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Animal Matter in Indigenous Place-Thought: A Case from the Moon Pyramid, Teotihuacan

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Abstract: This article interrogates an archaeological application of the Indigenous concept of place-thought, defined by Vanessa Watts as an "understanding of the world via a physical embodiment" through studying corporeal animal forms. This latter encompasses the osteological traces of animal matter (sacrificed animals and prepared body parts) that, because of their material vitalities, provide an opportune site of engagement to retrieve ancient interpersonal relationships. Over 100 corporeal animal forms from Burials 2 and 6 are interpreted as agentive persons who brought into being the Moon Pyramid as an *altepetl* (water mountain) of Teotihuacan. The *altepetl* is a seminal place-thought in Mesoamerica intimately tied with sovereignty. The author argues that potentate apex predators (eagles, wolves, jaguars, pumas, and rattlesnakes) became part of Teotihuaccan's community through their captive management and were buried alive to sustain the *altepetl* as master guardians. A zooarchaeological and isotopic investigation of corporeal animal forms provided lurid details of human–predator interactions, including differential access to the animals, esoteric knowledge about their personhood, and even deceit of that information. She concludes that providing a contextually and historically contingent, data-driven, and inter-personally centered reconstruction of ancient place-thought, though admittedly partial and from a specific perspective, should be attainable given the enhanced methods in archaeology.

Keywords: place-thought; relational ontology; new materialism; corporeal animal forms; mountain worship (*altepetl*); Mesoamerica; Teotihuacan; animal sacrifice

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1. Introduction

The UNESCO World Heritage site of Teotihuacan, Mexico (1–550 CE) is most renowned for its magnificent ceremonial landscape that was a materialization of the cosmos; it encoded concepts of place, time, and worldview effectively into a lived experience (Freidel et al. 2024; Sugiyama 2010, 2017). At its height, this metropolitan center of 100,000 was one of the most influential cities in Classic Mesoamerica, its long arm extending from northwest Mexico (Zacatecas, Jalisco) to as far to the southeast as Guatemala and Honduras (Hirth et al. 2020). The city is an archetype of top–down city planning, with the entire city, including the three major pyramids, the Moon, Sun, and Feathered Serpent Pyramids, aligned 15 degrees northeast of magnetic north in accordance with measurements and alignments following a cosmic blueprint (Cowgill 2015; Sugiyama 2010). The timing of monumental constructions suggests state monumentalism and urbanization were intricately tied to state governance and sovereignty (Sugiyama and Sugiyama 2021).

Excavations within the Moon Pyramid revealed nearly 200 animals embedded within as sacrificed agents and prepared artifacts, what I call corporeal animal forms. This term encompasses the osteological traces of animal matter that, because of their material vitalities, provides an opportune site of engagement (sensu Todd 2014) to retrieve ancient interpersonal relationships (Sugiyama n.d.; Sugiyama et al. 2019). By recognizing the generative and transformative possibilities of corporeal intra-action, I suggest we may be able to recover some aspects of what Vanessa Watts defines as place-thought, an "understanding of the world via a physical embodiment. . .the non-distinctive space where place and thought

were never separated because they never could or can be separated" (Watts 2013b, p. 21). Place-thought is challenging to define precisely because it is malleable and negotiated by discursive processes of physical interactions between agentive persons (e.g., people, animals, objects, and places). Below, I begin by unpacking theories of relationality, place-thought, and new materialism within the study of animals as intricately braided within the fabric of sovereignty formation as materialized by the *altepetl* (water mountain), the Moon Pyramid, of Teotihuacan. I focus my analysis on two dedicatory caches, Burials 2 and 6, embedded into Building 4, as it marked when city-wide monumentalism was established circa 250 ± 50 CE. In this process, my goal is to demonstrate how the rigorous analysis of the matter at hand, corporeal animal forms, is precisely the means for archaeologists to step a little closer to reconstructing ancient place-thought. Indeed, providing contextually and historically contingent, data-driven, and inter-personally centered reconstructions of ancient place-thought, though admittedly partial and from a specific perspective, should be attainable.

2. Place-Thought and Relationality

A pertinent place to begin is personhood. Personhood is defined by the "ability of reciprocity where social identity is a mutually constituted relationship" (Harrison-Buck and Hendon 2018, p. 4). Relational ontological approaches recognize other-than-human beings, such as animals, plants, earth, celestial bodies, and the like, as conscious, intentional agents that require negotiating and establishing meaningful relationships (Armstrong Oma 2010; Bird-David 1999; Harrison-Buck and Freidel 2021; Losey et al. 2011; Watts 2013a). The key here, which distinguishes it from new materialism, is that personhood does not merely recognize "subjugated agency" (V. Watts uses the example of dirt acting for the emergence of other life forms) but that these "persons" are members of a community with intentionality and socialities (Hill 2011, 2013, 2018).

Notably, the agency of each person is often unequally and hierarchically distributed, and thus often political (Harrison-Buck 2018). In this regard, Sky Woman in Haudenosaunee creation history is the designator of all persons who organize upon her (Watts 2013b). She fell from the sky, landed on the back of the turtle to become land, and "is alive and thinking. . .humans and non-humans derive agency through the extensions of these thoughts" (Watts 2013b, p. 21). Sky Woman (land), humans, and other-than-human persons intentionally engage with responsibilities, obligations, rights, and negotiated ways of relating and caring with each other. In this light, the world is socially diverse and highly stratified. Indigenous place-thought recognizes the interactions of persons as intrinsic and inseparable from Sky Women, who encompass sovereignty and governance (Watts 2013b).

In this view, place (as a site of bodily engagement) cannot be separated from thought (cognitive space of knowing), and its socialities. This approach contrasts with new materialist frameworks that separate the world-as-operational (through vital materialities) from human thought to invoke more universal relationalities (Cipolla 2020; Harris 2020). Such a separation has been rightfully criticized for further widening the Cartesian divide between mind and body (Harrison-Buck 2018). Methodologically, a call to "take materials seriously" (Ingold 2007, p. 14) has been attractive for archaeologists precisely because it provides a compelling framework to examine materiality (composition) and action (what things do in relation to other things) because we are limited to the materiality of the past. However, as Todd (2016) boldly stated, we must recognize that the importance placed on material agency and relationalities is not novel to new materialism but has been and continues to be a foundational concept in Native knowledge systems.

This manuscript is part of ongoing attempts by archaeologists to be better attuned to the social dimensions of ontologies (Alberti 2016; Alberti and Bray 2009; Harrison-Buck and Hendon 2018; Hill 2018). These scholars recognize the importance of providing due credit to Indigenous ontologies as described by Native scholars (e.g., Todd 2016; Watts 2013b) while maintaining methodologically and contextually grounded interpretations of the material culture left behind.

