

# The Impact of Coastal–Highland Interactions and Population Movements on the Development and Collapse of Complex Societies in Nasca, Peru (AD 500–1450)

Christina A. Conlee 

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*Coastal–highland relationships were important in the development, expansion, and collapse of ancient societies in Nasca, Peru. Connections between the regions began with the earliest occupants and extended through Inca rule; they consisted of the exchange of goods, sharing of ideas, migration, and political dominance. By the end of the Early Intermediate period (Late Nasca, AD 500–650), highland relationships intensified, and during the Middle Horizon (AD 650–1000), Nasca for the first time came under highland control as the Wari Empire brought transformations to the region. By the end of the Middle Horizon, Wari had collapsed, and much of the Nasca drainage was abandoned. People emigrated from the region, probably because of drought coupled with political and social instability. When Nasca was repopulated (ca. AD 1200) in the Late Intermediate period, a new type of society developed that was likely the result of large numbers of highland immigrants.*

**Keywords:** Nasca, Andes, highland–coast interactions, complex societies, population movements

*Las relaciones entre costa y sierra fueron importantes en el desarrollo, expansión, y colapso de las sociedades antiguas en Nasca. Las conexiones entre las regiones comenzaron con los primeros habitantes y se extendieron hasta la dominación inca, y consistieron en el intercambio de bienes, el intercambio ideológico, la migración y el dominio político. Al final del periodo Intermedio Temprano (Nasca Tardío, 500-650 dC) la relación con la sierra se intensifica y durante el Horizonte Medio (650-1000 dC), Nasca por primera vez queda bajo el control serrano cuando el imperio Wari trajo transformaciones a la región. Al final del Horizonte Medio, Wari se había derrumbado y gran parte del valle de Nasca fue abandonado. Después de 200-300 años, Nasca fue repoblado durante la mitad del Periodo Intermedio Tardío. La evidencia arqueológica indica que un nuevo tipo de sociedad se desarrolló como resultado, probablemente, que un gran número de personas eran inmigrantes de la sierra.*

**Palabras claves:** Nasca, Andes, interacciones sierra–costa, sociedades complejas, movimiento de población

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Nasca is a region of the Andes considered coastal in terms of both geography and culture. However, highland relationships and influences were critical in the development, expansion, and collapse of ancient societies in the area. Highland–coastal connections are well documented in the Andes; they began with the earliest occupants and continued through Inca rule. In Nasca, highland relationships were complex and varied, consisting of the exchange of goods, sharing of ideas, migration, and political dominance. One

defining factor of coastal–highland connections is that they were bilateral, with influence and people moving in both directions. Highland contacts were more pronounced in some periods than in others. This article focuses on the period AD 500–1450, which encompasses the end of the Early Intermediate period (EIP), the Middle Horizon, and the Late Intermediate period (LIP), all times of intensified highland influence and population movement that resulted in significant societal change.

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### Interactions, Population Movements, and Cultural Change

Many types of interactions occur between groups of people, some of which have a great potential to cause cultural change. In the Andes, highland–coastal relationships were particularly important in the development and expansion of complex societies. The geography and resources of the region influenced the type and frequencies of interactions. From the Andes mountains a series of valleys extend to the coast, and many have stacked vertical environments in which large changes in elevation are covered in short distances (Murra 1972; Pulgar Vidal 1996). This creates a situation where the procurement of resources from diverse environmental zones and interaction among different groups can occur more easily than the difficult terrain would indicate.

For many years, the dominant model of economic organization and exchange in the Andes centered on verticality and reciprocal exchange. Based on the work by Murra (1972), verticality is the practice in which highland communities established colonies or directly controlled areas and resources outside their home base to obtain agricultural or other goods not available in the high elevations. This system allowed communities to be self-sufficient and not rely on external exchange relationships, merchants, or markets. People were dependent on their ethnic group whose leaders redistributed goods. On the coast, by the Inca period specialization and commercial exchange were the bases of the economy, and not verticality (Rostworowski 1977). Today scholars propose that the situation was more complex and that verticality was not always the primary organization in the highlands. Sometimes it occurred along with other strategies, such as barter or exchange, and only involved certain segments of the population or particular commodities (Goldstein 2005; Stanish 1992; Van Buren 1996). The variability in how items were obtained and exchanged dates back to the earliest periods in the Andes and is evident over time in Nasca (Burger and Asaro 1977; Eerkens et al. 2010; Mader 2019; Reindel and Isla 2018; Van Gijsegem 2006; Vaughn 2009; Whalen 2014).

The exchange of ideas was just as important as the exchange of goods. Archaeologists have long documented time periods, called horizons, in which art styles spread across broad areas of the Andes (Rowe 1962). In many cases, these styles were connected to influential religions that brought new beliefs and ritual practices, and their dissemination was often facilitated by powerful states as they expanded their political and economic dominance (e.g., Burger 1992; Isbell 2008; Menzel 1964). The impact of these ideas was variable, but they were often a catalyst for change.

The movement of people between the highlands and coast is another important factor in the rise and fall of complex societies in the Andes. Resettlement of people was an extensively used strategy by the Inca, who moved communities into areas where they would be more productive, less of a threat, or both (e.g., Cieza de León 1984 [1553]; Garcilaso de la Vega 1966 [1609]); it was a strategy possibly used by earlier civilizations, such as the Wari. Other types of population movements—including the large-scale abandonment of regions and smaller, more sporadic movements of people—likely were also important factors in cultural change.

From the beginnings of archaeological research, migration has been proposed as a causal factor in changes evident in the archaeological record. This hypothesis was particularly prominent in the early and mid-twentieth century when the dominant paradigm was culture history that focused on the diffusion of traits through migration (e.g., Anthony 1990). Migration as an explanatory mechanism fell out of favor beginning in the 1960s with the spread of processual archaeology. A recent resurgence in the study of population movements has focused on how they affected societies in many areas, including the Andes (e.g., Beresford-Jones and Heggarty 2014; Goldstein 2015; Knudson 2008; Tung 2008). The renewed focus is partly due to archaeologists' more common use of newer techniques, including strontium and oxygen isotopic analysis, that can tell us where individuals were born and where they lived in adulthood, and of DNA that can elucidate broader population movements. In addition, today we vividly see

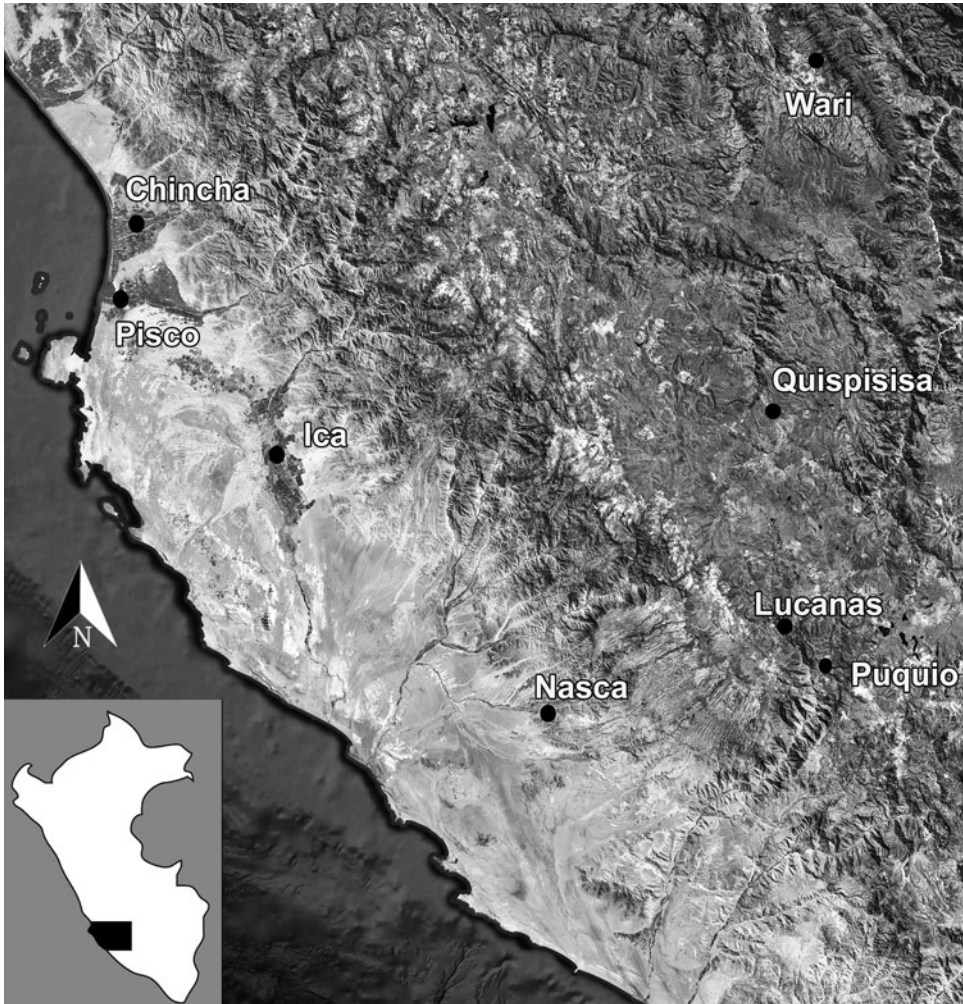


Figure 1. Map with modern towns on the south coast, the obsidian source Quispisisa, and the archaeological site of Wari.

the effect of migration and how it is related to broader political, economic, and environmental factors.

