

Reconstructing Inca Socioeconomic Organization through Biography Analyses of Residential Houses and Workshops of Pucara De Tilcara (Quebrada De Humahuaca, Argentine)

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Abstract

This paper presents a micro-structural analysis from a house of the Pucara de Tilcara, one of the most important archaeological sites of the Argentina northwestern region. These results reconstruct the biography of a dwelling space during the last pre-Hispanic period. Beyond its constitution like a preinca dwell space we identify its reconfiguration to become a house-workshop for the production of luxury goods after Inca domination, and its posterior abandonment and reoccupation as a burial place. We compare this residential unit with another structures excavated in early 20th century, that also had been occupied as house-workshops. Available evidences have allowed us to estimate the social-economic organization of the Pucara de Tilcara and to advance in the characterization of the Inca domination in the region. We suggest that the Pucara de Tilcara was a main production center destined to specifically enlarge some local technology and to develop new production within the lapidary industry.

Keywords: Inca domination – specialized production – household biography – contextual analysis –South Central Andes

1. In the last decades, archaeological investigations developed in the territories which conform the centre-south and southern province of *Tawantinsuyu* have provided increasingly solid information regarding the application of state policies adapted to local conditions (Malpass and Alconini 2010). Regional studies show different features regarding the organization of population, manifesting the implementation of different strategies in the construction and legitimation of Inca power (Burguer et al. 2007; Williams et al. 2009). In the case of the Quebrada de Humahuaca, a semi-arid valley, which is considered one of the main Inca provinces in Argentina's Northwest (González, A.R. 1982; Williams 2004), it was their topographic characteristics, abundance of natural resources and population density which allowed for the installation of numerous control points, sacred places, *tampus* (shelters and storage sites), and political and administrative centers, some of them over preexisting settlements, and also for the increase of agricultural and artisanal production.

The Pucara de Tilcara located in the central sector of the Quebrada (23° 35' S, 65° 24' W), is seen as one of the most important examples for proving this settlement reorganization. It was a densely populated town during late pre-Hispanic times (11th to 16th centuries A.D.), reaching its largest size and becoming the main hierarchical center of the region during Inca period (Greco and Otero 2015).

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It has been estimated that almost two thousand people lived on its 17.5 acres during this period, many of whom were devoted to specialized crafts. The craftsmen's work which was mainly related to metal and stone knapping, was organized by the installation of workshops in different sectors of the site (Otero 2015).

In this work we focus in a high-resolution contextual analysis of a productive and domestic space which was later transformed into a house-workshop at the time of the Inca annexation of the Quebrada. This happens as a response to the installation of a specialized productive unit over a domestic group previously devoted to manufacturing ceramic and metal objects. The study of Residential Unit 1 (SjuiTil1-UH1) and its historic development allows it to be compared to other house-workshops identified in the Pucara with the objective of determining the socio-economical organization of this settlement, both in a domestic and communal scale, through a deeper analysis.

1.1 Residential Unit 1 of Pucara de Tilcara

This habitational and productive structure is located in the middle of the south-west slope of Pucara de Tilcara, in the proximity of ten big enclosures defined as corrals -pens - (Casanova 1970) (FIGURE 1). Like the other 588 structures distributed through different parts of the 80 meter-high hill which makes up the Pucara, Residential Unit 1 has a double wall built of stones held with mortar. It includes five enclosures (E 1, 2, 3.2, 3.3 y 4) distributed in two terraces of the hillside at 2420 masl and connected to a large, 37 m², central courtyard called Enclosure 3.1 (FIGURE 2). Post hole found in three of the enclosures evidence the use of roofs made of wood and mud. Enclosure 2 (E2), which has an area of 36 m², was determined to have a dividing wall separating a courtyard (E2.1) from an enclosed space (E2.2). Enclosure 1 (E1), with a size of 18 m², was built on the highest terrace. Enclosures 3.2 y 3.3 (E 3.2 and 3.3), are connected to each other and to the big central courtyard. Enclosure 3.2 can be defined as a 4.5 m long rectangle shape; Enclosure 3.3 is a 3.5 m long trapezoid. Finally, another grid (N4) has been opened east of Enclosure 3 in order to determine the existence of a fourth enclosure (E4) which has not been completely excavated yet (FIGURE 2).

The area of excavations reached a total of 127 m² in 2009. The excavations were conducted in different stages by a team directed by one of the authors of this paper -M.N. Tarragó- from 1988 to 1992 (Tarragó 1992; Tarragó and Albeck 1997; Piñeiro and Di Lorenzo 1997; Otero 2013). During the first excavation of this Unit, a midden locator near the house was studied (Midden 2) (FIGURE 2). This midden was in a slope and had a mound area of 96 m². Five 1 m² grids were excavated. By correlating the datings and the characteristics of the material found in this garbage dump with material recovered in Residential Unit 1, it was possible to determine that both were used during the same time. However the midden was probably used for other houses near the one analyzed here for the discard of waste.

The result of the excavation of Residential Unit 1 has allowed us to establish activity areas related to diverse crafts production, to processing, storage, and consumption of food, and also to reuse of spaces for burial or residue discard. Both daily and ritual activities have been dated through 10 samplings obtained from occupation floors and successive burial events (FIGURE 2). We also have obtained four dates for Midden 2. Statistical analysis of the datings and its stratigraphic correlation provided ample data which, considered in conjunction with the contextual analysis of each enclosure and assemblage, allowed us to advance in the biography of this house-workshop.

2. Dwelling in Time

Probabilistic analysis of ten radiocarbon datings from Residential Unit 1 determinate that the occupation time occurred during 12th and 16th centuries A.D. (FIGURE 3). There must have been several socially-related generations dwelling from pre-Inca to post-Inca time. However, stratigraphic analysis performed in this house shows an interruption in the occupation, which can be related to the change of use from house-workshop to burial ground.

In a previous work we made a Bayesian chronological model, separating into two sequential phases the dates corresponding to the house dwelling time and the ones obtained in burials. This analysis defined the impossibility of statistically distinguish both series of events, using an A model index of 26% (Greco and Otero 2015). This proves that in the determination of occupation sequences the stratigraphic evidence still prevails over radiocarbon dates, at least till the discovery of radiocarbon techniques which could provide absolute temporal values with a smaller estimation range for short time events. However, the analysis of the seven dates corresponding to Residential Unit 1 occupation as a house-workshop using the same methodology, obtained from samples collected in different sectors of the occupation floor of the house, shows a continuity in the usage of the spaces since ca. 12th century A.D. until Inca times (Greco y Otero 2015) (Figure 2, 3, v. dates N° 1, 2, 3, 4, 8, 9, 10).

Stratigraphically, and with exception of a small area in the central patio, we recognized a single component corresponding to the occupation floor of the house which in some cases is very thick and constituted by compact clayey silt with small calcareous concretions. In some of the structures we also identified a superposed funerary component cutting through this floor. The identification of this single floor reveals continuity in the use of the spaces from pre-Inca times and during the entire Inca occupation. Nevertheless, is worth mentioning that material evidences associated to the occupation floor, both in the patios as in the enclosures of this house-workshop, are mostly related to the last occupation stage. Unlike garbage dumps, as in the case of the already mentioned Midden 2 (Tarragó and Albeck 1997), until now we haven't registered a superposition of strata belonging to each moment in the recently excavated houses, placed in other sectors of the Pucara (Otero 2013).

