

# Cosmology in the Inca Empire: Huaca Sanctuaries, State-Supported Pilgrimage, and Astronomy

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## Abstract

Huacas (shrines) and ushnus (ceremonial platforms) are ever-present elements of millennia-old Andean cosmology extending backward at least to Chavín de Huantar (1500-300 BCE). A major theme of Andean cosmology appears to be shamanic transcendence and transformation involving the three worlds of the cosmos. To avoid ethnocentrism, a new ontology may be necessary to grasp the full meaning of Andean astronomy. All of the known cases of astronomy in the archaeological record of the Inca appear to be associated with huaca sanctuaries that may also have been state-supported pilgrimage centers. The Sanctuary of Isla del Sol is a paradigmatic example of such a center. Its characteristic features are stone-lined channels, sacred rock, gateways for controlling access to ritual space, physical separation of space according to social status, and areas designated for observing the solstice sun. Most of the sites considered in this paper are associated with the June solstice, contain huacas consisting of natural and carved rocks, show evidence of social differentiation of participants, and have channels for natural or offertory liquids.

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## 1. Andean Cosmology: Not Just a Different World-View, But a Different World?

Andean cosmology has deep roots, extending at least back to Chavín de Huantar, 1500-300 BCE, where it is revealed by uniquely Andean artifacts: huacas (Malville et al. 2006; Bray 2009; Gullberg 2010), i.e., shrines with extraordinary power, often sculpted rocks; and ushnus, which are raised ceremonial platforms sometimes with basins or wells into which offerings were poured (Staller 2008). The carved 4.5 meter tall shaft of the Lanzón of Chavín is a well-known example of an early huaca, an evocative *axis mundi*, a link between the three worlds of sky, earth, and the underworld (Burger 1992). Although it thrusts upward toward the sky, it is set deep in the interior of the Old Temple, reached by labyrinthine passageways. It is carved with the image of the supreme deity of Chavín, a fierce transformation of a shaman priest into a fanged jaguar with swirling snakes.

Huacas, which continued to be central elements in Andean cosmology for at least another 2000 years, continued this tradition of penetrating the three worlds through their verticality and shamanic-like power of transformation (Eliade 1964; Burger 1992; Staller 2008). Huacas possessed supernatural power and an animating essence for people, crops, and animals (Malville 2009; Staller 2008). A primary role of Andean religion and ritual was to keep the universe in balance and harmony. Some of the ritual offerings to huacas were water, corn beer (*chicha*), or blood, which were poured into basins or channels as a form of sympathetic magic to stimulate the flow of energy through the cosmos. Shamanic transcendence through the three planes of the cosmos was a continuing theme in Andean cosmology (Figure 1). Symbolic stairways, linking the dark underworld of caves and labyrinths to the earth and sky are ubiquitous such as at Chavín (Figure 2), Chankillo (Figure 3 and 4), Chinchero (figure 5), and Machu Picchu (Figure 6).

Chankillo in the Casma-Sechín river basin followed the collapse of the Chavín civilization and was occupied between 320-200 BCE (Ghezzi 2006). With its hill-top fort, cloistered temple, thirteen towers, and extensive structures, Chankillo seems to be a complex mixture of warfare and ceremony. The major axis of the site is solar, extending from December solstice sunrise to June solstice sun set. There also is evidence for interest in major lunar standstills. Ghezzi (2006) presents a convincing argument that the great fortress may have been a scene of ritual battles. Kaulicke (1995) suggests a similar interpretation for nearby Cerro Sechín such that mythical battles were performed as a form of ritual dance. The towers of Chankillo may have been the scene of ritual processions. Each of the thirteen towers has double

stairways, suggesting that they were huacas and that shamanic movement between the worlds was their *raison d'être*. Furthermore, the orientation of each tower is gradually changed from terrestrial to solar as one ascends to the sky (Malville et al. 2009).

