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## Current Research in Andean Archaeology, Andean Past 9

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# Current Research in Andean Archaeology, Andean Past 9

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*Editors' Note:*

*Because of the large number of lengthy articles and obituaries published in Andean Past 7 and 8, we were unable to include a section on current research. Here we report on work done since mid-summer, 2000. New reports should be sent to Monica Barnes (monica@andeanpast.org).*

### **Current Research (2000-2008)**

#### **ARGENTINA**

#### **Archaeological Investigations at Antumpa (Jujuy): Contributions to the Characterization of the Early Ceramic Period in the Humahuaca Region**

In this report **Juan B. Leoni** (jbleoni@hotmail.com) presents ongoing archaeological research at the Antumpa site (Departamento de Humahuaca, Provincia de Jujuy). Investigations have yielded important new information about the Early Ceramic Period (c. 1000 B.C. to A.D. 800), also known as the Formative, a crucial, but poorly known, period in the developmental trajectory of the Humahuaca Quebrada region.

A proliferation of sedentary village societies characterizes Northwestern Argentina during the Early Ceramic Period (Albeck 2000; González 1977; González and Pérez 1972). These small-scale societies occupied different subareas of Northwestern Argentina, from punas, to highland valleys, to the *yungas* or low-lying warm valleys of the eastern Andean slopes. Their subsistence practices were based largely on agriculture and llama herding occasionally complemented by hunting and gathering. Ceramic, textile, and metallurgical production developed during these times, reaching, in some cases, very high manufacturing and aesthetic standards. It is generally believed that these communities were, for the most part, internally homogeneous, showing little social differentiation and political centralization. These societies

were interconnected through exchange of both everyday and sumptuary goods, as much as by ideas and people circulating over relatively extensive geographical areas.

Nevertheless, the archaeological record for this period is extremely fragmentary in the Humahuaca Quebrada region, one of the main subareas of the Argentine Andean Northwest. Only a handful of sites are known at present besides Antumpa, and include Estancia Grande (Palma y Olivera, 1992-93; Salas 1948), El Alfarcito (Madrazo 1969), Vizcarra (Nielsen 2001:187-189), Pueblo Viejo de la Cueva (Basílico 1992), Til 20 (Mendonça *et al.* 1991) and Til 22 (Rivolta and Albeck 1992), among others. They generally are hamlets or villages, with small numbers of houses within agricultural plots. Most of them have been intensively disturbed by both alluvial erosion processes and later human reoccupations. Contemporaneous occupations, which served specific purposes such as herding, hunting, raw material procurement, rock painting, and funerary practices, among other activities, have been found in caves and rock shelters as well (e.g. García and Carrion 1992, Hernández Llosas 1998).

Antumpa is in the northern sector of the Humahuaca Quebrada, in the angle formed by the confluence of the Chaupi Rodeo and Grande Rivers, about 2.5 km southwest of the modern town of Iturbe/Hipólito Yrigoyen (Figure 1). The site's geographical emplacement is key, in an area of environmental transition between the puna, the Humahuaca Quebrada, and the eastern valleys and *yungas*. This position

may have allowed Antumpa's inhabitants a relatively easy access to these markedly different environmental zones and their specific resources. Given its location, the site may have constituted a node in ancient exchange networks (Albeck 1992:101). In fact, until recently, puna settlers from the Casabindo area, about three hours by truck from the town of Humahuaca, visited Iturbe on their way to the eastern valleys to trade salt and livestock products in exchange for agricultural products and wooden objects, a practice that may very well have its roots in prehispanic times (*ibid.*:100).

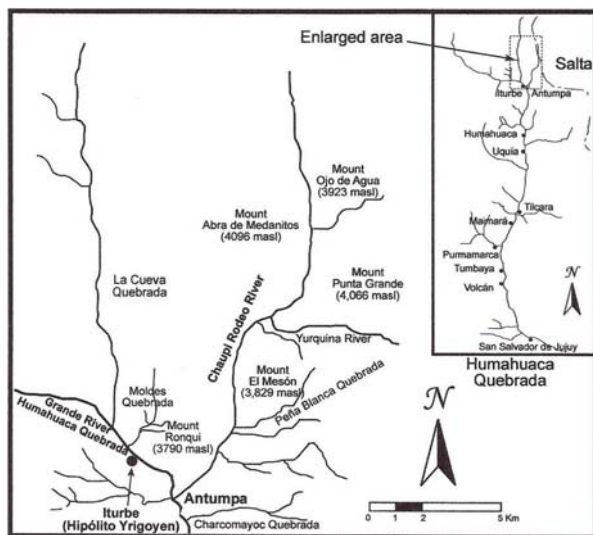


Figure 1: Map of the Humahuaca Quebrada region showing the location of the Chaupi Rodeo Quebrada and the Antumpa site.

Antumpa is one of the few sites known from the Early Ceramic Period in the general area of the Humahuaca Quebrada. It was first reported by Alberto Rex González, who characterized it as an Early Ceramic hamlet, based on its similarities to contemporaneous sites from the Humahuaca Quebrada and elsewhere in Northwestern Argentina. While González did not carry out systematic archaeological research at the site, his observations were incorporated into several works of synthesis, as part of the general discussion of the Early Ceramic Period in the Humahuaca Quebrada region (e.g. González

1963:106, 1977:355-356; González and Pérez 1972:60).

María I. Hernández Llosas, Susana Renard, and Mercedes Podestá (1983-85) carried out more specific research at the site in 1981, including partial mapping and test excavations, confirming González' original characterization. While they identified the remains of later occupations as well, they concluded that those corresponding to the Early Ceramic Period were the most extensive and well preserved (Hernández Llosas *et al.* 1983-85:526-527). Archaeological remains typically consist of large stone-walled squares or rectangles subdivided into smaller units. Circular structures, presumably houses, between 5 and 10 m in diameter, are spread over the site, generally within larger square or rectangular enclosures. Excavations in one of these circular structures produced evidence for Early Ceramic Period occupations and a radiocarbon date of  $1360 \pm 70$  B.P. (LP-105; animal bone;  $\delta^{13}\text{C} = -20 \pm 2\%$ ; *ibid.*: 530).

Investigations at Antumpa were reinitiated in 2005, and research activities have included site survey, mapping, and excavations, complemented with a survey of the lower section of the adjacent Chaupi Rodeo Quebrada. The archaeological remains extend between 3300 and 3600 masl, covering an estimated 161 ha area of a wide, low-sloped foothill (Figure 2). The densest concentration of architecture is, however, on the river terrace on the left margin of the Chaupi Rodeo Quebrada, and seems to have constituted the core of the human occupation. The use of this part of the site continued, perhaps sporadically, over the centuries after the Early Ceramic Period, and, in fact, a few modern homesteads, most of them currently abandoned, as well as a cemetery, can be found in this area.

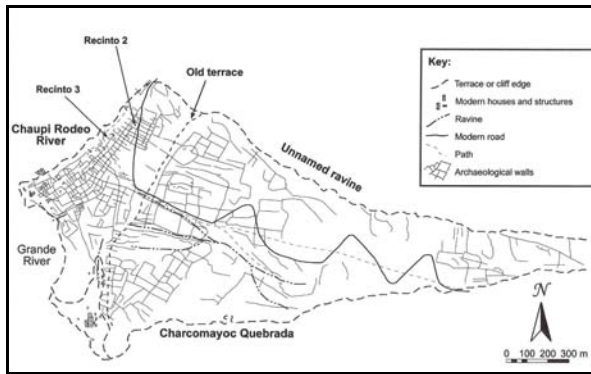


Figure 2: Map of Antumpha showing distribution of archaeological remains

The distribution of the archaeological architecture at the site is not homogeneous. At least two well-defined sectors can be identified. The boundary between these sectors is a fossil terrace that runs across the site in a general north-south direction. The lower sector, to the west of this feature, comprises extensive groups of square, rectangular, and trapezoidal stone-walled enclosures, very regularly built in what seems to be a planned construction pattern. These cover an area of about 56 ha. Some of these enclosures are internally subdivided into smaller units. The function of these enclosures seems to be related to agriculture (*ibid.*: 26). The stone walls defined the plots, and also protected soils from erosion and growing crops from winds and frost, as well as from domestic and/or wild animals. Given the general environmental conditions of the area, these agricultural facilities would have been used for the production of high altitude cold-resistant crops, such as quinoa, *kiwicha* (*Amaranthus* sp.), and a variety of tubers (Albeck 1992:96). No evidence for irrigation canals or reservoirs has been found as yet, implying that agricultural facilities were rather simple, and relied mostly, or exclusively, on rain water for irrigation, and, therefore, were limited in their use to the summer rainy season.

Circular residential structures can be found within some of the enclosures. In general, these

are poorly preserved. One of them, designated Recinto 2, was partially excavated by Hernández Llosas and collaborators (*ibid.*). Excavation of this structure continued in 2007. It is a large (7.70 m diameter) building with no visible doorways, in the center of a rectangular enclosure in the northwestern part of the site (Figure 3). Although an occupation level was identified, few primary contexts were located. While finds in this structure included Early Ceramic Period diagnostic artifacts such as ceramic smoking pipe fragments, lithic hoes, and small projectile points (Figure 4), the nature, length of occupation, and use of this structure remain unclear.

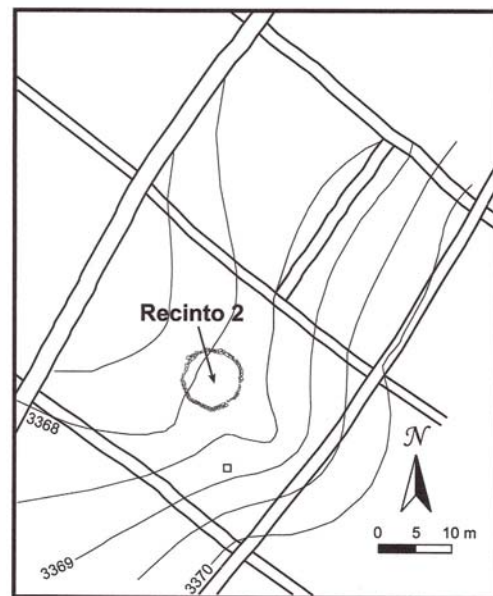


Figure 3: Plan of Recinto 2 and adjacent enclosures.

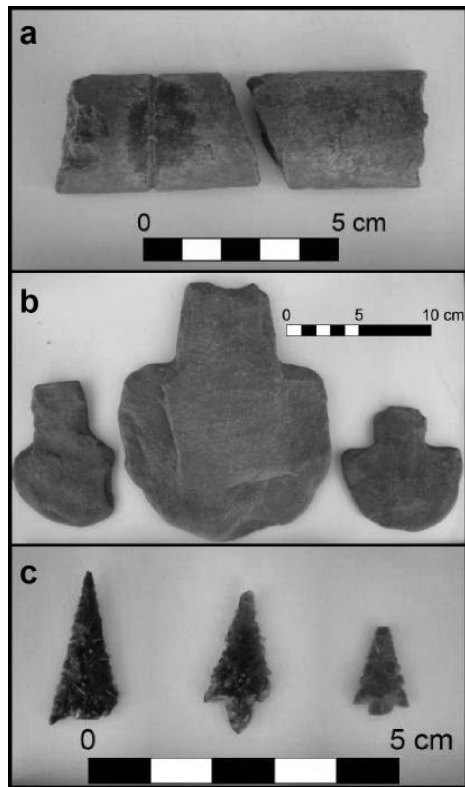


Figure 4: Artifacts from excavations in Recinto 2: a) ceramic smoking pipe fragments; b) andesite hoes; c) stemmed projectile points (left and center, obsidian; right, siliceous rock).