Apart from the continuity in the use of these structures, the presence of materials mostly attributed to the interval previous to abandonment, that is to say Inca times, is also possibly a response to the frequent cleaning of dwelling and artisanal work places. As it was presented in different papers, besides abundant faunal remains consumed by their inhabitants (Belotti et al. 2016) in all of the enclosures composing Residential Unit 1 we identified ceramic pieces used for the preparation, storage, and consumption of foods and also as burial goods. The analysis of this assemblage allowed us to detect a minimum number of 220 vessels, mostly attributed to Late local styles that remained present through Inca times (Otero and Cremonte 2014; Otero 2015).

3. Activity Areas

3.1. Enclosure 3.1

Regarding the use of spaces that make up Residential Unit 1, independently of the occupation moment, the life of their dwellers must have revolved around the central patio - Enclosure 3.1 (FIGURE 2)-; something to be expected if we consider the fact that most of the tasks developed here didn't required the protection of roofs since they were high oxygenation pyrometallurgical activities. At the south-central sector of this enclosure we detected a large circular combustion structure of 2.2 m long and 1.8 m wide, identified as *Locus 1* (FIGURE 4). This structure had red-orange sediments that are considered as evidence of high temperatures. Beside this *Locus*, at the upper layers we also detected a fragment of copper ore and a drop of the same material, which are probably waste of foundry in situ of this metal. At the lower levels we detected an 87 mm long copper chisel, a concretion of ferrous sediment and sherd of modeled clay belonging to a lost wax mold (FIGURE 4).

We also detected in the first layers at the courtyard sector different tools like hammers, anvils, crowbar, multifunction tools (hammer-anvil, pestles-polishers), a *taruca* (*Hippocamelus antinsensis*, Andean deer) horn with use wear -perhaps used like an awl or retoucher- and grinding tools like mortars and pestles impregnated with copper and red pigment which allowed us to infer its use both for culinary purposes and for the crushing of minerals, clays, antiplastics, and pigments. On the other hand, in this space we also recovered evidences which can be related to the development of areas linked to the first stages of pottery production. The most significant findings correspond to three uncooked clay blocks also near *Locus 1*, and another set of blocks of different colors (reddish, yellowish, and whitish) placed in parallel to the East wall of the patio where they were probably stored for a posterior use.

Besides from *Locus 1* we also discovered two other illustrative features of the development of metallurgic activities: *Locus 2* and *3* (FIGURE 4). *Locus 2* can be defined as a thick carbonaceous lens, 57 cm x 50 cm, located in the Southwest corner of this patio. Associated to this *Locus* we recovered a pestle and a clay mold 10.5 cm long, in which we detected part of the pouring orifice, 3 cm wide, and a lateral ventilation channel of 1 cm diameter. This mold could have been used in the lost wax technique pouring (Tarragó and González 1998: 192). *Locus 3* resulted even more remarkable since it consisted in an elevated structure formed by two 20 cm tall stones vertically placed and strongly attached to the floor by the use of mortar.

These stones, separated by 20 cm, were found placed over a hearth of about 75 cm diameter, presenting thermo altered sediments and reaching the wall separating this enclosure from R 3.2. Nevertheless, these highly thermo altered stones were about 40 cm apart from the wall. The way in which they were placed and their dimensions indicate that they could have been used as a base for supporting a melting pot. This is confirmed by the dross remains found in the proximities (FIGURE 5).

In the northern quadrant of this patio, the evidences linked to metallurgy and pottery production appeared with a lower density. We detected another drop of molten copper, a lithic smoothing artifact with hematite traces, a flat stone with traces of strikes, a grinding hand near a schist rectangular *conana* (mortar), a pestle with copper impregnations, a worked copper lamina, and a fractured obsidian projectile point. In the western sector we detected a tablet of ferrous ore with a rounded point, presenting numerous rub striations and a bone spatula. A sample of camelid bone from this sector was selected in order to date the occupation floor by AMS (FIGURE 2, 3, v. date N° 8). The calibrated result of this date is situated in the last interval before the Inca arrival and the beginning of their domination.

3.2. Enclosure 3.2

In the rooms adjacent to this big central patio we also recovered numerous evidences related to artisanal work. On the one hand, in Enclosure 3.2 of approximately 16m² we detected a sort of tool kit consisting of an oval hammer of 6.5 cm in diameter and a piece of rhyolite anvil of 8 cm long. In the center of the occupation floor we even detected a pentagonal stone placed as a work table -0.48 m x 0.43 m- and a heart with the presence of a dark carbonaceous stratum with dimensions of 1 m long by 80 cm in diameter and 10 cm thick (*Locus 4*) (FIGURE 4), thus with a different origin than *Locus 1, 3 and 5*. Over this work table we found a flat flagstone of 13.5 cm long which could be possibly used as a grinding bowl. The surface of this stone presented remains of hematite and a black stain of carbonaceous origin. It is probable that the heart and the associated table have been used for tempering the metallic objects since we detected a fractured circular mold of bivalve type in the proximities, manufactured in tuff (G. Gluzman personal communication 2015). The diameter of this piece is 20.5 cm and is 3.5 cm thick. These dimensions clearly link it to the production of metallic discs (FIGURE 6). It is worth mentioning that the discs of this kind that have been found in other enclosures of the Pucara and that currently are part of the collections (González 1992, Lam. 9, 148, 150), present similar measures to the ones indicated by this mold.

Other evidence that could indicate that, besides the tempering of metals, in this room the people was dedicated to different final stages of the manufacturing process was the finding of a highly corroded copper chisel whose bevel was not sharpened. In the floor of this room we also recovered another set of artifacts related to different productive tasks, among them a 11.5 cm long rectangular prismatic block that may have been used as a crowbar or hammerstone, a micaceous schist block with a sharpened edge perhaps used as an ax, a 13 cm long triangular prismatic artifact used as smoother/hammerstone –since it presents a smoothed face and the other one has striking marks-, and finally a 9.6 cm long block that, considering the visible striations, could have been used as a hammerstone. Along with these instruments we also found a 4 mm discoid shell bead and two base-notched projectile points, one of them manufactured in obsidian. These projectile points may have entered the site inside the meat of hunted animals since the consumption of domestic camelids was complemented with a variety of wild species (Belotti et al. 2016).

Finally, in this enclosure we identified another feature also related to productive tasks. Against the wall we detected a probable raw material's storage pit, with a circular contour and a size of 40 cm in diameter filled with different remains, like for example copper carbonate. Outside this pit (P1), at the floor level, we found a compact line of clay sediment (FIGURE 4). This sediment perhaps belongs to the clay stored in the pit. We collected samples from this sediment and from a limonite circular concretion, but also from pieces of red pigment. This pigment was analyzed along with samples recovered from Stratigraphic Levels 5 and 7. Considering the chemical composition, Cremonte (1993) established that this samples were different from the pigments used in the pottery decoration, which depending the case presented calcite and/or dolomite, elements absent in the engobes, and with high concentrations of hematite. In the precedent levels we also detected pieces of yellowish compact sediment, white clay, and light unconsolidated clay.

3.3. Enclosure 3.3

In Enclosure 3.3, with a size of 11 m², we found a second combustion structure with similar characteristics to *Locus 3* in the central patio, considering the height of the rocks, the distance between them, and the separation between the structure and the wall. Morphological and size similarities can be considered as evidence of a specialized metallurgic production mode. This oval structure, indicated in the map as *Locus 5*, was 1.10 m long and 0.65 m wide (FIGURE 4). Near this structure we found a flat grinding stone made using a 21 cm diameter metamorphic rock. As well as in other sector of this Unit we found obsidian flakes, quartz pieces and an opal variety.