The interactive parallelism of the three worlds is another feature of Andean cosmology. The Milky Way was understood to be the celestial counterpart of the Urubamba River (Urton 1981) and dark sky constellations such as the Celestial Llama provided the life force for terrestrial llamas (Solomon and Urioste 1991; Bauer and Dearborn 1995).

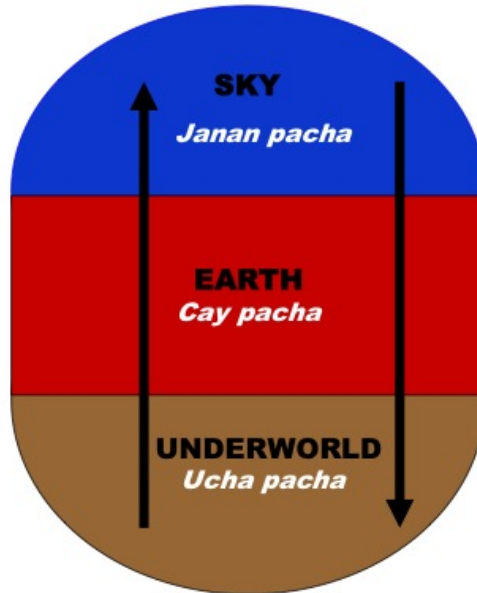


Figure 1: The Andean Cosmos: Movement between the worlds was symbolized by stairs, underground labyrinths, caves, huacas, and ushnus.



Figure 2. Chavín de Huantar, the underground Gallery of the Labyrinths: an example of shamanic transformation from priest to fanged feline (Burger 1992:158). Note the eyes and nostrils formed by coiled snakes, symbolic of the underworld. (photo by the author.)



Figure 3: The Huacas of Chankillo: an example of ritual movement between worlds. Each tower has two sets of stairs. Successively higher towers are rotated from a terrestrial orientation to a solar orientation. (photo by C. Aranibar.)



Figure 4: High Huacas at Chankillo: stairway after stairway (photo by C. Aranibar.)

The Spanish were immensely puzzled by huacas. For them huacas were very alien features in an already alien land. As documented by the chroniclers, huacas were carved and uncarved rocks, idols, buildings, springs, caves, poles, trees, nails, hair and body parts of Incas, mummies of ancestors, children born with deformities, piles of stones on mountain passes, and places where lightning had struck (Van de Gutche 1990). Andean huacas still can be puzzling to us today, but they are deeply embedded in millennia-old Andean cosmology, and to ignore their meaning puts one at the risk of not fully understanding Andean



astronomy.

The archaeologist Tamara Bray (2009) is a major advocate for the emerging paradigm in anthropology that uses the ethnohistoric record to explore alternate Andean ontologies. In particular she recommends that to understand the Andean world, we need to break out of Cartesian dualism in which living and non-living are fundamentally different. Applied to the astronomy of the Inca, this "different understanding of the nature and categories of being on the part of indigenous people in the Andes" implies that we should free ourselves of the notion that the stones of Cusco or Machu Picchu were inert lumps of inanimate matter, the sole meaning and function of which was to mark astronomical sightlines (Bray 2009:357). Such is the kind of thinking that leads to identifying as "observatories" those artifacts that give any hint of astronomy, whereas a term such as "sky watching place" might be more appropriate (Iwaniszewski 2009: 106). The authors of "Thinking Through Things" suggest that we need to be open to "moments of ethnographic revelation in which unanticipated, previously inconceivable thing become apparent" and propose that we move away from questions of epistemology to those of ontology (Henare et al. 2007: 1). Instead of assuming that nature is one and culture is many, we should consider that there may be genuinely different realities encountered and created by other cultures. An emic approach to culture, grounded in ethnography, is being increasingly encouraged in archaeoastronomy (whether it be of the old world or new world: Sims 2010). Instead of picking out those features that are astronomical, the cultural context needs to be considered in depth (Iwaniszewski 2010), requiring thick descriptions such as proposed by Geertz (1973).



Figure 5: Chinchero: Huaca of Titicala. The stairway and cave lead to an ushnu. (photo by the author.)