Site survey allowed field-workers to identify at least two small mounds, in addition to residence structures. One of the mounds had a badly eroded circular structure on its top (Recinto 3; Figure 5). The characteristics of this mound suggest a manmade origin, although it is not clear if it was intentionally erected, if it resulted from the continuous habitation of the same spot, or if a combination of both processes resulted in its formation, as is the case for other Early Ceramic sites in Northwestern Argentina (see Cigliano *et al.* 1976 and Tarragó 1980:31-35).

Test excavations inside this structure, which is about 7.70 m in diameter, showed that only the stone wall foundations had been preserved. Nevertheless, the excavations revealed the

mound's deep stratigraphy, with cultural deposits at least 1 to 1.5 m thick, with a very dense presence of archaeological materials (ceramics, lithic tools and debris, animal bone fragments, stone beads, charcoal, etc.) in secondary contexts. Radiocarbon assays from charcoal in the stratigraphic layers have yielded dates of  $2860 \pm 50$  B.P. (LP-1897; charcoal;  $\delta^{13}\text{C} = -24 \pm 2\text{‰}$ ) and  $2900 \pm 80$  B.P. (LP-1899; charcoal;  $\delta^{13}\text{C} = -24 \pm 2\text{‰}$ ), suggesting that the occupation of the site goes back to the very beginning of the Early Ceramic Period. These dates situate Antumpa among the earliest known ceramic sites in the whole of Northwestern Argentina.

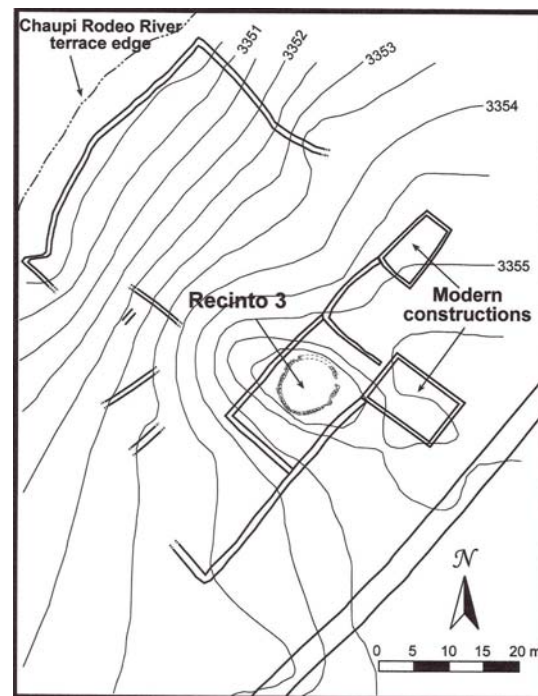


Figure 5: Area of mound on which Recinto 3 stands.

The other major site sector, which covers about 105 ha, is on higher ground to the east of the old terrace (Figure 2). Archaeological architecture in this sector differs significantly both in shape and size from that described above. Enclosures are much larger and more irregularly built here. Some have curved sides. No circular

residential structures have been identified within them so far. These formal differences may be related to a different function. Perhaps some of these larger enclosures served as corrals, or for the production of different types of crops. Another distinctive feature in this sector is the existence of long linear accumulations of fieldstones, generally, but not exclusively, longitudinal to the slope, reaching hundreds of meters in length. These seem to be the correlate of the first stages of the major landscape transformations involved in the construction of extensive agricultural facilities (see Nielsen 1995:250), perhaps part of an intensification effort that was never completed. Thus, stone accumulations would be the result of the clearance of potential agricultural plots, and could have served both as the primary walls for future sets of enclosures, and as caches of readily available construction material.

In summary, the ongoing investigations in Antumpa are producing valuable information on the Early Ceramic Period in the Humahuaca region that will undoubtedly contribute to a better understanding of this crucial, but so far little known, period of the Humahuaca prehispanic cultural development process. Antumpa holds important clues which will help build an understanding of the development of prehispanic agriculture as well, with its extensive facilities. There is evidence for the beginnings of an agricultural intensification effort which never developed to its maximum potential. Likewise, habitation structures and mounds are important sources of information on Early Ceramic Period social organization, with the observed differences in house locations and contents perhaps implying an incipient social differentiation. Finally, the newly available radiocarbon dates situate the site in the initial part of this period, a time for which little archaeological evidence exists at present.

Research at Antumpa and Chaupi Rodeo Quebrada is being conducted under a Research Grant from Agencia de Ciencia y Técnica, Argentina (PICT Jóvenes 34424), and a Postdoctoral Reinsertion Fellowship from CONICET Argentina (Resolución Directorial N° 1310 18/08/05). Primo Guanuco, president of the Aboriginal Community of Negra Muerta, and Sara Guzmán, Iturbe's municipal delegate, provided support in the field. María I. Hernández extended valuable advice and help throughout all stages of this project. Humberto Mamaní, Gabriel Cortés, Ramón Quinteros, Diana Tamburini, Graciela Scaraffa, Claus Freiberg, Georgina Fabron, Alejandra Raies, Anahí Hernández, Julieta Sartori, Sofía Fernández, Elisa Oitana and Micaela Corletta participated in the field-work.

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## CHILE

## San Pedro de Atacama

The National Fund to Support Science and Technology (Fondo Nacional de Apoyo a la Ciencia y Tecnología–FONDECYT) financed project 1030931, “Recording and Chronology of the Formative Period at San Pedro de Atacama” (Registro y Cronología de Período Formativo en San Pedro de Atacama”), directed by **Carolina Agüero** (Universidad Católica del Norte, e-mail: maguero@ucn.cl), **Mauricio Uribe** (Universidad de Chile, e-mail: mur@uchile.cl), and **Carlos Carrasco** (e-mail: C\_acg@yahoo.com).

In this project we are making a first approximation of early settlement in the oasis of San Pedro de Atacama, oriented towards the building and contextualizing of the chronological and cultural sequences of the local Formative. The data available did not provide a basis for discussion of the area’s settlement history during that time except in speculative terms (Berenguer *et al.* 1986; Núñez 1999, 2005). Our ultimate goal is to clarify the nature, causes, and manifestations of the settlement process within an optimized cultural-historical framework.

Towards this end, we discuss the prior explanations of the origin and development of Formative societies in San Pedro by means of (1) the hypothetical projection of the model of the Tulan transect (Núñez 1995), according to which a pastoral way of life developed, and (2) the application of the caravan model (movilidad giratoria) of Núñez and Dillehay (1978) and by Llagostera (1996) who indicated that the high cultural prestige of the oasis was based on a network system which had been developed since the Formative, having as its goal the Andean ideal of complementarity.

Considering that our general objective involves the examination of sociocultural indi-

cators which take into account the nature and reinforcement of the Formative way of life in an environment particular to the Puna Salada (puna with numerous salt pans and/or salt lakes), and in accord with the exploratory nature of the research, we put into practice a methodology organized into three stages, one for each of the three years of the project.

Thus, during 2003 we studied and catalogued the archaeological collections deposited in the Museo Arqueológico de San Pedro de Atacama corresponding to the 18,103 items of material culture and cultural use recovered from habitation and funerary sites of San Pedro, the Vilama Quebrada, and the edges of the Salar de Atacama. This activity, along with six thermoluminescence dates, allowed us to reaffirm the temporal sequence proposed for the Formative by Tarragó (1989) and Berenguer *et al.* (1986), and to emphasize the cultural content of each one of the phases for San Pedro, confirming an early Formative beginning, until now only suggested hypothetically.

The results caused us to conduct a systematic survey of the San Pedro Oasis and the Vilama Quebrada in 2004, registering more than 200 new sites (Agüero 2005), especially habitation sites. We observed a significant occupation in the Quebrada, and the two zones maintained a complementary relationship, indicating that the settlement patterns proposed for the Oasis (Núñez 1995; Llagostera and Costa 1999) needed to be reevaluated. The greater part of the occupations were single-component which, along with a greater diversity of site types, suggested a change in way of life, in terms of conceptions of the management of territory and its resources. According to our data and that of Núñez (1995, 1999; Núñez *et al.* 1999), the use of territory in the Formative included the pre-puna ecological niche between 2370 and 3250 masl. During the Late Formative particular control was exercised over the environments of

the Oasis and lower quebradas, from a base at San Pedro, which was a population center composed of several gathering and horticultural communities. Also under control was the neighboring quebrada, a complementary sector appropriate for the better maintenance of herds and the obtention of primary materials, the use of open areas for the practice of horticulture, and, one assumes, moving about. The contemporaneity of the sites with others in Tulan and Puripica (Núñez 1999) suggests that different economies already existed, with the latter places predominant in the practices of hunting and herding. This panorama presented us with the problem of determining if there was a settlement system made up of groups from the same cultural tradition, that is established communities installed more permanently in the Oasis, but periodically occupying the Quebrada.

Alternatively, the archaeological evidence may be an expression of two distinct cultural traditions, a Quebrada hunting tradition, a strong survival of the Archaic societies, and an Oasis tradition, of gathering and horticulture which began to manifest and develop the technological innovations of the time. According to the survey results (Agüero 2005) and studies of surface finds including pottery (Uribe 2006), stone objects (Carrasco 2004), architecture (Adán and Urbina 2007) and rock art evidence (Montt 2006), ten sites were selected, both from the Oasis (02-Po-12, 02-Po-18, and 02-Po-25 in Poconche, and Tchaputchayna in Beter), and from the Vilama Quebrada (Ghatchi-1A, Ghatchi-1B, Ghatchi-2B, Ghatchi-2C, 02-Vi-90, and Calar), to evaluate the preliminary results through excavations and new archaeometric tests, and through the functional analysis of these sites which represent different points of time in the Formative (Figures 1-4).

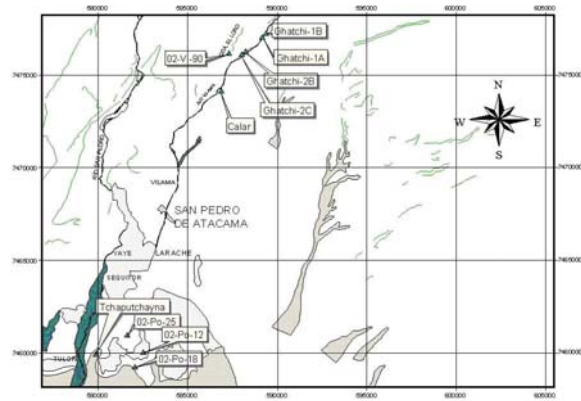


Figure 1: Map indicating the sites excavated in the San Pedro Oasis and the Vilama Quebrada.

During 2005 we excavated the ten sites, which, along with 16 absolute dates—ten radiocarbon dates and six thermoluminescence dates (Table 1)—allowed us to deepen the occupational history of San Pedro and advance discussion in terms of the hypotheses of this research. Given that we now have definite indications and propose a preliminary sequence which includes different categories of archaeological sites (Agüero 2005), we can now consider our hypothesis confirmed in that the initial Formative occupations had antecedents in the Archaic occupations which had only been documented previously in the high quebradas and 30 km to the south, at Tambillo.

In the Vilama Quebrada and in San Pedro, the earliest evidence of the Formative in the area dates to the first millennium B.C., and is very strong from the beginning. However, around A.D. 100 Formative traits begin to become differentiated. We interpret this as a transition to a complementary economy based on hunting, herding, and gathering practices, and another economy based on gathering, horticulture, and artisan production. Thus we propose Phase 1 or Early Period (1200-350 B.C.), an analog to the Tilocalar Phase (Núñez 1999), evident in the quebradas of the *Salar* (salt pan region) and related to the Vega Alta

Phase of the Middle Loa Valley (Pollard 1970), all with a transitional economic organization. However, this is still debatable because we are not dealing with agropastoral societies with clear social hierarchies.

