Ritual, Economy, and the Construction of Community at Ancient Hualcayán (Ancash, Peru)

By

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CHAPTER 1

INTRODUCTION

Introduction to the Study

This research investigates how communities—defined here as people, things, and places that are physically assembled, imagined, and emotionally linked through practice (Harris 2014)—reorganize during periods of widespread social, economic, and religious transformation. To examine the local dynamics of widespread change, the study begins with the position that regional shifts are rooted in and shaped by the histories, rituals, and ecologies of particular places. Exploring this position, this study traces the process through which the people of Hualcayán, an ancient ritual, settlement, and agricultural complex in highland Ancash, Peru, forged a new kind of community during one of the most transformative but little understood periods in Andean prehistory: the disintegration of the Chavín religious and political network (900–500 BC) and the subsequent emergence of more localized Recuay communities and polities (AD 1–700). It examines this process of community formation by focusing on how people at Hualcayán reorganized their ritual and economic practices to produce new relationships to each other, local lands, and local resources.

Broadly, scholars contend that Chavín, which flourished during the Late Formative Period (900–500 BC), was characterized by a pan-regional network of temples and their attendant communities, which were linked through a shared religion¹ that focused on consulting powerful oracles, gaining access to exclusive ritual knowledge, and acquiring

¹ Chavín is used to refer to the culture, the political network, and the religion.

foreign materials (Burger 2008, 2012; Contreras 2011; Fux 2013; Rick 2008b). In contrast, the Recuay, which emerged in Chavín's heartland of highland Ancash during the Early Intermediate Period (AD 1–700), was a culture and "commonwealth" (Lau 2011:16) of autonomous kin-based communities and lordships that dwelled in defensible locations, subsisted through agro-pastoral and mixed-farming economies², and ritually feasted to venerate local ancestors. Previous research suggests these ancestors and their noble descendants—Recuay elites—were likely celebrated in communities for their achievements in hospitality, defense, and warfare (Gero 1990, 1991; 1992; Lau 2011a, 2011b, 2015, 2016).

Essential to the Chavín to Recuay transformation is the poorly understood Huarás culture of the Final Formative Period (500–1 BC), which emerged after Chavín and eventually gave rise to Recuay. During the Huarás period, the people of highland Ancash appear to have rejected the authority of the Chavín religion and its ritual elites by profaning Chavín's sacred spaces (Lumbreras 2007). They also established a new society by creating new material styles and social networks, inventing new ritual feasting practices centered on libations and camelid meat, and, perhaps, beginning to organize new kin-based collectivities—all of which would come to shape Recuay communities (Gero 1990, 1991; Lau 2011, 2016).³

A question that remains is how the long-term ritual, political, ecological history of particular places like Hualcayán, where people had been assembling on a high mountain plain (3150 masl) for more than two millennia leading up to Chavín, played a role in

² As elaborated in Chapter 3 and explored further through this study, the Recuay economy likely varied between agro-pastoral (pastoralism supplemented with agriculture) and mixed-farming (agriculturalist supplemented with animal husbandry) practices (see distinctions outlined in Lane 2005:17).

³ This chapter introduces these prehistoric phases; see Chapter 3 for a detailed review.

establishing Huarás and Recuay social practices after Chavín. To date, archaeologists have studied transitional Chavín to Huarás archaeological contexts⁴ (e.g. Lumbreras 2007) or Huarás to Recuay contexts⁵ (e.g., Gero 1991), or they have examined shifting Chavín-Huarás-Recuay settlement and material patterns on a regional scale (e.g., Lau 2016; Ponte 2014). Yet the long-term process through which Recuay communities were formed out of and after Chavín communities has not been subject to substantial investigation, such as by examining a site with continuous Chavín, Huarás, and Recuay occupations like Hualcayán.⁶ This lack of direct study has also led to a disproportionate focus on how the most materially visible of social actors—elites—likely reacted to or emerged from the external forces of Chavín's disintegration.⁷ But beyond elites, what are the broader social practices and environmental interactions through which people participated in the dramatic project of remaking their communities after Chavín?

This study explores the Recuay emergence at Hualcayán as a bottom-up process of local innovation and community reorganization by examining how diverse kinds of collective labor and ritual practices—especially building, performance, food production, and ritual consumption—intersected to assemble the Hualcayán community through time. It contributes to theoretical perspectives and ongoing debates in anthropology that seek to understand how communities are dynamic, internally diverse, and continuously produced through practice (Creed 2006; Mac Sweeney 2011; Yaeger and Canuto 2000; Varien and

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⁴ Spanning approximately 900 BC and 1 BC.

⁵ Between approximately 400 BC and AD 700.

⁶ However, excavations are underway of a Huarás–Recuay village at the temple of Chavín de Huántar (indicated as "post-Chavín" activities in Rick and Bazán 2013, 2014; 2017). To date, the Huarás occupation at Chavín de Huántar has been largely considered as the product of "squatters" haphazardly reusing the site (Mesía 2007:32, Rick 2005:72) rather than in terms of the formation of a new community in this place.

⁷ For example, whereby high-ranking Chavín ritual specialists were replaced by enterprising Recuay elites

who vied for status after the collapse of the Chavín network (e.g., Lau 2011:248).

Potter 2008). It also considers how people assemble communities by engaging with and producing things as well as places (Harris 2014; Marsh 2016; Pauketat 2000). In so doing, the study applies a combined agency (Bourdieu 1977; Giddens 1984; Ortner 2006; Sewell 2005) and material/ecology-oriented approach to community transformation, focusing on the overlapping domains of practice that drew people and things together into interdependent relationships, shaped meaning, and defined social difference across sequential cultural periods and ecological zones.

By focusing on economic and ritual labor, spaces, and materials, the project also applies a "ritual economy" framework (see McAnany and Wells 2008) to the study of community formation and the Chavín to Recuay at Hualcayán (see discussion in Chapter 2). Specifically, I contend that rituals are not simply the symbolic means through which a community is solidified or unified, but also the practical means through which people produce and contest social roles, labor obligations, and cultural values more broadly (and vice versa). A main thesis I explore is how the practice of making rare or exotic objects and trading them over long-distances to support Chavín priestly rituals was replaced by a new kind of ritual-economic practice during Recuay times, which focused on the ritualized production and consumption of local foods for and by local corporate groups (see Chapter 4). I consider how these shifting ritual and economic endeavors were key to how and why the physical and social landscape of the community became more socially segmented during the Recuay period. I also explore the degree to which the Chavín to Recuay transition was a particularly transformative moment in the history of local places like Hualcayán by following these trends in communal labor and ritual practice over the *longue*

durée, beginning with the pre-Chavín period (2400–900 BC, dominated by Mito-Kotosh) and extending to the post-Recuay period (AD 700–1450).

Research Questions

This study is organized by three interconnected levels of inquiry: (1) anthropological questions of community formation, which are informed by theories of ritual economy, (2) cultural-historical questions about the Chavín to Recuay transition in Highland Ancash, and (3) analytical questions that examine how particular community practices, spaces, and materials changed through time in ancient Hualcayán. Each set of questions is outlined below.

(1) Community Formation

At its broadest level of inquiry, the study asks: how are communities assembled and transformed through the coordinated practices of building, performance, food production and ritual consumption? How do these ritual and economic labor activities interlink to organize communities and give meaning to the things and places they produce? These questions and their theoretical foundations are explored in greater depth in Chapter 2.

(2) The Chavín to Recuay Transition

Several questions remain unresolved about how Recuay community practices emerged and transformed over the course of several hundred years after the disintegration of the Chavín religious network around 500 BC. A comparison of our current knowledge of

Chavín, Huarás, and Recuay (see Chapter 3) reveals how distinct ritual-economic practices supported different kinds of community in these societies: one that was focused on foreign objects, exotic deities, and specialized ritual knowledge (Chavín), and the other focused more on local objects, familiar deities, and intra- and inter-group communal feasts (Huarás and Recuay). These practices have been linked to the different ways that Chavín and Recuay communities were organized as centralized and segmented institutions, respectively. That is to say, Chavín communities appear to have engaged in physically and spatially more nucleated or collectively integrated practices, while Recuay communities emphasized distinctions between corporate groups and their activities, yet assembled together in particular ritual instances. Ancash settlements also grew in size with the Recuay cultural emergence (Lau 2016:98), suggesting these new forms of social and economic organization either allowed for or responded to demographic shifts. The following questions aim to understand these processes of transformation that led to the production of new community forms during the Huarás and Recuay periods.

(a) Space and Social Organization: Through what types of changing spaces and practices did Chavín communities become Recuay communities? How did communities shift from being mostly regionally-focused and centralized societies with theocratic authorities to being more locally-focused and segmented societies with corporate kin-based authorities? My analysis at Hualcayán reveals how people first violently, yet ritually, decommissioned Chavín spaces; how they then redirected their rituals towards smaller, less coordinated consumption events using Huarás materials; and finally, how they instituted a new, diversified food production regime as they began to perform ancestor

veneration rituals using Recuay effigy vessels in segregated compounds within agricultural lands.

- (b) <u>Ritual and Economy</u>: How did the people of highland Ancash change their food production and ritual consumption practices and materials as they established a "Recuay" social organization after Chavín? What economic and ideational shifts occurred as communities grew demographically? My analysis at Hualcayán examines diachronic changes in macrobotanical, microbotanical, and faunal remains coupled with analyses of changing materials (e.g., ceramics), architectural space, and landscape features (e.g., terraces and canals) to reveal how innovations in food production, especially diversification and int/extensification through the expansion of fields and canals, were linked to the development of Recuay commensalism and rituals featuring ancestor images.
- (c) <u>Local-Regional Interaction</u>: How did Late Formative communities like Hualcayán, which participated in the Chavín sphere but was not a major regional center, experience and contribute to the end of Chavín and the emergence of Recuay? By focusing on long-term changes at Hualcayán, which had a deep history of its own pre- and non-Chavín local practices and spaces, the research assembles a more holistic and local account of how shifting traditions of building, ritual, and food production labor intersected and contributed to both the Chavín decline and Recuay emergence.

(3) The Changing Practices of Community at Hualcayán

This final group of questions guided the study's excavations, which were conducted in 2009 and between 2011 and 2013 ($569~m^2$) at Hualcayán, and material analyses, which were carried out intermittently between 2010 and 2016 and include the collaborative

analyses of ceramic, lithic, botanical, faunal, textile, and human remains (see Chapter 4 and appendicies). The questions and the resulting data aimed to reveal how the materials, spaces, and practices of building, performance, food production, and ritual consumption shifted through time. The archaeological correlates of these questions are outlined and described in detail in Chapter 4, and the results are reviewed in Chapter 7.

- (a) <u>Building, Performance</u>, and the <u>Organization of Space</u>: How did the people of Hualcayán modify their community spaces through time and for what reasons? What structures did they rebuild, alter, and/or abandon after Chavín and did these changes to the built environment occur quickly or through a series of incremental modifications? How did changes in space alter the proxemics and practices of performance? Do the layout, necessary labor demands (to create or maintain), and construction history of different ritual and agricultural spaces indicate an increased social segmentation, centralization, or stratification of community practices through time? Did construction labor shift toward or away from particular spaces or domains of practice?
- (b) <u>Food Production</u>: Did the people of Hualcayán intensify, diversify, and/or specialize food production to support a growing population or transform economic integration after Chavín? If so, through what strategies: intensification, specialization, multicropping, agro-pastoralism, and/or exchange?
- (c) <u>Ritual Consumption</u>: Did the people of Hualcayán change the types of foods they consumed (e.g. replacing quinoa with maize, or from particular foods to a variety of foods) and the methods for their preparation (e.g. roasting to brewing) and consumption (e.g. increased libation ceremonies)? Did ritual food preferences and practices diversify, and/or become specialized to establish complementary differences between the groups who

performed rituals within them? If so, how do these changing preferences and practices coincide with a restructuring of ritual space and food production infrastructure? What do they suggest about how a new arrangement or integration of ritual and economic practices transformed the community?

(d) <u>Chronology:</u> What is the temporal relationship between changes in artifact style, architecture, food provisioning and preference, and ritual practice at Hualcayán? What patterns of practice across the *longue durée* can be linked to the perpetuation of local traditions or moments of cultural innovation?

Broader Relevance of the Study

This research explores how communities are assembled and transformed through changes in coordinated practices, especially building, ritual performance and consumption, and food production. First, the research contributes to a growing body of literature on ritual economy by examining agriculture and food production as a ritual system, and exploring how agricultural intensification supports ritual practice and vice versa (Hastorf 1993; 2003a; Morrison 2010; Spielmann 2002; Wells and Davis-Salazar 2008). In this way, the research contrasts several enduring archaeological theories of early agriculture, which assume that economic factors such as population pressure or resource scarcity alone influenced ancient people to establish communities, draw political boundaries, and change their food production regimes (Boserup 1965, 1981, 1990; Brookfield 1984; Carneiro 1970; see critiques in Erickson 2006; Morrison 1996).

Second, the study adds to anthropological theories that define communities as assemblages of engaged people as well as things, plants, animals, and places (following Harris 2014) that are forged through dynamic sets of social practices and interactions rather than static social entities that are equal to an archaeological site or ethnographic setting (Amit 2002; Creed 2006; Goldstein 2000; Harris 2014; Isbell 2000; Mac Sweeney 2011; Marsh 2016; Pauketat 2000; Joyce and Hendon 2000; Yaeger and Canuto 2000; Wernke 2007). In particular, the project builds on anthropological theories of agency and practice by sharpening focus on how ancient people constituted their own community and defined its factions when they privileged select materials and foods in specific settings and circumstances (Appadurai 1986:21; Dietler and Hayden 2001; Hastorf 2003b; Martín 2013; Mills 2007; Twiss 2012). In so doing—and by concentrating on community formation in a place that participated in regional networks but without broad regional influence—the study provides a bottom up perspective of community-level social change, which challenges archaeological approaches that concentrate on centers of power (i.e. Chavín de Huántar) and elite interaction to the exclusion of broader social practices and ecological shifts.

Accordingly, the project also offers anthropological insights into how ritual food preferences distinguish social positions and groups within a community (Bourdieu 1984; Mintz and Du Bois 2002; Smith 2006). In particular, the study builds on and extends the ritual economy approach in archaeology, which has commonly focused on understanding how the production of elite goods underlie power and status (e.g., McAnany 2008), by focusing on the interplay between ritual and economy in the organization of heterarchical factions and communities more broadly—rather than polities or states.

More broadly, the study contributes to anthropological theories of community formation and transformation by focusing less on how people passively reacted to regional political demise and more on how they actively organized a new community by coordinating their labor and ritual. In this way, this dissertation builds on the work of Andean scholars who have explicitly sought to examine the links between ritual, agricultural production, space, and community formation in the Andes (e.g., Dillehay 2011:291-295; Hastorf 1993; 2003; Stanish 2013) in support a theories of cooperation and community empowerment (e.g., Erickson 2006).

Organization of Chapters

This chapter has introduced the study of community transformation at Hualcayán, and discussed its broader relevance. Chapter 2, "Ritual Economy and Community Formation," elaborates the study's theoretical approach to the study of community formation at Hualcayán, focusing on four principle lines of evidence: building, performance, food production, and ritual consumption. It argues that to understand how communities are assembled, we must consider how these diverse domains of ritual and economic practice, and the materials, spaces, and landscapes they produce, are intentionally integrated or inherently intertwined through interaction.

Chapter 3, "Reconsidering the Chavín to Recuay Transition" presents a background review, summarizing and challenging how scholars have studied the Chavín to Recuay transition. The chapter also reviews the pre-Chavín and early post-Recuay developments in Highland Ancash in order to situate the emergence of Recuay communities within a long-

transition represents a major shift worthy of intensive study. The reviews of each period are coupled with brief introductions to the Hualcayán data, which serve to introduce how a ritual economy approach addresses particular questions and/or revises our understanding about these prehistoric periods, thus situating the dissertation's research objectives within the existing knowledge of Ancash prehistory.

Chapter 4, "Investigating Ancient Hualcayán," then details the study's research setting in the Callejón de Huaylas valley, reviews the preliminary research conducted to select Hualcayán for further study, and then presents the research design and methods used to investigate Hualcayán, which included mapping, extensive excavation, and material studies.

Chapters 5, 6, and 7 present and discuss the results of the investigation at Hualcayán. Chapter 5, "Building Community," traces the ritual spaces and practices of the Hualcayán community from its founding during the Initial Formative Period (~2400 BC⁸) through to the end of the period of Chavín influence during the Late Formative Period (~500 BC). Chapter 6, "Cultivating Community" then reconstructs the ritual, building, and food production practices through which local people brought upon the end of Chavín at Hualcayán during the Final Formative (500–1 BC), or Huarás phase, and then how they established a Recuay community during the Early Intermediate Period (AD 1–700). Chapter 7, "Building, Ritual, and Economy Over the *Longue Durée* at Hualcayán" then synthesizes and discusses the data from Chapters 5 and 6 to consider the long-term

⁸ All date ranges at Hualcayán are based on calibrated radiocarbon dates (Appendix A).

changes in how the people of Hualcayán produced and ritually consumed foods, built ritual spaces, and performed their social affiliations through ceremony and labor.

Finally, Chapter 8 "Conclusions: The Labor of Community at Hualcayán" reflects on the study's findings more broadly. It reveals the Chavín to Recuay transition to be part of a long-term, ongoing process of change that extends far beyond this period of punctuated transformation, but also marks how a centralized community became increasingly segmented yet cooperative through practices ranging from canal construction to ritual feasts. The chapter also explores how the study's results expand and challenge key concepts of "tradition" and "community" in Andean scholarship.

These chapters are followed by nine appendices, which will contain data that will be referenced throughout the text. The appendices will include (A) Radiocarbon Dates (AMS), (B) Sites Surveyed, (C) Excavation Context Summaries, (D) Ceramic Remains, (E) Lithic Remains (analysis presented by Robert Connolly), (F) Botanical Remains (analysis presented by Victor Vásquez Sánchez with Teresa Rosales Tham), (G) Faunal Remains (analysis presented by Teresa Rosales Tham with Victor Vásquez Sánchez), and (H) Human Remains (analysis presented by Emily Sharp).

CHAPTER 2

RITUAL, ECONOMY, AND COMMUNITY FORMATION

This study builds on recent anthropological theories and archaeological studies to construct a ritual economy approach to community formation. To do so, it engages with the concepts of community, space and the built environment, ritual performance, food production, and ritual consumption—the combined study of which are key to understanding community change in general, and the Chavín to Recuay transition in particular. In this chapter, I review and evaluate how each of these concepts have been applied to archaeological studies in the Andes and elsewhere before turning to consider how they can be combined to understand how communities are socially and physically produced. I then discuss how I employ these concepts in the study of ancient Hualcayán.

My focus on understanding the process of community *formation* does not concern a search for a point of origin—such as the moment in which a community was founded. Instead, I approach community formation as an ongoing, regenerative process. In particular, I explore how communities are assembled in space and time, which is to say I focus on how the social, physical, and spiritual relations of people, things, and places are "reassembled" and given renewed meaning through practice (Harris 2014; see also Fowler 2017; Marsh 2016; Pauketat 2008). This framework recognizes that human relationships do not form, and cannot be understood, apart from the physical, emotional, and supranatural world they inhabit and create, which includes may deities, environmental forces, plants, animals, water, land, materials, objects, buildings, and even memories. As

these relationships between people, things, and places are continuously assembled through practice, so is the meaning and fabric of community transformed.

I propose that this definition of communities as more-than-human assemblages (Harris 2014) both enhances and is enhanced by a ritual economy approach. A ritual economy approach considers how entwined ritual and economic labor practices—such as temple construction activities, the production of ritual objects, the deposition of material offerings, or the ritual sharing of foods in feasts—define value, organize society, and shape worldview (McAnany and Wells 2008). I also emphasize how these ritual and economic practices do not just create and define society, but also how the things and spaces produced by this labor are themselves part of and essential to the emergent community. For example, the needs of agricultural crops for nutrient soils and water are also the obligations of the community to irrigate, terrace, manure, provide offerings, and so forth. A ritual economy approach forces us to recognize how these economic practices are made meaningful and even sanctified through ritual performances, offerings, prayers, and sacrifices, or consumption feasts that nourish the land, bodies, and ancestral or supranatural forces that are all essential to a good harvest and the perpetuation of the community. In so doing, people recreate yet transform their relationship to a place, to the living and non-living things in that place, and to one another.

Assembling Community: Ritual, building, food production, consumption

I employ an expanded notion of the interactionalist approach to communities (see Yeager and Canuto 2000 *inter alia*) by integrating recent approaches by Harris (2014) and others (Fowler 2017; Marsh 2016, Pauketat 2008, 2013) to consider communities as assemblages of people, deities, things, places brought together and given meaning through practice. The following sections take a closer look at the foundations of this approach and several key ritual and economic practices—namely building, ritual performance, food production, and ritual consumption—that link people and things in place to assemble communities.

Anthropological Approaches to Community

Anthropologists and archaeologists have long-been concerned with how communities are organized and expressed (e.g., Arensberg 1961; Durkheim 1964; Murdock 1949; Redfield 1956). Early theories viewed communities as largely homogenous and static social groups, equating them to small villages and casting them as the essential building blocks of a broader society (Arensberg 1961; Durkheim 1964). Applying functionalist approaches, anthropologists contended that communities were a natural consequence of co-residence in which everyday, face-to-face contact between neighboring family units perpetuated society at its most basic level (e.g., Chambers and Young 1979; Durkheim 1964; Murdock 1949; Redfield 1956). Archaeologists widely applied these perspectives by interpreting concentrations of artifacts and residential architecture, or "sites," as the material remains of spatially bounded ancient communities (e.g., Chambers and Young 1979; Chang 1967; see also Kolb and Snead 1997). More particularly, many considered communities as a particular kind of site—such as a hamlet, which made up the smallest and lowest tier of a regional settlement hierarchy—and as such, formed the basic unit of a regional political systems. The result was that communities were treated as powerless and

unchanging, except when influenced by external political forces that originated in nearby urban centers (e.g., Johnson 1977 Parsons 1972, Roper 1979, Sanders 1956; see Yaeger and Canuto 2000:4).

Similarly, anthropologists working in the Andes have long assumed but recently questioned whether a traditional form of Andean community organization—the *ayllu*—endured throughout prehistory (e.g. Allen 1988; Shady 2005; Silverblatt 1987; see discussions and critiques in Isbell 1997; Wernke 2013). The definition of an *ayllu* is largely derived from Andean ethnohistorical and ethnographic studies, which indicate that an *ayllu* is a community in which members collectively hold land and organize labor, claim descent from a common (real or fictive) ancestor (*mallqui*), and often have a dual (moiety) social structure (e.g., Bastien 1985[1978]). Andean researchers often uncritically apply this model of social organization to the deep archaeological past. For instance, it has been suggested that *ayllus* emerged with the first preceramic civilizations (Shady 2005). But this assumption collapses the ethnographic present into an essentialized archaeological past, assuming continuity in a form of community without examining why, and how, social and political actors actively constituted different kinds of communities during different time periods (see critiques in Isbell 1997; Kosiba 2011; Starn 1991; Weismantel 2006).

Recent scholarship in anthropology and archaeology has challenged such views that communities are static or natural social units (*ayllu* or otherwise), to instead approach communities as dynamic and diverse institutions that are produced, negotiated, and transformed through social interaction (Amit 2002; Creed 2006; Hegmon 2002; Joyce and Hendon 2000; Isbell 2000; Mac Sweeney 2011; Hegmon 2002; Isbell 2000; Janusek 1999, 2004; Wernke 2007, 2013; 2013; Yaeger and Canuto 2000). Drawing on practice theory

(Bourdieu 1977; Giddens 1984; Ortner 2006; Sewell 2005), these scholars seek to understand the diversity and mutability of communities. In particular, they focus on the wide range of daily and periodic (e.g., ritual) activities that draw together and distinguish a community's internal factions or corporate groups, such as those based on kinship, occupation, or status (Appadurai 1991; Creed 2006; Hastorf 2003b; Isbell 2000; Joyce and Hendon 2000; Marcus 2000; Wernke 2006; Yaeger 2000). Thus, while archaeologists have studied the remains of inclusive activities, such as monument construction and public gathering, that promoted an ideology of unity among different groups (e.g., Dillehay 2004; Mac Sweeney 2011; Pauketat 2000), they have also studied more exclusive activities, such as the construction of distinct neighborhoods, the production of distinct materials, or holding ceremonial feasts in exclusive structures, that reinforced distinctions between kin and status groups (Aslan 2005; Dillehay 2007; Hayden and Cannon 1982; Janusek 1999; Lau 2010c; Pacifico 2014; Warner 2010). Such studies reveal that communities overlap one another, are situational, and comprise multiple distinct social groups that were highlighted or altered in distinct social and historical contexts.

My approach to understanding the formation of Chavín and Recuay communities builds from these studies, and asserts that communities are always-emergent social institutions that may include or even draw attention to their internal factions, classes, or other groups. Moreover, I suggest that the interactions, tensions, and affiliations between these groups are key to understanding how communities are organized and how they change over time. This stands in contrast to some recent archaeological studies that perpetuate essentialized views of community even while they apply an agency-oriented framework. For example, Mac Sweeney (2011) identifies community in the historical

moments that reflect a "conscious sense of community identity," such as when people deemphasize their differences and emphasize their similarities¹. Though such approaches contribute to our understanding of the symbolic practices of identity formation through the lens of community, in many ways they hearken back to an essentialized version of Durkheim's (1915) "collective effervescence" and Tönnies's (1955/1988) *gemeinschaft*—and thus runs counter to the idea proposed here, which is that communities are dynamic (changing), diverse, built upon contestation and competition, and can even be predicated upon establishing and promoting links to foreigners.

Another recurrent issue in archaeology is how to discuss the organization of community practices on the landscape without relying on the material limits—however nebulous and permeable—of an archaeological site. Even archaeologists who reject the notion that a material-architectural concentration is the *de facto* equivalent of an ancient community are nonetheless confronted with the problem that social interactions tend to cluster on the landscape (see discussion and critiques in Yeager and Canuto 2011:9; Isbell 2000; Mac Sweeney 2011:30). After all, community identities are nonetheless tied to notions of place (Anscheutz et al. 2002; Harris 2014; Hirsch 1995; Stones 2015; Pauketat 2000)². Other scholars, however, suggest we deemphasize space and embrace the fluidity of community in order to consider how communities are "imagined" (e.g., Isbell 2000;

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¹ Mac Sweeney calls these practices "enactments of community, which include living in identical house structures, standardizing personal accourrements, holding inclusive rituals, and using non-local objects in public gatherings to contrast their own identity to the foreign or distant "Other" (for a similar example, see Rautman 2014).

² In order to deal with the problem of space and place, Yeager and Canuto (2000:10) suggest we look at interactions across a "mid-level" scale that considers materials and spaces both within and between nucleated settlements. Mac Sweeney (2011; see also Pacifico 2014) advocates that we distinguish between the broad category of "relational communities," which are based in a "mental construct...of commonality" and therefore less accessible through archaeological study, and "geographic communities," which are "rooted in a particular locality" and thus more accessible to archaeologists (Mac Sweeney 2011).

Goldstein 2000). This concept is drawn from Anderson's (1991) coining of the term "imagined communities." Though Anderson used the term to explain the rise of nationalism in modern states³, archaeologists have found the term useful to consider how communities can be created across regions in pre-capitalist societies. The imagined communities concept liberates the definition of community from the confines of space to shift the focus toward the intentionality of community, whereby communities overlap and emerge through the ongoing negotiation of competing discourses and alliances that are expressed through a range of practices and symbolic means (Isbell 2000).

And yet, with the imagined community approach, we risk equating "community" with "identity," which would make the term community redundant. If we accept that communities are not purely symbolic constructs (Anderson 1991; Cohen 1985; Mitchell 1998), but emergent social relationships (Creed 2006; Amit 2002) that are constituted through practice (Yaeger and Canuto 2000), it follows, then, that communities must be grounded in some form of material engagement that creates and occurs through space.

Jason Yaeger (2000) points to the nested "practices of affiliation" that define community membership at different scales on the landscape to understand how communities are rooted in space—becoming ever more "imagined" as one moves away from a neighborhood or settlement, yet cross-cutting one another according to these patterns of practice4 (see also Canuto and Fash 2004; Harris 2014; Hegmon 2008; Preucel 2000; Watts 2006).

Yaeger's approach is crucial for understanding the nested, overlapping, and otherwise messy web of social affiliations that characterize communities. I suggest an

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³ In particular, how these identities arose through newspapers and other forms of capitalistic print media. ⁴ In particular, Yaeger examines the construction of Maya communities at three levels: the daily habitus that emerges from village life (e.g., quarrying and food production), the more explicit interactions of local ritual gatherings (e.g., feasts), and the production and use of exclusive materials (e.g., greenstone beads) or spaces (e.g., ceremonial complexes) that were accessible only to a class regional elites (Yaeger 2000).

expanded notion of how daily practices link to more political practices of affiliation (i.e. feasting), however. Yeager suggests that daily practices are essential to the constitution of community as the semi-unconscious "fundamental concerns of production and consumption" (Yaeger 2000:129). By employing Bourdieu's (1977) concept of habitus to characterize the majority of local, everyday economic interactions, he minimizes the role of agency in these practices that he emphasizes at other scales and kinds of interaction. I argue that economic activities such as food production also require ongoing and complex social negotiations to coordinate labor (see also Isbell 2000:257), not the least because they often include rituals to ensure fertility (Sandstrom 2008; Wells and Davis Salazar 2008) and inter-family feasts to organize work parties (cf. Spielmann 2002), but also because land and other resources (i.e. water) are often shared and/or claims to them are contested.

Finally, though "interactionalist" approaches have enabled examination of how communities are organized and transformed, their focus solely on the relationships between people does not always adequately explain how communities become attached to, produce, and emerge through particular places and its buildings, animals, plants, water resources, deities or environmental forces. Some scholars applying an interactionalist framework have more closely examined the relationships between people and place, however. For example, Steven Wernke (2013) cogently argues that community transformation is an emplaced process, whereby landscape and community are mutually produced and historically contingent (see also Joyce and Hendon 2000). With this perspective, social and physical environments cannot be understood apart from one another, and one is not necessarily more primary than the other in the production of

community. It is thus crucial that we consider the material components and legacies of community practices in addition to social and political outcomes, such as how an agricultural landscape, as a palimpsest, becomes a historically situated product of the "congealed labor" of all preceding generations (Lansing 1991:12), continuously shaping practice through the production, maintenance, use, and form of the built environment (Bruno 2008; Erickson and Walker 2009; Gelles 2000; Ingold 1993; Kirch 1993; Lane 2005; Morrison 1994; 2014; Netting 1993; Smith 1992; Wernke 2003, 2013)⁵.

Though not rejecting interactionalist approaches entirely, Oliver Harris (2014) provides an even broader scope of community by considering communities as assemblages of not only people but also the materials, beings, and places, including landscapes, that emerge through interactions between people and their environment and through the things and spaces they use and produce. Harris's approach to communities as assemblages builds on a larger body of work originating from the influential writings of Deleuze and Guittari (2004) on assemblage theory and more recently Bennett (2010), DeLanda (2002, 2006), Lucas (2012), Ong and Collier (2005), and Thrift (2008)⁶. Though both internationalist and assemblage theory approaches emphasize how communities change through time, an assemblage theory approach eliminates the (stated or implicit) fallacy that materials and spaces provide merely a backdrop to social and political dramas. Moreover, this approach emphasizes how the relationships between people and materials are constantly reassembled as they are brought together; even when actions are copied or repeated, particular assemblages can never be duplicated (this point is elaborated in the

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⁵ This perspective builds from Blaike and Brookfield's (1987) concept of "landesque capital," through which scholars have shown how food production infrastructure, once built, shapes future food production activities by nature of its permanence yet its constant need for maintenance (Kirch 1994).

⁶ Compare this approach to Ian Hodder's "entanglements" (2012) and Tim Ingold's "meshworks" (2011).

following section). These assemblages have an affective component as well: acts of assembling define the value and meaning of the relationships between people and the places they inhabit (Fowler 2017; Hamilakis 2017; Harris 2010; Marsh 2016).

In sum, recent anthropological literature thinking about communities is largely unified by a common concern with practice and agency. These interactionalist approaches (e.g., Goldstein 2000; Isbell 2000; Joyce and Hendon 2000; Wernke 2007, 2013; Yaeger 2000) reveal how communities emerge through a web of overlapping practices in which people define and transform their relationships to one another to produce affiliations such as kin groups or elite cohorts. They suggest that while the practices of community may be daily or periodic, mundane or ceremonial, but they must be intentional and coordinated (Isbell 2000; Yaeger and Canuto 2000). Moreover, community affiliations are nested and rooted in different scales and types of interaction, such as food production, ritual performance, or construction events. Because community affiliations overlap—such as those between elites versus those between kin—they also lie in tension with one another and must therefore be constantly negotiated (verbally, through practice, etc.). These overlapping practices and affiliations, as well as the tensions between them, lie at the foundation how and why communities are transformed as they are reproduced. By investigating these changing practices at places like Hualcayán, the study can materially trace how communities reorganize their labor and social interaction through time.

Building, Ritual performance, and the Production of Space

An important focus of the dissertation is how two kinds of community performance—building and ritual—shaped Hualcayán's built environment, and conversely,

how this environment both constrained and afforded different community practices through time. I focus particular attention on how public or communal ritual and economic spaces, such as temples and terraces, were produced and reassembled throughout Hualcayán's prehistoric occupation. In this analysis, I approach building⁷ as a kind of performance (cf. Love 2013) that is often, though not always, ritualized through blessings, offerings, feasts, or by directly fashioning architecture according to a religiously sanctioned or perceived divine form (Bille and Sørensen 2016; Hodder 2006; Spielmann 2008; Swenson 2011, 2015; Pauketat 2013). These ideas are further explored in this section, along with a more comprehensive review of how space and ritual performance has been approached in the anthropological literature.

The above review of communities reveals that although communities are not defined by co-residence alone (i.e. Murdock 1949), they require some degree of co-presence and interaction (Yaeger and €anuto 2000:5-6). Acknowledging this means we must examine the spaces, be they ceremonial complexes or agricultural fields, in which these interactions occurred. And yet, an interactionalist approach demands that we examine not only how different spaces enabled, restricted, or otherwise mediated a range of interactions, but also consider the production of space itself—the ongoing practices of building, modifying, using, and perceiving the built environment—as fundamental to how communities are shaped and given meaning (cf. Ashmore 2002, Bradley 1998, Guengerich 2014; Gupta and Furguson 1992; Hastrup and Olwig 1997; Ingold 1993; Kosiba 2010; Low and Lawrence-Zúñiga 2003a; Smith 2003, Tilley 1993; Varien and Potter 2008; Warner 2010; Wernke 2013).

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⁷ I use "building" and "construction" interchangeably.

Though space was once considered a passive backdrop to human action or a byproduct of community organization (see discussion in Souvatzi 2012), recent approaches draw on the work of Lefebvre (1974), Soja (1989, 1996), and theories of agency and practice (Bourdieu 1977; Giddens 1984) to examine how spaces are dynamic, imbued with meaning, and exist in a dialectic with the human practices that shape them (Rappaport 1982). Spaces are, as Lefebvre (1991) put it, *perceived, conceived, and lived*—that is to say, planned, imagined, and experienced. Spaces embody negotiated discourses, for they emerge as people choose building sites and materials, coordinate and mobilize labor, and use or move through architecture (Preucel 2000; Varien and Potter 2008; Wernke 2013). By recognizing the recursive relationship between space and practice, space becomes less of a physical boundary that "contains" community interaction (i.e. separating it from the actions of non-members) and more of an emergent product of those interactions (Anscheutz et al. 2002; Hirsch 1995; Pauketat 2000; Soja 1996).

Archaeologists have drawn on these ideas of space and the built environment to varying degrees by analyzing architectural layouts to understand how the societies that built them were organized, often mixing ideas from spatial production theory with approaches that have long defined architecture according to its formal qualities (shape size, position, materials, etc.). In the Andes, these kinds of studies have led to productive discussions about how the organization of space was essential to the nature of ritual performance and the expression of power (e.g., Bawden 1996; Feldman 1985, 1987; Fung Pineda 1988; Janusek 2004; Kolata 1993; Moore 1996; 1997; 2005; Pozorski 1982; Rick 2013; Swenson 2004; Warner 2010). For instance, Jerry Moore (1997) has examined early Andean ceremonial architecture to reveal how elites created public spaces to visually and

symbolically communicate a social order to maintain their social position, control the masses, and amass ever increasing power (1997; 2005). John Warner (2010) and Edward Swenson (2004) have also applied a proxemics-based analyses of Late Formative and Moche ceremonial complexes to investigate how ritual performances were shaped by the possibilities enabled or limited by certain architectural forms, such as ramps, platforms, plazas, entrances, exclusive spaces, and corridors. Richard Burger (1992), and more recently John Rick (2013) and Silvia Rodriguez Kembel and Rick (2004) have examined how architectural elements such as stairway portals, narrow chambers, and exclusive spaces at the temple of Chavín de Huántar bolstered the status of temple authorities and fostered or reinforced hierarchical relationships among the ritual participants more broadly.

These studies are compelling examples for how the built environment shapes social interaction and reproduces or alters structures of power by materializing inequalities (cf. Foucault 1977; 1982). However, by emphasizing power, many such studies often fail to consider how non-hierarchical social relationships—such as the heterarchical or competitive relations between corporate factions—are also materialized in space, even within ranked societies. George Lau's work on household compounds at the Recuay settlement of Yayno (2010, 2011) reveals not only how house compounds within a walled monumental core had greater wealth and status than extramural structures, but also how there were competitive yet horizontal relationships between domestic compounds within the walled area, which were distinguished by their masonry style, shape, and monumentality. The ongoing and long-term maintenance of these house compounds, including the addition of abutting compounds over the course of several hundred years,

reveals the importance of these spatial forms to the organization and reproduction of the Yayno community as a collectivity of competing elite house societies.

Another example of how negotiated practices need not mediate social relations between the powerful and powerless is evidenced by Tom Dillehay's (2004) work at early Formative temples in the Zaña Valley, Peru (1500–1000 BC). His research examined the microstrata and macrostrata to consider the timing and tempo of ritual deposits and rebuilding episodes in these early monumental spaces in order to reveal how household groups resisted or intentionally slowed the process of political centralization by incrementally building their temples rather than organizing massive construction episodes that could have lent more power to those organizing the construction labor (such as the large construction episodes at Pampa de las Llamas-Moxeke and Sechin Alto; Pozorski and Pozorski 2008:620; see also Vega-Centeno 2006).

Though the examples above reveal distinct approaches to studying architecture, together they reveal that in order to truly understand the production of space we have to look beyond architectural layouts to examine the negotiated practices that produced these spaces. This requires an approach to architecture that does not collapse diachronic changes into periods or ignore the ongoing modifications that transform space within and between these periods. When scholars look at diachronic change by examining one form of spatial organization (e.g. Early Moche) and contrasting it with another (e.g. Late Moche) at a broad temporal scale, they tend to create spatio-social types that are then assigned to a distinct period, without examining the ongoing practices that transformed these spaces through time. Although these analyses may sharpen our focus on the changing ways that people experienced and perceived their spatial environment, they tell us little about the negotiated

practices that brought a new spatial and social arrangement into being and need to be balanced with studies on shorter temporal scales (e.g., Dillehay 2004; Kosiba 2010, 2012; Wernke 2007, 2013).

These examples indicate how the sequence of practices and coordinated labor events that produced community spaces were often ritualized in the Andes, and elsewhere, through performances involving the deposition of offerings, communal feasting, the construction of sacred architectural forms, or the refurbishment of buildings (e.g., Boivin 2000; Dillehay 2004; Swenson 2011, 2015b). Such building rituals are thus not limited to work party feasts through which a community is motivated to pool their labor and political relations are solidified (Dietler and Herbich 2001). The building process itself was often a ritualized practice in pre-modern societies⁸, in temples and houses alike (Bradley 2005; Kosiba 2010; Mills and Walker 2008; Plunket 2002; Swenson 2004, 2011, 2015b; Vega-Centeno 2006; Wills 2000). For example, the act of rebuilding Mito-Kotosh⁹ temples in the pre-Chavín era was performed not simply out of the need to rebuild a crumbling structure, but to periodically participate in the sacred act of building floor and hearth altars. Because of this, Mito-Kotosh temple floors were not destroyed but repeatedly "entombed" (Bonnier 1997; Grieder et al 1988), sometimes along with human remains, and were perhaps treated as having their own life cycles (cf. Joyce and Barber 2015). Houses could also be the focus of ritual renewal by adding floor layers to commemorate life events (e.g., Boivin 2000) or by burying the dead below floors to embedded social histories, memories, and emotions into these dwellings (Demarrais 2013:115; Hodder 2012:133).

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⁸ As well as in modern times (e.g., Boivin 2000; Ramsey 2016)

⁹ For a more complete description of the Mito-Kotosh tradition, see Chapter 2.