### Nasca–Highland Relationships

Nasca is located along the desert plain of the west coast of Peru in a region called the south coast, although geographically it is the south-central coast. It is part of the hyper-arid far northern Atacama Desert, with a mean annual precipitation of 10 mm (Mächtel et al. 2009:39). The Nasca drainage consists of a series of rivers that run from the highlands, merge into the Grande River, and then into the Pacific Ocean (Figure 1).

This positions much of the drainage away from the coastline; the focus of habitation was inland along the rivers in the middle valleys, where it was easier to access water and agricultural land. From this inland position people had quick access to higher environmental zones and their resources.

One difficulty in examining coastal–highland relationships in Nasca is distinguishing the coastal area from the highlands. Schreiber and Lancho Rojas (2003:30–31) subdivided the Nasca valleys based on hydrology, because water is the most critical resource in the desert. They developed the following zones: Lower Valley (below 400 m asl), Middle Valley (400–800 m

asl), Zone of Infiltration (800–1,200 m asl), Upper Valley (1,200–2,000 m asl), and Sierra (above 2,000 m asl). The Nasca cultural area is most closely associated with the Middle Valley (the lower elevations and foothills of the Andes), although the cultural area extends to the Zone of Infiltration. A noticeable change occurs in the elevations of 2,000 to 3,000–4,000 m asl near the headwaters of the rivers, where the valleys are steep and narrow except for pockets of open land known as *cabezadas* (McCool 2017; Sossna 2014). In many time periods this zone had a mix of influences from the lower elevations and societies to the east. The *puna* regions (high-elevation grasslands) are at around 4,000 m asl; farther to the east and lower in elevation lay the central Andean valleys of the province of Ayacucho. I define the coastal Nasca cultural area as being between zero and 2,000 m asl, an intermediate area focused on the *cabezadas* from 2,000 to 3,000–4,000 m asl, and a highland cultural area that includes the *puna* and regions to the east.

This article focuses on the period from AD 500 to 1450, but highland–coastal connections have their roots in the Preceramic period (9000–1800 BC). A central line of evidence for these contacts is the procurement of obsidian, because its sources are not present on the coast. The primary source used by Nasca people was Quispisisa in central Ayacucho, located 100 km from the town of Nasca (Burger and Glascock 2000; Eerkens et al. 2010). One of the most direct routes from Quispisisa to the coast is through Nasca, and from early on, the highland–coastal movement of obsidian affected cultural developments (Burger and Glascock 2002:360). During all phases of the Preceramic, obsidian is present, and by the end of the period camelid bones are present at lowland sites, indicating the widespread use of these highland animals (Conlee 2016; Engel 1981; Gorbahn 2013; Isla 1990; Vaughn and Linares Grado 2006). During the Early Horizon (800 BC–AD 1), highland–coastal links became well established. In the northern drainage many sites were in high elevation zones, some of which were production centers that provided coastal sites with goods (Mader 2019; Reindel and Isla 2018; Sossna 2014). Highland products (obsidian and camelids)

were found in large amounts in the lowlands, whereas coastal products (shell) were rare in the highlands, indicating that coastal people spurred this interaction (Mader 2019).

#### *Late Early Intermediate Period (AD 500–650)*

The EIP, beginning around AD 1, marks the rise of the Nasca culture, the first large complex society centered in the drainage. Best known for the Nasca Lines (geoglyphs), the people of the Nasca culture also produced fine polychrome pottery, built the large center of Cahuachi, and spread the practice of making trophy heads (e.g., Orefici 2012; Proulx 2006; Reiche 1968). Highland relationships are not particularly evident, and few settlements were located in high elevations compared to the Early Horizon (Reindel and Isla 2018; Sossna 2014). As in earlier periods, obsidian is a crucial indicator of highland connections, and its distribution was variable, suggesting different procurement strategies. It is proposed that people living in the *puna* above Nasca brought obsidian to the lower elevations to trade for products such as maize and *ají* peppers (Burger and Asaro 1977; Vaughn 2009). Vaughn (2009:146) concludes that this was small-scale reciprocal exchange among households and not redistribution by elites. However, at larger settlements in lower elevations, like La Tiza, the quantity of the material was greater, and reduction patterns and artifact types indicate more availability than previously found (Conlee 2014). There, a more organized and frequent type of trade is indicated that possibly involved elites. Generally, long-distance exotic goods were not the focus of the economy, exchange, or status building. Instead, Nasca goods, particularly pottery and textiles, are found as far away as the Moquegua Valley (Goldstein 2000). This attests to the prestigious position held by the Nasca culture: it was not a society that looked externally for legitimation or prestige.

Critical shifts in highland–coastal relationships began in Late Nasca, when links with the Huarpa (the pre-Wari people) of highland Ayacucho become evident. Huarpa potters adopted aspects of Nasca iconography and ceramic technology, practices that continued during the subsequent Middle Horizon (e.g., Benavides 1971; Knobloch 1983; Leoni 2006; Menzel 1964).

Some researchers have argued that people from Nasca moved up into the highlands because of increased aridity on the coast, and possibly artisans made their way to the Huarpa heartland where they directly influenced the pottery style (Eitel and Mächtle 2009; Schreiber 2005; Valdez and Valdez 2016). Genetic data support this hypothesis: mitochondrial DNA of northern Nasca populations suggests migrations into the highlands occurred around AD 640 (Fehren-Schmitz et al. 2014).

During the Late Nasca, shifts in obsidian procurement occurred, at least in the upper elevations of the southern drainage. At the site of Cocahuischo, obsidian was mostly in the form of finished tools with little debitage, indicating that objects were imported as preforms or finished tools (Whalen 2014:306–309). This contrasts with the pattern at earlier sites where the full sequence of reduction was found and the material was likely imported as nodules. Whalen (2014:332) suggests that Huarpa people controlled Quispisisa obsidian and produced complete artifacts carried by llama caravans into Nasca.

Late Nasca architecture also had highland influences. At the site of Huaca del Loro in the Las Trancas Valley, Strong (1957:36) excavated a large round structure (connected to a multiroom rectangular compound) that was constructed of stone and rubble, with a plastered floor and painted red walls. Paulsen (1983:100) proposes it was a highland-style temple built by the Huarpa people. The structure is similar to a round ceremonial building at Ñawinpukyo in Ayacucho, dating to the late Huarpa (Leoni 2006), and to a large round funeral structure with a central square chamber at Huayuncalla in northern Nasca (Sossna 2014:47). Cook (2015) identifies round structures in the midst of rectilinear architecture as a Huarpa tradition, which morph into D-shaped temples during the Wari period. Overall, the evidence indicates an important shift in the Late Nasca, when relationships between the highlands and coast expanded with the movement of ideas, goods, and people.

#### *Middle Horizon (AD 650–1000)*

During the Middle Horizon coastal–highland relationships were transformed, and Nasca

became directly enmeshed with the highland Wari, who expanded their influence and power to the coast. Whereas the exchange of goods and ideas, as well as some migration, occurred earlier between Nasca and the highlands, during the Middle Horizon the coast experienced highland political dominance and colonization. Nasca people had variable relationships and responses to the Wari (Figure 2). In the lowland areas of the northern valleys, the number and size of local settlements decreased (Reindel 2009; Silverman 2002; Sossna 2014). Wari-related tombs with multiple burials and high-status grave goods are documented at several sites, and Lambrasniyoq has small Wari-style rectangular compounds and a D-shaped temple (Isla 2001, 2009; Isla and Reindel 2014; Sossna 2014). In the *cabezadas* between 2,000 and 4,000 m asl, Proyecto Nasca-Palpa identified more than 40 sites with a Wari affiliation (Isla and Reindel 2014; Sossna 2014). One of the largest sites, Huayuncalla, has Wari-style rectangular compounds. None had defensive walls, slingstones, or other evidence of conflict (Sossna 2014:196). Late Nasca (Nasca 7), local Middle Horizon (Loro), and Wari (Chakipampa) ceramics are present, sometimes in the same stratigraphic contexts. Sossna (2014:192) proposes that in the late seventh century “conservative locals” using Nasca 7 pottery lived alongside local people using Loro pottery, who adopted some elements of Ayacucho pottery styles, as well as a small group of immigrants using Wari imperial styles. This mixing of people and cultures is a hallmark of the Middle Horizon in Nasca.

In the southern drainage, Wari sites include Pacheco in the lower Nasca Valley, Huaca del Loro in the middle valley, Pataraya in the upper valley, and Incawasi in the *cabezadas* (Conlee et al. 2021; Edwards and Schreiber 2014; Menzel 1964; Tello 2002). All contain Wari rectangular compounds and imperial- and local-style pottery, and Huaca del Loro has at least one D-shaped temple. Incawasi and Pataraya are connected by roads that originate in the sierra and continue down to the middle and lower Nasca Valley (Edwards and Schreiber 2014), indicating the importance and frequency of travel between the areas.