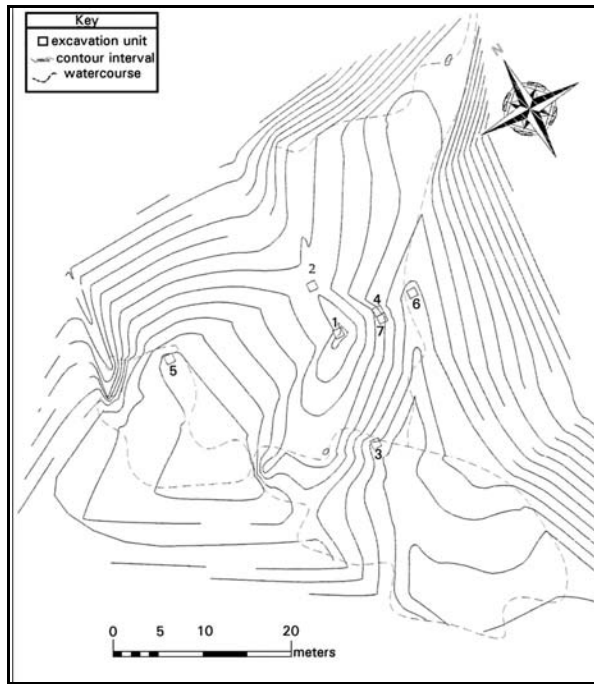


Figure 2: Plan of site 02-Po-18 (See Figure 1).

In this context, the Ghatchi-Calar Archaic groups temporarily exerted control over a large territory centrally positioned with respect to local resources such as circulation paths, travel and access to the puna, to the high quebradas of the Salado River, and the oasis of San Pedro. Their settlements did not necessarily function as village centers, but rather had a social, symbolic, and identity character, which is manifested in ceremonial constructions as well as at Tulan, in the south of the *Salar* (Núñez *et al.* 2006). This phase is centered in the quebrada sites of Ghatchi-2, but it includes Poconche 12 and Tchaputchayna in the Oasis.

Later, during Phase 2 or the Middle Period (350 B.C. to A.D. 100) an increased population

stabilization and settlement took place in the Oasis, and villages like Calar, Ghatchi-1A (Figure 4), and Tulor were constructed, and cemeteries like Larache Acequia and Sequitor Alambrado Acequia were being established contemporaneously with Toconao Oriente (UTM 596000 E/7455200 N). In this sense, we believe that the stylistic change seen in the ceramics (Uribe 2006), among other artifacts, alludes to a strengthening of local identity, but not one characterized by “sedentary agricultural populations” (*poblaciones agrarias estables*; Tarragó 1989). On the contrary, on one hand the gathering of tree products (*Prosopis* sp. [carob or *algarrobo*] and *Geoffraea decorticans* [*chañar*]) was reinforced in the Oasis, while the practices of pastoralism were concentrated at Calar, along with the recent initiation of maize horticulture (Vidal 2007). To this was added the emerging production specialization in manufactured goods, to strengthen the exchange between both places, opening up possibilities of a promising long distance trade (Pimentel 2008).

Nevertheless, the former did not support an agropastoral configuration backing a caravan system (Núñez and Dillehay 1978), especially because what one observes is a slight displacement in the hunting and pastoral economic systems in favor of another with emphasis on gathering and horticulture, promoting a surplus production and the development of manufactured goods to maintain control over the complementarity of their environment through internal trade.

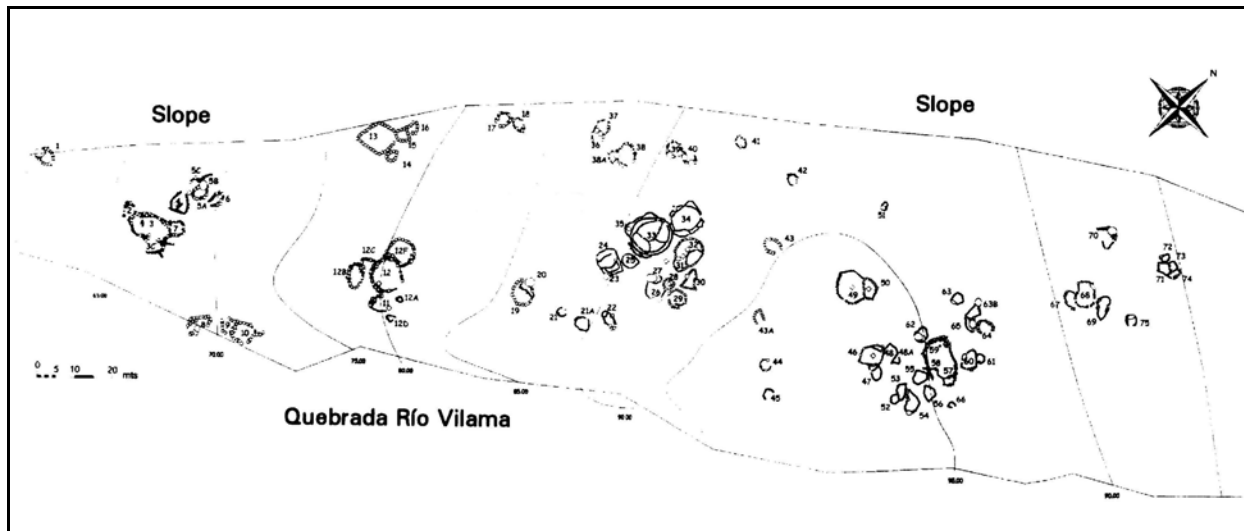


Figure 3: Plan of Ghatchi-2C

Site	Unit	Layer	Code	Calibrated BC-AD. (2 sigmas) / date BC-AD	Conventional BP / Age	Sample
Ghatchi-2C	R12/1	3 (35 cm)	A-13938	4000-33 50 BC	4885±125	Charcoal
Ghatchi Vi90	1	F (67 cm, east sector)	A-14110	2204-1930 BC	3685±50	Charcoal
Ghatchi Vi90	1	B (level 3, 23 cm)	A-14114	1531-1392 BC	3190±55	Charcoal
Ghatchi-2B	R23/1	3 (46 cm)	AA-66972	400-200 BC	2245±35	Charcoal
Ghatchi-1A	R12/1	Feature 1 (76-95 cm)	AA-68401	113BC-239 AD	1944±75	Bone
Calar	R3/1	3 (level 10, 60-65 cm)	A-14111	76-346 AD	1810±55	Charcoal
Ghatchi-1B	R4	2 (84-88 cm)	A-13936	210-620 AD	1650±95	Charcoal
Poconche-18	4	4 (level 12, 70-80 cm)	AA-68400	3638-3097 BC	4640±100	Bone
Poconche-12	3	4 (level 6, 60 cm)	A-14113	430-641 AD	1510±55	Charcoal
Tchaputchayna	T23/1	Feature 2 (50 cm)	A-14112	984-1296 AD	865±100	Charcoal
Poconche-12	Tumba Le Paige ?		UCTL 1611	870 BC	2870±260	Los Morros Ceramic
Poconche-12	Tumba Le Paige ?		UCTL 1612	845 BC	2845±290	Los Morros Ceramic
Poconche-12	Tumba Le Paige ?		UCTL 1610	360 BC	2360±140	Los Morros A Ceramic
Yaye C. de Toros*	Tr3, m2	Level 10	UCTL 1614	380 BC	2380±200	Los Morros B1 Ceramic
Yaye C. de Toros	Tr3, m2	Level 10	UCTL 1613	460 BC	2460±240	Loa Café Alisado Ceramic
Yaye C. de Toros	Tr1, m10	Level 10	UCTL 1615	640 BC	1360±130	Sequitur Ceramic

Table 1: Radiocarbon and thermoluminescence dates obtained from settlements in the San Pedro de Atacama oasis and the Vilama Quebrada. \*The Yaye Corral de Toros site was excavated by Hermosilla and colleagues (2003).

Finally, a Phase 3 or Late Phase (A.D.100 to 500) is an analog to Sequitor (Tarragó 1989) in which greater growth occurred, as well as sedentarism restricted to San Pedro, converting it into the base of the Middle Period. Poconche 12 (02-Po-12) and Tchaputchayna are the principal reference points along with Coyo-12 (UTM 582820 E/ 745950 N), and Coyo Oriente (UTM 578601 E/7460100N) (Llagostera y Costa 1999), Larache, Sequitor Alambrado, Sequitor Oriental, and Solor-6. Equally, important earlier

settlements were abandoned, such as Calar and Tulo-1, restricting occupation towards the center and north of San Pedro, and, in the end, social and geographical circumscription occurred as required by the specialized local economic system and long distance trade.

We can definitely conclude that it was neither agricultural production, nor caravan trade which played a central role in the complexity of the Atacama, which arose during the

Formative, but rather the ancestral Archaic dynamic related to the local resources of the quebradas and oases where the fruit and wood of carob and *chañar* caused San Pedro to convert itself into an attractive economic, social, and cultural center.

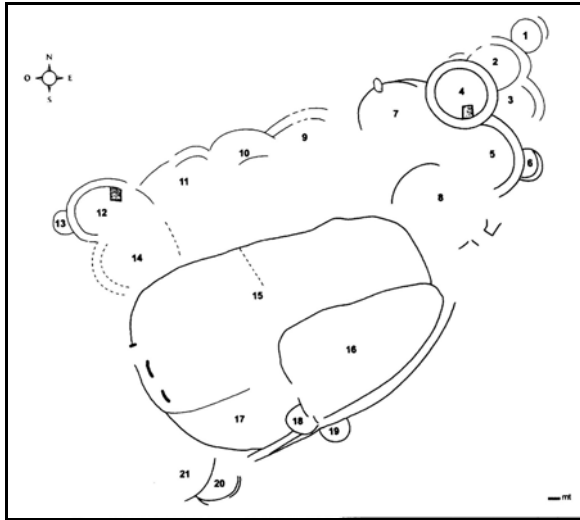


Figure 4: Plan of Ghatchi-1A.

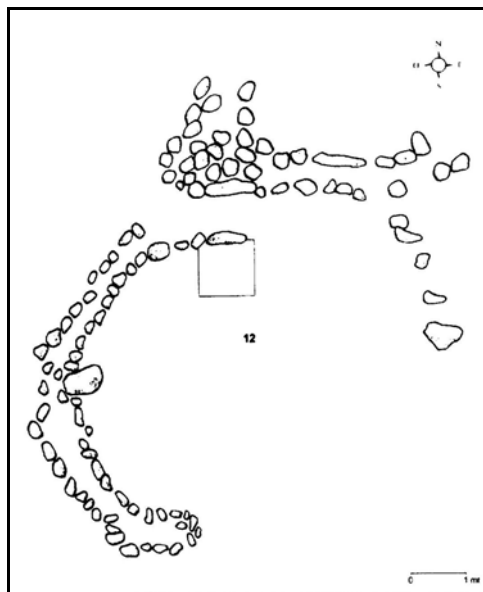


Figure 5: Ghatchi-1A, area (recinto) 12, unit 1.



Figure 6: Display at the Museo Arqueológico de San Pedro de Atacama.

The approaches, objectives, activities, and results of the project were recently presented to the Atacama community by means of the exhibition, “Interpreting Atacama’s Past: An Archaeological Research Project in the Oasis of San Pedro” (“Interpretando el pasado atacameño: Una investigación arqueológica en los Oasis de San Pedro”) in December 2007 and January 2008 in the Museo Arqueológico de San Pedro de Atacama (Figure 6).

