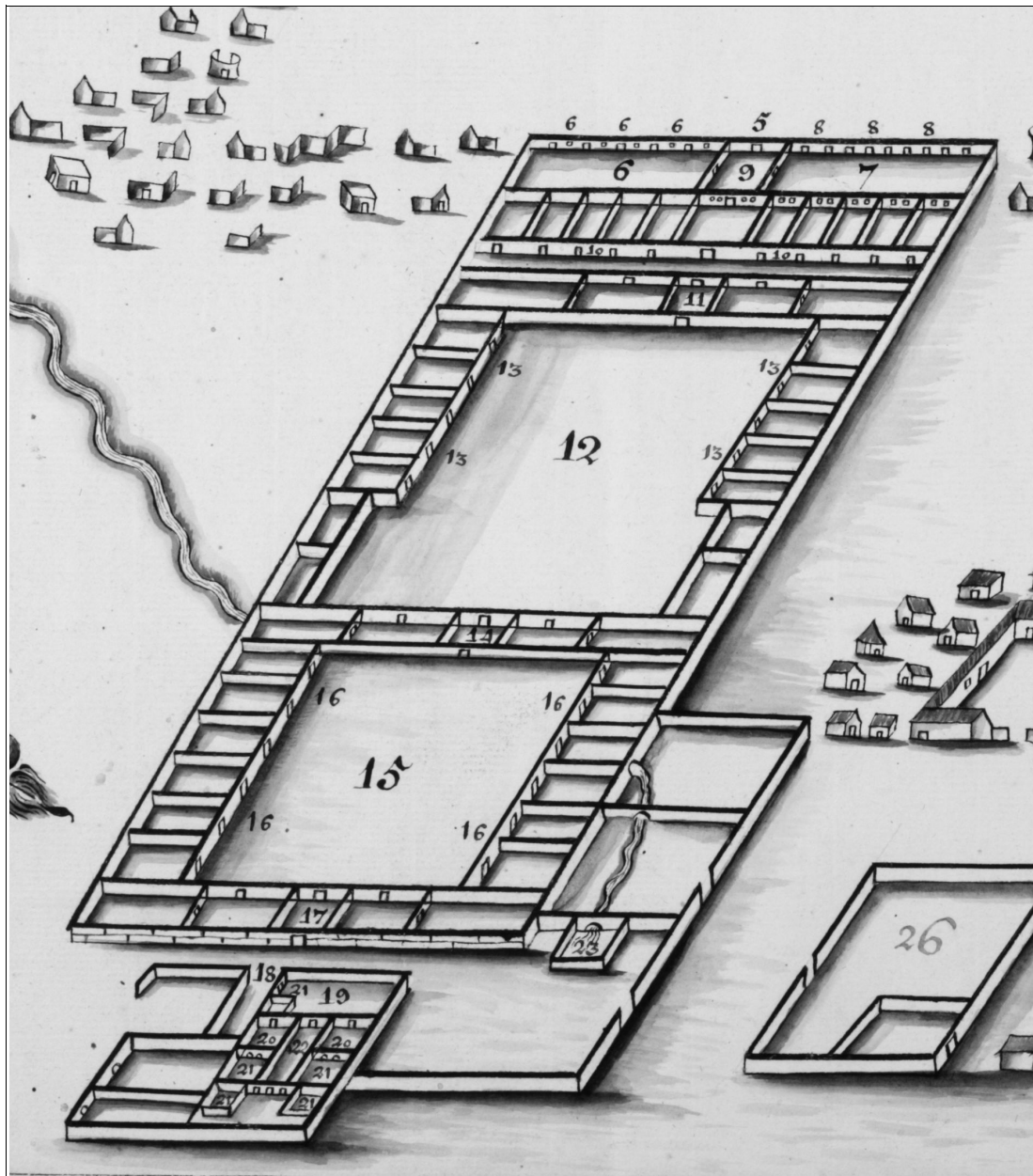


Figure 4. Detail of the eastern portion of Huánuco Pampa, from Sobreviela and Sierra (1786). East is at the bottom of the plan. Note water flow from the southwest, running beneath the Inca palace and into a reservoir. (5) Main entrance into the eastern part of the site; (6) doors leading into what we now know as the South Kallanka and the South Kallanka itself; (7) building now known as the North Kallanka; (8) doors leading into North Kallanka; (9) passage between kallankas; (10) "cloister" with five rooms; this has since disappeared, but traces are visible in some of Murra's photographs; (11) passage to the Inca palace; (12) main plaza of the Inca palace; (13) rooms around the main plaza of the palace; (14) passage; (15) secondary plaza; (16) rooms around the secondary plaza; (17) passage to the small bath plaza; (18) portal leading into the bath plaza; (19) small bath plaza; (20) windows through which water passes into the baths; (21) the baths; (22) passage to the second bath plaza; (23) fountain or reservoir that provides water to the baths; (26) ancient building.



Figure 5. Workers under the immediate supervision of Luis Barreda Murillo excavate bath at Huánuco Pampa, October 1965. From a contact sheet by Barreda, courtesy of the Junius Bird Laboratory of South American Archaeology, Anthropology Division, American Museum of Natural History.

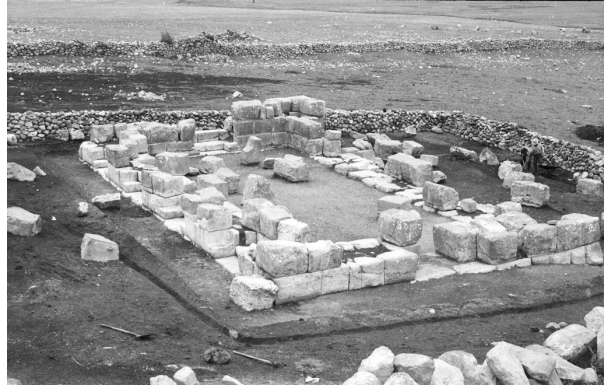


Figure 7. The "Unfinished Temple", Huánuco Pampa, after partial reconstruction by Luis Barreda Murillo, Rollo 35, foto 9, John Victor Murra Archive, Junius Bird Laboratory of South American Archaeology, Anthropology Division, American Museum of Natural History.

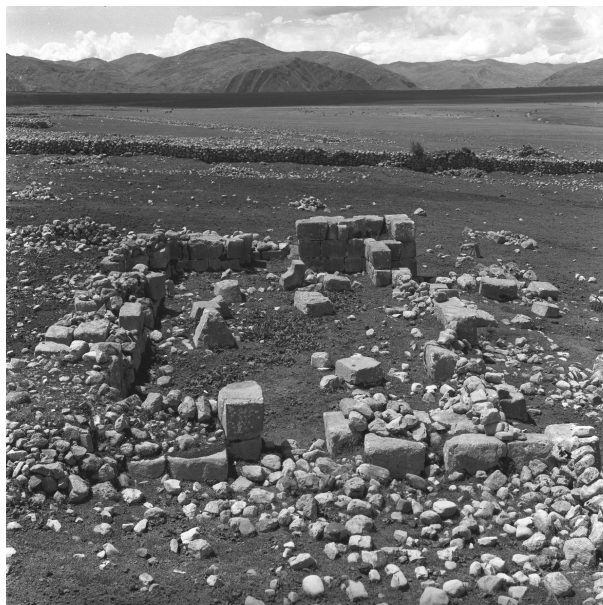


Figure 6. The "Unfinished Temple", Huánuco Pampa, before partial reconstruction by Luis Barreda Murillo. Rollo 36, foto 10, John Victor Murra Archive, Junius Bird Laboratory of South American Archaeology, Anthropology Division, American Museum of Natural History.

CHILE

EARLY VILLAGE FORMATION IN DESERT AREAS OF TARAPACÁ, NORTHERN CHILE (ELEVENTH CENTURY B.C.–THIRTEENTH CENTURY A.D.)

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The morphological and functional analysis of building elements and the construction of architectural typologies for thirteen habitation sites has allowed Urbina and colleagues to recover new information and to rethink the history of the populations residing in sequence on what is at present known as the Pampa de Tamarugal (Urbina, Adán, and Pellegrino 2012: figure 1, p. 35; Figure 1). From the ninth millennium B.C., the residential architecture of this desert zone manifested and established a concept of differentiated space, separating family space from collective space. This is dem-

onstrated by the incorporation of public architecture into agglutinated settlements, which established a more institutionalized and hierarchical social order (Adán *et al.* 2013:91). The goal of aggregation or residential nucleation was developed by means of a series of long-term gradual and radical transformations in the structure of kinship (Engels 2007 [1884]:28). These had an impact upon the architectural design of houses and upon the characteristics of settlements in general (Flannery 2002:417-418, 431; McGuire and Schiffer 1983:284-287). The analysis presented here encompasses the architectural study of settlements including extensive and/or subdivided agglutinated sites, as well as disbursed sites with isolated and/or expedient architecture (for example, camps or shelters), and better-made built environments that grew through additions and/or consisted of conglomerated or contiguous rooms. A historical and comparative glance at the diversity of types of settlements with architecture, their components, and their chronology permits an evaluation of Formative Period village dynamics in the region (Tables 1 and 2).