Huaca del Loro was a Wari colony at the southern edge of Nasca. The settlement spans

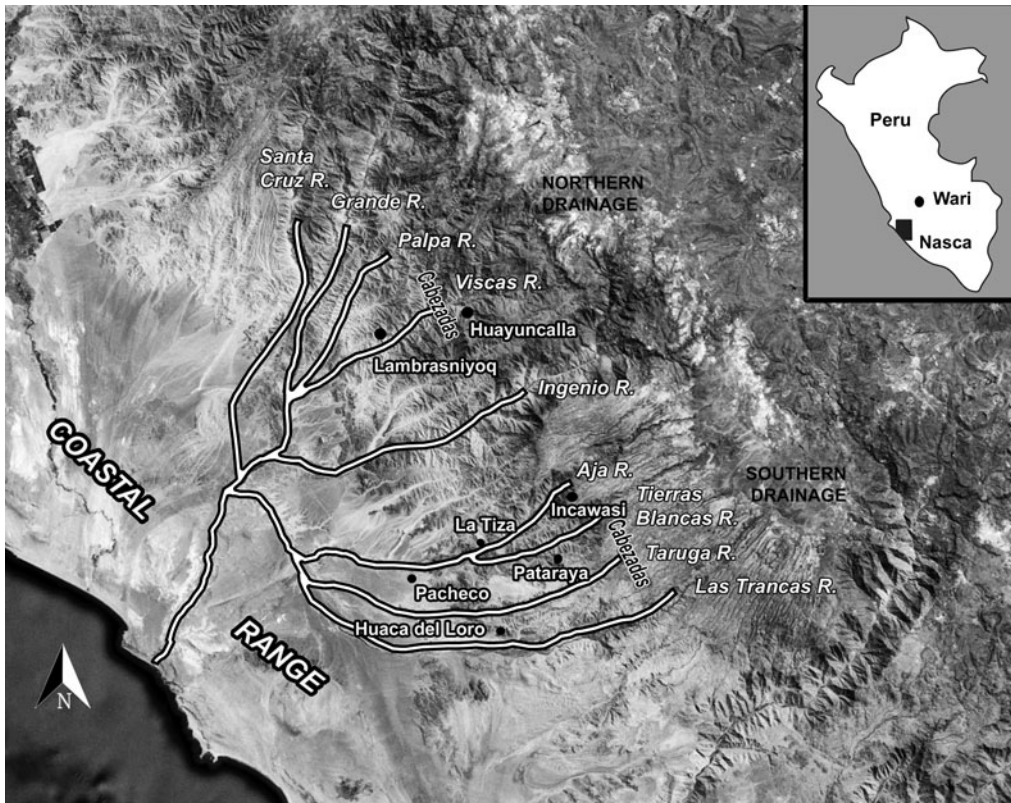


Figure 2. Map of the region showing the Middle Horizon sites discussed in the text.

approximately 20 ha and contains cemetery, ritual, and domestic areas (Conlee et al. 2021; Strong 1957; Tello 2002). Recent excavations uncovered a rectilinear Wari compound and a D-shaped temple in the western part of the site (Figure 3; Conlee et al. 2021). Ground-penetrating radar documented the presence of several other rectilinear compounds, indicating that the Wari sector was substantial. The eastern half of the settlement contains local architecture and may have housed local support personnel for the Wari installation. Local Loro-style pottery predominates, but imperial styles Chakipampa and Viñaque are present in small quantities (Figure 4). Similar pottery assemblages are found at all Wari sites in Nasca: Loro appears to be a widespread style used by Wari and local communities and was not developed solely in resistance to the Wari. The association between Wari and Loro pottery and Loro influence outside the region requires additional investigation. Future excavations at Huaca del Loro will further

clarify the nature of the site and the relationship between the Wari and Nasca peoples.

La Tiza in the middle Aja Valley is not a colony, but several lines of evidence indicate strong Wari ties. Obsidian was procured and used in greater quantity than earlier and exclusively came from Quispisisa, which was likely under Wari control (Conlee 2016). New copper alloys were developed in the Middle Horizon, and bronze objects are common at Wari sites (Jennings et al. 2015; Lechtman 1991, 2005). At La Tiza bronze objects were used for the first time; *tupus* (shawl pins) were the most numerous. The *tupus* are similar to those found at Pataraya (Edwards 2010:376–377), in tombs in the northern drainage (Reindel et al. 2013:304), and in the Wari heartland. *Tupus* were widespread in the Middle Horizon probably because of Wari influence. The Middle Horizon La Tiza textiles contain a higher quantity of camelid fiber than earlier, indicating that fiber or yarn was being increasingly traded from the highlands

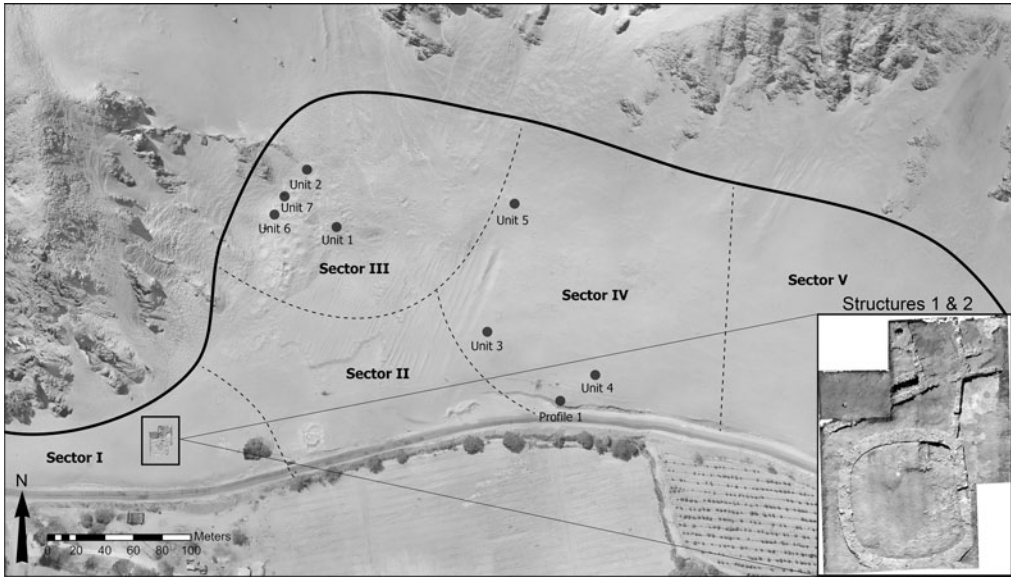


Figure 3. Map of Huaca del Loro showing the excavated units and the rectilinear compound (Structure 1) and D-shaped temple (Structure 2) (drawn by Zach Lindsey).



a.



b.

Figure 4. Pottery from Huaca del Loro: (a) Wari imperial Viñaque style and (b) the local Loro style. (Color online)

(Mills and Conlee 2019). Certain kinds of fabrics, such as interlocked tapestries, were probably introduced by the Wari (Rowe 1979:186),

and those that combined highland designs and coastal techniques indicate new highland links. As at other contemporary sites, the pottery consisted mostly of the local Loro style, with a few pieces of Chakipampa and Viñaque.

At La Tiza, Wari-style family mausoleums, similar to those documented in the northern drainage, were used and contained elite grave goods of *Spondylus* shell, fine pottery, textiles, and copper artifacts that were also common in Wari tombs. The new burial practices represent a stimulus from the Wari heartland where multiple burials were common and replaced the individual graves used previously (Isbell 2004; Ochatoma and Cabrera 2001). Foreigners were identified in the mausoleums through oxygen and strontium isotopic analysis (Buzon et al. 2011; Conlee et al. 2009). Two women in their early twenties had signatures similar to highland regions and may have married into the community to create ties between local high-ranking people and the Wari.

Nasca-highland relationships in the Middle Horizon were not unilateral. Various aspects of Nasca culture, most notably the Nasca pottery style, were adapted by the Wari. The Wari incorporation of Nasca religious and cultural images reflects the prestige of Nasca (Menzel

1964) and likely some aspects of a shared ideology. Trophy heads were possibly popularized through Nasca influence, although differences occurred in their use and who they were obtained from (Conlee et al. 2009; Kellner 2006; Knudson et al. 2009; Tung 2012). The Wari also perhaps incorporated the Nasca tradition of burying the dead in a flexed, seated position (Valdez et al. 2006:684).

In sum, the Wari and Nasca were very enmeshed. In Nasca, for the first time, archaeological evidence indicates the political, social, and economic dominance of highland people and institutions. This dominance is found archaeologically in the establishment of Wari colonies, an increase in highland goods such as obsidian and copper alloys, new mortuary practices, and the presence of foreigners. Nasca's influence in the highlands is reflected in Wari people's incorporation of Nasca ceramic technology and iconography and possibly in the increased use of flexed burial positions and trophy heads.

A major disruption occurred at the end of the Middle Horizon that resulted in the collapse of Wari and Nasca. Much of Nasca was abandoned by AD 1000, and it was not reoccupied until at least AD 1200 (Conlee 2016; Edwards 2010; Reindel and Wagner 2009; Sossna 2014). In the middle of the tenth century, the Wari colony Pataraya was ceremonially closed in an event during which corridors were sealed, ceramics vessels smashed, fires lit in the corners, and a fine layer of sand placed on the surface, indicating a purposeful and quick abandonment (Edwards 2017). At Huaca del Loro the D-shaped temple was filled in and offerings of cotton were left, although the timing and exact nature of this event are yet to be established. At La Tiza, the collapse was more gradual, with abandonment of domestic areas before burial areas. It is unclear where people moved, although it is suspected they migrated to higher elevations or to coastal areas to the north that had more regular access to water.