In these ways, ritual depositions—of human bodies, magical objects, sacred floors, and so forth—could animate buildings and landscapes into living, agentive beings in both prehispanic Andean communities and other pre-modern societies. Following the work of Viveiros de Castro (2004) scholars have recently paid greater attention to how Andean relational ontologies shaped ancient Andean practice, worldview, and the formation of the archaeological record (e.g., Alberti 2016; Alberti and Bray 2009; Alberti and Marshall 2009; Angelo 2014; Sillar 2009; Swenson and Warner 2012). Native American ontologies, though not monolithic, recognize the agency of non-human materials, objects, animals, plants and supernatural beings, and the ability of these things to shape the world alongside and through their interactions with humans. Relational approaches more broadly have brought renewed interest in how rituals, because of their ability to draw attention to these relationships through heightened visual displays, bodily movements, rhythms, sounds, smells, altered perceptions (through dance, trance, or substances), and use of metaphors, define for participants how the human-material relations of the world are ordered (Alberti & Bray 2009; Boivin 2009; Fowles 2013; Fowler 2017; Pauketat 2013; Swenson 2015:334). Seeking to understand how ritual deposits are different than other materials found juxtaposed in the archaeological record, scholars have considered ritual assemblages the product of "bundling" (Keane 2005; Pauketat 2013; Swenson 2015; inter alia), or practices that bring materials together to underscore how things, people, landscapes, and even the cosmos fit together in meaningful ways (Pauketat 2013), often using material metaphors (Boivin 2010). Though a kind of ritual practice may be repeated, each iteration requires a unique assembling of materials, people, and space, which in turn reassembles the community even as it is reified. Ritual performances are thus powerful political and

emotional practices for reaffirming or transforming the social and material relations of community through explicit displays of tradition and spectacle (Bell 1992; Hodder 2010; Inomata and Coben 2006; Pauketat 2013; Swenson 2015).

While ritual performances activate and are enabled by the spaces in which they are performed, these meanings are also produced through the physical construction of the spaces intended for these performances. I thus approach building as a ritual performance (Love 2000; Swenson 2011, 2015; inter alia). More specifically, I consider the construction of ritual space as a kind of ritual bundling: of builders, stones, mortar, offerings, dead bodies, deities, etc. that are gathered and grouped to create a living sacred structure. I suggest that sacred structures can be understood as a 'bundle of bundles', produced through a series of ritual performances involving deposition. These bundles are nested in space and time as—to draw an example from the present study—human bodies are placed in soil beneath floors, which are made of prepared ash, that are laid in different areas of a platform at different points in time (see Chapter 5). A sacred space is a physical testament to both the recent and past ritual performances and people that produced it: the community, and its materials, labor, and traditions. More than this, however, these bundled depositions can animate these structures—not only when particular past actions or constructions are remembered, but also where this history is visibly built into an architectural form. In an Amerindian relational ontology, such structures could become living members of the community, that, like deceased ancestors, needed tending (e.g., reflooring and cleaning), feeding (offerings, libations, feasting), or, when necessary, perhaps even killing (decommissioning and destruction) (e.g., Brzezinski et al 2017; Joyce and Barber 2015).

As Bille and Sørensen (2016:3) point out, what we call architecture is never fixed or finished: "architecture is an assemblage of elements" that are continuously produced. In this way, architecture is more of a material process than a finite thing or form. The assembling of architecture includes the many practices and social dimensions of building, use, and experience, such as acts of moving (people, materials, and objects), altering, refurbishing omitting, rejecting, appropriating, excluding, including, revering, remembering, dismantling, or abandoning (Bille and Sørensen 2016a; Boivin 2000; Swenson 2011, *inter alia*). With each action, the form and meaning of architectural spaces are transformed as are the people who assemble (and assemble within) them. The study at Hualcayán examines the material, social, and performative dimensions of architecture and their ongoing transformations through acts of building.

In sum, an approach that combines assemblage theory, relational approaches, and theories of the production of space brings new clarity to how the changing relationships between people, materials, and places form and transform communities (Harris 2014). To understand how social practices, places, and meanings are transformed, especially through ritual, Chris Fowler (2017:101–102) suggests we examine "how each assemblage—each gathering of things, bodies, smells, sounds, images—cites or recalls past assemblages." That is, by tracing how people cite (cf. Lucas 2012) past actions through time we can "attend to the changing affordances of materials, the legacies of past actions (cf. Hodder 2012, 193), the impact of sequences of contingent events, and the unfolding composition of place."

Thus, to gain the conceptual and methodological tools to study how communities transform and are given meaning, we must consider not only the broad patterns in the archaeological record—such as the periods of stability (e.g., the life of a religious or cultural tradition)

separated by others of change—but also trace the ongoing, small-scale, and accumulative changes that redefine the practices, places, and meanings of community as they unfold.

Food Production and Ritual Consumption

The above discussion revealed that, in order to understand processes of community formation, we must not only consider the architectural forms that people built, but also the ritual performances, material deposits, and other building practices that produced these spaces through time. Here, the discussion turns to other kinds of coordinated labor and performance that assemble community: food production and ritual consumption. These diverse practices are explored together to inquire into how they are entangled through chains of action. How do social affiliations, ritual requirements, and environmental affordances together inform what foods are consumed, how to produce them—and vice versa (Morrison 2010; Smith 1992; Spielmann 2002; 2008)?

Scholars have long considered how activities like food production are essential to the social production of ancient communities, for example, by organizing their labor in order to develop agricultural lands, herd animals, and maximize their use of environmental resources to support a growing human population (e.g., Kirch 2007; Kolb 1997; Kuijt 2000; Marston 2011). But the *need* to produce food doesn't *determine* how food production systems are organized, nor do population sizes or the environments people inhabit alone dictate these food production practices—even though these practices are certainly shaped by them. The preferences for how and what to grow and eat involve a range of social choices and production and consumption practices—for example, agriculture and herding, daily consumption and feasting—that are negotiated in space and time to produce the

value of foods in a particular community setting. In particular, the foods people choose to grow are bound up in both the choices they make at the dinner table and the broader interactions, exchanges, and labor that is coordinated to produce and prepare foods for consumption (Klarich 2010; Pollock 2003; Smith 2006).

Accordingly, anthropologists have explored the importance of food beyond its role in subsistence and daily life, turning in recent decades to the sacred, communal and/or diacritical practices of ritualized consumption and how these practices manifested social bonds and marked social differences within communities (e.g., Dietler and Hayden 2001; Hastorf 2003a; Hendon 2003; Lau 2002; Martín 2013; Twiss 2012). In particular, they have revealed how acts of ritual consumption, such as feasts or the offerings of foods to deities, attach value to the foods consumed in everyday life (i.e. the *ritualization* of everyday practices, Bell 1992) and organize production at a larger scale, shaping social relationships, social differences, and inequalities in the process (cf. Bell 1992; Dielter and Herbich 2001; Hastorf 1993; Morrison 1995; 2006; Smith 1992; Spielmann 2002; 2008). As communities grow or otherwise change in size and demographic composition, foods are not simply increased in order to "match" the nutritional needs of a growing population; instead, demographic change is closely linked to transformations in other social phenomena—class affiliations, religious beliefs, food preferences, ritual practices, etc.—all of which respond to as well as allow for these changing demographics as people reestablish their relationship to particular environments and places.

Archaeologists have focused specific attention on how ritual food consumption, usually feasting, helped to define the social groups that constituted communities in the ancient world (e.g., Bray 2003; Dietler and Hayden 2001; Hastorf 2003; Martín 2013; Mills

2007; Twiss 2012; Yaeger 2000; see also Bell 1997:120-127). They identify feasts from domestic contexts in terms of the size (scale) of participants above the family unit, the serving of particular kinds of foods, the use of food preparation techniques, and/or the use of special equipment (especially decorated cooking and serving wares) that are rarely seen in everyday contexts or perhaps not in the same configurations. In addition, feasts are often associated with particular spaces such as patios and plazas which, though usually cleaned, can be identified as feasting spaces by the discard of feasting refuse outside them in designated middens. Typically, feasts also feature a higher-than-domestic percentage of serving vessels or decorated vessels, and larger cooking and storage vessels that are appropriate to serve a large number of guests, or at least more individuals than would typically gather in a household during daily consumption. Finally, feasts are often marked by other ritualized practices and performances, such as offerings and music (seen materially through instruments; For a recent review of archaeological approaches to feasting and other food practices, see Twiss 2012).

Scholars often discuss how commensal feasts were "tournaments of value" (Appadurai 1986:21) in which people from different gender, kin, status, or other corporate groups publically established their identities, declared their social status, and negotiated the value of community resources by ritualizing food consumption (Bell 1992; 1997; Dietler 2001; 2003; Gero 1991; Weissner 2001). These feasts are often asymmetrical in some way, whereby particular individuals or groups serve as hosts, providing the venue, food, and/or event coordination, and guests contribute with foods, materials (e.g., ceramic serving vessels), or labor (e.g., cooking, serving), either for the feast or at a future date at the request of the host. These asymmetrical contributions and distinctions make feasts

particularly fertile grounds for testing the participatory willingness and "managerial skills" of the hosts and guests: not everyone participates according to their expected or idealized roles (Smith 2014). For example, guests may opportunistically display wealth by overcontributing to a feast, they may arrive as a freeloading guest, or they may not participate in the event at all (Smith 2014). Equally, a host may be seen as one who is unable to throw a "good" feast, thus affecting his or her ability to draw labor in the future. These tensions between hosts and guests, as well as between different factions present (or between those groups present and those purposefully excluded), reshape the social relationships of the community, as well as its material dimensions, which become again transformed through everyday labor and interaction.

Although studies of feasting reveal the dynamic ritual practices that constituted group boundaries and authority in ancient communities, they too often focus exclusively on ritual performance via studies of consumption, and thus overlook the broader labor practices that supported rituals like feasts (Brookfield 1984; Dietler 2003:277; Erickson 2006; Hastorf 2004; Kirch 1994; Netting 1993; Spielmann 2002; Wells and Davis-Salazar 2008). Despite the indications of overlap between food production and ritual consumption, archaeologists often view food production practices as distinct and unconnected from ritual events, treating food production as an exclusively economic practice through which communities adapt to their environments (e.g., Boserup 1965, 1981, 1990). If archaeologists discuss food production's relation to ritual and feasting, they generally view it as an indirect yet necessary aspect of more meaningful social and ideological practices (cf. Dietler 2003:277; Spielmann 2002).

In the Andes, many archaeologists who discuss ancient foodways have focused on how feasting helped to define social groups and status positions (Bray 2003; Chicoine 2011; Gero 1992; Jennings and Chatfield 2009; Lau 2002; Swenson 2006; Vaughn 2004). These studies have been essential to understanding the role of ritual in a variety of social contexts, from how feasts established mutual labor commitments between community members as they built the earliest monuments (Vega-Centeno 2006), to how ritual feasting mediated power between elite groups in the Late Moche world (Swenson 2006). Yet many studies of Andean ritual rarely examine local food production systems with equal attention (however, see Hastorf 1993; Dillehay 2001, 2017; and the discussion below).

Conversely, other scholars overemphasize food systems in their analyses of community organization. Since Murra's (1972) introduction of the "archipelago" model, many have treated social and kinship units (*ayllus*) as communities that emerged in large part by colonizing satellite areas (*colonos*) whereby residents specialized in exploiting the resources of different ecological zones. Similarly, studies have also concentrated on how Andean communities grounded their local authority in food production practices by choosing to produce a variety of resources in different, but highly compressed set of elevation zones (Brush 1976; Oberem 1976; Yamamoto 1985).

While these archaeological studies provide valuable insights, they rarely consider how Andean communities integrated ritual and food production practices in order to generate new kinds of political and social structures. That is, research on Andean food production has often concentrated on the economic geography of subsistence practices and assumed enduring Andean strategies of environmental adaptation and community organization (e.g., *lo Andino*), but neglected to consider the social conditions, ritual

requirements, and historical circumstances that influenced prehistoric Andean societies to engage in different kinds of local production systems. Similarly, studies of feasting too often overlook production practices and only focus on ritual performance—that is, the ritual provisioning and consumption of food—and what this implies about social differentiation, labor practices, and the political organization of communities.

The study at Hualcayán follows several anthropological examples from the Andes and elsewhere indicate a more direct connection between food production and ritual practice (e.g., Dietler and Herbich 2001; Geertz 1980; Hastorf and Johannessen 1993; Lansing 2006; Smith 2006; Spielmann 2002). For example, ethnohistorical accounts of the Inka, document how farmers produced large quantities of maize exclusively for community rituals, and that special terraces were set aside for this production (e.g., Polo de Ondegardo 1916:20; Silverblatt 1987). In addition, farming communities in the modern Andes often coordinate inter-communal labor during public rituals such as the *Yarqa Aspiy*, whereby they initiate the planting season with canal cleaning and repair, feasting, and food offerings to ensure the flow of sacred water (Apffel-Marglin 2010; Isbell 1978; Robles Mendoza 2010).

These integrated ritual-economic systems are well-documented beyond the Andes as well. For example, farmers in modern Bali perform rituals at sacred water temples as a means to publicly coordinate and schedule rice plantings and harvests (Lansing 1987; 2006). Likewise, the modern Honduran Lenca carry out a series of complex rituals featuring altar construction, food offerings, and feasting (*compostura*) during period of planting and harvesting, which mediate their relationship and obligations to fellow

community members, to their ancestors, and to the local environment (Wells and Davis-Salazar 2008).

In these examples, food production activities are not just indirect support-tasks for public rituals, nor are they exclusively subsistence activities. Instead, these examples show how food production, temple and infrastructure maintenance, and ritual consumption practices are inextricably linked through overlapping, or combined labor and ritual practices. These integrated practices are key to how value is produced—the value of foods, materials, spaces, and social relationships are defined as people gather and labor together in fields, share food during feasts, and construct and use sacred spaces. It is these combined practices that structure and give meaning to the social as well as material relationships that constitute community. The study at Hualcayán thus examines both how foods are produced and how they are ritually consumed in communal settings in order to explore how links between these practices shape social interaction, create interdependencies between people (and between people and their infrastructure, deities, etc.), and engender a shared sense of value.

Toward a Ritual Economy of Community Formation

These links between the production of space, ritual performance, labor coordination, food production, and ritual consumption have lead some scholars to focus more sharply on what they call "ritual economy." Scholars of ritual economy explore how rituals are not simply the symbolic means through which a community is solidified or unified, but also the practical means through which people produce and contest social roles, labor obligations, and cultural values more broadly. Though use of the term ritual

economy is fairly recent (McAnany and Wells 2008; Wells 2006), other scholars have applied a similar framework, examining links between ritual and food production and other kinds of economic practice (e.g., Kirch 1994:294; 2007; Lansing 1987; 2006; Munn 1988; Spielmann 2002).

The ritual economy approach builds on the work of many scholars who have long sought to understand the relationship between ritual and economic phenomena in society. For example, anthropologists such as Roy Rappaport (1968) suggested that ritual, religion, and belief can explain economic behavior by examining how the *kaiko* of New Guinea ritually sacrificed pigs in order to regulate local ecology and subsistence. Similarly, Geertz (1972) contrasted the Balinese adaptation to a "wet" climate, and the Moroccan adaptation to a "dry" climate, in order to suggest that humans necessarily create distinct ecosystems in the environments they inhabit, which leads to distinct cultural practices (such as the Balinese *subak* irrigation ritual) and social systems. Both of these studies had profound impacts on the anthropological study of how economy and ritual construct economic value and shape a variety of social practices. What limits both Geertz's and Rappaport's approaches, however, is that, by focusing on how cultural-ecological systems reproduce society or maintain a social-environmental equilibrium, their analyses are restricted by a functional framework. That is, while they reveal the interrelatedness of diverse social, economic and ritual practices, they can only account for how and why a system works at a given moment in time. Though not intending to cast these cultural systems as static and unchanging, they do not reveal how societies are transformed as they are produced, nor do they account for the role of politics in their transformation—both of which are important to the ritual economy approach.

Ritual economy was first coined by Christian Wells (2006; also, McAnany and Wells 2008) who sought to define the trend in Mesoamerican archaeology that combined agencyoriented theories (especially that of Giddens 1984) with political economy. In particular, proponents of ritual economy seek to focus on how ritual and economy are not distinct modes of practice that follow distinct logics (i.e. rational vs. irrational behavior), but rather how these practices work in a dialectic to shape and give meaning to materials, spaces, and social relationships as they are produced. The approach is thus distinct from political economy by examining questions beyond how elites amass power through control over production and consumption (Callaghan 2008; Spielmann 2007; Wells 2006). McAnany and Wells (2008:3) have outlined the approach's three central concerns: "(1) economic practice, i.e., provisioning and consuming; (2) resultant elements of practice, i.e., materialization and substantiation; (3) and, finally, the important social role of ritual practice in shading meaning and contouring the interpretation of life experiences." To say it another way, the approach examines how social relationships, identity, beliefs, perceptions, and value—collectively, one's "worldview"¹⁰—are produced through the recursive relationship between economic labor and ritual practice. Implicit in this approach is understanding how the forces and cycles of practice, materialization, and interpretation combine to organize and change communities over time (McAnany and Wells 2008:3-4). As a science of materials, practice, and long-term change, archaeology is well-suited to examine how interrelated patterns in ritual and economic practice structure and transform communities over the longue durée.

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¹⁰ Although worldview is key to their conceptualization of ritual economy, McAnany and Wells do not, themselves, define this term. This definition here is my own, but nonetheless based on their conceptualization of ritual economy and the general use of the term more broadly.

Though many archaeological studies that employ a ritual economy perspective have examined how craft production economies are linked to structures of power, few have directly examined relationships between food production and ritual consumption at either local or regional scales (e.g., Spielmann; 2002; Wells and Davis-Salazar 2008). Studies of ritual economy in Mesoamerica, for example, show how elites directed the production of fine ceramics, jade beads, pyrite mirrors, cacao, and obsidian weaponry that were produced by various lower class corporate groups and exchanged in theatrical rituals during which they competed for and solidified their status positions (Barber and Joyce 2007; Berdan 2007; Carballo 2011; Davis-Salazar 2007; Foias 2007; Joyce and Henderson 2010; Kovacevich 2007). As these examples demonstrate, many archaeological ritual economy studies concentrate on how elite actors orchestrated and intermeshed economic production and ritual practices in an effort to legitimize and materialize their authority and maintain social order within a regional polity (e.g., McAnany 2008). In essence, the studies examine how the social position and class of laborers (jade vs. ceramic craftsmen, etc.) in Mesoamerican society was often established by these laborers participating in elitesponsored ceremonies, where they both produced and presented their highly-valued ritual objects in a collective ritual setting. Similarly, Swenson and Warner (2012) have shown how cycles of metallurgical production, feasting, sacrifice, and ritual exchange integrated workers and elites into a broader community. Such acts simultaneously reinforced and materialized the social positions of laborers yet recognized their social value and that of the products of their labor (copper objects).

In this way, many ritual economy and similar studies in archaeology have focused attention on how a ritual schedule can organize the social relations of craft production in

service of maintaining elite power in regional polities and states without coercive measures. In so doing, however, these studies have largely neglected to explore how the practices of food production and construction were interconnected and to organize and assemble community (see Morrison 2006; Smith 2006; Spielmann 2002:197; Stone 2001:168; Wells 2007:35).

One main exception is the foundational work of Katherine Spielmann (2002; also 2008), who published a pioneering comparative analysis of small-scale societies to identify a "ritual mode of production." Her cross-cultural analysis shows that, like specialized crafts, foods that were used in ritual settings were not drawn from household surpluses, but were explicitly produced—and thus intensified for—ritual demands and obligations (cf. Halstead 1989). Such intensification practices occurred by a temporary or permanent increased investment in production and construction labor (Spielmann, 2002:197). Spielmann points to how the value of particular foods is not only defined by the rituals that imbue them with meaning, but is also related to the kinds and intensity of labor used to produce it (Spielmann 2002; cf. de Garine 1996; Hayden 1996; Lemmonier 1996). A ritual economy approach to food production thus treats agriculture less as an economic adaptation to the environment and more as a set of interdigitated social practices and organizing principles through which people built, exploited, and ritually propitiated their environment (Spielmann 2002; cf. Wells and Davis-Salazar 2008).

Although not adopting an explicit "ritual economy" approach, several other important recent studies have revealed such links between labor, food, ritual, and the built environment. In ancient South India, for example, elite groups built reservoirs to intensify the production of irrigated luxury foods such as rice and coconuts (Morrison 2006). The

architecture of these reservoirs invoked sacred temples, thus linking agricultural fertility to religious activity while demonstrating that ruling groups fulfilled a moral obligation to improve the environment and provide for the people who tended their fields (Morrison 2010:188,190; Morrison and Lycett 1994). Similarly, in the ancient Central Andes, local leaders hosted feasting ceremonies in which they declared their authority and defended their social group's local autonomy during the Late Intermediate Period—an era of unprecedented inter-group conflict (Hastorf 1993; cf. Arkush and Stanish 2005). To support these feasts, communities intensified maize production by developing additional local lands for food production, even aggressively appropriating distant fields and, by implication, heightening the social value of labor, land, and crops such as maize (Hastorf 1993:204-205).

Other work in the Andes has exposed how the production and ritual propitiation of foods, materials, and monuments was essential to the transformation of communities. For example, the work of Tom Dillehay (2011:289–295) reveals how labor organization and ritual practices are linked to transform community social structures along with technological innovations, such as occurred between the Preceramic and Initial Periods (~7800–1500 BC) in the Zaña Valley of Peru. In particular, Zaña communities implemented an agricultural system that based on the principles of labor organization and ritual obligations that were developed first for lime and lithic production as well as mound construction and ritual. Forthcoming results from Huaca Prieta show similar links between mound construction, ritual, and subsistence technologies during the Preceramic Period and beyond (Dillehay 2017). In a different way, John Janusek has explored how the nascent Tiwanaku state consolidated its subjects by commissioning techno-ritual specialists to

fashion lithic monuments made from recognized animate places in the landscape, which served to reassemble the natural, social, and supernatural world anew (Janusek 2017). Similarly, his work at Khonko Wankane suggests that sacred links between the community's natural and built environment, and the ancestral spirits and local leaders they represented, were established through material metaphors and landscape engineering; specifically, they built mounds to mimic sacred mountains, and these mounds and mountains were physically linked via canalized streams (Janusek 2012).

These studies suggest that, especially in ancient agrarian societies, ritual practices were deeply integrated into food production and corporate labor, as well as increased authoritative display by groups administering or controlling the production process for community rituals (see also Goldstein and Shimada 2010; Gumerman 2010; Kirch 1994:294; Spielmann 2002; Stanish 2013; Stein 1994; Wells and Davis-Salazar 2008). More importantly, they reveal how different social groups within communities constituted and integrated their diverse interests and identities by inventing, commingling, and organizing food production, construction, and ritual practices. Ritual-production practices often produced hierarchical community structures as particular individuals or elite groups became the religiously sanctioned leaders and labor organizers of production systems (e.g., Morrison 2006; Hastorf 1993). But such practices were also borne of more egalitarian forms of cooperation, undergirding the heterarchical relationships between social groups (Spielmann 2002, 2008; Stanish 2013). How corporate groups, such as extended kin groups, and community leadership positions emerged through these practices is central to the study of long-term community change at Hualcayán. Equally, the study considers how

these social divisions were enmeshed within the physical landscape (Janusek 2006, 2012; Joyce and Hendon 2000; Wernke 2013).

To conclude, a ritual economy approach highlights how ritual practices organize community labor, assign value to the things and foods that a community produces, and delineate the social roles of its participants. Although many ritual economy approaches focus on how the powerful use ritual objects and practices to substantiate the value systems that legitimate their control over others, assemblage theory tips the scales more evenly. That is, the raw materials, crafted objects, natural resources, irrigated foods, and built spaces of the community landscape are not merely tools for establishing one's social or political position; they are essential, vibrant (*sensu* Bennett 2009) elements of the community itself, which not only have the capacity to direct the course of history, but they are essential to how people produce an emotional connection to each other and particular places (Harris 2014).

This study focuses attention on how the people of Hualcayán changed their food production and ritual consumption practices and remodeled their built environment as they transformed their Chavín temple into a Recuay town, and reassembled and reorganized the community in the process. By tracing the changes made to particular spaces (e.g., the addition of walls, the repurposing of old rooms for new kinds of rituals, etc.) and the community landscape more broadly (e.g., site-wide reorientation of ritual and household structures, the introduction of new foods and production techniques, etc.) the study also considers how these practices materialized a new sense of place through time. Together, these integrated and overlapping economic and ritual practices and the spaces and materials they create produce community across its material and social dimensions—

things, places, buildings, and group affiliations—defining one's perception of their place in the community and their ritual and labor obligations to it. As Spielmann (2008:38) puts it: "...the production of communal ritual places may often have involved the creation of sociograms, which conveyed a particular view of corporate social reality, while the production of objects for use within these places encompassed a web of complementary and competitive relations. Complementary ritual obligations would have resulted in all adults participating in the materialization of ideology many times in their lives." That is, it is through the creation of sociograms—or microcosms of social divisions and the spaces and labor and ritual practices that reify them (Spielmann 2008:47)—that distinctions between corporate groups (e.g., kin groups) emerge, are materialized, and transformed.

Ritual, Economy, and Community Transformation at Hualcayán: Hypotheses

Drawing on this body of knowledge along with our current understanding of Chavín and Recuay societies¹¹, the dissertation hypothesizes that the emergence of a Recuay community at Hualcayán was grounded in a localized process of reorganization that sought to decentralize community authority and bolster local autonomy by introducing a ritual-agricultural system (i.e. ritual economy) that emphasized (1) membership within, (2) ritual and labor obligations to, and (3) the food resources produced by one's kin group¹². As part of this, the people of Hualcayán would have segmented and localized their ritual practices, shifting them away from the centralized spaces and foreign objects that had formed the

¹¹ As discussed in chapters 1 and 3.

¹² Current evidence suggests that Recuay corporate identities were likely rooted in either real (lineage) or fictive (kinship) ties (Lau 2011); further evidence for a kinship or lineage basis to these corporate group identities will be explored through the data from Hualcayán.

foundation of Chavín authority (cf. Rick 2005; Burger 1992) and instead focusing on ensuring and celebrating the successes of everyday food production vis-à-vis the coordinated ritual and economic labor practices and spaces of their particular group (cf. Gero 1991). Corporate groups would have thus regulated the integrated ritual-agricultural system with group leaders, perhaps chiefly lineage elites, managing particular organizational and integrative tasks both within their group and between groups. A corollary hypothesis is that while these practices likely produced and strengthened the cohesion and identity of distinct groups and encouraged competition between them, they also served to manage risk at the community level by intensifying (e.g., irrigation) extensifying (e.g., extensive terrace construction in new areas), and diversifying (e.g., multicropping, field fragmentation, food sharing during feasts) food production across the landscape (following Marston 2011:191-193).

This hypothesis builds on current scholarship, which has revealed how Chavín communities were typically centered on temple spaces where people participated in hierarchically-organized rituals that were focused on communing with supernatural beings, in part facilitated by exotic objects and hallucinogenic substances (Burger 2008; Rick 2013), and how Recuay communities were typically composed of segmented, competitive factions who lived in distinct domestic compounds and venerated their ancestors in feasting rituals (Lau 2011; 2013). To move beyond interpretations of the Chavín to Recuay transition that are based in comparisons between these social and cultural distinctions, this study employs a ritual economy approach in order to expose the particular practices, spaces, and materials through which Ancash communities transformed during this transition. In particular, it asks how the formation of Recuay corporate factions

are tied to the reorganization ritual space, consumption activities, and food production practices and how these practices and materials emerged in local places like Hualcayán. Moreover, it asks how these changes are rooted in local places and practices that emerged and transformed over the *longue durée*.

The hypothesis was also formulated based on my first observations of Hualcayán's architecture and surface materials during a survey of the northern Callejón de Huaylas Valley, which led me to choose the site for the dissertation study (see chapter 4 for a review of this preliminary work). In particular, I documented what appeared to be a Chavín-era mound and plaza complex, locally called "Perolcoto," which was surrounded by an area of agricultural terraces and bordered by two canals. What was particularly interesting was that there were at least four U- or D-shaped room-and-plaza compounds scattered throughout these terraces, which were presumed to relate to the Recuay-era occupation based on surface artifacts. If compounds were places of ritual activity, the layout suggested a decentralization of ritual activity through time from Chavín to Recuay, that is, away from a central ceremonial area and towards smaller and more segmented ceremonial spaces.

Moreover, the architectural association of terraces and potential ritual compounds suggested the possibility that agricultural activities became, in some way, an explicit focus of ritual practices during the Recuay period at Hualcayán.

Finally, a survey of the residential sector of the site also featured a segmented layout in the form of walled domestic clusters, which were also associated with Recuay material culture. Together, the segmented layout of Recuay residential areas along with the segmented pattern of U- and D-shaped compounds built within terraces suggested that the Hualcayán community experienced a marked shift in ritual practice and social organization

after Chavín. In particular, these data suggested that Hualcayán was first a centrally organized and perhaps loosely ranked society in Chavín times, with ritual activities focused on and around the Perolcoto mound, and was then transformed into a community organized as affiliated, but discrete corporate groups that emerged with the elaboration and intensification of a ritualized agricultural economy.

To explore this hypothesis the project needed to test: Do the Recuay period D- and U-shaped compounds reveal direct evidence for the integration of ritual and agricultural activities, such as food processing and storage as well as feasting? Does each compound reflect similar but separate material evidence for these activities, which could suggest they were built and used by similar but distinct corporate groups? Does the production and ritual use of food change from Chavín to Recuay times, such as the diversification of cultigens or irrigation techniques, suggesting new labor practices? Do activities such as ancestor veneration emerge in tandem with changes in the local food regime? Are there distinct ritual and food materials and practices (e.g., cultigens, feasting protocols) in each U- and D-shaped structure to suggest the expression of corporate group identities? Do changes in the ceremonial-agricultural landscape coincide with the creation of segmented households suggesting a community-wide transformation?

Although Recuay scholars had previously suggested some of these links between ritual and food production (especially Gero 1991), they had yet to fully recognize these connections, particularly in terms of agricultural practice, or demonstrate them through the material record. For example, the majority of Recuay research has been conducted in high elevation settlements with economies heavily focused on camelid herding. At the center of many of these Recuay settlements are circular buildings believed to be ritual

spaces similar to the "ceremonial corrals" of the historic period whereby ceremonies were focused on ensuring herd fertility (Lau 2011: 54). George Lau's discovery of middens containing massive amounts of roasted camelid remains at Chinchawas (Lau 2002), as well as Joan Gero's evidence for feasting at Queyash Alto (Gero 1991) support this interpretation. However, many other Recuay sites, like Hualcayán, are associated with extensive areas of agricultural terraces not present or as prevalent at sites like Chinchawas and Queyash Alto and may have had a less intensive herding and more intensive agricultural economy, and these differences may be reflected in ritual and other practices. Moreover, the evidence from documented Recuay feasts suggests they centered not only on the consumption of massive amounts of camelids but also on drinking maize corn beer, or chicha (Gero 1991; 2001 Lau 2002; 2011), pointing to at least some special production of maize in most Recuay communities. Yet neither the production of maize nor that of other cultigens has been directly examined through botanical analyses, leaving the relationship between different Recuay economies the development of Recuay communities largely unexplored.

Between 2011 and 2015, I carried out extensive excavations at Hualcayán—in the Perolcoto mound and plazas complex, in room and plaza compounds, in tombs, and in one domestic unit and patio—and material analyses—ceramics, AMS radiocarbon, macrobotanical/microbotanical remains, faunal remains—in order to evaluate support for the study's hypothesis. Specifically, the excavations and analyses tested whether the documented Recuay U-and D-shaped compounds were used for both ritual (e.g., feasting or offerings) and agricultural activities (e.g., food processing or storage). If so, the study also sought to explore how, and why, local people began to integrate these spaces and practices,

such as to coordinate community labor and ritual obligations to the community. I placed particular emphasis on the excavation and analysis of Hualcayán's ritual spaces and the food and ceramic remains recovered from them in order to understand whether rituals, including the emergence of ancestor veneration practices (Lau 2002) changed in tandem with the production and consumption of new foods and explore how these foods were important to these new ritual practices. The investigation of Hualcayán's presumed ritual structures and their excavated materials was supplemented by excavations in domestic structures and terraces at the site in order to compare ritual and everyday food consumption. By focusing on the ritual and economic practices across the community landscape, the study sought to understand whether and how innovations in ritual and food production—and the segmentation of these activities—reveal the process through which the people of Hualcayán reorganized its social relations and corporate group divisions after Chavín to form a new community of corporate groups. Moreover, by tracing these practices over the longue durée, the study sought to move beyond regional comparisons of art and architecture in the Andes to assemble a holistic and local account of the changing practices that contributed to the Chavín decline and Recuay emergence.

Summary

In conclusion, I have outlined the study's theoretical and conceptual framework to the study of community formation, which focuses on the cross-cutting ritual and economic labor practices that organize people, things, and spaces and link them to particular places. I explored the various dimensions of these practices, and focused on those which draw

people together into interdependent relationships, shape meaning, and define social difference: performance, building, food production, and ritual consumption. Finally, I outlined how this approach informed the study's organizing hypothesis for understanding community formation at Hualcayán. In the following chapter, I review in greater detail how the data at Hualcayán are situated within existing scholarship on prehistoric communities in Ancash.

CHAPTER 3

RECONSIDERING THE CHAVÍN TO RECUAY TRANSITION: PREVIOUS RESEARCH IN HIGHLAND ANCASH

When Julio C. Tello (1929, 1930) and Wendell Bennett (1944) first identified the impressive monuments and art of Chavín and Recuay (respectively), they placed highland Ancash at the center of early debates on the origins of Andean social complexity. Archaeologists have since worked to interpret the nature of Chavín (circa 900–500 BC) and Recuay (circa AD 1-700) societies through these places and materials. Yet while scholars have suggested that the end of Chavín was a period of dramatic social transformation that had wide-reaching and long-term consequences in the reorganization of Chavín-influenced communities across the central Andes (Burger 1992–229; Lanning 1967; Lau 2011; Lau 2016; Lumbreras 1974b; Shimada 2000), little empirical research, especially by means of excavation, has been focused on understanding these changes in Chavín's heartland of highland Ancash¹. Instead, excavations have focused on questions of *either* Chavín *or* Recuay societies, whereby the transitional Huarás (circa 500-1 BC) phase developments, where uncovered, are nearly always secondary to the overarching research objectives (e.g., Amat Olazábal 2004; Burger 1985; Gero 1990; Gero 1991; Gero 1992; Gero 2001; Lumbreras 1970-78; Lumbreras 1974a; Ponte Rosalino 2000; Rick, et al. 2009; Rick 2005) or are highly disturbed by modern dwellings, such as at the important Chavín-Huarás-

¹ The Chavín-Huarás-Recuay transition has received considerably less attention than, for example, the coeval Paracas-Nasca or Chavín-Salinar-Gallinazo-Moche sequences of the south and north coasts, respectively (with Paracas being a Chavín-influenced cultural phenomenon). The post-Chavín Final Formative Salinar/Samanco phase of coastal Ancash has only recently been closely examined and has been revealed to be a politically dynamic period of social diversity (Ikehara and Chicoine 2011; Shibata 2010; 2011).

Recuay phase temple of Pomacayán² in the city of Huaraz (Bennett 1944; Gamboa 2016; Reina Loli 1959; Serna 2005; Tello 1943:155, 1960:27). A study of the Chavín to Recuay transition is not only interesting in terms of filling a gap in knowledge about Andean prehistory, however. A study of this transition is an exceptional opportunity to understand how new communities were forged as religious beliefs, ritual practices, and economic networks shifted on a regional scale. More precisely, this study explores how local community practices like food production and ritual gatherings laid at the foundation of these widespread shifts.

The lack of focused archaeological study on the Chavín to Recuay transition is due in part to this period's settlement shifts: some Chavín-era settlements were abandoned and many new Huarás and Recuay settlements were subsequently founded, which alone points to this period as highly transformative as people uprooted, broke apart, and/or actively assembled new communities. Yet overall, archaeological studies have not adequately considered this transition as a central research question. Only related studies in the upper Nepeña Valley by Proulx (1985), Daggett (1984), and Ikehara (2010, 2015) have sought to directly study it through regional survey and test excavations, revealing a process of widespread political reorganization and the consolidation of elite power at certain sites in the upper Nepeña Valley (Ikehara 2015). However, these studies occur along the western extent of the Recuay area and outside of what we typically consider Huarás; moreover, they take a more regional, rather than local community perspective on changes during this period. As reviewed in Chapter 2, to examine community transformations we must not only

² Also referred to as Pumacayan in the literature.

compare community forms on regional scales, but also examine the ongoing practices through which people and things were reassembled in particular places.

With little direct study, the processes of Huarás and Recuay community formation remain unclear except for broad patterns of change that are identified through regional comparisons of Chavín, Huarás, and Recuay archaeological data from discrete sites (Lau 2016), supplemented by data from archaeological surveys (Diessl 2004; Herrera 2005; Ibarra Asencios 2004) and a handful of targeted excavations often focused on burials (e.g., Bennett 1944; Ponte 1999; Tello 1960). These broad patterns include: the movement of settlements to defensible hilltops suggesting increased uncertainty or warfare (Amat 1976; Astuhuamán & Espinoza 2006; Daggett 1984; Herrera et al. 2006; Ibarra 2003; Ikehara 2005; Lau 2011a; 2011b; Ponte 2001; Proulx 1982; Wilson 1988); a stark shift in material styles from mostly incised to painted wares (Gero 1991; Lau 2004, 2011, 2016) and/or the profaning of temple spaces suggesting a rejection (or in the least a stark transformation) of Chavín ideology (Lumbreras 1970; 2007; see also Willey 1948:11); a breakdown in interregional trade suggesting a more insular (or micro-rather than macro-regional) social landscape (Ikehara 2010; 2015; Lau 2011, 2016); and eventually the development of ancestor veneration practices and pronounced kin-based social divisions and elite leadership (Gamboa 2009; Gero 1991, 1992; Lau 2004, 2011a, 2011b; 2016; Ponte 2009, 2014, 2015). Yet without intensive studies of long-term change in social and economic practices across the Chavín to Recuay transition, it becomes difficult to cast these early Recuay developments as anything other than a reaction to the regional (and interregional) breakdown of Chavín (Lau 2011: 248). While perhaps true in part, such claims deemphasize or ignore the possibility that people across Ancash began to develop new

beliefs, practices, and economies that became incompatible with or challenged Chavín religious and ideological authority³. More importantly, to understand the emergence of Recuay it is imperative that we look beyond broad regional patterns to examine the long-term local processes and practices through which Chavín was rejected and new social orders were instituted in communities across Ancash.

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³ Which may have contributed to the end of Chavín in conjunction with other factors, such as a large earthquake that occurred around 500 BC, evidenced by crumbling walls at Chavín de Huántar that were quickly covered with wall supports to stabilize the buildings before ceremonies waned. Such a massive event would have likely called Chavín's authority into question or otherwise undermined its ideological foundations (Contreras 2007:244; Rick 2008:18).

To reveal the changing practices that established early Recuay communities, this dissertation hypothesizes that two interlinked domains of practice were key to organizing both Chavín and Recuay society but in dramatically different ways: ritual and economic practice. Chavín rituals centered on access to exclusive materials—many acquired through long distance trade—and knowledge about non-local supernatural deities and oracles. In contrast, Recuay community feasts, offerings, and dedicatory performances were important acts of reciprocity toward a life-giving ancestor and involved the local production and consumption of ceramics, camelid meat, and likely chicha beer (Gero 1991; Lau 2011). Yet, while Chavín ritual spaces, practices, and economies are fairly well studied, we know little about the Recuay economies beyond ceramic and camelid production and consumption, nor how and when Huarás feasting practices began after Chavín. Joan Gero (1991), has proposed that the emergence of Recuay communities after Chavín was perhaps linked to changes in food production, including not only the expansion of pastoralism (Lau 2007; 2011) but also of agricultural systems. In particular, she suggests that, as Chavín's value system and elite network disintegrated, which had supported the acquisition and production of exotic objects, the formation of Recuay chiefly leadership was likely achieved through the management of agricultural labor, which was consolidated by establishing communal fields and production requirements, such as terrace construction, field maintenance, and harvest activities. The literal fruits of this labor were then showcased during feasts, and the act of consuming them reestablished guests' debt of labor to the ancestor, chief, corporate group, and/or broader community.

Though a compelling narrative, Gero's proposed link between changes in food production and feasting and the emergence of early Recuay corporate identities and

leadership is more of a hypothesis and has yet to be fully demonstrated. The majority of the robust evidence for community rituals come from later (post AD 300/400) Recuay sites near the upper limits of agriculture (3800–4000 masl) where extensive pasture allowed for intensive camelid herding and the growth of agropastoral economies; fewer studies have examined lower altitudes (especially below 3500 masl) where agriculture would have played a central, rather than secondary role as part of a mixed-farming economy. Likewise, because botanical remains have been only identified from a handful of contexts at Huarás and Recuay settlements, usually domestic areas or tombs (Ponte Rosalino 2014), the results from faunal analyses have likely privileged camelid herding and consumption activities over agricultural practices. Thus, the broader food economy—and the labor and material foundations of both early and late Recuay commensalism—remain only partially understood.

In order to contextualize these issues raised above, this chapter presents a review of previous archaeological research conducted in highland Ancash⁶. The data from Hualcayán, which are presented and explored in Chapters 5, 6, and 7, are also briefly introduced alongside these summaries in order to illustrate how the present study addresses key issues in the study of the Chavín to Recuay transition.

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⁴ Based on ethnohistoric accounts from highland Ancash, Kevin Lane (2005:17) makes a strong case for distinguishing between Andean agropastoral economies as pastoralists who cultivate some crops, and Andean mixed-farming economies as agriculturalists who tend some animals. Due to the environmental restrictions that limit agriculture above 4000 masl, he suggests these distinctions were key to community practice and identity in the Andes.