Formative villages with circular ground plans

The authors of this report postulate an early social structure that employed residential units that were circular or ovoid in ground plan and were made of stone. These occur at altitudes between 10 and 2800 masl. There are also circular or oval mud structures found at altitudes between 10 and 1380 masl. Some are dispersed and/or isolated while others are agglutinated around patios of various sizes and variable complexity. The stone-built settlements (the camps of Caleta Huelén Alto, Pircas, Tasma, and Quebrada Ancha) are represented by hundreds of single residential structures, while other, more agglutinated structures, isolated or dispersed throughout a large territory, represent the nuclear family groups that occupied them seasonally, or for short periods of

time. Sites of this latter type are both better represented, and larger, in the region under discussion (Table 1). Exceeding a hundred structures, they occupy between 0.11 percent (Tasma) and 9.6 percent (Caleta Huelén Alto) of their terrain. Their sizes range between 10 and 180 hectares, and building density does not exceed 15 structures for every 100 square meters. The conglomerate structures are no larger than 70 square meters, with the exception of the central sector of Pircas where buildings reach great size (more than 1146 square meters) and internal complexity (up to 24 interconnected and abutting structures).

Pircas. The case of Pircas evinces an extensive multi-parental family and lineage structure that resulted in the modification of house design. The extended families expanded and subdivided their houses, investing more work in their construction and maintenance, and selected more durable materials such as large foundation blocks. The agglutinated sites join various smaller structures (for example, bedrooms, kitchens, storerooms, and others) around a common space, perhaps a multifunctional patio, or a small open plaza delimited by walls, or by alignments of pillars, or by perimetral and central monoliths (Núñez 1984; Urbina, Adán, and Pellegrino 2012).

The central sector of Pircas (1230 masl) is the best example of a mixed settlement. Within a dispersed and extensive camp of around ninety hectares, with parapets, or shelters, or domestic structures adjacent to small patios, a series of residential compounds were placed close together, visible from each other, in the manner of a segmented village. This sector is called Pircas-1 and is made up of large agglutinated compounds (Pircas-1 in Núñez 1984, figure 1, pp. 120-121; Figure 2). The settlement in its totality has at least five of this type of compound, as well as others of smaller size, in addition to geoglyphs and cemeteries in other places. One

must, therefore, inquire about the factors underlying the differentiation between basic single or double houses and the large residential compounds.

At the level of its internal organization and scale, the central sector of Pircas is partially analogous to the large compounds at the village of Ramaditas (1120 masl; Rivera 2005; Figure 3) and, certainly, to judge by the superficial architectural evidence at the site, to Pabellón de Pica on the coast. Pircas and Ramaditas share placement on flat ground near quebradas. Their structures are semi-subterranean. Because of this, the ground had first been leveled for the installation of foundational pillars. Unlike Pircas, Ramaditas is notable for the skillful use of large prepared adobe bricks, mud applied in a plastic state, and systems of internal posts for the placement of partial roofs, or tall conical roofs covering a large surface area.

Ramaditas. The agglutinated complexes of Ramaditas achieved sizes similar to those of the central sector of Pircas (less than 950 square meters). Therefore, it can be affirmed that at this location multi-parental lineages also developed. These continued for generations among the people who inhabited or frequented the place, who built “great houses”, each with its own spaces for communal/ceremonial activities (patios or small plazas). The large mud houses of Ramaditas are surrounded by smaller, isolated mud houses and others of dry stone masonry. These appear to be the normal or common houses of the population. From this it can be concluded that, as with Pircas, Ramaditas has a mixed settlement pattern, being a camp as well as a village.

Guatacondo. The mud buildings with circular ground plans reach a final level of complexity in the village or settlement of Guatacondo (Figure 4), where the complexes take the form of two large neighborhoods or moieties. The

surface area of the constructions of the South Barrio is 1382 square meters. That of the North Barrio is 995 square meters. The two barrios surround a large oval central plaza with an area of 1838 square meters. This plaza has a significantly greater capacity than the patios or small walled plazas located within the residential compounds at Pircas and Ramaditas. These do not exceed 234 and 710 square meters, respectively. In all, the settlements adhering to the circular pattern exhibit the structure of a net of settlements and populations that interacted on a regional level—villages or settlements, camps or small villages, camps or shelters, and caches. While the greater parts of the sites correspond to dispersed settlements with isolated and simple houses, the central sector of Pircas and the compounds of Ramaditas, as well as the village or settlement of Guatacondo, involve multi-generational lineages grouped in village barrios whose occupation was not necessarily permanent. The families who made up these lineages and constructed “great houses” of stone and mud came from different localities where they lived during the course of the year, in an austere manner, in circular stone houses, small compounds, or in shelters within extensive camp grounds.

The greater elaboration of certain domestic units at Pircas and Ramaditas, as with the population complex at Guatacondo, makes up only one portion of the panorama. At the latter site, a strategic increase in the storage system in the form of bodegas (excavated pits or recesses in the walls) increased the capacity for food autonomy or for provisioning mass ceremonial events, influencing the scale of public spaces, and the agglutinated form of the dwellings in an unprecedented manner (building density: 227;¹

Soil Occupation Factor [Factor de Ocupación de Suelo or FOS]: 54 percent). In all, the special nature of the large compounds and the barrios with circular ground plans correspond, within the history of the regional Formative, to the empirical or symbolic structure of the lineages or families dispersed during the greater part of the year, being a demonstration of their wealth, staged according to large-scale congregational practice, where daily tasks are linked to rites, constructive labor, and the use of public spaces (plazas). Urbina and colleagues believe that the structure and architectural capacity of the village or settlement of Guatacondo had festive and ceremonial ends associated with the schedule of seasonal mobility in the regional desert environment and with the rhythms imposed by the system of production and the exploration of resources related to the pampa, the *Prosopis* woods, and the environments of the high quebradas (*tolar*), where the socio-parental base (families and lineages) remained, largely dispersed in different campgrounds, shelters, and small sites during the annual cycle.

Formative villages with rectangular ground plans

The second type of social structure in the region employed residential units based on modular rooms with rectangular ground plans, or irregular orthogonal plans. Such stone-walled structures occur at elevations between 10 and 2800 masl, while anhydrite and mud structures are found at altitudes between 830 and 1290 masl. The rooms have internal subdivisions or contiguous external additions comprising other rooms or similar structures, maximizing the habitable surface and the use of construction materials. Dispersed, stone-built settlements are found in the highlands or quebradas altas (for example, at Tasma and Quebrada Ancha) and

¹ Building density is calculated by dividing the number of structures by the settlement area in hectares. FOS, widely used in hispanic real estate law, is that portion of a plot of land that can be used for the purposes for which the land

is intended. The rest is open space. Here it refers to the percentage of a settlement that is covered by roofed buildings in relation to open space inside the settlements.

at the mouth of the Loa River (Caleta Huelén Alto) while agglutinated sites on the Pacific Coast (for example Pisagua Norte and Chomache) correspond to small villages adjacent to coves on the rocky coast, built using contiguous rectangular units or orthogonal modules with internal subdivisions. In the case of Pisagua Norte (density: 278; FOS: 48 percent), the village incorporates mortar and *quincha* (wattle and daub), while at Chomache (density: 238; FOS: 30 percent) stone walls (*pirca*) bonded with a very compact adhesive made of mortar based on ashes, sand, and organic materials were used (Urbina, Adán, and Vidal 2012). The traits of the two settlements are congruent and include their placement on low terraces built on slopes. Both dispersed and agglutinated sites show elements of shared design, with their pattern of circular structures, as well as with the Early Stone Construction Tradition (la Tradición Temprana en Piedra; Adán and Urbina 2007) including foundations of pillars or monoliths, prepared floors, dedication burials (*waki*), and slightly curved corners in the structures. The compounds generally have internal connections via small openings. There are larger structures or multifunctional patios, and smaller structures used as garbage dumps, storerooms, and external circulation paths. Urbina and colleagues stress that Pisagua Norte and Chomache are villages with residential compounds or agglutinated structural modules which were the dwellings of nuclear family units or segments of extended families. These lived together or shared a single home with a specific economic orientation such as the collection of littoral resources including guano, molluscs, near-shore resources, and those of the rocky crags, such as edible plants and moisture from fog, as well as navigation, fishing, etc., that were part of the coastal-interior economic system (Urbina *et al.* 2011:93; Urbina, Adán, and Vidal 2012).

The rectangular building pattern of the valleys and interior oases appears on a much

larger scale at the village of Caserones in the Quebrada de Tarapacá (density: 171; FOS: 26 percent) and at the village of La Capilla in the middle Loa Valley (density: 96; FOS: 43 percent). Both correspond to agglutinated settlements with communal or public architecture made of anhydrite and stone, and with mud used for coating the walls, and as mortar, with various storage systems including storerooms and storage pits, and peripheric and internal posts to support sloping roofs. Sites stand on flat ground (Caserones) or on gentle, artificially terraced slopes (La Capilla). Both of these are on elevated river terraces that permit visual control of permanent or seasonal watercourses and nearby *Prosopis* woods. La Capilla consists of one or two large barrios of 1960 square meters formed by contiguous compounds organized orthogonally on a surface of 7500 square meters on which corrals, patios, or plazas can be recognized. These reach sizes of up to 176 square meters.

Caserones (Figure 5) is constituted by at least seven extensive barrios made up of compounds with irregular orthogonal plans (Pellegrino *et al.* 2011; Urbina, Adán, and Pellegrino 2012: table 10:51). These barrios, with ground surfaces ranging from 972 to 2245 square meters, were placed from northeast to southwest with respect to the quebrada. They are enclosed by a double perimeter wall that surrounds the settlement and limited its growth to a surface area of 3.8 hectares. In the south-central portion of the site this wall enclosed two open plazas with walls forming spaces of 1480 and 1452 square meters respectively.

In the extreme north-central part of the site, within the perimeter enclosure, and next to the quebrada, is another double complex of large structures (254 and 229 meters square, respectively), that look like temples or partially roofed patios and are six times smaller than the open plazas.