3. Place-Thought in the Mesoamerican Context: The *Altepetl*

This article explores the potential reframing of the *altepetl* (water mountain, a form of sacred mountain) as a place-thought, specifically as experienced at the Moon Pyramid of Teotihuacan. The sacred mountain is one of the foundational concepts in Mesoamerican knowledge systems (Broda et al. 2001; López Austin and López Luján 2009). It is an influential and centralizing place and person, an axis mundi, connecting the celestial forces and the primordial waters of the underworld with the community (Brady and Ashmore 1999; López Austin and López Luján 2009; Vogt and Stuart 2005). The sacred mountain was an animate being encompassing a dynamic community of deities, wild animals, *naguales* (animal companions), and vital life sources such as water. Tlaloc and Chalchiuhtlicue, who command the celestial (male) and terrestrial (female) waters, reside here, as do patron deities responsible for the creation and protection of their corresponding communities (López Austin and López Luján 2009). The Tzotzil Maya describes the sacred mountain as inhabited by animal companions, themselves stratified like the communities they oversee, with wild carnivores, especially the jaguar, residing in the uppermost echelon of the 13 tiers ascending to the celestial realm (Gossen 1975; Vogt 1981). Animals were socially differentiated like human communities, and Native knowledge systems often respected specific apex predators as master guardian spirits that controlled other animals (Fausto 2012; Hill 2011; Ingold 1986; Ulloa 2002).

Notably, pyramids are described as "mountains made by hand" (Seler 1986, p. 35), and pyramid-mountains anchored ceremonial landscapes throughout Mesoamerica from the Early Formative period (1200–900 BCE) until the Spanish conquest (Broda 1989; Joyce 2020; Ortíz and del Carmen Rodríguez 2006; Townsend 1982). Notably, the concept of sacred mountains remains a powerful entity and place among modern Indigenous communities (Broda et al. 2001; Sandstorm and Sandstorm 2023). By the Post Classic period (950–1519 CE), Central Mexican Nahuatl-speaking communities such as the Aztecs distinguished particular mountains as the *altepetl*, translated to watery hill, the hill of sustenance, or water mountain (de Sahagún 1956, Vol. III:345). The *altepetl* is a physical place, but also the community and system of kinship/governance encompassing "the ruler, his supporting population and the geographic territory that supported them" (Hirth 2003, p. 69). Intimate relationships between ruler-*altepetl* sustained political authority, allowing rulers to consult with and gain favors from the vital sources and ancestral persons that reside within (Stuart 1997). Differential access to potentate personages (human or other-than-human) who inhabit the *altepetl* was the very means of social differentiation.

Lacking a deciphered writing system (see however Taube 2011), it is hard to trace back in time the origins of this particular application of *altepetl* to Teotihuacan. What little is "read" of mountain signs in Teotihuacan art is that they were central toponyms referring to places, communities, and events (Helmke and Nielsen 2014). An elaborate mural from the Tepantitla apartment compound suggests that the particular application of *altepetl* was already an active knowledge base for Teotihuacan as a place encompassing the community, intimately tied to sovereignty (Figure 1). Here too, a principal mountain is the source of precious water to till fields and provide life, being a principal ligature of the community to assemble. Many have asserted the Cerro Gordo mountain and its artificial counterpart, the Moon Pyramid, to be the *altepetl* of Teotihuacan (Kowalski 1999; Tobriner 1972). The entire city is oriented towards these prominent features demarcated by the Avenue of the Dead. The Cerro Gordo, an extinct volcano, has multiple features characteristic of an *altepetl*, including a cleft at its pinnacle, with springs, streams, and caves at its base (Gamio 1922, I:13). Anthropogenic alterations of altars, shrines, and marcadores (pecked cross markers) and extensive terracing throughout Cerro Gordo suggest Teotihuacan communities actively engaged with this central agent of the landscape.

Here, I attempt to braid a more localized understanding of *altepetl* as experienced from Building 4 of the Moon Pyramid of Teotihuacan by highlighting the active participation of corporeal animal forms in place-thought. As a zooarchaeologist, my approach is intimately reliant on the materiality of animal bones and teeth left in the offertory chambers deep

in the nucleus of the pyramid. Methodologically, thus, I am indebted to the insights that new materialism offers in taking seriously the matter at hand: animal bones and teeth that are smart, green matter that materially encode physical intra-action that are ontologically entangled relational entities within an assemblage (sensu Barad 2007). Such approaches recognize properties of bone and teeth as part of the material vitalities, the efficacy of matter to affect, act, reproduce, and reassemble, what Bennett (2010) calls "thing power." However, as I already mentioned, materiality is also an elemental premise for relational ontologies.

Figure 1. Mural painting of an *altepetl* from the Tepantila apartment compound. Photograph: N. Sugiyama.

Dynamic life history reconstructions, both on humans and animals, demonstrate the potential of bones and teeth to stand as material testaments of the life of an organism (e.g., Boutin 2011). For example, the combination of standard zooarchaeological study with light (oxygen, carbon, and nitrogen) and heavy (strontium) isotope, paleobotanical, and ancient DNA analyses of a sacrificed spider monkey from Teotihuacan recorded details of the earliest instance of primate captivity and translocation in Mesoamerica (Sugiyama et al. 2022). This female spider monkey was likely captured and transported from the humid natural habitat to a more arid Central Mexican highland before roughly three years of age. She was maintained in captivity for over two years and subsided on an anthropogenic diet of maize supplemented with arrowroot and chili pepper. At around 5 to 8 years of age, she was sacrificed tethered and next to a golden eagle at a major civic-administrative complex at Teotihuacan. This spider monkey was likely a strategic and charismatic delegate gifted by its Maya neighbors to solidify diplomatic ties during an early phase of Teotihuacan state formation. Such life-history reconstructions are reliant on material vitalities, such as the biology, behavior, and ecology of the organism, but especially the "liveness" of bone that encodes physical embodied experiences (nutrition, disease, trauma, etc.) of inter-personal encounters materially and chemically on the bones that directly signal their social positionality within the community.

Applying a materially focused relational ontological approach, osteological data (presence/absence, pathologies, cut marks, and other surface features) convey physical–relational acts predicated on localized interpersonal negotiations between animals, humans, and other-than-human agents. As a case in point, Brown and Emery's (2008) ethnozooarchaeological study concluded that residents of the modern Maya village of San Pablo la Laguna acknowledge hunting requires careful and respectful negotiation with a multitude of human and other-than-human agents; the animal guardian, the hunted animal, notable rock outcrops, weapons, and human communities. Active engagement with these persons carries substantive rules and regulations carefully negotiated based on the participating communities' social, political, environmental, and economic realities (Todd 2014). Brown and Emery's (2008) interlocutors explained that each bone, even tiny toe bones, after

being stripped of its meat, when returned to the shrine, regenerates into a new animal, providing a resilient subsistence strategy that requires careful maintenance and continued negotiations with the animate forest. This is why special care was taken not to tarnish the bones throughout the hunting, butchery, cooking, and consumption processes. The result is the material testimonies of these negotiated contracts in the form of hunting shrines, assemblies of carefully curated bones of hunted animals gathered within notable caves, acknowledged as portals to the sacred mountain. A relational ontology recognizes the generative and transformative possibilities of corporeal intra-action, such as the spider monkey being fed corn amid a metropolitan city or the careful de-fleshing of a deer by a hunter, as active sites of engagements. In another instance, a chimeric figure relating to the Maya creation myth, the Starry-Deer Crocodile, was assembled into a multi-species corporeal animal form of a necklace built from 19 deer mandibles, whose teeth were extracted, and 33 crocodilian teeth (MNI 1) placed in its stead in a Shaman burial at Copan, Honduras (Sugiyama et al. 2019). In sum, bones do not only represent the ties between human communities, animals, and mountain spirits; their corporeal participation in public actions (like hunting rituals) generates and sustains a dynamic and resilient community.