In a previous stratigraphic level of the floor we found an alabaster scrap and fragments of modeled clay that could have been part of a mold used in the lost wax technique. The presence of this combustion structure in the interior of this small enclosure together with the pieces of the mold indicate that this metallurgic practices didn't require big spaces for being performed. On the other hand, so far we haven't detected the use of *huayras* (native stoves) in the Pucara. This is why we can presume that the minerals entered the site already processed after a first melting stage, perhaps performed in highly ventilated and cleared places in the surroundings of the Pucara. This enclosure, as well as the central patio, perhaps didn't have a roof or only presented a ceiling composed by a few branches in order to use the strong southern winds hitting the Pucara. The hearts could have been lighted during the afternoons, the moment in which the winds are stronger. This could have enabled the fast rising of the temperatures.

Besides this big structure, in Enclosure 3.3 we also registered two smaller hearts. The remains associated include faunal bones, a polisher with traces of pigments, clay, and two spatulas manufactured on camelid ribs, probably used for the regularization of the edges and the smoothed of ceramic pieces considering the traces of clay found on them. The x-ray diffractometry analysis performed over clay blocks by Cremonte (1993) were useful for determining that their characteristics were highly similar to the pastes of some Humahuaca N/R and Poma N/R ceramic pieces (Larcher et al. 2016). Regarding the pigments found in this room, as well as in the previously described, this kind of analysis allowed us to determine a high dolomite and calcite content, reason enough to propose that they were not used for the ceramic's engobe and decoration. An alternative use for them is the probable covering of metallic pieces (González L.R., 2004).

From the floor of Enclosure 3.3 we were able to obtain a radiocarbonic date (FIGURE 2, 3, v. date N° 10) that, considering its position in relation to the whole set of dates, could be indicating the first occupational moments of this space. The same can be stated for the results obtained from a heart detected in Enclosure 2.1 (FIGURE 2, 3, v. date N° 9). With the objective of finalizing the investigations started in the late 1980's of the two spaces comprising Enclosure 2, in the year 2009 we completed the excavations. Both spaces were dated, with results that allowed us to estimate that, as in the case of the big central patio, they were occupied during a long time (FIGURE 2, 3, v. dates N° 1, N° 2 and N° 3).

3.4. Enclosure 2

Taking the spatial structuration analysis as a starting point, Enclosure 2.1 was defined as a roofed space while Enclosure 2.2 may have functioned as an open patio (Tarragó 1992). During the excavations we registered two post holes in E2.1 (FIGURE 4). One of them had a diameter of 25 cm and was cutting through the floor until reaching sterile sediment. The other one, smaller, could not have worked as a roof pillar and maybe was used for an undetermined function like the hanging of clothes or artifacts. The roof was likely a shed roof supported by more than one post, placed over the central line of this room.

The features and findings detected in Enclosure 2.1 mainly indicate that, among other practices, in here the people were dedicated to the modeling and decoration of ceramic pieces. On the floor of the room we could distinguish a big "L" shaped heart, reaching 2 meters on each of its sides (FIGURE 4, see *Locus* 6). Its forms possibly responded to the fact that in the center of this grid, near the angle of this heart we identified one of the previously mentioned post holes (*Locus* 7) (FIGURE 4). Around the edges of the heart we recovered several clay blocks partially rounding the cavity. Some of these blocks were resting over the stones that may have been used to shim the post.

Besides the clay blocks, among the evidences related to the pottery production we can also mention ochre remains, hematite chunks, and tools as a spatula manufactured on a camelid rib presenting a red powder adherence, a hammer-smoother with ochre impregnations, three ovoid stones probably used as smoothers or polishers with surface adherences, a quartzite core used as a polisher in one of the sides and presenting traces of hematite grinding in the opposite side, three pestles one of them really large (20 cm in diameter), a 9 cm tall lithic hammer with red powder impregnations, and a multifunctional artifact with traces of iron oxide and dark impregnations (FIGURE 7).

Furthermore, over this floor we identified a great amount of obsidian flakes, an alabaster piece, a grinding hand-hammerstone with metal impregnations, and three quadrangular hammers of no more than 10 cm long, possibly related to the practice metal hammering, as laminating, retouch, hardening, and cutting edge's conformation and reactivation (FIGURE 7). The wide variety of adherences and wear traces detected on the lithic instruments evidence their indistinct use in task related both to metallurgy and pottery.

Regarding the presence of the alabaster piece, it is worth mentioning that we haven't detected any marks indicating that it was intervened by human labor. It corresponds to a 6 cm x 7 cm rock fragment from the quarry. This is the reason why, for the moment, it isn't considered as evidence of this type of rock artisanal manufacture in situ, since we haven't identified flakes or any other kind of scraps or elements that account for the development of this activity in the house-workshop.

Also related to metallurgy, in Enclosure 2.2 we found a grinding hand with copper ore impregnations, chunks of copper ore, and a kidney-shaped metallic fragment mainly composed of copper and identified as foundry residue, a piece of native copper, and a fractured silver tweezer. For the case of the last one, Tarragó and González (1998: 191) proposed that it could have been stored in order to be re-used as raw material after subsequent melting.

Likewise, taking the excavation work as a starting point we were able to determine that this patio functioned as an area destined to clay preparation before being used in the elaboration of ceramic pieces. On the Southwestern corner we recovered traces of pigments, clays, pieces of hammers, mortars and pestles, one of them with traces of white powder. The results from the diffractometry analysis over this clay samples were correlated to the paste of some ceramic fragments recovered in the transect delineated at the top of the Pucara (Cremonte 1992; Larcher et al. 2016), thus clearly reflect that it was destined to pottery elaboration. Furthermore, we recovered siliceous polishers, possibly used for burnishing the walls of the ceramic or metallic pieces, a grinding hand-hammerstone with traces of red pigment, and another two pestles, one of them with copper impregnations, a hammer, and red pigment (FIGURE 7). On the other hand, we also recovered obsidian flakes and shell fragments, maybe nacre. The latter may have been used for the manufacture of ornaments.

3.5. Enclosures 1 and 4

The remaining rooms, Enclosures 1 and 4, did not presented any feature that could evidence practices of foundry or metal's modeling (FIGURE 4). In Enclosure 1 we registered two low powered combustion structures, one of them located at the side of an entrance hall. This 18 m² enclosure probably functioned as a resting place. It likely presented a shed roof given the fact that we detected a post hole of about 30 cm in diameter surrounded by stones. Among the elements recovered in this room, above the floor surface, we can mention one of the fragments from the disc mold found in Enclosure 3.2, two grinding hands, one of the bowl type and around 5 cm in diameter, a pestle, a 7 cm long copper chisel, ochre remains, and a flat sandstone whorl with a size of roughly 4.5 cm in diameter. The presence of these instruments and the mold fragment are likely related to the material's discard during the extraction of E3.2 floor, when it was being prepared for the incorporation of a burial identified as Grave 4.

On the occupation floor of the N4 grid, corresponding to the partial excavation of Enclosure 4 we detected, besides fragmented ceramic pieces, a 12 cm tall grinding hand, a fractured quartz rolling stone, a few pieces of hematite, a flat denticulate flake, more flakes, and a medium sized obsidian piece. Above this floor, which was dated through AMS (FIGURE 2, 3, date N° 4) we registered a discard mound, mainly composed by fractured vessels (FIGURE 4).

In the proximities of the northwest oblique wall located in the big central patio, Enclosure 3.1, and in the southern wall from Enclosure 1 we also detected events related to garbage discard. Considering its stratigraphic position, the discard could respond to the fall of remains along collapses on the contention wall of the higher terrace, since we found it above the patio's occupation floor, contributing to the dispersion in the superior segment of Grave 1, as we will further describe (FIGURE 4).