The area covered by Caserones is four times that of the settlement of Guatacondo. The ground surfaces covered by each of its seven barrios or sectors show a gradation in size from moderate (972 square meters) to large scale (2245 square meters) with an average of 1642 square meters. Comparable to the size of first level of the barrios documented at Caserones (± 900 to 1700 square meters) are those of Ramaditas (compounds 1 and 3), the two sectors of Guatacondo (South and North), and Compound 1 of Pircas (Urbina, Adán, and Pellegrino 2012).

In summary, a regional network of settlements existed that employed rectangular dwellings, the majority being dispersed camps located between the coast and the high quebradas, in which simple, isolated dwellings were set up with small groups of walled structures. At the same time, small shelters or villages existed on the coast, as well as a number of well-enclosed settlements of greater importance and complexity in the interior. According to the hypothesis of Urbina and colleagues, enclosed or nuclear family units began to strengthen hereditary/generational and multi-parental links, implementing meeting points in villages used for political or ceremonial ends during the annual cycle, through the construction of residential sectors or barrios with large capacities for housing affinal and/or consanguineous kin. This would be the case at Caserones and at the village of La Capilla. There the scale of dwellings had been increased, as well as the capacity of storehouses and patios, with a modular organization of the internal connections of the settlement. This was accomplished by maximizing the internal built surfaces. At Caserones communal works of enclosure (the double perimeter wall), public buildings, and restricted access were executed for specific ceremonial functions. The presence of specialists in mud and anhydrite construction and a large labor force gathered together, who converged to

construct “twin” compounds of plazas and temples, can be inferred. This would have been congruent with the settlement’s accommodation capacity and a basic production surplus for the execution of supra-domestic tasks of great inspiration and length.

Looking at all this one may ask why, if the larger part of the population lived in houses and small stone-built settlements in various parts of the region, a large and complex settlement of mud and anhydrite was built next to the Quebrada of Tarapacá? As in the villages with circular patterns, communities or lineages whose families remained dispersed during the year, living in simple houses, shelters, and camps, appeared to institutionalize their kinship links by means of seasonal fiestas and collectives associated with the exploitation of the *Prosopis* woods and the economic regulation involved in their use (Adán *et al.* 2013). There, where large, planned communal works, open and closed ceremonial spaces in the form of temples and/or ceremonial patios were constructed with urbanistic ends (Vidal 2012:235-238; Urbina, Adán, and Vidal 2012:53), their own organization was manifested and exhibited. That is to say, the position and rank of each family, lineage, or community (including those without access to occupied spaces like Caserones) as well as its place in space with respect to the pampa’s resources, were demonstrated. These resources, without doubt fundamental to the economic cycle of the time, were institutionalized by gatherings and ceremonies in this conspicuous type of settlement, within the lineage disaggregated during the rest of the year. This practice that appears to have persisted during the first millennium A.D. in spite of the substantial changes in the Formative settlement pattern.

Significant historical changes

In accordance with the absolute dates presented in Table 2, Urbina and colleagues establish the outline of a general thesis about the structure and articulation of two formal architectural patterns, the kinship structures that sustained them, and the various degrees of residential integration registered at settlements of the regional Formative Period. Fishing villages and extensive camps with simple isolated dwellings, shelters, parapets, and agglutinated sectors, like those of Caleta Huelén Alto, Pircas, Ramaditas, Tasma, and Quebrada Ancha, constitute the inhabited places of greatest everyday importance, where it appears that the bulk of the Formative population of the region resided, almost during the entire sequence (eighth through eleventh centuries A.D.). In some cases, their occupation continued during the Late Intermediate Period (twelfth to fourteenth centuries A.D.).

The stone and mud buildings with circular ground plans utilized by segmented and dispersed villages developed during the first epoch, from the eighth to the ninth centuries A.D. in Ramaditas and Pircas, and, it is supposed, in the Quillaqua Valley and at the Pica Oasis, as well. As early as the seventh century B.C. the space where the large oval plaza was later built at Guatacondo was already inhabited, and it was the principal political center of the region from the fourth century A.D. There it appears that at certain times of the year, communities, extended families, and pluri-parental lineages showed up from simpler settlements near and far. This architectural village or settlement plan appears to have been abandoned on the pampa at the beginning of the present era. Nevertheless, this seems not to have significantly affected the continuance of camps, refuges, or walled shelters on the coast, in the pampa, or in the highlands.

A second epoch began with the emergence of rectangular modules built of stone and andrydrite, also dispersed regionally, with early dates, from the first century A.D., at Caleta Huelén Alto and Caserones. This pattern later disseminated to the coast between the third and fourth centuries A.D. (Pisagua Norte, Los Verdes, and Tasma) and from the seventh to the eighth centuries A.D. to Chomache, La Capilla, and Quebrada Ancha). Meanwhile, in the Guatacondo Quebrada, the decline or abandonment of the villages and settlements with circular ground plans occurred from the first to the fourth centuries A.D., although they lasted until the eighth century A.D. in Pircas. The residential concentration of Caserones increased from the third to the fourth centuries A.D., a product of the substantial investments in its housing capacity and the implementation of communal works such as perimetral enclosures and plazas. In spite of this, on the regional level, the countryside–town dynamic persisted. Equally, the simple, dispersed lifestyle in simple, isolated, circular, or rectangular dwellings, or somewhat nearby houses, in large occupied territories at various altitudinal niches persisted. It appears logical to suggest that the political and ceremonial weight of the southern lineages (Guatacondo), and their calendar of festivities, was shared and provided a model for other instances of institutional gatherings sponsored by communities now brought together periodically and with greater intensity in the lower valley and drainage of the Tarapacá Quebrada.

Finally, between the sixth and eleventh centuries A.D., the central sector of Pircas was abandoned, while the seven principal barrios of Caserones decided to build a perimeter wall, limiting its future growth and access by new members to the settlement space, storehouses, and public and religious buildings. This appears to constitute a segmentation process that influenced the establishment during this time of settlements like La Capilla (Quillagua), where,

without the infrastructure of plazas or temples and walls, the architectural characteristics of Caserones were reproduced, analogously to the consolidation of villages made of anhydrite and mud built upstream from Caserones (Quebrada de Tarapacá; Núñez 1983: figure 3:34).

Conclusion

During the Formative Period, enclosed and dispersed family units annually occupied minor settlements, refuges, shelters, or extensive camps on the coast, on the pampa, or in the highlands. During two millennia, at certain points in the calendar year, political and institutional relations were established in segmented villages and agglutinated settlements adjacent to the Pampa de Tamarugal, under a dynamic of supra-domestic and inter-community growth and segmentation that, throughout multiple generations, allowed the use of space and access to the Pampa. The agglutinated/dispersed dichotomy, sustained in categories like village or settlement versus camp or shelter, appears to lead one away from the conclusion of this report, that the significant social units that have been documented at this point in the regional research are those residential units that constitute and define the settlements, whether they are transitory and precarious, or durable. The principal challenges that the authors of this report have encountered during their research project in progress, as with the science of history of the Tarapacá desert and its population in general, are to deepen the comparative study of Formative dwellings in order to comprehend nuclear and extended family kinship structures, to understand changes in daily life over *la longue durée*, to give them more precise empirical dimensions, and to provide ethnological comparisons relevant from the cultural and geographical points of view.

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Site	Settlement		Surface		Indexes	
	Type (Components)	Structures (n°)	[ST] Settlement Area (Hectares)	[SC] M ² Built	Density (n° Str/Ha)	FOS (SC/STx100)
Pisagua N	Cove/Village	25	0.09	432	277.8	48.00
Los Verdes	Cove	1	n/ref.*	12	n/ref.	n/ref.
Pabellón de Pica	Cove	1	n/ref.	88	n/ref.	n/ref.
Chomache	Cove/Village	5	0.02	63	238.1	30.00
Punta Blanca	Cove/Shelter	8	0.13	78	64.0	6.24
Caleta Huelén Alto	Camp	159	10.68	1,300	14.9	9,6**
La Capilla (Quillagua)	Village/Town	72	0.75	1,960	96.0	26.13
Ramaditas	Camp/Village	83	9.23	2,370	9.0	2.57
Guatacondo	Village/Town	177	0.78	4,215	226.9	54.04
Pircas	Camp/Village	562	89.90	6,594	6.3	0.73
Caserones	Village/Town	640	3.75	15,996	170.7	42.66
Tasma	Camp	445	180.00	2,069	2.5	0.11
Quebrada Ancha	Camp	163	40.00	593	4.1	0.15

Architectural Tradition			
Site	Predominant ground plan	Location/ Preparation	Construction Materials
Pisagua N	Rectangular	Slope/Terraced	Stone/Wattle and daub
Los Verdes	Rectangular	Marine Terrace	Stone/Mortar
Pabellón de Pica	Circular	Marine Terrace	Mud/Stone
Chomache	Rectangular	Slope/Terraced	Stone/Mortar
Punta Blanca	Rectangular	Flat ground/Adjacent to rocks	Stone
Caleta Huelén Alto	Rectangular/Circular	Slope/Terraced/Cleared	Stone
La Capilla (Quillagua)	Rectangular	Slope/Terraced	Anhydrite/Mud/Stone/Wood
Ramaditas	Circular	Flat ground/Semi-subterranean	Mud/Stone/Wood
Guatacondo	Circular	Flat ground/Semi-subterranean	Mud/Stone/Wood
Pircas	Circular/Rectangular	Flat ground/Semi-subterranean	Stone/Wattle and daub/Mortar
Caserones	Rectangular/Circular	Flat ground/Cleared	Anhydrite/Mud/Stone/Wood
Tasma	Circular/Rectangular	Slope/Cleared	Stone
Quebrada Ancha	Circular/Rectangular	Slope/Cleared	Stone

Patterns of Growth				
Site	Conglomerates (n°)***	Barrio/Sector (n°)****	Size (surface oscillation in m ²)	Communal Architecture
Pisagua N	1	-	432	-
Los Verdes	-	-	-	-
Pabellón de Pica	-	-	-	Patio
Chomache	1	-	63	-
Punta Blanca	1	-	78	-
Caleta Huelén Alto	4	-	11,75 - 69,7	-
La Capilla (Quillagua)	-	n/ref.	n/ref.	Patios
Ramaditas	3	-	315 - 950	Patios
Guatacondo	-	2	995 - 1382	Patios/Central plaza
Pircas	5	-	124 - 1146	Patios
Caserones	-	7	972 - 2245	Patios/Lateral plaza/Perimeter wall
Tasma	5	-	6,3 - 21,2	Patios
Quebrada Ancha	44	-	8,7 - 64,4	Patios

* Without reference. Preliminary information as no new architectural documentation, excavations, or sub-surface detection analyses have been conducted.

