

## **Burning down the Brewery: Establishing and Evacuating an Ancient Imperial Colony at Cerro Baúl, Peru**

By Michael E Moseley, Donna J. Nash, Patrick Ryan Williams, and Susan D. deFrance.

Moseley, Michael E., [Donna J. Nash](#), Patrick Ryan Williams, and Susan D. deFrance. 2005. "Burning down the Brewery: Establishing and Evacuating an Ancient Imperial Colony at Cerro Baúl, Peru". *Proceedings of the National Academy of Sciences of the United States of America*. 102 (48): 17264-17271.

**Made available courtesy of the National Academy of Sciences:**

<http://www.pnas.org/content/102/48/17264.full>

**\*\*\*Reprinted with permission. No further reproduction is authorized without written permission from the National Academy of Sciences. This version of the document is not the version of record. Figures and/or pictures may be missing from this format of the document. \*\*\***

### **Abstract:**

Before the Inca reigned, two empires held sway over the central Andes from anno Domini 600 to 1000: the Wari empire to the north ruled much of Peru, and Tiwanaku to the south reigned in Bolivia. Face-to-face contact came when both colonized the Moquegua Valley sierra in southern Peru. The state-sponsored Wari incursion, described here, entailed large-scale agrarian reclamation to sustain the occupation of two hills and the adjacent high mesa of Cerro Baúl. Monumental buildings were erected atop the mesa to serve an embassy-like delegation of nobles and attendant personnel that endured for centuries. Final evacuation of the Baúl enclave was accompanied by elaborate ceremonies with brewing, drinking, feasting, vessel smashing, and building burning.

**Keywords:** andes | archaeology | empire | Inca | Peru

### **Article:**

Locally known as the “Masada of the Andes,” Cerro Baúl is a commanding geological mesa that towers over the Torata River in the arid sierra of the Moquegua river basin in southern Peru (lat 17.116°S, long 70.85°W) (Fig. 1). For many indigenous people, the 600-m-high promontory is a sacred mountain, or apu. Devotees arduously climb 1 h or more to reach the sheer-sided summit, where they use loose pebbles to make votive offerings depicting small farmsteads with houses, fields, and corrals. This article describes the monumental ruins of the mesa left by imperial colonists from the capital of Wari located 600 km to the north of Cerro Baúl (Fig. 1). The remote summit was uninhabited before and after Wari times because it was a highly impractical place to live, requiring that all necessities be hauled up with great effort. Wari colonizers likely chose this economically impracticable place on the basis of three considerations: defense, sanctity, and

politics. Cerro Baúl is a natural bastion. However, during the Inca conquest, local people reputedly fled to the impregnable top of a grand natural bastion but surrendered upon depletion of summit food and water stores to the invaders camped below (1). In the past, expansive Andean states often usurped sacred places for their own aggrandizement, and the Inca imperium incorporated hallowed places ranging from apu peaks to sacred islands (2). Temples around the base of Baúl suggest that it was an apu during Wari times, if not earlier. Finally, the colonization of Moquegua was certainly a political decision made by the central Wari administration that brought direct frontier contact with its largest peer polity. Emphasizing the latter, we hypothesize that the Baúl colony was an embassy-like enclave established atop a sacred natural bastion to emphasize political prowess regardless of economic impracticalities.

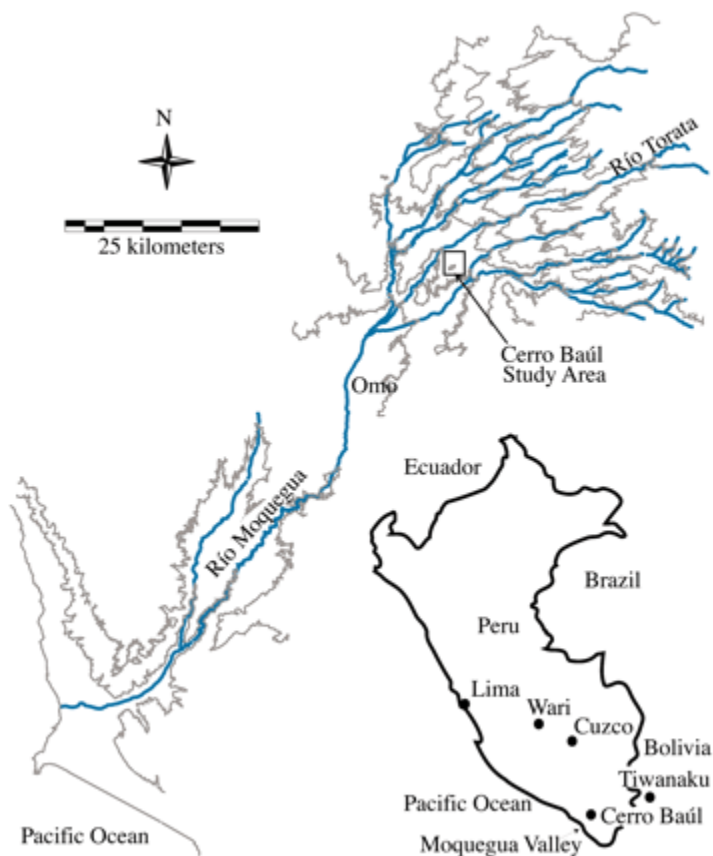


Fig. 1. Map of upper Moquegua Valley, Peru.

When Wari forces entered the region shortly before anno Domini (A.D.) 600, they seized upon the mesa and two adjacent hills, Cerro Mejia and Cerro Petroglifo, to implant the southernmost colony of the empire deep within the territorial sway of Tiwanaku, a southern nation with its capital near Lake Titicaca in Bolivia (Fig. 1). Enduring four centuries with a population numbering >1,000, the outpost was unique because it ensured that Wari and Tiwanaku came into direct contact (3). Elsewhere, the regimes were separated by buffer zones  $\approx 100$  km wide (4). The unique juxtaposition of the nations in the Moquegua sierra suggests that the Baúl enclave was

established to represent Wari interests to its imperial Tiwanaku counterpart. If this scenario is correct, then a monumental temple complex at the Omo settlement in midvalley was the likely Tiwanaku counterpart (Fig. 1). This temple is the only known imperial-style sanctuary built outside the highland heartland of Tiwanaku, and it may well represent a political response to the Wari colony (5).

Wari is characterized as relatively secular and militaristic, and Tiwanaku as more ecclesiastical and mercantile (6, 7). Both were socially stratified with commoners, principally farmers and herders, supporting artisans, technicians, religious specialists, and a hierarchical class of governing nobles. Distinctions in class and rank were demarcated by differential location and elaboration of living quarters and by differential access to comestible and durable goods. For example, shawl pins, called tupu, were insignia of elite women. People rendering service or tribute to overlords expected reciprocity in the form of food, beverage, and gifts, and some elite households had special facilities to host administrative gatherings (8). The preferred drink was chicha, a fermented alcoholic brew similar to beer. In the Baúl colony, both the quantity and quality of beverage served varied by class and rank, as did food, dining ware, and gift rewards. With little distinction between church and state, each nation had its own religion, and rule was in the name of the gods. Significantly, Wari and Tiwanaku iconography shared a paramount deity with distinctive eye bands and cranial rays, called the “Front-Facing God.”