4. Moon Pyramid's Burial 2 and 6: The Data

The interface between a dynamic knowledge system of past Mesoamerican communities and archaeologists is exactly these material delegates: the corporeal animal forms. In the case of the Moon Pyramid, nearly 200 animals were either sacrificed or offered as prepared ritual paraphernalia, providing one of the most abundant cases of mass animal sacrifice and the earliest evidence of ritualized captive management of carnivores in Mesoamerica (Sugiyama et al. 2015; Sugiyama n.d.). The Moon Pyramid Project, directed by Sugiyama and Cabrera Castro (2007, 2017), uncovered seven building phases and six offering assemblages within the monument. This article discusses the corporeal animal forms from the earliest assemblages, Burials 2 and 6. Burial 2 was placed along the axis at the base of Building 4, while Burial 6 was placed 15 m above, embedded amidst the construction (Sugiyama and Cabrera Castro 2007). During this expansion phase, the Moon Pyramid reached a monumental scale, marking an eight-fold increase in volume, coinciding with the construction of the Sun Pyramid and Feathered Serpent Pyramid (Sugiyama and Sugiyama 2021). Thus, it is relevant that the Moon Pyramid's Building 4 is intimately part of the creation of a cosmogram that physically and materially facilitates, through the coordination of an innovative political structure (the Teotihuacan state), intra-action between the built environment and the greater cosmos. I argue that these two burials together centered corporeal animal forms as potent delegates transforming the Moon Pyramid into a more proximal (within the city) *altepetl* of Teotihuacan, an integral place-thought intimately tied to sovereignty formation.

While perimortem trauma (cause of death injuries) was absent on the bones, Burial 2 provides the most convincing evidence of in vivo sacrifice. Two pumas and a wolf were individually caged, and coprolites indicated they were alive while awaiting their fate. World-centering directional offerings are a common feature throughout Mesoamerica (Freidel et al. 2024; Stanton et al. 2023; Ashmore 1991). These animals follow a spatially conscious configuration, with nine eagles roughly lying at cardinal/inter-cardinal locations and the radial axis atop a pyrite disc with radiating obsidian eccentrics and a greenstone figurine (Figure 2). Solar eagles were deposited with their dual counterpart, the rain deity Tlaloc, figured in its namesake jars. A concentration of six rattlesnakes near the axial offering suggests a deteriorated organic container, much like the basket described below for Burial 6, confined these venomous serpents. A pair of pumas, one male and another female, were stacked atop each other to the north of the cache, while a wolf was found to the south. In total, 18 primary burials (sacrifices) were accounted for in this offering (Table 1), a number that is found repeated among the ritual artifacts (e.g., number of obsidian blades) due to their calendric importance (18 months of the year) (Sugiyama and López Luján 2007). Secondary burials were noted, including multiple feline skulls (n = 4), other birds as wings

or semi-complete individuals (great horned owl, retailed hawk, quail, raven, and prairie falcon, $n = 11$), and small mammals found in stomach contents or fill (rabbits, hares, vole, and squirrel, $n = 10$).

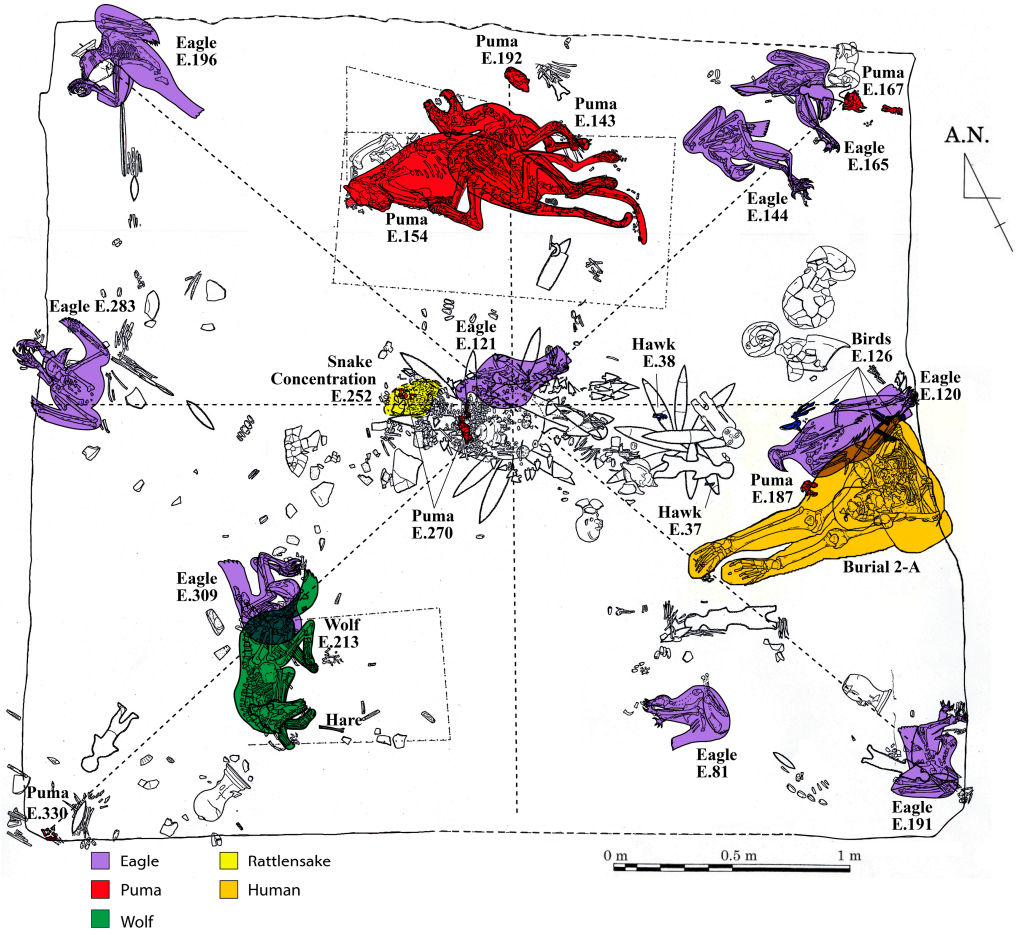


Figure 2. Plan view of Burial 2 of the Moon Pyramid. © Moon Pyramid Project.

The same apex predators of the sky (eagles), earth (felids and canids), and underworld (serpents) were sacrificed in Burial 6 (Table 1). Nine primary and nine secondary eagles ($n = 18$) were conjured for the ritual spectacle. Complete bodies of a wolf, an unidentified felid, three pumas, a jaguar, and likely 18 rattlesnakes testify to the 33 apex predators that would have participated in vivo. Skulls and pelts (represented by isolated paw bones) of these same species were abundant throughout the cache, totaling 41 minimum secondary remains. Rabbits/hares were consistently fed to the sacrificed mammals (eagle, puma, and wolf), while voles/squirrels were found in rattlesnake stomachs. Like the elaborate display of prey instincts to audiences at modern zoological gardens, live hunting scenes may have been notable scenes arousing emotive sensory experiences during ritualized performances at state sacrificial rituals at the Moon Pyramid.