Wari collapse and Nasca abandonment were caused by multiple factors. Wari was an expansive state that encompassed a vast area of the Andes; when the political system weakened, it would have been difficult to support administrative centers and economic activities in the

colonies. Climatic change, particularly drought, potentially caused instability as decreasing agricultural yields led to stress and weakened the power of the rulers (McEwan 2006; Shimada et al. 1991; Thompson et al. 1985; Williams 2002). Other potential factors include internal rebellion or epidemic diseases that affected people or crops (Schreiber 2012).

In Nasca, drought conditions are evident. Geoarchaeological data from desert loess indicate the desert shifted east (limiting agricultural land), and a more arid period began around AD 600 that extended until the fourteenth century in some areas (Eitel et al. 2005). Lake cores from Laguna Pumacocha document a period of marked aridity from AD 900 to 1100 (Bird et al. 2011:8587), and analysis of marine sediments near Lima indicates extreme drought from AD 800 to 1250 (Rein et al. 2004). However, Nasca had faced drought before that did not lead to large-scale abandonment (Eitel and Machtle 2009; Eitel et al. 2005; Reindel and Isla 2013); therefore, other factors contributed to its instability. During the EIP, the *puquios*, a system of underground aqueducts, were built in the southern valleys—a major investment that helped stabilize the water supply (Schreiber and Lancho Rojas 2003). Large-scale irrigation systems anchor people to locations and can generate vulnerabilities because fields and communities are not easily moved when water availability decreases (Hegmon et al. 2008; Nelson et al. 2010). The *puquios* may not have been effective during a drought that lasted many years and severely limited the subterranean water supply (Conlee 2015). Additionally, irrigation systems may increase water availability or stability for some while causing shortages or instability for others (Nelson et al. 2010:4). It is possible that the Wari fundamentally changed local communities' control over irrigation and water, which created greater disparities in the water supply and generated more social inequality, which was a factor in people leaving (Conlee 2015).

#### *Late Intermediate Period (AD 1000–1450)*

The Nasca drainage was reoccupied around AD 1200, a period that coincided with improved climatic conditions. Evidence from loess and related deposits suggests increased humidity,



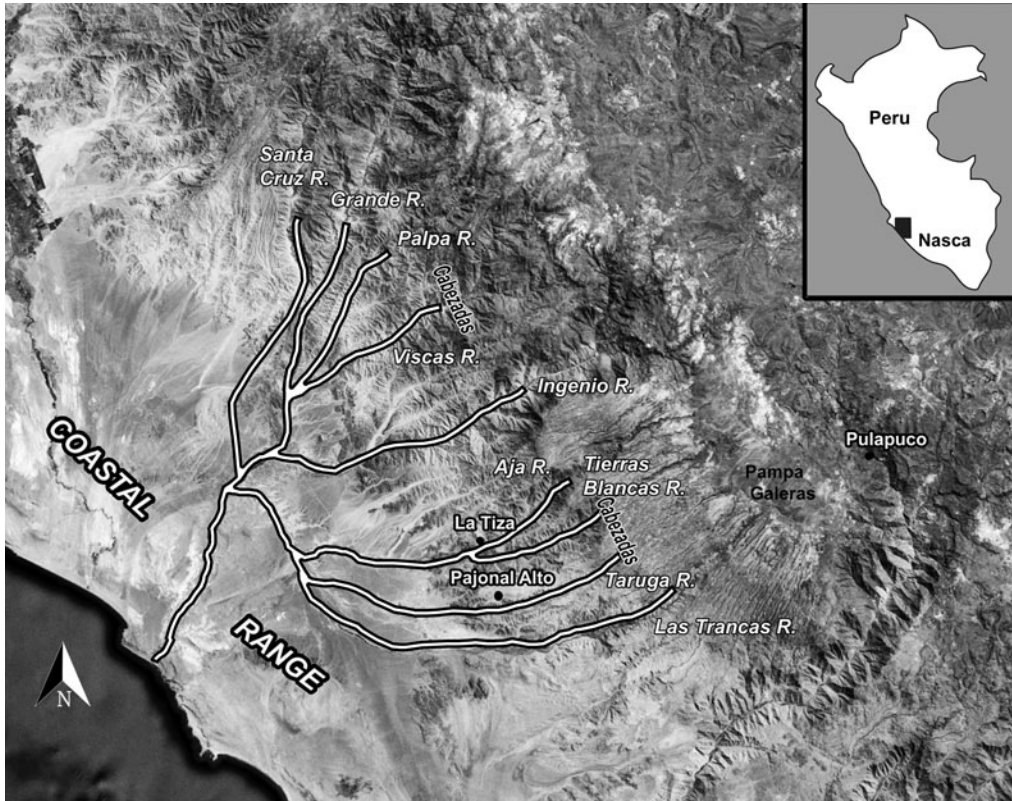


Figure 5. Map of the Nasca region showing the LIP sites discussed in the text.

and the period is classified as semiarid with more reliable rainfall (Eitel et al. 2005:153). A period of monsoonal precipitation occurred between AD 1320 and 1440, with more water in the Nasca rivers (Unkel et al. 2007:23). The improved conditions may have spurred populations to settle in the region, although other factors were likely important as well.

The society in the LIP was profoundly different from earlier ones in Nasca. Throughout the middle valleys and foothills, the population increased, and large agglutinated villages and towns dominated the settlement hierarchy; many ranged from 8 to 30 ha (Conlee 2003; Lambers et al. 2007; Reindel 2009; Schreiber and Lancho Rojas 2003; Siveroni 2017; Sossna 2014; Figure 5). Settlements were more varied in size, location, architectural layout, and construction material. Many sites, such as La Tiza, were in defensive locations and contained large walls and piles of slingstones, indicating increased conflict and a greater concern with

defense. (Figure 6). However, a few sites such as the village of Pajonal Alto were located on the valley bottoms without any defensive features.

Sites in the *cabezas* were unlike those in the coastal region. In the northern drainage they consisted primarily of round structures, whereas in the lower elevation, houses were square and rectangular and often agglutinated in compounds (Sossna 2014). Despite the architectural differences, the pottery was similar. Sossna (2014:201) suggests that a cultural or political border existed between the two and names the group living in the foothills Nanasca, and the one in the *cabezas* Rucanas, names that come from historic sources. He proposes that similar pottery in both areas and the presence of highland products such as camelids and tubers in the lower elevations indicate a close economic relationship. Both areas have defensive sites and evidence of conflict indicating a threat from groups in neighboring valleys or populations in

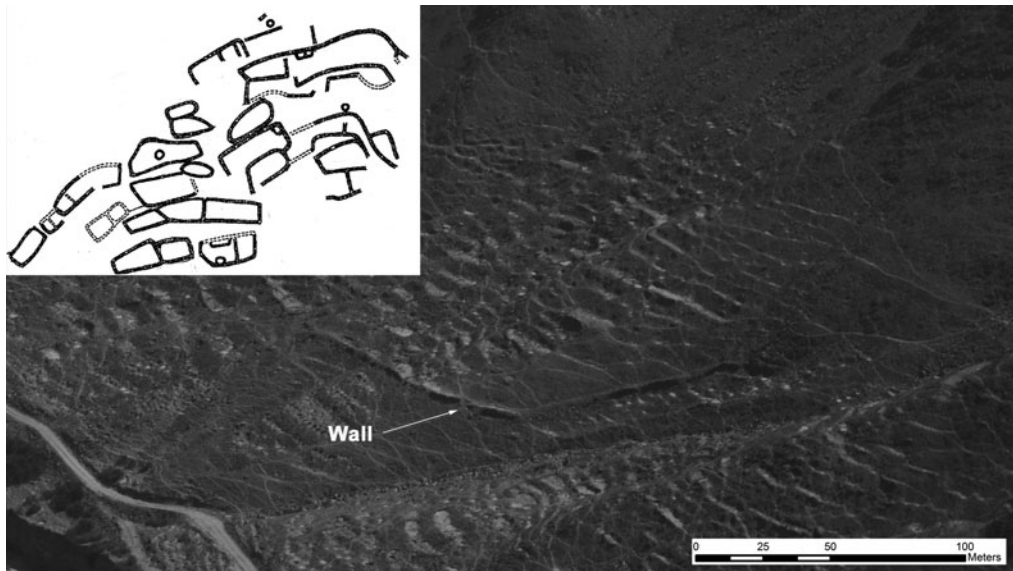


Figure 6. Large wall at La Tiza with an inset of typical domestic terrace architecture at the site.

the highlands east of the *puna*. A similar pattern is found in the *cabezadas* in the southern tributaries, where Weston McCool (2017, personal communication 2020) has documented 17 sites with round residential architecture and *chullpa* burial towers, which resemble those of the Lucre region to the east (Abraham 2010; Schreiber 1992). This pattern contrasts with settlements in the lower elevations where rectangular and square architecture is the norm and burials were in simple pits. The settlements in the southern *cabezadas* are described as hillforts with nucleated residences, multiple large walls, and ditches, indicating endemic warfare and conflict (McCool 2017). The ceramics are similar to those in lower elevations (Weston McCool, personal communication 2020). These patterns indicate that the *cabezadas* were a well-demarcated intermediate zone during this period.