Moquegua settlements of the two colonizing regimes sometimes lay within sight of one another, but they were segregated by different adaptations to farming the desert sierra that requires irrigation. Following earlier local practices, Tiwanaku people built relatively short canals to reclaim level areas in midvalley flat lands that supported the Omo complex and numerous other towns. The upper, rugged sierra was an undeveloped economic niche that Wari transformed into an agrarian landscape by constructing a high-elevation contour canal system that fed off the large Rio Torata at an altitude of 2,600 m above sea level.

### The Wari Colony

Foreign occupation concentrated on the adjacent hills of Cerros Baúl, Mejia, and Petroglifo that are now uninhabited for want of water (Fig. 2).|| Each hill had lower status residences on their flanks and elite quarters on the summit, with the preeminent facilities atop Cerro Baúl. The Wari canal originated high above the colony, and water was shunted down slope to a lower contour canal that irrigated terrain around Cerro Petroglifo, which had partially built hillside billets for commoners and hilltop domiciles for elites (9), all left unoccupied. The canal then fed terraces on the flanks of Cerro Mejia, where the channel had a maximum flow capacity of 400 liters/sec (10). Cerros Mejia and Baúl are closest to one another at El Paso, a high pass between the promontories. Here a southern branch canal crossed a large aqueduct to water both terraced and

unterraced planting surfaces on the mesa slopes. The colonists grew maize, potatoes, tubers, other comestibles, and *Schinus molle*, the Peruvian pepper tree that yields small seeds used in brewing. Irrigating 324 hectares of land capable of sustaining  $\approx 2,000$  people, the 20-km-long canal system was forsaken when the colony was abandoned in ca. A.D. 1000.+

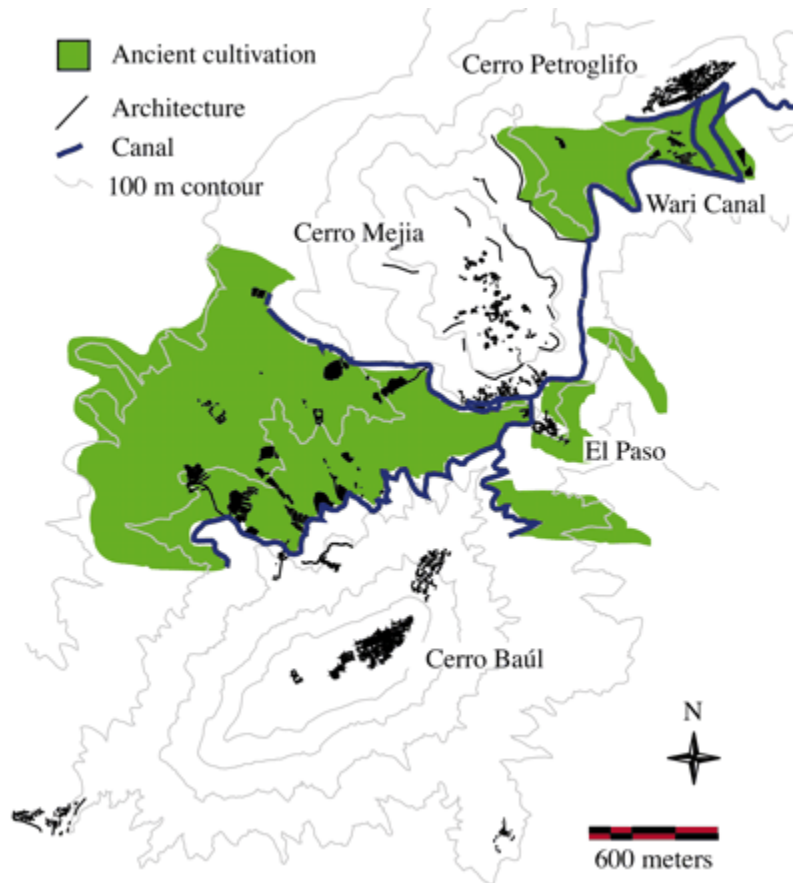


Fig. 2. Map of the Cerro Baúl colony.

### Cerro Mejia

Radiocarbon dates suggest a two-phase colonial occupation divided at ca. A.D. 800, with Mejia falling exclusively in the early phase and Baúl represented in both (Table 1). Cerro Mejia is a big hill with the largest settlement area of the colony, but its not the densest or the most sumptuous. Housing commoners, numerous masonry-faced residential terraces were erected on the hillside around El Paso. With rain rare, most pursuits took place in open courts. Framed by low stone walls, single and multifamily dwellings consisted of an open patio for general activities joined to one or more small thatch-roofed rooms for cooking, storage, or sleeping. Large walls descending the hillside divided the occupation into six discrete neighborhoods. Each contained 8–15 separate domestic structures of varying size and elaboration, and the divisions may reflect distinctions in kinship or ethnicity (11).

**Table 1.** Carbon-14 dates from the Moquegua colony of Wari

Laboratory	Identification no.	Date BP	Error	1 $\sigma$ range	2 $\sigma$ range	$\delta^{13}C$ , ‰	Material	Context
AA	46602	1,454	35	560-645	540-660	-13.60	Wood	CB-A 9A palace
AA	46607	1,308	37	660-770	650-780	-27.10	<i>Molle</i>	CB-A 9B palace
AA	58413	1,252	33	680-810	680-890	-24.5	Carbon	CB-A 25.1202 palace
AA	58414	1,237	41	690-870	680-890	-21.17	Carbon	CB-A 25.1208 palace
Beta	36969	1,370	60	600-770	550-780	NA	Carbon	CB-A 2 outside palace
AA	46603	1,294	35	675-775	650-780	-24.10	Bean	CB-A 7G outside palace
Beta	36970	1,270	60	660-860	650-900	NA	Carbon	CB-A 2 outside palace
GX	24708	1,220	60	710-890	670-970	-26.00	Carbon	CB-A 7B outside palace
AA	58415	1,201	35	770-890	710-960	-24.9	Carbon	CB-A 24.2332 outside palace
Beta	36968	1,400	60	580-690	530-780	NA	Carbon	CB-B 1.2 brewery
Beta	36967	1,090	70	880-1,030	770-1,160	NA	Carbon	CB-B 1.2 brewery
TX	9280	1,070	50	890-1,020	860-1040	-27.10	Carbon	CB-B 1.4 brewery
TX	9281	900	40	1,040-1,210	1,030-1,220	-26.70	Carbon	CB-B 1.4 brewery
AA	46595	1,310	44	660-770	640-810	-27.90	Wood	CB-C 10 D-temple
AA	53343	1,195	44	770-900	690-980	-23.20	Carbon	CB-C 26.1373 D-temple
GX	24709	1,140	55	780-990	770-1,020	-27.80	Wood	CB-B 5 D-temple
TX	9279	1,150	50	780-980	770-1,000	-23.20	Carbon	CB-B 5D D-temple
GX	24706	1,400	45	600-670	540-720	-24.90	Carbon	CB-C 3E administrative
AA	58411	1,240	33	690-860	680-890	-25.3	Wood	CB-C 6.97-1226 administrative
GX	24707	1,180	50	770-940	710-990	-23.90	Carbon	CB-C 3E administrative
TX	9278	1,150	50	780-980	770-1,000	-27.00	Carbon	CB-C 3A administrative
AA	46599	1,366	35	645-685	600-770	-23.70	Carbon	CB-E ritual platform
AA	46601	1,438	35	600-655	540-670	-24.30	Wood	CB-H 21 slopes
AA	53345	1,211	46	720-890	680-960	-24.10	Carbon	CB-K 30.368 slopes