*Translated from the Spanish by Monica Barnes*

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## CHILE

## Tarapacá Region

The National Fund to Support Science and Technology (Fondo Nacional de Apoyo a la Ciencia y Tecnología–FONDECYT) financed Project 1030923, “The Pica-Tarapacá Complex: Proposals for an Archaeology of the Societies of the South-Central Andes (A.D. 1000-1540)” (“El Complejo Pica-Tarapacá: Propuestas para una arqueología de las sociedades de los Andes Centro-Sur [1000-1540 DC]”), directed by **Mauricio Uribe** (Universidad de Chile, e-mail: mur@uchile.cl), **Leonor Adán** (Universidad Austral, e-mail: ladan@uach.cl), **Carolina Agüero** (Universidad Católica del Norte, e-mail: maguero@ucn.cl), **Cora Moragas** (e-mail: emoragas@vtr.net), and **Flora Viches** (Universidad Católica del Norte, e-mail: fvilches@ucn.cl).

With this project we are making an archaeological evaluation of the Tarapacá region from an interpretative perspective. We are studying associated materials to identify elements which will let us confirm or disprove the existence of the Pica-Tarapacá Complex of the Late Intermediate Period (LIP) as a geographical and cultural entity. During the fourth and last year (2006), which we report on here, we studied the settlement of Pukarqollu (Altiplano of Isluga) and its environs, in relation to its architecture and rock art, performing typological, functional, and archaeometric analyses of evidence recovered from the surface and in excavations. We proceeded in the same way as for the sites investigated previously, making comparisons with reference materials from the coast and from the interior of the region (Figure 1).

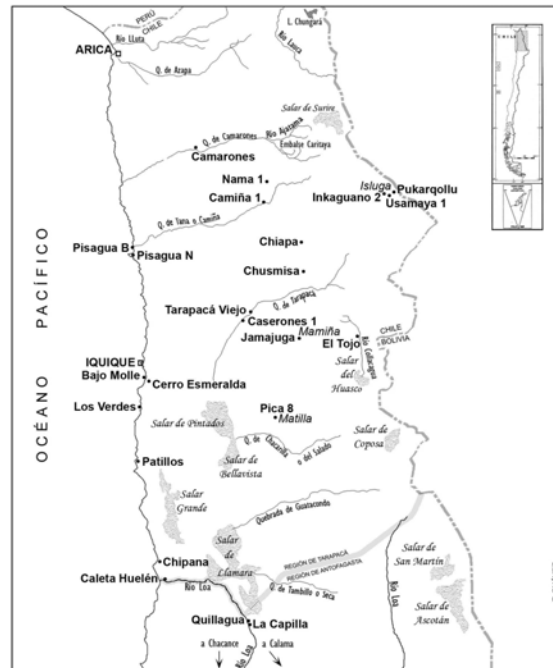


Figure 1: Map of the study area showing the principal sites mentioned in the text.

## Architecture

Pukarqollu has 586 structures which we evaluated by comparison with the Tarapaqueño traditions of the coast, the valleys of the lower Pampa del Tamarugal, and the highlands, as defined in previous years. The earliest architectural tradition is Formative and was dependent on the exploration of the resources of the Pampa, its quebradas, and the coast. It is characterized by distinctive settlements with public architecture, such as open, as well as enclosed, plazas. It had a role in intensive gathering and social assemblage on the Pampa. In this sense, it is the heir of the Late Caserones occupation which has more than 600 structures.

Later, between Camiña and Mamiña, we detected another settlement system, contemporaneous with, and later than, the one established earlier. In late prehispanic times it occupied the quebradas where a Highland Tradition (Tradición de Tierras Altas) developed. This tradition combined several manifestations of



domestic and public architecture, placing them on hillsides or on mountains, in order to control the valleys, and implemented terrace building techniques to increase surface area. Camiña and Nama, with around 600 structures each, and Chusmisa and Jamajuga with around 200 structures each, reveal social groups which were increasingly enclosed. Public areas were minimized or differentiated from habitation spaces, and include cists, rock art, and/or *chullpas* (burial towers) which also served as places for social and economic gatherings and are related to the cult of the ancestors, tying this system to the Altiplano of Isluga and Carangas, Bolivia.

Pukarqollu belongs to the Highland Tradition with areas devoted to herding and storage, and with the conspicuous public architecture of the Altiplano, including plazas and surrounding *chullpas*. In parallel, on the coast, a tradition of versatile constructions arose, which goes back to the end of the Archaic and the beginning of the Formative and continued during the LIP.

In Pisagua we discerned groups of no more than 25 structures which represent different sorts of occupation, both disperse and nucleated, with specialized areas for fishing and the hunting of marine mammals. The coastal, Formative, and Altiplano forms were clearly based on those of the quebradas from Camiña to Mamiña. These manifestations mark part of a highland cultural sphere (Adán *et al.*: 2007).

#### *Ceramics, stratigraphy, and chronology*

We are evaluating the Pukarqollu ceramics, comparing them with those of the coast, the lower Pampa valleys, and the highlands, which we examined in previous years, making a sample of the 21,000 sherds recovered. According to typology and stratigraphic positioning, the settlements and their ceramics cover the time from the Formative to the Inca. This cultural continuity, in contrast to Arica, is not marked

by the intervention of Tiwanaku. The high frequency of Pica-Tarapacá monochrome pottery at all sites indicates that their principal occupation occurred during the LIP. This includes the Pampa, the valley settlements, those on the coast, and in the quebradas. The transition from Formative ceramics, and their regional development, is delineated by the Pampa and the coast, by villages such as Caserones in the Quebrada de Tarapacá, and by the cemeteries of Pica and Iquique.

Later, a gradual integration began with the high quebradas. This marks the second phase of the LIP which includes a high proportion of Altiplano bichrome pottery, especially at Carangas. Thus, from A.D. 1200, economic changes occurred and new links were forged among the central Altiplano, Arica, and the Atacama. Taking account of this, we propose two phases for the Pica-Tarapacá Complex, named for the locations which exemplify them.

We call the phases the Tarapacá Phase (890-1250 cal. A.D.) and the Camiña Phase (1200-1430 cal. A.D.). It was the latter phase which was dominant at the arrival of the Incas in Tarapacá Viejo around 1532 A.D. (Table 1). In Caserones, the lower levels yield dates corresponding to the Formative. In contexts with ceramics, forest resources, and on the coast, the upper levels are LIP. In Camiña there was a first occupation with Formative ceramics present, which is similar to Caserones, and which we also detected in Chusmisa, Jamajuga, and Tarapacá Viejo. However, the most important occupation of these settlements corresponds to the Camiña Phase, whose indications dominate the upper quebradas with terracing to support more permanent habitations and with an agricultural concentration. Finally, the Pukarqollu contexts are predominantly Altiplano, suggesting a different situation from that observed in the Tarapacá quebradas (Uribe *et al.* 2007).

(a) Sample	Site	Area	Level	Age (years BP)	Date
Beta-220919	Caserones 1	526	5C	Cal 1870-1700	80-250 A.D.
Beta-220918	Caserones 1	468	3A	Cal 1840-1540	110-410 A.D.
Beta-220917	Caserones 1	7	3	Cal 1060-930	890-1020 A.D.
Beta-210436	Nama 1	287	1	Cal 970-750	980-1200 A.D.
Beta-227581	Pukarqollu	499	6 R1	Cal 940-700	1010-1260 A.D.
Beta-210442	Camiña 1	296	2C	Cal 930-740	1020-1210 A.D.
Beta-227580	Pukarqollu	317	2A	Cal 930-740	1020-1210 A.D.
Beta-210435	Pisagua N	1	3A	Cal 920-700	1030-1250 A.D.
Beta-220921	Jamajuga	5A	1B	Cal 790-660	1160-1290 A.D.
Beta-210437	Nama 1	67	4	Cal 790-570	1160-1380 A.D.
Beta-210441	Camiña 1	139	3/4	Cal 750-550	1200-1400 A.D.
Beta-220920	Chusmisa	89	R1	Cal 650-520	1300-1430 A.D.

(b) Sample	Site	Area	Level	Age (years BP)	Date
UCTL 1638	Pisagua N	19, Stratum 7A	PCH	1710±150	290 A.D.
UCTL 1798	Caserones 1	7, Stratum 1	PCH	1125±110	880 A.D.
UCTL 1799	Caserones 1	280, Stratum R1B	PCH	1115±10	890 A.D.
UCTL 1800	Caserones 1	516, Stratum 3B	CNP	1110±110	895 A.D.
UCTL 1639	Pisagua N	19, Stratum 14	DUP	1040±95	960 A.D.
UCTL 1801	Caserones 1	516, Stratum 3B	QTC	1035±100	970 A.D.
UCTL 1634	Pisagua N	6, Stratum 4A	IND 1	780±80	1220 A.D.
UCTL 1802	Camiña 1	119, Stratum 1B	ISL	675±40	1330 A.D.
UCTL 1636	Pisagua N	12, Stratum 4A	PCH	645±50	1355 A.D.
UCTL 1633	Pisagua B	F1, Stratum 1	PCZ	605±60	1395 A.D.
UCTL 1632	Pisagua B	E1, Stratum 2	PCH	555±40	1445 A.D.
UCTL 1635	Pisagua N	12, Stratum 3A	AND	545±50	1455 A.D.
UCTL 1637	Pisagua N	19, Stratum 2A	AND	530±50	1470 A.D.
UCTL 1803	Camiña 1	250, Stratum 1	PCH	525±50	1480 A.D.
UCTL 1804	Camiña 1	215, Stratum 3 R1	PGA	390±40	1615 A.D.

Table 1: Radiocarbon (a) and thermoluminescent dates (b) obtained for the Pica-Tarapacá Complex.

### Rock art

We studied 274 rock art panels in Camiña, Tarapacá Viejo, Chusmisa, Jamajuga, and Pukarqollu, comparing them with the isolated geoglyphs and petroglyphs that suggest interpretations that relate Tarapacá rock art exclusively with trade routes and caravans. Beneath this economic character we detect one more social and quotidian, because in settlements there is a greater variety of figures, including animals, insects, and plants which indicates an intense study of the local environment. The images are, for the most part, represented in a fashion particular to each site, and include simple variations on the circle, the zigzag, and an undefined lineal geometric figure, simple camelids and complex anthropomorphic personages.

The absence of rock art on the coast and on the Altiplano indicates that, as a means of

expression in domestic spaces, it is an element of the quebradas. Likewise, its variety across settlements indicates differing social relations during the LIP, because few works of rock art were made before that time. In consequence, this rock art is concentrated in places where a lot of agricultural activity and mobility took place, without Altiplano public architecture, forcing a contrast between the local and the foreign. Likewise, the presence or absence of rock art, the diversity of techniques, and the large inventory of motifs and renderings, indicate the cultural complexity of heterogenous societies. Given that it is probable that this art served as a catalyst for the development of differences, for ritual, and/or for exchange, it must have had an important role on various levels. In fact, rock art and foreign images are most frequent in locations where it was necessary to justify and reaffirm a political or ethnic presence, which are frequently outside the villages. In such places the making of rock art

seems to have been an element added to a symbolic and relational landscape which reflects the social diversity and segmentation of the time (Cabello and Vilches 2006).

### *Textiles*

We studied 333 tunics collected at eight funerary sites on the coast and lower valleys of Tarapacá between Pisagua and the Loa River, confirming the development of a textile style particular to the region. This includes warp-faced trapezoid tunics with warp-finished, curved edges, and lateral multi-colored stripes and/or embroideries in loop stitch, or satin stitch, as well as *chuspas* (small fabric bags used to contain coca leaves) and bag-belts decorated with complementary and floating warps, in addition to striped domestic bags. All of these textiles employ a single web, a choice which characterizes the western valleys, but the curve in the borders of the tunics is a technological innovation characteristic of this region that was already known in the Formative.

Textiles from Iquique are clearly related to those from Pica, even though they differ in quality, richness, and diversity. Likewise, there are garments made with local techniques and materials characteristic of the maritime activities of the Archaic Tradition. In this sense, the reduced richness and variety on the coast, and the recurrence of repairs, indicates a dependence on the textiles from the interior from a few centers like Pisagua and Iquique where textiles are concentrated.