Compared to the human sacrificial victims piled on the northern sector of Burial 6, the animals followed a coordinated spatial layout (Figure 3). A pair of eagles, alongside various accompanying animals (both primary and secondary), were placed in cardinal and intercardinal directions and at the radial axis, as observed in Burial 2. Again, the core of the dedicatory cache is composed of a pyrite disc with radial obsidian eccentrics (18 in total), a greenstone figurine, and, in this case, two of the only humans that were not beheaded. This central assemblage also included two eagles (primary and secondary), two wolf skulls, a jaguar skull, and a basket full of rattlesnakes. A fiber sample taken from an intact round basket found just to the side of one of the two complete humans revealed the presence of

small bones in its interior. An MRI of the basket exposed multiple rattlesnakes swarming in its interior (Figure 4). Though the drawing calculated between 16–23 minimum number of individuals (MNI), the consistent emphasis on the number 18 provides a reasonable assertion that it was also the number of rattlesnakes necessarily conjured for the event.

Another notable pattern in Burial 6, explained more extensively below, was that when sex could be determined, males tended to be placed to the east of the cache while females tended to be placed to the west (Figure 5). Out of the 28 sex designations on primary and secondary burials, 85% of the animals follow this pattern, with exceptions among the three male eagles placed on the western half (E.2070, E.2200, and E.1888) and one female wolf skull on the eastern half (E.2194) (Hofman et al. 2024). In essence, not only was the most appropriate quantity of powerful apex predators conjured for the ritual, but they necessitated animals of a specific sex. This selection process resembles the social parameters applied to human sacrificial victims where sex, occupation, and social status were pertinent. Intimate knowledge of the animals' sociality and access to such a large population of highly specialized apex predators required establishing long-term relationships with these animals that likely contributed to initiating a highly ambitious animal management program.

Table 1. Summary of zooarchaeological remains from Burials 2 and 6. P: primary burials, S: secondary burials, MNI: total minimum number of individuals. Grey: species with primary burials. D.: Dessert, E.: Eastern. Species names are in italics, totals are in bold.

			Burial 2			Burial 6			*Total*			
			P	**S**	**MNI**	**P**	**S**	**MNI**	**P**	**S**	**MNI**	**% MNI**
Aves												
Aquila chrysaetos		Golden eagle	9	-	**9**	9	9	**18**	**18**	**9**	**27**	23
Bubo virginianus		Great horned owl	-	2	**2**	-	-	**-**	**0**	**2**	**2**	2
Buteo sp.		Hawk	-	3	**3**	-	-	**-**	**0**	**3**	**3**	3
	B. jamaicensis	Redtailed hawk	-	1	**1**	-	-	**-**	**0**	**1**	**1**	1
Colinus virginianus		Bobwhite quail	-	-	**-**	-	2	**2**	**0**	**2**	**2**	2
Columbidae		Dove/Pigeon	-	-	**-**	-	-	**-**	**0**	**0**	**0**	0
	Columbina inca	Inca dove	-	-	**-**	-	1	**1**	**0**	**1**	**1**	1
Corvus corax		Common raven	-	2	**2**	-	-	**-**	**0**	**2**	**2**	2
Falco mexicanus		Prairie falcon	-	1	**1**	-	-	**-**	**0**	**1**	**1**	1
UnID Bird			-	2	**2**	-	3	**3**	**0**	**5**	**5**	4
Mammalia												
Canis sp.		Canid	-	-	**-**	-	-	**-**	**-**	**0**	**0**	-
	C. lupus baileyi	Mex grey wolf	1	-	**1**	1	7	**8**	**2**	**7**	**9**	8
	C. latrans	Coyote	-	-	**-**	-	2	**2**	**0**	**2**	**2**	2
Felidae		Feline	-	3	**3**	1	-	**1**	**1**	**3**	**4**	3
	Cf. Panthera onca	Jaguar	-	-	**-**	1	5	**6**	**1**	**5**	**6**	5
	Puma concolor	Puma	2	1	**3**	3	4	**7**	**5**	**5**	**10**	9
Leporid		Rabbit/hares	-	1	**1**	-	-	**-**	**0**	**1**	**1**	1
	Lepus sp.	Hare	-	2	**2**	-		**-**	**0**	**2**	**2**	2
	Sylvilagus sp.	Cottontail	-	3	**3**	-	1	**1**	**0**	**4**	**4**	3
	S. audubonii	D. cottontail	-	1	**1**	-	3	**3**	**0**	**4**	**4**	3
	S. floridannus	E. cottontail	-	1	**1**	-	1	**1**	**0**	**2**	**2**	2
Microtus mexicanus		Mex vole	-	1	**1**	-	-	**-**	**0**	**1**	**1**	1
Sciurus aureogaster		Mex gray squirrel	-	-	**-**	-	1	**1**	**0**	**1**	**1**	1
UNID Mammal			-	1	**1**	-	2	**2**	**0**	**3**	**3**	3
Reptiles										**0**	**0**	
	Crotalus sp.	Rattlesnake	6	-	**6**	18	-	**18**	**24**	**0**	**24**	21
	Anura/Lacertilio	Frog/lizard	-	-	**-**	-	-	**-**	**0**	**0**	**0**	0
TOTAL			***18***	***25***	**43**	***33***	***41***	**74**	**51**	**66**	**117**	