⁵ The most robust studies of Recuay non-mortuary ritual and integrative community practices come from the late Recuay high elevation sites of Chinchawas (Lau 2001; 2001; 2002; 2003) and Yayno (Lau 2010; 2011a; 2011b), and the earlier lower elevation site of Queyash Alto (Gero 1991; 2001). Other studies have focused more on late Recuay and Middle Horizon mortuary analyses (e.g., Ponte 2000; 2015; Ibarra 2013; 2014) including from Hualcayán (Cruzado Carranza 2015).

⁶ This review considers social developments beyond Highland Ancash where relevant; however, for a more extensive review of central Andean prehistory during the Formative Period and Early Intermediate Periods, see Silverman and Isbell 2002a; 2002b; 2006; and 2008. The review places particular emphasis on regional developments in the Callejón de Huaylas Valley, where Hualcayán is located.

Current Perspectives on Highland Ancash Prehistory: Contextualizing the research at Hualcayán

This literature review is divided by chronological period. The chapter's primary concern is tracing our current knowledge of the Chavín to Recuay transition by reviewing Late Formative (Chavín era; 900-500 BC), Final Formative (Huarás era; 500-1 BC) and Early Intermediate Period (Recuay era; AD 1–700) community practices in highland Ancash. In addition, the review situates this transition within the *longue durée* of regional and community development from its *pre-Chavín* beginnings during the Initial, Early, and Middle Formative Periods (3000–900 BC) through to the *Post-Recuay* transformations of the Middle Horizon (AD 600-1000) and into the Late Intermediate Period (AD 1000-1450). The project's excavations at Hualcayán uncovered these early and late contexts in many areas where there was continuity and/or reuse of Chavín, Huarás, and Recuay spaces, and a coherent presentation and interpretation of the data is nearly impossible without a consideration of these long-term construction histories and practices. Moreover, this longterm, uninterrupted occupation at Hualcayán provides an exceptional opportunity to examine the historical contingencies that led one Highland Ancash community to redefine and reproduce itself over time. By exploring these early and late phases, the Chavín to Recuay transition is revealed as a pivotal, transformative moment in the community's history. Moreover, it casts light on the period's unanswered questions concerning how Recuay communities emerged from Chavín communities, and the theoretical perspectives

that remain unexplored in Ancash, much of which centers on understanding links between food production economies, ritual and building practices, and community organization.

Table 3.1 helps guide this review, which summarizes the time periods discussed in the dissertation. In addition, Figure 3.1 and Figure 3.2 show the location of early prehistoric (Initial Formative to Late Formative) and mid-prehistoric phase (Final Formative to Middle Horizon) highland sites in and around Ancash.

Table 3.1 Occupational phases at Hualcayán and their relationship to the Central Andean chronology and its time periods. The table also references the affiliated cultural or regional building tradition that is associated with each phase. Note that while the Initial Formative Period begins around 3000 BC, the earliest documented occupation at Hualcayán is between 2400 and 2300 BC.

| Chronological Period | Time Span | Hualcayán Phase | Period Code | Affiliated Cultural or Building Tradition Present at Hualcayán |
|--------------------------------|--------------|-------------------|----------------|---|
| Initial Formative | 3000-1700 BC | Perolcoto Phase 1 | PC1 | Mito-Kotosh (Late Preceramic) |
| Early Formative | 1700-1200 BC | Perolcoto Phase 2 | PC2 | Mito-Kotosh |
| Middle Formative | 1200-900 BC | Perolcoto Phase 3 | PC3 | Post Mito-Kotosh; early platform stage |
| Late Formative | 900-500 BC | Perolcoto Phase 4 | PC4 | Chavín |
| Final Formative | 500-1 BC | Cayán Phase 1 | CY1 | Huarás |
| Early Intermediate | AD 1-700 | Cayán Phase 2 | CY2 | Recuay |
| Middle Horizon | AD 700-1000 | Tzacpa Phase 1 | TC1 | Wari-influence |
| Late Intermediate ⁷ | AD 1000-1450 | Tzacpa Phase 2 | TC2 | Akillpo |

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⁷ Though the Late Intermediate Period is not an important focus of the dissertation, some remains from this period were encountered at Hualcayán in association with Middle Horizon spaces, and are briefly mentioned in the text.

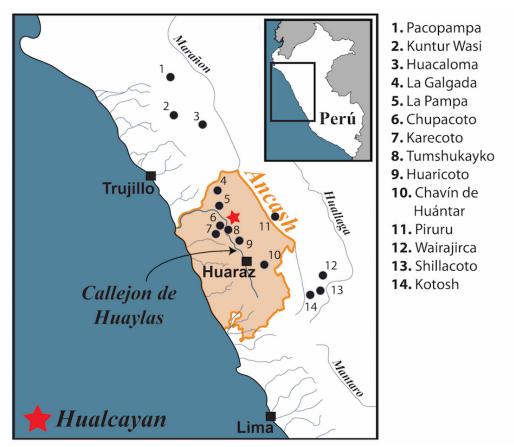


Figure 3.1 Sites with principal occupations during the Initial Formative Period (Late Preceramic) to the Late Formative Period (3000–500 BC). These periods are coeval with Perolcoto Phases 1–4 at Hualcayán (pre-Chavín and Chavín eras).

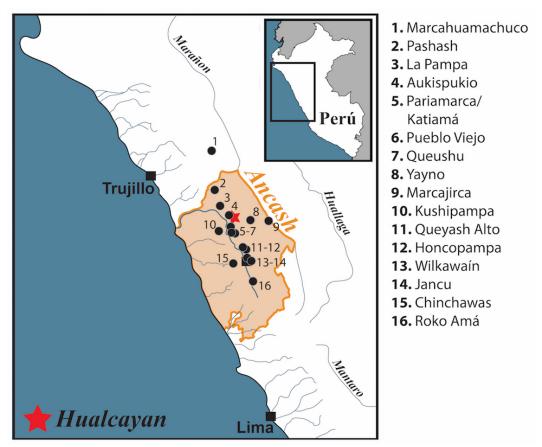


Figure 3.2. Sites with principal occupations during Final Formative Period, Early Intermediate Period, and/or Middle Horizon (500 BC–AD 1000). These periods are coeval with Cayán Phases 1–2 and Tzacpa Phase 1 at Hualcayán (Huarás, Recuay, and post-Recuay eras).

Pre-Chavin Community Practices (3000–900 BC)

More than two millennia before the expansion of Chavín, Kotosh (~3000 to 200 BC)—and its more specific variant Mito—emerged as the first regional ritual and religious tradition of the north-central highlands (Bonnier 1997; Burger and Salazar-Burger 1986; Contreras 2010; Kaulicke 2010)⁸. Kotosh is the early Andean religious tradition of burning of offerings in special hearths sunken into prepared floors, a practice that was broadly

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⁸ Although common, Kotosh rituals were not practiced at all early highland temples in north-central Peru, as exemplified by Alberto Bueno Mendoza's (2004; 2005a; 2005b) investigation of Tumshukayko, a temple located near Hualcayán in highland Ancash. In particular, no ritual hearths or characteristic Mito/Kotosh enclosures were located on Tumshukayko's large artificial mound, which was one of the earliest ritual centers of the Callejón de Huaylas valley.

shared across the coast and highlands. In comparison to domestic hearths, Kotosh hearths commonly featured below-floor ventilation ducts, which were placed in the center of a prepared and cleaned ceremonial floor. The hearths were also usually placed at the center of an enclosure, though open-air floors also exist, especially during the Initial Formative Period (Bonnier 1997; Burger and Salazar Burger 1980). Nearly all Kotosh, as well as Mito temples, were built on top of artificial platforms or mounds that grew incrementally larger as temples were carefully covered and then rebuilt on top of the now "entombed" temples below {Izumi, 1972 #2093}{Bonnier, 1997 #941}.

Kotosh (and Mito-style) hearths and their enclosures were often clustered on mounds, suggesting that a number of individual groups, perhaps families or kin, built and gathered at these temple sites, likely pooling their labor on a larger scale to renovate and raise the mound in particular moments (Burger and Salazar Burger 1980). Kotosh hearths and practices are found in a variety of temple forms built and used by communities of varying sociopolitical organization, ranging from socially stratified and complex (e.g., Caral; Shady and Machacuay 2003; Shady, et al. 2003) to small group-based collectivities (e.g., Huaricoto; Burger and Salazar Burger 1985).

The regional variant of Kotosh called the Mito Tradition—herein referred to as "Mito-Kotosh"9—involved similar rituals, but Mito-Kotosh temples were constructed according to a more prescribed, liturgical form, and are scattered amongst non-Mito¹⁰ temples in the more restricted geographic area of north-central Peru (Bonnier 1997). In particular, Mito-Kotosh structures feature chambers that have a quadrangular form, split-

⁹ The term Mito-Kotosh is used in this study in order give adequate attention to Mito as a distinct ritual and building phenomenon, but also mark it as part of the broader Kotosh tradition.

¹⁰ Non-Mito Kotosh temples as well as temples where people did not practice Kotosh-related fire temples.

level floors, and usually, niches and plaster (Bonnier 1997; Contreras 2010). It isn't entirely clear how Mito-Kotosh temples were connected socially and politically, but their similarities point to how these temples formed nodes in a social network in which ideas and materials were shared (see below).

Mito-Kotosh tradition rituals were most intensively practiced during the Initial Period through the mid-Middle Formative Period (3000 BC-1500 BC), with the exception of one Mito-style temple at Chavín de Huántar, where the temple's hearth ash was dated to between ~850-750 B.C (Contreras 2010:6) or the early Late Formative Period (900-500 BC). Despite this anomaly, Mito-Kotosh practices seem to largely disappear by 1500 BC, while Kotosh hearth continued to be built and used into the Late Formative Period, perhaps as late as 200 BC, at the site of Huaricoto in the Callejón de Huaylas Valley (Burger and Salazar Burger 1980).

It is unclear how these group ritual and building practices may have been linked to the organization of other kinds of group labor, such as agriculture. However, agricultural terraces and crop-specialization, especially of cotton, were both identified at La Galgada (Grieder et al. 1988), suggesting that the community who built the temple was also engaged in other kinds of collaborative building and food-related practices, that is, to build and maintain terraces and irrigation systems, and that they also engaged in community-level decision-making when selecting crops for local production¹¹. The choice of cotton over food cultigens for this coordinated, or at least semi-coordinated community production is linked to the presence of a textile specialization at La Galgada that was itself linked to a longdistance exchange network with the coast and amazon (see further discussion below)—all

 $^{^{11}}$ Though these decisions can be considered "community-level," I contend that it was also through these practices that such communities were formed and transformed.

of which may have been in support of the temple and its ability to acquire materials and knowledge from visitors and traders. Nonetheless, the relationship between agricultural activities and ritualized consumption, including burning, of plants and foods in Mito-Kotosh temples isn't well-understood, largely due to the fact that microbotanical techniques needed to detect them have only recently matured. Such techniques are needed to identify what was burned into fine ash in fire rituals, though some remains, such as capsicum (chili pepper) is commonly indicated through microremains (though perhaps overstated; see Piscitelli 2014: 74-75).

Neither is much known about the domestic practices of highland Kotosh and Mito-Kotosh practicing communities, except that residential units were simple structures that often surrounded the ceremonial platforms, such as at the Mito-Kotosh temple and community of La Galgada, which represented an idealized form in Figure 3.4. Although Siveroni (2006) suggests that Kotosh rooms are simply high status residences based on comparison to domestic units with central hearths at Monte Grande (Jequetepeque Valley, coastal Peru; Tellenbach 1986), she does not account for the ritual practices of maintaining the Kotosh structures by keeping them impeccably clean—a common feature of ritual space—nor the ritual entombment of these temples over time (cf. Piscitelli 2014:104). It is possible, however, that the ritual hearth of a Kotosh structure was symbolically linked to that of domestic spaces. More documentation of domestic practices is needed to understand these distinctions.

The term "Mito" was established by Elizabeth Bonnier (1997), who sought to distinguish between Richard Burger's more broadly inclusive Kotosh Tradition and the more elaborate Mito architecture she identified. Her comparison of several Mito Tradition

temples, which I refer to as Mito-Kotosh temples in this dissertation, reveals how they were built according to a specific architectural cannon that included, most importantly, a splitlevel floor with a sunken "altar" for the sacred hearth. The rooms are either rectangular or rectangular with curved corners ("sub-rectangular") and their interior ledges, which create the boundary between the upper ("epicaust") and lower ("pericaust") floors, are rectangular (Bonnier 1997; Figure 3.3). It is possible that the upper floor was used as a bench for viewing the fire, but Bonnier suggests it was more likely a platform for ritual performances and the preparation of hearth sacrifices due to the use of niches throughout the structure (Bonnier 1997:124). Other elements of the Mito architectural tradition include yellow, red or white colored floors and niches. In addition to being of a more specific form than Kotosh temples, the Mito architectural style also spans a more limited range of time, which Bonnier (1997) suggests ends a few centuries after the introduction of pottery by the middle Early Formative, or sometime between 1700 and 1500 BC. Nonetheless, at Chavín de Huántar Daniel Contreras recovered what can now be considered the latest radiocarbon date for a Mito-style Kotosh temple, between ~850-750 BC. This reveals that the Mito tradition was practiced alongside the Chavín religion at the site (Contreras 2010).

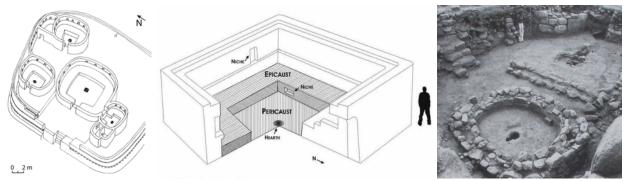


Figure 3.3 Examples of Kotosh and Mito-Kotosh architectural forms. **Left:** Reconstruction of La Galgada's Initial Period Mito-style Kotosh temples, which usually had curved exterior corners (image from Grieder et al 1988, Figure 10). **Middle:** Schematic representation of the rectangular Mito-style Kotosh temples found at Kotosh, Piruru, and Chavín de Huántar. This rectangular form was also found at one structure at La Galgada (image from Contreras 2009, Figure 5). **Right:** Small non-Mito Kotosh enclosure with hearth and adjacent open temple floor with hearth at the site of Huaricoto (image from Burger 1992, Figure 109).

Ongoing acts of construction and reconstruction were also central to the Mito tradition, which involved the periodic covering of the floor altars, either by "entombing" the entire structure with fill and then building another on top, or by dismantling the outer structure after carefully sealing the altar floor before beginning new construction (Bonnier 1997; Onuki 1993). At one Mito-Kotosh temple, La Galgada, the process of "temple entombment" involved converting chambers into tombs for the dead, which Terence Grieder believes may link the central hearth rituals to the practices of ancestor veneration (Grieder 1997:109)¹².

Though Kotosh Tradition hearths are fairly common in the archaeological record, Mito-Kotosh temples are comparatively rare, having been identified at only about seven highland sites, including Kotosh, Shillacoto, Wairajirca, La Galgada, Piruru, and three coastal sites, Chavín, Caral, El Silencio, and Huaricanga (Bueno Mendoza 1998; Burger and

¹² Grieder (1997:109) draws an analogy from a 17th century source: "Antonio de la Calancha described Peruvians throwing bits of maize or red peppers into the fire to satisfy the hunger of complaining ancestors, who appeared as sparks in the fire (Calancha t6J8, II: 12). When a temple was converted to a tomb it was replaced by a new temple built directly over the old one, where we can imagine that the casting of food into the fire was a ritual to feed the spirits of ancestors whose bodies were lying in the tomb below"

Salazar-Burger 1986; Contreras 2010; Grieder, et al. 1988; Izumi 1971; Izumi and Sono 1963; Izumi and Terada 1972; Montoya Vera 2007; Piscitelli 2014; Shady and Machacuay 2003; Shady, et al. 2003).

Of the documented Mito-Kotosh temples in Ancash, La Galgada is the best preserved and studied and therefore provides the best evidence for community change throughout the Formative Period, which includes evidence for increasing community centralization during the Initial and Early Formative Periods (also called the Late Preceramic and Initial Periods; Grieder et al. 1988). Archaeologists Terrence Grieder and colleagues link this centralization to greater investments in ritual and agricultural labor and long-distance exchange. Greider et al. support the claim that the La Galgada community became more centralized based on the evidence that, over time, its inhabitants (1) increasingly prioritized certain temple enclosures by building them larger and in the center of the mound, marginalizing others, perhaps indicating a growing hierarchy; (2) expanded irrigation agriculture by building terraces and canals; and (3) began burying high-status individuals with foreign objects. La Galgada originated as a Mito-Kotosh temple during the Initial Formative¹³ and was rebuilt several times into the Early Formative. Eventually, during the Early Formative, inhabitants of La Galgada abandoned the Mito-Kotosh tradition all together when they covered the hearths and enclosures with a U-shaped platform before abandoning the temple and moving their settlement during the Early Formative (Figure 3.4).

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¹³ Although Bonnier (1997:142) points out the earliest temple may have had a single level, and not a split-level floor.



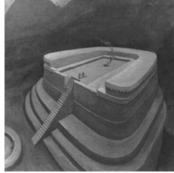


Figure 3.4 Illustrative reconstructions of La Galgada's North Mound during different phases of construction. Left: La Galgada during the Initial Formative Period, with Mito-style enclosures on its summit. Also note the circular house studctures surrounding the mound. Right: La Galgada during the Early Formative Period, with a U-shaped platform and central patio. (Images from Grieder et al 1988, Figures 19 and 38).

The variety of foods and local and non-local materials found at La Galgada suggest its economy was rooted in irrigation agriculture and trade. Surrounding the temple were mountainside terraces and canals that the archaeologists propose must have been built and used by the builders of La Galgada, because in La Galgada's semi-arid canyon rainfall cultivation could not have supported the cotton, gourds, squash, beans, fruits, and other cultigens they recovered at the site. Of these crops, cotton was the most heavily cultivated, leading Grieder and his colleagues to suggest that the La Galgada inhabitants may have produced it and cotton textiles for exchange with traders who were moving along the Santa River (Grieder et al. 1988)—very likely on their way to or from the Callejón de Huaylas valley along the Santa River itself¹⁴. The presence of non-local materials, including Pacific spondylus, scallop, and muscle shells and Amazonian feathers and fruit, support this. Moreover, La Galgada's mid-elevation position along this coastal-highland corridor suggests the temple may have had a strategic role in a regional system of trade (Grieder et al. 1988). While some of this trade likely occurred 'down-the line,' the geographic

¹⁴ See the next section on the Research Setting of the Callejón de Huaylas for a review of the research area's geography.

expansion of the highly-specialized Mito-Kotosh architectural cannon supports the claim that Mito-Kotosh temples were in direct contact through trade and movement of peoples, and as such, the spread of Mito occurred via a network of temples rather than diffusion (Grieder et al 1988:198). In comparison, the more broadly defined Kotosh tradition may have been based in a loosely shared set of ideas that were spread and then manifested in a variety of ways at different communities.

As presented and discussed in Chapters 5 and 7, similarities between La Galgada and Hualcayán suggest that some direct contact between these communities likely occurred. For example, people at both sites constructed their Mito-Kotosh enclosures using a similar architectural style—a curved exterior with a rectilinear split floor ledge—which was previously thought to be unique to La Galgada (Bonnier 1997; Grieder, et al. 1988). In addition, similar foreign objects, such as sodalite and mollusk beads, were recovered from within Hualcayán's Mito-Kotosh enclosure fills. Also discussed in Chapter 7 is how the similarities between the building histories of La Galgada and early Hualcayán may illuminate a regional trend of increasing community integration and/or centralization—increasingly dominant spaces that may reflect a nascent consolidation of authority—vis-à-vis Mito-Kotosh tradition building events and communal ceremony.

Moreover, the data from Hualcayán also reveal how the ritual structures that supported public performances during the Chavín era were built during pre-Chavín times as Mito-Kotosh spaces were covered and platforms were built during the late Early Formative (past 1400 BC) and early Middle Formative (1200–900 BC). Such Middle Formative, pre-Chavín data is rare from Ancash, and are largely limited to (a) cave sites (e.g., Lynch 1980; 1985), (b) Huaricoto, where people continued to practice Kotosh

Huántar, which began to grow into a major oracle and temple complex—perhaps itself emerging from a converted Kotosh tradition temple (Contreras 2009; Kembel 2001:226-227). In fact, recent dating of the construction sequence at Chavín de Huántar—Chavín's paramount temple in highland Ancash, which is believed to be a major origin and/or catalyst for the expansion of the Chavín religion¹⁵—has confirmed that the temple community built the majority of its massive temple constructions during the late Middle Formative, specifically between 1440 and 1120 BC (Kembel 2008: 69), and not during the Late Formative Period (900–500 BC), which has long been considered its period of regional fluorescence (Rick et al 2009). As discussed in Chapters 5 and 7, the Hualcayán data support that temples in smaller communities also transformed before, and not as a consequence to, and exportation of Chavín ideology¹⁶.

In this study, these architectural influences, economic and exchange systems, and ritual practices of the Initial, Early, and Middle Formative sites in highland Ancash will be used to draw parallels between shifting regional patterns and the changing practices through which the Hualcayán community first emerged and thrived before Chavín.

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¹⁵ Though the roots of Chavín are tied to earlier and coeval Cupisnique developments on the north coast. ¹⁶ The Middle Formative "Black and White" phase constructions at Chavín de Huántar—including the construction of its three plazas, the expansion of its internal galleries, and the temple's transformation into the shape of a "U"—came to define the temple's mixture of inclusive (large plazas) and exclusive (internal galleries) spaces. The builders of Chavín de Huántar likely integrated coastal and highland architectural canons into these constructions, such as U-shaped layouts and sunken plazas from the coast and sunken ritual chambers from the highlands, in order to broaden the community's regional appeal and construct a universalizing religious ideology (Burger 1992).

Chavín-Era Community Practices (900–500 BC)

Archaeologists have widely argued that during the Final Formative Period, the production, exchange, and display of valued ritual objects rich with symbolism were essential to the meteoric expansion of the Chavín religion and culture across the Central Andes¹⁷, supporting its "global" network of interaction (sensu Jennings 2011) ca. 900-500 or 500-200 B.C.E.; Burger 2008; Inokuchi 2014; Kaulicke 2008; Rick 2008b). They propose that a network of ritual specialists with increasing religious authority orchestrated temple rituals in which they displayed these valued objects, such as strombus shell trumpets and elaborately engraved pottery, to declare their esoteric knowledge of the supernatural and demonstrate their long-distance social connections (Contreras 2011; Cook et al. 2010; Rick and Lubman 2002; Rick 2004). These elites, in particular the priests at the temple of Chavín de Huántar (Figure 3.5), used such objects to garner authority, attract devotees, and acquire additional goods from across the central Andes. Simultaneously, these same spaces reinforced hierarchical distinctions within Chavín society by restricting access to key areas of the temple's inner chambers, particularly where they housed the carved "Lanzón" stone (Figure 3.5), believed to represent Chavín's supreme deity and a widely-consulted oracle. Devotees from other regions brought finely made objects—often produced with intimate knowledge of Chavín iconography (Figure 3.6)—to these spaces as offerings to the Lanzón deity, local priests and other elites (Burger 2008; Lumbreras 2007; Rick 2013).

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¹⁷ The Chavín religion and political network is closely affiliated with that of Cupisnique on the north coast and highlands, and are often considered together. For example, Ikehara labels the phenomenon the "Cupisnique-Chavín Religious Complex" (Ikehara 2015). In this dissertation, I use the term Chavín, in part because of Hualcayán's proximity to Chavín de Huántar and the focus on local and regional shifts in highland Ancash, but also because the florescence of Cupisnique begins earlier (1200-900 BC; Jones 2010). Nonetheless, any discussion of superregional interaction for this time period presupposes the inclusion of Cupisnique communities, religion, and culture.



Figure 3.5 Left: Photograph of Chavín de Huántar's principal temple, showing the relationship between Chavín de Huántar's open plaza spaces for large gatherings and monumental structures inside of which were exclusive, hidden spaces (Image from Contreras 2015, Figure 2). **Right:** The carved stone Lanzón, considered to be the principal diety and oracle at Chavín de Huántar, located inside the temple near "B" in the image at left, which was accessed via a stairway from the sunken plaza (visible in front of "B"). (Image from Burger 1992, Figure 126).

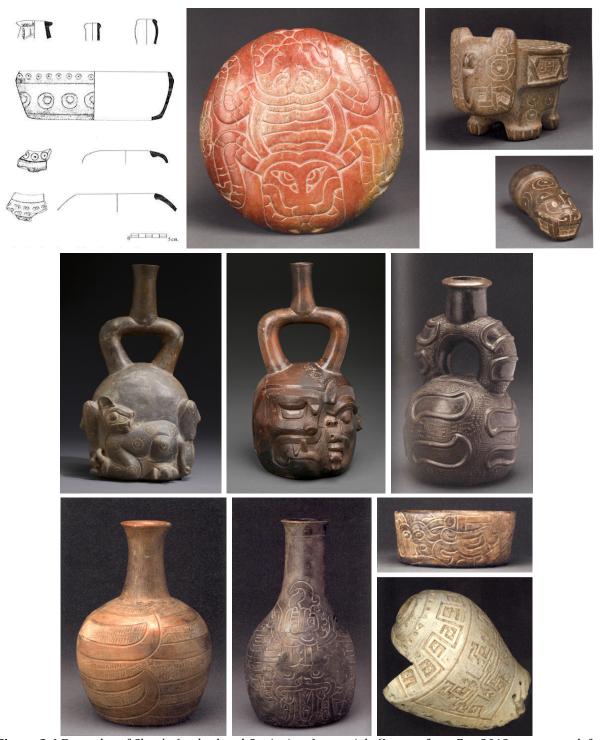


Figure 3.6 Examples of Chavín (and related Cupisnique) materials (Images from Fux 2013, except top left (Burger 1992) and middle left (Walters Art Museum; http://art.thewalters.org/).

Recent research at Chavín de Huántar suggests that while elites controlled the production of ritual objects, they apparently did not control the subsistence economy,

which was likely organized at the household level and independent from temple control (Rosenfeld and Sayre 2017; Sayre 2010). In particular, macrobotanical, microbotanical, and faunal analyses from temple and household sectors at Chavín de Huántar show no clear distinctions or patterns in access to locally produced foods between neighborhoods or to the use of foods in temple contexts. Instead, it appears that each household provided a variety of crops typical to the environment, including tubers, potatoes, and quinoa, with some maize and beans¹⁸, which may have been produced for temple feasts¹⁹ (Sayre 2010:172-173) along with the meat of camelids, deer, guinea pig, and some wild animals and fish (Rosenfeld and Sayre 2017). Yet because food analyses in highland Ancash have primarily focused on household contexts (Burger and van der Merwe 1990; Sayre 2010), or have been limited to faunal remains (Sawyer 1985), we have lacked sufficient evidence to evaluate whether and how specialized ritual foods such as maize chicha beer (Burger and van der Merwe 1990) were produced for Chavín period temple rituals. Most of our evidence for plant use in temple spaces comes from stone iconography, such as on the stela of shamans carrying the hallucinogenic San Pedro cactus (Figure 3.7). Temple spaces are often clean of refuse, making it difficult to directly associate food consumption practices with particular ritual spaces. While terraces have been identified near the temple at Chavín de Huántar, excavations suggest that they were primarily used as building platforms, rather than for agriculture (Contreras 2009:1010), and that rain-fed agriculture likely occurred on the open plains of the valley floor (Sayre 2010:45).

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¹⁸ Although preservation was notably poor at Chavín.

¹⁹ This is similar to the system of production noted for other types of materials at other Chavín-affiliated temples, such as ceramics at the coastal site of Cerro Blanco (Ikehara 2007; Ikehara and Shibata 2008).

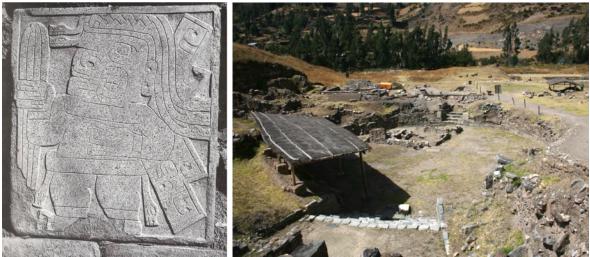


Figure 3.7 Left: Stela from Chavín de Huántar's sunken plaza, which is interpreted as a shaman holding the hallucinogenic San Pedro cactus, and who is undergoing a process of transformation into an anthropomorphic being. **Right:** The sunken circular plaza where the stela shown is located at Chavín de Huántar. Note that the structures on the plaza floor are Huarás phase houses that transformed the plaza floor into a domestic space.

At Hualcayán, massive (~2 ha) Chavín-era terraces were built to create level ground around the site's central temple mound and sunken plaza, although these terraces may have also been cultivated and irrigated. As will be revealed in Chapters 5 and 7, excavations on Perolcoto, Hualcayán's main temple, uncovered platform complexes on top of the mound that combined both highly visible spaces and chambers that would have been hidden from spectators gathered around the mound. A large sunken circular plaza with an adjacent U-shaped patio was also likely constructed during this period, perhaps mimicking the sunken plazas that were built at Chavín de Huántar. Excavations uncovered evidence of food preparation and consumption—in situ vessels, ash layers, hearths, butchered animal bones, and carbonized botanicals—within Chavín period fills and on Chavín period floors. Chapters 5 and 7 will examine these architectural, ceramic, lithic, botanical, and faunal remains from Perolcoto, attempting to move beyond many previous studies focused on

iconography and elite control by revealing the specific foods, rituals, and communal labor that produced a Chavín Period temple and its community in highland Ancash.

Huarás Community Practices (500–1 BC)

For reasons still unknown, Chavín lost its influence across the Andes sometime around 500 BC²⁰. Huarás is the name archaeologists call the subsequent transitional period between the decline of Chavín and the development of Recuay in Ancash, which spans 500/200 BC-AD 200. They largely identify the initial appearance of Huarás with a stark shift in pottery style, that is, when Chavín's incised designs are replaced by Huarás white on red painted ceramics (Bennett 1944; Burger 1985b; Gero 1991; Lumbreras 1970). The Huarás white on red style is particular to northern highland Ancash, but these ceramics are closely associated with similar styles found in coastal and northern Peru at this time, forming supposed white on red "horizon" (Willey 1945). Based on the discovery of Huarás ceramics on top of or within Chavín spaces (e.g. Figure 3.8), archaeologists link the Huarás style to the abandonment or profanation of Chavín ritual spaces and the rejection of Chavín religion and centralized authority (Amat Olazábal 2004; Burger 1985a, 2004; Rick et al. 2009; Terada 1979). Analyses of Huarás community food production and ritual consumption are mostly limited to faunal remains (Gero 1991; Sawyer 1985), but Joan Gero's (1991) excavation of Queyash Alto, a Huarás-Recuay transitional site located in the Callejón de Huaylas valley, uncovered evidence for Huarás hilltop community feasting that continued throughout the Recuay period (Figure 3.9). Based on the evidence for feasting, which occurred in special walled spaces at a site surrounded by agricultural terraces, she

 $^{^{20}}$ There is disagreement over whether the end of Chavín occurs around 500/400 BC (e.g., Rick et al, 2009) or 200 BC (e.g., Burger 1992, 2008).

proposed that the emergence of Huarás—and later Recuay—community organization was directly associated with the reorganization of food production, whereby increasingly larger, more diversified, and inclusive feasts were hosted by lineage heads as "payment" to lineage members who managed fields and herds for both daily subsistence and for these kinds of periodic ritual activities (Gero 1991:135-138).



Figure 3.8 Examples of the Huarás White on Red ceramic style (Images at left and center from Municipalidad de Asunción, Chacas, Ancash 2001, Figure 5; image at right from Bennett 1944, Figure 12).

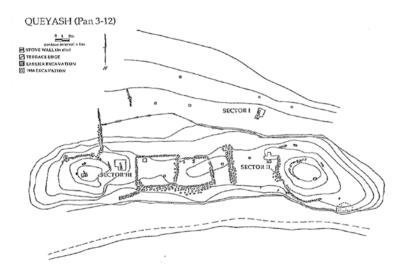


Figure 3.9 Huarás and Recuay hilltop site Queyash Alto (Image from Gero 1991, Figure 11-2).

By documenting the foods produced for and consumed in Huarás rituals at Hualcayán and comparing them to the site's Chavín assemblages, this study evaluates

Gero's hypothesis, clarifying whether and how the Huarás phase inaugurated a corporately organized food production economy realized through the intensification or diversification of agricultural cultigens and animals, and the presentation and celebration of these foods in local community feasts. As will be revealed in Chapters 6 and 7, my excavations in Hualcayán's Perolcoto mound uncovered in situ Huarás phase food offerings and discrete deposits of feasting refuse within destroyed corners of Chavín period structures, in fill that buried Chavín floors, and in Huarás phase rooms built on top of buried Chavín structures. Chapter 6 details how these Huarás contexts contained ash, carbonized wood, cooking pots, decorated bowls, and high densities of faunal and botanical remains. The study will explore the significance of these Huarás remains and architectural changes at Hualcayán to not only identify how a Chavín temple was remade into a Huarás space but also understand how these materials and spaces laid the foundation for the formation of a Recuay community at Hualcayán.

Recuay Community Practices (AD 1–700)

A growing body of evidence suggests that Recuay communities were composed of lineage-based corporate factions that competed with other groups for prestige by constructing monumental house compounds and tombs, creating intricate personal adornments and ceramic objects, and performing elaborate ritual displays, particularly feasts (Lau 2010, 2011; Gamboa 2009; Gero 1991, Orsini 2007, Wegner 1988, Ponte 2014). Excavations of feasting refuse have revealed large deposits of finely made serving vessels, ash, and animal bones (Lau 2011; Gero 1991), which suggest it was important for lineage groups to publicly present both a high quality and a large quantity of the resources they

produced (Gero 1991). Scholars have proposed that these competitive feasts were symbolic efforts to attach their corporate group or lineage to lands and resources, and were oriented towards both the veneration of a group's ancestors and the legitimization of chiefly authority (DeLeonardis and Lau 2004; Lau 2011). As such, ancestors and elites are prominently featured, often as warriors, on effigy pots and stone sculptures associated with plazas and tombs. These human effigies are depicted in several ways: wearing headdresses, earplugs, or intricate tunics; holding clubs, shields or trophy heads; at a larger scale than surrounding individuals; and as mummified or naked persons (as one may be or become in death) (Figure 3.10 through Figure 3.12). Moreover, the remains of feasting and food offerings in and around elaborate tombs, particularly during the late Recuay phase, provide further evidence of elite authority and ancestor veneration practices (Grieder 1978; Lau 2002, 2011; DeLeonardis and Lau; Pereyra Iturry 2006). Much of this evidence is also found at Hualcayán, as will be explored Chapter 6; however, these representations of elite personages, at least those currently preserved, occur not in tombs but in public ceremonial displays and feasts.







Figure 3.10 Recuay vessls with modelled images of elite or chiefly personages wearing headdresses and ear plugs who are attended or surrounded by others who are modelled at a smaller scale. In these "presentation scenes," attendants or audience are either females (left) or warriors (center and right). (Images from the Museum zu Allerheiligen Schaffhausen, Ebnöther Collection (left) and the Staatliche Museen zu Berlin (middle and right).







Figure 3.11 Recuay elite effigy vessels. **Left and center:** Chiefly figures with headdress, ear spools, elaborately decorated textiles, playing musical instruments. Figure at left also carries a shield (Images from the Staatliche Museen zu Berlin (left) and Lau 2011 Plate 6a (center)). **Right:** Recuay elite with ear spools represented as a mummy bundle (from Lau 2011, Figure 62).



Figure 3.12 Recuay stone sculpture featuring likely deceased, venerated individuals. **Left:** Seated individual whose eyes and mummy bundle position suggests a deceased individual. The effort to carve this individual in stone suggests this was likely a venerated individual, perhaps an ancestor. **Right:** Lintels, perhaps from the entranceways of late Recuay *chullpa* (standing stone tomb structures), featuring a naked, central male figure holding weapons (and shield at top) in one hand and a trophy head in the other. The individuals are flanked by two felines, which were a common symbol of Recuay authority. (Images from Lau 1991.)

Corporate group divisions within Recuay communities are also reflected in the built environment of Recuay village centers, where distinct house compounds—from simple walled patio groups to multi-story apartment-like structures—provided quotidian and ritual space for group activities and also provided enduring representations of each group's authority and status within the community (e.g., Figure 3.13 through Figure 3.15, left; see Lau 2010). Lau suggests that these efforts to maintain social divisions and bolster group as well as community authority can be linked to a leadership ideology that became materialized and manifested in multiple social domains, from house forms to burial treatment and ceramic and stone iconography (Lau 2010), suggesting that these horizontal and hierarchical social divisions pervaded all aspects of community life. Simultaneously, however, patio and plaza spaces, which were often located at a settlement's topographically highest point, were also used for communal rituals such as feasts (e.g.,

Figure 3.15, right) to foster community-wide relationships (Lau 2001; 2011, Herrera 2005).

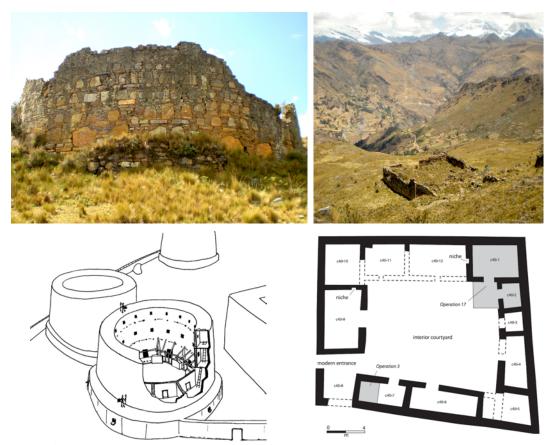


Figure 3.13 Monumental Recuay house compounds at Yayno, recorded by George Lau (2010). **Top:** photographs of house compounds (Photographs courtesy of Imogene Simpson-Mowday) **Bottom:** Corresponding schematic illustration (left) and map (right) of these compounds (Images from Lau 2010, Figures 7 and 5, respectively).

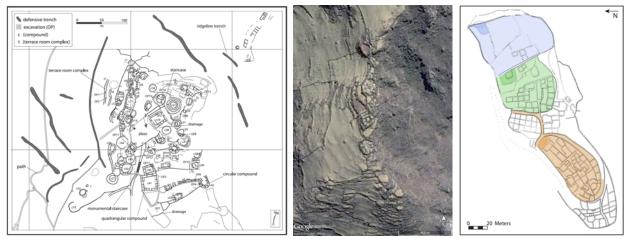


Figure 3.14 Recuay sites with discrete house compounds. These sites, Yayno, Aukispukio, and Pueblo Viejo Wandoy, were inhabited during both the Early Intermediate Period and Middle Horizon. **Left:** Map of Yayno (Lau 2010, Figure 3). **Center:** Google Earth Image of Aukispukio, a site surveyed by the author. **Right:** Partial sketch map of the hilltop settlement at Pueblo Viejo Huandoy, with several distinct terraced compounds colored (scaled sketch map by the author, drawn in support of the Proyecto de Investigación Arqueológico Wanduy and its director Alex Herrera).

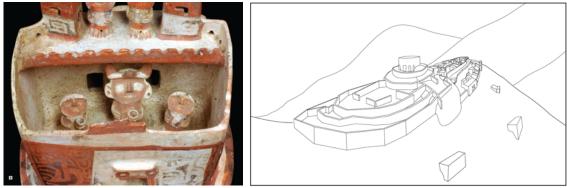


Figure 3.15 Left: Modeled elite house with larger central figure and smaller attendants engaged in a drinking ceremony (Image from Lau 2011, Plate 8b: Photographs by Christopher Donnan, Fowler Museum of Cultural History) **Right:** Reconstruction of the site of Chinchawas, a hilltop site with an agglutinated settlement layout and central ritual structure (Lau 2011, Figure 10).

This leadership ideology was linked to ideas of warriorhood and warfare (Lau 2011b), which made competition a central mobilizing and mediating force in Recuay community organization. George Lau suggests that Recuay leaders, groups, and communities delineated, maintained, and bolstered their distinct identities via competitive feasting displays, warrior iconography, defensible house compounds and settlements

(hilltop locations, tall walls, and moats) and, perhaps, actual warfare between factions and/or communities (Lau 2011b). A preliminary study of Recuay trauma on a human skeletal sample from Hualcayán and another from nearby Aukispukio suggests that warfare was, in fact, common during the late Early Intermediate Period and into the Middle Horizon (Sharp and Bria 2015).

Recuay groups also expressed their individual and group authority and identity by constructing tombs in distinct styles and, particularly during late Recuay times (beginning by around AD 600), by placing their tombs in strategic places on the landscape (Lau 2002; 2011; 2016). Though smaller tombs were constructed to inter a single individual, larger tombs were commonly built to bury groups of people, likely immediate and extended family members, in single or agglutinated chambers. Recorded Recuay tomb forms are varied and include stone slab box graves, cist tombs, semi-subterranean tombs, subterranean galleries, unlined graves under overhanging boulders, and, perhaps, dolmenstyle stone slab tombs over subterranean galleries²¹ (Lau 2011; Ponte 2015)(e.g., Figure 3.16). In addition, above ground standing stone structures called *chullpa*, and chambers beneath boulders and rocky overhangs today called *machay*, are important late Recuay innovations that emerge during or towards the end of the first century of the Middle Horizon (Lau 2002; 2011). As such, *chullpa* and *machay* burial forms emerge at the end of the "classic" Recuay era. For this reason, they are discussed in the following section on Terminal and Post-Recuay developments, particularly due to their proliferation during the

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²¹ Alexander Herrera and student Diana Acosta Parsons (Acosta 2012) have documented this unique dolmen form at Pueblo Viejo Wandoy. Herrera proposes that Recuay ancestor statues may have been placed within these dolmen chambers, which are found constructed over subterranean galleries at the site.