These events demonstrate that, perhaps during different intervals, some sectors of the different enclosures were no longer occupied as dwelling or working areas and started to be used as burial areas or, in other cases, as residues deposits. Regarding the connection between enclosures, from the excavation we were only able to identify the gateway to Enclosure 1, the opening communicating Enclosures 2.1 and 2.2, and the ones articulating Enclosures 3.1, 3.2 and 3.3 (FIGURE 4).

Nevertheless, despite the fact that we cleared the external walls both from the central patio (E3.1) and from Enclosure 2, we couldn't detect a connection hall between them nor the entrance door to the Residential Unit. Neither have we identified building remodeling that could explain the expansion or structural modification of the walls in the different enclosures. Even the burial of individuals in mortuary chambers built with stones and mortar did not involve large architectural changes, since tombs were attached to the walls, breaking through occupational floor in order to prepare the foundations.

4. Mortuary Structures

Between late 15th and early 16th centuries A.D this house-workshop was first temporary abandoned and ceased to function as a productive and dwelling space, and then re-used as a locus for direct inhumations and primary-burial's secondary relocation place through structural modifications and sedimentary re-conditionings. Until now, among the five identified burial areas, Grave 1 (G1) (FIGURE 2) can be described as the one presenting clearer examples of these practices. This burial was raised above the occupational floor of the central patio. After the first event, related to an infant's direct burial, whose remains were found articulated and presented offerings as a wooden goblet with red pigment, two necklace beads, cucurbit fragments, and painted woods, this structure was later used as an ossuary. The dimensions of this chamber, 1.6 m wide x 1 m long, are possibly indicators that it was initially built with the purpose of placing several individuals.

After the infant's burial event, separated by an ash layer and some objects, as a siliceous polisher prepared for being used as a pendant, ceramic pieces, copper pigments and minerals, we detected a secondary inhumation phase in which 11 adults and 10 immature individuals were identified (Adaro 2002). This phase included several burial events that were difficult to distinguish due to the form in which they were deposited. That is the main reason behind the decision of recovering the abundant human bones, which were placed massively and intermingled, through successive and ordered extractions. Among this remains we also found pieces of objects and materials related to mortuary offering included during the first secondary inhumations such as camelid bones, pieces of wood, some with the shape of shafts and with traces of red pigments, a spatula or wooden loom rod fragment, pieces of a lost wax mold, more than 50 cucurbit fragments which could have been used as *mates* (bowls) containing liquids, pigment's chunks, a bone *tarabita* (buckle) possibly used for the tying of a mortuary package, and fragments corresponding to five ceramic pieces. All of these elements were found covered in successive ash and charcoal layers, which were used for the people conducting the inhumation ceremonies as ritual marks for the separation of each event.

With the purpose of dating some of these burials, two charcoal samples were analyzed by AMS, corresponding to extractions 5 and 7 respectively (FIGURE 2, 3, v. dates N° 6 and 7). The obtained results present similar values. Also, they are relatively contemporaneous to the dates obtained from the occupational floors of the different enclosures of the Residential Unit (FIGURE 2). Nevertheless, the inhumations dates are posterior to the one obtained from the northern grid floor of the central patio (FIGURE 3, date N° 8), the sector in which this chamber was raised. This chronological correlation matches the observations made by one of the authors a few decades ago (Tarragó 1992) trying to describe the sequence of the activity areas in Enclosure 3.1 following a stratigraphic matrix. This allowed her to identify that, for the construction of this chamber the foundations were placed over a previous occupational floor. In this sense we must highlight the fact that the observations made during excavations are clearer than the radiocarbon results. This is to say that, although the dates obtained from several extractions are grouped in the same temporal range than floor's occupations, the superposition between them is definitely clear.

The last placing event of human remains in the ossuary is coincident with the collapse of the chamber's lid and superior wall. The dispersion of these remains and the accompanying materials reached more than 3 meters, even covering part of the southern grids from Enclosure 3.1. Among the materials belonging to this event found as part of the patio filling we can mention seven copper ore beads, a *Pecten Purpuratus Lam.* shell fragment, abundant cucurbit *mate's* fragments, some painted in red and black, wood, and ceramic fragments corresponding to pieces presenting wear traces which evidence a use prior to their inclusion as mortuary offering.

In Grave 2 and 3 we also detected the re-use of ceramic pieces, one of them corresponding to Angosto Chico Incised style and the other to the Ordinary type (FIGURE 8). These burials correspond to two infants placed in vessels along the eastern wall of Enclosure 3.1, aligned with the ossuary.

For the placing of these vessels the occupational floor was cut off and their lids remained exposed approximately 20 cm above it (FIGURE 4). Considering the fact that they were placed along the E3.1 eastern wall and linearly to Grave 1, we could stratigraphically determine that the burial of these children, one of them between 2.5 and 3 years old and the other a neonate (Mendonça y Bordach 1988; Adaro 2002), was contemporary to the first use moments of the chamber from Grave 1.

Grave 4, detected in the NW corner of the room 2 in Enclosure 3, also correspond to the direct inhumation of an infant placed on the floor (FIGURE 4). In this case, several bones were missing, perhaps as a consequence of a removal posterior to the primary deposition or the perturbation of the context after the collapse of the contention wall from the superior terrace. Part of these remains and fragments from three ceramic pieces attributed to local styles and included as funerary goods were found covered by a layer of consolidated mud and surrounded by ashes.

The fifth and last burial, Grave 5 (G5), was detected at the NW grid of Enclosure 2.2 (FIGURE 2). It corresponds to a primary burial of an adult woman that, next to the head, had red pigment's chunks and a base-notched projectile point under the pelvis. Perhaps this projectile point was related to the cause of death of the woman if she was involved in a bellicose reaction event against the Inca or the Spaniards. Her body was placed in genuflector position inside a 1 x 1 m stone chamber that was found partially collapsed. As in the case of Grave 1, in order to lift this mortuary structure the occupation floor was cleared. Likewise, the correlation between the dates obtained for this floor (FIGURE 2, 3, v. dates N° 1 and 2) and the AMS dating on the bones of this woman (FIGURE 2, 3, date N° 5) allowed us to ascertain, as in the dates obtained from Grave 1, a seeming contemporaneity in this space's use events during Inca times. Nevertheless, like we said before, stratigraphic superposition evidences the sequence of these events. We must consider that we are studying a series of complex events closely related in time and thus indistinguishable by radiocarbon method. Considering the calibration ranges of the dates the occupations could even have reached the beginnings of the European conquest.

The elements added to these burials, enumerated before, can also shed light on the complexity of these events. The selection of everyday use objects as mortuary goods, particularly materials linked to the productive tasks developed in the house-workshop, demonstrate the possible filiations between the individuals performing the burials and the dead, and the connection with this productive space through time. Furthermore, the finding of Hispanic-indigenous ceramic, possibly deposited as an offering in Grave 1, could be reflecting that the ritual practices devoted to honoring the ancestors continued in much later times to the burial itself, or that perhaps some of the individuals were incorporated during the first moments of the European conquest, in a post-contact "inter-ethnic" friction situation (FIGURE 9).

5. Residential Unit 1 in the intra-site organization

This house's biography allowed us to estimate three main stages in its trajectory regarding its construction and development during pre-Inca times, its reconfiguration as a house-workshop during Inca conquest, and its subsequent abandonment by mid and late 16th century A.D. If we consider these different stages, its constitution as a house-workshop allowed us to advance not only in the characterization of the minimal spatial unit of human societies –the *house*–, but also in the study of another analytical unit of socio-economic base: the *workshop*.