New economic activities and relationships developed, with production focused on utilitarian goods such as plain pottery and textiles, contrasting with the fine pottery and textiles of earlier periods (Conlee 2003, 2006, 2016). Pottery changed dramatically to simple geometric designs and less skillful manufacture, suggesting a loss or rejection of the previous practices. Chemical compositional analysis (INAA) of pottery from the small village of Pajonal Alto and

the large town of La Tiza identified a variety of clay sources and many communities producing pottery (Conlee et al. 2019; Vaughn et al. 2006). People continued to obtain obsidian primarily from Quispisisa, but Jampatilla (located 18 km farther away) was a source of lower-quality material that was also used (Conlee 2016; Eerkens et al. 2010). Metal objects are not reported, suggesting that people could no longer obtain these items or that they were no longer important in demarcating social identity and status. Subsistence activities were similar to those at earlier settlements, with a focus on farming and possibly an increase in camelid herding (Conlee 2003, 2016). Overall, the evidence for production, exchange, and subsistence practices suggests substantial regional interaction and continued ties to the highlands.

Religious and burial practices were markedly changed. In the burial practices of the middle valleys and foothills, individuals were placed in pits with few grave goods, and infants and children were interred in large ceramic pots or with large pieces of pottery (Conlee 2016). The mausoleum tombs of the Middle Horizon were absent, as were elaborate grave goods. No longer were supernatural beings depicted in the art, and trophy heads are not documented. The geoglyphs that were a hallmark of the Nasca culture, and

continued to be constructed in the Middle Horizon, were not used in the same way. Many long paths with an abundance of associated LIP pottery cross the desert plateaus where large concentrations of geoglyphs are found (Lambers 2006; Sakai et al. 2010). However, LIP buildings were constructed on top of geoglyphs, indicating they were no longer sacred (Lambers 2006), and much of the religious system centered on the geoglyphs appears to have been abandoned. Rituals were also no longer conducted on a regional scale and instead were community or family based. At Pajonal Alto a small mound and plaza were associated with an elite compound (Conlee 2003). In contrast, at La Tiza small hill-top structures were used for rituals, indicating diversity in ritual locations (Conlee 2016). People maintained Pan Andean religious ideas, which included mountain and water worship, animal and plant offerings, and the use of *chicha*, *antaras*, and *Spondylus* in rituals. Religious practices associated specifically with the Nasca and Wari cultures were absent.

The political and social nature of society was substantially different. Given the complexity of regional settlement patterns and the diversity of architecture, it appears that the number and kinds of social statuses increased (Conlee 2005, 2016). The hierarchy expanded but also diffused, with resources of power becoming more variable and resulting in a more segmented and horizontally complex society. With religion no longer playing an important centralizing role, expanded economic relationships and regional trade—along with new political structures—worked to integrate the region. Evidence of conflict suggests that violence and the threat of violence were common and that leadership was based in part on the ability to defend settlements or lead attacks.

These major changes may be attributed to the long period that the region was abandoned. When people resettled, they brought different ideas and practices, which resulted in a different material culture. Another consideration is that the new immigrants (or at least a large percentage of them) were not genetically related to those who lived there previously. Mitochondrial and Y-chromosomal DNA research by Lars Fehren-Schmitz and colleagues suggests major changes in the Nasca population based on

samples from the northern Nasca drainage. Genetic distinction between coast and highland populations was very marked during the EIP and the Middle Horizon, but not in the LIP (Fehren-Schmitz et al. 2010, 2011, 2014). Mitochondrial DNA studies indicate genetic discontinuity between the Middle Horizon and the LIP, and that LIP coastal populations were similar genetically to those of the highlands (Fehren-Schmitz et al. 2014:9445). It is proposed that a substantial influx of highland people to the coast occurred around AD 1150, coinciding with increased humidity on the coast and increased aridity in the highlands (Fehren-Schmitz et al. 2014:9447). The genetic data suggest that many of the people who resettled Nasca were not the direct descendants of the previous occupants, which would help explain the major differences in society.

At La Tiza four individuals were buried near each other in a large domestic structure. They included one possible female aged 25–33, one possible male aged 14–15, and two infants aged 1.0–1.5 years. All four were born and lived in the local region, based on oxygen and strontium isotopic analysis (Buzon et al. 2012; Conlee et al. 2009). A radiocarbon date of AD 1315–1435 came from charcoal associated with the adult female. Radiocarbon dates from other LIP contexts at the settlement span AD 1212–1455. These data suggest that, if emigration from the highlands occurred and some people settled at La Tiza, by 1300 a new generation was being born and raised at the settlement. It is also possible that these individuals represent a small local population who did not move out of the region at the end of the Middle Horizon.

In addition to the use of DNA and isotopic analysis, connecting highland people to the new type of society in the LIP can be done by the comparison of material culture. However, this comparison is difficult, given the sparsity of information about groups in the highland regions adjacent to Nasca. In particular, little is known about early LIP sites in coastal Nasca (where they are missing), in the intermediate area, or in the highlands. More information is known from the later part of the LIP and the Late Horizon. Historic and archaeological evidence indicate that the Lucanas ethnic group occupied the upper areas of the Nasca drainage,

including the *puna* regions such as the Pampa Galeras (Meddens and Schreiber 2010:134). Preliminary reconnaissance, including around the town of Puquio, identified a substantial population at the time of Inca conquest. The site of Pulapuco, located at 3,450 m asl near the town of Lucanas, was an LIP settlement and then an Inca administrative center. The settlement has round residential architecture, fortification walls, and tombs constructed at the base of boulders or outcrops that contain multiple individuals (Abraham 2010). The pottery is highland in style, with only one piece with the dot-and-band motif common in Nasca (Abraham 2010:233). Two sherds—one with a raised oval appliqué with deep impressions and one with a round circle appliqué that forms a flower (Abraham 2010:Figures 7.16 and 7.17)—are similar to single examples found at Pajonal Alto. These styles have not been identified at other coastal settlements and are likely highland imports. In contrast, the red slip and other types of appliqué pottery common at Pulapuco are found at many sites in the surrounding Lucanas region, the Andamarca Lucanas region to the east, and the Soras region to the northeast (Abraham 2010; Meddens and Schreiber 2010; Schreiber 1993). Pulapuco architecture is similar to that in Andamarca Lucanas and Soras, and in the *cabezadas*, but has nothing in common with sites in coastal Nasca. Historical information indicates the Lucanas people traded camelid meat and wool for coca and *aji* pepper with populations in the lower elevations (Monzón 1965). Overall, the Lucanas people, as represented by those who lived at Pulapuco, had some shared cultural traditions with the Andamarca Lucanas and Soras groups, as well as the *cabezadas* people, but not with people of the lower elevations of Nasca.

In the northern Nasca drainage, Sossna (2014:236) proposes that people living in the middle valleys and foothills were immigrants from the northern valleys of Ica, Pisco, and Chincha, and that those living in the *cabezadas* emigrated from the southern or central highlands. However, isotopic and genetic data do not indicate influxes of northern coastal populations at this time. Additional samples from lowland Nasca settlements and from the northern south

coast valleys are needed to fully assess this proposal. In the southern drainage, one potential scenario is that in the early part of the LIP people from eastern Lucanas began moving across the *puna* and settled at the site of Pulapuco and around Puquio. By the middle of the LIP, they had established settlements in the *cabezadas*, and possibly large numbers of them moved down to the foothills and middle valleys. There they may have mixed with remnant coastal populations. Radiocarbon dating and excavations at *cabezada* sites, as well as additional DNA analysis of individuals from the highlands, *cabezadas*, and lowlands, will help address this scenario.

### Discussion and Conclusions

Archaeological evidence reveals a long and dynamic history of Nasca–highland relationships. By the EIP interactions between the highlands and coast were well established. Consumption of highland obsidian had increased in some but not all Nasca communities, suggesting a differential access to goods based on community location and status. By the Late EIP, substantial changes occurred as connections between the Nasca and the Huarpa people of Ayacucho strengthened. DNA evidence indicates the movement of coastal Nasca people into the highlands, and Huarpa-style architecture on the coast suggests that highlanders moved to Nasca. This dynamic period led to the development and expansion of the Wari Empire.

Highland relationships were transformed in the Middle Horizon as the Wari came to govern Nasca. However, questions remain about the relationship between the two. When did the Wari conquest begin? Evidence suggests the presence of substantial Huarpa influence and connections in the late EIP. Did the movement of people, ideas, and goods occur before domination by the Wari, or did political conquest begin in the Huarpa period? What did conquest involve? The lack of defensive sites or other evidence of conflict indicates that large-scale warfare did not occur. How then, did the Wari establish itself in the region? The Wari colonies found in the *cabezadas* imply direct control of that area, but the Wari people's relationship with settlements in the middle valleys and

foothills is more complex, involving both the establishment of colonies such as Huaca del Loro and government through local elites and marriage alliances at La Tiza.