The ethnography of huacas indicates that they were regarded as living beings possessing extraordinary powers and the great wisdom of ancestors (Salomon and Uriste 1991; DAltoy 2000; Bray 2009). They had vibrant lives, functioned as oracles, dispensed wisdom; they were fed and dressed in clothes; they could be married, abducted, or even destroyed by enemies. The personhood of huacas blurs the distinctions between the living and the dead, between animate and inanimate (Bray 2009: 358).

In addition to the calendrical functions they may have had, the 328 or so huacas surrounding Cusco (Zuidema 1964; Bauer 1998) must have served as powerful protectors of the Inca state. They were a standing army and a council of wise advisors always in residence.

Outside of Cusco, huaca sanctuaries are found in Royal Estates such as Chinchero, Quespiwanka (Urubamba), Pisac, Ollantaytambo, and, of course, Machu Picchu, with the largest density of huacas of

all. Machu Picchu was more than a vacation lodge for the Inca Pachacuti: everything and everyone contained within the place would have been imbued with the power of its huacas.



Figure 6: The Great Huaca of Machu Picchu. Torreón on top and Royal Mausoleum below. Inside the cave of the Mausoleum there are stairs and niches for the ancestors. Both the window of the Torreón and the cave receive light of the sun on the morning of June solstice. (photo by C. Ruggles.)

One of the most impressive huacas of Machu Picchu is the single rock that contains the Torreón on top and the cave of the Royal Mausoleum below. This huaca penetrates the three worlds, like a gigantic Lanzón. It combines a cave, symbolic stairs, niches for ancestors, illumination at June solstice, and proximity to transformative water.

## 2. Water and Camay

Running water was understood to be an energizing and animating life force in Andean cultures, associated with the Quechua verb, *camay*. The agent of *camay*, the "camayer" is known as *camac* (Bray 2009; Malville 2009; Solomon and Urste 1991). The dark constellation of the Celestial Llama is the *camac* of llamas, responsible for giving llamas the vitality to flourish on the earth. The Pleiades, also known as the storehouse or granary, *Collca*, was especially revered because that asterism was considered the supreme *camac* or mother from which flowed all the energy for animals (Cobo 1990:30). It seems quite possible that the sun was understood to be a *camac* for certain huacas, such as the rocks of the Torreón and the Palace of Huayna Capac (see below), which are touched by light of the rising sun at June solstice. People skilled in their crafts, such as sculptors, engineers, and weavers would be *camayers*. As early as AD 600, drainage canals in Tiwanaku may have served the ritual purpose of energizing sacred buildings through the process of *camay* (Couture 2004). We find evidence for similar energizing of sacred buildings at Machu Picchu where the canal was diverted toward the huaca of the Torreón/Royal Mausoleum. At Tipón, the major aqueduct was diverted under its Intiwatana and the Ceremonial Plaza.

## 3. Ceremonial Centers as Huaca Sanctuaries

Every known instance of astronomy in the Inca Empire appears to be associated with huacas and public/private ceremony. Distinguishing characteristics of these ceremonial centers are suggested in Table 1.

Table 1/ Features Common to Ceremonial Centers with Visual Astronomical Event

A	Empowerment by Camay	<ol style="list-style-type: none"> <li>1. Stone-lined channels</li> <li>2. Fountains and aqueducts</li> <li>3. Pouring of water or chicha</li> <li>4. Lake</li> </ol>
B	Sightlines to horizon sun	<ol style="list-style-type: none"> <li>1. Markers on horizon</li> <li>2. Alignments toward horizon sun</li> </ol>
C	Huacas	<ol style="list-style-type: none"> <li>1. Natural rocks</li> <li>2. Carved rocks</li> <li>3. Platforms</li> <li>4. Horizon pillars</li> <li>5. Caves</li> <li>6. Sacred mountain</li> </ol>
D	Plazas, courtyards, terraces	<ol style="list-style-type: none"> <li>1. Open</li> <li>2. Enclosed</li> </ol>
E	Physical separation of social classes	<ol style="list-style-type: none"> <li>1. Barriers and walls</li> <li>2. Separate platforms</li> </ol>
F	Gateways	<ol style="list-style-type: none"> <li>1. Double-jamb doors</li> <li>2. Triple-jamb doors</li> <li>3. Ceremonial gateways</li> </ol>
G	Structures	<ol style="list-style-type: none"> <li>1. Storehouses for pilgrims</li> <li>2. Quarters for attendants</li> </ol>