On the one hand, Residential Unit 1 considered as a *house*, must have been constituted as a reproduction space in which through its ordering over time, its occupants possibly incorporated different principles and schemes generators of the society (Bourdieu 2007). As a discrete spatial unit it must not have been a mere container of the social group's activities, but probably suffer multiple transformations based in the interactions between their occupants and the interactions between them and the other members of the community.

At a domestic structuration level, one of the most drastic changes took place with the socio-economic reorganization of the local population in response to the interests of the Inca State. While productive activities of the *multi-artisanal* type (sensu Shimada 2007) were developed in Residential Unit 1, the metallurgical specialization must have generated large modifications. The characteristics, abundance, and diversity of the findings located in the occupational floors corresponding to Inca time evidence that metallurgic production was destined to the extra-domestic consume of different objects, including sumptuary pieces. As an example, in order to produce a metal disc using the bivalve circular mold previously described (Figure 6), at least two kilos of mineral were used (Tarragó and González 1998: 192) which implied an external supply and control in the use of metals.

On the other hand, the identical morphology and the size of the combustion structures are indicators of a specialized metallurgical production. Besides the quantity of instruments, raw materials and *Locus* detected in the different enclosures shows planning and intensity in demand for luxury goods.

Based on these evidences, and in the frame of the state strategies in order to promote metallurgical specialization, we can assert that Residential Unit 1 was transformed in one of the many productive spaces in the Pucara that were used for the installation of workshops destined to take advantage of the artisanal abilities of some members of the domestic units existing before Inca arrival. This situation implied the incorporation of local artisans into a production politic implemented for a large productive and administrative center like this site. It is possible that the State positively valued the local knowledge regarding the advanced management of tinned bronze, perpetuating an ancestral foundry and molding tradition, as it has been generically proposed for the societies that developed the metallurgy in the Argentinean Northwest (González L.R. 2004; Angiorama 2005; González and Tarragó 2005; Lechtman 2007). Although some stylistic modifications could have been imposed, the local notions regarding mineral's characteristics, its foundry and molding, and even the mechanisms employed for the obtaining of raw materials were used.

In other Pucara's structures we also identified several evidences regarding metallurgical specialization during Inca time, as well as a lapidary industry. Based on the revision of 659 elements conserved in the collections of both of the museums from the Facultad de Filosofía y Letras of the Universidad Nacional de Buenos Aires, and from papers and unpublished manuscripts made by the first archaeologists working on this site during the first decades of the XX century -Ambrosetti (1908) and Debenedetti (1930) - we were able to advance on the definition of other buildings as house-workshops (Otero 2013; Zaburlin and Otero 2014). In order to achieve this, the correlation and determination of the materials provenance, the association or coexistence degree, and the characteristics of the findings context were essential.

On the one hand, 53 workshops destined to the production of sumptuary and symbolic objects were identified. Among these objects we can mention vases, discs, *tumis* and *tupus* manufactured in gold, silver, bronze, and copper. On the other hand, pendants, plaques, vessels, and carvings probably used as *illas* were manufactured using different varieties of shells and stones, like for example onyx, limestone, silex, and alabaster (Krapovickas 1958-59; Otero 2013, 2015). These raw materials were also used for the manufacture of stone whorls, knives, chisels, and metal awls.

It is worth mentioning that in some of these house-workshops, both metal and stone objects were produced together. Furthermore, we proved that as in the case of Residential Unit 1 in addition to specialized activities people were also performing everyday activities like the cooking and consuming of foods, and also to pottery and textiles production. Until now, the evidences regarding the whole set of house-workshops, including Unit 1, do not allow us to estimate if this productions –pottery and textile- were developed in a specialized way.

Apparently, the Quebrada de Humahuaca pottery, unlike other provincial styles like Inca Pacajes or Inca Paya, was not a valued asset for its distribution in other provinces of the Empire, considering the lack of positive evidences outside the Quebrada environment. Its production was likely devoted to cover a domestic demand inside the Pucara. On the contrary, the goods manufactured on shells or stones were probably transported outside the site after their manufacture. Based on the revision of collections and Ambrosetti and Debenedetti's journals we could determine that 32 of the 53 identified workshops showed evidences of stone work. These workshops feature an important amount of unfinished objects and not the final products. Here we are referring to more than a hundred same dimensioned preforms of limestone whorls and incomplete pieces of alabaster plaques and pendants, similar to the ones found by Bingham in Machu Picchu (Rowe 1946: 316, fig. 79a).

The scarcity of complete pieces could be indicating that these goods were transported for being used outside the Pucara. Among the abundant materials belonging to the collection of this site, only three *illas*, an alabaster pendant, and two limestone whorls have been found as complete pieces. This could be indicating an extra-local consume or, as it has already been mentioned by Krapovickas (1982-83) considering that their use in the Quebrada has not been documented, even an extra-local consume.

These pieces could have been sent as tributes or gifts to Cuzco or other provinces, which could have implied a strict control on their production. If we consider the detected evidences and the number of workshops, this production could have been developed at a great scale and in standardized way. Regarding metallurgical production, many of these metal pieces were probably manufactured in these workshops and used in the Pucara. However, this does not mean that the elements were insufficient for covering an extra-local demand given the amount of evidences related to their manufacture such as hammers, polishers, molds, plug spoons, melting pots, mineral's chunks and dross (FIGURE 10).

Workshops' distribution also reflects an important planning behind Pucara's productive tasks. Until now we have noted that the workshops destined to the lapidary industry, which in some cases also presented evidences of metallurgical production, were located in the higher sectors of the site. The spaces exclusively destined to metallurgical production apparently were located in the lower slopes, orientated towards South considering the prevailing winds system. This would have been the case of Residential Unit 1.

The concentration of lapidary workshops in the higher levels of the Pucara could respond to the centralized installation of artisans coming from other regions, as the case of *mitmaqunas* (colonist moved by the Inca to fulfill works). Lack of evidences confirming the making and consuming of sumptuary objects manufactured in alabaster and siliceous stones during pre-Inca times allowed us to estimate that it corresponded to the imposition and development of a new technology organized under State parameters. As we mentioned before, despite the advance of archaeological investigations in the Andes, alabaster pieces have only been identified in Peruvian Inca sites (Valcárcel 1934, 1935; Rowe 1946). This is the main reason why we think that the artisans devoted to lapidary industry could have received a preferential treatment over the rest of the people.

Inside these workshops we recovered pieces attributed to regional Inca styles –Inca Yavi, Chicha, Inca Pacajes, Inca Paya- and other pieces of fine quality such as Yavi-Chicha artifacts, Red Burnished Pucos, Pink Polished Pucos, among others (Otero 2015). We even detected other objects as *keras* (wooden glasses), *tumis*, and metal discs. The presence of these objects, perhaps rewarded for the work done by these artisans, could indicate that working in the lapidary industry, along with metallurgists, was one of the most beneficial types of *mit'a* for the State in this area. This tasks were likely acknowledged by local chiefs too since the handling of the productions could have been helpful for the maintenance of alliances, redistribution and, mainly, reciprocity over time. Other feature highlighting these artisans' privileges is the presence, inside the workshops, of vessels used for the conservation and serving of *chicha* (alcoholic beverage from maize), such as jugs, *aribalos*, and jars, as well as *pucos* destined for its consumption. These pieces could be evidence of the Inca tradition of providing food and beverages to the *corvée* workers of the State (Bray 2004). Ceramic assemblage from Residential Unit 1 is different from the ones detected in the workshops located at the top and higher terraces of the Pucara. Although we identified vessels that could have been used for the elaboration of *chicha* such as *virques* and pots, we have not identified fine quality pieces or Inca ceramics styles with a non-local origin (Cremonte et al. 2009; Otero and Cremonte 2014).