The end of the Middle Horizon and beginning of the LIP was a time of great disruption as people left Nasca. A better understanding of the impact of changing environmental conditions on people, farming, and irrigation is necessary to understand what led to collapse and migration. It is informative to compare this period in Nasca with that in the Ica Valley to the north: in the lower valley, abandonment did not occur, indicating different political, social, and environmental conditions (Cadwallader et al. 2015). Information is lacking on this period in the Acarí Valley to the south, but this would be a productive area of future investigation. Other issues that need to be further addressed are the extent of highland people in Nasca in the LIP, where in the highland these individuals came from, and what aspects of culture they brought with them. The hillfort settlements in the *cabezadas* resemble those to the east in the sierra in Lucanas and have little in common with settlements in the lower drainage; however, the ceramic styles are similar to those in the lowlands. What does this disparity in material culture represent? These settlements may be key to understanding population dynamics in this period.

If LIP populations consisted primarily of highlanders, then the Nasca culture of the EIP may have been the last primarily coastal society in the region. The Middle Horizon was a time when the cultures of Nasca and Wari mixed and coastal–highland dichotomies became less pronounced. If, in the LIP, new people settled the region and brought different ideas and traditions, when the Inca conquered Nasca they may have encountered a society that had many aspects of highland religious beliefs, sociopolitical organization, and perhaps even language. This history of the Nasca region highlights the close connections between coastal and highland regions over several hundred years that involved substantial population movements, intensified in the Middle Horizon, and transformed local society by the time of Inca conquest.

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## References Cited

- Abraham, Sarah Jane  
2010 Provincial Life in the Inca Empire: Continuity and Change at Pulpaco, Peru. PhD dissertation, Department of Anthropology, University of California, Santa Barbara.
- Anthony, David W.  
1990 Migration in Archaeology: The Baby and the Bathwater. *American Anthropologist* 92:895–914.
- Benavides Calle, Mario  
1971 Análisis de la cerámica Huarpa. *Revista del Museo Nacional* 37:63–88.
- Beresford-Jones, David, and Paul Heggarty  
2014 Andes: Archaeology. In *The Global Prehistory of Human Migration*, edited by Peter Bellwood, pp. 410–416. Wiley Blackwell, Chichester, UK.
- Bird, Broxton W., Mark B. Abbott, Mathias Vuille, Donald T. Rodbell, Nathan D. Stansell, and Michael F. Rosenmeier  
2011 A 2300-Year-Long Annually Resolved Record of the South American Summer Monsoon from the Peruvian Andes. *PNAS* 108:8583–8588.
- Burger, Richard L.  
1992 *Chavín and the Origins of Andean Civilization*. Thames and Hudson, New York.
- Burger, Richard L., and Frank Asaro  
1977 *Trace Element Analysis of Obsidian Artifacts from the Andes: New Perspectives on Pre-Hispanic Economic Interaction in Peru and Bolivia—LBL6343*. Report on file. Lawrence Berkeley Laboratory, Berkeley, California.
- Burger, Richard L., and Michael D. Glascock  
2000 Locating the Quispisisa Obsidian Source in the Department of Ayacucho, Peru. *Latin American Antiquity* 11:258–268.
- 2002 Tracking the Source of Quispisisa Obsidian from Huancavelica to Ayacucho. In *Andean Archaeology I: Variations in Sociopolitical Organization*, edited by William H. Isbell and Helaine Silverman, pp. 341–370. Kluwer Academic, New York.
- Buzon, Michele R., Christina A. Conlee, and Gabriel J. Bowen  
2011 Refining Oxygen Isotope Analysis in the Nasca Region of Peru: An Investigation of Water Sources and Archaeological Samples. *International Journal of Osteoarchaeology* 21:446–455.

- Buzon, Michele R., Christina A. Conlee, Antontio Simonetti, and Gabriel J. Bowen  
2012 The Consequences of Wari Contact in the Nasca Region during the Middle Horizon: Archaeological, Skeletal, and Isotopic Evidence. *Journal of Archaeological Science* 39:2627–2636.
- Cadwallader, Lauren, Susana Arce Torres, Tamsin C. O'Connell, Alexander G. Pullen, and David G. Beresford-Jones  
2015 Dating the Dead: New Radiocarbon Dates from the Lower Ica Valley, South Coast Peru. *Radiocarbon* 57:765–7773.
- Cieza de León, Pedro de  
1984 [1553] *La crónica del Perú primera parte*. Fondo Editorial de la Pontificia Universidad Católica del Perú, Lima.
- Conlee, Christina A.  
2003 Local Elites and the Reformation of Late Intermediate Period Sociopolitical and Economic Organization in Nasca, Peru. *Latin American Antiquity* 14:47–65.  
2005 The Expansion, Diversification, and Segmentation of Power in Late Prehispanic Nasca. In *Foundations of Power in the Prehispanic Andes*, edited by Kevin Vaughn, Dennis Ogburn, and Christina A. Conlee, pp. 211–223. Archaeological Papers No. 14. American Anthropological Association, Arlington, Virginia.  
2006 Regeneration as Transformation: Post-Collapse Society in Nasca, Peru. In *After Collapse: The Regeneration of Complex Societies*, edited by Glenn M. Schwartz and John J. Nichols, pp. 99–113. University of Arizona Press, Tucson  
2014 Nasca Culture Integration and Complexity: A Perspective from the Site of La Tiza. *Journal of Anthropological Archaeology* 35:234–247.  
2015 Reestablishment of Complex Societies following Collapse and Abandonment in Nasca, Peru. In *Beyond Collapse: Archaeological Perspectives on Resilience, Revitalization, and Reorganization in Complex Societies*, edited by Ronald Faulstich, pp. 213–236. Center for Archaeological Investigations, Southern Illinois University, Carbondale.  
2016 *Beyond the Nasca Lines: Ancient Life at La Tiza in the Peruvian Desert*. University Press of Florida, Gainesville.
- Conlee, Christina A., Matthew T. Boulanger, and Michael D. Glascock  
2019 1,500 Years of Pottery Production on the South Coast of Peru: Instrumental Neutron Activation Analysis from the Site of La Tiza. In *Ceramics of the Indigenous Cultures of South America: Studies of Production and Exchange through Compositional Analysis*, edited by Michael D. Glascock, Hector Neff, and Kevin J. Vaughn, pp. 113–124. University of New Mexico Press, Albuquerque.
- Conlee, Christina A., Michele R. Buzon, Aldo Noriega Gutierrez, Antonio Simonetti, and Robert A. Creaser  
2009 Identifying Foreigners versus Locals in the Burial Population of Nasca, Peru: An Investigation Using Strontium Isotope Analysis. *Journal of Archaeological Science* 36:2755–2764.
- Conlee, Christina A., Corina M. Kellner, Chester P. Walker, and Roberto Aldo Noriega Gutiérrez  
2021 Early Imperialism in the Andes: The Wari Colonization of Nasca. *Antiquity*, in press.
- Cook, Anita G.  
2015 The Shape of Things to Come: The Genesis of Wari Wak'as. In *The Archaeology of Wak'as: Explorations in the Pre-Columbian Andes*, edited by Tamara L. Bray, pp. 295–334. University Press of Colorado, Boulder.
- Edwards, Matthew J.  
2010 Archaeological Investigations at Pataraya: A Wari Outpost in the Nasca Valley of Southern Peru. PhD dissertation, Department of Anthropology, University of California, Santa Barbara.  
2017 Ritual Practice at the End of Empire: Evidence of an Abandonment Ceremony from Pataraya, a Wari Outpost on the South Coast of Peru. In *Rituals of the Past: Prehispanic and Colonial Studies in Andean Archaeology*, edited by Silvana A. Rosenfeld and Stefanie L. Bautista, pp. 151–168. University Press of Colorado, Boulder.
- Edwards, Matthew J., and Katharina J. Schreiber  
2014 Pataraya: The Archaeology of a Wari Outpost in Nasca. *Latin American Antiquity* 25:215–233.
- Eerkens, Jelmer W., Kevin J. Vaughn, Moises Linares-Grados, Christina Conlee, Katharina Schreiber, Michael D. Glascock, and Nicholas Tripcevich  
2010 Spatio-Temporal Patterns in Obsidian Consumption in the Southern Nasca Region, Peru. *Journal of Archaeological Science* 37:825–832.
- Eitel, Bernhard, Stefan Hecht, Bertil Mächtle, Gerd Schukraf, Annette Kadereit, Günther A. Wagner, Bernd Kromer, and Ingmar Unkel  
2005 Geoarchaeological Evidence from Desert Loess in the Nazca–Palpa Region, Southern Peru: Paleoenvironmental Changes and their Impact on Pre-Columbian Cultures. *Archaeometry* 47:137–158.
- Eitel, Bernhard, and Bertil Mächtle  
2009 Man and Environment in the Eastern Atacama Desert (Southern Peru): Holocene Climate Changes and their Impact on Pre-Columbian Cultures. In *New Technologies for Archaeology: Multidisciplinary Investigations in Palpa and Nasca, Peru*, edited by Markus Reindel and Günther A. Wagner, pp. 17–37. Springer, Berlin.
- Engel, Frédéric-André  
1981 *Prehistoric Andean Ecology: Man, Settlement and Environment in the Andes, Volume 2: The Deep South*. Papers of the Department of Anthropology, Hunter College of the City University of New York. Humanities Press, New York.
- Fehren-Schmitz, Lars, Wolfgang Haack, Bertil Mächtle, Florian Masch, Bastien Llamas, Elsa Tomasto Cagigao, Volker Sossna, Karsten Schitteck, Johnny Isla Cuadrado, Bernhard Eitel, and Markus Reindel  
2014 Climate Change Underlies Global Demographic, Genetic, and Cultural Transitions in Pre-Columbian Southern Peru. *PNAS* 111:9443–9448.
- Fehren-Schmitz, Lars, Markus Reindel, Elsa Tomasto Cagigao, Susanne Hummel, and Bernd Herrmann  
2010 Pre-Columbian Population Dynamics in Coastal Southern Peru: A Diachronic Investigation of mtDNA Patterns in the Palpa Region by Ancient DNA Analysis. *American Journal of Physical Anthropology* 141:208–221.
- Fehren-Schmitz, Lars, Ole Warnberg, Markus Reindel, Varena Seidenberg, Elsa Tomasto Cagigao, Johnny Isla Cuadrado, Susanne Hummel, and Bernd Herrmann  
2011 Diachronic Investigations of Mitochondrial and Y-Chromosomal Genetic Markers in Pre-Columbian Andean Highlanders from South Peru. *Annals of Human Genetics* 75:266–283.
- Garcilaso de la Vega, el Inca  
1966 [1609] *Royal Commentaries of the Incas and*