### 3a. The Huacas of Cusco

The most detailed descriptions of Inca astronomy by the Spanish chroniclers involve the solar pillars of Cusco, where as many as 16 horizon pillars on the horizon once marked the annual changes in the location of the rising or setting sun (Aveni 1981; Zuidema 1981, 1982; Bauer and Dearborn 1995). None of the pillars that were on the Cusco horizon has survived the Spanish campaign of eradication of indigenous cosmology and religion. On sunrise of the feast day of June solstice, Inti Raymi, the Inca and his relatives watched the rising sun from the plaza of Haucaypata (Plaza de Armas) while others watched the event from the Plaza Cusipata, to the west across the Huatanay River. After drinking to the Sun, the celebrants poured chicha and or water from Lake Titicaca into a basin from which it flowed in a channel to the House of the Sun (Zuidema 1981; Bauer 2004).

The horizon pillars on the surrounding horizon and the ushnu in the Plaza of Cusco were important features of Inca ceremonialism in Cusco, but it seems likely that the most powerful ritual objects in the Cusco basin were the 328 or so huacas tied together by 41 ceques which radiated outward from the Coricancha (Zuidema 1964; Bauer 1998). The personhood of these huacas may have been of primary significance because they may have been understood to be powerful protectors of the capital of the Inca Empire and valued sources of advice and wisdom for the Inca.

### 3b. The Sanctuary of Isla del Sol

The Sanctuary on the northern end of Isla del Sol in Lake Titicaca and its pilgrimage traditions have been documented by Bauer and Stanish (2001) and Dearborn et al. (1998). The difficult journey to the island and along its spine gave it a sense of otherworldliness for the pilgrims. The most important feature of the Sanctuary was the Sacred Rock, known as Titicala, out of which, according to legend, the Sun had first emerged. The concave portion of the rock was reportedly covered by gold and silver and the entire rock was sometimes clothed by a large finely-woven cloth (Bauer and Stanish 2001). The first European visitors to the area reported numerous women attendants who made large quantities of corn beer, chicha, which was poured into a stone basin at the base of the sacred rock. The basin had a hole in its center and stone-lined channels carried the chicha away from the rock. Only Inca nobility and priesthood were allowed to pass through the several gates to reach the plaza in front of Sacred Rock. Lower status pilgrims were limited to a platform just before one of the gates, from which they could watch the ritual in front of the sacred stone from a distance of some 400 meters.



Figure 7: Sacred Rock on Isla del Sol (Squier 1877).

### 3c. Machu Picchu

In a manner similar to Isla del Sol, pilgrims would have had to pass through gates on the Inca trail as they approached Machu Picchu, first at Intipunku, the Gate of the Sun, and then at a security station half way down to the primary gate (Wright and Valencia Zagarra 2004). The station contains a carved huaca, which may have both protected the area and received offerings from pilgrims. Having reached the southern terraces of Machu Picchu, pilgrims would have encountered a second major carved huaca, the Ceremonial Rock. They could have gathered at the adjacent upper kallanka, which served as a storehouse and shelter. Entry to Machu Picchu itself was limited by the main gate and may have been closed to non-elite pilgrims. Ceremonies in the Sacred Plaza and the ushnu on Huayna Picchu were viewed from the Terrace of the Ceremonial Rock.

For those allowed to enter Machu Picchu, they could not help but note that the main gate beautifully frames Huayna Picchu. The northern side of Huayna Picchu is protected by the largest double-jamb doorway of Machu Picchu. The Temple of the Moon with its beautifully prepared double-jamb niches for ancestors is a major huaca. This area, which could have been reached by a not-yet-located trail from the Urubamba River, was an elegant entry to the steep steps leading to the summit of Huayna Picchu.