This could indicate that Residential Unit 1, as well as the other productive units from these sectors, corresponded to a lower status. Furthermore, considering the structures segregation based on the path network running through the Pucara we distinguished 30 sectors or building sets. Nevertheless, we still can't estimate if this responds to some criterion used for the distribution of the population devoted to productive tasks given that the evidences for metallurgical production are found widely scattered in the site. At the same time, in several of these sectors we have found isolated buildings presenting special architectonic characteristics (niches, flagstone floors or built using quarried rocks) that does not present evidences related to any productive work, but do include pieces from Cuzco and elements resembling imperial styles.

This types of ceramics, presenting similarities with the ones found in other *Tawantisuyu's* nuclear areas as power and hierarchy emblems (Morris 1995), could be reflecting a status demarcation by the minority in charge of the Pucara's complex socio-economic organization as well of the region as capital of *wamani* (Inca province).

6. Conclusions

In this paper we presented the results obtained from the excavation and micro-structural analysis of a house-workshop located in the Pucara de Tilcara, which were then compared to other spaces excavated during the first years of the 20th century whose functions were also related to dwelling and artisanal work spaces for the production of goods destined to an extra-domestic consume.

On the one hand, Residential Unit 1 biography, reconstructed by means of a stratigraphic analysis, the recomposition of the findings context, and the statistical analysis of 10 radiocarbon dates, allowed us to identify at least three stages on its trajectory, defining this Unit as a dynamic entity. The first stage was defined by considering its constitution as a space inhabited by a pre-Inca domestic unit. Second stage corresponded to its reconfiguration as a house-workshop and the subsequent transformation of the domestic unit into a productive unit under Inca domination. Third and last stage was determined by the re-use of the dwelling and artisanal work contexts as a funerary space during the last interval of Inca domination and the beginnings of Hispanic-indigenous time.

Although as in most of the archaeological cases we could not establish the composition and characteristics of the set of social actors who inhabited Residential Unit 1, both the way in which the people modeled it through time and the inclusion of mortuary offerings in much later times could be the reflection of a group presenting a high filiations degree. This could explain the reasons behind the fact that commemorative rituals for the dead kept being practiced and as a part of the collective memory even several decades after the initial inhumation. In turn, this proves that neither Inca nor Spaniard domination could dissolve the bonds generated at a domestic level. In this regard, the case of this Unit adds to other examples in which other investigators have proven that *houses* are the minimum and basic unit of a society that, regardless external factors, consolidate and delineate the life of their members (Stanish 1992; Nielsen 2001; Taboada and Angiorama 2003; Tarragó 2007).

On the other hand, the integration of the results obtained through the detailed analysis of this Unit with the ones obtained through the revision of the collections and the archive material corresponding to the first excavations of the Pucara allowed us to estimate that the socio-economic organization of the Pucara was based on the establishment of workshops destined to the production of sumptuary and symbolic goods during Inca times. Beyond the functions and the possible almost exclusive dedication of their artisans, in each one of these house-workshops the domestic and ritual practices of the family life must have articulated with the productive tasks.

Besides the reorganization of the domestic life in pursuit of State interests, another factor that could have promoted changes in the local settlers is the cohabitation with groups coming from other regions in order to complete the necessary force task. For the development of the metallurgy it was necessary to easily obtain skilled workforce, taking advantage of local knowledge. Nevertheless, it is yet to be determined who were the artisans in charge of introducing the techniques linked to the lapidary industry, considering that its development occurred at the same time that metallurgical activities in the frame of a multi-artisanal type specialized production. The maintenance of the local productive bases in order to appropriate the artisanal work capacity of several domestic units demonstrate the versatility of economic politics and the State capacity to adequate and quickly obtain results from local populations. In this regard, the Pucara de Tilcara allows us to advance in the definition of the characteristics of the type of Inca control exercised in a peripheral province of the Empire, since it is constituted as one of the few southern Andes examples concretely manifesting the organization of local populations within a State productive politics. This site was probably of profound strategic interest for the State given its location in the central sector of the Quebrada de Humahuaca, naturally constituted as a corridor between Puna and Yungas, the management of economic resources, and the circulation of different kind of productions through the *Qhapaq Nan* (Inca vial system).

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Figure Caption List:

- Figure 1. Pucara de Tilcara's map (From Zaburlin 2006). Planimetry of North and Southwest slopes made by Lanzelotti et al. (2012).
- Figure 2. Layout of Residential Unit 1 (taken of Tarragó -1992- and modified by Arq. Trillo) and Midden 2, with dates location.
- Figure 3. Radiocarbon dates from Residential Unit 1. Calibration curve ShCal04 (McCormac et al. 2004); Software OxCal v4.1.6 (Bronk Ramsey 2009). Calibration analyses made by Dr. Greco.
- Figure 4. Areas of activities registered at the Residential Unit 1.
- Figure 5. Locus 3, elevated structure used during metal melting.
- Figure 6. Front and back of the circular bivalve mold. It can be noted, in the left image and highlighted with the circle, the emptying channel. Photography of G. Gluzman and M. Lamamí (2011).
- Figure 7. Top. Left: Hammer with hematite impregnations. Center: pestle with copper adherences. Right: quadrangular lithic hammer. Down: Left: grinding hand-hammerstone with hematite impregnations. Center: siliceous polishers. Right: clay chunks.
- Figure 8. Angosto Chico Incised style pot used at the burial of an infant. Picture of the children deposited inside the vessel.
- Figure 9 Top: Pitcher Humahuaca N/R style. Found next to the external foundations of the Grave 1. Inside this vessel we recovered three silica polishers, maybe deposited as an offering to the death. Down, left and center: small pitcher placed over the lid of the Grave 1. The decorative attributes of this piece are similar to one *puco* (bowl) found at other residential unit of the Pucara de Tilcara, that currently is exhibit in the "Dr. E. Casanova" Archaeological Museum (FFyL-UBA)- number MT 2254-MEJBA 4153- also describe for the initial Hispanic-indigenous moment.
- Figure 7. Bivalve mold used for the elaboration of a *tumi* (ritual knife) and four *tupus* (clothes pins) pouring metal only once. Piece number MEJBA 6018, Collection of the "JB Ambrosetti" Ethnographic Museum, (FFyL-UBA).