- General History of Peru*. Translated by Harold V. Livermore. University of Texas Press, Austin.
- Goldstein, Paul S.  
2000 Exotic Goods and Everyday Chiefs: Long-Distance Exchange and Indigenous Sociopolitical Development in the South Central Andes. *Latin American Antiquity* 11:335–361.
- 2005 *Andean Diaspora: The Tiwanaku Colonies and the Origins of South American Empire*. University Press of Florida, Gainesville.
- 2015 Multiethnicity, Pluralism, and Migration in the South Central Andes: An Alternate Path to State Expansion. *PNAS* 112:9202–9209.
- Gorbahn, Hermann  
2013 The Middle Archaic Site of Pencil Alto, Southern Peru: The Beginnings of Horticulture and Sedentariness in Mid-Holocene Conditions. *Diálogo Andino* 41:61–82.
- Hegmon, Michelle, Matthew A. Peeples, Ann P. Kinzig, Stephanie Kulow, Cathryn M. Meegan, and Margaret C. Nelson  
2008 Social Transformations and Its Human Costs in the Prehispanic U.S. Southwest. *American Anthropologist* 110:313–324.
- Isbell, William H.  
2004 Mortuary Preferences: A Wari Culture Case Study from Middle Horizon Peru. *Latin American Antiquity* 15:3–32.
- 2008 Wari and Tiwanaku: International Identities in the Central Andean Middle Horizon. In *Handbook of South American Archaeology*, edited by William H. Isbell and Helaine Silverman, pp. 731–760. Springer, New York.
- Isla Cuadrado, Johny  
1990 La Esmeralda: Una ocupación del período arcaico en Cahuachi, Nasca. *Gaceta Arqueológica Andina* 4 (20):67–80.
- 2001 Wari en Palpa y Nasca: Perspectivas desde el punto de vista funerario. In *Huari y Tiwanaku: Modelos y evidencias, segunda parte*, edited by Peter Kaulicke and William H. Isbell, pp. 555–584. Boletín de Arqueología PUCP No. 5. Fondo Editorial de la Pontificia Universidad Católica del Perú, Lima.
- 2009 From Hunters to Regional Lords: Funerary Practices in Palpa, Peru. In *New Technologies for Archaeology: Multidisciplinary Investigations in Palpa and Nasca, Peru*, edited by Markus Reindel and Günther A. Wagner, pp. 119–140. Springer, Berlin.
- Isla Cuadrado, Johny, and Markus Reindel  
2014 La ocupación Wari en los valles de Palpa, costa sur del Perú. *Arqueología y Sociedad* 27:193–226.
- Jennings, Justin, María Inés Valarde, Franco Mora, and Willy Yépez Álvarez  
2015 Wari Imperialism, Bronze Production, and the Formation of the Middle Horizon: Complicating the Picture. *Journal of Anthropological Archaeology* 39:63–75.
- Kellner, Corina M.  
2006 “Trophy” Heads in Prehistoric Peru: Wari Imperial Influence on Nasca Head-Taking Practices. In *Skull Collection, Modification, and Decoration*, edited by Michelle Bonogofsky, pp. 101–112. BAR International Series 1539. Archaeopress, Oxford.
- Knobloch, Patricia J.  
1983 A Study of the Andean Huari Ceramics from the Early Intermediate Period to the Middle Horizon Epoch 1. PhD dissertation, Department of Anthropology, State University of New York, Binghamton.
- Knudson, Kelly J.  
2008 Tiwanaku Influence in the South Central Andes: Strontium Isotope Analysis and Middle Horizon Migration. *Latin American Antiquity* 19:3–23.
- Knudson, Kelly J., Sloan Williams, Rebecca Osborn, Kathleen Forgey, and Patrick Ryan Williams  
2009 The Geographic Origins of Nasca Trophy Heads Using Strontium, Oxygen, and Carbon Isotope Data. *Journal of Anthropological Archaeology* 28:244–257.
- Lambers, Karsten  
2006 *The Geoglyphs of Palpa, Peru: Documentation, Analysis, and Interpretation*. Linden Soft, Bonn.
- Lambers, Karsten, Henri Eisenbeiss, Martin Sauerbier, Denise Kupferschmidt, Thomas Gaisecker, Soheil Sotoodeh, and Thomas Hanusch  
2007 Combining Photogrammetry and Laser Scanning for the Recording and Modelling of the Late Intermediate Period Site of Pinchango Alto, Palpa, Peru. *Journal of Archaeological Science* 34:1702–1712.
- Lechtman, Heather  
1991 The Production of Copper-Arsenic Alloys in the Central Andes: Highland Ores and Coastal Smelters. *Journal of Field Archaeology* 18:43–76.
- 2005 Arsenic Bronze at Pikillacta. In *Pikillacta: The Wari Empire in Cuzco*, edited by Gordon F. McEwan, pp. 131–146. University of Iowa Press, Iowa City.
- Leoni, Juan B.  
2006 Ritual and Society in Early Intermediate Period Ayacucho: A View from the Site of Ñawinpukyo. In *Andean Archaeology III: North and South*, edited by William H. Isbell and Helaine Silverman, pp. 279–306. Springer, New York.
- Mächtel, Bertil, Bernhard Eitel, Gerd Schukraft, and Katharina Ross  
2009 Built on Sand: Climatic Oscillation and Water Harvesting during the Late Intermediate Period. In *New Technologies for Archaeology: Multidisciplinary Investigations in Palpa and Nasca, Peru*, edited by Markus Reindel and Günther A. Wagner, pp. 39–48. Springer, Berlin.
- Mader, Christian  
2019 *Sea Shells in the Mountains and Llamas on the Coast: The Economy of the Paracas Culture (800–200 BC) in Southern Peru*. Forschungen Zur Archäologie Ausseureuropaischer Kulturen, Berlin.
- McCool, Weston C.  
2017 Coping with Conflict: Defensive Strategies and Chronic Warfare in the Prehispanic Nazca Region. *Latin American Antiquity* 28:373–393.
- McEwan, Gordon  
2006 Inca State Origins: Collapse and Regeneration in the Southern Peruvian Andes. In *After Collapse: The Regeneration of Complex Societies*, edited by Glenn M. Schwartz and John J. Nichols, pp. 85–98. University of Arizona Press, Tucson.
- Meddens, Frank M., and Katharina Schreiber  
2010 Inca Strategies of Control: A Comparison of the Inca Occupation of Soras and Andamarca Lucanas. *Ñawpa Pacha* 30:127–166.
- Menzel, Dorothy  
1964 Style and Time in the Middle Horizon. *Ñawpa Pacha* 2:66–105.
- Mills, Blair N., and Christina A. Conlee  
2019 An Analysis of the Fabrics from La Tiza, a Site in the Southern Nasca Drainage. *Ñawpa Pacha* 39:213–232.
- Monzón, Luis de  
1965 Descripción de la tierra del repartimiento de los