Machu Picchu is distinguished from the other royal estates in the Sacred Valley by its large plaza and by its many huacas (Reinhard 2007). Salazar (2004:41) counts some 30 "religious structures", many being carved rocks. The density of huacas is high compared to Ollantaytambo, Pisac and Chinchero. A number of its huacas appear to be associated with astronomical sight-lines such as the Torreón (June solstice), Temple of the Condor (anti-zenith sunrise), and Intimachay (December solstice sunrise) (Dearborn and Schreiber 1986; Dearborn et al. 1987; Dearborn and White 1983; Westerman 2003). We can perhaps understand a little more about what a royal estate meant. It was a place for feasting and hunting, but in the case of Machu Picchu it was a place of great power wherein Pachacuti would have been surrounded by a remarkable cluster of huacas that drew upon the powers of earth, water, sun, and ancestors.





Figure 8: Main Gate of Machu Picchu framing Huayna Picchu (photo by the author).



Figure 9: Temple of the Moon. Northern entrance to Huayna Picchu with the largest double-jamb doorway at Machu Picchu (photo by the author).

Llactapata and Machu Picchu probably served as combined huaca sanctuary and pilgrimage center. Llactapata is reached by the narrow and dangerous trail that starts at the Draw Bridge and leads across the face of Machu Picchu Peak (Malville et al. 2004, 2006). Many features of the major structure at Llactapata duplicate the Coricancha of Cusco. Access to the Coricancha was extraordinarily limited and its ceremonies were clearly private. Because of the difficult and limited access to Llactapata, ceremonies at its temple were probably similarly private. A stone-lined channel leads from the double-jamb doorway toward Machu Picchu and the direction of June solstice sunrise. A 33 meter long ceremonial corridor may have been the setting for a procession toward the rising sun on June solstice (Malville et al. 2006). There are no carved huacas in Llactapata because there is no granite on that ridge. A major huaca, the River Intiwatana, which is associated with fountains, a tower, and two caves, lies between Llactapata and Machu Picchu and appears to tie the two places together.

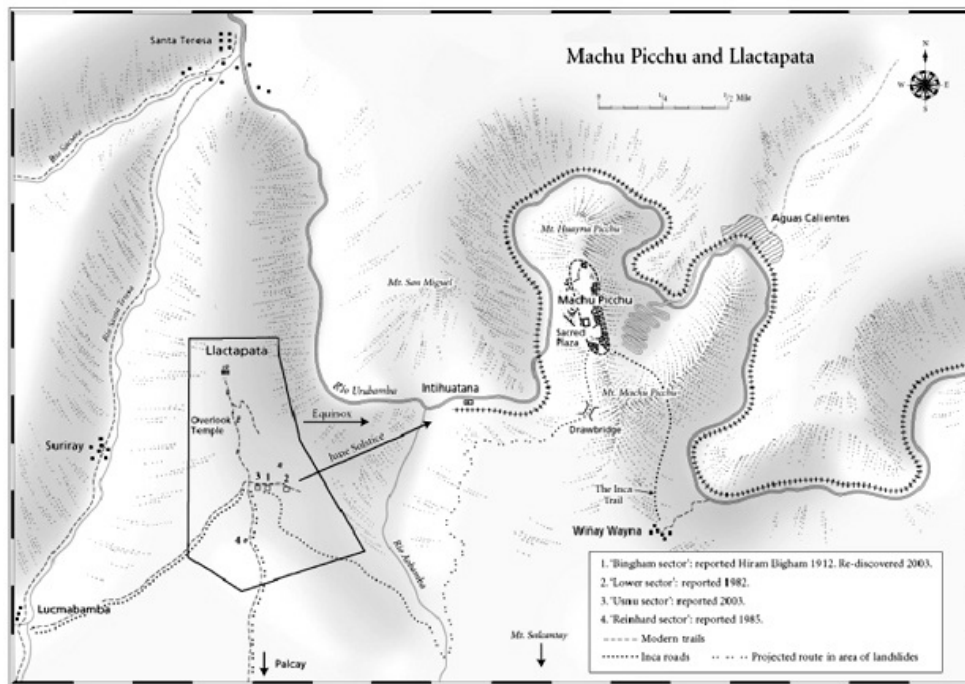


Figure 10. Llactapata and Machu Picchu.