Laboratory	Identification no.	Date BP	Error	1 $\sigma$ range	2 $\sigma$ range	d13 C, ‰	Material	Context
AA	53346	1,162	61	780-960	710-1,000	-24.10	Carbon	CB-K 30.372 slopes
AA	41951	1,313	58	650-780	620-880	-25.30	Carbon	CM 3B slopes
AA	41956	1,289	41	680-775	650-860	-21.60	Carbon	CM 136 summit
AA	41952	1,284	54	670-780	650-890	-24.00	Carbon	CM 145 summit
AA	41955	1,269	42	680-780	660-880	-22.00	Carbon	CM 118 summit
AA	41957	1,268	40	685-780	660-880	-26.10	Carbon	CM 5 slopes
AA	46598	1,236	35	690-870	680-890	-25.80	Carbon	CM canal
AA	41954	1,174	43	780-940	720-980	-22.50	Carbon	CM 11 El Paso
AA	41953	886	40	1,040-1,220	1,030-1,250	-10.50	Carbon	CM 8 slopes

BP, radiocarbon years before present; d13 C, delta  $^{13}\text{C}$ ; CB, Cerro Baúl; CM, Cerro Mejia; NA, not applicable.

Where the spacious summit of Mejia was not protected by impassable slopes, it was enclosed by a thick double-faced stonewall averaging 1.5 m high and >1 m wide. Lacking parapets or piled sling stones, the barrier seemingly segregated social classes, but it had an opening toward Cerro Petroglifo and a formal gateway accessed by a long flight of monumental stone stairs from El Paso. The hilltop occupation was organized around a central plaza area framed by four stone-faced low platforms, two to the east and two to the northwest. Two large residences flanked the plaza to the north and south. These structures were elite quarters with an open rectilinear patio surrounded on three or more sides by larger rectangular rooms that were typically roofed. Masonry walls were higher and better constructed than those of hillside dwellings, but summit facilities were scattered over large open areas, unlike the imperial Wari pattern of tightly agglutinated walled compounds.

Excavations suggest that a head administrator of the Mejia settlement occupied a four-building patio complex north of the platforms. Private domestic affairs transpired in the two structures framing the western and southern sides of the patio (Fig. 3). The visual focus of the patio was the raised salutation hall in the east. Demarcating high status, the hall was elevated about 1 m above other buildings, paved with rhyolite flagstone, and ornamented with two rear wall niches positioned for visibility through an oversized entrance. The wide doorway opened on a long exterior bench accessed by a central flight of stone steps rising from a low dais in the patio. Hierarchically, the structure could segregate the plaza audience from higher ranks on the bench while a dominant noble stood in the elevated entrance framed by rear wall niches, presumably

displaying status objects. An interior corner bin contained small chunks of lapis lazuli and chrysacolla, minerals used to make beads. Equipped for preparing banquets, the northern building had three open hearths for cooking food and four stone fireboxes to support large boiling pots. The boiling pots were probably used to reduce grain or fruit to a sugary mass and fermented to create chicha that would accompany food served during ceremonies centered on the adjacent salutation hall. Similar to other hilltop quarters, the buildings of this elite complex exhibited a greater range of artifact types and less refuse than hillside dwellings.

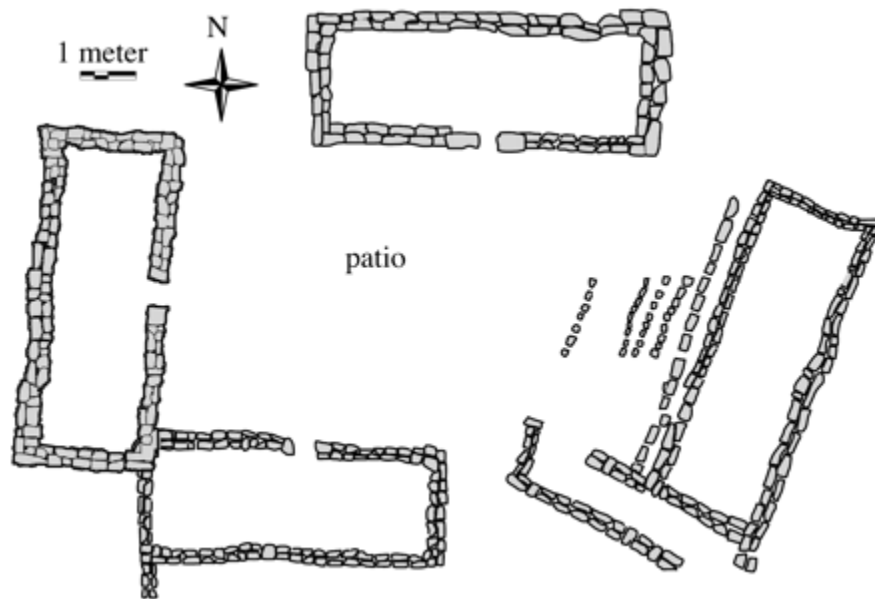


Fig. 3. Elite patio complex on the summit of Cerro Mejia.

### Cerro Baúl

From El Paso, a single formal thoroughfare passed between residential terraces ascending 400 m to the summit of Cerro Baúl. Poorly conserved remains of densely packed quarters survive above the summit cliffs along  $\approx 400$  m of the northeastern and western slopes of the mesa top. These unelaborated facilities accommodated the majority of hilltop residents, some of whom generated debris from precious stones and other materials indicative of lapidary work and craft activity. Impressive monumental architecture was erected on the artificially leveled mesa top. Packed into high-walled compounds, agglutinated structures of one or more stories covered three hectares. The masonry constructions used earthen mortar to bond irregular stone blocks cut from the mesa cap (Fig. 4). Contiguous quarry pits up to 10 m in diameter and 3 m deep occupy a large southeastern swath of the mesa top. Cut into porous conglomerate, they were poorly suited to serve as cisterns. All water was apparently hauled up, as was clay for mortar and plaster, beams for roofing, grass (*Stipa ichu*) for thatching, and rhyolite slabs for paving.