- Rucanas Antamarcas de la Corona Real, jurisdicción de la ciudad de Guamanga, año de 1586: Relaciones Geográficas de Indias—Peru, edited by don Marcos Jiménez de la Espada. *Biblioteca de Autores Españoles* 183:220–227.
- Murra, John V.  
1972 El “control vertical” de un máximo de pisos ecológicos en la economía de las sociedades andinas. In *Visita de la Provincia de León de Huánuco en 1562*, Vol. 2, edited by John Murra, pp. 427–476. Universidad Nacional Hermilio Valdizán, Huánuco, Peru.
- Nelson, Margaret C., Keith Kintigh, David R. Abbott, and John M. Anderies  
2010 The Cross-Scale Interplay between Social and Biophysical Context and the Vulnerability of Irrigation-Dependent Societies: Archaeology’s Long-Term Perspective. *Ecology and Society* 15(3):31.
- Ochatoma Paravicino, José, and Martha Cabrera Romero  
2001 *Poblados rulaes Huari: Una visión desde Aqo Wayqo*. CANO, Lima.
- Orefici, Giuseppe  
2012 *Cahuachi: Capital teocrática Nasca*. Vols. 1 and 2. Universidad de San Martín de Porres, Fondo Editorial, Lima.
- Paulsen, Allison C.  
1983 Huaca del Loro Revisited: The Nasca–Huarpa Connection. In *Investigations of the Andean Past*, edited by Daniel H. Sandweiss, pp. 98–121. Cornell University Latin American Studies Program, Ithaca, New York.
- Proulx, Donald  
2006 *A Sourcebook of Nasca Ceramic Iconography: Reading a Culture through Its Art*. University of Iowa Press, Iowa City.
- Pulgar Vidal, Javier  
1996 *Geografía del Perú: Las ocho regiones naturales*. PEISA, Lima.
- Reiche, Maria  
1968 Giant Ground Drawings on the Peruvian Desert. *Proceedings of the 27th International Congress of the Americanists* 1:379–384.
- Rein, Bert, Andreas Lüchge, and Frank Sirocko  
2004 A Major Holocene ENSO Anomaly during the Medieval Period. *Geophysical Research Letters* 31:L17211.
- Reindel, Markus  
2009 Life at the Edge of the Desert—Archaeological Reconstruction of the Settlement History in the Valleys of Palpa, Peru. In *New Technologies for Archaeology: Multidisciplinary Investigations in Palpa and Nasca, Peru*, edited by Markus Reindel and Günther A. Wagner, pp. 439–461. Springer, Berlin.
- Reindel, Markus, and Johnny Isla  
2013 Cambio climático y patrones de asentamiento en la vertiente occidental de los Andes del sur del Perú. *Diálogo Andino* 41:83–99.  
2018 De Paracas a Nasca: Nuevas evidencias desde la vertiente occidental de la sierra de Lucanas, Ayacucho. *Boletín de Arqueología PUCP* 25:229–254.
- Reindel, Markus, Thomas R. Stöllner, and Benedikt Gräffingholt  
2013 Mining Archaeology in the Nasca and Palpa Region, South Coast of Peru. In *Mining and Quarrying in the Ancient Andes: Sociopolitical, Economic, and Symbolic Dimensions*, edited by Nicholas Tripcevich and Kevin J. Vaughn, pp. 299–324. Springer, New York.
- Reindel, Markus, and Günther A. Wagner  
2009 Introduction—New Methods and Technologies of Natural Sciences for Archaeological Investigations in Nasca and Palpa, Peru. In *New Technologies for Archaeology: Multidisciplinary Investigations in Palpa and Nasca, Peru*, edited by Markus Reindel and Günther A. Wagner, pp. 1–13. Springer, Berlin.
- Rostworowski de Diez Canseco, María  
1977 Coastal Fisherman, Merchants, and Artisans in Pre-Hispanic Peru. In *The Sea in the Pre-Columbian World*, edited by Elizabeth P. Benson, pp. 167–186. *Dumbarton Oaks*, Washington, DC.
- Rowe, Ann Pollard  
1979 Seriation of an Ica-Style Garment Type. In *The Junius B. Bird Pre-Columbian Textile Conference, May 19th and 20th, 1973*, edited by Ann Pollard Rowe, Elizabeth P. Benson, and Anne-Louise Schaffer, pp. 185–218. Textile Museum, Washington, DC; *Dumbarton Oaks*, Washington, DC.
- Rowe, John H.  
1962 Stages and Periods in Archaeological Interpretation. *Southwestern Journal of Anthropology* 18:40–54.
- Sakai, Masato, Jorge Olano, Yuichi Matsumoto, and Hiraku Takahashi  
2010 *Centro de líneas y cerámica en las pampas de Nasca, Perú*. Yamagata University Press, Yamagata, Japan.
- Schreiber, Katharina J.  
1992 *Wari Imperialism in Middle Horizon Peru*. Anthropological Papers No. 87. Museum of Anthropology, University of Michigan, Ann Arbor.  
1993 Inca Occupation of the Province of Andamarca Lucanas, Peru. In *Provincial Inca: Archaeological and Ethnographic Assessment of the Impact of the Inca State*, edited by Michael Malpass, pp. 77–116. University of Iowa Press, Iowa City.  
2005 Imperial Agenda and Local Agency: Wari Colonial Strategies. In *The Archaeology of Colonial Encounters: Comparative Perspectives*, edited by Gill J. Stein, pp. 237–262. School of American Research, Santa Fe, New Mexico.  
2012 The Rise of an Andean Empire. In *Wari: Lords of the Ancient Andes*, edited by Susan E. Bergh, pp. 31–46. Thames and Hudson, New York.
- Schreiber, Katharina J., and Josué Lancho Rojas  
2003 *Irrigation and Society in the Peruvian Desert: The Puquios of Nasca*. Lexington Books, Lanham, Maryland.
- Shimada, Izumi, C. Schaaf, Lonnie Thompson, and E. Mosley-Thompson  
1991 Cultural Impacts of Severe Droughts in the Prehistoric Andes: Application of a 1,500-Year Ice Core Precipitation Record. *World Archaeology* 22:247–271.
- Silverman, Helaine  
2002 *Ancient Nasca Settlement and Society*. University of Iowa Press, Iowa City.
- Siveroni, Viviana  
2017 Campanas cerámicas prehispánicas y la presencia de tráfico caravanero tardío en la cuenca de Nasca, sur del Perú. *Boletín de Arqueología PUCP* 22:277–305.
- Sossna, Volker  
2014 Impacts of Climate Variability on Pre-Hispanic Settlement Behavior in South Peru: The Northern Río Grande de Nasca Drainage between 1500 BCE and 1532 CE. PhD dissertation, Faculty of Mathematics and Natural Sciences, Christian-Albrechts-Universität zu Kiel, Kiel, Germany.
- Stanish, Charles  
1992 *Ancient Andean Political Economy*. University of Texas Press, Austin.



- Strong, William Duncan  
1957 *Paracas, Nazca, and Tiahuanacoid Cultural Relationships in South Coastal Peru*. Memoirs 13. Society for American Archaeology, Salt Lake City, Utah.
- Tello, Julio C.  
2002 *Arqueología de la cuenca del Río Grande de Nasca: Cuadernos de Investigación del Archivo Tello, No. 3*. Museo de Arqueología y Antropología, Universidad Nacional Mayor de San Marcos, Lima.
- Thompson, Lonnie G., Ellen Mosley-Thompson, John F. Bolzan, and Bruce R. Koci  
1985 A 1,500-Year Record of Tropical Precipitation in Ice Cores from the Quelccaya Ice Cap, Peru. *Science* 229:971–973.
- Tung, Tiffany A.  
2008 Life on the Move: Bioarchaeological Contributions to the Study of Migration and Diaspora Communities in the Andes. In *The Handbook of South American Archaeology*, edited by Helaine Silverman and William H. Isbell, pp. 671–680. Springer, New York.  
2012 *Violence, Ritual, and the Wari Empire: A Social Bioarchaeology of Imperialism in the Ancient Andes*. University Press of Florida, Gainesville.
- Unkel, Igmarr, Annette Kadereit, Bertil Mächtle, Bernhard Eitel, Bernd Kromer, Günther A. Wagner, and Lukas Wacker  
2007 Dating Methods and Geomorphic Evidence of Paleoenvironmental Changes at the Eastern Margin of the South Peruvian Coastal Desert (14°30'S) before and during the Little Ice Age. *Quaternary International* 175:3–28.
- Valdez, Lidio M., Katrina J. Bettcher, José A. Ochatoma, and J. Ernesto Valdez  
2006 Mortuary Preferences and Selected References: A Comment on Middle Horizon Wari burials. *World Archaeology* 38: 672–689.
- Valdez, Lidio M., and J. Ernesto Valdez  
2016 Highland and Coastal Cultural Interaction: New Evidence from the Ancient City of Huari, Ayacucho, Peru. In *Trading Spaces: The Archaeology of Interaction, Migration, and Exchange*, edited by Margaret Patton and Jessica Manion, pp. 91–108. Chacmool Archaeology Association, University of Calgary, Calgary.
- Van Buren, Mary  
1996 Rethinking the Vertical Archipelago: Ethnicity, Exchange and History in the South Central Andes. *American Anthropologist* 98:338–351.
- Van Gijsegem, Hendrik  
2006 A Frontier Perspective on Paracas Society and Nasca Ethnogenesis. *Latin American Antiquity* 17:419–444.
- Vaughn, Kevin J.  
2009 *The Ancient Andean Village: Marcaya in Prehispanic Nasca*. University of Arizona Press, Tucson.
- Vaughn, Kevin J., Christina A. Conlee, Hector Neff, and Katharina J. Schreiber  
2006 Ceramic Production in Ancient Nasca: Provenance Analysis of Pottery from the Early Nasca and Tiza Cultures through INAA. *Journal of Archaeological Science* 33:681–689.
- Vaughn, Kevin J., and Moises Linares Grados  
2006 Three Thousand Years of Occupation in Upper Valley Nasca: Excavations at Upanca. *Latin American Antiquity* 17:595–612.
- Whalen, Verity H.  
2014 *Re-Becoming Nasca: A Household-Based Analysis of the Transformation of Community and Tradition at a Late Nasca Village, Peru*. PhD dissertation, Department of Anthropology, Purdue University, West Lafayette, Indiana.
- Williams, Patrick Ryan  
2002 Rethinking Disaster-Induced Collapse in the Demise of the Andean Highland States: Wari and Tiwanaku. *World Archaeology* 33:361–374.

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