Figure 11: River Intiwatana. The huaca that ties together Llactapata and Machu Picchu. Note the multiple scales of steps (photo by the author).

### 3d Tipon (Quespichancha):

With its aqueducts, elaborate water channels, and multiple fountains, Tipon seems an excellent example of the action of camay. It was a place for pilgrimage during the Inti Raymi festival (Zuidema 1981). There are two areas of modern Tipon that might have been the destination of the pilgrimage, either the peak of Cruz Moqo or the vicinity of one of its thirteen terraces. The summit of Cruz Moqo is remote and lacks the features expected at a pilgrimage center such as a plaza, solar markers, storehouses, or residences for attendants. On the other hand, the buildings of Iglesia Raqui are adjacent to the largest of the terraces. From those buildings the sightline to June solstice sunset passes over the terrace and over the sacred rock and rooms of the Intiwatana some 350 meters away. The trail upward to the Intiwatana contains a double-jamb gateway. The major canal carrying water from Cruz Moqo was diverted in order to pass beneath the Intiwatana (Wright et al. 2006). Pilgrims could gather in the vicinity of Iglesia Raqui to observe rituals taking place in the large terrace below them and at the Intiwatana some 350 meters distant.





Figure 12: Intiwatana of Tipon (photo by S. Gullberg).

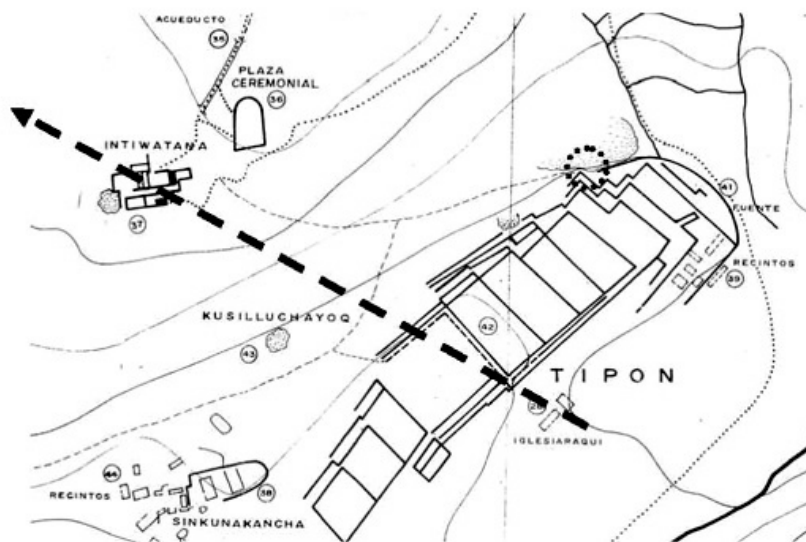


Figure 13: Tipon Showing the sightline from Iglesia Raqui to the June solstice sunset and the location of a double-jamb gateway (circle) (Adapted from Wright et al. 2006).

### 3e Urubamba (Quespiwanka):

The courtyard of the palace of Huayna Capac, Quespiwanka, in the town of Urubamba, contains a large granite boulder in its center, after which the palace had been named (Farrington 1995; Niles 1999). From its vicinity the June solstice sun can be seen to rise between two pillars on the skyline high above the palace (Zawaski 2007, Malville et al. 2009). Today a stone-lined channel carries naturally flowing water into the vicinity of the boulder. The massive triple-jamb entrance to the courtyard indicates that only those of high status could participate in ceremonies held within it. The area outside the south wall of the palace contains 40 unusual double-jamb niches and granite boulders. This ceremonial area outside the palace compound may have been the location where lower status celebrants could observe the rising sun.