Just as many textiles were distributed from the interior to the coast, and from certain places on the coast textiles were distributed to other places on the shore. According to what is observed from Cemetery C, excavated by Uhle at Pisagua, known as "Tiahuanaco", and from certain sites in the upper Loa Valley, it appears that at the beginning of the LIP this region

maintained contacts with other regions and subareas of the central Andes. Nevertheless, there was no coexistence or permeability with Tiwanaku, as was the case with Azapa to judge from the closeness of the Osmore Valley.

During this time, in certain cases coincident with the end of the Middle Horizon (Período Medio) or Formative, there may have been a fluid textile exchange between Pica-Tarapacá and its cultural borders, which, in an eclectic sort of way, forced the development of its own identity, with clothing providing a method for the demonstration and exercise of power, perhaps by means of exclusive garments. We are impeded, for now, in the investigation of the second phase of the LIP when the high quebradas we occupied. There textiles are not preserved (Agüero 2007).

### *Stone objects*

We are analyzing 1,418 stone objects from Jamajuga and Pukarqollu in addition to those materials previously recorded from nine settlements with architecture from different settings in the region. Although it is true that each site has a diversity of categories related to a variety of activities, there was also production emphases which distinguish them.

All of them supplied themselves locally with primary materials of great thickness (andesites, basalts, granites), and, to complement these, with rocks from distant places. Common at all sites were cores, scrapers, projectile points, and cutting tools. The cores were sometimes the most important because from them were extracted matrices used to keep knives sharp or to make instruments, or, they were used to cut and scrape. On the other hand, each settlement had the tendency to use specific tools related to its economic orientation. While at some sites (Pisagua and Camiña) hunting was the most developed activity, at others such as Nama and

Pukarqollu, agricultural or gathering tasks were more important, an interpretation backed up by the abundance of hoes (Carrasco 2006).

#### *Zooarchaeological and malacological analysis*

In 2006 we studied 605 bones from Pukarqollu and defined a system of provisioning based on the consumption of camelids, and, to a lesser extent, on smaller fauna which characterized the Altiplano in spite of their availability in the environment. In previous years we discerned two systems. Coastal sites were provided with marine resources close at hand, and were, therefore, quite homogenous, except for Pisagua B, which had a slightly greater hunting of marine mammals which brought down the frequency of fish, and for Pisagua N which, on the contrary, had a rise in fish resources and a decline in hunting activities.

In the lower quebradas, and on the coast, we observe a unity in a basic custom, in which interior settlements depend on maritime resources, assigning camelids an alternative role, exploiting by-products like wool, more than using them for food. In Camiña there was a high percentage of rodents, as well as a single species of camelids, adding to them sparse fish resources, which signals a connection with the coast during the earliest occupations, in a manner like that of Caserones. Considering what has just been noted, the advance towards the interior translates into an increase in dependency on camelids, and an implementation and expansion of their husbandry from the Altiplano to the upper quebradas. This dependency increased with time, to judge by the almost exclusive presence of the remains of this taxon at Tarapacá Viejo (González in press).

On the other hand, objects made with mollusc remains had three uses: 1) ornaments for the human body, for example, necklaces, bracelets, and accessories for clothing or hair-

dos; 2) containers, for example, for pigments; and 3) small cutting tools or points. Beads made from different mollusc shells, usually from *Oliva peruviana*, are characteristic of the quebradas, but absent at Caserones and Tarapacá Viejo. Beads are encountered at all sites, except coastal ones, in which molluscs represent the remains of food, although there are tools made of bivalves. In Caserones, in early times, there was more diversity of species, artefacts, and uses of malacological resources, suggesting a greater experimentation at a time of fixed norms for the production of objects. In Camiña, we noted places dating from a later time dedicated to the production of beads, which we interpret as an indication of artisan specialization, supported also by a manufacturing which was quite uniform. *Oliva peruviana* was converted into the preferred species, as we see in Camiña, Nama, or Chusmisa, or used in a more modest manner on the Altiplano. Thus, we emphasize the transition from a diversity of objects made domestically, to a specialized system and standardization with *Oliva peruviana* characteristic of the highlands (Valenzuela 2006).

#### *Arqueobotanical analysis*

We analyzed 3018 plant remains from Tarapacá Viejo, Nama, Chusmisa, Jamajuga, and Pukarqollu. Previously we had postulated that the coastal societies in Pisagua oriented themselves towards the collection of local woodland species although they knew maize, carob (*algarrobo*, *Prosopis algarrobilla*), squash, and beans, products of the Pampa and quebradas, suggesting a strong relationship with the valleys. In Caserones, the equal abundance of *algarrobo* and maize in the sites indicates that agriculture was fundamental to the economy from the Formative onwards, along with the intensive gathering and tree cultivation of the groves of *Prosopis*, marked by community control, according to the analysis of architecture. To this we add the possible insertion of dynamics of interre-

gional exchange demonstrated by exotic elements such as cotton, *cebil* (a South American tree valued for its seeds used as a hallucinogen), peanut, *Mucuna sp.*, *Aspidosperma desmanthum*, and *Prosopis algarrobilla*. This site gradually moved away from the forest resources of the Pampa in order to concentrate more on the cultivation of maize and other crops. Later, at Jamajuga, Nama, and Chusmisa the most significant cultigens were maize and quinoa, demonstrating the move away from gathering, turning towards the agrarian control characteristic of the quebradas. Finally, vegetal remains are sparse at Pukarqollu. Nevertheless, we identified *Chenopodium quinoa*, locally cultivated in pre-hispanic times, brought from the Altiplano to the valleys and quebradas such as Camiña (García 2007).

#### *Bioanthropological and mortuary analysis*

We studied 21 skeletons from Pica 8 in order to know the biological profile of the principal regional cemetery. The results indicate that the population was under heavy environmental and pathogenic (principally tuberculosis) stress. That is, they endured cultural processes common to complex agricultural societies in deficient sanitary conditions, high levels of sedentariness, and overcrowding. Nevertheless, the environmental stress was not sufficient to create severe nutritional problems. On the other hand, there were differences in the indications of oral health which suggest different ways of life and specific conduct of the genders to which was added some violence towards women.

The analysis of 25% of the Pica 8 (n=66) contexts distinguishes a Tarapacá style recurrent on gourds, basketry (*cestería* and *capachos*), and spatulas. The analysis also discovered that 51.79% of the contexts were simple, 33.92% were somewhat complex, and only 14.29% were complex, supporting the idea of a hierarchical society. Also suggested is the existence of indi-

viduals in charge of rites, for example, those buried with ritual bundles and hallucinogen paraphernalia, as well as of people associated with specific tasks such as musicians. For example, panpipes (*zampoñas*) are present. Other individuals were linked to working the earth and subsistence activities. The objects also reveal a society permeable to the iconography and textiles of the extreme north of Chile, to the psychotropic complex of the Atacama, and to polychrome ceramics from the Altiplano. The finds allude to diverse practices of interaction, integration, and politics. On the other hand, the coast dominated the repertory of hunting and fishing artifacts, with agricultural implements being almost entirely absent. Craneometric analysis and discrete traits complement the differential accumulation of funerary goods in Pica 8, indicating social strata generally different due to migratory processes or endogamy (Catalán 2006; Retamal 2006).

In summary, during the LIP the Tarapacá region was characterized by historically distinct groups, represented by the coastal communities, by those of the lower valleys and the Pampa, and by people from the quebradas and Altiplano, who constituted independent units which were, nevertheless, related to one another and complementary economically and socially, defining specific identities and practices in both the domestic and public spheres. This heterogeneity had antecedents in local developments, taking account of the Archaic and Formative experiences, and bringing them to the cultural frontiers through economic interaction, and, fundamentally, suggesting the domestic or family conduct of relatives which was sanctioned in the community space. Through this, more than through the conduct of great lords, these dynamics responded to collective decisions which defined the privileged ambit for manifestations of hierarchy and power. In this way, differences and inequalities operated according to place of origin, economic activity,

and family ties, permitting hierarchies, the multiethnic occupation of land, access to resources, or the transactions of caravans. All this occurred with the aid of traits expressed on clothing, ceramics, jewelry, or rock art, which allowed both communicating and concealing, conducting business or co-opting, in places of convergence along the lines of Andean *ayni* (Quechua for “mutual aid”) and *taipi* (Aymara for “the place where things converge”).

*Translation from the Spanish by Monica Barnes*

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Bolivia

NEW ARCHAEOLOGICAL AND ROCK ART PROJECTS IN BOLIVIA

Matthias Strecker, Freddy Taboada, and Claudia Rivera (all SIARB, La Paz, e-mail: siarb@accelerate.com; Taboada - Museo Nacional de Etnografía y Folklore, La Paz) write that the Bolivian Rock Art Research Society (SIARB) is conducting several projects that preserve rock art in archaeological parks and incorporate archaeological research.

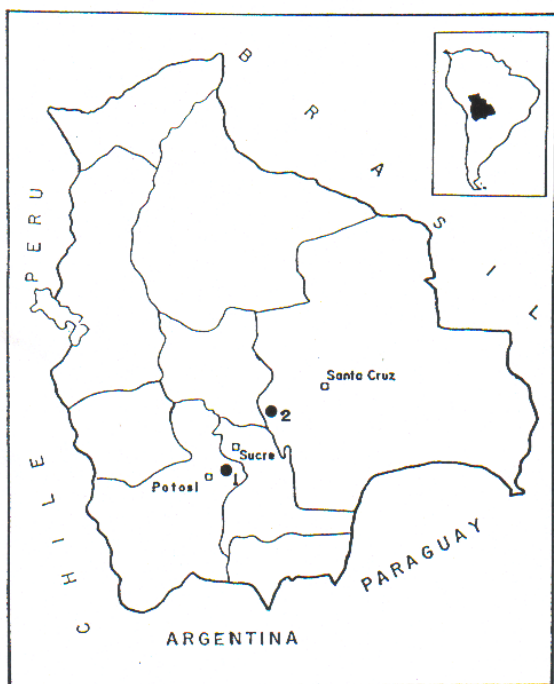


Figure 1: Location of sites mentioned in the text. (1) Lajasmayu, Betanzos, Dept. of Potosí; (2) Vallegrande region, Dept. of Santa Cruz, location of Paja Colorada and Mataral Caves.

The Vallegrande Project

This initiative concentrates on two sites, Paja Colorada and Mataral in the municipalities of Moro Moro, and Pampa Grande, in the western portion of Department of Santa Cruz (Figure 1). The small cave of Paja Colorada, 35

km northwest of the city of Vallegrande, is one of the most important rock art sites in Bolivia, due to its sequence of traditions that span millennia. Work from several prehispanic periods, as well as Colonial times, can be found at the site (Figure 2; Strecker 1999).

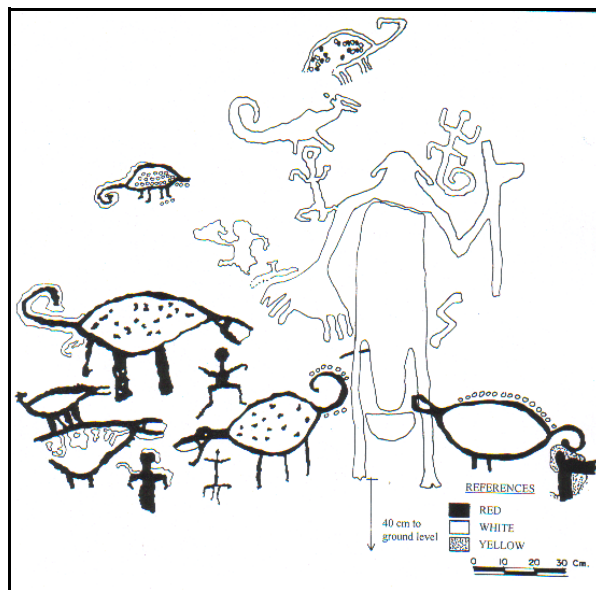


Figure 2: Paja Colorada Cave. Recording by Matthias Strecker. Drawing by Renán Cordero (from Strecker 1999:7 and volume cover).