Middle Horizon in the face of Wari influence and expansion, which greatly transformed corporate and elite expressions of identity (Lau 2011; Isbell 1997).



Figure 3.16 Recuay tomb forms. **Left:** cist tomb (Ibarra 2009:29; Figure 3) **Center:** semi-subterranean tomb (Ponte 2015). **Right:** subterranean gallery (Lau 20XX after Wegner XXXX).

Recognizing the social role of Recuay corporate group feasting in particular, scholars have suggested that food production was important to how Recuay communities were socially integrated (Gero 1991, 1992; Lau 2002, 2007:467). Nonetheless, no studies have examined the full range of economic practices that supported these feasts—we only know from faunal analyses that camelids were often produced and consumed in large quantities (Gero 1991; Lau 2007; Miller and Burger 1995). Moreover, most studies of Recuay community, economy, and ritual have focused on sites located in the mid to upper Suni ecological zone, and the *Suni-Puna* ecotone in particular²², which is the boundary between the upper limits of agriculture and high grasslands that are ideal for camelid herding (e.g., Lau 2007). These studies have consistently revealed moderate to intensive Recuay camelid production and consumption practices, which are shown to have increased from Formative times (Miller and Burger 1995). Archaeologists have uncovered the

 22 The following section provides a more detailed description of the Callejón de Huaylas's ecological zones and their elevations.

importance of camelids in the economies and rituals of Recuay communities at lower elevations as well (Gero 1991; Ponte 2014) yet, aside from Joan Gero's aforementioned excavations of Huarás-Recuay feasting at Queyash Alto²³, little work in the Callejón de Huaylas valley has focused on community practices of the *Quechua-Suni* ecotone²⁴, the elevation zone where Hualcayán was established and where a variety of mid- and high-elevation crops can be managed. Most importantly, none of the existing research has examined agricultural practices and food preferences directly through botanical analyses apart from occasional analyses of carbonized botanicals or from tombs (Cruzado Carranza 2016; Ponte Rosalino 2014).

The data from Hualcayán presented in this dissertation explores whether and how Recuay ritual feasting practices, materials, and spaces emerged in association with the reorganization (new labor groups), diversification (new local crops)²⁵, and intensification (construction of irrigated terraces) of agriculture, along with an increased investment in camelids. As detailed in Chapter 6, local groups built multiple D-and U-shaped ritual and storage compounds (~15-22 m wide) in and among agricultural terraces and canals. Within these compounds, there is evidence for large-scale food preparation (e.g., hearths, grinding stones, and cooking vessels), food storage (e.g., small agglutinated rooms and large jars) and food consumption (e.g., maize cobs, tubers, beans, guinea pig and camelid

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²³ Joan Gero's work at Queyash Alto (2900 masl) revealed that camelid consumption was central to these feasts, as well as chicha consumption. Yet while her study documented the presence of camelid bones, a comprehensive faunal analysis was not published. Moreover, no botanical studies were performed to corroborate chicha consumption nor indicate the plants used in its production.

 ²⁴ Several additional sites with substantial Huarás and Recuay occupations, including Chavín de Huántar, are located in the lower Suni. However, many of these documented sites are located at the valley bottoms as opposed to a mountain slope where a community could exploit the Quechua as well as Suni elevations.
 ²⁵ The food data also reveal that as this new ritual-agricultural landscape was constructed, agricultural production simultaneously diversified. That is, the community as a whole expanded the range of cultigens produced and consumed to include crops such as peanuts as well as higher quantities and greater varieties of long produced crops like maize, beans, and tubers.

bones, serving wares). Chapters 6 and 7 will explore how these practices indicate an increasingly segmented community organized through integrated ritual and economic labor practices. These chapters will also explore how and why human effigy vessels, which were modeled as either living, deceased, or deified individuals, begin to appear as agricultural and ritual practices shift. Collectively, these data are used to trace how these practices and changing materials assembled dramatically new kinds of social bonds and interactions as well as materials and spaces that, in the process, forged a new kind of community.

Terminal and Post-Recuay Community Practices (AD 700–1450)

Just as the social transformations of the Initial, Early, and Late Formative Periods was crucial to understanding the organization of the Late Formative community at Hualcayán, a brief consideration of how the Recuay community practices of the Early Intermediate Period continued and changed during the Middle Horizon (AD 700–1000) is important in order to illuminate certain long-term trends and transformations in community organization in highland Ancash. Likewise, many of these social practices were maintained during the final pre-Inka period in Ancash, the Late Intermediate Period (AD 1000–1450).

The presence of the Wari—an expansive state from south-central Peru—in highland Ancash has been long debated, as has the impact of their presence or trade relationships in undermining Recuay social hierarchies, community practices, and their artistic traditions during the Middle Horizon (Bennett 1944; Buse 1965; Herrera 2005; Isbell 1989, 1991;

1997; Lanning, 1965: 140; Lumbreras 1969; Lau 2002; Tschauner 2004; Williams and Pineda 1985). Like in other regions of Peru during the Middle Horizon, archaeologists have discovered material and architectural evidence for Wari presence and interaction in the Callejón de Huaylas. Though the evidence does not lend support to the hypothesis that the Wari state held complete territorial control over the valley, it seems clear that the Wari established administrative enclaves at Honcopampa (Isbell 1989; Isbell 1991; Tschauner 2004) and the area near modern-day Huaraz (Lau 2011); that they established direct trade with Recuay elites and strategic communities throughout the Callejón de Huaylas (and in particular with communities along trade routes, like Chinchawas); and that they had extensive influence on aesthetic expressions and ritual practices in the valley (Lau 2016). Beyond stylistic indicators, direct Wari-Recuay contact in the Callejón de Huaylas is supported by the finding of several locally-made ceramic effigies of individuals wearing Wari ethnic or state accourrements such as four-cornered hats (Frame 1990; Rowe 1996); these individuals are shown in both ceremonial (Paredes 2012; Herrera 2005:246-247) and captive (Ponte 2001:242, Fig. 24) roles, suggesting that Recuay-Wari relationships in the valley were both collaborative and antagonistic (Lau 2016:154).

The available evidence indicates that Wari trade, elite interaction, and cultural influences had a dramatic influence on the social practices and organizational structures of Recuay communities in Ancash (Lau 2011). As cultural brokers who provided access to exotic resources to elites and commoners alike, Wari interaction led to the dissolution of Recuay elite leadership and ushered in a new era of artistic expression that was less focused on Recuay chiefly authority and more on abstract symbols rooted in foreign affiliations (Lau 2011: 263). Without apparent state interventions in the Callejón de

Huaylas such as the construction of terrace, storage, roads, or waystation infrastructure, the Wari appear to have been interested in the valley primarily to gain access to key areas and resources in the northern highlands and coast (Lau 2010; 2011). The Wari thus interacted and traded more heavily with communities located along the valley's main access corridors, such as Chinchawas, or at sites along the valley itself, including Honcopampa and Wilkawaín/Ichic Wilkawaín. Through this strategic interaction, the Wari became brokers of both new materials and new cultural ideas of authority and religious beliefs.

Lau (2011) suggests that while it is likely that the Wari first interacted and traded with Recuay elites, their trade soon expanded to non-elite groups and individuals, effectively undermining the legitimacy of elite structures of power in Recuay communities. This exchange included high status objects, such as Wari and other (Cajamarca, Moche, coastal) foreign, high-prestige crafts and materials like polychrome vessels, marine resources, and obsidian that originated on the coast and in the south-central or northern highlands. The growing ubiquity and accessibility of prestige goods is archaeologically visible primarily through the appearance of these foreign-style objects in mortuary and ritual contexts, and in the dramatic replacement of Recuay prestige styles, such as ceramics made with kaolin clay and in the image of local lords, with coarser redware vessels decorated in more abstract designs (Lau 2004; Figure 3.17). Because both high-prestige and exotic materials had long been reserved for Recuay elites and the ritual events they administered, this trade quickly undermined Recuay hierarchical society and the religious beliefs that upheld it (Lau 2016:153).

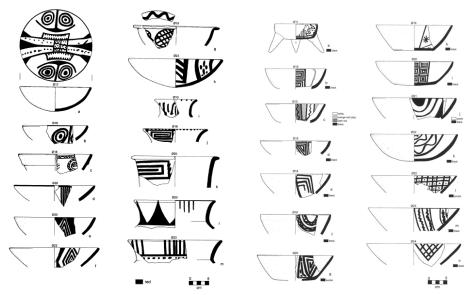


Figure 3.17 Early (left) and late (right) Middle Horizon ceramics from the Callejón de Huaylas valley, at the site of Chinchawas (Lau 2004, Figures 8 and 9).

Lau's research at Chinchawas (Lau 2001; Lau 2002; Lau 2010) is the most extensive study of how an Early Intermediate Period Recuay community was reorganized during the Middle Horizon. Lau revealed how the people of Chinchawas continued but intensified and dramatically transformed the rituals to venerate their dead. In particular, during the Early Intermediate Period the community centered their ritual practices on large-scale elaborate feasts in the presence of stone statues that they had fashioned in the form of ancestors. During the Middle Horizon, however, they began venerating ancestors in patios surrounding the tombs of the recently deceased, buried in elaborate above ground multichamber *chullpa* structures with ancestral images fashioned in relief on stone slabs adorning tomb entrances and facades. This shift reflects not only a change in mortuary tradition, which made burial locations, now above ground, more visible on the landscape, but this new practice segmented ancestor rituals within the community. Lau also notes that the community increased camelid production and interregional exchange and discarded

kaolin ceramics for redware styles. He largely attributes these changes to the presence of the Wari, a state based in the south-central Peruvian highlands that, around 700 AD, had begun trading in and inhabiting key areas of the Callejón de Huaylas Valley, including near Chinchawas.

Evidence from *chullpa* across the Callejón de Huaylas Valley, including those with Recuay-style sculptural façades or tenon heads, provides convincing evidence that this tomb style originated as a late Recuay tradition around AD 700-800 (Bennett 1944; Lau 2002, 2012, 2016:180; Isbell 1997). Though *chullpa* became an important burial style throughout much of Peru in subsequent periods, among the largest ever built are found in the Callejón de Huaylas valley at the Middle Horizon sites of Wilkawain, Honcopampa, Katiamá, Keushu, and Waullac (Bennett 1944, Herrera 2005, Isbell 1989, 1991; Soto Verde 2004; Tschauner 1988, 2003; Zacky 1978). The most monumental is the Wilkawain mortuary complex near Huaraz (Bennett 1944; Figure 3.18). Not far from Hualcayán is a two-story chullpa called Katiamá; six feline tenon heads made in the Recuay style once adorned its façade (Figure 3.19; Zaky 1978; Rivas and Bria 2010)²⁶. Although scholars have confirmed that chullpa emerged as a late Recuay burial form, there is less evidence for the origins of *machay* burials (e.g., Figure 3.20), which are commonplace during the Middle Horizon along with *chullpa*. Nonetheless, the evidence from Hualcayán—*machay* containing mixed late Recuay and Middle Horizon styles—supports the proposition that *machay* first

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²⁶ These feline tenon heads from the Katiamá *chullpa* were removed half a century ago. There is photographic evidence of three of the tenon heads in situ on one side of the building suggesting that there were likely three heads on either side of this "megachullpa" (cf. Herrera 2005), totaling six. There is also material evidence: displaced tenon heads are kept in the nearby schools of Tzactza (n=2) and Rayampapa (n=2), as well as in a field below the Katiamá chullpa (n=1, discovered by the author) as if carried off partway down the mountainside and then forgotten). The sixth tenon head was purportedly taken by a collector years ago.

emerged around the same time as *chullpa* at the site, although perhaps slightly before (see Chapter 6). Further research at other sites in the valley would bolster this claim.



Figure 3.18 Middle Horizon architecture. **Left:** Plan map of the site of Honcopampa, thought to be a possible Wari administrative center in the central Callejón de Huaylas. Note the rectangular compounds and the D-shaped enclosure near the lower right of the map. **Right:** A large *chullpa* mausoleum at the site of Wilkawain in the southern Callejón de Huaylas.



Figure 3.19 The monumental two-story chullpa of Katiamá, which is built on a large rectangular platform at the top of a highly visible ridge. The chullpa was adorned by several feline tenon heads, fashioned in a late Recuay style. I am standing on the platform in front of the chullpa to provide scale. Photo at left by the author; at right by Kevin Lane.





Figure 3.20 Examples of *machay* tombs from Hualcayán. Damage to the stone structures are due to looter activity. Commingled human remains were recovered from the interiors.

Chapters 6 and 7 discuss how Late Recuay transformations at Hualcayán during the early Middle Horizon may parallel the shifts documented by Lau at Chinchawas. These chapters explore how mortuary rituals in walled or terraced patios surrounding tombs became an important focus of ritual activity as burials also became more visible on the landscape with the construction of *chullpa* as well as many *machay*—walled tomb chambers beneath natural boulders. Many of these tombs were likely first built during the end of the Early Intermediate Period or the first century of the Middle Horizon, as indicated by the mixed presence of Recuay kaolin ceramics with local (tricolor) and Wari-style (polychrome) Middle Horizon vessels and tapestry fragments (see detailed material analyses in Grávalos 2014 and Cruzado Carranza 2015).²⁷ Chapters 6 and 7 will consider whether what these patterns in material and mortuary practice suggest for shifting community organization during the Middle Horizon at Hualcayán.²⁸

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²⁷ It is currently unknown whether Wari-style vessels were imported or locally produced, however. This question that is currently being examined through ICPMS studies by Beth Grávalos at the Field Museum of Chicago.

²⁸ This evidence is bolstered by the current study of Hualcayán as presented in Chapter 6 and the recent master's theses of M. Elizabeth Grávalos (2014) and Elizabeth Cruzado Carranza (2016).

In addition to tomb data, excavations and artifact scatters indicate a substantial Middle Horizon habitational occupation at Hualcayán. Few Middle Horizon contexts were suitable for comprehensive food analysis, as these were often substantially mixed with Recuay remains or from disturbed soils in tombs, but macrobotanical analyses from several Middle Horizon tombs analyzed by Elizabeth Cruzado included maize, peanuts, beans, capsicum peppers, and achira root, among other foods and plants (see Cruzado 2016).

Though not central to the present study of Chavín to Recuay social transformations, it should be noted that excavations and surface collections at the site uncovered "Akillpo" style materials which proliferated during the Late Intermediate Period (AD 1000–1450) in highland Ancash.²⁹ Most notably, excavations recovered these materials in the Hilltop Residential Sector (see Chapter 6) and in the final construction phase of a house that was built during the Recuay era and continuously occupied until the Late Intermediate Period. Excavations in Hualcayán's tombs revealed some continued use of previously built tombs, but these remains are few and concentrated in *chullpa*. Too few Late Intermediate Period contexts were excavated in order to understand this period's foodways, but domestic foods included maize, beans, viscacha, guinea pig, and camelids. More detailed studies of the Late Intermediate Period in the Callejón de Huaylas Valley are conducted by Kevin Lane (2005, 2006, 2007, 2009, 2008, 2010, 2011) and Alex Herrera (2005a, 2005b, 2006; see also Herrera and Lane 2001, 2004, 2006).

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²⁹ These styles continue to be made into the period of Inka dominance, the Late Horizon (AD 1450-1532)

Summary

The goal of this chapter was to establish a regional and chronological context for the study at Hualcayán through a literature review that shows the extent of research and general state of knowledge of Ancash prehistory, focused primarily on the Callejón de Huaylas valley. It reviewed the Formative Periods through the Late Intermediate Period, covering the pre-Chavín (Mito-Kotosh), Chavín, Huarás, Recuay, and post-Recuay developments of the region (~3000 BC–AD 1000). Within this review, the chapter emphasized the Chavín to Recuay transition, placing it within a long and complex history of change in Ancash. More critically, however, it examined the evidence for shifting food, building, exchange, and ritual practices for each period, and considered how these practices assembled different kinds of community through time. This review is summarized below.

The earliest complex communities in the Callejón de Huaylas were associated with the Kotosh (and Mito-Kotosh) ritual tradition of burning sacred fires in temple enclosures. Drawing on evidence from sites like La Galgada, at least some of these early communities were fairly nucleated, whereby people both lived and grew crops near their temples, though clearly people were moving between these temples and trading goods and ideas from the coast to the Amazon in the process. Evidence from La Galgada and Huaricoto indicate that temple mounds were collectively renovated, but discrete groups built separate ritual enclosures upon them. Robust food analyses are largely lacking, but a substantial macrobotanical study at La Galgada point to a specialization in cotton, rather than edible foods, with a diet made up of primarily squash, beans, fruits, without maize, potatoes, or tubers. Because no microbotanical studies have been conducted at Early

Formative settlements and temples, it is unclear what foods beyond chili pepper (*capsicum sp.*), if any, were part of Kotosh/Mito-Kotosh fire rituals, which commonly reduced organic remains to fine ash. Overall, the current evidence suggests that temple construction, semi-collective ritual spaces and practices, and a collective focus on particular crops such as cotton were important to pre-Chavín communities in highland Ancash. Nonetheless, these practices are based primarily on data from one site, La Galgada, aside from faunal analyses from Huaricoto; thus, we know comparatively little about early Formative economic production and food consumption in the Callejón de Huaylas, including how these practices were linked to temple rituals.

Broadly speaking, Chavín-affiliated communities, most notably Chavín de Huántar, were centered on temples that were likely managed by a group of ritual specialists who both maintained the temple and served as ritual leaders in festivals and hallucinogenic rites. Such temples were nodes in a system of exchange that was facilitated in large part by the pilgrimage of religious adherents who sought ritual knowledge and shared both ideas and exotic materials. Though communities like that at Chavín de Huántar may have sought out master stone masons from afar to build its elaborate temple, smaller and less elaborate community temples were likely built through communal labor, perhaps similar to how labor was pooled to entomb Kotosh enclosures in earlier periods. At Huaricoto, in particular, community building practices and rituals changed little with the adoption of Chavín-affiliated Janabarriu style ceramics and bone objects during the Late Formative Period. Studies have shown a trend toward increased reliance on domesticated camelids for protein, though little is known of agricultural production outside Chavín de Huántar, where recent studies by Matt Sayer and Silvana Rosenfeld convincingly reveal a localized

food economy that was not controlled by temple leadership. Overall, Chavín-era community practices in highland Ancash are still fairly unknown beyond Chavín de Huántar and Huaricoto. Just by comparing these two sites alone, however, it appears that community structures and practices were highly varied in highland Ancash during the Chavín-era, and much more research is needed in order to understand this complex social landscape of Late Formative Period communities.

A growing body of data has revealed a variety of Huarás and Recuay community practices, many of which centered on feasting and ancestor veneration rituals, as well as warfare and elite domestic practices. Though Huarás communities are the least understood, research suggests that many such Recuay practices were founded during the Huarás-era, notably communal feasting and the designation of elite ritual spaces and practices. Recuay ritual constructions and feasts were largely communal, occurring within large, central enclosures within a settlement, a but mortuary evidence and iconography indicate that Recuay communities had elite leaders who were both valorized in life and venerated in death, and that male individuals were celebrated for their success as warriors. Community structures remain fairly centralized until late Recuay times, when distinct corporate groups, perhaps lineages or elite factions, emerge, leading to a segmented organization of domestic and ritual activities and spaces. Ample faunal studies and iconographic evidence supports that camelid production was a central economic practice in some communities, such as at Chinchawas, and that these meats were important to communal feasting and community leadership. However, a lack of botanical analyses has produced a likely skewed understanding of the broader food and ritual economy of Recuay

communities; for example, making it impossible sufficiently identify of what kinds of daily and ritual labor or materials were central to community interaction or sense of place.

Evidence from late-Recuay settlements has shown how, in conjunction with the arrival of the Wari state during the Middle Horizon, Recuay communities largely shifted away from communal feasts venerating common ancestors and towards a more segmented pattern of performing family or lineage-specific mortuary rituals. Food production systems are poorly understood, but what is becoming increasingly clear is that Wari exchange networks undermined Recuay systems of authority, leading to increasingly fragmented Recuay communities in the early Middle Horizon. Camelid production continues to be an important economic practice, though it is unclear how any agricultural systems established by the Recuay were maintained or transformed by Middle Horizon and subsequent Late Intermediate Period communities.

Finally, this chapter also briefly introduced data from Hualcayán at the end of each section in order to foreshadow how these data compare, contradict, or align with what we already know from previous studies. This brief review of the study's initial findings emphasized some of the initial questions raised by the Hualcayán data, which shaped many of the research questions that are presented in the following chapter.

CHAPTER 4

INVESTIGATING ANCIENT HUALCAYÁN: GEOGRAPHIC SETTING, SITE SELECTION, AND RESEARCH DESIGN

This chapter outlines the overall scope of the investigation at Hualcayán, beginning with a description of the site's geographic setting in northern Callejón de Huaylas Valley and Cordillera Blanca mountain range. The chapter then reviews the preliminary research that led to choosing Hualcayán for further analysis; this initial work involved opportunistic survey in the northern valley as well as test excavations at the sites of Pariamarca and Hualcayán. Building on the observations made during this preliminary work, the following section outlines the research design and field and laboratory methods I used to examine the research objectives, which explore the shifting ritual and economic practices, spaces, and materials that assembled Recuay communities after Chavín. Finally, I conclude the chapter with a brief explanation of how I organize, code, and present data in this dissertation.

Research Setting: The northern Callejón de Huaylas Valley and the site of Hualcayán

The Callejón de Huaylas valley's unique mountain geography and abundant natural resources have long drawn the attention of scholars interested in early social interaction and political economy. The Callejón de Huaylas—which roughly translates to the "alleyway" of the so-called Huaylas people of this area—is an intermontane valley shaped by the Santa River and its tributaries, which are fed from the glaciers and springs in two parallel mountain ranges: the steeper Cordillera Negra (Black Cordillera) to the west and

the more gradually sloping, higher, glaciated Cordillera Blanca (White Cordillera) to the east. The Callejón de Huaylas is the upper, highland portion of the larger Santa River system, which runs from southeast to northwest. Where the river valley turns west to empty into the Pacific Ocean, the Callejón de Huaylas valley ends and becomes the coastal Santa Valley. The Callejón de Huaylas valley's direct access to the coast via its connection to the coastal Santa Valley makes it geographically and geologically distinct from most other highland Andean river valleys that instead drain east towards the Amazon—for example, the Marañon River of the Callejón de Conchucos, a valley running parallel to and east of the Callejón de Huaylas, forms the watershed of the Amazon River. The Callejón de Huaylas valley's direct connection to the coast made it one of the most important corridors for north to south and coast to highland interaction and the flow of materials and cultigens, beginning during early prehistory¹. Studies such as those conducted at La Galgada (1000 masl; Grieder and Bueno 1982; Grieder et al 1988;), a site located in a northern tributary near the juncture of the Callejón de Huaylas and Santa Valley, and Guitarrero Cave, located in the central Callejón de Huaylas Valley (2580 masl; Lynch 1980) together confirm that this corridor played a key role in coastal-highland interactions from an early period in Andean prehistory, bolstering the growth of Initial and Early Formative temples (see discussion in chapter 3).

Hualcayán is located in the northern Callejón, where there is a particularly large elevation disparity between the highest and lowest elevations across a narrow width of the valley. For the purposes of my study, I define the northern Callejón de Huaylas valley as the

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¹ However, the extremely steep and narrow Cañon del Pato (Duck Canyon), which more or less divides the main corridor of the Callejón de Huaylas from the lower Santa Valley, may have been circumvented in favor of less formidable paths.

area within the modern Province of Huaylas² and the northern districts of the adjacent Yungay Province: Yungay, Matacoto, and Ranrahirca (Figure 4.1). This delineation is based in part on the convenience of modern boundaries, but also in the gradual narrowing of the Callejón de Huaylas valley beginning north of Yungay, as well as the marked climactic and elevation changes that occur north and west of Yuramarca, where the valley becomes narrow and dry, and the Cordilleras Blanca and Negra end. The elevation range of this area is dramatic, and spans between 6768 masl at the valley's highest peak, the Nevado Huascarán, to around 1200 masl at the valley bottom near Yuramarca—although the majority of settlements and agricultural activities likely took place above 1500 masl—that is, above the deeply incised Santa River at the valley bottom. The northern Callejón de Huaylas's extensive elevation range between 6768 and 1900 masl is found in a relatively small area (from highest to lowest point across a distance of 39 km) and spans roughly five of the six Andean ecological zones: the *janca* (4800+ masl), *puna* (4100–4800 masl), *suni* (3100–4100 masl), *quechua* (2100–3100 masl) and *yunga* (500–2100 masl).

The *janca* (4800+ masl) is an extreme zone that includes the highest, often glaciated peaks of the region, surrounded by lagoons. Few plants and animals survive in this region, but camelids can survive at its lowest elevations (Pulgar Vidal 1981:154) and fish thrive in the lagoons. Moreover, foxes, condors, viscacha, mountain cats and pumas often roam or find shelter here. The *puna* (4100–4800 masl) is a high grassland above the upper limits of agriculture, often some lagoons and abundant marshy plant-rich areas (*bofedales*) that are prime for herding camelids. To increase camelid productivity, ancient peoples built extensive corrals in the *puna*, as well as water management systems such as artificial

² This excludes the District of Pamparomas, which is the only district in the Province of Huaylas on the western slopes of the Cordillera Negra, and as such, lies outside of the Callejón de Huaylas valley.

bofedales and silt dams (Lane 2009). The suni (3100-4100 masl), where Hualcayán is situated, is the highest agricultural zone, and was—and still is—intensively cultivated due to its proximity to the glacial lagoons and springs used for irrigation during the dry season between May and October. The *suni* is the breadbasket of the Callejón de Huaylas, particularly in the Cordillera Blanca where year-round water from glaciated peaks provide ideal conditions for agriculture and large settlements. Not only is the *suni* close to water sources, but it is also low and warm enough for a range of agricultural crops to grow, including varieties of maize, quinoa, beans, potatoes, and tubers. Camelid agro-pastoralists also lived near the *suni-puna* ecotone. Although the European eucalyptus is now the preferred wood species in the *suni*, native species such as *Polylepsis sp.* once grew more abundantly in the *suni* and in the *puna* above. There is disagreement, however, over how much deforestation occurred during antiquity and the colonial era (e.g., Denevan 2001), for few native forests exist today. Below the suni lies the quechua zone (2100–3100 masl), another important agricultural production zone, which benefits from the natural and canalized water systems that running downslope from the *suni*. The *quechua* zone is warmer than the *suni*, and a variety of fruiting trees, shrubs, and cacti grow there. Maize grows particularly well in the *quechua*. Finally, the *yunga* (500–2100 masl), which characterizes the lower areas of the far northern valley, was used to grow crops that thrive in very sunny and warm climates, including maize, chili pepper, and yucca.

These ecological zones and their capacity to support different economic activities changed throughout prehistory, however. According to the analysis of ice cores sampled from a glacier near Hualcayán called Huascarán (Thompson et al. 1995), there was a sudden warming period following the Late Glacial stage between 13,000 and 8,000 BC,

which continued until 3200 BC. After this point, the climate underwent a gradual cooling that continued until around AD 1700. People began occupying Hualcayán around 2300 BC, which is about a millennium after the climate began to shift from a warmer and wetter climate to a cooler and drier one. However, there are many fluctuations within this general trend, many of which are associated with the El Niño (Southern Oscillation – ENSO) phenomenon that brings heavy rainfall and warmer temperatures.

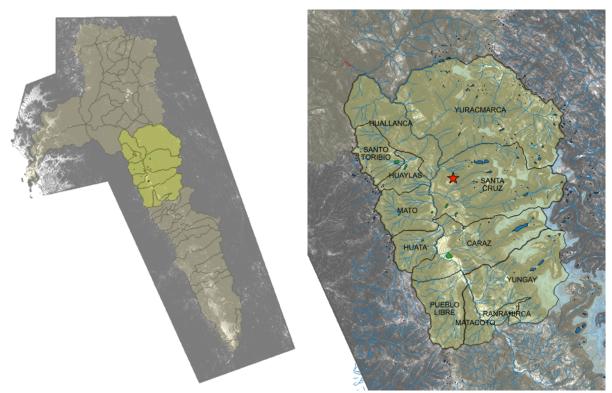


Figure 4.1 Map showing the area identified as the northern Callejón de Huaylas, marked in yellow. Light brown areas mark the provinces that fall within the complete watershed and tributary system that feeds into the Santa River in both the Callejón de Huaylas and the coastal Santa Valley. The location of Hualcayán is marked by a red star.

Ethnohistorical sources indicate that many late prehispanic³ Andean communities were divided into complementary groups who identified as either agropastoralists—the *Llacuaz*, who tended to live near or above the upper limits of agriculture and supplemented camelid herding with some agriculture—and those who identified as agriculturalists—the *Huari*, who tended to live at or below the upper limits of agriculture and supplemented a primarily agricultural regime with animal husbandry (Duviols, Gose, etc). In the Callejón de Huaylas, these divisions often defined entire communities, rather than a segment within it (Duviols 1973; Zuidema 1973; Lane 2005). Moreover, the *Llacuaz* considered themselves the conquering outsiders and the *Huari* the local natives. Kevin Lane's research in the Cordillera Negra (2005) revealed that *Llacuaz* and *Huari* community settlements can be identified archaeologically by both the elevation they occupy and their proximity to different kinds of infrastructure and natural resources. Agro-pastoralists tend to live at higher elevations (above ~4000 masl), near lakes and reservoirs, corrals, silt dams for producing nutrient-rich grazing areas, wetlands (bofedales), and some terraces which produced supplementary agricultural products. Agriculturalists tended to live at lower elevations (below ~4000 masl) near large expanses of terraces and irrigation canals.

While it is unlikely that *Huari-Llacuaz* identities map directly onto earlier Chavín or Recuay societies, the vertical and highly variable landscape of the Callejón de Huaylas likely cultivated similar kinds of social divisions throughout prehistory (Herrera 2011; Lane 2005; Lau 2011). Previous research has shown that camelid herding, while part of Chavín's long distance trade and everyday consumption, was only just emerging as an important economic activity during the Late Formative (Miller and Burger 1995). By the Early

³ Perhaps beginning as early as the Middle Horizon (Lane 2005).

Intermediate Period, however, camelid production and consumption increased dramatically (Miller and Burger 1995), and many Recuay communities began settling the *suni-puna* ecotone to maximize both agricultural and pastoral production (Lau 2011:35). It is important to point out, however, that archaeological research has yet to closely examine the economic practices of Recuay communities at the *quechua-suni* ecotone, such as this study does at Hualcayán. These lower, mid-elevation community sites are expected to have a more agricultural and less agro-pastoral way of life due to their distance from the *puna* grasslands.

The extensive and often continuous terrace systems and canals that cover the slopes of the northern Cordillera Blanca are testaments to the cordillera's suitability for irrigation agriculture, particularly in comparison to the Cordillera Negra (Lane 2005, 2009). First, the Cordillera Blanca has abundant water, due to runoff from permanent glaciers. Moreover, its slopes are comparatively more gradual than in the Cordillera Negra, especially in the northern valley where the Cordillera Negra reaches its highest elevations and contains some of its steepest slopes. The Cordillera Blanca rises sharply from the valley bottom but then becomes a gradually undulating series of slopes, plateaus, and plains (*pampas*) before rising again towards its highest peaks. The forces of erosion are less severe on the *pampas*, but ancient people built bench terraces across these plains as well as on the steeper mountainsides to control the flow of irrigated water. Irrigation canals lead from lakes and springs in the *puna* and eventually drains into the Santa River below.

Hualcayán's settlement center lies between 3125 and 3200 masl, near the *quechua-suni* ecotone. The settlement was built on a sloping plain (*pampa*) high above the valley floor. Its densest architecture is clustered on top of and around a broad hilltop (possibly a

moraine) at the base of the steep mountainside that rises sharply to the glacial peaks of the Cordillera Blanca. Continuous terraces extend out from the settlement center, both eastward up the mountainside as high as 4000 masl, and westward down the sloping plain as low as 2775 masl (Figure 4.2). Around this lower elevation the terrain becomes very steep in many areas and Hualcayán's sloping *pampa* ends abruptly, giving the pampa a plateau-like form.

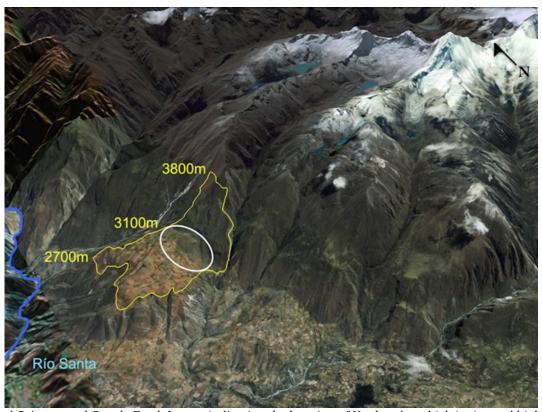


Figure 4.2 Annotated Google Earth Image, indicating the location of Hualcayán, which is situated high above the Santa River (~1900 masl) on a broad sloping pampa near 3100 masl (white ellipse) in the *quchua-suni* ecotone. The yellow polygon indicates the extent of terracing at Hualcayán, between 2700 and 3800 masl. The southern entrance to the narrow Cañon del Pato is visible at the center left edge of the image. The tallest peak visible in the upper right is the Nevado Alpamayo. The Laguna Yanacocha, from which Hualcayán's irrigation canals lead, is visible at the top center.

At the upper and lower extents of Hualcayán's agricultural terraces lie other small settlement clusters: Ragapunta at 3850–3790 masl and Cruz Punta at 3025 masl. These settlements may have formed part of Hualcayán's community landscape, whereby

segments of the community lived in these areas to focus on distinct economic activities like agro-pastoralism, which would be a kind of compressed "verticality" form of resource exploitation and community organization (Brush 1976; Murra 1972; Yamamoto 1985) or they may have provided temporary housing during harvests in distant fields. A third, much larger settlement called Ramrash is located on a narrow ridge above and slightly north of Hualcayán, built near the *suni-puna* ecotone (3650–3950 masl). Ramrash may have been an independent community, but it may have formed part of a larger community along with Hualcayán—perhaps similar to the complementarity between *Huari-Llacuaz*. Not only do these settlements inhabit distinct ecotones that could have been strategic for diversifying the local economy, but also they share the same canalized water source originating in the Yanacocha lagoon above. In the very least, this shared canal system suggests these two community groups established an alliance, for the Yanacocha water naturally runs away from Hualcayán.

It is possible that a segment of the Hualcayán community settled Ramrash⁴ in order to strategically exploit and integrate resources and economic activities across the vertical landscape. It is equally possible that the Ramrash inhabitants were interloping agropastoralists who claimed the Yanacocha headwaters (*Llacuaz*). Although I do not explicitly examine these inter-community interactions in this study, the presence of camelid remains at Hualcayán and the shared irrigation system between these two settlements may indicate a relationship of economic complementarity with this settlement, which would have produced a variety foods and materials from across the upper *quechua*, *suni*, and lower

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⁴ It is possible that instead inhabitants moved from Ramrash to Hualcayán, but this is less likely given the demonstrated antiquity of Hualcayán's origins during the Initial Period. I have not fully documented Ramrash nor determined its origins. Materials from its tombs curated by the Museo Caraz suggest an Early Intermediate Period and Middle Horizon occupation. In-depth studies are needed at Ramrash to demonstrate its chronology and relationship to Hualcayán.

puna. Future studies could examine the extent of economic integration between these communities and identify whether inter-community economic complementarity, if present, was tied to Hualcayán's origins and growth into a Chavín temple complex or to its later transformation into a Recuay community during the Early Intermediate Period.

Selecting Hualcayán: Results from the preliminary research

In this section, I review my results from the preliminary research I conducted between 2007 and 2009 to select an appropriate site for investigating Recuay community formation after Chavín. This preliminary research included an opportunistic survey of the northern Callejón de Huaylas valley followed by test excavations at the archaeological sites of Pariamarca and Hualcayán. This preliminary research led me to discover Hualcayán, verify its long-term occupation, and ultimately, confirm its suitability for investigating the Chavín to Recuay transition.

Opportunistic Survey of the northern Callejón de Huaylas Valley

My preliminary survey and test excavation research in the northern Callejón de
Huaylas valley had two central objectives: (1) One objective was to document and broadly
understand how site locations and characteristics such as function and size differed for
each recorded time period in the northern valley. (2) The second objective was to identify
sites with (a) long-term occupations that spanned the Chavín to Recuay transition and (b)
both ritual and domestic features, that is, a broad range of ancient community practices.

To begin my study, I performed two and a half months of opportunistic survey with surface collections in the northern Callejón de Huaylas. This survey had three goals: to record and date previously undocumented archaeological sites in the northern valley, to broadly understand the region's settlement patterns, and, most importantly, to identify an archaeological site with a long-term, complex occupation that would be appropriate for an in-depth study of the Chavín to Recuay transition. I conducted the majority of the survey over a two-month period in 2009, which I planned after an initial two-week informal exploration of the northern Cordillera Blanca during 2007⁵. I also recorded a few additional sites in the vicinity of Hualcayán during subsequent seasons of excavation fieldwork (see below).

I chose to conduct an opportunistic survey rather than a systematic survey because my primary goal for the dissertation was to identify and then perform extensive excavations at a Chavín to Recuay transitional site. This goal left insufficient time to perform a 100% full coverage or systematic sampled survey of the study area. I used government terrain maps and 1962 aerial photographs obtained from Peru's National Institute of Geography as well as Google Earth satellite imagery⁶ to identify areas with visible archaeological remains. In addition, I traveled to various modern villages and asked local people to indicate the location of ruins (*ruinas*). At each archaeological site that I encountered, I documented the site's preservation, area and extent, architectural features, and surface artifacts. I also took photographs, made sketches, and assigned sectors to each

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⁵ Surface collections were only performed in the 2009 season, however.

⁶ In 2007 and 2009, Google Earth satellite imagery was only available in a few areas of the northern Callejón de Huaylas, with the highest concentration of images in the Cordillera Blanca, but not as far north as Hualcayán. More imagery was added in 2010, however.

site. Finally, I registered the site's location and elevation using a Trimble Juno GPS using a pre-defined data dictionary to systematize the data collected.

In order to maximize the possibility of identifying archaeological sites with substantial occupations in both the Chavín and Recuay phases, I focused my opportunistic survey in the *suni* (3000–4000 masl) elevation zone, although I also registered a few sites in the upper *quechua* (2000–3000 masl) and lower *puna* (4000+ masl). I also limited the study to the area roughly between the modern city of Caraz to the south and the Cañon del Pato to the north (Figure 4.3). I chose these geographical constraints for several reasons that can be explained through a review of the survey area's previous archaeological research and geography.

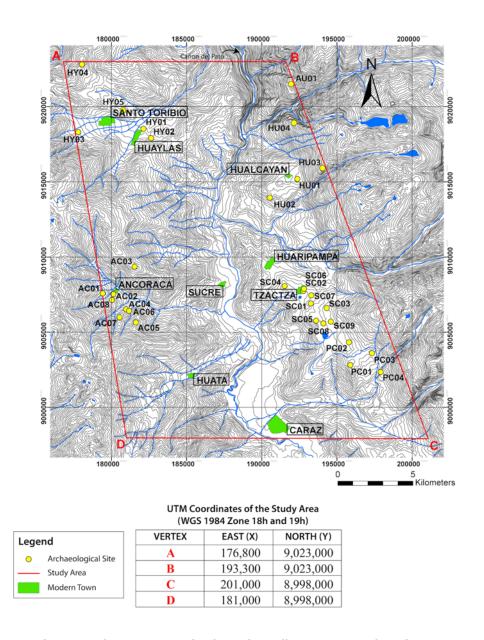


Figure 4.3 Study area with sites surveyed indicated in yellow. See Appendix B for site names and their periods of occupation.

To the south, the survey area begins roughly north of Alexander Herrera's (2005) east-west survey transect across the Callejón de Huaylas and east of Kevin Lane's (2005) survey of the Cordillera Negra's *puna*. The survey area extends north up to the area near

where the Santa River drainage narrows dramatically in the *Cañon del Pato*. To the east, the survey boundary is the *puna* of the *Cordillera Blanca*.

Within this defined area, I excluded the valley floor from the opportunistic study because archaeologists Alberto Bueno Mendoza (2004) and Angélica Alcalde Milla (2004) had previously surveyed the *quechua* zone between approximately 2200 and 2700 masl. Bueno and Alcalde primarily identified early, non-Kotosh or Mito ceremonial temples and villages that were occupied during the Initial-Late Formative Periods (2500–500 BC). A more recent survey of these sites by Querevalu (2014) confirms their findings. The number of early settlements in this area confirms what Richard Burger and others (Burger 1992; Bueno 2004) have suggested, which is that early highland complex societies typically settled and built their temples along the valley floor, particularly where tributaries intersected rivers.