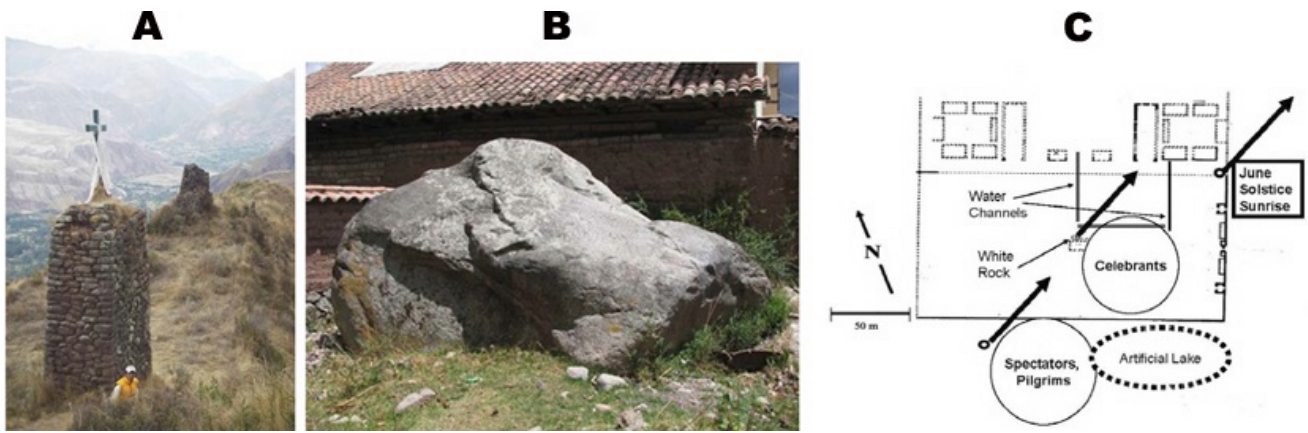


Figure 14. a. Sun Pillars above Urubamba (photo by M. Zawaski). b. Granite boulder of Quespiwanka (photo by the author); c. Quespiwanka showing locations where June solstice sunrise between pillars can be viewed (Adapted from Niles 1999).



Figure 15: The massive southern wall of Quespiwanka with 40 double jamb niches and a shaped granite boulder in the foreground (photo by the author).

### 3f. Saihuite

Known primarily for its Principal Stone, Saihuite is an elaborate and complex huaca sanctuary, which contains three carved stones, fountains, a double-jamb doorway, and a cardinally-oriented platform. A large niche faces June solstice sunrise. On the elaborately carved Principal Stone a network of grooves carries liquids past a myriad of figures (humans, pumas, llamas, frogs, monkeys, lizards). The stone may have been a representation of the Inca cosmos, which could be empowered by liquids flowing across it (Paternosto1989; Zawaski 2007).