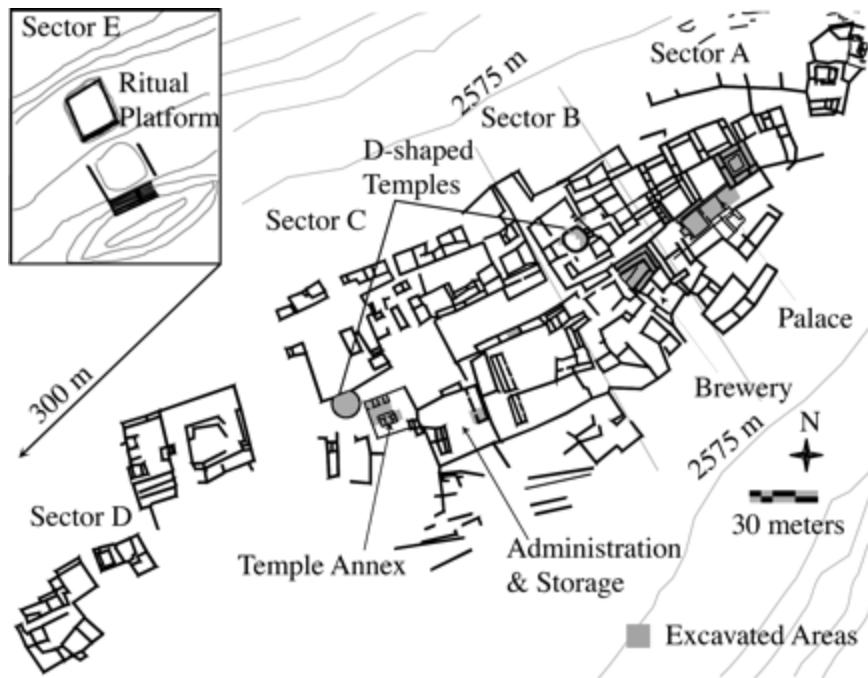


Fig. 4. Monumental architecture on the summit of Cerro Baúl.

As at the capital, urban layout lacked grid-based planning. Instead, agglutinated high-walled, inwardly oriented compounds bespeak of social differentiation and sociopolitical segmentation. Because collapse of the architecture obscures its original layout, we have divided the summit into lettered study sectors beginning with A in the northeast (Fig. 4). Extensive architectural reconfiguration occurred at ca. A.D. 800, with leveling of earlier structures and building of new ones that now form the surface ruins (3). Excavation reveals the state of these later facilities at the time they ceased to be used and maintained. Gradual decay or piecemeal desertions of buildings are not evident. Instead, the monumental architecture was abandoned swiftly. Planned, orderly evacuation best explains why many structures lack objects indicative of their original use, and why other buildings were accorded ritual closure that left behind artifacts that are indicative of the status and nature of the structures.

**Brewery.** The most elaborate termination ceremony was that of a monumental brewery that contained original equipment and final offerings (Figs. 5 and 6). The facility yielded numerous tupu shawl pins, implying a prominent involvement of elite women in chicha beer production. Trapezoidal in plan, the edifice had separate compartments for milling, boiling, and fermentation. The milling room had a full thatch roof, and chemical analysis of the floor revealed high levels of total phosphate. Maize-based chicha de jora requires milling sprouted corn kernels, which was done on the grinding stones of the room. The northern boiling room contained at least seven fire pits, each with a pair of opposed stone pedestals. They originally supported ceramic vats, now broken, inclined against accumulated ash and the back wall of the structure that was



probably not roofed. Thick floor deposits of ash, as well as fire pit detritus, contained abundant seeds of *Schinus molle*. Today, these spicy berries are boiled or soaked whole to release the sugars in resin pockets on their central pits. With pits discarded, the boiled syrupy mash is fermented to create *chicha de molle*. It is unclear whether two types of brew were produced or whether molle was added to *chicha de jora* to create a special concoction. After vat boiling, the mash was transported to the fermentation area and placed in a row of 12 large vats lining the north wall of the central patio. Here the liquid aged for 3–5 days, depending on desired potency. After fermentation, the brew was ladled into pitchers for serving elsewhere. Each vat could hold up to 150 liters of beer, indicating a production capacity of  $\approx 1,800$  liters per batch, making this one of the largest pre-Inca breweries yet discovered in the Americas.

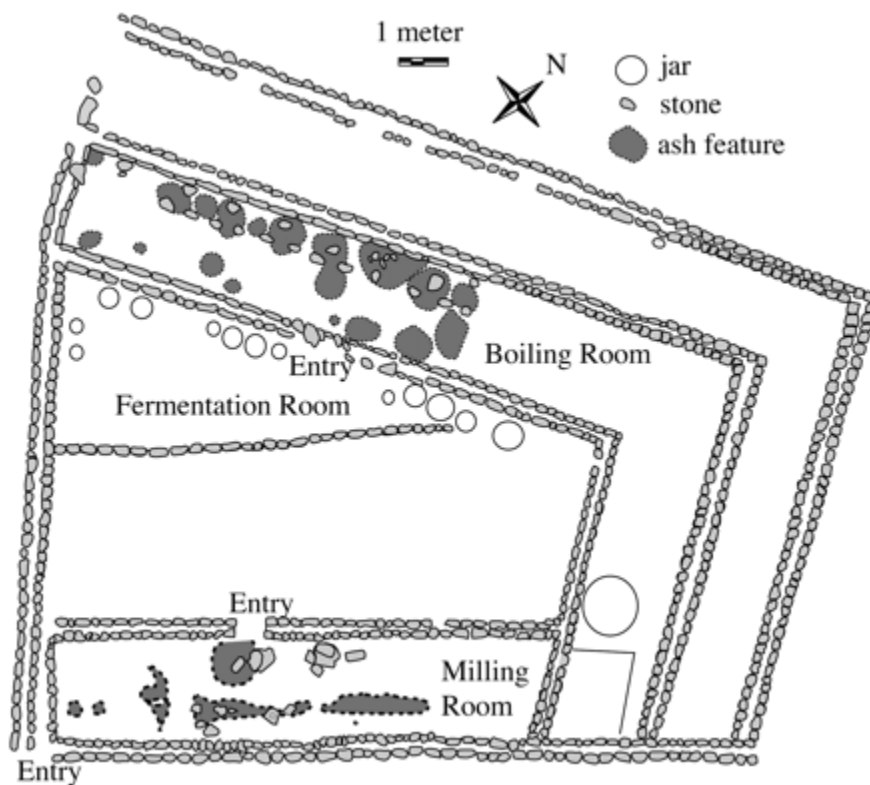


Fig. 5. Brewery complex atop Cerro Baúl.