** FOS: Surface Occupation Factor (*Factor de Ocupación de Suelo*). Modified from the original (Urbina *et al.* 2011, Table 2:70).

*** Conglomerates of three or more adjacent structures were considered. The maximum number of structures included is 30, as documented at the site Pircas (Urbina, Adán and Pellegrino 2012, Table 9:51).

**** Interconnected or adjacent groups of structures, conglomerates, and rooms with three or more internal subdivisions. The minimum number of structures documented in this category was approximately 50 (Urbina, Adán, and Pellegrino 2012, Table 9:51).

Table 1. Settlement features and architectonic indexes, by site.

Site	Location		Period of occupation by Settlement (chronological range)				Reference
	Area	Altitude (masl)	Thermoluminescence dates	Lab [n° of samples]*	Radiocarbon dates (14C)	Lab [n° of samples]	
Pisagua N	Coast	50	290-1420 AD	UCTL [6]	1030-1250 AD	BETA [1]	Uribe <i>et al.</i> 2007; Mendez-Quiroa & Uribe 2010; Urbina <i>et al.</i> 2011.
Los Verdes	Coast	10	380-1590 AD	UCTL [3]	1160-1280 AD	BETA [1]	FONDECYT 1080458, 1130279.
Pabellón de Pica	Coast	10	-	-	1280-1430 AD	BETA [1]	FONDECYT 1080458.
Chomache	Coast	10	-	-	650-1290 AD	BETA [2]	FONDECYT 1080458
Punta Blanca	Coast	22	1080-1240 AD	UCTL [1]	390-620 AD	BETA [2]	FONDECYT 1080458, 1130279.
Caleta Huelén Alto	Coast/ River mouth	65	90-1010 AD	UCTL [3]	-	-	FONDECYT 1130279.
La Capilla (Quillagua)	Valley/Oasis	830	-	-	710-1240 AD	BETA [1]	Núñez 1978; Cervellino & Tellez 1980 [discussed by Gallardo <i>et al.</i> 1993]
Ramaditas	Pampa/ Quebrada	1120	-	-	806 BC-50 AD	BETA/TO/ GX/AA [14]	Rivera 2005; Urbina, Adan & Pellegrino 2012; Uribe & Vidal 2012.
Guatacondo	Pampa/ Quebrada	1380	-	-	669 BC-384 AD	UCLA/ BETA [11]	Tartaglia 1980; Urbina, Adan & Pellegrino 2012; Uribe & Vidal 2012.
Pircas	Pampa/ Quebrada	1230	785 BC-1235 AD	UCTL [9]	370 BC-722 AD	BETA [6]	Núñez 1984; Urbina, Adan & Pellegrino 2012; Uribe & Vidal 2012; Fondecyt 1130279.
Caserones	Pampa/ Quebrada	1290	770-1070 AD	UCTL [4]	20-1020 AD	BETA/ CAMS [22]	Oakland 2000; Mendez-Quiros & Uribe 2010; Urbina, Adan & Pellegrino 2012; Uribe & Vidal 2012.
Tasma	High quebradas	2500	235 BC-1035 AD	UCTL [7]	380-1260 AD	BETA [3]	FONDECYT 1080458, 1130279.
Quebrada Ancha	High quebradas	2800	435-1030 AD	UCTL [3]	640-1380 AD	BETA [2]	FONDECYT 1080458, 1130279.

* Dosimetry Laboratory, Universidad Católica de Chile (UCTL).

Table 2. Thermoluminescence and radiocarbon datings of the sites analyzed. Radiocarbon dates are calibrated to two standard deviations using the programs INTCAL04 and INTCAL09 (Heaton *et al.* 2009; Oeschger *et al.* 1975; Reimer *et al.* 2009; Stuiver and Braziunas 1998).

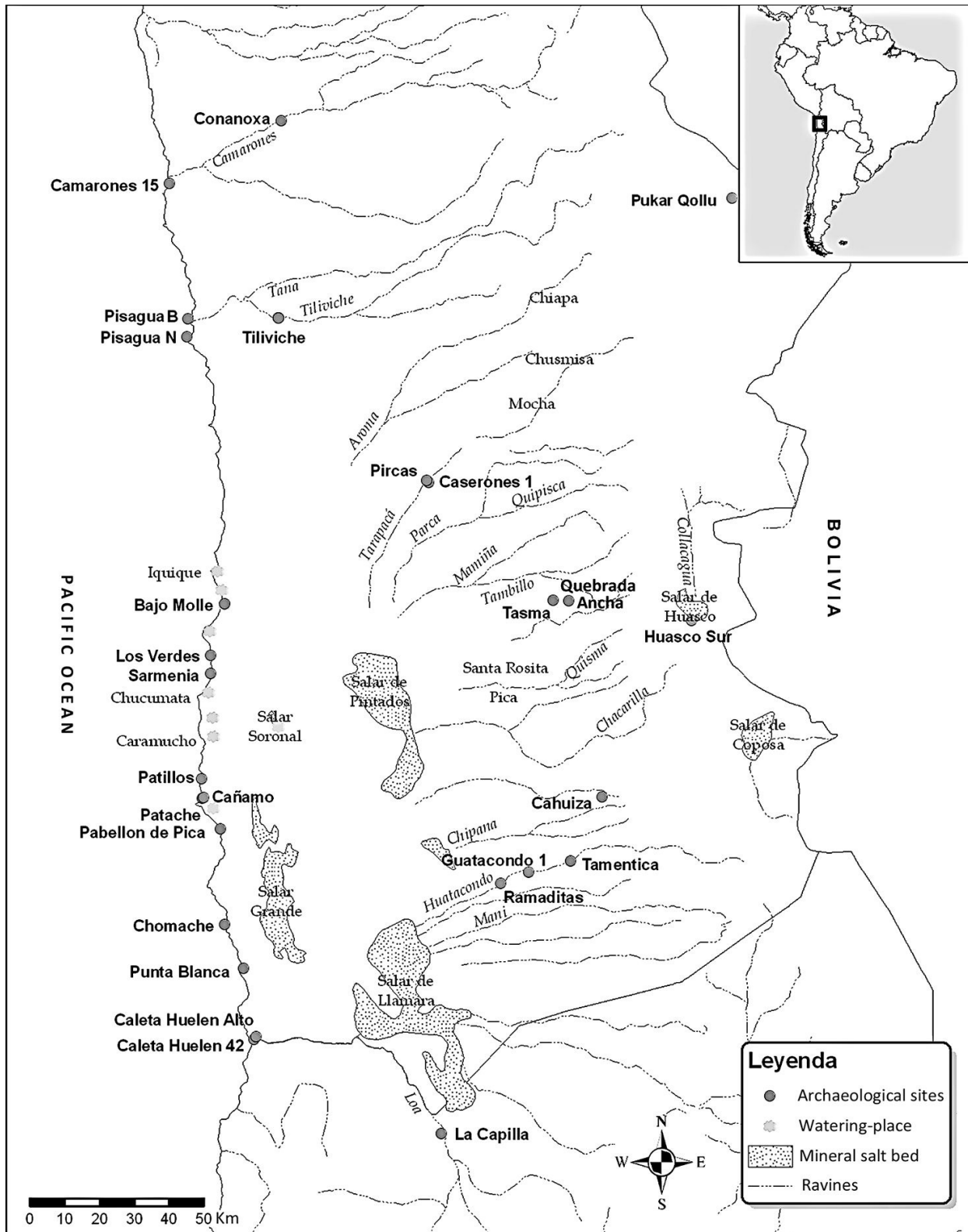


Figure 1. Map of the Tarapacá region showing settlements mentioned in the text.