Figure: 1



Figure: 2

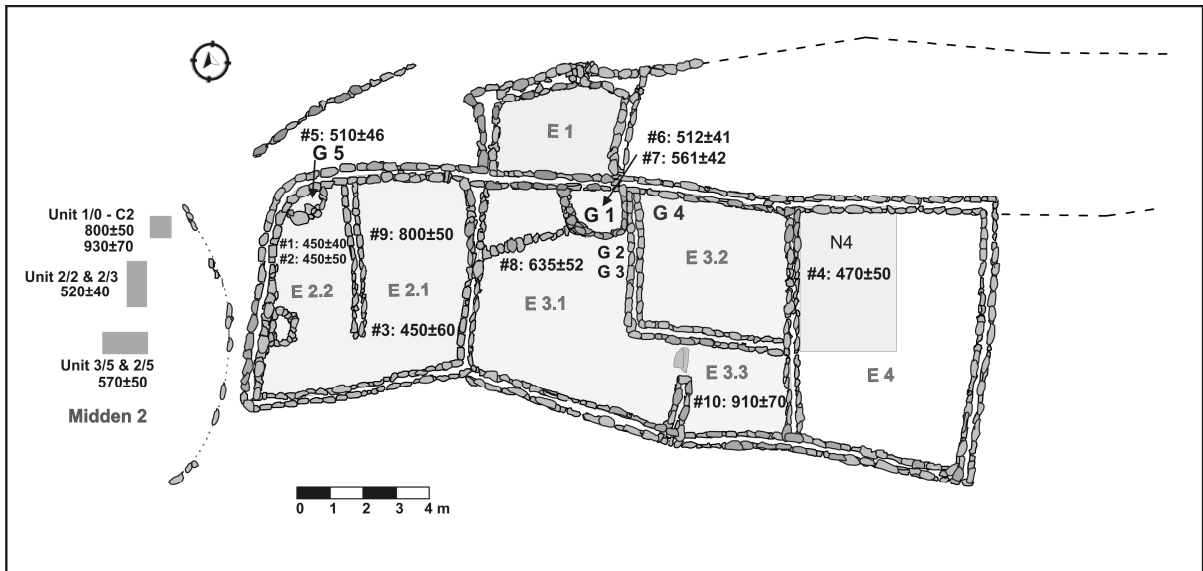


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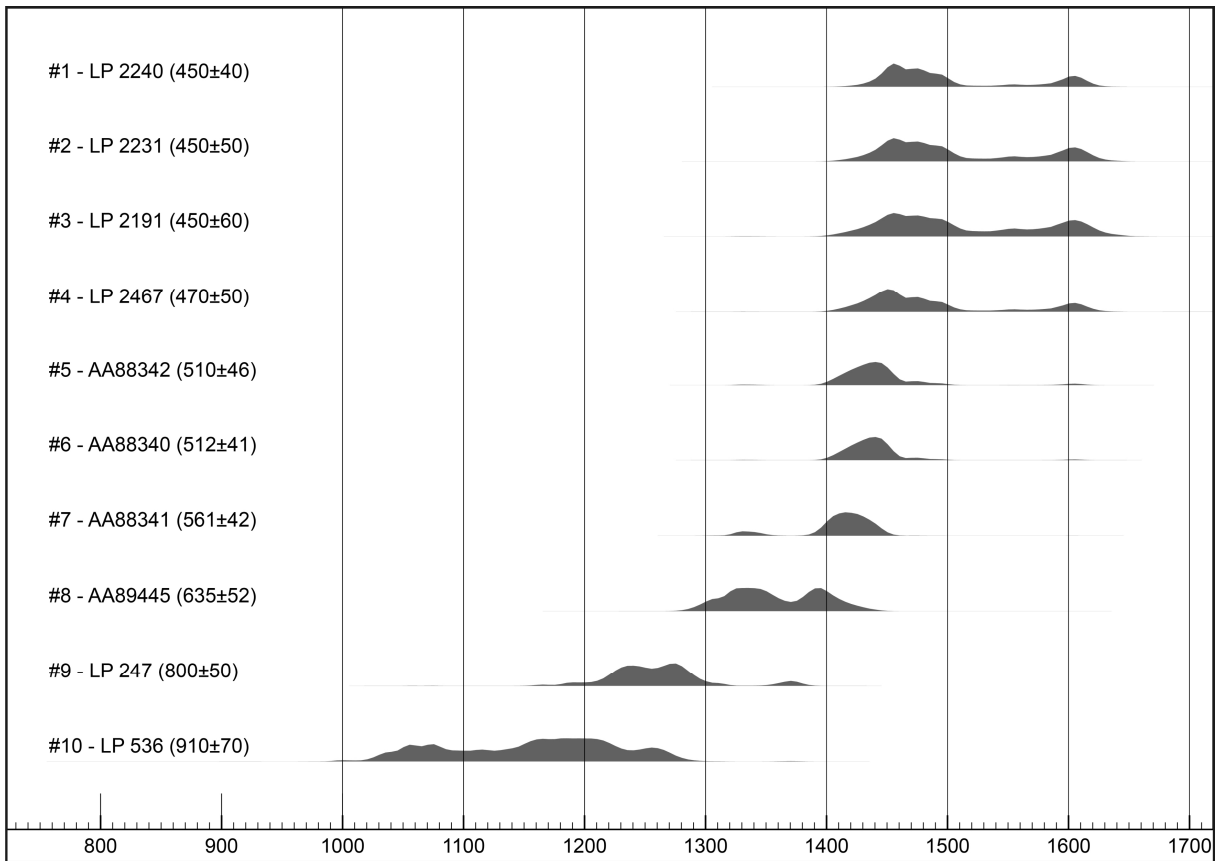


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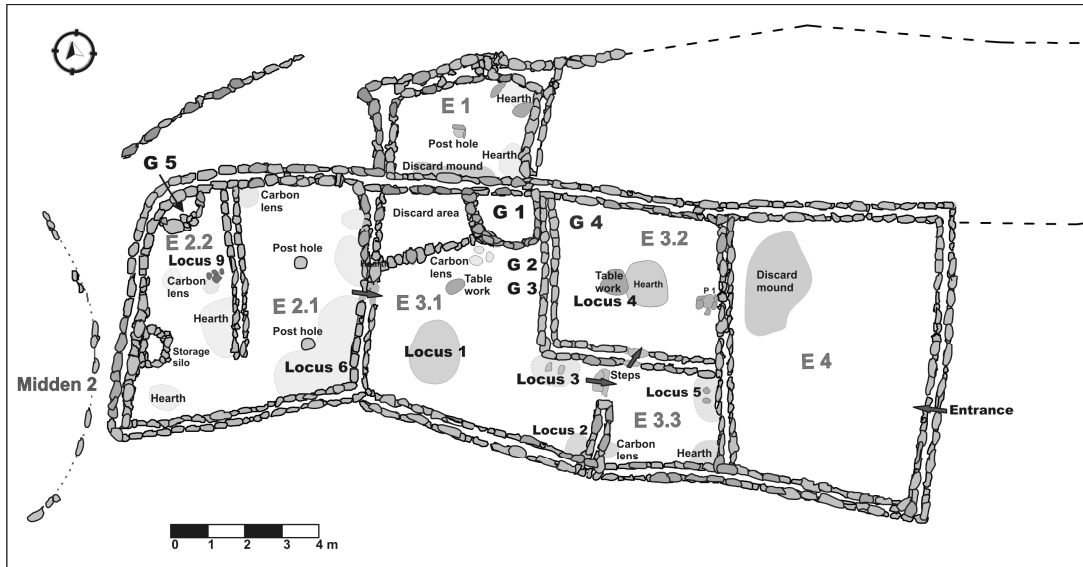