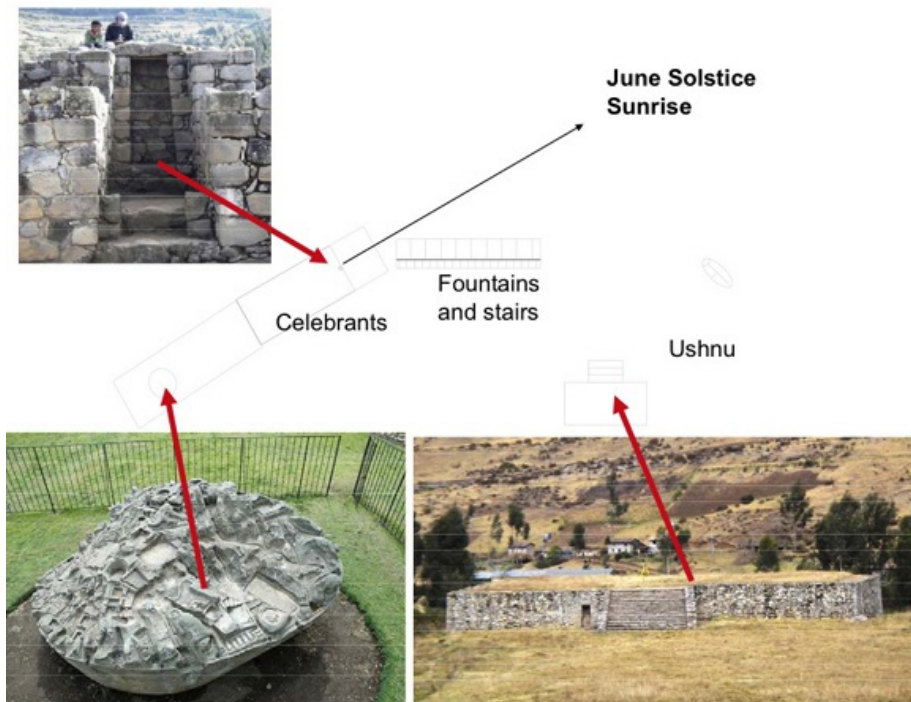


Figure 16. Saihuite (photos by M. Zawaski).



Figure 17: Rumihuasi at Saihuite. Note the fractal-like sets of stairs of different sizes (photo by S. Gullberg).

### 3g. Sondor

Located about 300 km from Cusco and 21 km from Andahuaylas, Sondor is the most impressive Inca site in the Andahuaylas region (Mendoza Bellido 2004). The conical hill of Apu Muyumuyu contains six terraces with a stairway leading to stone huacas on the summit. In order to reach the summit one must pass through two double-jamb gateways.

Sondor is the only astronomical huaca discussed in this paper without June solstice alignment or a major water feature. There are three clusters of buildings beneath the conical, terraced Apu Muyumuyu. The easternmost cluster of structures encloses a courtyard from which the rising sun at the day of zenith sun can be seen. Since the stairway is parallel to that sight-line to the rising zenith sun, it would appear that the zenith sun is the primary solar phenomenon of Sondor. As the sun rises in the sky the shadows of the terraces become shorter and disappear when the sun reaches the zenith making a dramatic visual spectacle.





Figure 18. a. View from the summit of Apu Muyumuym. The locations where sunrise can be seen over the summit are indicated. Note that these involve December solstice sunrise and Zenith sunrise. Other sunrise positions on the horizon are shown (photo by M. Zawaski). b. Apu Muyumuyu from a hang glider (photo by G. Breitenbach).



Figure 19 Sondor: Stairway to the Zenith Sun. Note the double jamb doorway at the entrance to the stairway (photo by R. Hurvitz).

#### 4. Summary and Conclusions

How should the new ontological paradigm in anthropology influence our interpretation of Inca astronomy? First, the meaning of these ceremonial centers is clearly enriched by consideration of possible alternate realities. Secondly, we should pay attention to the difference between epistemology and ontology in our analysis. Not only were huacas engaged in activities that were astronomical in an epistemological sense, but the presence of living huacas may have filled places like Machu Picchu and Cusco with special power. Some of the huacas may have been animated through the action of water and chicha. Others may have been animated by the light of the sun on June solstice. In the case of the Torreón, the northeastern window may not have been designed for an observer looking outward but for the sun to look in and touch the huaca.

In Table II the centers considered in this paper are ranked by the number of the attributes that are given in Table I. The Sanctuary of Isla del Sol and the Lactapata-Machu Picchu ceremonial complex contain the greatest depth of cosmic symbolism. It should come as no surprise that the Inca royalty and pilgrims would undertake arduous journeys to visit these powerful places.

Table II

<b>13</b>	<b>Isla del Sol</b>
<b>13</b>	<b>Llactapata/Machu Picchu</b>
<b>10</b>	<b>Tipon</b>
<b>10</b>	<b>Quespiwanka, Urubamba</b>
<b>8</b>	<b>Cusco</b>
<b>8</b>	<b>Saihuite</b>
<b>6</b>	<b>Sondor</b>

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