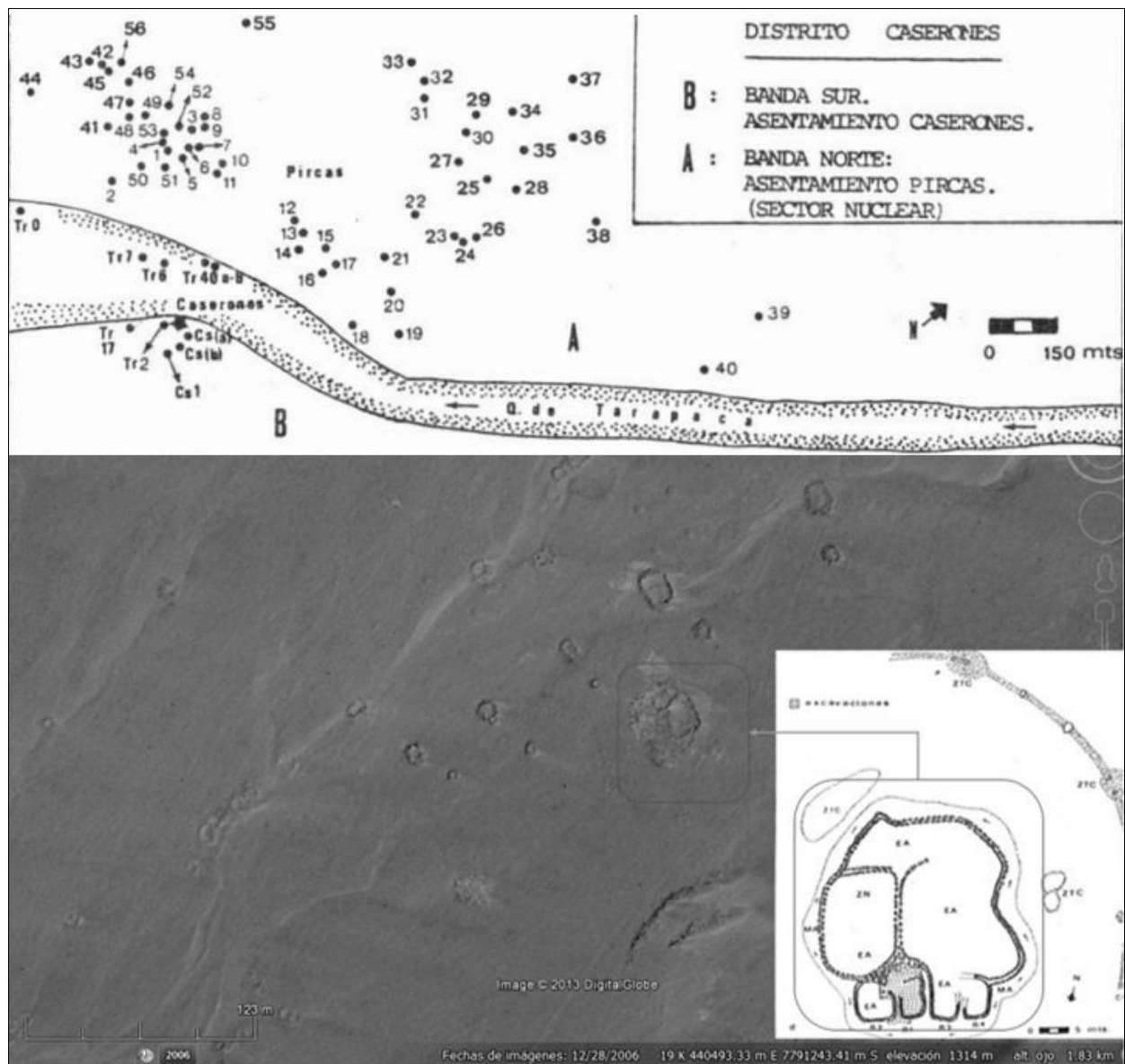


Figure 2. The site of Pircas in the Tarapacá Valley. Note the scattered settlement pattern (top). A Google Earth satellite photo (2013) is at the bottom. A detailed plan of Compound 1 is at the lower right. After Núñez (1984) figures 2-3, pp. 121-122.

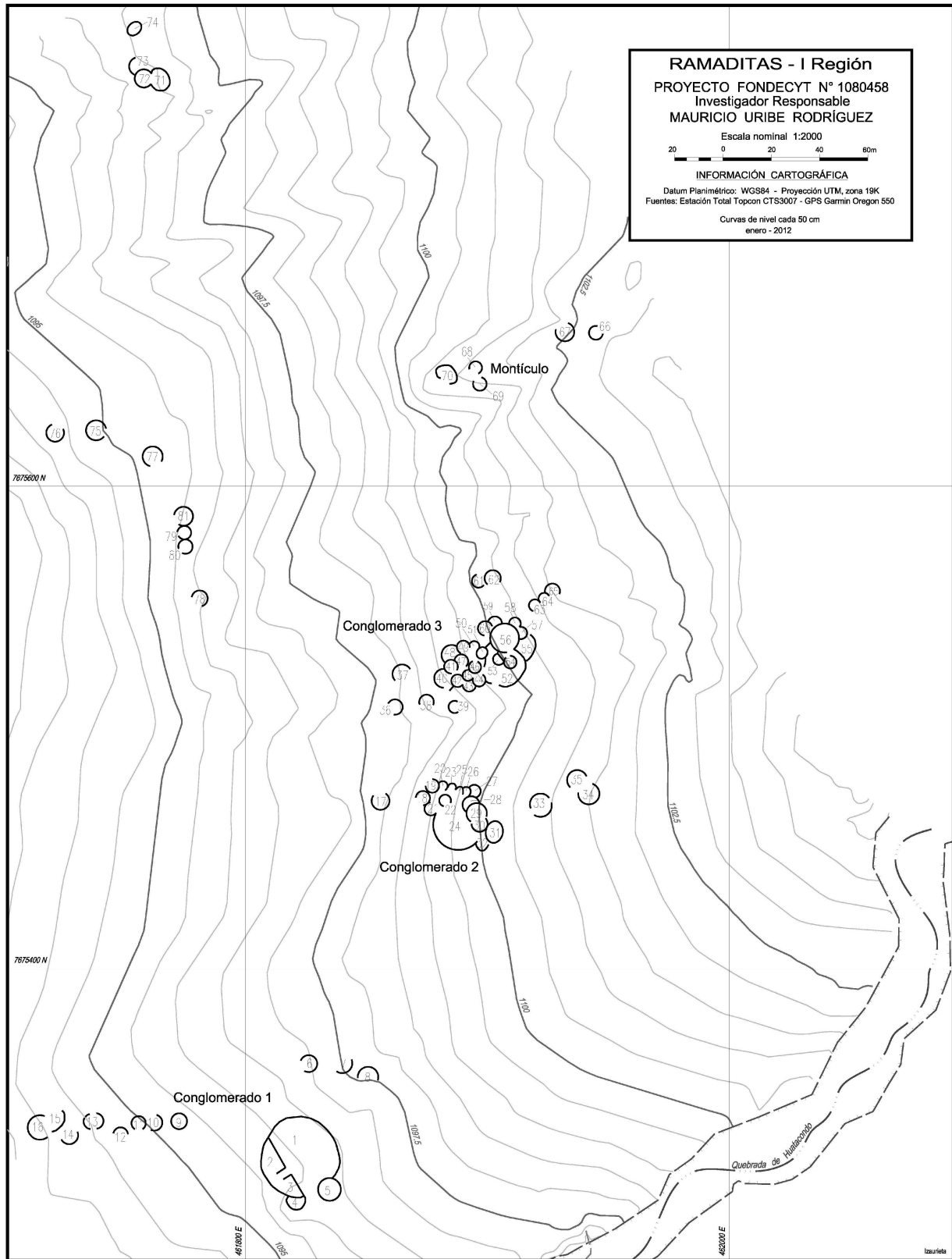


Figure 3. Plan of Ramaditas in the Guatacondo Valley. Note the scattered settlement pattern and the compounds.