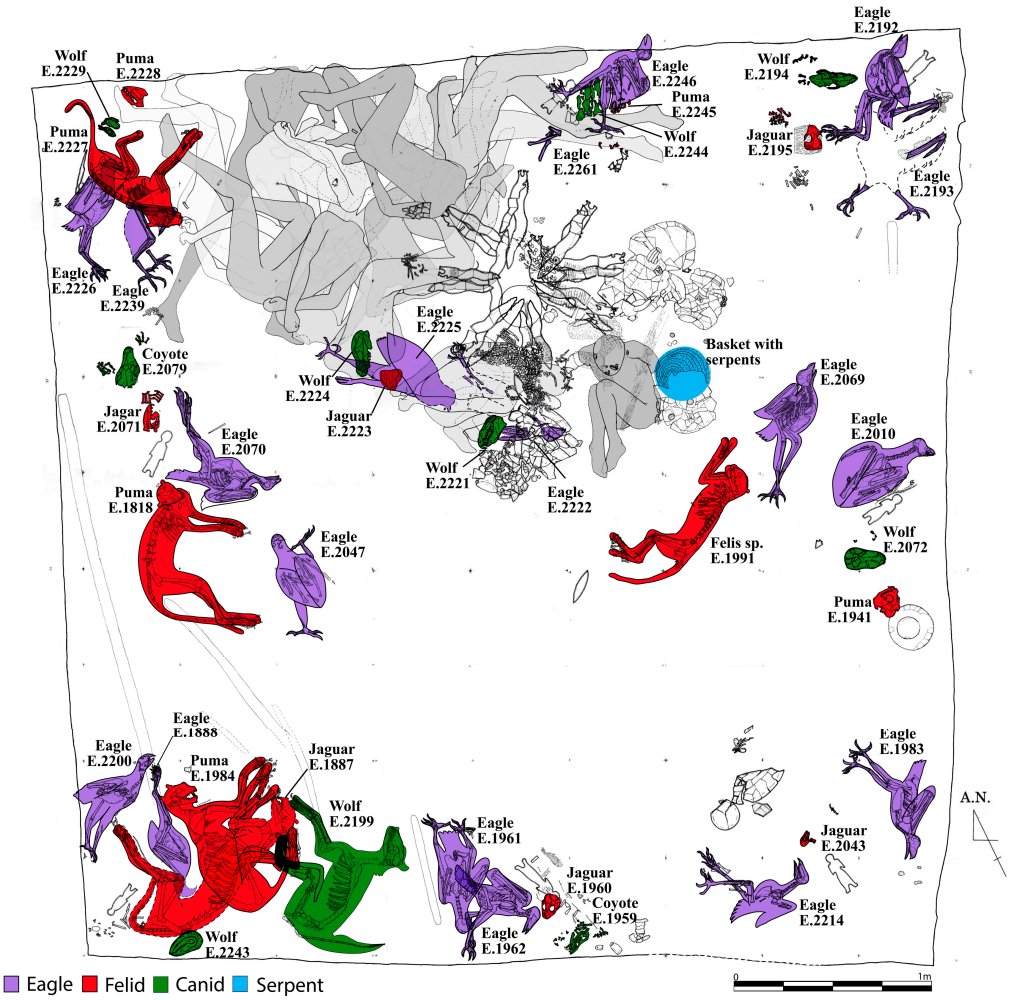
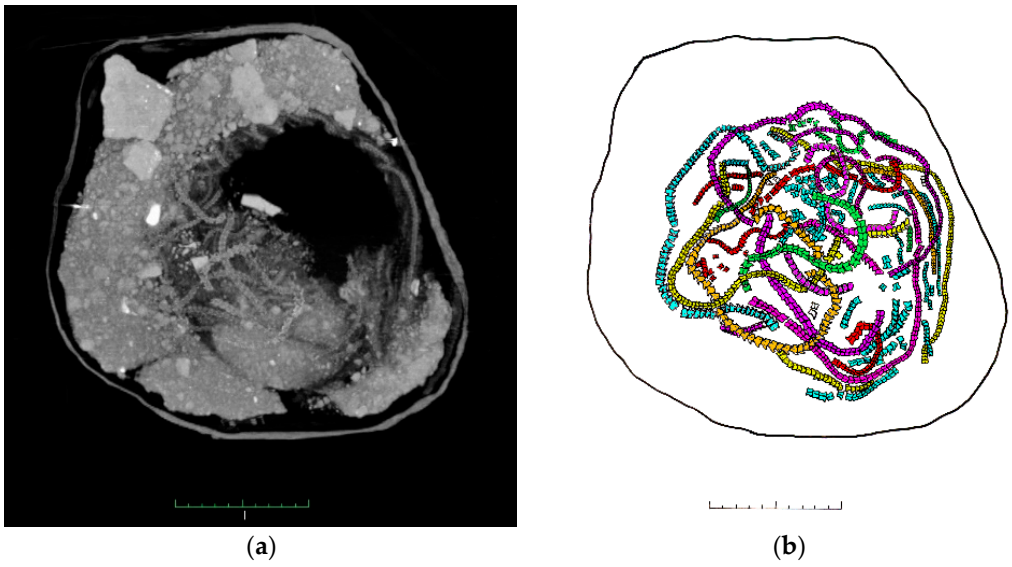


Figure 3. Plan view of Burial 6 of the Moon Pyramid. © Moon Pyramid Project.



(**a**) (**b**)

Figure 4. Archaeological basket with rattlesnakes: (**a**) MRI scan; (**b**) drawing. Scale bar 10 cm. Different colors mark distinct individuals. Drawing: N. Sugiyama.

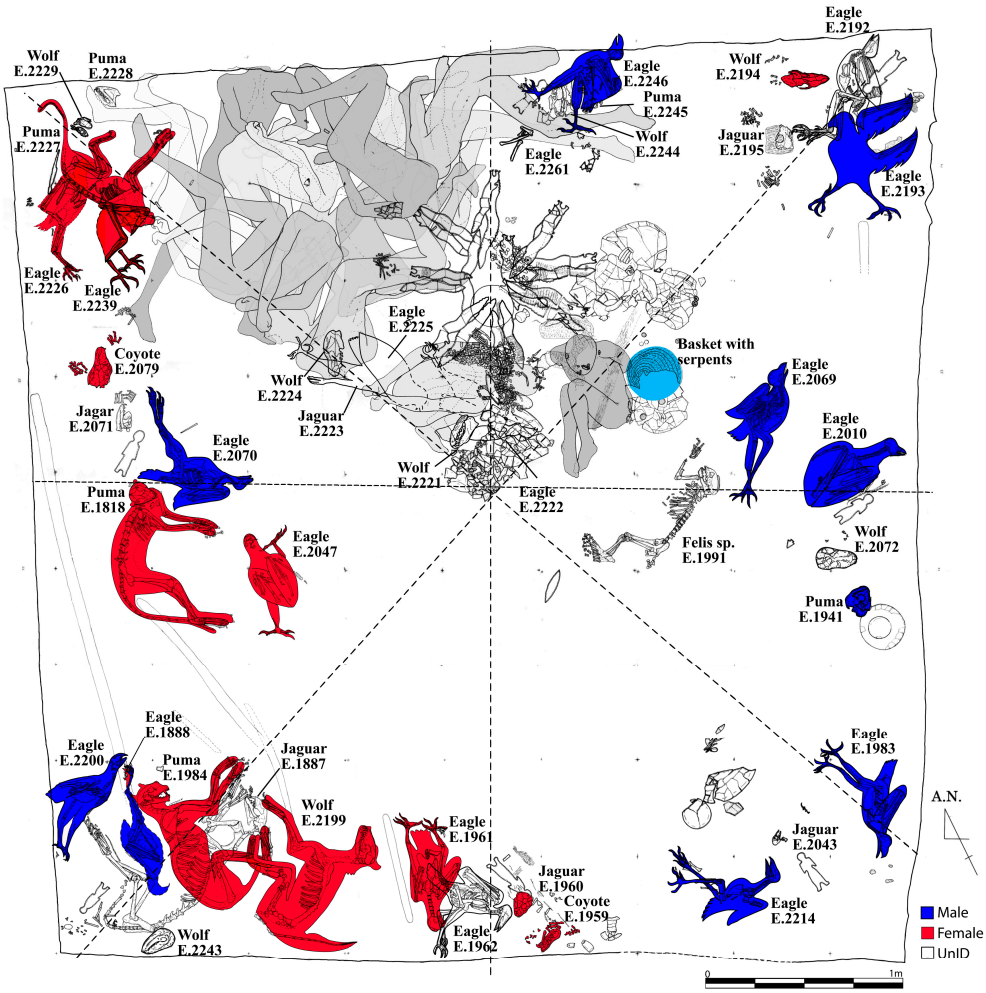


Figure 5. Animal sex distribution of Burial 6 of the Moon Pyramid. © Moon Pyramid Project.