Despite the evidence that many Formative Period communities preferred to build their settlements and temples on the valley floor, the Chupacoto mound, located within the survey area in a higher *quebrada* of the Cordillera Negra, suggests a more variable settlement pattern: Chupacoto was built at 2724 masl, nearly 1000 meters above the valley floor below (~1900 masl; Rivas Otaiza and Bria 2010; Appendix B)⁷. Chupacoto's most visible feature is a large platform mound, which had been dated to at least as early as the late Early Formative Period (or ~1200 BC) based on the presence of stone iconography similar to sites of this period on the coast (Thompson 1962). Chupacoto's high location raises the possibility that additional early sites were established in the still unexplored

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⁷ Though Chupacoto has been previously identified but remains unstudied; Thompson 1962; Burger 1992:123.

higher elevations of the Province of Huaylas—a point supported by the subsequent discovery of an early ceremonial mound at Hualcayán, which sits at 3100 masl.

My focus on the valley's middle elevations was also to identify early sites with major occupations that extended into the Early Intermediate Period. Previous research in the northern Callejón de Huaylas, such as Bueno's and Alcalde's studies, had indicated that Recuay settlements of the Early Intermediate Period were infrequently established in the *quechua* zone on the valley floor in this area. Moreover, Recuay scholarship in general has shown that while the Recuay established their settlements in all ecological zones of the Callejón de Huaylas, Recuay communities often preferred highly defensible locations on hilltops or locations in or near the *suni-puna* ecotone (Lau 2011). Surface artifacts at the early ceremonial mounds on the valley floor, such as at Tumshukayko, indicate that some Recuay activities occurred there during the Early Intermediate Period. However, these Recuay reoccupations are shallow and may indicate that Recuay groups later returned to these mounds, perhaps to venerate them as ancestral places (Bueno 2005, Querevalu 2014).

Given the available settlement pattern evidence for Late Formative and Early

Intermediate Period settlements, I focused my survey within and bordering the *suni* zone.

As in other highland Andean valleys, the *suni* is a highly productive zone of the Callejón de

Huaylas valley, particularly in the Cordillera Blanca where year-round water from glaciated

peaks provide the ideal conditions for agriculture, pastoralism, and consequently, large

settlements. Not only is the *suni* close to the water sources that originate in the *puna*, but it

is also low and warm enough for a range of agricultural crops to grow, including varieties

of maize, quinoa, beans, potatoes, and tubers.

Time did not allow me to survey the entire study area, so the survey focused on five distinct areas that were in part defined by the valley's topography and that were selected based on a review of aerial photographs and satellite images, as well as government maps, which occasionally mark the location of ancient remains. In the Cordillera Negra, the survey covered the steep ridges and narrow ravines (*quebradas*) near the modern towns of Huaylas and Santo Toribio (site codes HY01-HY05) and Ancoracá (AC01-AC08). In the Cordillera Blanca the survey covered the rolling plains and steep prominences near the modern towns of Pamapcocha (PC01-PC06), Tzactza (SC01-SC08), and Hualcayán (HU01-04), as well as the more isolated site of Aukispukio (AU01; see Figure 4.3).

In total, the project recorded thirty sites during my opportunistic survey of the Province of Huaylas: seventeen sites in the Cordillera Blanca and twelve sites in the Cordillera Negra (Figure 4.3; Appendix B). Of the thirty sites registered, I identified Chavín phase materials at three to four sites: Hualcayán, Chupacoto, Wayumarca and possibly Pariamarca. Recuay materials were recovered at fourteen sites, including at Hualcayán, Chupacoto, Wayumarca, and Pariamarca (Rivas Otaiza and Bria 2010) where transitional Huarás-phase white on red sherds were also recovered.

The settlement pattern of these sites—denser and more clustered in the Cordillera Negra than in the Cordillera Blanca—is likely due to several factors. First, each cordillera had different topographical constraints, whereby the steep Cordillera Negra limited the area of suitable habitation areas to the center of sloping *quebradas* or on ridgetops, and the Cordillera Blanca allowed for more dispersed settlements across its sloping plains or on ridges. Second, these distinct settlement patterns are surely based in the social preferences, economic foundations, and political histories of the people who lived on opposite sides of

the valley and in different ecological zones through time (e.g. *huari-llaquaz*; see Duviols 1973; Lane 2005)—histories which can only be revealed through additional research.

Third, the observed settlement patterning is due to the way in which I moved through the different terrains as I recorded sites during my survey.

A more formal, systematic survey would undoubtedly reveal more sites, especially smaller homestead sties, both within and between the documented settlement clusters. Nonetheless, the survey ensured I could choose an appropriate archaeological site for more intensive study, broadly understand its relationship to nearby settlements, and identify various landscape features, such as terraces and canals, that reflect the economic practices of the region's settlements through time. For example, the survey revealed that Hualcayán was one of only two or three⁸ of the valley's mid-elevation Late Formative (Chavín era) settlements, yet one of many of the mid-elevation Recuay settlements. Moreover, it revealed that particular sites, such as Hualcayán and Pariamarca, were directly associated extensive ancient terrace systems and canals, whereas other sites, such as Chupacoto, were not.

Using the survey data, I identified two sites, Pariamarca and Hualcayán, with long term occupations, monumental ritual spaces (e.g., mounds, plazas), extensive areas of habitation, and adjacent agricultural terraces that together suggested these sites were well suited to study the role of ritual and economy in the process of community formation and transformation. Based on surface materials, both Pariamarca and Hualcayán had a clear Early Intermediate Period through Late Intermediate Period occupation, but the Late

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⁸ Surface artifacts confirmed that Hualcayán and Chupacoto had Late Formative occupations. Pariamarca did not reveal Late Formative artifacts, but a platform mound was believed at the time to be evidence of a possible buried Late Formative Period occupation.

Formative Chavín era component at each site was less obvious, requiring excavations. First, the architecture at both sites included a platform mound, suggesting a Late Formative or earlier ceremonial temple, yet Janabarriu-style ceramics were only identified on the surface of Hualcayán's mound. Although these Janabarriu-style surface ceramics confirmed Late Formative Chavín-era activities (900–500 BC), it was unclear whether they represented substantial building and ritual practices or only intermittent Late Formative activities on top of an older Initial-Middle Formative Period (3000–900 BC) mound structure—such as scholars have identified at other temples in the northern valley, such as at the site of Tumshukayko (Bueno 2005, Querevalú 2014). At Pariamarca, no definitive Janabarriu ceramics were recovered from the site9; however, it was possible that Late Formative contexts were buried beneath later construction phases, particularly on the platform mound, which is an architectural form common to early temples. Therefore, excavations were needed to clarify the occupational history of both sites.

Test Excavations and mapping at Pariamarca and Hualcayán

While the survey primarily fulfilled the preliminary research's first objective, which was to identify the location, size, function, and period(s) of occupation of archaeological sites in the northern Callejón de Huaylas, test excavations and mapping were needed to complete the second objective and find a suitable site for further study. In particular, test excavations and site mapping were used to confirm the occupation histories of sites that

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⁹ Stamped circles on vessel exteriors, which is a common stylistic element of Janabarriu ceramics, were found on many vessels at Pariamarca. However, due to the comparative coarseness of the vessel paste, their appearance on vessel forms uncommon to the Formative Period, and the wet, rather than leather-hard, application of these stamps, we determined these vessels to be representative of the Late Intermediate Period Akillpo style. A few decorated fragments were inconclusive, however.

had been identified as spanning or likely spanning the Chavín to Recuay transition, as well as begin to understand the ritual and economic community practices and materials used at these sites through time. I focused these studies on two sites, Pariamarca and Hualcayán, which I identified during survey as having long-term occupations with potential Chavín and Recuay ritual activity and which featured adjacent domestic, mortuary, and agricultural spaces. I designed the test excavations to reveal the chronology and overall function of these two sites in order to choose one for more intensive study.

To reveal the materials, spaces, and activities of ritual, I employed a non-systematic selective excavation strategy at each site. In particular, I chose to place units in structures that I believed were most likely to have been used for ritual activities during the Late Formative, Final Formative, and/or the Early Intermediate Period, such as in areas with high concentrations of decorated ceramics, included monumental architecture such as mounds or plazas, and generally, in areas that did not overtly appear to have been used for habitation. In addition, I placed units in areas with good preservation and that had the highest potential of revealing the greatest chronological depth, staying away from low, flat areas that had been plowed by modern villagers. Though excavations in non-ritual spaces would have benefitted the study, the focus on ritual spaces was in attempt to target places where communal gatherings likely occurred and obtain materials that would elucidate economic practices such as food consumption and material production.

At Pariamarca (site code SC05) we excavated a total of 32.93 m² within eight test units ranging between 1x1 m and 2x3 m in size. At Hualcayán (HU01), we excavated 14 m² within three test units ranging from 2x2 m to 2x3 m in size. Both sites were test excavated in 2009. We defined the test units as "Units of Excavation" (*Unidades de Excavacion*), which

we coded "UE", such that UE1 indicates Unit 1. All excavated layers and features were identified by unique context numbers starting with context 1 for each unit, such that UE 1.01 was the first context excavated in Unit 1. Of the collected materials, analysis of ceramics was prioritized in order to establish each site's chronology. Finally, we mapped as much as possible of each site's monumental core during the course of excavations at each site. To create these maps, and to record all unit locations, we used a Nikon DTM 322 total station, and ArcGIS.

Ultimately, I chose Hualcayán as the most suitable for further study based on the test excavations at each site, which revealed Chavín and Recuay-era occupations at Hualcayán but only Recuay and later occupations at Pariamarca. I summarize these findings from both sites below with two objectives: (1) to provide justification for my selection of Hualcayán as the principle research focus for this study, and (2) to present evidence—in particular, of Recuay-era constructions—from Pariamarca that will contextualize my findings at Hualcayán within the broader social landscape of the northern Callejón de Huaylas.

Pariamarca

We excavated eight test units at Pariamarca, which revealed Recuay, Akillpo, and Inka material culture and architecture, with occupations in the Early Intermediate Period (AD 1-600), Late Intermediate Period (AD 1000-1450), and Late Horizon (AD 1450-1532?), respectively. These excavations were conducted in three of Pariamarca's four sectors:

Sector A, which is defined by a massive rectangular compound locally called the "Palacio Del Inka"; Sector B, which is an artificial mound abutting Sector A; and Sector C, a hilltop

fortress on a steep prominence. The fourth unexcavated sector, Sector D, appears to be a habitation area with large and small spaces that may have been houses and patios mixed with administrative structures and/or workshop-type areas along with a series of *colca* storage units. The Sector D room complex ends abruptly at a wall perpendicular to the cliff it was built against (Figure 4.4 through Figure 4.6), suggesting it was executed according to a pre-defined plan. The four sectors are built across a terrain that varies between 3294 and 3375 masl.

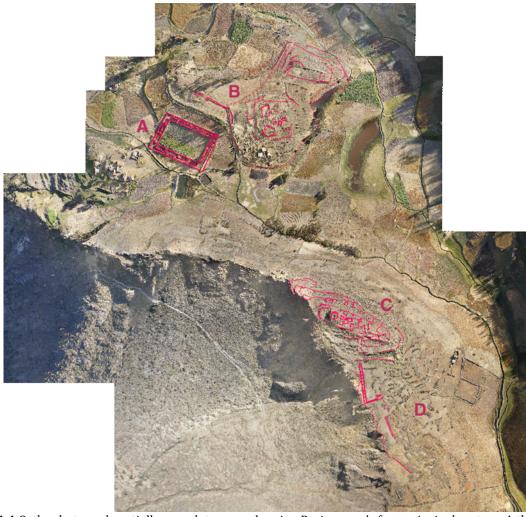


Figure 4.4 Orthophoto and partially complete map, showing Pariamarca's four principal sectors, A through D. Notice the steep cliff on which the site was built (center left), the site's lagoons (lower and upper right), and the southermost wall where Sector D's architecure abruptly ends (undrawn wall at the bottom right, parallel to image border and perpendicular to the cliff).

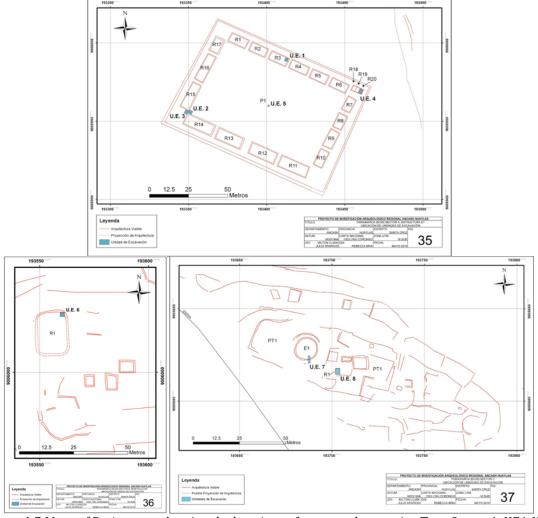


Figure 4.5 Maps of Pariamarca showing the locations of excavated test units. **Top:** Sector A, UE1-UE5. **Bottom Left:** Sector B, UE6. **Bottom Right:** Sector C, UE7-UE8.



Figure 4.6 Top: Photograph of Sector A compound (middleground left) and Sector B mound (middleground right), facing northwest and taken from Sector C. Bottom: Sector C hilltop (right) and Sector D room complex (left), facing southwest.

The principal phases of occupation at Pariamarca that are reflected in the test excavations as well as surface collections, are the Early Intermediate Period and Late Horizon, which were associated with Recuay and Inka occupations, respectively (Figure 4.7 and Figure 4.8). Some ceramic fragments had forms similar to those produced during the Formative Period, such as thin, smoothed incurving bowls and neckless ollas, but without decorated vessels that would clarify a specific period, a strong Formative period occupation at Pariamarca could not be determined with confidence. The Middle Horizon is

also not well-defined at Pariamarca but Middle Horizon sites adjacent to Pariamarca (e.g., Katiamá) point to the possibility of a small Middle Horizon occupation. The excavations primarily suggest, however, an abrupt abandonment of Pariamarca at the end of the Early Intermediate Period. They also confirm that there was no Wari presence at Pariamarca, as scholars Williams and Pineda (1985) proposed from their survey of aerial photographs of the Palacio Del Inka compound.

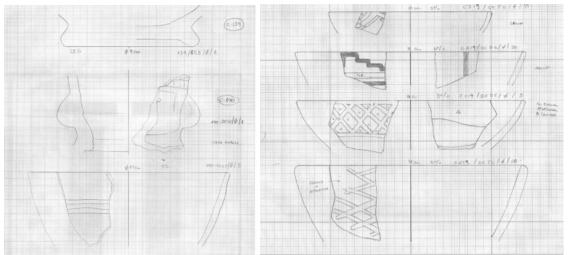


Figure 4.7 Early Intermediate Period Recuay ceramic styles (modeled and painted) collected on the surface at Pariamarca.

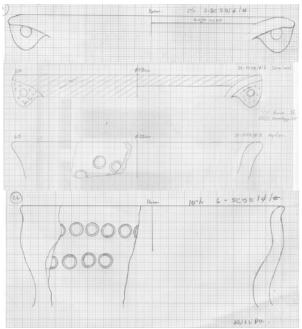


Figure 4.8 Late Horizon Inka and local Akillpo ceramic styles collected on the surface at Pariamarca. **Top:** locally-made Inka-style *aribalo* ceramic rim fragments. **Bottom:** local Akillpo style rim fragments with circle impressions, which could be associated with either the Late Intermediate Period or Late Horizon.

Five test units (UE1-5) were excavated in Sector A's multi-room "Palacio Del Inka" compound, which revealed it was an Inka administrative structure that perhaps functioned for integrative redistributive rituals with local people¹⁰. It is important to note that we extensively excavated the compound not because of its affiliation with Inka, but because of the prevalence of Recuay-style artifacts surrounding it and the lack of materials which initially made the structure both difficult to date and to understand. It's Inka affiliation became apparent only with the final test unit was placed in the compound's northeast corner. Moreover, due to the prevalence of Recuay materials within the sub-floor fills, the compound was thought to be a possible Wari-affiliated administrative compound, as had

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 $^{^{10}}$ The original interest in excavating this structure was to test whether the Wari Empire built it as had been suggested (Williams and Pineda 1985), and if so, understand the role of this administrative center in late Recuay transformations.

been proposed by Williams and Pineda (1985), built atop a Recuay settlement or ceremonial center.

In brief, the massive Palacio Del Inka compound is 107x75 m with 17 rooms facing a central plaza, and an additional three-room, two story structure built in the northeast corner (Figure 4.5 and Figure 4.9). Each of the principle 17 rooms had its own entrance into the central plaza, and between each room were entrances (16 total) that led to the plaza from the structure's outer corridors. Together, the room and corridor entrances make an impressive 33 entrances total into the central plaza, which face inward from the structure's four sides, or facing NE, SE, SW, NW, respectively. The need for so many structures and entrances into a single plaza can only be hypothesized, but they could correspond to the valley's administrative units or other participating or representative groups. Alternatively, they were perhaps built purely for theatrical effect during performances. Excavations in UE1-3 and UE5 revealed extremely clean soils in the compound and rooms, and UE4, placed within the three-room structure in the northeast corner, which had plainware storage vessels and a burned layer of soil. I assigned an Inka affiliation to this structure not so much based on the materials found within it, which were few and mostly included sparse Recuay materials in the sub-floor fill, but to its distinctive Inka architectural form¹¹ and the local-Inka *arybalos* ceramic jar fragments recovered on the surface of other sectors of the site (Figure 4.8). The results from these Sector A units are not detailed further due to their lack of relevance to this study.

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 $^{^{11}}$ The Sector A compound was built with *pirca* fieldstone masonry, as opposed to the Inka imperial style of finely-shaped fitted stones, however.



Figure 4.9 Sector A "Palacio Del Inka" compound, looking northwest from Sector D.

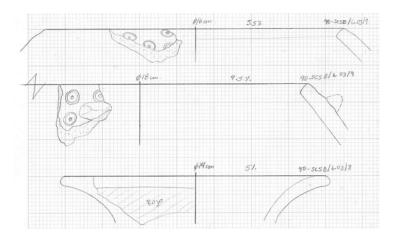
We placed one test unit, UE6, in the Sector B mound with the goal to dig the site's deepest vertical unit in a mound that was thought to date to the Formative Period (Figure 4.5 and Figure 4.10). We placed the unit along the interior of a room with a curved wall that was likely built during the Late Horizon based on the local-Inka, Akillpo¹², and incised pottery that we recovered (Figure 4.11), although the structure could have been first build during the Late Intermediate Period. This structure was built on top of an artificial mound that was likely built much earlier, given the stark change between these late prehistoric layers—the structure's wall, floor, and subfloor fill—and the earlier fills and floors below, from which no artifacts were recovered (Figure 4.10, right). These buried constructions were built by placing alternating floors with layers of large stones up to 80 cm in diameter. We uncovered three floors below the late structure, and the lower floors had a distinctive reddish hue (Figure 4.10, left). These fills and floors were extremely clean, such that we did not even recover carbon that could have been used to date the mound's layers. The large

 $^{^{12}}$ Scholars have suggested that Akillpo styles continued to be the major local style produced during the Late Horizon.

stone fill made excavating deeper somewhat dangerous, so we terminated the unit at 2.3 m below the surface at the lowest floor. Due to the lack of materials in its fill, this structure may be quite early, perhaps dating either the Initial or Early Formative Period; the red floors in particular may be affiliated with the pre-Mito (Initial Formative) structures identified by Elizabeth Bonnier (1997) at the site of Piruru. However, more excavations are needed to support this claim; no datable materials were recovered in the unit.



Figure 4.10 Test excavation UE6. **Left:** Photograph, taken from above and facing east, of the second to lowest floor exposed in UE6. The curved Late Horizon wall above it is visible at the bottom of the image. **Right:** Photomosaic of UE6's northwest profile. The early floors—which were not associated with any artifacts—are indicated in white, while the Late Horizon wall and floor level (at the base of the wall) are indicated in black.



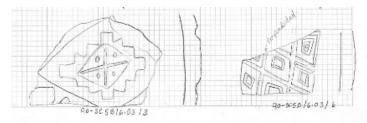


Figure 4.11 Diagnostic ceramics recovered from UE6's uppermost structure include local Akillpo impressed wares (top) and Inka-influenced forms and mold styles (bottom).

We placed the final test excavations, units UE7 and UE8, in the Sector C hilltop (Figure 4.5), both of which revealed Recuay materials and spaces. The hilltop was heavily built up with artificial platforms, culminating in a circular structure built on the highest platform. UE7 was placed across the wall of this circular structure, and UE8 was placed in a room on the second highest terrace on the hilltop. UE8 revealed a room built atop a dense ash layer, but the field season ended before the room could be fully investigated.

Unit UE7 uncovered insights into Recuay ritual activities and spaces at Pariamarca. First, the location of the circular enclosure at the hilltop's highest point is similar to the circular enclosures at many Recuay sites, where excavations and survey by Lau, Orsini, and Herrera have suggested ritual activities (Lau 2011, Herrera 2005a; 2005b, Orsini 2014). The UE7 excavations revealed that Pariamarca's circular enclosure is unique because it isn't a free-standing walled structure, but instead is a 12 m diameter ring-shaped platform with a ~6m sunken center circumvented by a ringed stairway (Figure 4.12). The test unit did not extend into the sunken area in part because a large bushy tree was growing inside the sunken area (Figure 4.14). However, we revealed that the top of the circular platform was a gravelly floor, contained by the platform's outer wall. We also discovered a stairway leading up to the top of the platform. A gold disk was recovered from the floor's fill, which

was likely an offering and seems to underscore the ritual nature of activities in this structure at the summit of the hilltop.



Figure 4.12 Photomosaic of the circular platform's compact surface (left) its outer wall (center), and its exterior stairway (two coursings visible at right) exposed in test unit UE7 located at the summit of the Sector C hilltop. A gold disk was recovered from within the floor's compact soil. Photographs taken from above and facing east.

A possible interpretation of the Recuay ritual activities at Pariamarca is that they centered in part on water-related fertility rituals. This hypothesis needs further substantiation, but is based on the discovery of a massive internal canal system that exited a lower terrace, the possibility that the sunken enclosure on the hilltop was designed to divert water—perhaps connecting to the canals—and the fact that the hilltop is bordered by two lagoons (Figure 4.13 through Figure 4.15). Clearly this canal has a practical purpose: to drain water away from important spaces. But it may connect to a central space at the platform summit, where water may have been collected.

The canal was nearly a meter in diameter and continued for over three meters to the north where it split, turning 90° to the west and 90° to the east, continuing for approximately 12 meters in either direction. At the end of each of these segments, it turned to lead straight up—in the form of interior vertical shafts—and at this point it became

impossible to explore the canals further. Stony silt was deposited inside the canal, suggesting they were used to direct the flow of water. Drainage systems are common at Recuay sites, including below non-ritual domestic spaces. However, the massive scale of this drainage system may suggest it held a special significance or a ritual function, such as the canal system at Chavín de Huántar. A ritual function of the canal system may be supported if excavations reveal the canal leads directly from the circular enclosure and if special or rare offerings, such as the gold disk, were deposited inside. It is also possible that the canals were built during an early or pre-Recuay phase, for the canal's opening was seemingly sealed behind a massive Recuay terrace wall that collapsed during the devastating 1970 earthquake, according to local people. The lower levels of the mound were not reached through excavations to confirm its origin.



Figure 4.13 Pariamarca's sector C hilltop fortress, which is built at the edge of a very steep precipice (image on the left). A circular structure was built at the hilltop summit. On the lower face of a large terrace (which is cast in shadow in the image on the right) we discovered the entrance to an internal canal.



Figure 4.14 Left: The upper terrace and circular structure at the top of Sector C. **Right:** Internal canal that may connect to the circular structure through an intricate system of canals throughout the Sector C hilltop.



Figure 4.15 Panorama, showing the lagoons that border Pariamarca's southeast (left) and northeast (right) extent. The northeast lagoon is smaller, but was recently redirected into a reservoir built near Sector A. The Cordillera Negra is visible in the distance. (Photo courtesy of Alberto Cafferata, Caraz.)

In sum, the test excavations revealed that Pariamarca is a complex, multi-component site that deserves much further investigation, but it does not fulfill the research objectives to find a site that was used for both ritual and domestic purposes by a Chavín, Huarás, and Recuay-era transitional community. First, excavations revealed that the most intensive occupations occurred during the Early Intermediate Period by the Recuay, and later during the Late Horizon by the Inka or local Inka representatives. It is possible that Pariamarca's high visibility, defensiveness on a steep cliff, and abundant water was

attractive to both the Recuay and the Inka who built monumental ritual spaces here for large gatherings. The Inka may have chosen Pariamarca for its defensive location, but more likely, for its visible, central location in the northern valley, its abundant water, and, perhaps, its history. Likewise, the Recuay may have chosen Pariamarca not only for its visibility and defensiveness, but to lay claim to an ancestral place *if* its origins were in the Formative Period. Its early phases could not be confirmed, however, making Hualcayán the more appropriate site in which to examine Chavín to Recuay transformations. Future studies of Pariamarca could focus on understanding its initial occupation, which may date to the Initial Formative Period (based on the evidence for a buried mound structure with no ceramic materials in UE6, Sector B) and its possible role as a major, regionally-recognized Recuay (and later, Inka) civic-ceremonial center in the northern Callejón de Huaylas valley.

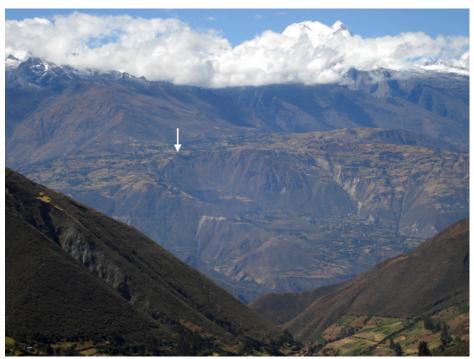


Figure 4.16 Pariamarca's highly visible and defensible location (white arrow) on the precipice of a steep cliff, as seen from the village of Ancoracá in the Cordillera Negra. The peak of the Nevado Huandoy (6395 masl) is visible above the clouds in the center right of the horizon. Photograph facing southeast.

Hualcayán

Like at Pariamarca, test excavations and mapping was conducted at Hualcayán in order to clarify whether there was continuous occupation between the Chavín and Recuay periods, as well as understand the kinds of ancient ritual and economic practices carried out there. We placed three test units in Hualcayán's most prominent mound, Perolcoto, which revealed a long-term and continuous occupation at the site that spans the Early Formative (1700–1200 BC), Middle Formative Period (1200–900 BC), Late Formative Period (900-500 BC; Chavín era), Final Formative Period (500 BC-AD 200; Huarás era) and Early Intermediate Period (AD 1-600; Recuay era). These periods were associated with Kotosh, Chavín, Huarás, and Recuay architecture and materials, respectively. Surface collections suggested the site's occupation also extended into the Middle Horizon (AD 600-1000) and Late Intermediate Period (AD 100–1450), and the Perolcoto mound's similarity to La Galgada (see Chapter 7) pointed to the possibility that the site was founded during the Initial Formative (3000–1700 BC). Moreover, I observed extensive agricultural infrastructure that several possible ritual structures abutting agricultural terraces and canals. In fact, it was through mapping Hualcayán and observing these integrated ritual and agricultural spaces that I began to form the hypothesis that Recuay community transformations after Chavín were linked to shifts in ritual economy.

Hualcayán was divided into four sectors, A through D (Figure 4.17). These sectors are fairly large (and could have been divided into sub-sectors) and each is broadly distinct from the others in terms of how ancient people used these segments of the landscape.

Sector A, which is approximately 34 hectares, includes the Perolcoto mound, a semi-

circular sunken plaza, bench terraces, a few chullpa tombs, and several dispersed room and plaza compounds, making it primarily a ritual-agricultural sector (see detail in Figure 4.18). Sector B, which is approximately 41 hectares and located southeast of Sector A, is a walled area that covers a low and broad hilltop. Located at the base of the mountainside, it consists mainly of habitations, with interspersed tombs, open spaces, and terraces, indicating use as a mortuary-habitation area. Sector C, which is approximately 112 hectares, is a steeply sloping ($\sim 60^{\circ}$) mountainside that towers above Sectors A and B. Despite the steep incline, the sector is covered with agricultural terraces and tombs, making it a mortuary-agricultural sector. The tombs in Sectors B and C are classified principally as the *machay* variety, that is, chambers built beneath boulders, but they also include several *chullpa*, or freestanding roofed stone structures. Finally, Sector D includes the large sloping *pampa* below and surrounding Sectors A and B. Covered by broad terraces and intermittent tombs on a gradually sloping plain, Sector D was used as a mortuaryagricultural sector. The sector mainly includes agricultural terrain, and is approximately 370 hectares. Though stone terraces did not cover the entire plain, ceramic concentrations across Sector D terraces may suggest homesteads made from perishable structures where people would have temporarily lived or stored goods during harvests. Alternatively, these ceramic concentrations could be temporary food preparation and consumption activities during daily agricultural work, similar to those used by villagers today. A low hill in the center of the sector contained several Recuay subterranean tombs, but these had long been looted when the study first documented the site.

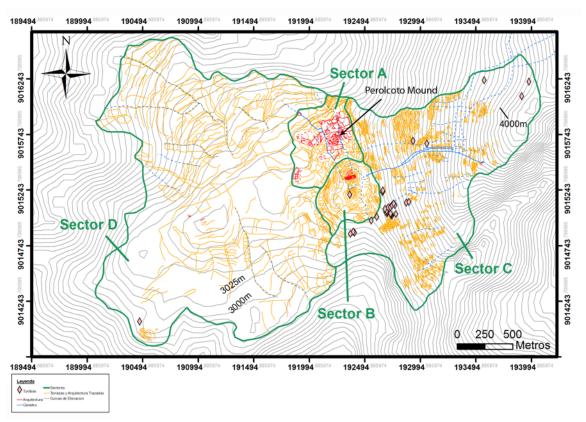


Figure 4.17 Map of Hualcayán's sectors, showing various architectural features. The majority of terraces are traced from areal photographs and satellite images.

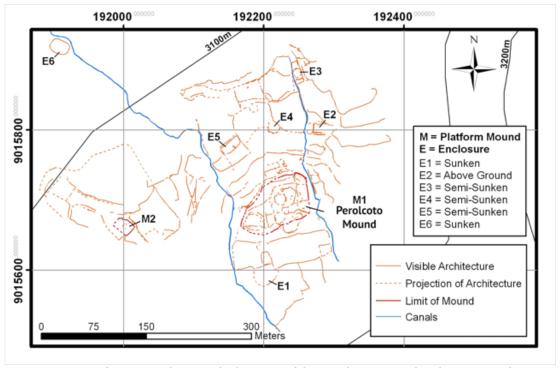


Figure 4.18 Map of Sector A, showing the location of the Perolcoto mound and various architectural compounds (listed as enclosures) and surrounding terraces.

Although Hualcayán is a large, multicomponent archaeological site, all three test units were excavated in Sector A's Perolcoto Mound. This is because the mound had the greatest potential to reveal superimposed Chavín to Recuay architectural phases given that survey had previously identified Janabarriu (Chavín), Huarás, and Recuay-style ceramic fragments on the mound's surface. Moreover, by placing multiple units in the mound, we were more likely to uncover areas in which the three phases were represented and well-preserved.

Before excavations began, the two platforms on the mound's summit were named the Southwest and Northeast Platform Area, and a test unit was placed unit in each (these were named UE1¹³ and UE3, respectively). We placed the third test unit, UE2, on the flat open terrace between these two platform areas, which we later named the Central Terrace Area (Figure 4.19). Because UE1 and UE3 were expanded in subsequent seasons (Operations 2 and 1, respectively) and are important to the final interpretations of the Perolcoto mound, I incorporated the results from UE1–UE3 into the general discussion of Hualcayán data, which is presented in Chapters 3 and 4. Nonetheless, I briefly summarize the test excavation findings here.

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¹³ UE = Unidad de Excavación ("Excavation Unit" in English).

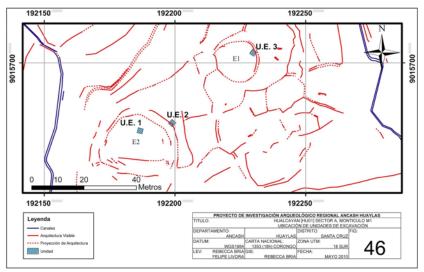


Figure 4.19 Map detail of the Perolcoto mound, showing the location of the three test units UE1 through UE3.

In the Southwestern Platform Area, test unit UE1 was placed along the outer extent of a looter's trench with the goal to reveal deep stratigraphy in the mound. While the upper contexts in the unit were completely destroyed by the looters activity, the lower levels were intact and revealed what we later understood to be a Kotosh-Mito enclosure with an inner ledge (Figure 4.20, left). We also uncovered the structure's original floor, a higher floor refurbishment, and construction fill placed inside the structure. In this unit we recovered ceramics dating to the Early, Middle, Late, and Final Formative Periods, as well as the Early Intermediate Period—thus spanning the Pre-Chavín-Chavín-Huarás-Recuay sequence—but these were highly mixed from the looting. Based on the early ceramic styles and the possible Kotosh-Mito architecture, we believed that the lowest intact layers and enclosure dated to the Early Formative Period.

We placed test unit UE2 in the Central Terrace Area along the exposed outer wall of the Southwest Platform In order to expose the depth of any of the structure's external floors and understand the history of building in this area (Figure 4.20, right). The excavations revealed two floors and a thick layer of construction fill to support the Central Terrace Area, but they did not reach the wall's foundation, as the unit became too narrow to continue excavations. Diagnostic ceramics were sparse from the unit, but included a few plainware or local, non-Janabarriu Formative styles of an unknown period.



Figure 4.20 Left: Hualcayán test unit UE1, viewed from above and facing south. The principal wall and inner ledge of a Mito-Kotosh enclosire are visible on the northern extent (bottom). The construction fill placed inside the enclosure is visible to the east (left), and its angular cut reflects the extent of the looters cut. **Right:** test unit UE2, viewed from above and facing north. The Southeast Platform's northern wall is visible towards the south (bottom), and the upper two floors are exposed in the unit's eastern half (right).

Test unit UE3, which was placed along the edge of an exposed platform wall on the northwest side of the mound, was the only unit to clearly reveal superimposed Chavín (Janabarriu), Huarás, and Recuay style materials and architectural layers (Figure 4.21). The upper layers revealed a Recuay curvilinear wall and platform, which was also visible on the surface. This Recuay platform was built above a thick layer of Huarás fill. The Huarás fill was found atop a floor separating it from earlier materials: alternating brown and ashy layers containing some Janabarriu-style ceramics were found below the floor. At the base of the test unit (3.2 m), we uncovered the crania and appendages of a child buried beneath a layer of stones, and expanded the 2x2 m unit into a 2x3 m unit in order to expose the entire burial.



Figure 4.21 Left: Hualcayán test unit UE3, viewed from above and facing west. The intact stones of the curvilinear Recuay wall are visible in the upper right corner and middle of bottom edge of the image. The Huarás fills are visible on the right (north) and bottom (east) profiles. Janabarriu-related and earlier architecture is visible below this fill. A child burial was uncovered in the lowest excavated area, and the unit was later expanded one meter east in order to uncover it. Right: The 1x2 meter eastern extension of UE3 at the level of the Recuay platform. Partially intact stones of the curvilinear wall are visible, as is a small insitu vessel. Taken from above and facing west.

The UE3 test unit—having contained high concentrations of Recuay, Huarás, and Janabarriu decorated materials in well-defined superimposed layers—confirmed there was an ongoing and intensive tradition of ritual and building at Hualcayán, and thus an ideal location in which to examine how an ancient community was reconstituted after Chavín.

The preliminary study of architecture also revealed that there was likely a shift in ritual activity away from the centralized Perolcoto mound—which had been the focal point of ritual activity throughout the Formative and period of Chavín influence—and into a series of dispersed Recuay compounds in an area of terraces north of the mound. These observations were based on a combination of the test excavation data in the Perolcoto mound, which revealed that building ceased after a final Recuay platform was built on its summit, and mapping and survey data from around the mound, which revealed the dispersed structures and terraces with a high concentration of Recuay-style artifacts. These

data led to the formation of a principal hypothesis of the study: that the Recuay community was constituted through corporate group labor and the formation of an agriculture-focused ritual economy.

In sum, the preliminary test excavations at Hualcayán revealed there was a continuous and nearly uninterrupted sequence of building in the Perolcoto mound between the Chavín phase (Late Formative Period)¹⁴, the transitional Huarás phase (Final Formative Period), and the Recuay phase (Early Intermediate Period), spanning approximately 900 BC-AD 700. In addition, survey around the mounds revealed evidence for an extensive Recuay settlement with tombs and agricultural infrastructure that was reused and rebuilt during the Middle Horizon (AD 700–1000) and beyond. Excavations in the Perolcoto mound had also revealed a likely Mito-Kotosh temple, which suggested that building and ceremonial practices at Hualcayán likely predated Chavín, perhaps spanning the Initial and Middle Formative Periods between 3000 and 900 BC. In comparison, excavations at Pariamarca revealed only Recuay through Inka occupation, or between the Early Intermediate Period and Late Horizon (~AD 1-1532)15. Based on these data, I chose Hualcayán as the central focus of the research program, and planned extensive excavations and material analyses at the site in order to examine changing community practices across the Chavín to Recuay transition. Future studies will seek to further link these two sites, which I believe may point to Pariamarca being more than a typical Recuay community settlement with ritual sector, as Hualcayán appears to have developed. Instead, it is likely that Pariamarca was either the seat of a powerful group, or more likely, was an important

 $^{^{14}}$ Which subsequent excavations and radiocarbon dates confirmed to begin much earlier, during the Initial Formative Period (\sim 2400 BC).

¹⁵ Although there may also be a pre-Recuay occupation buried beneath these later occupations, it was not revealed through excavations.

shrine that was regionally important to Recuay communities across the northern Callejón de Huaylas Valley.

Research Design

Based on this preliminary data from Hualcayán, and in combination with our existing knowledge of Chavín and Recuay community practices, this study hypothesized (see Chapter 2) that the emergence of a Recuay community at Hualcayán was grounded in a localized process of reorganization that occurred as people sought to decentralize (i.e. segment) community authority, yet bolster local autonomy, by introducing a ritualagricultural system that emphasized (1) membership within, (2) ritual and labor obligations to, and (3) the food resources produced by one's lineage or kin group. ¹⁶ In this scenario, the people of Hualcayán—perhaps in rejection of local structures of power and their foreign networks—would have shifted their ritual practices away from the centralized spaces and foreign objects that had formed the foundation of Chavín authority to focus instead on ensuring and celebrating the successes of everyday food production visà-vis the coordinated ritual and labor practices and spaces of their particular group¹⁷. These practices would have drastically reassembled the social and physical dimensions of the local community as both agricultural and ritual labor became socially and physically segmented on the landscape and as new materials and as spaces were produced. Though these segmented practices may have encouraged or emerged through competition between distinct groups, these new practices could have also served to manage risk and bolster

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¹⁶ Current evidence suggests that Recuay corporate identities were rooted in either real (lineage) or fictive kinship ties (Lau 2011); further evidence for a kinship or lineage basis to these corporate group identities will be explored through the data from Hualcayán.

¹⁷ Compare to Gero 1991:136-138 and Lau 2002:298.

autonomy at a broader community level by diversifying (multicropping and field fragmentation) and perhaps intensifying (terrace construction and irrigation) food production across the local landscape, and by food sharing (cf. Marston 2011:191-193), perhaps during ceremonial activities like commensal feasts.

In many ways, this hypothesis highlights the agency of a community of people who reorganized their patterns of interaction and social relationships after Chavín. However, the scenario above leaves room for the ongoing and often unintended transformations in practice that would have occurred as new materials and spaces were produced. Together, the (a) building, ritual, and agricultural practices, (b) their emergent spaces, foods, and materials, and (c) the generations of people who performed these practices would have assembled and reassembled an ever-evolving community of people, places, and things that was as much rooted in the community's pre-Chavín beginnings as it was in the dramatic, perhaps even abrupt events that lead to the end of Chavín's religious authority and the subsequent emergence of Huarás and Recuay on a local and a regional scale. Understanding this process of community formation through a study of the interlinking ritual and economic practices, materials, and spaces at Hualcayán is the study's primary objective.

As mentioned above and outlined in Chapter 2, the hypothesis was formulated based on both (a) preexisting knowledge of Chavín and Recuay communities in Ancash, and (b) observations of architectural space and materials during preliminary fieldwork at Hualcayán. In particular, it first considered the known distinctions between Chavín and Recuay social organization and community practices: that Chavín communities were fairly centralized and focused on establishing and expressing foreign connections (Burger 2008; Kaulicke 2010:400-402; Kembel and Rick 2004) and that Recuay communities were often

(or eventually became) socially segmented and made up of corporate groups who competed for local resources and labor (Gero 1991; Lau 2010; 2011). Second, it considered how Hualcayán's built environment was organized and built through time, in which a prominent Chavín and Huarás period mound was surrounded by a series of Recuay period compounds that were dispersed amongst agricultural terraces and irrigation canals.