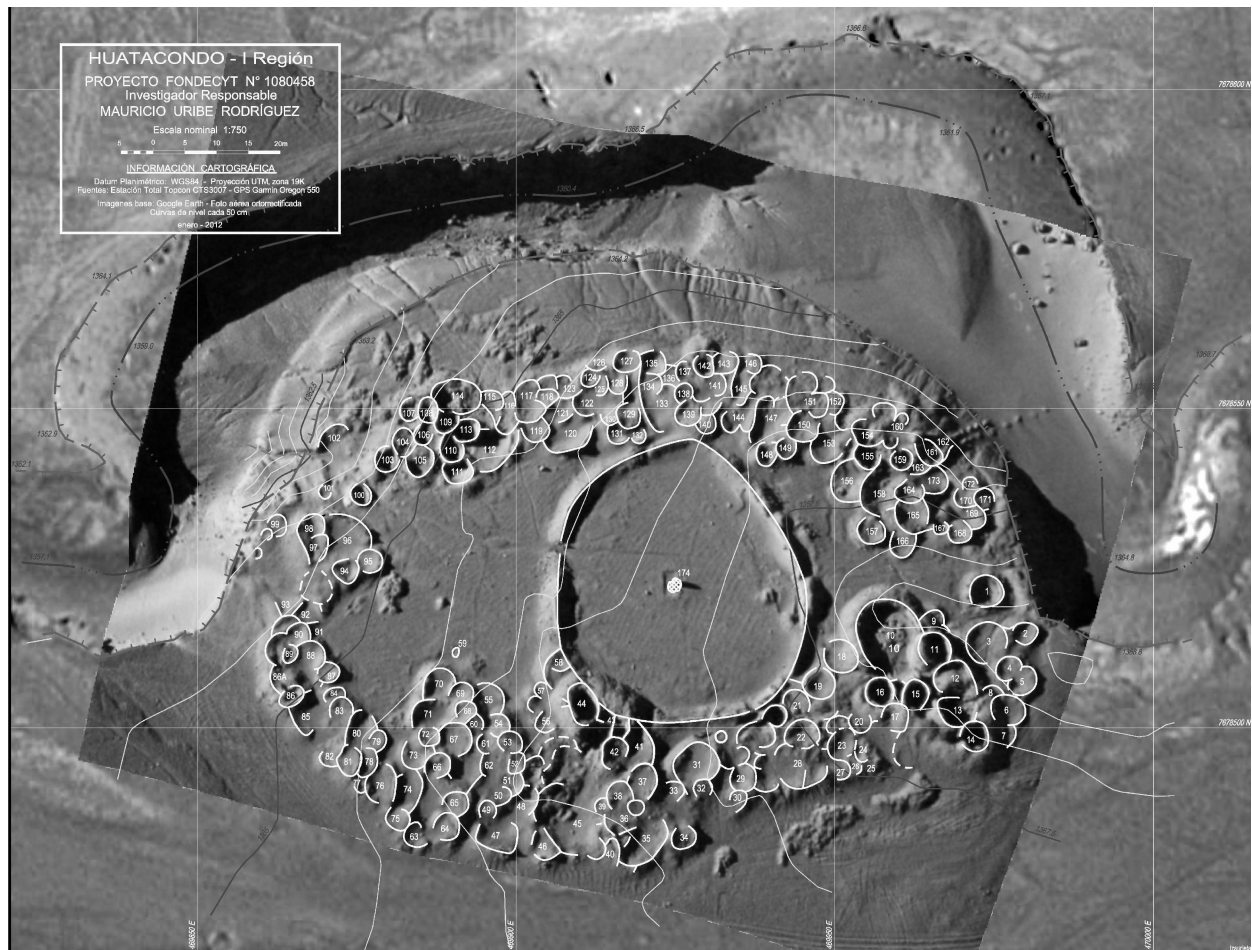


Figure 4. Satellite photograph with superimposed plan of Guatacondo Village. Note the evidence of moiety or sector divisions as expressed in the settlement plan, the agglutinated compounds, and the central open plaza.

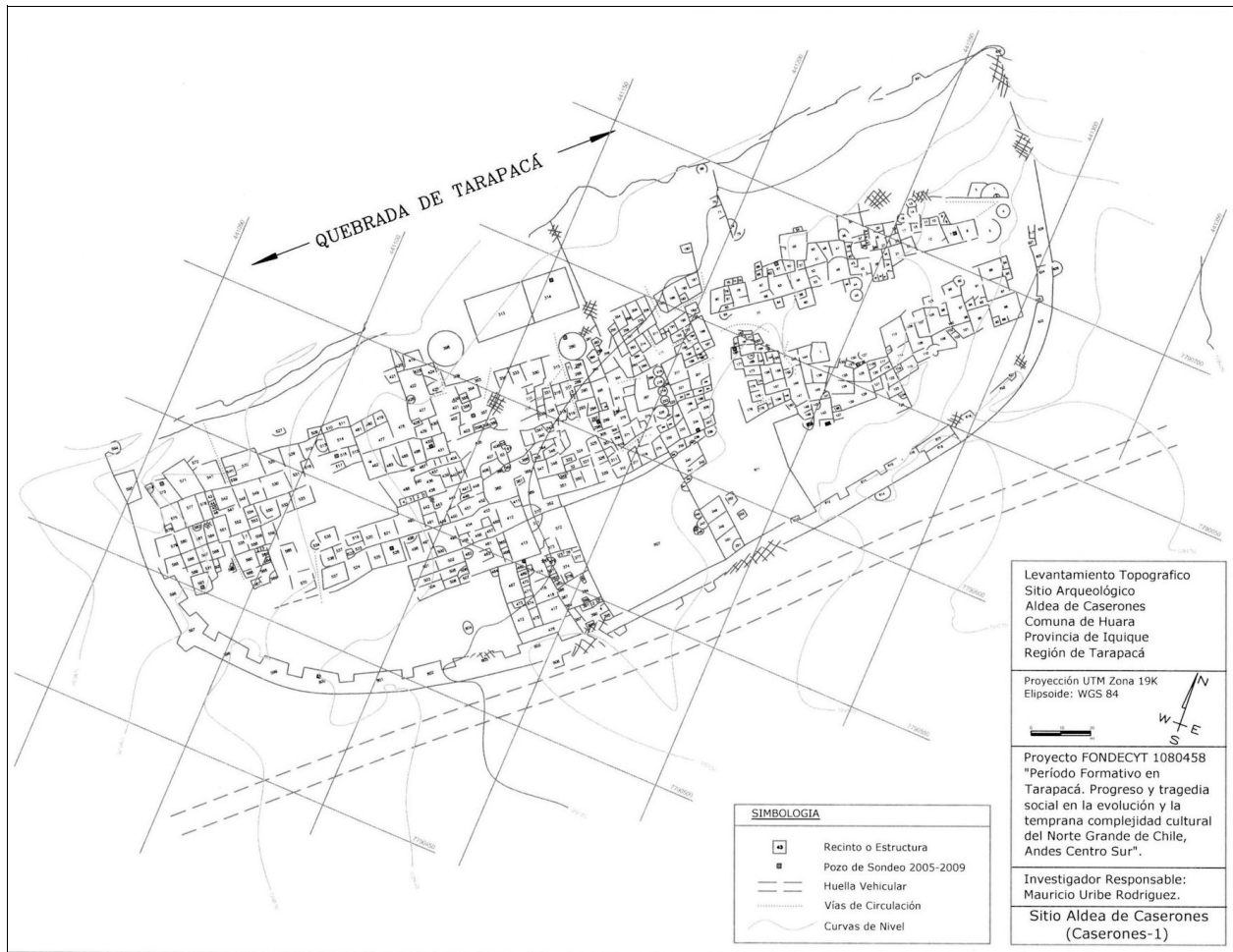


Figure 5. Caserones village. Note peripheral wall, sectors or neighborhoods, open double plazas (southeast) and ceremonial enclosure or temple (northwest).

Argentina

Don Mateo–El Cerro, a Newly Rediscovered Late Period Settlement in Yocavil (Cataramarca, Argentina)

Alina Álvarez Larrain (Museo Etnográfico, Universidad de Buenos Aires; alinalvarezlarrain@gmail.com) writes that she has located a residential settlement called Don Mateo in Northwest Argentina (NOA), probably the site of El Cerro, first reported in 1960.

The Late Intermediate Period or LIP (A.D. 900–1430) in the Andean area is a span of time that runs from the fall of the Wari and Tiwanaku states to the formation of the Inca state. The consensus is that this period is characterized by population growth, political decentralization, complex social processes, and both cooperation and competition, including warfare, in the context of a changing political landscape (Arkush 2011). The socio-political decentralization at the beginning of the LIP appears to have given way during the second half of this period to more concentrated settlements and the investment in defensive features due to an increase in armed conflict as a possible response to population growth, climatic fluctuations, and the emergence of new ethnic and political groups. Evidence from fortified sites (*pukara*) indicates that both inter-group conflict and political integration increased towards A.D. 1200, before the region came under the control of the Inca (Arkush and Stanish 2005).

Particularly in Northwest Argentina (NOA), the beginning of the Late or Regional Development Period, contemporaneous with the LIP, is characterized by an important growth in population, extensive agricultural areas with complex irrigation systems, new technology, specialized artisans, and the emergence of regionally distinct material culture (Tarragó 2000). During the first centuries of the second

millennium A.D., a clear settlement hierarchy appears to have been absent. However, around the thirteenth century A.D., multiple nuclear settlements developed with hundreds to thousands of inhabitants. The largest sites, located on hilltops and relying on defensive features, constituted administrative centers in complex settlement hierarchies (Nielsen 1996; Tarragó 2011). These fortified sites appeared to have arisen as places for the temporary gathering of dispersed populations in times of external threat. Nevertheless, the *pukara* of the final LIP are usually characterized as places of permanent residence.

The Yocavil or Santa María Valley forms part of the region of mountains and valleys of NOA. It is one of the best known archaeological zones, and much work has occurred there. This is mainly because of the size and quantity of Late Period sites, among them many *pukara*. The valley runs from Punta de Balasto in Cataramarca Province to its joining with the Calchaquí River Valley at Cafayate in Salta Province. It is bounded by the Sierra del Cajón or Quilmes on the west and by the Calchaquíes Peaks (Cumbres Calchaquíes) and the Sierra del Aconquija on the east (Figure 1). In April 2011, as part of her doctoral thesis on settlement patterns and archaeological landscapes, Alina Álvarez Larrain conducted survey in the archaeological zone of Andalhuala, in the southeast of the Yocavil Valley (Álvarez 2014). This allowed Álvarez and her team to locate a Late Period settlement known as Don Mateo or Rincón del Tío Mateo, that they believe is the settlement identified in 1960 as El Cerro, and whose exact location had been previously unknown (Arocena and Carnevali 1960). Don Mateo stands at 26°53'13.71" south, 66°2'2.63" west. This site poses new questions about the relationship between the *pukara* and settlements without defensive features. It also offers new information about the beginning of the Late Period in Yocavil and the southern Andes.