The most ancient representations are more than twenty negative stenciled hands (Figure 3), which are extremely rare in the Andes. Similar representations in Patagonia at Cueva de las Manos, Argentina, a UNESCO World Heritage site, have great antiquity. They belong to several stylistic groups. The oldest such hands were made about 9300 years ago. The practice of making them possibly continued into the fourth millennium B.C. (Gradin 1988:9).





*Figure 3: Paja Colorada Cave: hand stencil and painted animal figure.  
Photograph by Roland Félix.*

Until November 2003 Paja Colorada Cave remained without protection, although vandalism by visitors had begun. SIARB and the Municipality of Moro Moro received partial funding from the Cultural Foundation of Bolivia's Central Bank and installed a fence at the entrance, impeding uncontrolled visits (Figure 4). Following a request by SIARB, the World Monuments Fund included Paja Colorada in its Watch List of 100 endangered sites selected world-wide for the year 2004.



*Figure 4: Paja Colorada Cave protected by fencing. Photograph by Ian Wainwright.*

In 2006, Claudia Rivera (SIARB, e-mail clauri68@yahoo.com) and her collaborators,

**Sergio Calla** (SIARB) and **Patricia Alvarez** (Universidad Mayor de San Andrés, La Paz) made a preliminary archaeological survey of the region of Paja Colorada (30 km<sup>2</sup>) registering 33 sites. They also partially excavated the cave and found remains of two hearths in the cave floor. AMS dating of charcoal (ANSTO Laboratory, Australia) yielded dates with a range of A.D. 250-900. In addition, they documented and catalogued the archaeological collection of the regional museum at Vallegrande. According to the information they obtained, the archaeological evidence includes the Preceramic Period, the Formative Period, the Regional Development Period, the Inka Horizon, and the Colonial-Republican Period (Taboada 2008:18-19).

Freddy Taboada is directing a rock art recording project and has been able to recognize six different phases of rock art. He is working in conjunction with **Robert Mark** (Rupestrian Cyber Services, e-mail rockart@infomagic.net) who undertook a new photographic survey of the cave.

Taboada and Canadian conservation scientist **Ian Wainwright** (Canadian Conservation Institute [retired], e-mail wainwright@universe.com) carried out a condition survey of the cave. In 2007 Taboada removed graffiti, while Wainwright took seven pigment samples of white, yellow, and red paint. These were analyzed by him and **Mati Raudsepp** (University of British Columbia, e-mail mraudsepp@eos.ubc.ca). The results of SEM-EDS and XRD analyses have been published in detail (Wainwright and Raudsepp 2008). The investigators identified hematite, goethite, kaolinite, and illite/muscovite. The authors suggest that a more detailed examination of the sequence of Paja Colorada rock art might allow researchers to investigate relative and absolute dating of the paintings using pigment analyses, cross-section microanalysis, and AMS C14 dating.

Taboada and Strecker wrote a preliminary management plan for the administration of the site, as well as a proposal for the construction of a visitors' center. **Carlos Kaifler** (SIARB, Santa Cruz, Bolivia) installed signboards at the site. Rivera conducted two training courses for local people interested in working as guides for visitors to the archaeological park.

#### *Betanzos Project in the Deptment of Potosí*

The first reports about rock art at Betanzos were published in newspapers in the late 1970s. During the 1980s and 1990s preliminary recordings were carried out by SIARB investigators. Several publications (e.g. Strecker 1990, 2003) present preliminary results and point to a long sequence of rock art traditions.



*Figure 5: Lajasmayu River and rock art site.  
Photograph by Matthias Strecker.*

The criteria for selecting one particular cliff face of Cerro Lajasmayu for repeated painting over millennia may include its high visibility in the landscape, its proximity to the river, and its location along an ancient trading route (Figure 5). In the 1980s, caravans of llamas still crossed the Lajasmayu River near the rock with the paintings. In 1986 we met a caravan transporting salt from Lake Uyuni some 200 km to the southwest.

Archaeological research in the central region of Potosí (Lecoq and Céspedes 1997:33) revealed prehispanic occupation from the Pre-ceramic Periods until the Inka Horizon. There are three preceramic sites (~6000-2000 B.C.) reported near Betanzos in small caves or rock shelters with rock paintings. Additionally, the Bolivian archaeologist Jorge Arellano (personal communication, 1986) analyzed a small sample of surface finds in the area of Lajasmayu. He tentatively identified a lithic instrument of the Preceramic Period (Strecker 2003: figure 16A-D), as well as Formative, post-Tiwanaku, and Inka ceramics (Strecker 1990, 2003). Strecker believes that the rock paintings of Lajasmayu belong to several different traditions pertaining to different time periods (Figures 6, 7). In addition, there are a few Spanish Colonial representations (Figure 8) and some later graffiti. Apparently, the earliest phase consists of very small camelids represented in movement and painted in dark red, in a few cases accompanied by stylized human figures (Figure 7).



*Figure 6: Rock painting at Lajasmayu. The design is typical of a phase which had ceramics and textiles. Photograph by Matthias Strecker.*

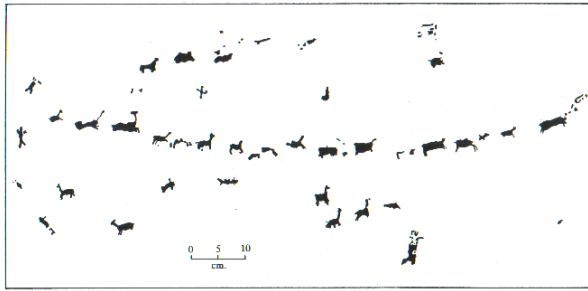


Figure 7: Rock paintings at Lajasmayu. Red camelids with human figures, one with partially obliterated headdress. Possible hunting scene. Recording and drawing by Freddy Taboada (from Strecker 1990: 198)

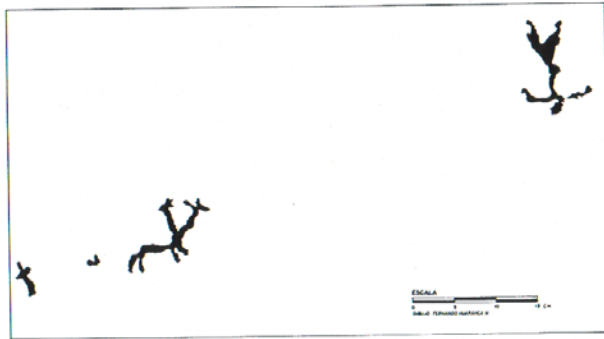


Figure 8: Colonial rock paintings at Lajasmayu depicting a horse and rider and an upside human figure. Recording by Matthias Strecker. Drawing by Fernando Huaranca (from Strecker 1992:99)

SIARB has recently been approached by representatives of the municipal government of Betanzos who are aware of the potential of the rock art sites for tourism and of the problems created by vandalism. In 2007, SIARB and the municipality signed an agreement to plan a project. The SIARB project aims at protecting the principal rock art sites at Lajasmayu near Betanzos. The suggested plan of action includes preliminary meetings and consultations, archaeological survey and excavations, recording of rock art, conservation analysis and treatment, an education campaign and training courses for guides and site stewards, coordination with tourism agencies, topographical work, basic

infrastructure at sites and sign boards, publication of leaflets for visitors, and the construction of a visitors' center with a permanent exhibition on the rock art sites, as well as publication of a report in the *Boletín* by SIARB. This project is partially supported by the The Ambassador's Fund for Preservation (United States Department of State, Cultural Heritage Center). Work directed by Freddy Taboada (president of SIARB, conservator and curator), Matthias Strecker (coordinator), and Claudia Rivera (archaeologist) is scheduled to take place from mid-2008 to mid-2010.

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## PERU

**Exchange at Chavín de Huántar: Insights from Shell Data**

**Matthew P. Sayre** (University of California at Berkeley, e-mail: sayre@berkeley.edu) and **Natali Luisa López Aldave** (Universidad Nacional Mayor de San Marcos, e-mail: fortaleza2003@hotmail.es) chronicle some of the recent history of excavations at the site of Chavín de Huántar, specifically in the La Banda sector. They present analysis of archaeological shell material in order to examine patterns of ancient exchange. The shells also provide evidence of past climatic fluctuations.

*Ecological and Archaeological Background*

Chavín de Huántar is in the Callejón de Conchucos in the Huari Province of the Department of Ancash, in the farming or Quechua Zone which is between 2300 and 3500 masl (Pulgar Vidal 1972:75). Chavín de Huántar itself stands at 3150 meters where two rivers meet in an intermontane valley. Most central highland archaeological sites are located in the Quechua zone where the climate is most hospitable for human habitation. A relatively mild climate allows a wide variety of crop plants to be grown. The weather is seasonally marked, with most of the annual precipitation falling from November to April.

Many archaeologists (Burger 1995:128; Lathrap 1973; Lumbreras 1974:67, 1989:13; Tello 1942:30-31, 1960:26, 36) have described Chavín as optimally located halfway between the Pacific coast and the Amazon rainforest. However, it is not in one of the easiest places to cross the Andes and there are many highland sites that have better access to the coast (Rick 2008:8). Nevertheless, the time required may not have been a major constraint. It would have

been possible to travel to the coast with camelids bearing goods in under two weeks.

Chavín was a meeting point of diverse peoples who created their world both through the construction of monumental architecture and the daily process of living and working in a highland valley. The remarkable religious building there, and the practitioners of rites within it, served as a magnet for foreign goods. Thus it is not surprising to find quantities of shell in the settlements surrounding the temple.

*Stanford Archaeological Project at Chavín de Huántar (Proyecto Stanford Chavín de Huántar)*

In 1994 the Stanford Project, under the direction of **John Rick**, began field research at Chavín de Huántar. The project initially focused on mapping the ceremonial center with highly accurate laser tools. The refined data recovered led to new assertions about the chronology and history of the site (Kembel 2001, 2008; Kembel and Rick 2004; Rick *et al.* 1998).

Beginning in 2001, field seasons have placed increasing emphasis on research outside of the ceremonial core. **John Wolf** directed much of the initial work in the area to the east of the Mosna River in the sector known as La Banda (Figure 1). While this region was not the focus of early field projects, John Rowe (1963) postulated that La Banda may have contained Chavín period settlements. Burger's (1984) limited excavations in the sector did not reveal any significant Chavín Period domestic settlements. Burger's work appeared to support the idea that the ancient domestic settlements were concentrated under the modern town of Chavín. Initial field survey in La Banda by the Stanford Project did not reveal the presence of significant Chavín era domestic occupations there.

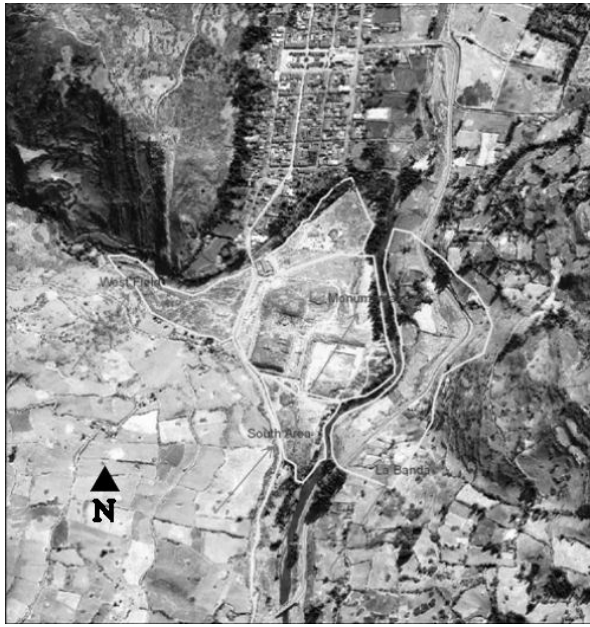


Figure 1: Site sectors of Chavín de Huántar (photo after Contreras 2008: Figure 1.4).