Excavations and material analyses at Hualcayán sought to evaluate the hypothesis by examining whether and how, after Chavín, the people of Hualcayán decentralized, intensified, and/or diversified their coordinated practices of building and performance (i.e. construction or modification of ceremonial spaces and agricultural infrastructure, changing proxemics of ritual performance, etc.), food production (i.e. agriculture and animal husbandry), and ritual consumption (i.e. food offerings and feasting). In particular, the study examined how local people reorganized: (1) their communal labor to increase local economic production and integration by intensifying, diversifying, and perhaps specializing food production within community lands on the corporate lineage-level; (2) their ritual obligations to solidify corporate group distinctions by diversifying the ritual practices of food preparation and consumption; and (3) the spaces for performing these labor and ritual activities, such as when they constructed five "D" and "U"-shaped compounds and in the more than eighty tombs¹⁸ situated among the site's agricultural terraces.

These building, performative, productive, and consumptive practices could have manifested in a variety of ways. For example, local people may have diversified foods to increase economic integration within the local community, but only intensified the production and ritual consumption of special foods (e.g., maize processed into *chicha* beer)

¹⁸ Norgon (2013) documented 80 tombs in her survey of tombs at Hualcayán, after which several more were identified, and many more undocumented in full.

for use in particular ritual spaces, such as D- and U-shaped compounds. This scenario would suggest that maize and chicha were specifically produced for corporate, lineageoriented feasts that were to reinforce social ties and perhaps to "repay" some lineage members for their labor (Gero 1991:136-7). If food remains from the D and U-shaped compounds, in contrast to tombs and domestic areas, reveal both a wider variety (i.e. diversity) and higher quantity (i.e. density) of food types, this may suggest that local groups were likely engaged in competitive ritual displays to increase their prestige and to negotiate the value of lineage and community resources (Lau 2002:298-299; cf. Clark and Blake 1994; Dietler 2001; Martín 2013; Mills 2007; Swenson 2006; Twiss 2012; Wiessner 2001). The evidence for competitive practices between each Recuay compound would be further supported by evidence for a similar layout, use, and date of construction for each compound, especially if each is revealed to have storage and gathering spaces that were used in similar ways. Such evidence will also suggest that the construction of this ritualagricultural landscape was designed simultaneously to organize the labor and ritual obligations of and between corporate groups within the community.

Alternatively, if analyses reveal a low degree of diversity of food types within particular D-and U-shaped ritual structures, but a high degree of diversity in the overall Recuay assemblage, they will suggest that the groups represented in each ritual compound were likely specialized food producers; for example, agriculturalists producing only midelevation crops (i.e. maize and quinoa) or agro-pastoralists primarily herding camelids¹⁹.

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¹⁹ If a groups of primarily camelid herders were associated with ritual spaces in Hualcayán, however, this suggest that the settlement clusters at the upper reaches of agriculture and at higher elevations in the *puna*, such as Ragapunta, would have been part of the Hualcayán community and that Hualcayán was a central place in which all community segments in a vertical archipelago came together to conduct rituals in specific compounds. This is suggested by work in the Cordillera Negra by Kevin Lane (2005, 2006), who showed in

This would also reflect the creation of an ecological "mosaic" or patchworks of foods produced in different areas or elevations and through different labor practices (cf. Zimmerer 1999).

Conversely, if the breakdown of Chavín's centralized infrastructure had little impact on food practices at Hualcayán—i.e. food production and ritual consumption remain largely unchanged into the Huarás and Recuay periods (cf. Sayre 2010:121)—then it is unlikely that the Chavín temple was involved in coordinating domestic and ritual food production, as the disintegration of a centralized Chavín leadership would have no effect on production. In this scenario, it is also unlikely that the development of Recuay corporate group divisions was linked to the organization of agricultural and pastoral labor as hypothesized above. However, the data may indicate that food production was intensified and diversified in the Recuay period, but that corporate groups did not use food preferences to differentiate their ritual activities—i.e. they used similar foods and consumption practices in each D/U-shaped compound and tomb—and instead used the scale and spatial division of feasts and materials such as fine ceramics and stone sculptures to distinguish group practices.

Finally, if foods and ritual spaces and practices become either more diversified or specialized in the early centuries following the end of Chavín and then persist (or intensify) during the Recuay phase, then the origins of these Recuay practices proposed in the above scenarios can be attributed to Huarás phase developments that began before the Recuay ritual-agricultural compounds were built.

part that only agro-pastoralists living and exploiting both upper farmlands and puna grasses usually specialized in intensive camelid herding, which was nearly always supplemented by some farming practices. To examine the above primary and secondary hypotheses, I performed excavations in activity areas and features in Chavín, Huarás, and Recuay levels of the central mound (102 m²) and sunken plaza (25 m²), and in Recuay period D- and U-shaped ritual compounds (n=2; 221 m²), tombs (n=8; 164 m²), terraces (n=3; 37m²), and domestic spaces (n=2; 20 m²). My collaborators and I then analyzed the ceramic, lithic, macrobotanical, microbotanical, faunal, human skeletal, and textile materials²0 recovered from the more than 1000 distinct contexts such as features, fills, and floor sediments. We analyzed the excavated architecture and artifact samples to provide the data needed to address the following specific questions of changes in (1) construction practices and the organization of space; (2) the practices of food production and (3) ritual food preparation and consumption within ritual structures, terraces near canals, and domestic spaces; and the (4) chronology of these changes at Hualcayán.²1

(1) Building, Performance, and the Organization of Space

How and why did the people of Hualcayán modify their community spaces through time? What structures did they rebuild, alter, and/or abandon after Chavín and did these changes to the built environment occur quickly or through a series of incremental modifications? What was the function and meaning of these structures and their changes? How did changes in space alter the proxemics and practices of performance? Do the layout,

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²⁰ These specialists and their role in this analysis are reviewed in the Field and Laboratory Methodologies section below. Material collections and analyses also included human skeletal remains, textiles and other perishable materials, and metal artifacts from tombs, but these remains were less central to addressing the hypothesis. Therefore, although they aren't discussed here as part of the research design, these analyses provide additional data that contextualize the results of this study, and are presented in the following chapters where directly relevant.

²¹ The quantity of archaeological samples analyzed and the locations from which they were recovered is outlined in the following section.

necessary labor demands (to create or maintain), and construction history of different ritual and agricultural spaces indicate an increased social segmentation, centralization, or stratification of community practices through time? As explored in Chapter 2, communities exist in a dialectical relationship with the spaces they create: the built environment simultaneously enables/constrains social interaction and is produced by these interactions (Lefebvre 1974; Soja 1989, 1996). The ongoing construction activities at Hualcayán can thus be examined in order to identify changing patterns of social interaction—which are key to understanding community organization and socioeconomic integration (Yaeger and Canuto 2000).

An examination of the built environment across space and through time will focus on documenting variations in the form (shape, access, etc.), size (relative number of people who could gather, etc.), function (ritual, economic, mixed, etc.), and degree of labor coordination (large scale projects vs. smaller, less coordinated building events). Changes in these variables will be used to identify shifts in community organization that can be compared to (and tested against) the materials found in these spaces (see questions (2) and (3), below). For example, the construction of an increasingly larger temple that juxtaposes restricted and public gathering spaces would indicate an increased centralization of ritual activities while simultaneously emphasizing status or other "role" distinctions (such as between ritual specialists and participants) in the community. This is similar to the earlier Late Formative Period constructions at the temple of Chavín de Huántar, which were built around approximately 900 BC (Kembel 2008; Kembel and Rick 2004; Rick 2005; Rick, et al. 2009). Conversely, the construction of multiple ritual areas—particularly if similar and coeval practices occurred within them—would indicate social

segmentation in the community. This scenario is similar to the construction of massive residential compounds at the Recuay site of Yayno, which are interpreted as pertaining to new corporate groupings within the community (Lau 2010).

The timing and tempo of building activities will also be important to understanding long term transformations at Hualcayán. In particular, small scale and incremental modifications will suggest an ongoing process of social change or a focus on social maintenance and reproduction—either by small independent groups or through community-wide consensus, whereas major renovations to the built environment will be used to identify moments of punctuated social change, which may reflect the invention of new ritual traditions, economies, or social affiliations—or, perhaps, their end. In addition, building episodes will also be examined for evidence of ritualized building practices, which may include ritual destruction (e.g., systematic alterations to corners), offerings and dedicatory burials, or feasting events. These kinds of ritualized practices can illuminate the intended reverence for or rejection of preexisting ideologies and community structures (Swenson 2011) as well as the way that labor was mobilized (i.e. by organizing a work feast to "pay" laborers) to complete large construction projects (Dietler and Herbich 2001; Vega-Centeno 2007).

In addition, comparisons between the size and extent of building episodes provide a relative estimate of labor requirements through time, which will be used to understand whether the production of different spaces in the built environment were more integrated (i.e. fewer, larger, and/or more extensive structures requiring a large and broadly coordinated group of builders) or more segmented (i.e. multiple or smaller structures requiring fewer people or multiple groups of builders) than in adjacent periods (e.g.,

Pozorski and Pozorski 2008:620). For example, if the creation of a Chavín temple at Hualcayán involved a massive building project to cover preexisting ritual spaces, then the data will suggest that the temple construction was a highly coordinated and integrated event that required broad community collaboration and consensus. Similarly, if the terraces surrounding the Recuay era "D"-shaped compounds at Hualcayán are found to be constructed around the same time and that they are integrated into a single system of irrigation canals, this would also suggest a coordinated construction effort. The mapped layout of this terraced area already points to this kind of coordination: although discrete D/U-shaped compounds are dispersed throughout the Hualcayán terraces, the overall terraced area has an integrated design and uniform layout, which suggests that it was collectively perceived, designed, and built. This spatial arrangement of distinct compounds constructed within a collectively built agricultural landscape may point to a variety of overlapping segmented and integrated social practices that reflect both the social divisions and broader affiliations that together formed the broader community. An examination of the food production and ritual consumption practices that occurred in these spaces are needed, however, to fully interpret such of community patterns.

(2) Food Production

Did the people of Hualcayán intensify, diversify, and/or specialize food production to support a growing population or increase economic integration and autonomy after Chavín? If so, through what strategies: intensification, specialization, multicropping, agropastoralism, and/or exchange? Agrarian communities use a variety of techniques—such as crop irrigation, weeding, or selective animal breeding—to produce higher and more

reliable yields (Browman 1987; Bruno 2008:2; Marston 2011; Netting 1993:262). In the Andes, they also diversify the foods they produce and procure through practices such as multicropping, intensifying pastoralism activities, and exchange—often integrating different corporate groups who produce a variety of foods in different areas or elevations (e.g., Browman 1990; D'Altroy 2000).

The intensification and specialization of foods for ritual will be indicated by an increase over time in the density (ratio per sample) and ubiquity (presence or absence in a group of samples) of particular cultigens in relation to others—such as maize vs. quinoa, beans, and squash. Density and ubiquity values will be compared between Chavín, Huarás, and Recuay phase assemblages to understand changes in the investment of particular foods through time. Intensification also may be identified by weeding practices, which can be studied by quantifying plant taxa and then comparing the density and ubiquity of cultigens and weeds in each botanical assemblage (Bruno 2008). The appearance or increased density and ubiquity of maize—which requires more water and care than many other cultigens and is usually associated with terraces and irrigation (Mitchell and Guillet 1994:6)—will also indicate intensification. Moreover, if certain cultigens are dominant within samples taken from the terrace and compound fills, and if these dominant cultigens differ according to each terrace and compound, the study will suggest that distinct groups specialized in the production of these foods and tie the production of these foods to rituals.

Crop diversity will be measured by counting taxa and calculating their percentage within their particular category (i.e. grains, legumes, tubers) and within the over botanical assemblage (these analyses will be completed by Victor Vasquez, see below). Comparisons of diversity between Chavín, Huarás, and Recuay phase assemblages will indicate the

degree to which ritual foods became more or less diverse through time. If specific feasting contexts and/or periods contain a comparatively high variety of cultigens, this will reflect increased multicropping and/or multi-zonal production (Marston 2011)—a common food production strategy in the Andes, that involves planting different crops that thrive in neighboring elevations (Bruno 2008; Mayer 1979; Mayer 1985; Mayer 2002). For example, the modern Hualcayán community grows potatoes and tubers between 3500 and 3800 masl. and quinoa, beans, and maize between 2300 and 3500 masl., all within a two hour walk and on a mountain landscape that is physically bounded by steep escarpments and irrigated by a single water source—an ancient canal system that must have been constructed during the Recuay period, because it connects Hualcayán and other Recuay sites. A similar array of crops produced at these different elevations will suggest a similar agricultural and irrigation strategy in ancient Hualcayán.

The diversity of animal production will be evaluated by counting taxa and then calculating their percentage within their category of wild (e.g., deer), large herded (e.g., camelids), and small penned animals (e.g., guinea pigs). An increase in the ratio of herded to wild animals, such as camelids to deer, from the Chavín to Recuay periods will indicate greater time investment in pastoralism activities, particularly for the production of meat (Lau 2007:463; Miller and Burger 1995). Because camelids have low fertility and high infant mortality rates, pastoralists typically cull most juvenile males to control herd size while females are tended throughout their reproductive years, and so mortality profiles, sex, and bone element ratios will reveal camelid herd management strategies (Vallières 2012). For example, the consumption of neonates and juvenile male camelids will indicate whether herds were managed locally—and thus were part of the local food production

economy—rather than exchanged (Siracusano 2004; Stahl 1999; Vallières 2012:207). Low versus high rates of camelid arthritic joint pathology will also indicate whether the animals were herded for wool or transport (deFrance 2010; Vallières 2012:70, 217). This will provide more information on the pastoralist economy at Hualcayán, such as whether people in any period directly engaged in long-distance trade using camelids as pack animals.

The presence of ritual foods acquired through exchange will be identified by distinguishing between foods that could be produced or procured locally in the immediate vicinity of Hualcayán—within a two-hour walk (cf. Hastorf 1993:149) between 2300 and 4000 masl—from foods that do not thrive in nearby elevation zones. Foods that can be grown and procured in lower elevations of the Callejón de Huaylas valley (down to 1900 masl) will be categorized as regionally exchanged, such as chili peppers (*aji*). Coastal and lowland foods such as marine mollusks and guayaba fruit and utilitarian cultigens such as cotton will be considered acquired through long-distance exchange. The analysis may also show that hallucinogenic plants were exchanged or procured (e.g. *vilca Anadenanthera colubrina*). These exchange practices can be compared through time and across space to examine whether local access to long-distance goods increased or decreased through time, and gauge whether certain corporate groups had special exchange relations with other communities.

Shifts in the production of particular types of food will also be reflected in the food production infrastructure such as the construction or abandonment of terraces, canals, and corrals. For example, agricultural production is often intensified—raising the productivity/yields of land—through the construction of terraces and irrigation canals,

which allow for additional dry season harvests. Equally, extensification—more land under production—can raise yields by bringing irrigation water to previously unused lands. Although a complete temporal reconstruction of the agricultural landscape at Hualcayán cannot be achieved without extensive excavations, targeted excavations can reveal the construction history of particular terraces, such as where datable structures abut these features (Goodman-Elgar 2009:94). Changes in food production strategies can also be reflected in changes in lithic tool or ceramic assemblages. For example, the production of new foods or invention of new production techniques could be accompanied by the adoption of new types of agricultural implements, such as hoes and clod-breakers, and the intensification or extensification of particular crops may be reflected in the presence or frequencies of these implements (Bruno 2008; Netting 1993). Ceramics may show a shift in consumption or storage practices associated with these changes as well, which are reviewed below.

(3) Ritual Consumption

(3a) Continuity and Change: Did the people of Hualcayán change the types of foods they consumed (e.g. replacing quinoa with maize, or from particular foods to a variety of foods) and the methods for their preparation (e.g. roasting to brewing) and consumption (e.g. increased libation ceremonies) through time? If so, how do these changing preferences and practices coincide with a restructuring of ritual space and food production infrastructure? In ancient and small-scale societies, rituals are often performed in which people select, share, prepare, and publically consume foods to celebrate fertility, reinforce cooperative labor, and demonstrate cultural knowledge and religious piety by observing ritual protocols (Bell

1997; Dietler 2001; Kyriakidis 2007; Stanish 2013). Thus, I examined continuity in ritual food preferences—i.e. shifts in the techniques for ritual food preparation and consumption—to consider both cultural and organizational changes in the Hualcayán community as ritual practices became spatially decentralized with the repurposing of the Chavín mound and the construction of Recuay D/U-shaped compounds, tombs, and agricultural terraces and canals. A comparable study of changes in ritual food consumption from beyond the Recuay area shows that people at the Chavín-affiliated temple of Cerro Blanco shifted from the production and consumption of manioc chicha to maize chicha after the Chavín collapse (Ikehara et al. 2013). While manioc is a lowland domesticate and is less likely to be found at Hualcayán, people might have similarly shifted to maize chicha, but replaced a highland cultigen, such as quinoa, as the main ingredient. Alternatively, ritual meals may have begun to feature a higher variety of foods produced by the community as a whole.

Shifts in ritual consumption protocols and/or the introduction of new types of foods in ritual events will often be reflected in the ceramics and lithics used for food preparation and consumption rituals. For example, an increase in maize chicha production would be reflected in assemblages with increases in grinding stones (to grind dried maize), cooking pots (for boiling processed maize) large jars (for the fermenting and storage of liquids), and colanders (for straining fermented maize from liquid chicha), which would likely be found together in open patios (Jennings and Bowser 2009; Morris 1979; Morris and Thompson 1985; Moore 1989; Segura Llanos 2001; Bray 2009:110). Scrapers and other expediently made tools are also likely to form part of these assemblages, and be used for separating maize kernels from their husks. Likewise, an increase in chicha consumption—

be it of chicha made from maize or another plant such as molle—would be evidenced by an increase in vessels used to serve and consume liquids, such as small bottles, bowls, and drinking cups (*keros*). Although vessels such as bowls may also be present in domestic, non-ritual contexts, the vessels in which foods were consumed during Chavín and Recuay rituals are often decorated, and these decorated vessels occur in higher numbers than domestic assemblages (Lau 2001; Gero 1991; for Chavín de Huántar, compare Mesia (2007) and Sayre (2010) for ritual and domestic areas, respectively).

(3b) Diversification and Specialization: With the construction of separate Recuay ritual spaces (i.e. D- and U-shaped compounds and tombs), did ritual food preferences and practices diversify, and/or become specialized to establish complementary differences between the groups who performed rituals within them? If so, what do these changes suggest about how a new arrangement or integration of ritual and economic practices transformed the community? Numerous scholars have shown that food preference, preparation, and consumption are political practices that define group membership (e.g., Gumerman 1997; Mintz 1985; Sahlins 1976; Smith 2006; Twiss 2012). Therefore, a comprehensive analysis of variability in ritual food selection, preparation, and consumption practices in contemporary but separate spaces will reveal not only the range of ritual practices for each phase, but also how a variety of social relationships and distinctions were established in discrete ritual gatherings at Hualcayán. Comparisons were made between Recuay D- and Ushaped structures and tombs as well as the coeval feasting contexts of earlier periods, such as between Chavín period mound and plaza structures and between distinct Huarás feasting areas on the mound.

In short, the combination and comparison of charred macrobotanical, phytolith and starch, and faunal remains between time periods and across space can reveal whether specific foods and activities were preferred in specific periods, used only by certain groups, associated with particular rituals (i.e. collective, mortuary), and processed and served in particular spaces or with particular materials (i.e. lithic and ceramic types) (Logan et al. 2012). Ritual food preferences were quantified by calculating and comparing the ubiquity, density, and diversity of plant and animal taxa in particular ritual contexts, such as those associated with the same ceramic phase or in each D/U-shaped compound.

(4) Chronology

What is the temporal relationship between changes in artifact style, architecture, food provisioning and preference, and ritual practice at Hualcayán? What patterns of practice across the longue durée can be linked to the perpetuation of local traditions or moments of cultural innovation? Twenty-three radiocarbon dates from Hualcayán were used to clarify when Chavín, Huarás, and Recuay materials and practices emerged after the decline of Chavín (compare Burger 1981; Kembel 2008; Mesía 2007; Pozorski and Pozorski 2008; Rick 2008a) and whether these changes were swift or gradual (Burger 1995:228; Lau 2011:116, 248; Rick et al. 2009:121-3). Dates also revealed when particular characteristics common social organization and practice in highland Ancash, such as lineage group organization and ancestor veneration feasting in Recuay societies, emerged at Hualcayán. More precisely, these radiocarbon analyses will date the confluence of different spaces, materials, and practices as they changed through time in order to understand how the Hualcayán community was assembled, and thus transformed, throughout its early history.

In so doing, the study will also identify when and how local people maintained local traditions of practice, including across the Chavín to Recuay transition, and when and how they innovated new practices.

Field and Laboratory Methodologies

The study employed horizontal excavations at Hualcayán followed by the analyses of excavated materials. The excavations involved collaborations with numerous collaborators, institutions, and students, as part of the Proyecto de Investigación Arqueológico Regional Ancash, or "PIARA" project.²² These excavations totaled 16 months performed across four seasons between 2009 and 2013: in 2009, text-excavations were conducted with co-director Cora Rivas Otaiza²³ (Otaiza and Bria 2010); in 2011 and 2012, excavations were conducted with co-director Felipe Livora Castillo²⁴ (Livora and Bria 2012, 2013); and in 2013, excavations were conducted with co-director Elizabeth Cruzado Carranza²⁵ (Carranza and Bria 2014). The project involved a field school that was executed in collaboration with the Universidad Nacional Santiago Antúnez de Mayolo (UNASAM, Huarás, Peru), and thus involved archaeology students from across the globe as well as Ancash itself. Finally, we had many community members from Hualcayán work with us over the years on various projects, including excavation, drawing, laboratory activities, and cultural hertigage projects (Bria and Cruzado 2015).

²² Though the official project name changed slightly at different points in the permitting process with the Ministry of Culture of Peru; refer to the names in the following footnotes.

²³ Proyecto de Investigación Arqueológico Regional Ancash – Huaylas

²⁴ Proyecto de Investigación Arqueológico Regional Ancash

²⁵ Proyecto de Investigación Bioarqueológico Regional Ancash

These material analyses were performed by a team of collaborators and included the variety of materials we recovered, especially ceramic (myself, Elizabeth Cruzado, Bryan Nuñez, Erick Casanova, *inter alia*), lithic (Robert Connolly), macrobotanical and microbotanical (Victor Vásquez Sánchez, along with Elizabeth Cruzado performing macrobotanical analyses of tombs), faunal (Teresa Rosales Tham), textile/perishable remains (M. Elizabeth Grávalos), and human skeletal (Emily Sharp, Chris Pink, *inter alia*) remains. We also documented metal objects, but these await a more detailed study.

Excavation

Twenty-four operations (units) of various sizes were excavated at Hualcayán, exposing 569 m² of ancient cultural remains. These excavations were assisted by Peruvian and international crew chief volunteers and field school students, as well as local community members (Figure 4.25). In order to test the principal hypothesis, the excavations focused on Hualcayán's communal and mortuary ritual spaces, supplemented by excavations in habitation and agricultural areas. Excavation operations were situated in: the site's largest ceremonial mound (102 m² in Operations 1, 2, and 6), the mound's sunken plaza (25 m²; Operation 5), two D/U-shaped compounds (221 m²; Operations 7 and 4/13/15-18²6), a household and patio (20 m²; Operation 22), three terraces (37 m²; Operations 9, 10, and 14), and six above-ground *machay* and *chullpa* tombs (164 m²; Operations 3, 8, 11, 12, 19, 20/21²7). The size and location of these operations are detailed in Figure 4.22 through Figure 4.24 and Table 4.1. Six additional test units were excavated

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²⁶ Operations 4, 13, 15, 16, 17, and 18 are small units placed in one Recuay multi-use compound, while Operation 7 is a single larger unit placed in a second multi-use compound.

²⁷ Operations 20 and 21 are adjacent to one another: Operation 21 is the interior of a *chullpa* tomb, and Operation 20 is the *chullpa*'s exterior patio.

with limited results at the site of Ragapunta, located at the eastern extent of Hualcayán's Sector C; see Chapter 6 for additional details²⁸.



Figure 4.22 Photograph of the Perolcoto ceremonial mound during excavation, facing southwest.

 $^{^{28}}$ Hualcayán's site code is HU01 and Ragapunta's site code is HU03. Test excavations at Ragapunta were led by Jimmy Ponce Campos and assisted by Hualcayán community members.

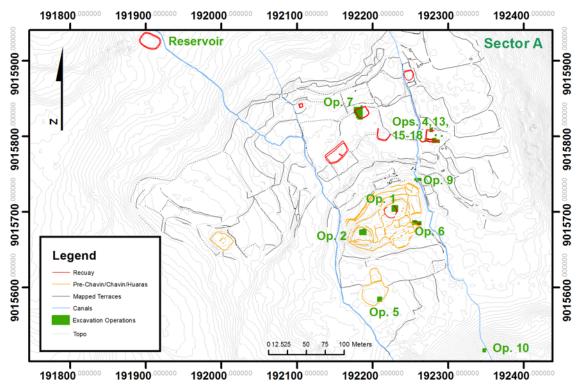


Figure 4.23 Map showing the location of the excavation operations in Sector A at Hualcayán. Structures in red are Recuay (Cayán Phase2) era constructions.

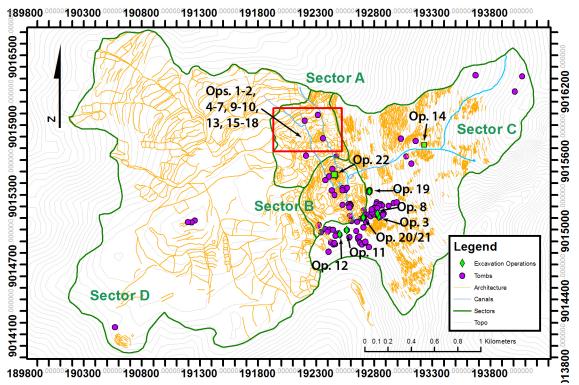


Figure 4.24 Map showing the location of excavation operations in Sectors B and C at Hualcayán. Red square indicates the area detailed in the above Figure 4.23 of operations in Sector A.

 Table 4.1 Excavation operations at Hualcayán.

| Operation | Sector | Size (m ²) | Brief Description | |
|--------------|--------|------------------------|--------------------------------------|--|
| 1 | A | 49 | Northeast platform area of the mound | |
| 2 | A | 48 | Southwest platform area of the mound | |
| 3 | С | 20 | Machay tomb | |
| 4, 13, 15-18 | A | 90 | Ritual-storage compound | |
| 5 | A | 25 | Sunken, partially circular plaza | |
| 6 | A | 49 | Eastern Terrace of mound with tomb | |
| 7 | Α | 131 | Ritual-storage compound | |
| 8 | С | N/A* | Machay tomb | |
| 9 | Α | 16 | Canal and terrace | |
| 10 | В | 16 | Canal and terrace | |
| 11 | С | 20 | Machay tomb | |
| 12 | С | N/A* | Machay tomb | |
| 14 | С | 1 | Terrace | |
| 19 | С | N/A* | Machay tomb | |
| 20 | С | 28 | Patio surrounding chullpa tomb | |
| 21 | С | N/A* | Chullpa tomb | |
| 22 | С | 20 | Residential house and patio unit | |

*Tomb with irregular dimensions



Figure 4.25 Excavations and documentation in action, which included assistance by field school students (left) and community members (right; image from Bria and Cruzado Carranza 2016, Figure 4).

During excavation, a unique context number was assigned to distinct soils (i.e. color, texture, artifact density), as well as features (i.e. wall sections, hearths), which were mapped using a Nikon (DTM 322 or Nivo 3M) total station. Soil, botanical, faunal, and carbon samples were collected according to these context distinctions. Construction fills that were greater than 10 cm deep were arbitrarily divided for vertical control, and a 1x1 m suboperation grid provided horizontal control (i.e. artifacts from different suboperations were separated into separate bags). The suboperations were named according to a predefined grid that was applied to the architectural feature or area (i.e. the Northeast Platform Area) being excavated, which began with "A0" in the northwest corner and increased in letter and number to the east and south (respectively) at each meter increment. All 1x1 meter grid squares were named according to the intersection of gridlines at its northeast corner²⁹. By making the grids slightly larger than each architectural area, any excavation operation placed inside the grid could be expanded in any direction, including west and north, without needing to use negative grid designations. An excavation operation was then placed inside the grid in the desired location, and the 1x1 m grid squares inside the operation's boundary became that operation's suboperations (Figure 4.26). Each grid was given a unique roman numeral that was not repeated at the site. More than one operation could be placed in the same grid.

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²⁹ Note that the organization of the grid we applied, whereby A0 begins northwest of the labeled grid area, does not follow the more orthodox organization, whereby A0 begins southwest of the labeled grid area.

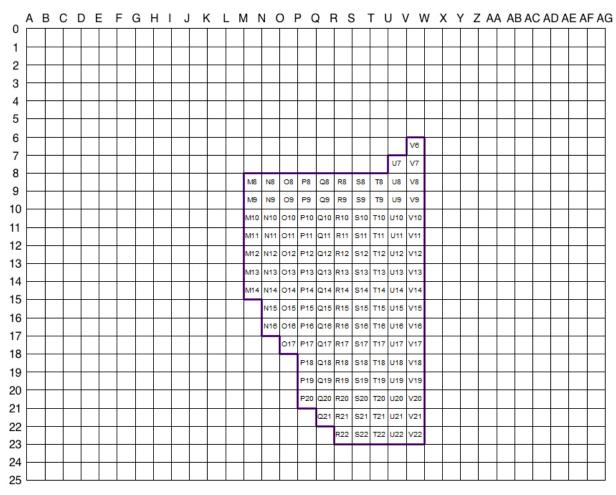


Figure 4.26 Illustration showing the relationship between a grid, operation, and suboperation, using Grid VII and Operation 7 as an example. Each grid square represents 1x1 m². The purple polygon indicates the outline of Operation 7 within Grid VII. Operation 7's suboperations, whose names are derived from their location within Grid VII, are labeled. Grid begins far beyond the excavated area in order to allow for expansion in all directions.

All excavation data was collected using iPad tablets and a mobile relational Filemaker database that Kathryn DeTore and I custom developed for the project³⁰ (Bria and DeTore 2016; Figure 4.27). All total station data were integrated into, visualized in, and spatially analyzed using ArcGIS and QGIS³¹. Photogrammetry software Agisoft Photoscan was used to create 3D models and to-scale orthophotographs of important excavated

 30 We provide a more comprehensive description of the digital database in Bria and DeTore 2016.

³¹ I first used ArcGIS to manage data during excavations, but during the post-season I switched to QGIS because I preferred it to ArcGIS, especially its ability to run natively on a Macintosh operating system. As such, I used QGIS to create the majority of maps presented in this dissertation.

features and structures. Once created, the orthophotographs were imported into QGIS. A summary of excavated contexts are presented in Appendix C.

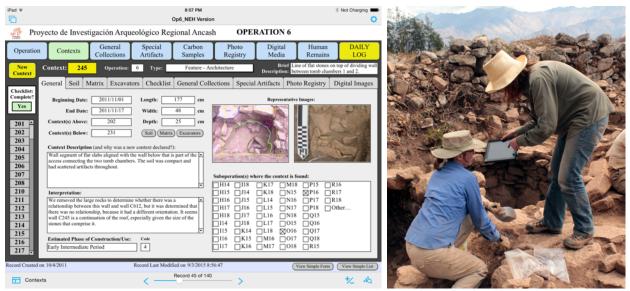


Figure 4.27 Left: Screenshot, showing one of the digital forms used to collect excavated data on an iPad in the field. **Right:** The iPad in action during excavations. (Images shown are Figures 2 and 5 from Bria and DeTore 2016).

AMS Radiocarbon Dating Analysis

Twenty-three carbon samples were selected from Kotosh, Chavín, Huarás, and Recuay contexts for AMS (Accelerator Mass Spectrometry) radiocarbon dating, specifically from (1) surfaces where feasting is indicated by the high proportion of serving vessels, hearths, grinding stones, and/or high quantities of botanical and faunal remains, and (2), sub-floor soils and fills to date discrete construction events. Samples were processed by the Direct AMS laboratory in Bothell, Washington. The AMS results are presented in Appendix A.

Ceramic Analysis

All ceramic fragments (roughly) over 1.5 cm were collected, in addition to smaller fragments that had signs of decoration. Ceramic fragments with decoration, that were highly diagnostic, or whose location was important to piece-plot were collected individually as "Special Artifacts" (Artefactos Especiales) and coded with a unique "AE" number. All other ceramic materials were collected in general bags according to the context in which they were recovered. Ceramics with soot or interior residues that could be used for microbotanical analysis were wrapped in aluminum, bagged, and not washed, while all other Ceramic artifacts were washed, dried, and placed in clean bags after they entered the laboratory. Next, diagnostic and non-diagnostic fragments were separated and then weighed and counted individually before attribute analysis began.

In most operations, all collected "Special Artifact" ceramics were photographed, drawn, and analyzed, and the rest of the diagnostic artifacts were analyzed according to a sampling strategy that differed depending on the type of context and its primacy in the dissertation's objectives. First, a 50% systematic sampling strategy—ceramics collected from every other suboperation of a given operation in a checkerboard fashion³² (e.g., Figure 4.28)—was applied to the operations excavated in non-mortuary ritual or domestic structures: Operations 1, 2, 4/13/15-17, 5, 6, 7, and 22. These operations were the most important to addressing the study's principal hypothesis, and therefore received the greatest attention. It should be noted that we experienced data loss from the analysis of Operation 6's undecorated diagnostic ceramics, but there was no data loss on the

³² Diagnostic ceramics were analyzed from all superimposed layers/contexts of these suboperations.

operation's "Special Artifacts" which comprised a large majority of the data given that many vessels were found smashed in-situ around a tomb (see Chapter 6). For her master's thesis of Hualcayán's tombs, Elizabeth Cruzado Carranza completed the analysis of the decorated or "Special Artifact" ceramic materials from tomb interiors in Operations 3, 8, 11, 12, 19, 20/21 in order to study specimens that could be tied to a chronological sequence, but the undecorated diagnostic ceramics also remain unanalyzed from these tombs. Finally, the ceramic materials from the three operations excavated in terraces and/or canal features, Operations 9, 10, and 14, remain mostly unanalyzed because they were largely disturbed by modern activities (Operations 9 and 10) or contained no diagnostic materials (Operation 14).

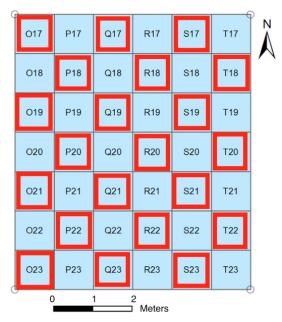
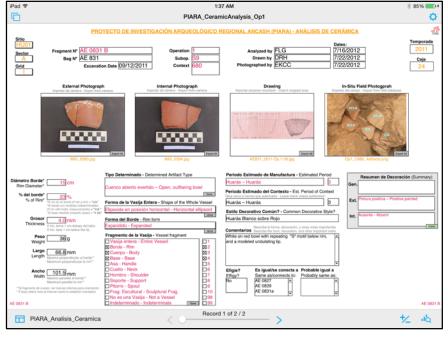


Figure 4.28 Example of the 50% systematic sampling strategy applied to the analysis of non-decorated diagnostic ceramics in Operations 1, 2, 4/13/15-17, 5, 6, 7, and 22. This example is of Operation 4, and the red squares indicate the suboperations in which non-decorated diagnostic ceramics were analyzed. In addition to this 50% analysis, ceramics collected as "Special Artifacts," which were usually decorated, were 100% analyzed.

Ceramic analysis involved recording a variety of attributes that included an object's form, decoration, paste composition, construction, and firing technique. The ceramic

analysis form for Special Artifacts was created in Filemaker and used on iPads to conduct attribute analysis (Figure 4.29). Visuals and dropdown menus in the Filemaker form helped guide and streamline the analysis, and codes were automatically generated from the selected attributes. A slightly more simplified version of the ceramic analysis was used for the undecorated diagnostic ceramics, and was collected in an Excel spreadsheet. I performed the analysis with several collaborators, the most involved being Elizabeth Cruzado Carranza. She was assisted by several others including Bryan Núñez Aparcana, who conducted a bachelor's-level thesis at the Universidad Mayor Nacional de San Marcos on the ceramics from Operation 6, and Erick Cassanova Vasquez. In addition, Hannah McAllister analyzed a sample of undecorated diagnostic ceramics from Operation 7 for her bachelor's honor thesis at the University of Wisconsin, LaCross and Sulma Karina Tahua Espinoza analyzed several Special Artifacts from Operation 1 for her bachelor's thesis at the Universidad Nacional Santiago Antúnez de Mayolo. Several other project crew chiefs and students also contributed their time to completing the ceramic analysis and illustrations. A summary of the ceramic analysis results is presented in Appendix D.



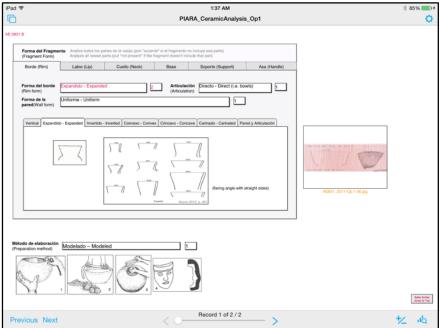


Figure 4.29 Screenshots of two sections of the ceramic analysis form, which was created in Filemaker and used on an iPad to conduct atribute analysis. Visuals helped guide the analysis. (Images shown are Figures 15 and 16 from Bria and DeTore 2016).

Lithic Analysis

Lithic remains were primarily analyzed by specialist Robert Connolly³³, who sorted the remains into tool and debitage categories, as well as raw material types where possible³⁴. This analysis was key to establishing not only the processes and places of tool manufacture, but also the kinds of food preparation activities in different contexts. A full description of Robert's methodology and his results are presented in Appendix E.

Macrobotanical and Microbotanical Analysis

Using standard procedures (Pearsall 2000; Piperno 2006; Piperno and Pearsall 1993; Scott Cummings 2007), during excavations we collected: (1) 5 liter bulk soil samples for flotation and macroscopic botanical analysis and (2) 50 gram samples for microscopic phytolith and starch analysis. Wherever possible, samples were collected above, below, and/or immediately outside of features such as hearths or floors (Lennstrom and Hastorf 1995). Bulk samples were floated to separate light (i.e. small botanicals) and heavy fractions (i.e. stones, large botanicals). Of the bulk soils, I chose 282 samples for analysis from across the excavation operations and represented time periods. During excavations, we also collected in situ macrobotanical remains, which were analyzed in full. Phytolith and starch grains were floated from soil samples (n=30), washed from artifact surfaces (n=123 from 37 ceramics and 86 lithics), and analyzed in liquid vials under a polarizing microscope to identify the presence of botanical remains (Pearsall 2000:90; Piperno 2006). Samples

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³³ Scott Jackson and Elizabeth Granley supported the analysis in its earlier stages

³⁴ In order to preserve the opportunity to do microresidue analyses, most lithics were not washed and therefore sorting the lithic remains by raw material types and identifying use-wear was difficult or impossible.

taken on, in, or near features with the greatest interpretive potential—hearths, floors, in situ ceramics, grinding stones, and fills immediately surrounding these features—were prioritized for analysis (cf. Bruno 2008:108).

Specialist Victor Vásquez Sánchez at the ArqueoBios laboratory in Trujillo, Peru, who has an extensive comparative collection from across Peru, performed the macrobotanical and microbotanical analyses of all samples, excluding the analysis of macrobotanicals from tomb interiors; Elizabeth Cruzado Carranza analyzed these macrobotanical remains from tombs for her master's research project at the University of Memphis, and her findings are referenced in Chapter 6 (Cruzado Carranza 2016). A full summary of Victor Vasquez's results from the botanical analyses is presented in Appendix F.

Faunal Analysis

Faunal analysis was conducted on all 9771 (75,390 kg) excavated whole and fragmented bone and shell specimens recovered from excavations. These remains were recovered either in situ, during excavation sieving (1/4 inch mesh), or during flotation. The faunal analysis applied standard metric and non-metric techniques to document species, skeletal element and side, age, and sex, cultural modifications (i.e. butchering), pathologies (i.e. arthritis), and state of preservation (O'Connor 2008). These data were then quantified to reveal the number of specimens. Specimens of unknown species were identified according to body size: large, medium, or small. Dr. Teresa Rosales Tham, in collaboration with Dr. Victor Vásquez Sánchez at the ArqueoBios Laboratory, analyzed all faunal remains

from Hualcayán, including the analysis of worked bone implements. A summary of the results from the faunal analyses is presented in Appendix G.

Human Remains Analysis

Bioarchaeologist Emily Sharp analyzed the majority of human remains from Hualcayán, building on the initial work of Chris Pink (2013) and Rachel Witt (2012). Emily conducted the analysis as part of her PhD research at Arizona State University. A more complete analysis will be provided in her dissertation, but for the purposes of this study, Emily recorded the age and sex of the excavated burial population at Hualcayán in order to establish the MNI of each tomb and the overall demographic profile of the sample. Emily's methodology and results are detailed in Appendix H.

Textile and Perishable Remains Analysis

M. Elizabeth Grávalos analyzed textile and perishable remains from Hualcayán as part of her master's thesis at Purdue University (Grávalos 2014). These remains and Grávalos's study are referenced in the dissertation but without a separate appendix.