5. Embodied Experiences: Human–Animal Interactions

Multi-archaeometry techniques recount perils, hardships, and adjustments for humans and animals during prolonged residence in the metropolis. Carbon and nitrogen isotope analyses captured prolonged periods of anthropogenic-C_4 (maize)-based diets among primary burials (Sugiyama et al. 2015). Housing some of the most ferocious apex predators was no easy task, and the earliest instance of ritual management of carnivores carried mishaps and adjustments. Direct interpersonal contact during this period prompted embodied interactions, sometimes turned violent, with these potent beings. On the one hand, there were requisites aspired by the ambitious ritual itself, while on the other hand, these animals imposed their own set of demands for their acquisition, care, and deposition. In this regard, the animals' materiality (including biology and behavior) and personality directly contributed to their sociality as they resided within the city confines.

As a case in point, puma cubs displayed light black spots on their coat that faded between 12 and 14 weeks and, after a year, fully transformed into their characteristic golden shine (Currier 1983). As their pelage directly contributed to their proximal affiliation with solar ideology, especially in juxtaposition with the nocturnal jaguar, pumas must be displayed with golden splendor (Sugiyama 2016). However, pumas are highly territorial, and home ranges vary by seasonality, sex, and prey availability; they average between 90 and 100 km^2 (female) and 300 and 350 km^2 (male), with some study sites reporting figures extending 349–723 km^2 (Grigione et al. 2002). By two years of age, they are aggressive toward other felids and would be unruly to keep within the same city confines. These two factors combined likely contributed to the reasonably homogenous age range (five young

adults and two juveniles) among the primary felid burials. These felids were old enough to have golden coats but young enough that they would not be unwieldy in the presence of other felids in procession along the Avenue of the Dead to their final resting place. Lurid details, such as on E.1818, a female puma about 18 months of age that survived an injury to her right femoral head, a blow to the cranium, and extremely high levels of C_4 (maize) consumption, suggest the majority of her short-lived life was in captivity within the city confines, and injuries facilitated the manipulation of apex predators (Sugiyama et al. 2015).

I cannot over-emphasize the scale of the operation. In Building 4, the ritual necessitated the participation of 18 eagles in Burial 6 and half of this number (n = 9) in Burial 2. That is a population beyond the territorial range of the Valley of Teotihuacan. As bearers of the sun, eagles are particularly potent actors regularizing the passage of time through their calendrically (number 18) and spatially (along cardinal and intercardinal directions) accurate placement in the burials. Assembling 27 eagles, which are territorial with wide home ranges, carried logistical hardships that likely led to captive management and supplementing primary burials with prepared skeletons.

It was difficult to determine if the eagles were sacrificed or if they were prepared cadavers as most were reported as complete and in anatomical position during excavations. However, the zooarchaeological analysis revealed some missing elements, likely due to taxidermic preparation. Others expressed surface modifications such as perforations and cutmarks to signal post-mortem manipulation of the corpse. Though all nine eagles from Burial 2 were primary, half (n = 9) from Burial 6 were recognized as secondary burials. E.2246, for example, expressed pathological traces of captivity (infection on both inner thighs where the animal was likely tethered), alongside extensive manipulation of the corpse post-mortem (Figure 6). The isotopic value of this individual revealed an anthropogenic diet composed of an unnatural degree of C4 (maize) consumption, similar to other primary eagles. Yet the body of this individual disclosed that the encephalic mass was extracted from an occipital opening on the head. Perforations on the furculum and leg bones (left tibiotarsus) were probably placed to maintain skeletal integrity. Fibers adhered to many bones, suggesting the corpse was further wrapped or stuffed. The life history of this individual highlights the complexities of life in captivity, but also that sometimes, these animals may not have been successfully sustained in captivity. Perhaps these are the subtle clues of hidden transcripts (sensu Scott 1990), the offstage discourse of resistance that captures and can eventually undermine potentate public actors in the ritual theater. Maintaining a population of highly specialized apex predators rightfully was not a one-way process.

Eagle captivity recorded in the colonial Florentine Codex describes hunters ascending cliff outcrops with baskets on their heads to capture nesting chicks while distracting the female guardian (de Sahagún 1963, p. 42). Likewise, ethnographic records from the Southwestern United States document children capturing eagle chicks from nests raised among Hopi communities for their plumage (McKusick 2001). We can infer that similar strategies were employed at Teotihuacan. The pathology on the inner thigh was recorded on three individuals, suggesting the eagles were generally maintained tethered.

Ethnographic accounts describe that bird sacrifices tended to be executed once the raptor reached prime plumage (~1 year) (McKusick 2001). Among Teotihuacan samples, the majority were adult-statured eagles (73% of 19 skeletons with age designations), though this was likely due to a methodological deficit. Eagles have no teeth nor fusion plates that facilitate age designations (teeth wear and fusion patterns), making body size the primary aging parameter. However, eagles grow to adult stature by 10–12 weeks, long before reaching sexual maturity after five to six years of age. Despite the tendency to overrepresent adult eagles, Burial 2 contained five infant/juveniles or juvenile/young adults. Based on this data, Burial 2 seasonality was calculated as sometime between June and August, during the wet season. As young are more accessible to acquire in greater quantities and more amenable to captivity, they were likely acquired from nests. Unlike the evidence of macaws or turkeys in the northern Mesoamerican site of Paquime

(Schwartz et al. 2021; Somerville et al. 2010), there was no evidence of captive breeding in this population.