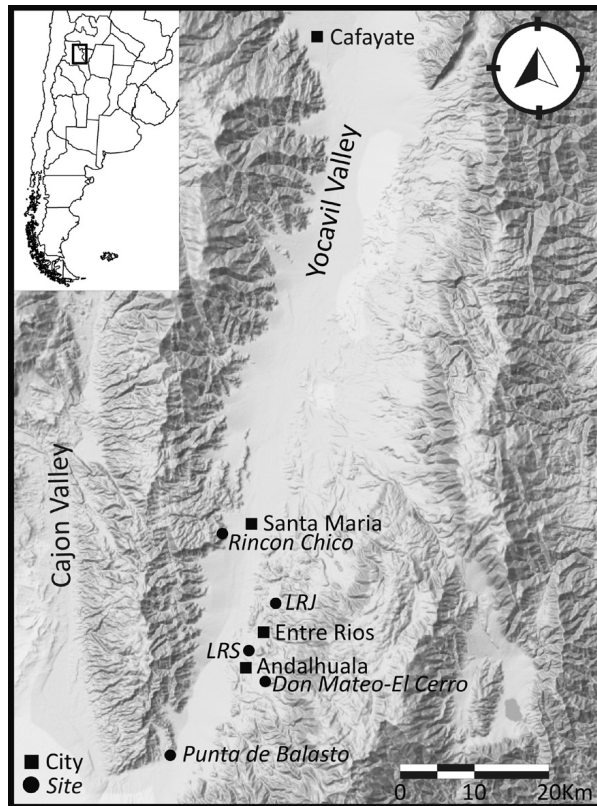


Figure 1: Yocavil Valley with the cities and archaeological sites mentioned in the text.

The archaeological location of Andalhuala

Andalhuala stands in what is today an important zone of fincas dedicated to agriculture and ranching, in the southeastern portion of the valley, twenty-five kilometers southeast of the town of Santa María. Its location is in the midst of sandy Tertiary outcrops shaped by erosion in the Quaternary. Glacis and piedmont terraces are geomorphological features of this micro-region (Ruíz 1972). These are the remains of older fans, the result of denudation of the landscape, that have been covered by a light cap of detritus, and formed by colluvial material such as angular clasts and pebbles, mixed and united with a matrix that varies from coarse sand to fine muddy clay. Their surfaces can be large, flat, and slightly inclined. In general they are divided by large gullies into islets at the same

altitude, on average between 2200 and 2300 m.a.s.l.

Even though Andalhuala is little-known in the archaeological literature of Northwest Argentina, this area has been visited frequently from the end of the nineteenth century until recently, with repeated allusions made to its archaeological richness (for a synthesis see Álvarez 2014). The main archaeological reference point in the area is the site called Loma Rica de Shiquimil (LRS), an agglutinated settlement with 189 structures on 2.45 hectares, occupying a small relict glacis that rises one hundred meters above the level of the valley floor, completely bounded by coarse sandstone (Tarragó *et al.* 1988). The characteristics of its placement, that make its ascent very risky, and that permit full visual surveillance of the main valley, allow Loma Rica de Shiquimil to be considered as one of the clearest examples of the Late Period *pukara* type settlement in Northwest Argentina.

In 1960 María L. Arocena and Blanca Carnevali explored the Andalhuala area, mentioning a Late Period settlement atop an isolated peak of the main Aconquija chain, calling it El Cerro. There they noted retention walls, and three compounds of two rectangular enclosures each, staggered along the slope of the hill, and linked by passages. The work undertaken in Enclosure 1 (Recinto 1) of one of the compounds (Unit U1), that measured 3.80 meters by 5.30 meters, resulted in a surface collection of 72 ceramic sherds belonging to local Formative Period and Late Period styles (Arocena and Carnevali 1960:57). Excavation also confirmed the presence of a well-consolidated occupation floor associated with a subglobular olla covered with a bowl (Arocena and Carnevali 1960:60). The olla is 23.5 centimeters high, 16 centimeters in maximum diameter, and is decorated with an anthropomorphic face whose eyebrows and nose are modeled, and whose mouth is represented by an oval painted

in black with the teeth indicated. These stylistic characteristics allow one to think that this is an olla of the Rincón variant (personal communication, Myriam Tarragó, August 2014), vessels that belong in the universe of the San José ceramics from the beginning of the second millennium A.D. These are antecedents of the Santa María style, predominant during the Regional Development Period. Unfortunately, the geographical coordinates of this site are unknown and there is no locational map.

A low-lying settlement from the Late Period

As part of the pedestrian survey designed to study the settlement patterns of the Andalhuala area, and with the objective of relocating the El Cerro settlement, a relict quaternary glacia immediately to the east of the present town of Andalhuala del Alto was traversed. Local people know this settlement as Don Mateo or Rincón del Tío Mateo, taking its name from the owner of the modern finca at its base. This relict terrace is separate from the ridges of the Sierra del Aconquiya and is surrounded by steep sandstone hills that are difficult to ascend. The exception is its western slope, that is in the form of a small alluvial fan cut longitudinally by a large gully with an area of about 26 hectares, rising from about 2280 to 2323 m.a.s.l. On this slope one can observe twelve architectural units, among them small habitation structures that ascend following the natural contours of the hill (Figure 2). It is possible that the site may include a larger number of architectural units covering the whole alluvial fan. This must be determined in the future by complete mapping of the settlement that will require removal of the thick vegetation that covers the alluvial fan.

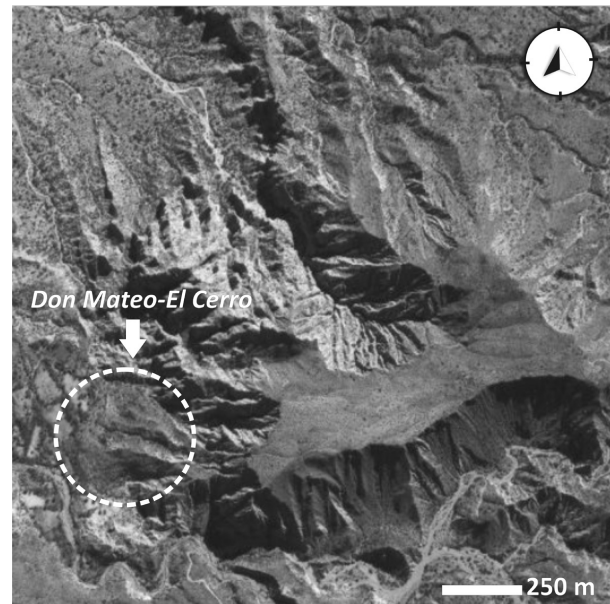


Figure 2: Satellite image showing the location of Don Mateo–El Cerro.

The architectural units recorded were numbered in accordance with their order of discovery. In each case their geographical coordinates were measured using a geographical positioning system (GPS) and their main construction characteristics were noted. The units registered are the following:

Architectural Unit 1: 2290 m.a.s.l.; a rectangular enclosure measuring 11 meters on the long sides and 6.5 meters on the short sides. There are double-faced walls filled with rubble and sediment. These exceed 0.50 meters in both height and width.

Architectural Unit 2: 2290 m.a.s.l.; an L-shaped double-faced wall filled with rubble and sediment with arms measuring 10 meters and 20 meters. It is a possible remnant of an agricultural or retention terrace.

Architectural Unit 3: (2281 m.a.s.l.); a double-faced wall filled with rubble and sediment about 5 meters long and 0.50 meters high and wide.

Architectural Unit 4: (2282 m.a.s.l.); an L-shaped wall, possibly the remains of a rectangular enclosure. The walls appear to be double-faced and to have had fill, but they have collapsed. In this structure one can observe abundant ceramics both of the local Formative Period and of the Late Period, such as Santa María style ceramics.

Architectural Unit 5: (2283 m.a.s.l.); a rectangular enclosure made of double-faced walls with fill, 13 meters on its long sides and 5.7 meters on its short sides.

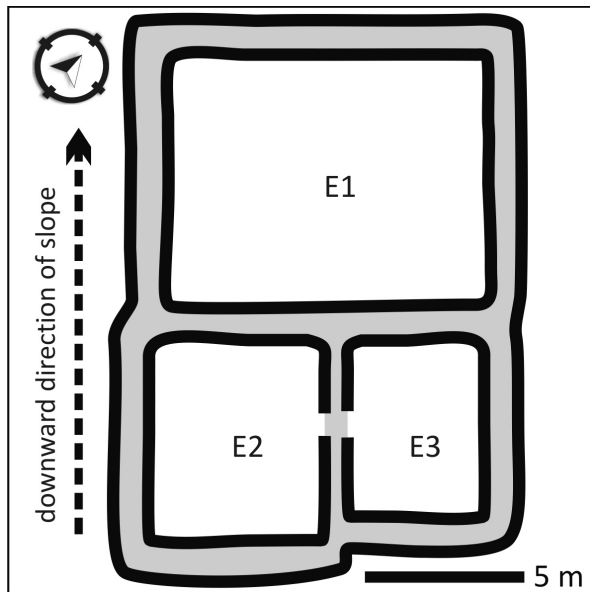


Figure 3: Sketch plan of Architectural Unit 6.

Architectural Unit 6: (2293 m.a.s.l.); a quadrilateral compound made up of three attached enclosures (Figure 3). The largest enclosure (E1) measures 7 meters by 9 meters in its largest dimensions and has a possible looter's pit in its north corner (Figure 4). The second enclosure (E2) is about 5 meters along its sides. The third enclosure (E3) measures about three meters. Enclosures E2 and E3 are connected by a 0.50 meter wide access passage. The entire unit was constructed with double-faced walls filled with rubble and sediment, about a meter wide, and excavated into the slope of the hill so that Enclosures E2 and E3 are at a higher level

than Enclosure E1. Santa María style sherds were observed on the surface.



Figure 4: General view of Enclosure 1 (E1) of Architectural Unit 6, looking from Enclosure 3 (E3).

Architectural Unit 7: (2306 m.a.s.l.); a compound of two adjacent circular enclosures made of double-faced walls with rubble and sediment fill, one meter wide. Enclosure 1 measures 4.40 meters in internal diameter, and Enclosure 2 measures 3.10 meters in internal diameter.