Figure: 5



Figure: 6

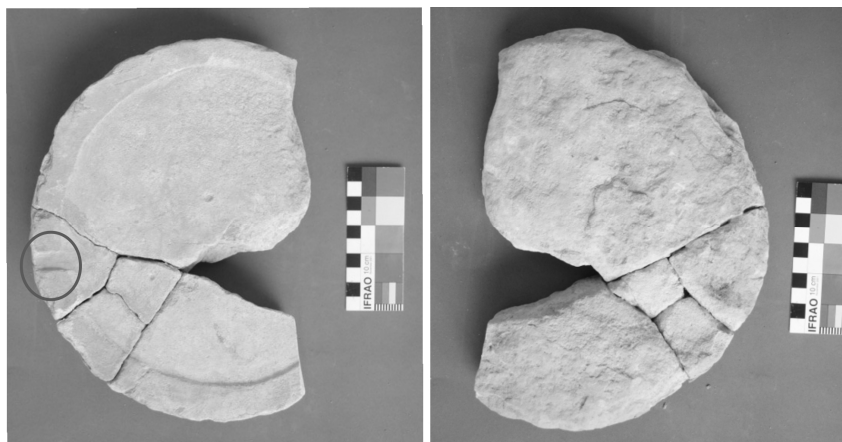


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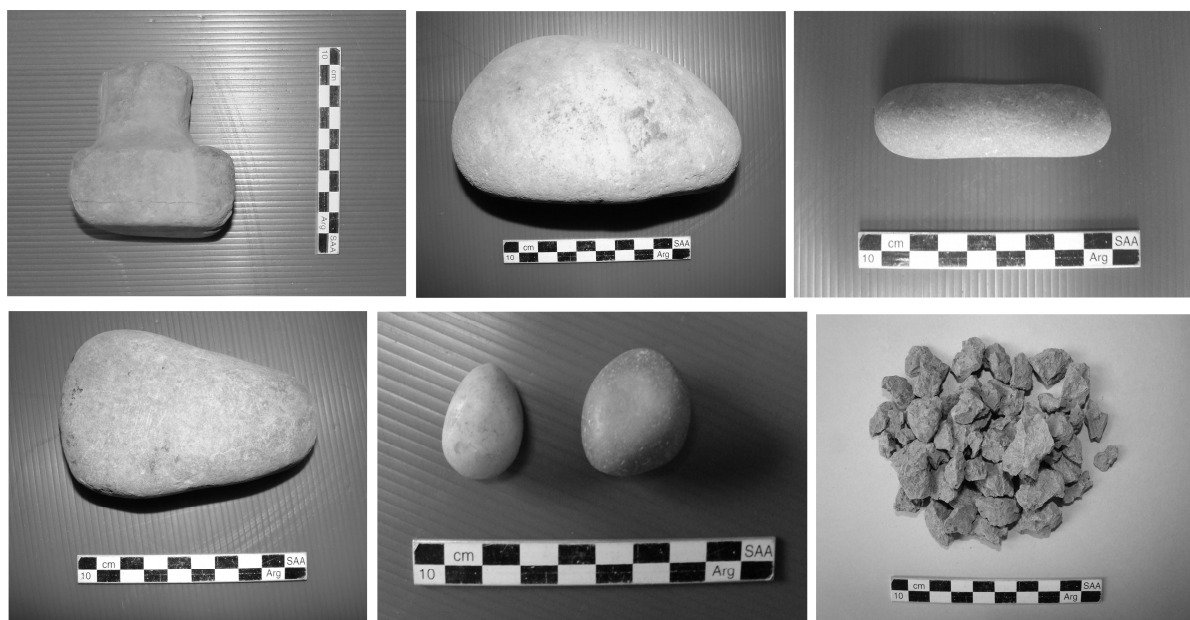


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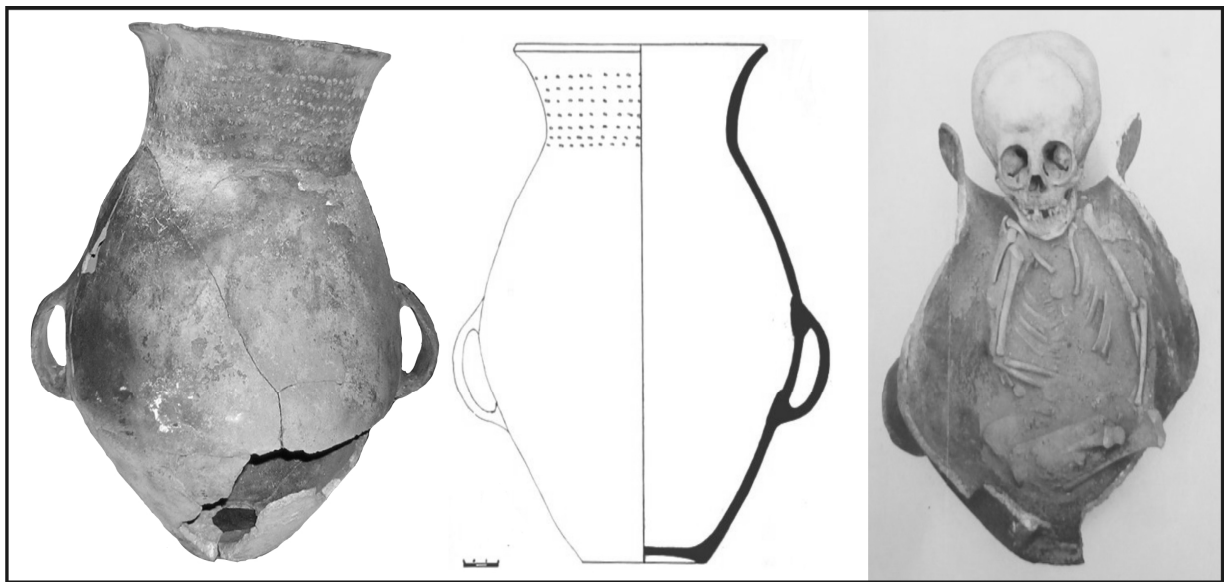


Figure: 9

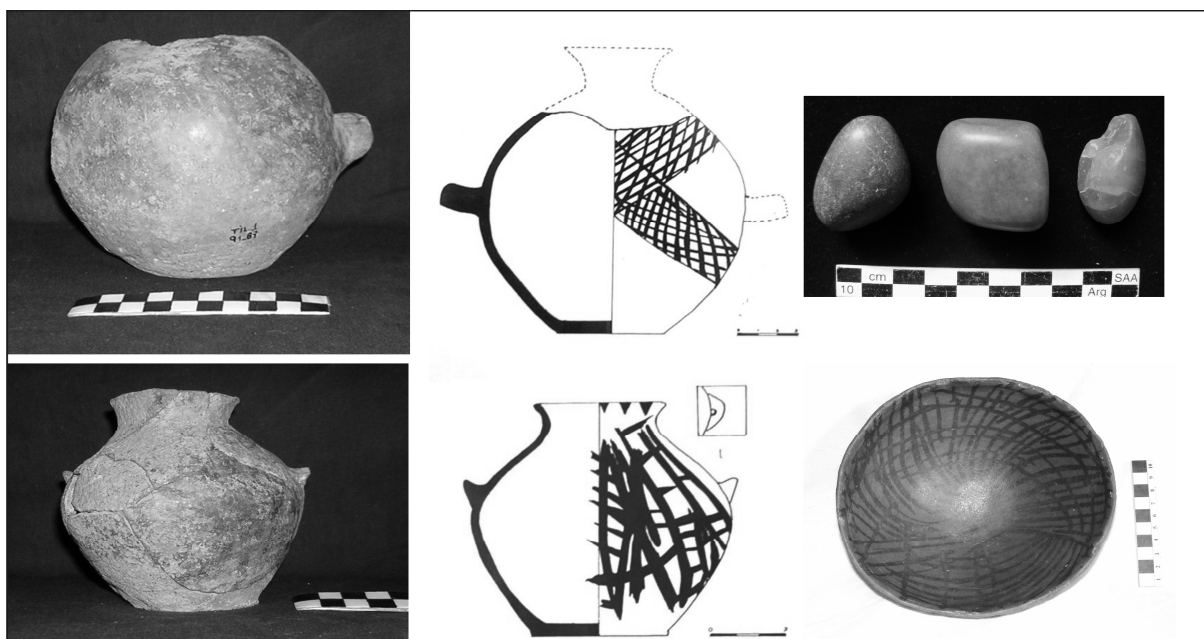


Figure: 10