**Figure 6 has been omitted from this formatted document.**

If the brewery was the central facility sustaining libation rites throughout the monumental compounds, then it was essential to the colonial political economy and probably the last building accorded closure ceremonies. The excavated evidence supports a scenario of planned closure that began with the brewing of a final batch of *chicha*. One week later, it was served from pitchers to nobles assembled in the court in front of the fermentation patio. There were 28 lords if each drank individually from one kero produced in seven distinct four-vessel sets. Sets were ranked by ornamentation and size, with simpler, smaller ones holding 12 oz (1 oz = 29.57 ml). Volume

graded up through a penultimate group of black-and-white-paneled vessels identical to high status beakers used at the Wari capital (Fig. 7). Holding 64 oz of brew, the largest, most ornate keros depicted the head of the front-facing deity, an icon very rarely depicted in the colony (Fig. 8). Presumably, as ceremonies neared completion and the chicha batch neared depletion, the edifice was ceremonially torched. Serving pitchers were thrown in as flames consumed the thatched milling room, and each attendant lord cast his emblematic kero into the conflagration in an act of sacrifice. Later, when the embers had cooled, six necklaces of shell and stone and a bracelet were placed atop the ashes in a final act of reverence.

**Figures 7 & 8 have been omitted from this formatted document.**

If corn and molle were stockpiled before chicha production, the nearest identified storage facility was a row of three contiguous rectangular rooms 15 m north of the brewery. Measuring  $\approx 2 \times 2$  m, each compartment was accessed by a single outside door with an elevated doorsill 10 cm high. Excavation yielded molle and squash seeds, peanut husks, as well as bones of camelids, guinea pigs, and marine fish. One sector C compound contained a quadripartite facility for food storage, with two aligned rooms opening east abutting two opening west. Each conjoined compartment measured  $12 \times 5$  m and had a small central door elevated  $\approx 10$  cm above the ground. On both interior sides of the entry, closely spaced poles were laid across the width of the room and inset in the walls  $\approx 70$  cm above ground to create ventilated flooring beneath plant food stored in bulk. If wall-top vents, as in Inca facilities (12), also enhanced air circulation, then they collapsed with the upper masonry. Unlike the brewery it may have supported, this facility and its compound were cleaned and unceremoniously burned and abandoned.

Palace. The most lavish residential quarters of the colony were built northwest of the brewery, and one partially excavated complex was probably an elite palace. The quarters were accessed via a narrow corridor leading to the southern door of a spacious, unroofed entry court. Stone-faced benches, 20 cm high, along the walls and the lower floor could accommodate people according to their rank or activities (Fig. 9). Opening on the court at bench height, a roofed U-shaped structure was recessed into the center of the western wall. Small, elevated U-shaped buildings were elite office-like edifices in the later empires, and Inca forms are called masma (13). If of a similar nature, then the Baúl entry court masma was likely the chief executive's office for conducting statecraft.

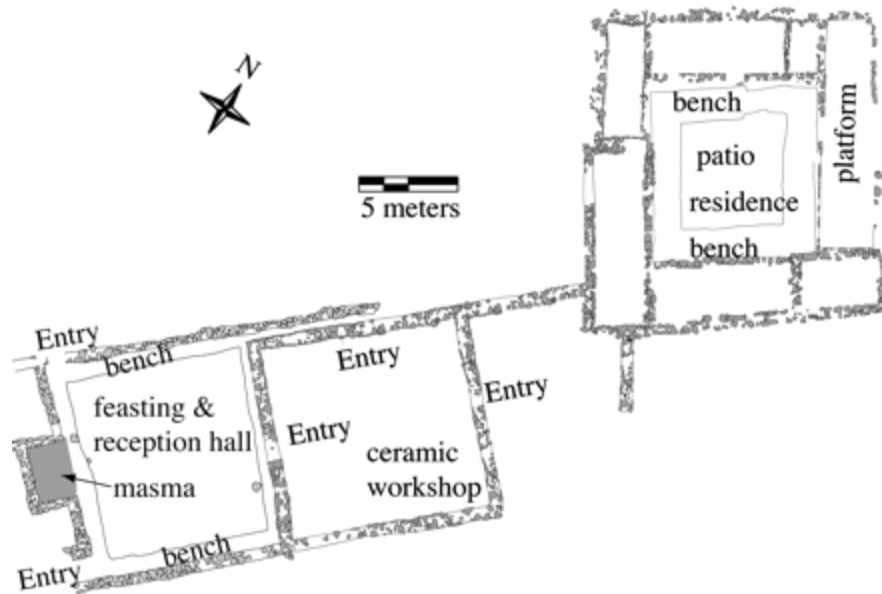


Fig. 9. Excavated areas of the palace complex atop Cerro Baúl.

A door in the wall opposite the U-shaped structure accessed a simple  $8 \times 8.2$  m open court used for pottery production, as evidenced by floor pits containing raw clay, several kinds of temper, as well as tools for grinding the raw materials and implements for burnishing shaped vessels. Presumably, the finished products were doled out in the entry court as gifts. Chemical analysis of ceramics from the broader colony points to different pottery production centers for people residing off summit versus atop Baúl, with the latter using vessels distinct in raw materials and execution quality that closely emulated elite wares of the imperial capital (Figs. 7 and 8) (14).

Inner sancta of the palace were accessed from two passages on the northwest side of the entry court, with the northernmost opening to a narrow corridor leading toward a grand patio group with an open paved court surrounded by 30-cm-high paved benches that were enclosed by five contiguous roofed buildings and a 30-cm-high eastern platform that was paved but very poorly preserved (Fig. 9). Four of the surrounding ground-level rooms yielded grinding stones, stone flake tools, spindle whorls, weaving implements, and other remains indicative of domestic affairs.

Terminal rites for the palatial quarters may have proceeded from the more private interior patio complex to the more public entry court. The remains of an impressive feast were strewn on patio benches and the floor. Vizcacha (the Andean hare) and deer were consumed. Various camelid bones (llama or alpaca) were abundant. Significantly, three of the camelids had isotope osteological signatures of coastal pasturing (15). Seven types of marine fish, including abundant

jurel (*Trachurus murphyi*), were also consumed in this extraordinary banquet. The ceremonial deposits included bird bones of Andean condor, pygmy owl, and flycatcher that were probably of ritual importance and not eaten. More than 30 pitchers and bowls were smashed and left in the patio, as were fragments of one small cup, but no keros. The entry court was terminated with less exotic feasting but with destruction of serving and dining wares and the burning of the masma roof. Notably different, a small number of bowls and jars were shattered only at the east and west entrances of the adjacent ceramic workshop but not elsewhere.

Temples. D-shaped structures at the capital and other Wari sites are interpreted to be elite temples (16, 17), and Baúl had two (Fig. 4). The temples opened to the northeast, had tall walls with shoulder-high wall niches, and accommodated few participants. Phosphate and nitrogen in the floor of the smaller building may be remnants of food or beverage. However, termination of temple use did not entail feasting with vessel smashing.

Temple Annex. Sector C buildings comprise the biggest, most elaborate monumental works of Baúl, and ceremonial abandonment was accorded one partially investigated compound adjacent to the larger temple. A central rectangular building, with an interior platform at one end and a bin at the other, opened to the north and had a frontal bench with a veranda. It faced a row of four small contiguous rooms built against the western corner of the northern compound wall (Fig. 10). The elaborate corner room had a painted and plastered wide entrance that provided a view of the interior. A small urn buried beneath the floor in the southwest corner of the room contained the remains of a human infant. Within the compartment, a prepubescent adolescent, lacking funerary artifacts, was centrally interred in a circular cist cut through the plastered floor.\*\* If these simple inhumations were dedicatory burials, then the sacrifice conferred great sanctity on the unusual content of the room: a large ornate ceramic drum with a rounded base (Fig. 11).