Architectural Unit 8: (2307 m.a.s.l.); a compound of two adjacent quadrilateral enclosures built of double-faced walls with rubble and sediment fill. Enclosure 1 measures 5.70 meters by 6.20 meters and Enclosure 2 measures 2.50 meters by 4.70 meters along their sides. The enclosures are not at the same level. Enclosure 2 is higher.

Architectural Unit 9: (2313 m.a.s.l.); a compound of two adjacent quadrilateral enclosures built of double-faced walls with rubble and sediment fill. Enclosure 1 measures 4.40 meters by 5.50 meters and Enclosure 2 measures 6.70 meters by 7.20 meters along their sides.

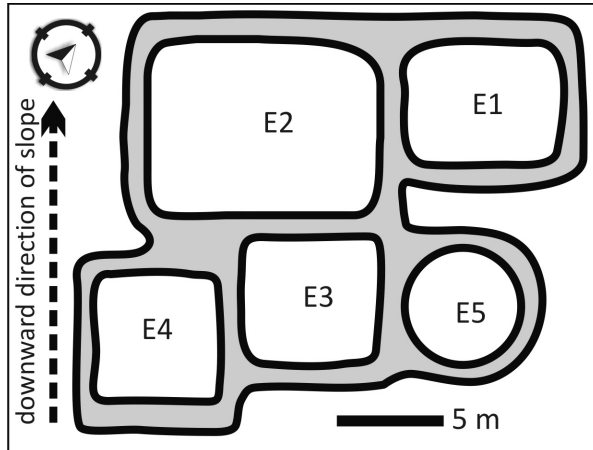


Figure 5: Sketch plan of Architectural Unit 10.

Architectural Unit 10: (2317 m.a.s.l.); a complex of five adjacent enclosures on the slope. Enclosures 1 and 2 are lower than the rest (Figures 5 and 6). Enclosure 1 is rectangular and measures 10 meters along its long sides and 7.50 meters along its short sides. Enclosures 2, 3, and 4 (E2-E4) have quadrilateral ground plans measuring between 5 and 7 meters along their sides. Enclosure 5 (E5) is circular with an internal diameter of 5 meters. The entire compound is made of double-faced walls with rubble and sediment fill, employing large blocks of stone. The common walls can reach one meter in width. The height of the walls varies according to their positions in the compound. In Enclosures 1 and 2 (E1 and E2) they are close to a meter high, and in Enclosures 4 and 5 (E4 and E5) there are low walls of only one or two courses (Figure 6).

Architectural Unit 11: (2323 m.a.s.l.); a compound of two adjacent enclosures with double-faced walls with rubble and sediment fill. Enclosure 1 has a circular ground plan with an internal diameter of 5 meters (Figure 7), while Enclosure 2 is quadrangular, with walls measuring 5 meters along each side.

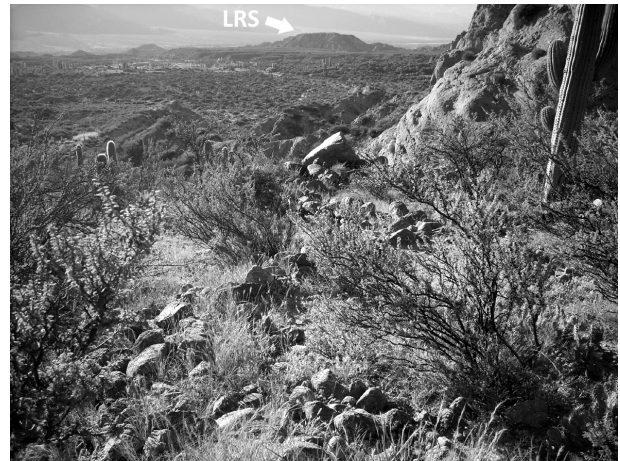


Figure 6: General view of Enclosures 1 and 2 of Architectural Unit 10 from Enclosure 3. In the background is the Loma Rica de Shiquimil.



Figure 7: Detail showing the height of the internal wall of Enclosure 1, Architectural Unit 11.

Architectural Unit 12: (2328 m.a.s.l.); a compound of two adjacent circular enclosures with double-faced walls with rubble and sediment fill. The compound has a stone block with five shallow depressions (Figure 8).



Figure 8: Shallow depressions on a block of stone found in Architectural Unit 12.

All the units observed on the western slope of Don Mateo exhibit the same construction methods—double-faced walls with rubble and sediment fill between 0.50 and 1 meters wide. They also have a ground plan consisting mainly of quadrilateral enclosures. Both features are characteristic of habitation sites from the Late Period Santa María culture. The building stones selected for use are of small-to-medium size gneiss locally found in the form of round stones, like those used at the Loma Rica de Shiquimil and the majority of other sites built on the eastern slopes. These constitute, therefore, the first geo-referenced evidence of another late residential site in Andalhuala, in a radius of less than five kilometers from the *pukara* of Loma Rica de Shiquimil.

Álvarez Larrain previously believed that a trait that distinguished the late settlement of the southeastern Yocavil Valley with respect to the opposite side of the river was the absence of associated enclosures on slopes typical of the settlements on the alluvial fans of the Sierra del Cajón. Considering that the presence of glacia with sandstone walls on the eastern margin impedes this type of installation, populations were forced to settle on flat-topped hills, or on

the lower piedmont terraces near the rivers. Nevertheless, although Don Mateo presents a morphology typical of the southeastern part of the valley (terraces delimited by sandstone crags), the sector chosen for the construction of the settlement was its small fan. In this sense, the units of two or more adjacent enclosures half-excavated in the slope and following its natural levels, resemble the sector of the population center on the alluvial fan at Rincón Chico, a town located on the opposite side of the river (Tarragó 2011).

Don Mateo–El Cerro

The cultural evidence observed at Don Mateo presented above, and the topographic traits of the site, such as the fact that it is located on a lateral extension of the main Aconquija mountain chain, at an altitude approximately four hundred meters above the valley floor, and with a perfect view of the Loma Rica de Shiquimil, make it highly probable that Don Mateo and El Cerro are the same settlement. An interesting line of proposed future work will allow, through the creation of a complete plan of the site, the identification of Unit UI, excavated in 1960, as a way to fully demonstrate that they are the same site.

In a preliminary, but convincing, way, evidence suggests that Don Mateo–El Cerro constitutes another habitational area in a concentrated pattern of the Late Period at Andalhuala. This population center could be linked to the Loma Rica de Shiquimil both in cultural terms, revealing similar architectural practices and ceramic styles (the Santa María style), and in terms of panoramic views and sight-lines, with both settlements having excellent inter-visibility from their highest parts (Figure 6). This allows one to suggest that the population of Don Mateo–El Cerro may have been within the political sphere of the Loma Rica de Shiquimil.

The relationship between the *pukara*-type settlements and subsidiary populations, or lower settlements, has been tackled from different perspectives which run from the simultaneous settlement of differentiated population sectors, to the occupation of new segments in response to population increase, or, as proposed for example, by Axel E. Nielsen (1996:320-321) for the Quebrada de Huamahuaca, settlements may, perhaps, be used from time to time and alternatively by the same population, in response to armed conflict. A recent study of Loma de los Antiguos (Catamarca Province), a fortified site, allowed Federico Wynveldt to suggest that only a few family groups had access to this fortress, drawing his conclusion from the lack of complete occupation of this protected hill (Wynveldt 2009:319-320). Wynveldt proposes that the Loma de los Antiguos functioned as the seat of a local leadership that remained effectively integrated into the population dedicated to agricultural production in the Azampay area.

In keeping with these suggestions, it can be emphasized that the Loma Rica de Shiquimil is at the “entrance” to the Andalhuala area, near the trunk road of the main valley, a characteristic that justifiably made it one of the best-known and most-visited sites. In this manner, the population of Loma Rica de Shiquimil, so easily distinguishable on the landscape, enjoyed a strategic topographic location that gave it visual control of the main valley, while, at the same time, protected it. This could have been necessary for it to protect, in turn, other settlements and the rural sector occupying the lower glacis. Strikingly, Don Mateo–El Cerro is found located where it is easily accessed, apparently without defensive constructions, but in the interior of the area, in a hidden corner, visually protected by the hills that surround the area of Andalhuala on the west. This settlement may have been in intimate spacial association with cultivated fields created on the banks of the Yapes

River. In this sense, Loma Rica de Shiquimil, as a settlement with defensive features and visual control of the main valley, may have protected the population settled at Don Mateo–El Cerro. Within a context of fragmented sociopolitical units, or small domains among which a dynamic relationship of alliances and conflicts prevailed (Tarragó 2011), the evidence recovered at Andalhuala can be included within the same territorial unit whose political seat may have been located at Loma Rica de Shiquimil. This unit may have extended about five kilometers around Loma Rica de Shiquimil, also including the lower settlements recorded to the north at Entre Ríos, or even farther away, to the *pukara* Loma Rica de Jujuil (LRJ), within a system of allied *pukara*.

Conclusions

Although the inclusion of Loma Rica de Shiquimil and Don Mateo–El Cerro in the Santa María populations is irrefutable, future excavations must be undertaken to refine knowledge of the occupation of the lower settlement. This will be a starting point for progress in knowing the possible connections with Loma Rica de Shiquimil within the regional settlement pattern. At the moment, the view that is developing of the spacial relationship between the settlements is promising. Likewise, the association established between Don Mateo and El Cerro is of fundamental value, given that it would be the first observed case for the Yocavil Valley of a domestic context with San José ceramics, which, until now, had only been found in cemeteries and as isolated burial finds.

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