Notes on the Presentation of Data

In this dissertation, I present the excavated data from Hualcayán according to the time period (e.g., Perolcoto Phase 1), architectural area (e.g., Southwest Platform Area) and structure code/phase (e.g., PC-A1) in which remains were found, in that order. This style

was chosen as opposed to presenting summaries of each excavation unit—denominated "Operations" in this dissertation—in order to prioritize revealing temporal changes across the Hualcayán landscape. This was especially important because of the long periods of complex building represented in a single operation. For example, excavations revealed 3000 years of activity in Operation 5 and 2500 years of activity in Operation 2. Nonetheless, these complete construction sequences are important to provide context to the excavated matrices, and as such, I present the unit summaries in Appendix C.

During excavations, I assigned a unique context number to all excavated features (wall segments, floors, fills, etc.). At the end of excavations, I grouped adjacent contexts into architectural or activity areas (including major building events), and assigned a unique code to each group. I use these architectural codes in this dissertation to both interpret and more clearly communicate changes through time. Architectural codes begin with a two-character code that indicates the structure's general period, which is followed by a "-" and a unique letter suffix, such as "A" or "B," etc. Thus, "PC-A" indicates a structure (or activity area) that was built, used, or modified during Perolcoto Phases 1–4. Likewise, "CY-A" indicates a structure that was built during Cayán Phases 1 or 2^{35} . Letter suffixes are unique within each general period (beginning with A).

While architectural/activity area codes (e.g., PC-A, PC-B, etc.) reflect general construction areas, an additional number suffix is often added to refer to a particular modification or event in the history of a structure, such as the addition of a room in a

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³⁵ These codes are drawn from the name of the general periods of construction (such as "PC" for Perolcoto or "CY" for Cayán) rather than particular phases (such as "PC1" for Perolcoto Phase 1 or "CY2" for Cayán Phase 2) to provide flexibility in the event that future radiocarbon analyses refine the architectural sequence at Hualcayán. The Perolcoto and Cayán Phases were, however, distinct enough to divide them accordingly. This division corresponds to the end of Chavín or between the Late and Final Formative Periods (see Table 3.1 for a description of these periods).

platform complex. For example, PC-A1 refers to the initial wall construction of the PC-A enclosure, and PC-A2 refers to the first modification made to the structure after it was built. These numbers are always assigned in chronological order, although additional excavations may reveal intervening construction events.

In some cases, the letter suffix of the structure codes is assigned according their chronological order, whereby structure "PC-D" is earlier than structure "PC-E." However, this order only provides a general guide within particular areas of the site, for coeval structures uncovered in different areas of the archaeological site cannot be placed in an absolute chronological sequence relative to each other. Thus, the letter order only corresponds to a chronological sequence when abutting structures are discussed. Therefore, the relative chronological relationships between structures are described in the text rather than suggested by the structure's letter.

Where necessary, the original context numbers that were assigned during excavations will also be used to distinguish between the different features that make up a structure, including wall segments, fills, and floors. For example, it may be necessary to distinguish between the specific wall segments that make up a single construction phase or to provide greater detail to the provenience of specific artifact scatters. This also ensures the structures, contexts, and artifacts can be referenced in the appendices with ease.

Context number designations are indicated by a "C" followed by a unique number, such as "C1155."

When describing the most commonly found botanical and faunal remains at Hualcayán, I will often use their common, rather than scientific names for brevity. For example, the terms camelid, deer (always white-tailed), guinea pig, maize, potato, sweet

potato, and peanut, will be used to indicate *llama sp.*, *Odocoileus virginianus*, *Cavia porcellus*, *Zea mays*, *Solanum tuberosum*, *Ipomoea batatas*, and *Phaseolus vulgaris*, respectively. Nonetheless, where greater specificity is needed or can be given (such as the camelid species *Llama glama* or *Vicugna pacos*), the scientific names of a species will be provided parenthetically after the common name or in the place of it. For reference, A table in Appendix G (botanical remains) and F (faunal remains) provides a complete list of the plant and animal taxa (respectively) recorded at Hualcayán with their scientific names.

Finally, it is important to note that, when not discussing time periods or architectural phases, I use the term "Perolcoto" to refer to the Perolcoto mound complex, and "Hualcayán" to indicate the ancient community that built the Perolcoto mound as well as the name of the broader archaeological site that encompasses the mound.

Summary

The goal of this chapter was to establish the regional environment and historical context, research objectives, and methods of the present study. First, it provided a literature review of the Formative and Early Intermediate Periods in highland Ancash, covering the pre-Chavín, Chavín, Huarás, Recuay, and post-Recuay developments of the region. The review aimed to reveal the importance of the Chavín to Recuay transition within a long and complex history of change.

Second, the chapter described Hualcayán's rugged environmental setting in the northern Callejón de Huaylas Valley in order to provide geographical context to the site. As this dissertation will explore, the area's unique mountain landscape and resources are

crucial to understanding community interaction and economic production at Hualcayán, which become mediated through corporate group ritual practices during Recuay times.

Third, the chapter examined the study's preliminary phases of research, which included an opportunistic survey of the northern Callejón de Huaylas and test excavations and mapping at the sites of Hualcayán and Pariamarca. The survey was focused on documenting differences in site locations and site characteristics through time, as well as identifying sites with (1) long-term, Chavín to Recuay occupations and (2) multi-component landscape features, such as ritual structures, domestic units, and agricultural terraces, that reflect a broad range of ancient ritual, domestic, and economic community practices. Based on these criteria, both Hualcayán and Pariamarca were chosen for test excavations and intensive mapping, although only Hualcayán produced evidence for a substantial and continuous Chavín to Recuay occupation. For this reason, as well as the site's intriguing integration of Recuay ritual and agricultural spaces near a Chavín-era mound, these preliminary observations led to the formation of the dissertation's hypothesis and the decision to focus all remaining investigations on Hualcayán.

Fourth, the chapter presented the study's research questions and data collection methods. These questions and methods, which included extensive excavation and the collaborative analysis of ceramics, lithics, botanical, faunal, textile, and other remains, aimed to reveal the changing ritual and economic practices, materials, and spaces that assembled the Hualcayán community through time, especially during the Chavín to Recuay transition. In particular, these analyses trace the changing practices of communal building, food production, and ritual consumption as measures of how the people of Hualcayán

reassembled and reorganized their community, particularly as they began to move, as well as segment, their ritual practices into agricultural spaces.

Finally, the chapter ended with a short explanation for how data is presented in this dissertation, focused primarily on how architectural data are grouped, coded and organized. The following chapters, Chapters 5 and 6, present the data collected and analyzed at Hualcayán.

CHAPTER 5

BUILDING COMMUNITY: THE INITIAL TO LATE FORMATIVE PERIODS AT HUALCAYÁN

This chapter reviews how a Formative Period community at Hualcayán was first assembled through the building of a Mito-Kotosh temple and was later transformed into a Chavín affiliated community and temple through the ongoing reconstruction and ritual use of a mound and plaza complex called Perolcoto. It presents a chronological reconstruction of the contexts uncovered through excavations in Perolcoto between 2400 and 500 BC. This reconstruction of Hualcayán's ritual space reveals a complex history of community transformation during the site's first two millennia, which occurred as people reassembled spaces and materials on the mound.

This history is divided into four periods. First are Perolcoto Phases 1 (2400–1700 BC) and 2 (1700–1200 BC), which are associated with activities in Mito-Kotosh spaces.

These early phases are followed by Perolcoto Phases 3 (1200–900 BC) and 4 (900-500 BC), which are characterized by an abandonment of Mito-Kotosh structures (Phase 3) and then an affiliation with Chavín during its regional fluorescence across the Central Andes (Phase 4; see Table 5.1). These four phases are thus divided according to Hualcayán's major architectural, ritual, and social developments, which coincide with the earliest four phases of the recently revised Central Andean Formative Period chronology: the Initial, Early, Middle, and Late Formative Periods, respectively (Fux 2013; Kaulicke 2010).¹

¹ This Formative chronological scheme was chosen over the popular alternative that divides this period into the Late Preceramic (3000–1800 BC), the Initial Period (1800–900 BC), and the Early Horizon (900–1 BC) because Hualcayán's major architectural and social changes aligned closely with the Formative chronological scheme.

Table 5.1 Table of the chronological phases discussed in Chapter 5.

| Hualcayán Phase | Period Code | Central Andean Chronological Phase | Estimated Time Span | Affiliated Cultural or Building Tradition at Hualcayán |
|----------------------|----------------|--|------------------------|--|
| Perolcoto Phase 1 | PC1 | Initial Formative Period | 3000-1700 BC | Mito-Kotosh (Initial Formative) |
| Perolcoto Phase 2 | PC2 | Early Formative Period | 1700-1200 BC | Mito-Kotosh |
| Perolcoto Phase 3 | PC3 | Middle Formative Period | 1200-900 BC | Post Mito-Kotosh; early platform stage |
| Perolcoto Phase 4 | PC4 | Late Formative Period | 900-500 BC | Chavín |

Omitted from this discussion are domestic practices, which were not clearly defined for the Formative Period at Hualcayán. The focus on ritual contexts is not to suggest that the construction of houses, performances of hospitality, or the preparation of daily meals are somehow less important to assembling community during the Perolcoto Phases than the public rituals and production activities that are examined here, but these early domestic contexts were not uncovered through excavations. I have thus chosen to focus on the communal rituals, public spaces, and supra-household economic practices that require a pronounced level of social coordination, thus using them as a lens through which to study how the early Hualcayán community was assembled.

The chapter presents the four Perolcoto Phases together in a single chapter in order to highlight several overarching continuities in early ritual practice that are abandoned and replaced during the Huarás and Recuay developments of the subsequent Cayán Phases (AD 500-700; reviewed in Chapter 6). In material terms, these continuities most notably include the intensive and prolonged reconstruction and use of ritual space on and around the

Moreover, this more fine-grained chronology allows for a refined understanding of how local developments correspond to regional sociopolitical changes (cf. Inokuchi 2014).

Perolcoto mound, the continued emphasis on foreign ritual materials (e.g., shell objects or fish from the Pacific coast), and the persistence of ritual food preparation and consumption practices (e.g., preparation and ritual consumption of potato and maize in ceramic neckless ollas). Simultaneously, this diachronic examination of the Formative Period at Hualcayán unveils a long-term process of local change that culminated in the formation of what scholars broadly classify as "Chavín" based on the presence of Chavín material culture (e.g. Janabarriu) and a growth in social inequality manifested through distinctions between ritual practitioners and participants (Burger 2008). Moreover, several core Chavín-era spaces on the Perolcoto mound were built during earlier phases and reused during the Chavín era, which made it difficult to trace the architectural and ritual history of these spaces without contextualizing their development over time. More importantly, this longterm study of ritual continuity and change at Hualcayán allows us to consider, from a local perspective, how and why new practices emerged as part or in rejection of preexisting norms of social interaction and tradition in the community. For ease of presentation, the chapter groups these data into Early Perolcoto (Perolcoto Phases 1 and 2) and Late Perolcoto (Perolcoto Phases 3 and 4) sections: many structures were used or remodeled during more than one period, but this reuse tended to cluster between early and late periods, respectively.²

The chapter also presents the Perolcoto data chronologically and according to the area of the mound they were recovered, as opposed to providing excavation unit summaries, in order to reconstruct ritual activities through time and space (see Appendix

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² For example, while the Mito-style enclosure PC-A was built during Perolcoto Phase 1, it was remodeled several times until the end of Perolcoto Phase 2. Then, platform complex PC-E was built during Perolcoto Phase 3 and was remodeled throughout Perolcoto Phase 4.

C). The ongoing construction of the Perolcoto mound produced complex archaeological assemblages that required a precise yet flexible naming system to highlight both the major architectural features as well as the smaller but significant modifications to this architecture (see Chapter 4 for an explanation of naming conventions). All structures and construction phases described in this chapter are listed in Table 5.2 and Table 5.3.

Table 5.2 List of the Perolcoto Phase structures and architectural complexes discussed in Chapter 5, along with their periods of use, locations, number of construction phases, and a brief description of each³.

| Code | Period | Area | Unit | Phases | Description |
|------|--------------------|------|-----------|--------|--|
| PC-A | PC1-2 | SWPA | Op. 2 | A1-A7 | Mito-style enclosure with inner ledge and platform |
| PC-B | PC1-2 ⁴ | SPA | Op. 5 | B1-B3 | Terrace/retaining wall, possibly part of the sunken plaza |
| PC-C | PC2 ⁵ | SWPA | Op. 2 | C1 | Filling and covering of PC-A |
| PC-D | PC2 ⁶ | СТА | U.E. 2 | D1-D2 | Flooring of CTA and construction of SWPA retaining wall |
| PC-E | PC3-4 | SWPA | Op. 2 | E1-E6 | Platform complex over PC-C |
| PC-F | PC3-4 ⁷ | CTA | U.E. 2 | F1-F2 | Fill over PC-D to raise the CTA surface |
| PC-G | PC4 | NWPA | Op. 1 | G1-G2 | Child burial |
| РС-Н | PC4 | NWPA | Op. 1 | Н1-Н6 | Successive filling and flooring events with wall segments |
| PC-I | PC48 | NWPA | Op. 1 | I1-I3 | Rustic enclosures on platform |
| PC-J | PC4 | NWPA | Op. 1 | J1-J5 | Platform complex built over PC-H |
| РС-К | PC4 | ETA | Op. 6 | K1 | Wall construction on a flanking terrace of Perolcoto mound |
| PC-L | PC4 | SPA | Op. 5 | L1 | Reuse and/or construction of the Sunken Plaza |
| PC-M | PC4 ⁹ | HRA | Op. 22 | M1 | Buried rectilinear structure, perhaps domestic |

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³ Abbreviations: (1) Column titles: "Area"=Architecture Area, "Unit"=Excavation Unit/Operation, and

[&]quot;Phase"=Construction Phase; (2) Periods: "PC1-PC4"=Perolcoto Phase 1 through 4; (3) Architecture Areas:

[&]quot;SWPA"=Southwest Platform Area, "NWPA"=Northwest Platform Area, "CTA"=Central Terrace Area,

[&]quot;SPA"=Sunken Plaza Area, "ETA"=Eastern Terrace Area, "HRA"=Hilltop Residential Area; (4) Units:

[&]quot;Op"=Operation, "U.E."=Unidad de Excavación (test unit).

⁴ Phase PC-B3 may have been built during either PC2 or PC3.

⁵ PC-C fill may have been laid during late PC2 or early PC3.

⁶ PC-D may have been first built during PC1, but the floor was not excavated to determine this.

⁷ PC-F is estimated to have been first built during PC3 and later resurfaced during PC4.

⁸ PC-I is estimated to have been built during PC4 based on architectural associations, but cannot be confirmed due to an error in the AMS radiocarbon date.

⁹ PC-M is estimated to have been built and used during PC4 but this isn't confirmed by dates.

Table 5.3 List of the architectural areas with a detailed list of all construction events discussed in Chapter 5, These are listed in general order of their construction history and their appearance in the text. A brief description is provided (Column titles are abbreviated: "Code"=Architecture Code, "Unit"=Excavation Unit/Operation, and "Phase"=Construction Phase).

| Code | Unit | Phase | Brief Description |
|------|------|-------|-------------------|
|------|------|-------|-------------------|

| | PEROLCOTO PHASE 1 | | | | |
|---------|-----------------------------------|-------|--|--|--|
| PC2 - 7 | PC2 - The Southwest Platform Area | | | | |
| PC-A | Op. 2 | | Mito-style enclosure with inner ledge and platform | | |
| | | PC-A1 | Original enclosure and ledge | | |
| PC-A2 | | PC-A2 | Low platform around inner perimeter | | |
| PC1 - 7 | PC1 - The Sunken Plaza Area | | | | |
| РС-В | PC-B Op. 5 | | Terrace/retaining wall, possibly of sunken plaza | | |
| | | PC-B1 | Subsoil below retaining wall PC-B2 and floor PC-B3 | | |
| | | PC-B2 | Retaining wall and terrace fill | | |

| | PEROLCOTO PHASE 2 | | | | |
|-----------|-----------------------------------|----------|---|--|--|
| PC2 - 1 | PC2 - The Southwest Platform Area | | | | |
| PC-A | PC-A Op. 2 | | Additions to Mito-style enclosure PC-A | | |
| | | PC-A3 | High curvilinear platform around inner perimeter | | |
| | | PC-A4 | High rectilinear platform around inner perimeter | | |
| | | PC-A5 | Small platform built on top of inner platform against wall | | |
| | | PC-A6 | Re-flooring of exterior and canal feature | | |
| | | PC-A7 | Re-flooring of exterior | | |
| PC-C | Op. 2 | | Filling and covering of PC-A | | |
| | | PC-C1 | Large fill event up to the top of PC-A | | |
| PC2 - 1 | Ր <mark>he Ce</mark> n | tral Ter | race Area | | |
| PC-D U.E. | | | Flooring of the CTA and construction of SWPA retaining wall | | |
| | | PC-D1 | Construction of the SWPA northwest retaining wall | | |
| | | PC-D2 | Lowest excavated floor abutting the (likely) base of retaining wall PC-D1 | | |
| PC1 - 7 | PC1 - The Sunken Plaza Area | | | | |
| PC-B | PC-B Op. 5 | | Terrace/retaining wall, possibly of sunken plaza | | |
| | | PC-B3 | Floor against wall PC-B2 and over soil layer PC-B1 | | |

| PEROLCOTO PHASE 3 | | | | | |
|-------------------|-----------------------------------|----------------------------|--|--|--|
| PC3 - 7 | PC3 - The Southwest Platform Area | | | | |
| РС-Е | Op. 2 | Platform complex over PC-C | | | |

| PC-E1 | | PC-E1 | Small rectangular platform | |
|--|-----------|--|--|--|
| PC-E2 Rectangular platform and stairway covering PC-E1 | | Rectangular platform and stairway covering PC-E1 | | |
| PC3 - 7 | The Cen | tral Ter | race Area | |
| PC-F | U.E. 2 | | Fill over PC-D to raise the CTA surface | |
| | | PC-F1 | Thick fill event/floor over PC-D2 floor and against PC-D1 retaining wall | |

| | | | PEROLCOTO PHASE 4 | | | |
|---------|-----------------------------------|----------|---|--|--|--|
| PC4 - 7 | PC4 - The Southwest Platform Area | | | | | |
| РС-Е | C-E Op. 2 | | Ongoing modification/expansion of platform complex PC-E | | | |
| | | PC-E3 | Corridor leading to PC-E2 platform | | | |
| | | PC-E4 | Filling of corridor PC-E3 to make raised pathway with elongated step | | | |
| | | PC-E5 | Elaboration/modification of step PC-E4 | | | |
| | | PC-E6 | Wall built against PC-E3 | | | |
| PC4 - 7 | The Cen | tral Ter | race Area | | | |
| PC-F | U.E. 2 | | Re-flooring of the CTA | | | |
| | | PC-F2 | Re-flooring of the CTA, covering PC-F1 | | | |
| PC4 - 1 | The Nor | theast P | Platform Area | | | |
| PC-G | Op. 1 | | Child burial | | | |
| | | PC-G1 | Child burial, lowest excavated area in Op. 1 | | | |
| | | PC-G2 | Stone layer placed over burial PC-H1 | | | |
| РС-Н | Op. 1 | | Successive filling and flooring events with wall segments | | | |
| | | PC-H1 | First fill and floor over burial PC-H | | | |
| | | PC-H2 | Fill and floor over PC-H1 with large in situ ceramic vessel | | | |
| | | РС-Н3 | Fill and floor over PC-H2 | | | |
| | | PC-H4 | Fill and floor over PC-H3 | | | |
| | | PC-H5 | Fill and floor over PC-H4 | | | |
| | | РС-Н6 | Fill and floor over PC-H5 | | | |
| PC-I | Op. 1 | | Rustic enclosures on platform (retaining wall C13 raised incrementally) | | | |
| | | PC-I1 | Lowest rustic structures | | | |
| | | PC-I2 | Second layer of rustic structures, constructed over PC-G1 | | | |
| | | PC-I3 | Third layer of rustic structures, constructed over PC-G2; hearth | | | |
| PC-J | Op. 1 | | Platform complex built over PC-H | | | |
| | | PC-J1 | Covering of PC-G3 and raising of retaining wall C13 to level the platform | | | |
| | | PC-J2 | Wall segment built against the C13 platform | | | |

| | | PC-J3 | PC-J1 platform refurbished/expanded with construction of retaining wall C14 | | |
|---------|--------------------------------|----------|---|--|--|
| | | PC-J4 | Room complex built against retaining wall C14 | | |
| | | PC-J5 | Small platform built against retaining wall C14 | | |
| PC4 - 1 | The Eas | tern Ter | race Area | | |
| РС-К | Op. 6 | | Wall construction on a flanking terrace of Perolcoto mound | | |
| | | PC-K1 | Parallel walls constructed (only partially uncovered) | | |
| PC4 - 1 | PC4 - The Sunken Plaza Area | | | | |
| PC-L | Op. 5 | | Reuse and/or construction of the sunken plaza | | |
| | | PC-L1 | Reuse of the sunken plaza floor, possible embellishment of plaza wall | | |
| PC4 - I | PC4 - Hilltop Residential Area | | | | |
| PC-M | РС-М Ор. 22 | | Rectilinear structure buried below CY-H domestic | | |
| F C-IVI | Op. 22 | | structure ¹⁰ | | |
| | | PC- | Partially excavated structure below CY-H, may date to PC4 based | | |
| | | M1 | on ceramics | | |

Within these Early and Late Perolcoto sections, the excavation results are presented according to the architectural areas in which they are found, namely the "Southwest Platform Area" (Operation 2), the "Northeast Platform Area" (Operation 1), the "Central Terrace Area" (U.E. 2), the "Sunken Plaza Area" (Operation 5), and the "East Terrace Area" (Operation 6; see Figure 5.1–Figure 5.2). The chapter's organization into architectural areas allows for the simultaneous discussion of both the particular features uncovered through excavation as well as the associated structures and alignments observed beyond the excavated areas. In brief, Perolcoto Phase 1 and 2 contexts were uncovered on the Perolcoto mound within Operation 2 and test unit U.E.2, and in the Sunken Plaza Area within Operation 5. Perolcoto Phase 3 contexts were also recovered from Operation 2 and

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¹⁰ Structure PC-M was partially uncovered and can only be estimated as built during Perolcoto Phase 4. Yet because it was found when uncovering a Cayán Phase 2 domestic structure, it is discussed in Chapter 6.

U.E. 2 on the mound. Perolcoto Phase 4 contexts were the most numerous in the data¹¹, and were uncovered on the Perolcoto mound within Operations 1, 2, 6, and test unit U.E. 2, as well as in the sunken plaza in Operation 5. Perolcoto Phase 4 diagnostic materials (i.e. Janabarriu ceramics) were also found mixed with later fills throughout the site.



Figure 5.1 Photograph of the Perolcoto mound in Sector A facing northwest, annotated with the various architectural areas discussed in the text.

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¹¹ This is due to project's sampling bias to reveal late Formative contexts rather than due to actual differences in the extent of building activities at Hualcayán.

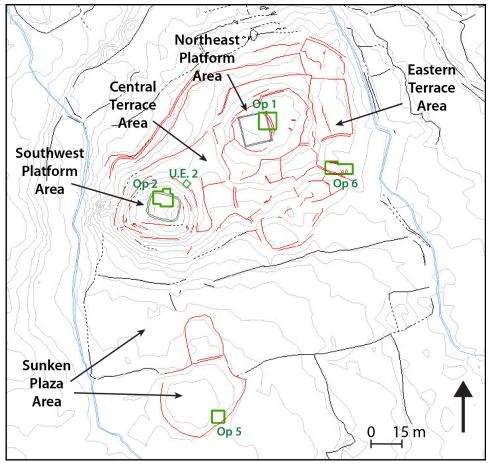


Figure 5.2 Map of the Perolcoto mound in Sector A, indicating the various architectural areas discussed in this chapter. Excavation unit locations are indicated in green, surface architecture in red, and terraces surrounding the mound in black. For reference, the projected size of two major Perolcoto Phase structures, which were found buried beneath the surface architecture, are represented in gray in Op. 1 (PC-J) and Op. 2 (PC-A).

Early Perolcoto (Phases 1 and 2): The Initial Formative Period (2400–1700 BC) and Early Formative Period (1700–1200 BC) at Hualcayán

This first data section details the Perolcoto Phase 1 and Perolcoto Phase 2 structures and materials that the excavations uncovered at Hualcayán. Evidence for Perolcoto Phases 1 and 2 come from the Sunken Plaza Area, the Southwest Platform Area, and the Central Terrace Area. This evidence is briefly summarized below, and then detailed in three sections, one for each of these three architectural areas.

The earliest evidence for occupation at Hualcayán comes from construction PC-B in the Sunken Plaza Area, which dates to the Initial Formative Period, or Perolcoto Phase 1 (2400–1700 BC). Carbon recovered from the lowest cultural layer above sterile in Operation 5 radiocarbon dated PC-B to between 2464 and 2297 cal. BC (HU01-SPA-1, Appendix A). This early date, which predates ceramic technology, corresponds to activities that predate the initial construction of the sunken plaza. Constructions in the Sunken Plaza Area likely began during the subsequent Early Formative, or Perolcoto Phase 2 (1700–1200 BC), although it is not yet clear whether this early period of building involved the construction of the plaza itself.

Excavations in Operation 2 of the Southwest Platform Area of the Perolcoto mound indicated that it was also under construction by Perolcoto Phase 1. Carbon dated to between 2138 and 1922 BC was recovered from the lowest floor of a Mito-Kotosh enclosure, structure PC-A. This structure remained in use and was modified throughout much of Perolcoto Phase 2, which is evidenced by the presence of ceramics—a technological innovation that spread throughout much of the central Andes around 1700 BC—within the structure's fills. Towards the end of Perolcoto Phase 2, structure PC-A was covered by a massive fill event, PC-C, which created a new, flat surface on the Southwest Platform Area.

Finally, excavations in the Central Terrace Area, exposed in test unit U.E. 2, revealed the construction of a large platform retaining wall and the adjacent floor of the Central Terrace, PC-D. The precise date for these constructions is somewhat unclear, but they were likely constructed during Perolcoto Phases 1 or 2. It is possible that the retaining wall formed part of the platform upon which enclosure PC-A was built, which would indicate a

construction date of Perolcoto Phase 1, but this wall may have also been a later refurbishment of the platform during Perolcoto Phase 2. The latter interpretation is favored due to the cruder masonry style used to build it in comparison to the careful masonry style used to build PC-A. No radiocarbon dates were processed to confirm the date of construction, however.

Early Perolcoto: The Sunken Plaza Area

PC-B: Plaza floor and retaining wall/terrace

Excavations in Operation 5 sought to define the construction history of the sunken plaza located south of the Perolcoto mound. The plaza's irregular form, in particular its somewhat "keyhole" shape (curvilinear bottom with a narrow U-shaped protrusion), suggests it was a product of several construction events during distinct moments in time (Figure 5.3 through Figure 5.5).

This section reviews the early activities and stages of construction uncovered in the Sunken Plaza Area, PC-B (later constructions in the Sunken Plaza Area are presented as PC-L). Architectural area PC-B includes three phases. First is PC-B1, a layer of soil void of ceramic artifacts that was radiocarbon dated to Perolcoto Phase 1, and is associated with the initial construction of PC-B2. PC-B2 is a two-tiered, rectilinear retaining wall or terrace with a 50° orientation that was built directly over PC-B1. PC-B3 is a layer of soil that abutted the base of the PC-B2 retaining wall, creating a floor surface that covered PC-B1.

Operation 5 - Sunken Plaza Area

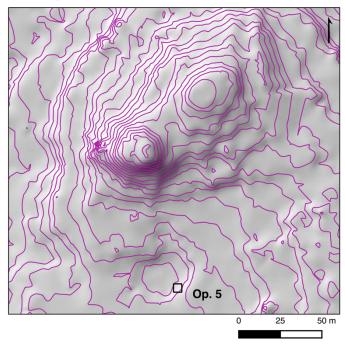


Figure 5.3 Topographic map of the Perolcoto mound and plaza complex, indicating the location of Operation 5 in the Sunken Plaza Area.

Operation 5 - Sunken Plaza Area

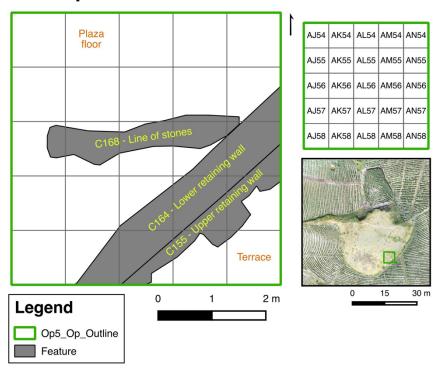


Figure 5.4 Left: Map showing the architectural features exposed during excavations in Operation 5, including features included in phase PC-B. Split-level retaining wall C164/C155 are grouped as PC-2 (C168 is from a later period, perhaps Cayan Phase 2). **Top Right:** Schematic map of Operation 5 showing its suboperations. **Bottom Right:** Orthophoto showing the location of Operation 5 within the Sunken Plaza Area. Note the irregular "keyhole" shape of the sunken plaza, which is formed by a large semi-circular depression bordered to its north by a slightly higher U-shaped depression.



Figure 5.5 Left: Operation 5 as seen from inside the sunken plaza, facing east. **Right:** Operation 5 (white outline) as seen from the Sunken Plaza Area of the mound.

PC-B1 was the lowest cultural layer found in Operation 5, which was also the earliest uncovered at Hualcayán. PC-B1 was radiocarbon dated to 2464 and 2297 cal. BC (HU01-SPA-1, Appendix A), or the Preceramic era (Initial Formative) of Perolcoto Phase 1. Phase PC-B2 is a two-tiered retaining wall (made up of wall and fill contexts C164, C162, C157, C153, and C156) built directly on top of PC-B1. Although not radiocarbon dated, the direct association between the lower wall face C164a and the Perolcoto Phase 1 soil C170 below suggests PC-B2 was also built during Perolcoto Phase 1 (see Figure 5.6 and Figure 5.7).



Figure 5.6 Top: View of Operation 5 facing southeast, showing structure area PC-B, which includes a two-tiered retaining wall (PC-B2; made up of wall faces C164 and C155) built on top of surface C170. **Bottom:** View of Operation 5 facing east, with annotations. The architectural features outlined in red and yellow make up retaining wall PC-B2. The top of C170 (PC-B1) is also outlined in red. Scaled north arrow is 20 cm.



Figure 5.7 Left: View of Operation 5's northern profile with contexts indicated. C170 is the lowest cultural layer excavated in the operation and the oldest excavated at the site. (Context C171c is covered by tarp and stones in this image). **Right:** View of the lowest excavated layers in Operation 5, taken from above and facing east. The image shows the stratigraphic relationships between PC-B's wall face C164a, cultural layer C170, and sterile layers C171a-c.

The PC-B2 retaining wall was in poor condition (C164 and C155; Figure 5.6), but its form suggests it was built over a destroyed stairway or stepped platform feature. In particular, wall face C164 had two levels and masonry styles: the southern section, C164b, was approximately 40 cm higher and made of larger stones than C164a to the north. C164a was clearly laid on top of PC-B1 soil layer C170, but a stone feature near the center of the unit separated it from the soils below C164b, which laid over layer C173/C174¹². However, C173 is very similar in color and texture to the dark soil that composes C170 (Munsell 10YR 4/2) and was likely part of the same layer or construction episode. In profile, C173 forms a clear step-shaped pattern (Figure 5.8). The dark color and fine texture of both C170 and C173 suggests that they were made up of highly organic topsoil that was buried with

 $^{^{12}}$ Context C174 was a soil feature located below C164b towards the center of Operation 5. C174 had a slightly lighter color than C173 but was clearly associated with it in some way. The area was highly destroyed, making it difficult to decipher its form.

the construction of the PC-B2 wall. However, the step shape of the soil also suggests builders moved and modified this topsoil as fill to form the C173 step feature as part of PC-B's original structure. No stones faced the step feature, however, which may have been made of a now deteriorated clay mix. If the C170/C174/C173 feature is in fact a stepped platform or a stairway, this supports the interpretation that PC-B1 and PC-B2 were part of a sunken plaza—or at least part of a feature much more complex than a terrace retaining wall.

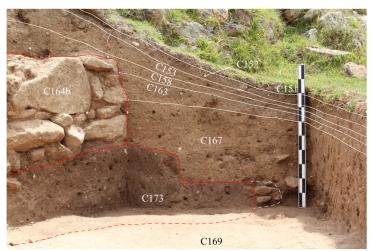


Figure 5.8 The south profile of Operation 5, showing the step-shaped feature C173 below and northwest of wall C164b. Layer C169 was a floor layer associated with this feature and layer C167 was a separate fill and surface.

Artifacts associated with PC-B1 and PC-B2 were few, but they do indicate maize processing. In particular, PC-B1 fill C170 included two lithic tools—a bifacial point (AE123) and an unusual grooved stone disk (AE124; Figure 5.9)—that microbotanical analyses indicate were used to process maize. Maize starches on the bifacial point suggests the tool was likely used to scrape maize kernels away from the cob, while the edges of the disk-shaped object were used as a hammerstone, such as to grind maize (Appendix E). The

disk's shape suggests it may have had other purposes as well: its flat sides may have also been used as a smoothing stone, and its central depression could have been used, perhaps, as a hand socket for a bow and drill fire starter¹³. The fill (C162) located behind the C164 retaining wall was only partially excavated, but was composed of loose stones and little soil with no artifacts. The upper fills were likewise excavated only slightly to expose the architecture, and recovered soils were disturbed due to modern farming on the terrace behind the wall.



Figure 5.9 Lithic artifacts recovered from C170, which is the lowest cultural layer (above sterile) in Operation 5. Objects include a bifacial point (left; special artifact AE123) and a stone disk (center, AE124), which may have been a multifunctional tool used as a hammerstone, smoothing stone, and/or some other purpose that is indicated by the linear grooves.

During PC-B3, soil layer C169 was laid over the PC-B1 soils to create a new floor surface that abutted the bottom face of the C164 retaining wall¹⁴ (see Figure 5.6–Figure 5.7). Diagnostic materials included ceramic forms, closed bowls, neckless jars (*ollas*) and short necked jars that are common to Formative Period assemblages (Figure 5.10), but no decorations were found on these vessels to point definitively to a period of use. However, given that Perolcoto Phase 4 Janabarriu-style (Chavín) ceramics appear in later fills (see

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¹³ Though there are few archaeological examples of similar hand sockets in the Andes, the wooden fire drill shafts and fire drill hearth boards have been found in highland Ancash (e.g., Lynch 1980:243-244), suggesting that this technique of fire-starting was practiced. It should be noted that the use of the tool for the purpose of starting fires is unconfirmed and presented purely as a possibility, based on the disk's central groove.

¹⁴ However, the association between C169 and feature C173 in the southern extent of Operation 5 is less clear.

section PC-L), it is believed that PC-B3 dates to Perolcoto Phase 2 or 3, with the former more likely given that it was built directly over Perolcoto Phase 1 preceramic layer PC-B1. None of these artifacts were found in situ, as they were mixed within the C169 fill.

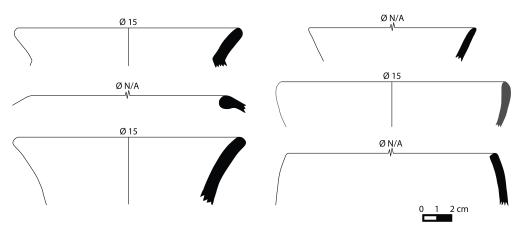


Figure 5.10 Ceramic forms from PC-B3 context layer C169.

In sum, the data from the Sunken Plaza Area suggest a complex history of use and building began in this area by the Initial Formative Period, which is the earliest evidence at Hualcayán and thus likely marks the community's origins. The earliest cultural layers that occur above sterile soil include lithics with evidence of maize processing. Given that maize has been shown to be primarily a ceremonial rather than nutritional crop during Andean prehistory, especially during the Formative Period (see Cuellar 2013, Tykot et al 2006, *inter alia*), the early presence of maize processing tools during Perolcoto Phase 1 in the Sunken Plaza Area point to early ceremonial practices and not simply settlement and quotidian activities. The construction history is less straightforward and more data are needed to provide a clear picture of how the Sunken Plaza Area developed during Perolcoto Phases 1 and 2. Nonetheless, the outline of early steps beneath a large terrace that was later incorporated into the Sunken Plaza itself suggest constructions began during

Perolcoto Phase 1. Modifications continued in later periods as well, which will be discussed below (in section on Late Perolcoto and Cayán Phase 2 in Chapter 6).

Early Perolcoto: The Southwest Platform Area

The most extensive evidence for building and ritual activities during Perolcoto Phases 1 and 2 comes from the Southwest Platform Area of the Perolcoto mound, uncovered within Operation 2 (Figure 5.11; see Figure 5.1 and Figure 5.2 for map location). These excavations revealed an enclosure, PC-A, which featuring curved corners and an inner ledge similar to the Mito-Kotosh ritual enclosures found at other sites, particularly those at La Galgada. Given its position towards the top of the mound, PC-A was undoubtedly built over earlier architecture buried below.

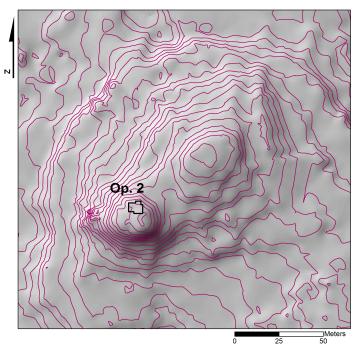


Figure 5.11 Topographic map of the Perolcoto mound, indicating the location of Operation 2 in the Southwest Platform Area.

Before presenting data from the Southwest Platform Area, it is important to note that looters destroyed a large portion it. These looting activities created an irregular trench extending from roughly the center of the platform to its northern extent (Figure 5.12). The trench penetrates lower and deeper as it moves northwest. As such, the western walls of buried structures—even those found several meters below the top of the mound—were partially or completely destroyed. We placed test unit U.E. 1, and later Operation 2¹⁵, along and slightly beyond this looters' trench to quickly expose the architectural phases that were buried on the mound (Figure 5.13 and Figure 5.14). A large Perolcoto Phase 2 enclosure, PC-A, was found mostly intact despite the looting damage, save for its western extent.

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 $^{^{15}}$ Test unit U.E. 1, which was excavated in 2009 to collect preliminary data, was expanded into Operation 2 in 2011.



Figure 5.12 Looters' trench in the Southwest Platform Area, facing west (left) and northeast (right). The photographs show the trench after test unit U.E. 1 was excavated and the beginning of excavations in Operation 2.

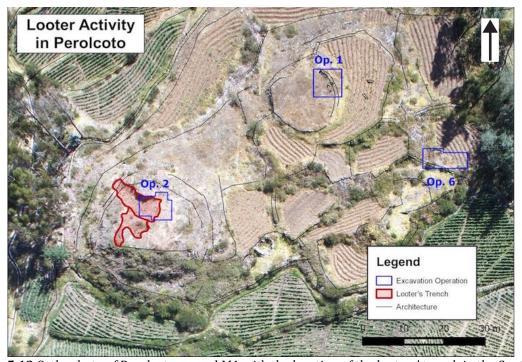


Figure 5.13 Orthophoto of Perolcoto mound M1 with the location of the looters' trench in the Southwest Platform Area indicated in red.

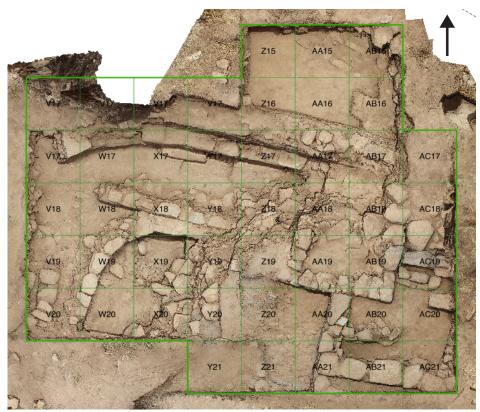


Figure 5.14 Orthophoto of Operation 2, showing the major architectural features discussed in this section. The 1x1 meter Suboperations, outlined in green, provide scale.

PC-A: Mito-Kotosh enclosure

Structure PC-A is a semi-subterranean open enclosure with an internal ledge and an interior platform that was remodeled several times (Figure 5.15–Figure 5.21). The structure's overall form is subrectangular; that is, roughly rectangular with curved corners. Its original form—the first of its approximately seven construction phases, or PC-A1—was formed by the construction of an outer wall, C65, and an inner ledge and lower interior wall, C80 (Figure 5.15). Only the northwest quarter of the PC-A structure was uncovered during excavation due to Operation 2's horizontal limits and due to the superposition of higher and later architecture, however. This makes it difficult to accurately measure the structure's complete size. Nonetheless, assuming a degree of symmetry and centrality

within the Southwest Platform Area, and taking the structure's curvature into consideration, PC-A is estimated to have a width of approximately 12 m on its northwest-southeast axis. It is currently unclear whether the structure likely had an equivalent length because there is not enough area preserved of the western wall to establish the wall's curve. The projected form of PC-A shown in Figure 5.15 is therefore estimated, and as such, provides a visual approximation rather than actual representations of the enclosure. The original construction PC-A1 may have had a semi-subterranean form—that is, having an exterior floor higher than the interior floor—but excavations did not reach the exterior base of wall C65 to confirm this. Alternatively, PC-A may have been transformed from a free-standing enclosure to a semi-subterranean enclosure during a later construction phase (see description of PC-A6 below). Excavations revealed that structure PC-A was modified at least six times after its initial construction, and these construction phases are denominated PC-A2 through PC-A7 (Figure 5.18–Figure 5.21).