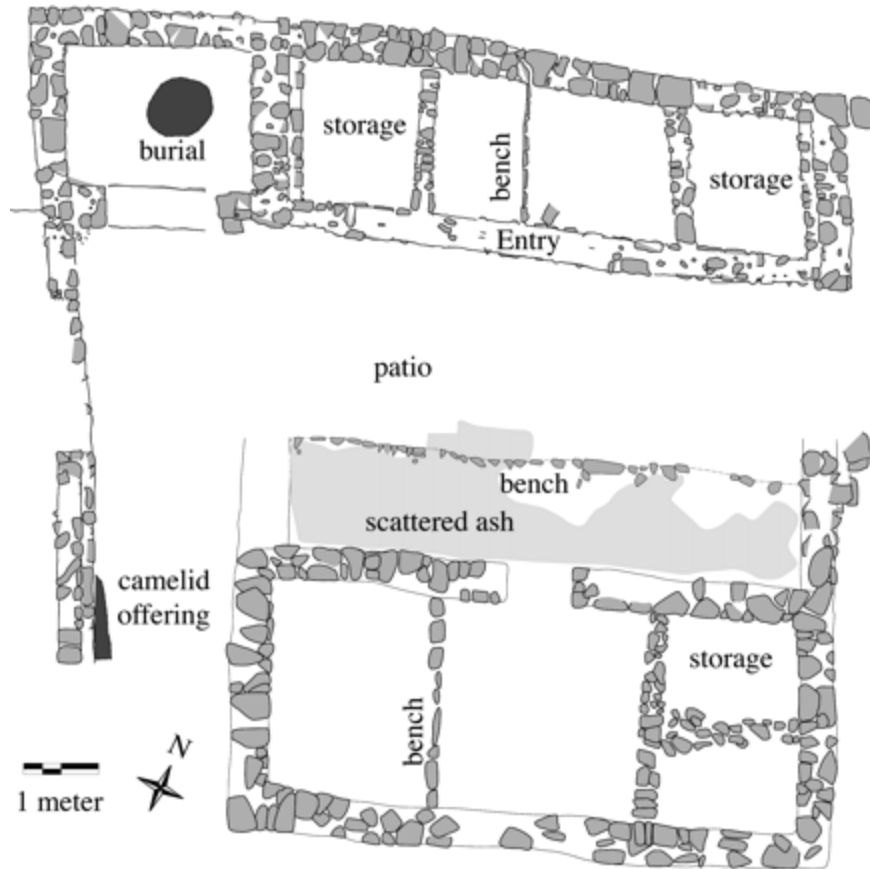


Fig. 10. Floor plan of the temple annex.

**Figure 11 has been omitted from this formatted document.**

The drum skin did not survive, but it was laced-on through 14 offset holes perforated around the undecorated rim of the instrument. The drum may have been displayed, but not played, upside down because iconography on the bottom is inverted. A red band inside two black stripes encircles the central concavity of the instrument above a lower row of stylized bird heads in black. The polychrome base depicts three naked androgynous figures, each wearing a vertically striped cone-shaped hat and one with a spear (Fig. 11). The iconography is not Ayacucho Wari but is related to a contemporary coastal style, late Nazca, as are four Loro-style bowls found in the room.

The drum and Loro bowls were shattered upon abandonment. Drinking during final rites is implied by one small fragmentary kero, by finely decorated cups broken on the bench beneath the burnt veranda of the central building, and by cups in the eastern patio area, where we recovered fractured serving vessels and camelid remains. One cluster of bones yielded remains of an almost complete young adult camelid, probably a llama. An apparent sacrifice, the beast

was dispatched and butchered (with cut marks evident on both cranial and postcranial meaty portions), and its bones were placed in a shallow pit with the anterior portion of the cranium facing the drum room. This differs from other abandonment rituals, although libation, feasting, and roof burning were common denominators.

### Social Differentiation in Cuisine and Commodities

Social differentiation in sumptuary goods, diet, and ceremonial use of plants and animals is evident in the broader Wari enclave. Everyone consumed maize, chenopods, beans, peanuts, and chili peppers, but the summit residents of Baúl had exclusive access to molle chicha, prickly pear fruit, coca, and tobacco. Zooarchaeological debris also indicates stark distinctions in faunal procurement, consumption, and ritual use of animals. The Mejia assemblage consists almost exclusively of large and small camelids (presumably the domestic llama and alpaca) with incidental use of locally available species: vizcacha, deer (but antler only and no edible portions), and one unidentified bird (Table 2).

**Table 2.** Faunal remains from Cerro Baúl summit and slope Wari contexts

Taxon	Common name	NISP	MNI	Bone weight, g
<i>Cavia porcellus</i>	Guinea pig	616	17	95.9
<i>Lagidium peruanum</i>	Vizcacha	13	2	10.6
Rodentia uid (small)	Small rodents	74	12	4.4
Sigmodontinae	Rats and mice	12	0	<0.1
<i>Canis familiaris</i>	Dog	59	2	16.5
<i>Felis concolor</i>	Mountain lion	1	1	0.9
<i>Felis</i> sp.	Feline	1	1	0.4
<i>Pseudalopex culpaeus</i>	Puna fox	1	1	1.5
<i>Lama</i> cf. <i>glama</i>	Llama	170	4	1,946.7
<i>Lama</i> sp.	Llama, alpaca	1,390	9	6,511.7
<i>Lama</i> sp. (large)	Large camelid	114	3	1,755.5
<i>Lama</i> sp. (small)	Small camelid	11	1	118.1
Camelidae	Camelids	3	0	5.6

<b>Taxon</b>	<b>Common name</b>	<b>NISP</b>	<b>MNI</b>	<b>Bone weight, g</b>
<i>Hippocamelus antisensis</i>	Taruca	3	1	45.9
<i>Odocoileus virginianus</i>	White-tailed deer	12	2	106.4
Camelidae/Cervidae	Camelids/cervids	19	0	7.6
Mammal uid (large)	Large mammal uid	8,477	0	9,721.0
Mammal uid (small)	Small mammal uid	30	0	71.0
Mammal uid	Mammal uid	2,913	0	353.8
Total Mammalia		13,919	56	20,773.5
<i>Vultur gryphus</i>	Andean condor	2	1	3.6
<i>Nothoprocta cf. ornata</i>	Ornate Tinamou	1	1	0.6
<i>Nothoprocta</i> sp.	Tinamou	7	1	2.4
<i>Columba maculosa</i>	Spot-winged pigeon	9	2	1.2
<i>Zenaida auriculata</i>	Eared dove	1	1	0.1
<i>Glaucidium cf. peruanum</i>	Pygmy owl	1	1	0.1
cf. <i>Muscisaxicola</i> sp.	Flycatcher	1	1	<0.1
Aves uid	Birds uid	31	0	10.8
Total Aves		53	8	18.8
Lacertilia	Lizard	29	2	0.5
Total Reptilia		29	2	0.5
<i>Bufo cf. arequipensis</i>	Toad	3	2	0.5
Amphibia uid	Amphibians uid	2	0	0.2
Total Amphibia		5	2	0.7
<i>Isurus oxyrinchus</i>	Shortfin mako	1	1	2.7
Total Chondrichthyes		1	1	2.7
Engraulidae	Anchovy, anchoveta	8	2	<0.1