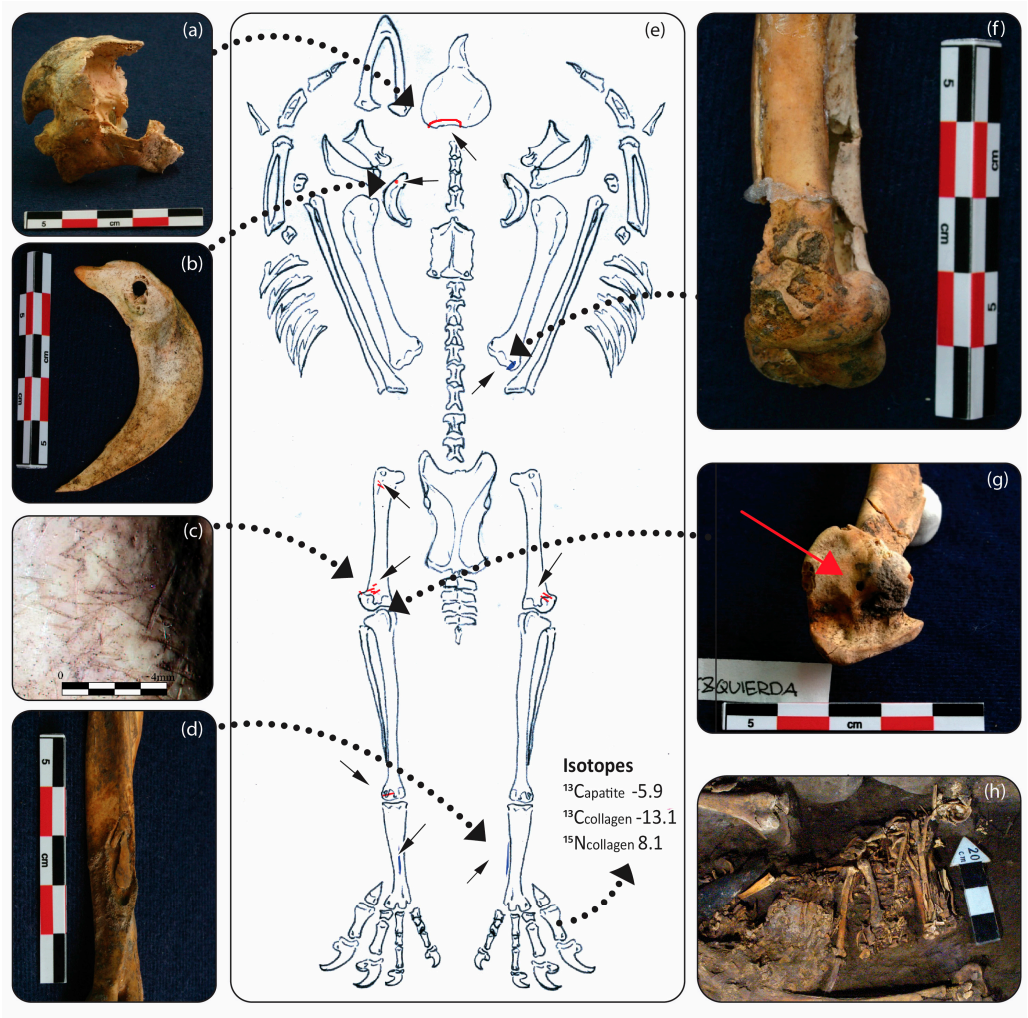


Figure 6. Eagle E.2246: (**a**) dorsal view of the skull with large opening; (**b**) left furculum with perforation; (**c**) microscope image of left femur with cut marks; (**d**) pathology on left medial tarsometatarsus; (**e**) distribution of surface modifications (red: cutmarks, blue: pathologies) and isotope values; (**f**) pathology on distal humerus; (**g**) perforation on tibiotarsus; and (**h**) eagle in situ, Burial 6.

Caregivers were paying close attention to these raptors, which were not only challenging to age (primarily based on plumage coloration) but difficult to sex. There was a degree of sexual dimorphism, with females 40–50 percent heavier than males (Watson 2010, p. 33), but modern biologists tend to favor utilizing genetic tests. It is not realistic that ancient Teotihuacanos were utilizing length-to-width ratios on the tarsometatarsus bone (or later ancient DNA studies, Hofman et al. 2024) applied in this study to sex the eagles who tended to have directional preferences in the dedicatory cache. For ancient eagle handers, sex was part of their sociality, which was determined through direct manipulation of eagles during captivity. This practice is documented among modern Hopi communities who rear young eaglets. They describe the sex to be identified when captured and are gifted a patterned blanket that identifies the gender (McKusick 2001). This same blanket wraps the eagle upon sacrifice, interred with a bow for a male and a doll for a female. Surprisingly, both live sacrifice and secondarily prepared eagles from Teotihuacan largely followed this pattern, indicating that even after death, their sex was remembered as part of the identity of the eagle. Like modern pets, long-term maintenance of the eagles fostered intimate relationships,

with some likely even named, recognizing individualized personalities, and integration into the community. The evidence of taxidermy and attempts to keep skeletal integrity intact suggests that acquiring 18 eagles for Burial 6 was difficult, with some supplemental secondary remains acquired to complete the necessary numerological requisites.

This sparks a more realistic narrative of past rituals; even some of the most extravagant ritual theaters had hidden transcripts contested and negotiated by the biology and behavior of the corporeal animal forms. As López Austin astutely said, "...cosmovisions are not perfect" (López Austin 1993, p. 165); it is precisely these imperfections that help us understand how diverse persons adjust themselves dialectically and relationally to the community. At the same time, these supplementary corporeal animal forms may not have extensively impacted the embodied experiences of the greater public. This is to say, among the 18 extravagantly displayed eagles paraded alongside pumas, jaguars, and wolves along the Avenue of the Dead to reach their final resting place, who would realistically notice a few of the eagles were immobile? There are multiple ways of knowing and interacting with the world, and rituals encompass individualized interpersonal interactions with diverse persons (humans and other-than-human). Some had a degree of intimacy with these potent raptors, such as governing individuals, but also caregivers that regularly handled and visited them within the city confines and knew the names and even the sex of the live and prepared eagles. Others in the public were impacted precisely as they should, with awe and admiration to be witnesses and in physical co-presence with these majestic beings. Public rituals provide the meta-sensory form of embodied cognition across a grand public, despite differential access to degrees of intimacies with these potent beings, to conversively co-create (Harrison-Buck 2018, p. 274; Harrison-Buck and Freidel 2021) an *altepetl*, the Moon Pyramid, at the heart of Teotihuacan.

6. Animals That Reside Within: The *Altepetl* as Place-Thought

The next step is to translate the zooarchaeological and isotopic data of physical interactions into understanding the Moon Pyramid as a place-thought. As place-thought is not static but always recontextualized and on the verge of becoming, we investigated the Moon Pyramid's localized personhood during the construction of Building 4. Here, I argue potent corporeal animal forms, alongside other persons, participated in situating the Moon Pyramid into space and time, transforming a dirt mound into the ultimate place-thought, the *altepetl* of Teotihuacan.

Who, when, how many, and how corporeal animal forms, alongside other persons, assembled in Burials 2 and 6, inform the materialization of place-thought at the Moon Pyramid. Here, animals followed similar spatial syntax emphasizing cardinal and intercardinal directionality and embodying calendrically important numerals (n = 18). Despite the exceptions already discussed, Burial 6 recognized gendered directionality. The animal's sex was part of the social positionality (personhood) of the corporeal animal forms, where males tended to favor eastern sectors and females were inclined to the western sphere.

Rituals throughout Mesoamerica mark the passage of time by recognizing important temporal divisions in the calendar. Time was materialized by eagles, solar avatars, placed in sets of 9 (Burial 2) and 18 (Burial 6). Their presence along cardinal and intercardinal directions reproduced the sun's daily movement from East to West, but also its northern and southern mobility along the eastern horizon throughout the solar cycle. Place-thought, like cosmospaces, is situated through horizontal (often quadripartite) and vertical dimensions (upper-lower) (Freidel 2022). The verticality of the Moon Pyramid materially attested to its place-thought. Burial 2 was planted along the bedrock between June and August during the wet season, with the animals directly in contact with the moist, cool, feminine earth. Burial 6 floats above Burial 2 as the mound grew skyward. Offered between September and April during the dry season, it encompassed the celestial realm, hotness, and dryness. In conjunction, corporeal animal forms co-constituted a gendered, social, and relational place and time of the Moon Pyramid (Figure 7).