It now appears that over the last three millennia this portion of the valley bottom has been subject to several large landslides (Contreras 2008:6; Turner *et al.* 1999:47-56). These massive earth movements covered Initial Period/Early Horizon settlements. In 2003, work began on a major road project that inadvertently uncovered domestic settlements predominantly dating to the Black and White Stage (850-550 BC) of monumental Chavín (Rick 2008:11). Additionally, the road building exposed a Middle Horizon tomb complex. The possible destruction of these precolumbian settlements led to the filing of a formal protest against the construction company by the Peruvian National Institute of Culture (INC) and a rescue archaeology project that began to document these important finds (Sayre 2004).

Excavations in La Banda led by John Wolf, John Rick, and local members of the INC during 2003 uncovered many domestic units with numerous occupations dating to the Black and White Stage. The extent of these dwellings and associated patios needs further clarification, but

the evidence to date suggests that the occupations were densely spread across the landscape. There does appear to be a strong tradition of building and rebuilding houses in this area, as evidenced by repeated building of floors with similar construction patterns.

The La Banda structures exhibit a standardized construction technique that reflects the thoroughness evident in other areas of construction at Chavín. The La Banda sector is of primary importance because the population that dwelt within its structures was most likely responsible for the construction and/or upkeep of the monumental center. The results of the 2005 season confirm that the residents of this area were at least partially responsible for the production of goods for the ceremonial center. While the exact nature of local production is still open to debate, the horizontal spread of the neighborhoods around La Banda allows for the diversity of production and trade in this period. The data presented in this report were recovered during excavations. Recovery was enhanced by systematic screening of soils.



Figure 2: Ceremonial center of Chavín and La Banda excavation area (arrow points to excavation grids).

The area of La Banda (Figure 2) described in this report has been dated with six AMS wood charcoal samples, processed by Beta Analytic. All of them fell between 810-470 BC calibrated

(2 sigmas) with an error range of 40 years. The ceramics associated with these settlements are stylistically part of the Janabarriu ceramic tradition.

#### *Marine Shell at Chavín*

Iconographic research on Chavín's stone art has emphasized the importance of lowland plants, sacred plants, and animals in the site's wide array of exotic imagery (Burger 1995:153; Lathrap 1973; Roe 1974). In addition to these images, there are several repeated motifs of marine shells as objects of ceremonial value. These shell taxa have been found throughout the excavations at the site, both within and outside the ceremonial core. The best documented case of recovered shell artifacts is that of the Caracoles Gallery. This gallery contained numerous, elaborately decorated shell trumpets (*pututus* or *huayllaquepas*) made from *Strombus* (Burger 1995: 135; Lumbreras 1989:158-161; Rick 2008:25-26; see Falcón, this volume, for a discussion of the shell trumpet found at the Formative site of Punkuri). These artifacts were offerings, but there was no evidence of shells in production. The *pututus* are completed pieces.

The varied sectors of the site where foreign goods were found indicate differential practices at the site. Shell artifacts are not uniformly distributed across the site, and to date no shell artifacts were excavated in the Wacheqsa sector (Mesia 2007:137) which did contain dense concentrations of other artifacts, and is close to the monumental center. The area of La Banda, further from the monumental center, and across the river, was excavated in 2005, and contained evidence regarding ceremonial goods production and use. Faunal material that may have been used as priestly regalia was also recovered in La Banda. The diversity and large number of marine shells found in the La Banda production area indicate the settle-

ment's regional importance as a manufacturing center.

It is well established that many marine species are ecological indicators and some marine molluscs can only survive in distinct climatic regimes (Claassen 1998). The classic example in Andean archaeology of a mollusc subject to these ecological constraints is *Spondylus* which live in warm water like that off of the coast of Ecuador. There are other species of marine molluscs that survive only in particular climates. The clearest constraint on the viability of many Pacific species is the havoc that El Niño Southern Oscillation (ENSO) events can cause. Two of the most common species found at coastal sites that are used to establish the changing frequencies of El Niño events in antiquity are *Mesodesma donacium* and *Choromytilus chorus*. These species are not able to survive the warm waters that come with ENSO events. These taxa were readily accessible shoreline animals that formed a regular portion of the central Peruvian coastal diet, and were generally the most common component of shell middens between 3850 and 850 BC (Sandweiss *et al.* 2001). *Choromytilus chorus* may have been a species of ceremonial importance before the widespread use of *Spondylus sp.* in Andean rituals (Sandweiss 1996).

As Sandweiss *et al.* (2001) explain, there is evidence that there was greater variation in ENSO events between 1250 and 850 B.C. By 850 B.C. ENSO events became more frequent, and the microclimate suitable for *Choromytilus chorus* was thereby restricted. This means that they would have been more difficult to gather on the central coast of Peru, because they would have only been able to survive further south, beyond what is now Casma, at that point in time.

<i>Choromytilus chorus</i>	55
<i>Perumytilus purpuratus</i>	7
<i>Aulacomya ater</i>	3
<i>Argopecten purpuratus</i>	5
<i>Eurhomalea rufa</i>	2
<i>Oliva peruviana</i>	2
<i>Donax obeselus</i>	4
<i>Natica</i> sp.	1
<i>Mesodesma donacium</i>	1
<i>Spondylus princeps</i>	1
sea snail cf. <i>Thais</i> sp.	3
unidentified	2
<i>Thais chocolate</i>	1
<i>Tegula atra</i>	1
TOTAL	88

Table 1: Marine shell species identified. In addition there were 23 specimens of *Scutalus* sp., a land snail.

Table 1 depicts the relative proportions of individual marine species recovered during the excavations. The species were identified by Natali López Aldave and were confirmed using standard references (Alamo and Valdivieso 1997; Osorio and Piwonka 2002). *Choromytilus chorus*, n=55 out of 88, is by far the dominant species in the assemblage. While the other environmentally sensitive species mentioned in this report (*Mesodesma donacium*) was rare in the La Banda assemblage, n=1, its presence must still be noted. These species not only provide direct evidence of trade, but also are indicative of broader environmental conditions. The samples recovered (see Figure 3 for a representative image) from the La Banda excavations confirm that the most likely coastal source of these shells at the time of La Banda's existence (~850-500 B.C.), is between 7-9° south latitude, the central coast of what is now Peru.

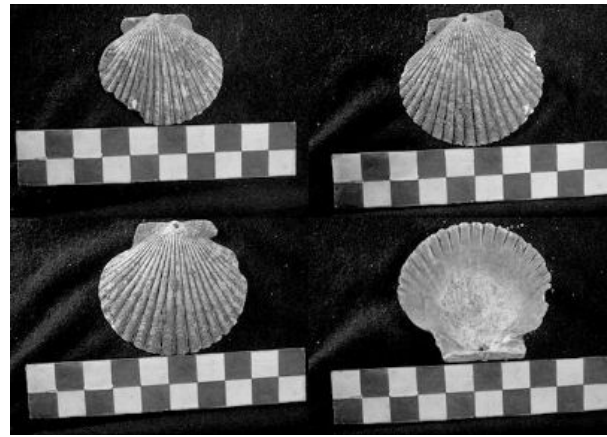


Figure 3: Worked marine shells (*Argopecten purpuratus*) from excavation unit K-13. Scales in one centimeter intervals.

This coastal region was still less prone to El Niño events at the time of La Banda's initial construction and these shells would not have been common on the central coast after 850 B.C., although: "*M. donacium* and *C. Chorus* remained minimally present in the Casma Valley past 2.8ka" (Sandwiss *et al.* 2001:604). Thus, these shells may have initially come from a coastal source due west of Chavín, but if they were transported to Chavín at a slightly later phase, their most likely source would have been regions to the south. The evidence presented here reveals that the distinct mollusc species found in La Banda were gathered from different portions of the Pacific coast of South America. After being transported to Chavín they were differentially processed and deposited across the site.

This report builds on previous work (Pozorski 1979; Pozorski and Pozorski 1987; Sandweiss *et al.* 2001) that illustrated the potential of malacological material to elucidate patterns of climatic variation in the past. The analysis presented here indicates that Chavín established early trade connections with coastal peoples and engaged in the long-distance exchange of ecologically sensitive molluscs. These remains reveal more than ancient trade routes or clima-



tic patterns, however. Their presence in circumscribed areas of the site means that only certain participants or craftspeople had access to these goods and inhabitants of other regions of the site may not have been permitted to work with these materials.

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## La Fortaleza at Ollantaytambo

**J. Lee Hollowell** (email: holloxyz@aol.com) reports on his long-term analysis of portals and other construction elements of the Fortaleza at Ollantaytambo.

The Fortaleza at Ollantaytambo is among the most sophisticated precolumbian stone structures in the western hemisphere. Ollantaytambo and its Fortaleza are in the Sacred Valley of the Incas, southeastern Peru. The Fortaleza is a very complex part of the site whose architecture has still not been investigated in important respects (c.f. Bengtsson 1998; Gasparini and Margolies 1980: 71, figures 52, 60; Hemming 1982:103-111; Patermosto 1996:137-151; Protzen 1993:73-94, 241-260; Squier 1877:498-501; Ubbelohde-Doering 1967:251-254, figures 268, 274, 275). Crowning the Fortaleza is a massive unfinished platform, the Templo del Sol (Temple of the Sun). This report examines one of the many intriguing problems presented by La Fortaleza. I focus on what I term Block 21 (Figures 1-3, 5), which Protzen designates Block 16 (c.f. Protzen 1993: figure 3.8). It is sometimes called El Trono, or the Throne because it looks to some as if it may have provided a seat.



Figure 1: El Trono at Ollantaytambo.

Scattered about at the Fortaleza are architectural elements from at least ten separate portals which I call “missing portals”. Two of these are of monumental size. Two others are from walls apparently important enough to have been designed to be seen from both sides. Only one of these portals remains standing, the Puerta Principal (Main Portal; called the “Unfinished Gate” by Protzen [1993]: figure 14.15) in the Wall of 10 Niches, and that only in partial reconstruction (Figure 4; Ubbelohde-Doering 1967: figure 272).



Figure 2: Lithons at the Templo del Sol.

It is remarkable that in spite of the precision fit of many vertical fillet stones, the Templo del Sol lacks a formal foundation (*vidi*; Ubbelohde-Doering 1967: figures 274-275). Two of its *lithons*, or massive upright stones, numbers 15 and 16 (Figures 2, 3), have shifted forward some 4 cm from the top during the 25 years I have been studying the site. This is because of a poorly-made, rubble foundation. This rubble support includes a greenstone (secondary andesite) block salvaged from a building which I postulate was constructed elsewhere.

Careful inspection reveals that the Templo del Sol is actually a construction made from blocks salvaged from a different, and probably nearby, sector of Ollantaytambo. Originally, the *lithons* must have had a formal foundation. Note the straight line formed by the bases of *lithons*

15, 16, 18, 19, and 20. Note also the extension of the base of *lithon* 17, which extends a meter below ground level (Figure 3; Bengtsson 1998: 98, photo; Ubbelohde-Doering 1967: figures 274-275). Block 47, nearby, is probably the corner stone and would fit into the space as indicated in Figure 3, below *lithon* 20. Block 47 is now upside down, but when it was in its original position it had both a requisite 90° angle, and the 7° talud, or batter, typical of Inca fine masonry.