Taxon	Common name	NISP	MNI	Bone weight, g
Clupeidae	Sardines, herrings	82	4	1.2
cf. Atherinidae	Silversides	1	1	<0.1
Carangidae	Jack	10	2	0.7
cf. Carangidae	Jack	2	1	0.2
<i>Cheilopogon</i> sp.	Flying fish	6	2	0.3
<i>Labrisomus</i> sp.	Blenny	1	1	0.1
<i>Scartichthys</i> sp.	Blenny	2	1	0.1
<i>Sciaena deliciosa</i>	Lorna	1	1	0.1
<i>Trachurus murphyi</i>	Jurel	192	7	47.8
<i>Auxis</i> sp.	Tuna	1	1	0.3
Osteichthyes uid	Bony fishes uid	1,012	0	20.1
Total Osteichthyes		1,318	23	70.9
Sample total		15,325	92	20,867.1

- NISP, number of individual specimens; MNI, minimum number of individuals; uid, unidentified. The Cerro Baúl assemblage reported here is from excavations conducted in 1989, 1997, 1998, and 2001. The faunal remains were collected by using either 1/16 inch (1.8 mm) mesh screen (Cerro Baúl 2001, Cerro Mejia all excavations) or 1/8 inch mesh screen (3.5 mm) (Cerro Baúl 1989, 1997, 1998). The majority of the remains were identified by using the comparative collection at the Contisuyo Museum Laboratory (Moquegua, Peru). Permission for the export of some faunal remains for which there were no comparative specimens was granted by the Peruvian National Institute of Culture. These remains were identified by using comparative specimens at the Florida Museum of Natural History, Environmental Archaeology Program, and the Divisions of Mammalogy and Ornithology.

Atop Baúl, large as well as small camelids and guinea pigs were principal sources of protein. Abundant remains of the latter, and their absence at Mejia, suggest that guinea pigs were lordly fare. Other food animals include vizcacha, two species of deer (including postcranial elements), tinamous, doves, pigeons, and at least 10 species of Pacific bony fishes, ranging from anchovies to tuna, all found in the palace and other monumental contexts. Also, present on Baúl are the remains of several animals interpreted as nonfood taxa that may have been obtained either



locally or from marine habitats  $\approx 100$  km away. Of low dietary utility, these species are difficult to acquire and may represent items of symbolic or ritual value. They include at least one mountain lion or puma (one distal phalanx or bony portion of the claw), a small-sized native cat, the highland Andean fox, two juvenile domestic dogs, the Andean condor (two wing elements: a worked distal ulna and a distal digit), a pygmy owl, a flycatcher, at least two toads, and a single tooth from a shortfin mako shark (Table 3). The majority of exotics came from the palace and brewery, and all animals were inhabitants of the mountain highlands or Pacific watershed and adjacent sea.

**Table 3.** Faunal remains from Cerro Mejia Wari contexts

Taxon	Common name	NISP	MNI	Bone weight, g
<i>cf. Phyllotis</i> sp.	Small rodents	5	3	<0.1
<i>Lagidium peruanum</i>	Vizcacha	1	1	2.1
<i>Lama</i> sp.	Llama, alpaca	264	3	1,101.8
<i>Lama cf. glama</i>	Llama	28	3	269.2
Cervidae	Deer	5	1	51.9
Total Mammalia*		303	11	1,425.0
Aves uid	Birds uid	2	1	NA
Total Aves		2	1	NA
Sample total		305	12	1,425.0

- NISP, number of individual specimens; MNI, minimum number of individuals; uid, unidentified; NA, not applicable.

\* Unidentifiable mammalian material was not quantified because of the fragmentary nature of the remains.

Distinctions are also evident in the distribution of durable goods of local and foreign origin. Used for knives and arrowheads, obsidian was imported primarily from mines near the Wari heartland rather than closer sources used by Tiwanaku (18). It appears in all residential contexts. However, the frequency of obsidian decreases with distance from the Baúl summit, as does that of chrysacolla and lapis lazuli. The palace and brewery produced rare specimens of both colorful Ecuadorian *Spondylus* shell from beyond the borders of Wari and of Cajamarca-style kaolin pottery from the northern frontier of the realm. Originating  $\approx 2,000$  and 1,300 km north, whereas the Nazca-related drum came from 500 km to the north. The palace also revealed an Aguada-style copper plaque (Fig. 12) from the Catamarca region of Argentina 1,300 km to the south.

This likely arrived through Tiwanaku intermediaries, but Tiwanaku artifacts are conspicuously absent.

**Figure 12 is omitted from this formatted document.**

## Discussion

Wari and Tiwanaku were ethnically heterogeneous, and the Baúl enclave had at least three distinguishable groups of people. The dominant were mesa-top inhabitants who presumably derived from the Wari capital. Split between slope commoners and summit elites with minimal Wari trappings, the Mejia populace came from elsewhere in the realm and served as support personnel until ca. A.D. 800. After this, a highland folk diaspora brought a third populous, called Tumilaca, into the region (19). The Baúl canal supplied three of their settlements, and the presence of Wari obsidian implies that these were client communities of support personnel. Except for obsidian, Wari elements are absent in Tumilaca archaeological assemblages. If ornate objects were social insignia that rarely crossed cultural components within the colony, then similar strictures probably extended beyond the colony to foreign neighbors, resulting in a dearth of Tiwanaku fine arts in elite Wari contexts and vice versa.

Imagery of the Front-Facing God appears in both Wari and Tiwanaku arts. Unlike Christian crucifixes, depictions of the paramount divinity circulated only among the highest elites. The palace and brewery of Baúl yielded seven fragmentary keros depicting the divinity's rayed head, including the oversized four-beaker set (Fig. 8). The specimens were all Wari in execution and possibly products of the palace ceramic workshop. Unfortunately, the sample is silent as to whether the god had a distant ancestor that Wari and Tiwanaku revitalized independently or whether the former borrowed the divinity from the latter (20).

Ritual libation was important to both, and a 4- × 4-m Tiwanaku brewing and drinking facility was located at the Omo archaeological complex (21). It had one boiling vat, three fermentation vessels, and an estimated 360-liter batch-production capacity. Grain grinding transpired elsewhere, but fermenting and drinking from fine keros beakers took place in the structure. Used for both beer and food production, the better-built Mejia facility had a similar production capacity, but consumption took place in the adjacent patio and salutation hall. With discrete compartments for grinding, cooking, and fermenting, the monumental Baúl brewery is the largest specialized chicha production facility known for its time, and numerous shawl pins implicate a staff of elite women.