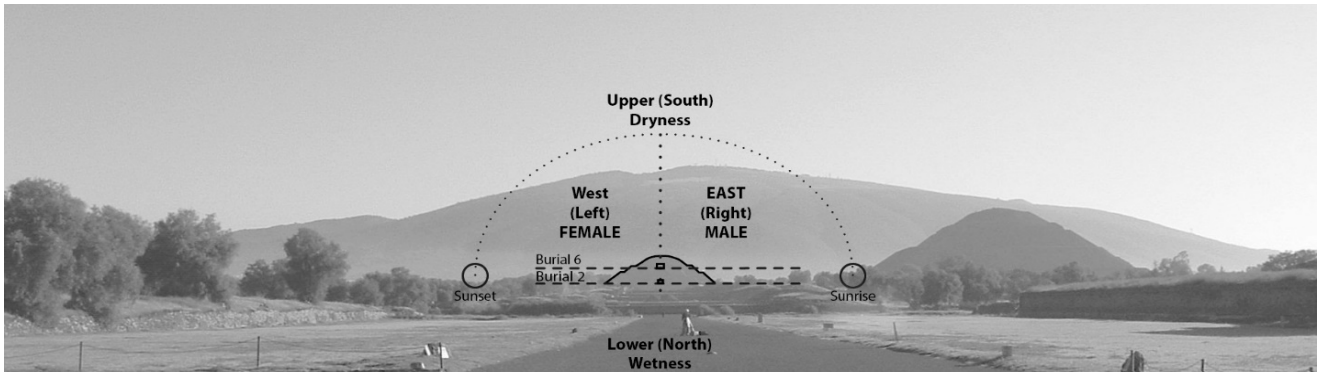


Figure 7. Horizontal and vertical dimensions of the Moon Pyramid illustrating the location of Burials 2 and 6. Photograph: S. Sugiyama.

Such place-thought is not unique to Teotihuacan. Complementary oppositions are embodied in monumental works' symbolism, layout, and even size. The sun is a principal celestial person organizing directionality and temporality in indigenous place-thought. The east (or right) is marked by the rising male sun each morning, while the sunset along the west (or left) marks its transformation to the female moon (Gossen 1979). Males originating from the east are associated with celestial spheres, hotness, and dryness, while females birthed from the west are related to the earth, underworld, and coldness (Lumholtz 1945, V.I:500). These fundamental organizing principles explain why Aztecs consider males who die in warfare to reside in the eastern sky while female warriors slain in childbirth inhabit the western horizon (López Austin 1993, pp. 170–71).

Archaeologically, we see place-thought divisions materialized in monumental works. López Austin and López Luján (2009, p. 481) describe the Aztec Templo Mayor as directionally and dually organized; the southern-upper sections were known as hot, dry places, where celestial bodies, like Huitzilopochtli (the sun and warfare deity) reside, while the northern-inferior sections were areas associated with coldness, vegetation, and humidity, where tellurian beings undulate, in the realm of the rain deity Tlaloc. Offering 125 accordingly followed these rules and regulations, embedding a male eagle adorned with gold bangles to the south (masculine, hot, celestial world). In contrast, its dual counterpart, a female eagle adorned with copper bells, laid to its north (darkness, underworld, cold, earthly, wet, and feminine sphere) (López Luján et al. 2022). Despite the long temporal gap between these two cultures (~1000 years), corporeal animal forms reveal that at the Moon Pyramid, the dedicatory theatrical event, both in its timing and social positionality of the animals, also co-constituted the monument in vertical and horizontal space as a central place-thought, the *altepetl*, of Teotihuacan (Sugiyama in press).

The zooarchaeological data support an instance of socialization during residency within the grand metropolis. Potent apex predators were more than majestic divine beings; they were citizens of Teotihuacan with active personhoods and vital materialities. Sometimes, this resulted in violent encounters with their handlers (trauma), and for others, it facilitated deceit (e.g., substitution of male/female eagles).

Data from Burial 2 confirm that caged pumas and wolves (alongside their coprolites) were in vivo burials. Though consecrated through intimate co-habitation in city confines, they were likely not "killed" in sacrifice; instead, they "dwelled" within the *altepetl* as master guardians. As all other primary deposits in Burials 2 and 6 were tethered (mammals, raptors, and even humans) or confined in containers (serpents), the Moon Pyramid likely housed many potentate beings, similar to the understanding above of the *altepetl* as the home of deities, ancestors, and master guardians. So, the Moon Pyramid as *altepetl* was not only an opportune site of engagement with these powerful entities, but it was also enlivened, brought into being, via the persons that resided within. Thus, when we see depictions of "shouting mountains" (Helmke and Nielsen 2014), they are active persons in dialogue, negotiating with the community. In the case of the Moon Pyramid *altepetl*, it housed

potentate predators intimately part of the community as the ultimate master guardians of the city. Communities (human but also other-than-human) were thus intimately connected and reliant on sustaining amiable relationships with the powerful beings that dwelled within the *altepetl* for their continued well-being.

The animal community was socially differentiated, with some individuals, like the master guardian predators analyzed in this study, heavily engaged in animal politics as persons (Sugiyama in press). Indigenous communities describe animals as hierarchical, with one animal category (e.g., jaguars) to preside over, often controlling the fate of all others. In this manner, a pelican may preside over lake birds (Holland 1964, p. 304). López Austin (1993) describes the importance of animal classifications within a hierarchical structure (e.g., jaguars controlling wild animals) and with political capacity. Some dominant species held political titles (e.g., *tecpilli*, *tlazopilli*, *pilli*, *tlatoani*, and *achcuauhtili*). Such categories were negotiated and maintained through relational (often corporeal) dispositions between humans and other-than-human persons.

At Teotihuacan, the *altepetl*, as materialized by the Moon Pyramid, not only featured the vertical ascent toward the celestial realm but was also set in place and time through the hierarchically arranged animals within. As discussed above, by the Aztec period, the *altepetl* encompassed not only hierarchies but also a social cohesion mechanism that seamlessly braided the political structure of divine kingship with supporting human communities and territories (Hirth 2003; López Austin and López Luján 2009). I argue this application of place-thought, intricately embedded within sovereignty formation, was established at Teotihuacan in Building 4 of the Moon Pyramid.

A multi-archaeometry analysis of corporeal animal forms inherently takes seriously the materialities of animals (both in vivo and their bones/teeth). Enhanced methods available to archaeologists are permitting more detailed, richer descriptions of past interpersonal dynamics. Here, I attempted to go beyond understanding subjugated agencies by recognizing active, intentional, and contextually contingent socialities (including their captivity, gendered spatiality, seasonality, in vivo sacrifice, and even ritual mishaps) of animal persons based on Indigenous knowledge systems. Though a snapshot confined within a single construction episode, the proposed engagement with ancient Indigenous place-thought provided a more dynamic, though admittedly imperfect, and intimately entangled understanding of place, thought, and the community of humans and other-than-human persons at Teotihuacan.

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