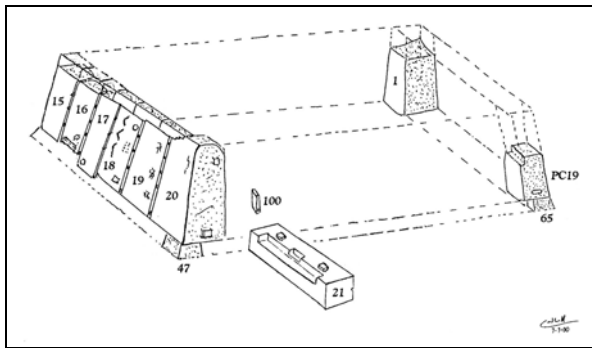


Figure 3: A proposed reconstruction of the Fortaleza as a rectangular ushnu based on the possible fit of known ashlars.

The Templo del Sol, as and where originally built, was probably an *ushnu*, a classic Inca, rectangular, stone-walled, ceremonial platform, perhaps similar to the well known one at Huánuco Pampa. There are extant blocks at the Templo del Sol that may have formed this *ushnu* (Figure 3). Shown in Figure 3 is an extra fillet block (Block 100) which is no longer present at the Templo del Sol, having been salvaged for use as a lintel in a local restaurant. This block would fit into the original temple's probable overall motif of vertical *lithons*, each separated by three or four vertical fillet stones. This motif was intended to encompass the entire construction. Note the three top blocks (Figure 3, above Blocks 18, 19, and 20). Though now displaced to the ground at the front of the structure, a sketch made in 1842 by Johann Moritz Rugendas, shows them still in position

atop the Fortaleza as in Figure 3 (Hemming 1982:109; Paternosto 1996:138-39, Plate 80; Ubbelohde-Doering 1967:252).

At the right end of the Templo del Sol from the viewer's perspective as (s)he faces *lithons* 15-20 is Block 21, El Trono (Figures 1-3; Gasparini and Margolies 1980: figure 60; Paternosto 1996: plates 79, 82; Squier 1877:500). On careful inspection it is apparent that this was not a ceremonial seat. Two rectangular *jetas* or protuberances are at the top of this stone as it now rests (Figure 5). This facet of the stone is, in fact, the intended front face of the block. The block is now lying on its back on a recent, flat stone and rubble foundation.



Figure 4: Puerta Principal (Main Portal) in the Wall of 10 Niches.

Block 21's original orientation is confirmed when it is viewed from one of its ends. The lift hole, a common device for levering blocks, is always on the bottom once the block is in its final position, but as it stands now this hole is on one of the vertical sides (Figure 5). Furthermore, most fine Inca walls have a talud for stability. When in its original position, the interior angle between the intended bottom edge and the intended front edge is 83°, while that between the intended top edge and the front edge is 97°, just what would be expected for the talud, if this surface with *jetas*, was, in fact, the front of a typical wall block. Note the

inset and the step or seat (Figures 1, 3). El Trono then, is not a throne, but rather, the sill of a monumental double-jambled portal with a central step, seemingly designed for people to pass through in single file. This portal is unusual because it is the only one known with a double inset sill. It is also the only sill known to survive at the Fortaleza.<sup>1</sup> Block 21 is not indicated in the 1842 sketch. Its original location is unknown.



Figure 5: Block 21, end view.

What would a portal using Block 21 have looked like? To aid in reconstruction I have noted the proportions of 18 typical double-jambled Inca portals from various sites. I have calculated the ratios for width at top to width at base, and of height to width at base, noted the angles formed within the trapezoids of the portals' interiors, and then calculated the standard deviations (Figure 6). The small standard deviations of these proportions suggests the high level of accuracy with which Inca masons adhered to standards when constructing portals.

<sup>1</sup> The mismatched block serving as a sill under the Puerta Principal is not wide enough to fit the jambs. It is probably a wall block salvaged for the reconstruction of this portal. Behind this "sill" is a second mismatched block.

Applying these calculations to El Trono, I have calculated the original dimensions of the portal which contained it as a sill and compared the reconstructed portal's size with the *lithons* of the Templo del Sol. If on a proper foundation, the *lithons* would stand about 5 m high. The El Trono portal would have been substantially taller, standing at about 6.6 m. The El Trono portal may not originally have been part of the Templo del Sol, although its stone, a porphyritic dacite, is identical to those of the *lithons*. Where could such a huge portal have been employed? It could not have been accommodated on the present Templo del Sol terrace because there is insufficient space, no apparent plan into which it would fit, no apparent purpose, and no fitting marks for it on that terrace.

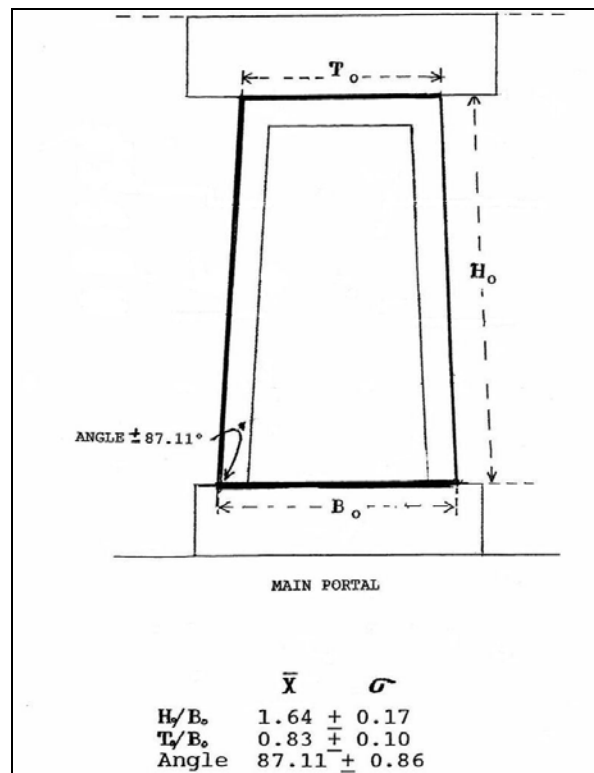


Figure 6: Reconstructed Puerto Principal of Ollantaytambo ushu based on extent components.

How could the El Trono portal have been incorporated into an original Templo del Sol *ushnu*? There is a clue in the Puerta Principal. This portal is a reconstruction made of jambs from at least two different earlier portals. Careful inspection reveals that the top two jambs do not match the bottom two. Viewed from the front, both sets of jambs have *jetas*. However, viewed from the rear, only the top two jambs have *jetas*. These two top jambs were made for a wall important enough to be designed to be seen from both sides. In contrast, the rears of the bottom two jambs have vertical “ears” instead of *jetas*. Figure 7 shows the “ear” on the left-hand jamb (viewer’s perspective Figure 7). These ears are unique at Ollantaytambo, and seem designed to connect with a passage or stairway wall. Such a stairway portal design can be found at the Vilcashuaman *ushnu*. Here a monumental double-jamb portal is connected to a walled stairway. Perhaps the original Templo del Sol at Ollantaytambo was similarly designed as an *ushnu* with a stairway, thus incorporating a massive, El Trono-sized portal. Because only jambs, and no lintel or sill, exist for the Puerta Principal, no entirely reliable reconstruction can yet be made for this portal.



Figure 7: Back of Puerta Principal showing an “ear” on the lower left jamb stone (viewer’s perspective).

The former existence of a second monumental portal is indicated by a pair of huge jamb blocks. Though not of the double jamb, inset type, the extant blocks from this portal today mark a critical location, the entrance to Ollantaytambo’s *parroquia* or rectory (Figure 8). The original lintel, and possibly two additional jamb blocks, are missing. Its sill, if one exists, seems buried at an unknown depth. It is not known whether the portal blocks are in their original location. However, two facts suggest that they are. First, they form an integral part of the 300 m wall in the Pampawasi section of Ollantaytambo. Recent excavations by Padre César Cárdenas have revealed impressive sections of this major construction. An oblique view of these jambs shows that the jambs are tilted to the exterior, eliminating the expected talud to the interior. This may have been caused by pressure from a major avalanche down the Patacancha River, flowing from the back to the front of the blocks as seen in Figure 8. Two 100 ton river boulders are just behind the *parroquia*, at least eight meters above the river bed, clear evidence of a major avalanche.

As with the top double-sided jambs of the Puerta Principal (Figure 4), a set of worked blocks in the Mañay Raqay Plaza (also spelled as Manyaraki or Maniaraki), three jambs and a lintel, are from a double-sided, double inset portal, Portal M2 (see Hollowell 1987:70, figure 116 for terminology), obviously designed for a wall to be seen from both sides. Where was this double portal originally placed?

A third orphan lintel for a single inset portal is on the slope northwest of the Fortaleza. The sole standing portal, in the Wall of Ten Niches, was also designed to be seen from both sides. So was a probable, long-destroyed, companion on the north end of the Wall of Ten Niches.

What are the implications for the Templo del Sol, not only of the huge El Trono portal,

which would have stood higher than the remaining walls of the Templo del Sol, but also of the four double-jambed portals designed to be seen from both sides, and of the four other, remnant portals whose parts are from distinctly different and identifiable former portals? The original construction complex, as planned, would have had to have been substantial to accommodate these nine portals and accompanying walls. They surely would not all have fit on the present Templo del Sol terrace. There is neither enough room, nor any evidence that the construction would have been there originally. Where, then, is there a sufficiently large location? It has to be to the northeast, in the Pachacancha Valley.

The probable site is under the Mañay Raqay Plaza and under the Church of Santiago Apóstol. One piece of evidence supporting this supposition is the anomalous location of the church, begun in 1620. Instead of being on the Plaza de Armas, or central square, as in most other Spanish towns, it is across the river, near the Fortaleza, in the archaeological zone. The prominent sixteenth century colonial cleric, José de Acosta, provides a rationale for such a siting. Quoting papal letters, he argued that it was beneficial to construct churches on the locations of non-Christian houses of worship so that the Indians could render homage to God in the places where they had been accustomed to pray (Acosta 1954 [1590]:502). Extant examples from the Andes prove that this advice was sometimes followed (Barnes 2002:283 and references therein). Perhaps the most famous is Cusco's church of Santo Domingo, which incorporates the Inca shrine of Coricancha. The Quechua term, *Mañay Raqay*, the name for the plaza to the immediate north of the Ollantaytambo church, has been translated as "hall of petitions" (Squier 1877:503). This concept emphasizes the probable ceremonial importance of the area and what may lie under it.

It seems likely that whatever remnants of an original *ushnu* still exist lie under the Mañay Raqay and church sites. The *ushnu* had most probably been demolished and buried by one or more massive avalanches like the one which occurred in the 1860s (*ibid.*: 493-494). However, the possibility of deliberate destruction by Spanish authorities cannot be eliminated at this time. *Ushnu* were recognized and demolished when possible (*c.f.* Albornoz 1990 [1569-1604]:265-268, 274-276). In any event, I suggest that "El Trono" is the only surviving sill of this *ushnu* at Ollantaytambo. Otherwise, only lintels and jambs have survived. This is further evidence of burial by an avalanche, because one would expect to encounter such sills had they not been buried. Further evidence includes the presence of orphan joints and tumble damage, as well the absence of blocks that logically should be present. Future research should include a ground penetrating radar survey of the Mañay Raqay and church.



Figure 8: Entrance to the parroquia, Ollantaytambo.

A longer version of this paper "Missing Portals, their Reconstruction via Statistics and the Implications for the Fortaleza, Ollantaytambo" was presented at the 48<sup>th</sup> Institute of Andean Studies conference, University of California at Berkeley, 11 January 2008.

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