For unknown reasons, Wari and Tiwanaku entered decline ca. A.D. 1000. If Tiwanaku broke down first, there would be no need for a Wari embassy. Economic duress in the settlement or its agrarian hinterland is not evident, and political decisions may best explain the founding and evacuation of the enclave. Most summit buildings were simply cleaned of valued goods and deserted. However, the brewery figured in the closure of important facilities that were feted by the elite. They consumed chicha along with comestibles served from fine ware that was smashed on the ground as verandas and roofs were torched. Sacrificed ceramics in other closure ceremonies were principally serving vessels, consumption bowls, and drinking cups. Thus, if paramount lords attended these ceremonies and quaffed from their own keros, they did not sacrifice these emblems. The time required to brew beverages and prepare food for a final ceremony suggests that individual termination rites were paced and sequential. The brewery was apparently abandoned last because chicha was essential to previous ceremonies. The facility was ritually closed with unusual fanfare, culminating with paramount lords sacrificing their heraldic beakers as they had not done in other contexts.

## Conclusion

The Cerro Baúl mesa, a dramatic landmark in the Peruvian sierra, is capped with monumental summit ruins built by imperial colonists on the southern frontier of the Wari empire between ca. A.D. 600 and 1000. The summit is a costly place to live in stately opulence. However, if it housed an imperial delegation, then Wari established impressive political representation in the only region where it had immediate contact with the Tiwanaku imperium. The early empires were thus marked by the creation of monuments that served as embassies for imperial interaction. Bygone political decisions are elusive, but their physical implementation transformed the frontier landscape, leaving behind striking records of ancient planning, labor organization, and imperial power.

## Acknowledgments

Charles Stanish and Joyce Marcus provided invaluable comments on this manuscript. Luis Lumbreras and Elias Mujica were supportive in initiating this research many years ago. We thank our Peruvian codirectors, Johnny Isla, Mario Ruales, and Ana Miranda. We also thank S. Chacaltana, R. Coleman, K. Costion, C. Dayton, D. Goldstein, N. Sharratt, K. Sims, J. Szymczak, B. Vining, and our field hands in Moquegua. Adan Umire and Jill Seagard provided illustrations for this work. We thank the people of Torata, Moquegua, and Peru for the privilege to uncover their glorious past. Southern Peru Copper Corporation, the G. A. Bruno Foundation, the Heinz Family Foundation, the National Science Foundation (Grants BCS-9907167, BCS-0074410, and BCS-0226791), and the National Endowment for the Humanities (Grant RZ-50098) provided funding. We thank our institutional sponsors, the University of Florida, The

Field Museum, and the Museo Contisuyo in Moquegua. We thank the Peruvian National Institute of Culture for permits over several field seasons [Resolución Directoral Nacional 302/INC (1997), 443/INC (1998), 988/INC (1999), 613 (2001), 646/INC (2002), and 773/INC (2004)].

## Footnotes

† To whom correspondence should be addressed: E-mail: moseley@anthro.ufl.edu.

This contribution is part of the special series of Inaugural Articles by members of the National Academy of Sciences elected on May 2, 2000.

Conflict of interest statement: No conflicts declared.

Abbreviation: A.D., anno Domini.

|| Mapping and surveying of the Wari colony in Moquegua has been ongoing since 1993. Excavations were conducted on (i) Cerro Baúl in 1989 (by R. Feldman), 1997, 1998, 2001, 2002, and 2004, exposing  $\approx 5\%$  of the monumental architecture, and (ii) Cerro Mejia in 1999 and 2000, exposing  $< 2\%$  of the buildings.

\*\* Jane Buikstra and Maria Lozada examined the human remains, but no sex determination could be made because of immaturity of the individual.

Copyright © 2005, The National Academy of Sciences

## References

Garcilaso de la Vega, E. I. (1966) *Royal Commentaries of the Incas and General History of Peru* (Univ. of Texas Press, Austin).

Bauer, B. S. & Stanish, C. (2001) *Ritual and Pilgrimage in the Ancient Andes: The Islands of the Sun and the Moon* (Univ. of Texas Press, Austin).

Williams, P. R. (2001) *Lat. Am. Antiquity* 12 , 67–83.

Lumbreras, L. G. (1974) *The Peoples and Cultures of Ancient Peru* (Smithsonian Institution, Washington, DC).

Goldstein, P. (2005) *Andean Diaspora* (Univ. Press of Florida, Gainesville).

Schreiber, K. (1992) *Wari Imperialism in Middle Horizon Peru* (Univ. of Michigan Press, Ann Arbor).

Kolata, A. L. (1993) *The Tiwanaku: Portrait of an Andean Civilization* (Blackwell, Cambridge, MA).

Isbell, W. (1977) *The Rural Foundations of Urbanism: A Study of Economic and Stylistic Interaction between Rural and Urban Community in VII Century Peru*. *Illinois Studies in Anthropology* 10 (Univ. of Illinois Press, Urbana).

Nash, D. J. (1996) M.A. thesis (Univ. of Florida, Gainesville).

Williams, P. R. (1997) Ph.D. dissertation (Univ. of Florida, Gainesville).

Nash, D. J. (2002) Ph.D. dissertation (Univ. of Florida, Gainesville).

Morris, C. (1992) in *Inka Storage Systems*, ed. Levine, T. (Univ. of Oklahoma Press, Norman), pp. 237–258.

Moseley, M. (2001) *The Inka and Their Ancestors* (Thames and Hudson, London).

Perez, I. (1995) Informe “Excavaciones de Salvataje y Propuesta Sobre Conservación de Estructuras Descubiertas, Area Museo de Sitio en Wari” (Universidad Nacional San Cristobal de Huamanga, Ayacucho, Peru).

Kennedy, E. (2002) M.A. thesis (Univ. of Florida, Gainesville).

Bragayrac, D. E. (1991) in *Huari Administrative Structure: Prehistoric Monumental Architecture and State Government*, eds. Isbell, W. H. & McEwan G. (Dumbarton Oaks, Washington, DC), pp. 71–80.

Cook, A. (2001) in *Ritual Sacrifice in Ancient Peru*, eds. Benson E. P. & Cook A. (Univ. of Texas Press, Austin), pp. 137–164.

Burger, R., Mohr Chavez, K. & Chavez, S. (2000) *J. World Prehistory* 14 , 267–362.

Owen, B. (2005) *Lat. Am. Antiquity* 16 , 45–80.

Cook, A. (1994) *Wari y Tiwanaku: Entre el Estilo y la Imagen* (Pontificia Universidad Católica del Peru, Lima, Peru).

Goldstein, P. (1993) in *Domestic Architecture, Ethnicity, and Complementarity in the South-Central Andes*, ed. Aldenderfer M. (Univ. of Iowa Press, Iowa City), pp. 25–41.