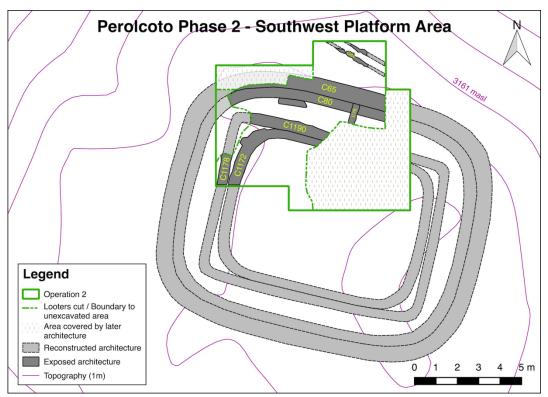


Figure 5.15 Map of the Perolcoto Phase 2 architecture uncovered in the Southwest Platform Area.



Figure 5.16 Overhead view of excavated features inside structure PC-A.



Figure 5.17 West-facing (top) and northeast-facing (bottom) birds-eye view of excavated features inside structure PC-A.

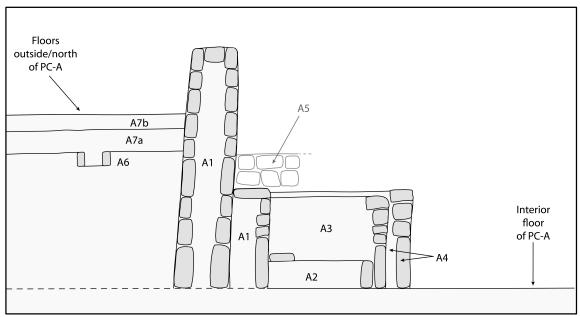


Figure 5.18 Cross section of structure PC-A, presented as an elevation drawing, in order to show the relative assocations of various architectural features extending from the center of the structure (right), across its walls and platforms (center) to the floors north and outside of the structure (left). Labels A1 through A7 indicate the different construction phases of PC-A.

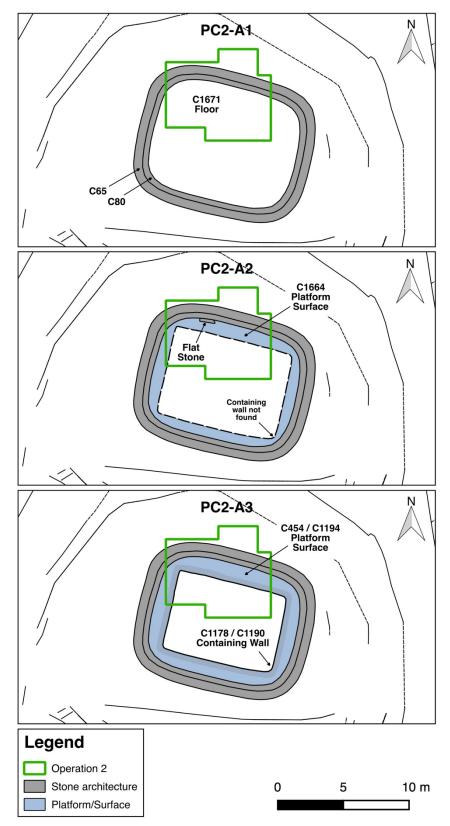


Figure 5.19 Architectural reconstructions, showing the proposed form and extent of construction phases PC-A1 through PC-A3.

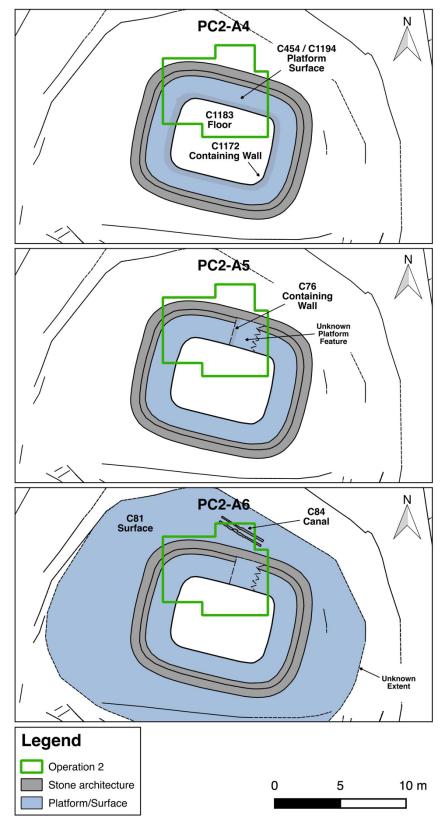


Figure 5.20 Architectural reconstructions, showing the proposed form and extent of construction phases PC-A4 through PC-A6.

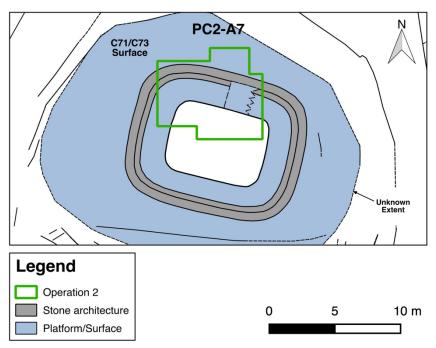


Figure 5.21 Architectural reconstruction, showing the proposed form and extent of construction phase PC-A7.

Enclosure PC-A had well-made decorative masonry with a distinctive aesthetic style throughout its construction phases. The enclosure's main outer wall C65, which was visible and used throughout all construction phases, was 67 cm wide and 2.15 m high (height calculated on the interior only). The interior ledge and lower wall, C80, was 41 cm wide and 1.05 m high. Combining these measurements, the enclosure's main outer wall was at least 1.08 m wide, although additional excavations to expose the structure's exterior base will likely reveal that the wall was even wider given that this wall was battered (had a slightly inward slope). This inward slope also suggests PC-A may have been roofed, since inward sloping walls are often constructed to better distribute weight from above—though battering is also an aesthetic style (Protzen 2000:197).

The masonry styles of the C65 and C80 wall sections were made by layering different decorative elements. For example, the lowest exposed coursing of C65's external

face is formed by a row of large cut stones (approximately $50 \times 40 \text{ cm}$) that are roughly flat on the bottom and curved at the top. The spaces between these stones are then filled with small (approximately $15 \times 5 \text{ cm}$), neatly arranged horizontal chinking stones, or "pachillas" (Figure 5.22). The upper section of the wall has alternating coursings of horizontally-placed stones (approximately $40 \times 20 \text{ cm}$) and stacked pachillas (visible in the upper left of Figure 5.22). Although ordered, the masonry of C65's interior face was somewhat less formal than its exterior, consisting mostly of horizontal chinking stones above a single row of roughly rectangular stones (approximately $40 \times 15 \text{ cm}$; Figure 5.23).



Figure 5.22 External face of wall C65, facing south. This wall was visible throughout all of PC-A's construction phases.



Figure 5.23 Detail of structure PC-A's internal wall masonry, facing northeast. Background: interior face of wall C65 (upper) and wall/ledge C80 (lower). Foreground: Walls C1172 and C1190. Note the looter's trench to the left (west).

The lower interior wall face, or ledge C80, was carefully constructed in a manner similar to the exterior wall's masonry, with large, upright worked stone slabs at the base (ranging from approximately 20 to 40 cm wide and 20 to 50 cm high) and smaller chinking stones between and above them. A row of rectangular stones (with faces approximately 60 x 10 cm) formed the top of ledge C80. These stones were placed flat and are set in a thick, hard, white clay mortar. The posterior portion of these stones runs beneath the stonework of the upper wall C65, suggesting that C65 and C80 were constructed simultaneously, as part of the structure's original design. White mortar was found intact over several of the large stones at the top of the C80 wall ledge, indicating that mortar once leveled this surface and smoothed the construction seam between the upper and lower walls (Figure 5.24). However, no visible traces of mortar were found on any of the wall faces, suggesting that the decorative stone masonry was left visible, or perhaps only a thin layer of plaster once covered it. The white mortar used was likely of local origin, but specially mined; members of the modern Hualcayán community, as well as the study's excavations, have indicated several nearby locations of white kaolin clay.





Figure 5.24 Photographs showing the intact white mortar that covered the top of the lower wall/ledge C80. The mortar was not well preserved in most areas. The area of preserved mortar shown here was sectioned in order to show its thickness in profile.

A 10 cm projection of the interior face of wall C65 adorned the northwest corner of the structure, and may have formed part of a niche. This corner is mostly destroyed, however, likely in part by looters and in part by ancient builders when they later filled and decommissioned the structure (discussed below). Therefore, this feature is difficult to reconstruct. Its preserved section is a step-like protrusion that jutted out from the curved corner of wall C65 in the area just above ledge C80 (Figure 5.25).

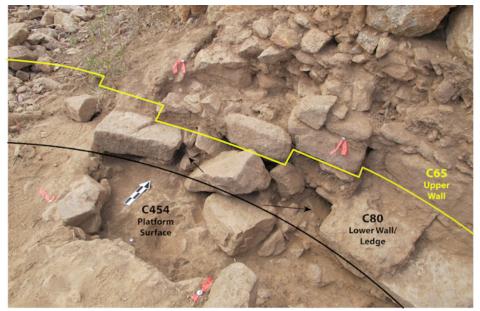


Figure 5.25 Photo of PC-A's interior northwest corner showing partially destroyed features: (1) the stepped architectural projection of the C65 corner, outlined and reconstructed in yellow, which may have surrounded a niche, and (2) two stones that were dislodged from their original position at the top of ledge C80. The black line indicates the general curve of ledge C80. C454 is the platform surface associated with construction phases PC-A4 and PC-A5.

PC-A2 through PC-A4 were the first three construction phases to modify structure PC-A's original form. These construction phases added and then altered the size and shape of an interior platform that ran around the perimeter of the structure. The construction of these platforms created a lower central sunken space inside PC-A. The inner floor area and the platform wall face of the first of these modifications, PC-A2, were never recovered, however, because later construction phases were built over and seemingly destroyed these features. Only the surface of the PC-A2 platform, C1663 (interface)/C1664 (upper floor fill), was uncovered (Figure 5.26). The PC-A2 platform's height can be reconstructed to an estimated 24 cm by measuring from PC-A1's floor, C1671, to the surface of C1664. A flat elongated stone, approximately 100 x 20 cm in size, was placed at the top of the C1664 surface and against wall C80 for an unknown purpose. The overall width and shape of the PC-A2 platform is unknown, but is estimated in Figure 5.19. Its form, and the premise that

the surface was the top of a platform—and not a floor that extended across the structure—is based on the logic that because the bottom of the subsequent platform, built during PC-A3, was lower than the top of the PC-A2 platform surface, the surface of C1664 must have terminated at a retaining wall that is no longer preserved. An alternative possibility is that surface C1664 was a floor that extended across the entire structure, and that C1664 was then cut into during PC-A3 in order to build the first two-level interior. However, because all subsequent modifications involved the construction of a platform, and because of the relative unlikelihood that the builders would excavate into the preexisting floor rather than building on top of it, PC-A2 also likely had this two-level interior form. Carbon obtained from the floor was dated to between 2138 and 1922 cal. BC (HU01-SWPA-1, Appendix A), placing the PC-A2 construction into Perolcoto Phase 1, or the Initial Formative Period. It is likely that the original PC-A1 enclosure was built at this time because Mito temple enclosures always featured an inner platform and these features would have been mostly likely built together.

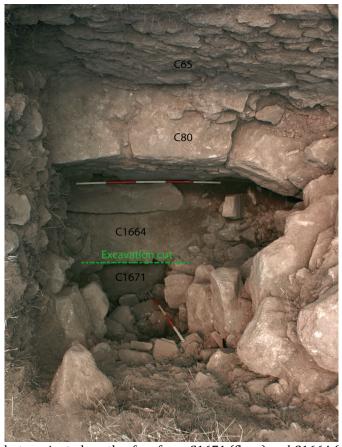


Figure 5.26 Overhead photo, oriented north, of surfaces C1671 (floor) and C1664 (raised platform surface) as they were first uncovered in 2009 test unit UE1.

The platform ledges built during construction phases PC-A3 and PC-A4 were much larger and taller than during PC-A2. Both platforms were constructed by adding a single-faced retaining wall (C1190 and C1172, respectively) and then placing fill behind and up to the top of these walls, creating a platform surface (Figure 5.27–Figure 5.28). During PC-A3, a new platform was constructed by placing fill behind a rectilinear retaining wall C1190/C1178¹⁶ (Figure 5.19). This platform refurbishment not only raised the height of the inner platform, but also likely widened its surface area and reduced the area of the central space below. PC-A4 further enlarged the platform and reduced the central space. More importantly, the PC-A4 modification—which refaced retaining wall C1190/C1178

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¹⁶ Features are labeled with two context numbers when they were excavated in two areas, such as where a floor was separated by a test pit, or where a wall was cut into two sections by a looters' trench.

with C1172—changed the platform shape from a rectilinear to a subrectangular form, mirroring the original and outer curvature of PC-A (Figure 5.20).



Figure 5.27 Photograph of Operation 2 at the end of excavation, facing northeast. PC-A architectural features are indicated in white. Red arrows indicate the internal sides of retaining walls C1190 (phase PC-A3 platform) and C1172 (phase PC-A4 platform) that did not have faced masonry.

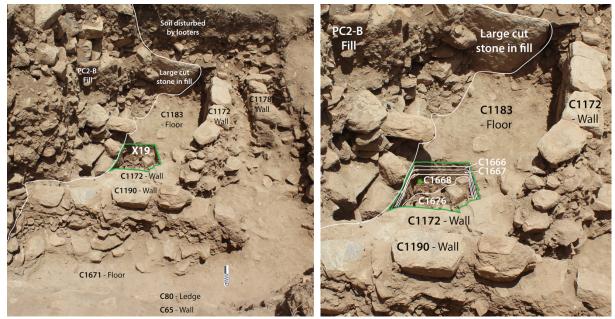


Figure 5.28 Left: Annotated photograph, facing south, of Operation 2 at the end of excavations. Image shows the unfaced interiors of retaining walls C1190/C1178 (PC-A3 platform) and C1172 (PC-A4 platform). Image also shows the layers excavated below floor C1183 in the Suboperation X19 test unit. **Right:** Zoomed detail of the C1183 floor and the subfloor layers exposed in the X19 test unit. The general location of AMS dated sample HU01-SWPA-2 is indicated with a green asterisk (see also Figure 3.26 and 3.27).

Neither the top nor the surface of the platforms built during PC-A3 or PC-A4 were completely intact, which suggests they were in poor preservation when they were later covered by construction fill (although the destruction of the surface is due to looting in some areas). For example, the preserved top of retaining wall C1172 from PC-A4 was lower than C1190 from PC-A3, even though the PC-A3 construction would have covered and buried the preexisting platform (Figure 5.19–Figure 5.20). For this reason, the intact surface C454/C1194, which was only preserved in certain areas, could be associated with either or both of the PC-A3 and PC-A4 platforms (see and Figure 5.29). Finally, although the PC-A3 and PC-A4 platforms covered the majority of the C80 wall, it seems the surface C454/C1194 terminated just below C80's top stones, leaving these top stones visible around the platform's perimeter.



Figure 5.29 Overhead view, facing north, showing the semi-preserved surface that was associated with PC-A3 (C1190) and PC-A4 (C1172) platforms. Notice how this surface abuts the base of retaining wall C76, built during construction phase PC-A5. The image also shows the PC-C construction fill (discussed in the following section) that was composed of neatly laid layers of stone near wall C60, and less ordered piled stones and soil towards the center.

In overall design, the PC-A2 through PC-A4 platforms split the interior of the PC-A enclosure into two distinct spaces: a central sunken space, likely for activities that were the visual focal point within the structure, and a platform around the internal perimeter, perhaps for standing and viewing these activities (Figure 5.15–Figure 5.20). As mentioned above, these constructions also made the space of the inner floor increasingly smaller. The PC-A3 platform, which had an area of 37m², reduced the inner floor from an estimated 90 m² during PC-A1—when there was no platform around the perimeter—to an area of 53 m². PC-A4 further widened the platform around the inner perimeter from 37 m² to 50 m², which reduced the interior space from 53 m² to 40 m². Throughout these changes in form, PC-A3 and PC-A4 maintained the masonry style first established with the construction of

PC-A1, which featured larger cut stones and smaller horizontal chinking stones at the base of the wall, and rectangular blocks placed horizontally at the top of the wall (compare the PC-A1, PC-A3, and PC-A4 masonry styles in Figure 5.30–Figure 5.32).

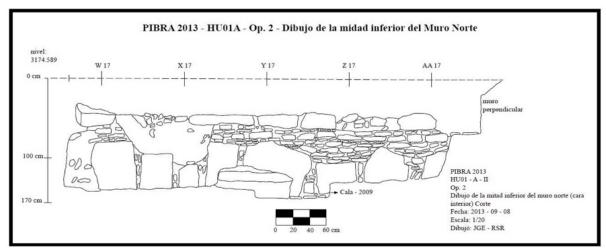


Figure 5.30 Profile drawing of PC-A1's interior wall ledge, C80, showing its masonry style.

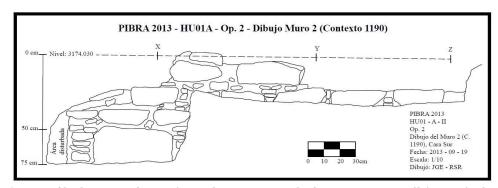


Figure 5.31 Profile drawing of PC-A3's northern interior platform retaining wall (C1190), showing its masonry style. Asterisk indicates the area covered by wall C1172 (PC-A4), which was built against the face of C1190.

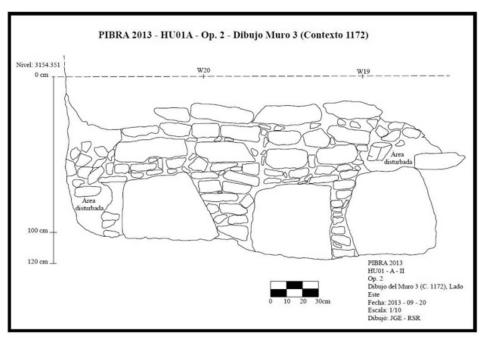


Figure 5.32 Profile drawing of the western portion of the PC-A4 curved platform retaining wall (C1172), showing its masonry style.

The cranium of a child, estimated between five and seven years of age, was placed in front of the curved platform wall C1172 and on top of PC-A4's inner floor surface, C1183. This cranium was recovered under stones in a disturbed area of the floor where the surface was no longer intact (Figure 5.33 and Figure 5.35). An unlikely coincidence, it is probable that this area of the floor was prepared or partially excavated in order to deposit the cranium. The cranium was extremely fragmented, either having been intentionally smashed by stones or crushed by the weight of the stony fill deposited when the entire PC-A structure was filled at the end of its use. In either scenario, it is probable that the cranium was deposited at the end of the structure's use or when it was eventually filled (see below). Only the lower section of the fragmented cranial vault was found articulated. The remains were highly fragmented, although it was relatively clear that no other bone elements aside from cranium fragments were recovered. Moreover, the volume and concentration of bone fragments were consistent with a single cranium. Because the cranium was disarticulated

from any post-cranial remains, it likely reflects a secondary burial and was perhaps placed as an offering. The cranium was not directly associated with any other material finds on the floor, aside from one black polished ceramic body sherd fragment that is difficult to precisely date, but that is common among the ceramics from Perolcoto Phase 3.

To sample the subfloor fill and date the PC-A4 construction phase, a 1 x 1 m test unit was excavated in the northern section of the structure's inner space (Figure 5.34). A carbon sample, dated to between 1624 and 1505 cal. BC, was recovered approximately 12 cm below the C1183 floor, in fill C1668 (HU01-SWPA-2; Appendix A; Figure 5.33 and Figure 5.34). Given its position in C1668, which may have been an earlier floor below floor C1183, this date may in fact pertain to the construction of PC-A3, not PC-A4.



Figure 5.33 Location of the cranium and carbon sample recovered from the inside of PC-A3. Arrow "A" indicates the location of the crushed child cranium on floor C1183. Arrow "B" indicates the general location of radiocarbon carbon sample HU01-SWPA-2, located below the floor (photo shows a 1x1m excavation area that penetrated the floor)



Figure 5.34 Location of radiocarbon dated sample HU01-SWPA-2 (dark spot above photo scale). Floor C1183 is visible above and surrounding the test pit. Photograph facing south.



Figure 5.35 Detail of fractured cranial vault in situ (located between the photo board and the north arrow). Photograph facing northwest.

During construction phase PC-A5, a smaller platform was added to the interior of the enclosure, faced by retaining wall C76 (Figure 5.20–Figure 5.36). The PC-A4 construction phase is poorly understood, for only a small segment—approximately 70 cm—of C76's western face was exposed during excavations. Nonetheless, the exposed area of the wall clearly reveals that C76 abutted and was perpendicular to the interior of C63. It

also reveals that wall C76 was constructed directly on top of the C80 ledge and that it extended across PC-A4's interior platform surface (C454/C1194). The platform's overall shape and size is difficult to reconstruct because the wall continued southward into an area of unexcavated construction fill. Nonetheless, because the platform's construction would have divided the interior space, likely for the first time in the structure's use, this construction may reflect a shift from the PC-A structure's original function.



Figure 5.36 Images showing the platform retaining wall C76, built during construction phase PC-A5. No intact platform surface was identified, in part because large stones from the fill above could not be removed. Notice that C76 abuts wall C65 and is built on top of C80. Features in green are later than C76 and are indicated here for clarity. Facing east (left) and north (right).

Three superimposed floors (C71, C73, and C81) and a canal feature (C84) were laid during construction phases PC-A6 and PC-A7 in the exterior of PC-A, just north of and abutting wall C65 (Figure 5.20, Figure 5.21, Figure 5.37; see Figure 5.18 for floor depths). These floors do not appear to have been made of unusual soils, but they were very hard and compact.

Outside of PC-A, the lowest and earliest floor C81 was associated with canal feature C84 and together these additions compose construction phase PC-A6. C81 is located 87 cm below the preserved top of wall C63. It is very likely that there are additional floors below C81, but our excavations ended at this level when we uncovered the C84 canal feature at the level of this floor (Figure 5.38; see also Figure 5.14 Figure 5.15). This canal, C84, has a 50 cm. external and 25 cm internal diameter. It is unclear where this canal leads from or to, how it is related to the use of PC-A, or what was its function. It possibly forms part of a drainage canal to move rainwater off the mound. Alternatively, it could be a segment of a smoke flue—a feature common to Kotosh-Mito ceremonial hearths. The second latest floor outside of PC-A, C73, was 81 cm below the top of C65, and covered the C81 floor and C84 canal feature. The last, or highest, exterior floor was C71, which was placed 72 cm below the preserved top of C65 and 1.43 m above the level of the interior floor of PC-A1.

It is unclear exactly when these floors were constructed, but they are believed to be late in the construction sequence of PC-A because these floors were laid very high above the interior floor level and because there is a pattern of successively laid floors, suggesting a likelihood that earlier floors are buried below them. Moreover, canal C84 is believed to be late in the construction sequence because it is aligned with the exposed surface architecture of the mound—a large platform wall—just to its north (black lines, Figure 5.20), rather than to the PC-A structure buried deeper in the mound. Nonetheless, it is possible that PC-A was originally constructed as a semi-subterranean structure, and that floor C81 and canal C84 are near or at the original external surface. Excavations below the level of C81 would clarify this construction history.



Figure 5.37 Photograph showing profile where successive floors were uncovered along the exterior of structure PC-A. The structure's principal wall C65 is visible to the left. Facing west.



Figure 5.38 Photo facing south of the canal feature outside and north of PC-A (wall C65), at the level of floor C81.Witnesses of floors C71 and C73 are visible in the upper left of the photo.

Few materials were associated with the PC-A Mito-Kotosh structure and its modifications due to their fairly clean soils, even in platform and sub-floor fills. Faunal remains were best preserved and represented, and revealed a variety of domesticated, hunted, and foreign (marine) faunal remains (Table 5.4). Mammals included both camelids and deer, which were represented relatively equally in the sample, and thus show a

relatively equal investment in domesticating and hunting practices for temple-related food consumption, with a slightly higher presence of camelid (n=19) over deer (n=13)¹⁷. Five species of marine mollusks from the Pacific Ocean were also recovered (*Argopecten sp., Enoplochiton niger, Fusinus dupetitthouarsi, Protothaca theca, Engraulis ringens*), suggesting a variety of these foreign foods, rather than one in particular, were desired or available through regional trade networks. Macrobotanical remains were poorly preserved but at least three species of wood (*Juglans sp., Alnus sp., Buddleja sp.*) were used for fuel, perhaps in PC-A's ritual hearth. Finally, lithics and ceramics were few but include short-necked ollas and polished bowls, and chipped stone biface artifacts

Figure 5.39).¹⁸ Microbotanical remains revealed potato starches, but only two samples from PC-A fills were analyzed; samples from the fill (PC-C) covering the structures floors included both maize and potato (see below).

-

¹⁷ Though these NISP numbers may be due to the bone elements counted (e.g., phalanges vs. long bones; MNI information is not currently available).

¹⁸ The ceramics from PC-A and other Perolcoto Phase 2 fills at Hualcayán have some stylistic affinity to ceramics from coeval sites in the Callejón de Huaylas, such as those documented at La Galgada and the Toril and Huaricoto phases at Huaricoto (Burger 1985; Grieder 1988, Chapter 10). It is difficult to draw many comparisons to the ceramics from other sites such as La Galgada because only 181 ceramic sherds (and one whole vessel) were recovered from La Galgada's Early Formative Period levels, after which construction ceased at the site (Greider 1988, Chapter 10). This is also because temple spaces at Hualcayán were kept notably clean, revealing few in situ artifacts. Nonetheless, neckless ollas with folded over rims and/or gritty paste textures, and roughly-burnished red-slipped vessels with punctured or incised applique nubs are to the Toril style (Burger 1985).

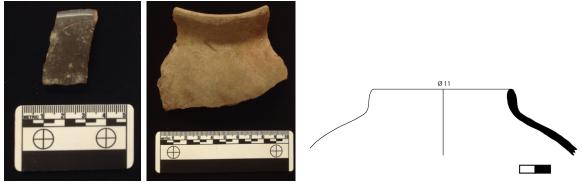


Figure 5.39 Ceramics from the Early Perolcoto Mito-Kotosh structure PC-A.

Table 5.4 Faunal and botanical remains from the Mito-Kotosh structure PC-A.

Faunal

| <u>raunai</u> | | |
|----------------------------|----|--|
| Domesticated Mammal | | |
| Cavia porcellus | 1 | |
| Lama sp. | 19 | |
| Bird/Bat | | |
| Strigidae | 1 | |
| Passeriforme | 1 | |
| Quiróptero n/i | 1 | |
| Other Mammal | | |
| Lagidium peruanum | 1 | |
| Odocoileus virginianus | 13 | |
| Carnívora n/i | 3 | |
| Artiodactyla | 29 | |
| Mamífero n/i | 8 | |
| Marine Mollusks | | |
| Argopecten sp. | 1 | |
| Enoplochiton niger | 1 | |
| Fusinus dupetitthouarsi | 1 | |
| Protothaca thaca | 1 | |
| Engraulis ringens | 2 | |
| Land Snail | | |
| Bulimulidae | 13 | |
| Other | | |
| Reptil n/i | 1 | |
| Muridae | 2 | |

Macrobotanical (Wood)

| · · · · · · · · · · · · · · · · · · · | |
|---------------------------------------|---------|
| Juglans sp. | 0.20 g |
| Alnus sp. | 2.25 g |
| Buddleja sp. | 1.10 g |
| Carbon n/i | 13.78 g |

Microbotanical

| Solanum tuberosum | Ceramic |
|-------------------|---------|
| Negative | Lithic |

In sum, the PC-A enclosure revealed what is likely the origins of ritual activities in Perolcoto, which were associated with the Mito-Kotosh tradition. Though earlier and other coeval Mito-Kotosh temples at the site have yet to be uncovered (due to them being covered by later architecture), the PC-A building area was likely one of several entombed temples buried in the Perolcoto mound. However, PC-A is significant in that it is the last major Mito-Kotosh temple before the mound was dramatically transformed in Late Perolcoto times (see below). In particular, it was notably large (approximately 12 meters across) and was centrally located on the Southwest Platform Area in a manner similar to the later phase of building at the site of La Galgada (see further discussion of these similarities in Chapters 3 and 7). At la Galgada, Grieder and Bueno suggest the increasingly central position and prominence of particular temples is associated with particular groups, perhaps lineage or other kinds of corporate groups.

It is significant that at the end of the Mito-Kotosh tradition at Hualcayán the final temple was maintained and repeatedly remodeled, rather than covered and rebuilt. These modifications seem to have raised the platform "bench" along the inner wall to more greatly separate it from the inner floor where a ritual hearth was presumably located beneath the unexcavated PC-C construction fill (see next section). It also changed its shape through time. These adjustments to the inner temple floor may indicate a growing distinction between ritual participants, who would have stood on the raised platform, and practitioners, who would have tended to the fire below. The changes in the form of the inner bench also suggests shifting and perhaps contested ideas about how to construct and/or perform Mito-Kotosh ritual constructions and their associated ceremonial practices toward the end of the tradition.

PC-C: Filling and covering of the PC-A enclosure

Construction phase PC-C involved the partial dismantling of the PC-A enclosure followed by a large fill event that entombed the PC-A enclosure and created a surface for subsequent construction (Figure 5.40). Radiocarbon dating indicated this fill was likely placed between 1415 and 1295 cal. BC (HU01-SWPA-3, Appendix A), or during the latter part of the Early Formative Period of Perolcoto Phase 2. The dated carbon, was collected from a concentration of neckless ollas, many covered in soot, found smashed beneath a large rock and above an overturned grinding stone in PC-C1.

Inside the PC-A enclosure, the PC-C1 fill was 2.2 m deep, the difference between the level of the PC-A4 inner floor, C1183, and the new surface constructed above the fill, C458/C62, which begins at the level just above the top of the main wall of the PC-A enclosure, C63. In the center of the enclosure, the fill is constructed by alternating layers of stone and soil, perhaps a technique used for structural stability (fill includes contexts C463, C464, C466 (partially disturbed), C470, C471, and C1174; Figure 5.40). Abutting these fill layers, and stacked on top of PC-A's inner platforms along the C65 wall, were several layers of stones placed in rows (C70; Figure 5.42; see also Figure 5.29 Figure 5.36, left). These stacked stones were placed along the outer ring of the enclosure's interior, perhaps to stabilize wall C65 before the rest of the interior fill was placed. Stone and soil fill (including C66) was also placed outside of the PC-A enclosure during the coeval fill event PC-C2, which covered floor C71 up to the level of the top of the C65 wall (Figure 5.43).



Figure 5.40 Photo of Operation 2 facing northwest, showing several PC-C1 layers, indicated in white, that filled the interior of the PC-A enclosure. The green asterisk indicates the area where carbon sample HU01-SWPA-3 was recovered. (Note: All layers above floor C458 [labeled in yellow] were constructed during Perolcoto Phase 3 or later.)



Figure 5.41 Photographs of artifact concentration (Suboperation AB17) where dated carbon sample HU01-SWPA-3 was recovered. This artifact concentration was composed of smashed ceramic neckless ollas, all undecorated, beneath a large stone located in the upper strata of the PC-C1 fill covering the PC-A enclosure (wall C65). Facing north (left) and south (right).



Figure 5.42 Photograph, facing north, of the ordered and layered stone fill, C70, that was placed against the interior face of the C65 wall during PC-C1. Floor C71 is visible north of wall C63. The image also indicates the location of the C74 platform above this fill, whose northwest corner had collapsed before this photograph was taken.



Figure 5.43 Photograph, facing south, showing the PC-C2 fill placed outside (north) of the PC-A enclosure (showing layer C66). The exterior of PC-A's principal wall, C65, is visible at the top of the photograph. This fill covers floor C71.

PC-A's state of preservation suggests that the structure was partially dismantled and/or allowed to fall into partial disrepair for a period of time before it was covered with fill PC-C. In particular, the tops of many of PC-A's architectural features were not intact. For example, the upper coursings of C65's outer masonry were only uncovered in a small area towards the eastern extent of Operation 2 (visible to the far left of Figure 5.22). In addition,

the surfaces of the interior platforms constructed in phases PC-A3 and PC-A4 were not intact, and the upper stone coursings of their retaining walls (C1172 and C1178/C1190) were uneven, with some stones missing—including in areas not affected by looting. While these incomplete wall sections could be due a period of abandonment before fill event PC-C, much of PC-C's lowest fill—C1174, placed within the interior sunken space—contained large cut stones that were likely dismantled from a nearby structure, perhaps PC-A itself (Figure 5.28 and Figure 5.44).



Figure 5.44 Photo shows stony fill placed inside PC-A3, which included several large, shaped stones that were likely taken from architecture on the mound.

Moreover, the removal of several top stones of ledge C80 in distinct areas of PC-A may further indicate an intentional effort to decommission the structure via the destruction of its most important features before filling it in. In particular, C80 stones were displaced in both the middle section of the structure's north wall, presumably opposite the structure's entrance (Figure 5.45), and in the structure's corner, precisely where the wall had a decorative protrusion that may have formed part of a niche (Figure 5.25). Expanding the excavation to reveal whether other corners of the structure were similarly and thus

systematically destroyed would further support the claim that the partial destruction of PC-A was intentional.



Figure 5.45 Image of the interior of PC-A, facing north, showing evidence that the top stones of ledge C80 were displaced or removed before the structure was covered with fill. Looters did not disturb this area.

Despite its large volume, the PC-C fill contained few artifacts, indicating that the structure was not filled with soil from a large deposit of refuse, but instead used mostly clean soils. Moreover, several of the few ceramics recovered are from two distinct decorated vessels whose fragments were distributed, perhaps intentionally, throughout the different soil and stone layers of the PC-C fill—evidence suggesting that the entire 2.2 m of the PC-C fill was placed during one construction "event". One of these vessels was a burnished blackware bottle with an undulating body featuring a repeated "X" motif incised across the vessel. The other vessel was also a bottle, and had a highly burnished black exterior decorated with rows of stamped punctations and prominent raised nubbins in a form that is highly similar to a known complete vessel curated at the Minneapolis Institute of Art (Figure 5.46), and other Cupisnique and Chavín vessels and fragments, including from Chavín de Huántar (e.g., Burger 1998:425, figure 343). Additional fragments are of

styles common to the late Middle Formative Period were also found in the fill, which featured punctated and incised designs, zoned rocker stamping, and zoned punctation (see Figure 5.47). These styles suggest that the fill was laid close to 1200 BC, when these kinds of ceramics begin appearing with greater frequency.



Figure 5.46 Ceramic bottle fragments from fill PC-C. **Top:** Local design of "X" incisions. **Middle and Bottom:** Dentate stamped patterns with nubbin appliques. This design technique resembles Cupisnique bottles with nubbins, such as the complete bottle (of unknown provenience) shown at right from the Minneapolis Institute of Art (http://collections.artsmia.org/art/2511/vessel-chavin).



Figure 5.47 Additional Perolcoto Phase 2 decorated ceramic fragments from late Early Formative or early Middle Formative fill PC-C in Operation 2.

Several beads were also recovered from throughout the PC-C fill. These beads were made of a variety of local and non-local materials, including bone, shell, a blue colored stone that resembles sodalite, and a white stone with blue-green streaking that may be chrysocolla or malachite¹⁹ (Figure 5.48). These types of bodily adornments are often associated with elites or individuals with special roles in the society, such as ritual specialists (Burger 2012; Onuki 1997). Nonetheless, comparatively the examples from Hualcayán were less elaborate than contemporary examples, such as from Chavín de Huántar and Kuntur Wasi (Onuki and Inokuchi 2011; Fux 2013).

¹⁹ The raw materials of these stones have yet to be identified, but they resemble the stones used for bodily adornments recovered at Formative Period sites, such as the elite graves at Kuntur Wasi (cataloged in Fux 2013, page 272-313).



Figure 5.48 Perolcoto Phase 2 beads from PC-C fill in Operation 2. **Top:** Bone beads. **Bottom:** (From left) blue stone (perhaps sodalite), white stone with blue-green streaks (perhaps chrysocolla or malachite), and shell.

A large (30 cm diameter) grinding stone (AE16) was found just below the concentration of ceramic vessels from C68—the context from which the PC-C carbon was dated, just below the top of the PC-C fill (Figure 5.49). Together these remains are likely evidence that a consumption event took place after the fill was nearly complete, just below the platform's new surface. Phytolith and starch analysis from the AE16 grinding stone revealed maize starches. Seven undecorated ceramic cooking vessels from C68, many of which had exterior soot, were also tested for microbotanical remains. This analysis revealed that both maize and potato were prepared or stored in these vessels. It also suggests that these ingredients were prepared in separate dishes: two sherds had potato remains and four sherds had maize, but none had both. Two of the four sherds with maize remains, however, were mixed with an unidentified grass species (*Pooideae*). All seven sherds are believed to be unique vessels based on paste analysis, color, and surface treatment. While four of the sampled fragments were body sherds, three were rim fragments. These rims were from a short-necked jar (maize), a neckless jar with a slight fold-over rim (potato; Figure 5.50, left), and a cruder neckless jar with a more pronounced

fold-over rim (maize; Figure 5.50, right). One animal bone was recovered from C68, but it was of an unidentified mammal.



Figure 5.49 Photographs of the top (left) and bottom (right) of context C68 (Suboperation AB17), taken from above and facing north. The image at the left is at a level approximately 10 centimeters above the image on the right. The image on the left shows the C68 smashed ceramics partially covered by an elongated stone. The image on the right shows an over-turned grinding stone found immediately below the concentration of ceramics.



Figure 5.50 Two neckless olla ceramic fragments from a food consumption event at the top of the PC-C fill in context C68 (exteriors shown at top, interiors at bottom). These two ceramics were tested for microbotanical remains and one had maize residues (left) and the other had potato residues (right). Note that both have unsmoothed folded rims on their interiors, common to Early Formative Period pottery.

In sum, the PC-C fill event dramatically altered the form and function of the Perolcoto mound, ending more than a millennium of Mito-Kotosh related practices and creating a flat-topped platform in the Southwest area of the mound. This transformation would have required collective labor and likely involved the filling in of other areas of the mound as well (see discussion of the Central Terrace Area below), and appears to have occurred as part of a single building event rather than incrementally. The end of this fill event was associated with consumption activities, as evidenced by collections of cooking ollas with maize and potato remains. The construction itself changed the top of the mound from mostly semi-private events in Mito-Kotosh temples to ones visible by onlookers standing on other parts of the mound or surrounding the mound itself. This moment of transformation predates Chavín by several centuries, and occurred between approximately 1400 and 1300 BC.

Early Perolcoto: The Central Terrace Area

The Central Terrace Area is located between the Southwest and Northeast Platform Areas (Figure 5.1). The Central Terrace's surface is lower than each of the more prominent platforms that flank it, making it possible that it served as a sort of atrium on the mound. However, the visible surface architecture does not suggest that the Central Terrace had a stairway or another direct access leading to it from the terraces below it. Instead, the terrace seems to have been constructed in order to connect the two platform areas and to provide a space for gatherings or performances on top of the mound. In its final form, the Central Terrace Area covered an area of 436 m², but later platforms cover what may have been an original surface area of around 680m². One 2x2 m test excavation unit, U.E. 2, was placed in the southwestern extent of the Central Terrace Area, along the outermost retaining wall of the Southwest Platform Area (Figure 5.51–Figure 5.53; see also Figure 5.2). U.E. 2's limited area revealed one Early Perolcoto construction area, PC-D, which was later covered during Perolcoto Phase 3 by construction PC-F.

PC-D: Retention wall and floor

The PC-D construction area includes the outermost platform retaining wall of the Southwest Platform Area as well as the floors and fills of the Central Terrace Area.

Construction phase PC-D1 is assigned to the outer Southwest Platform retaining wall.

Although not technically part of the Central Terrace Area, the Central Terrace's floors and fills were placed against this wall, which therefore forms the southwestern limit of the Central Terrace. The wall's masonry is not uniform, nor does it reflect a particular style of construction. Nonetheless, given its altitude and position relative to enclosure PC-A, the

wall likely forms the platform base upon which PC-A was built (Figure 5.51 and Figure 5.52). Alternatively, PC-D1 could have been a refurbishment of the original platform that supported PC-A. Excavations did not reach the wall's foundation, but its exposed height was 3.5 m.



Figure 5.51 Left: Photograph, facing southwest, showing the location of the U.E. 2 test unit and the PC-D1 retaining wall. The PC-D1 wall forms the northeastern extent of the Southwest Platform Area. The final surface (PC-F2) of the Central Terrace Area is visible in the foreground, and the Southwest Platform Area is visible behind it. **Right:** Detail of the PC-D1 retaining wall's masonry, shown during excavations.

PC-D2 is the earliest documented floor that was built against the PC-D1 retaining wall (Figure 5.52 and Figure 5.53). Excavations didn't continue below this floor during the 2009 preliminary season of test units due to a lack of time, and the test unit was never reopened in later field seasons. Therefore, it isn't known whether the retaining wall continues below this floor, or whether the floor is associated with the initial construction of the wall. The PC-D2 floor was uncovered below a large fill event, PC-F1, which is discussed in a later section of this chapter.

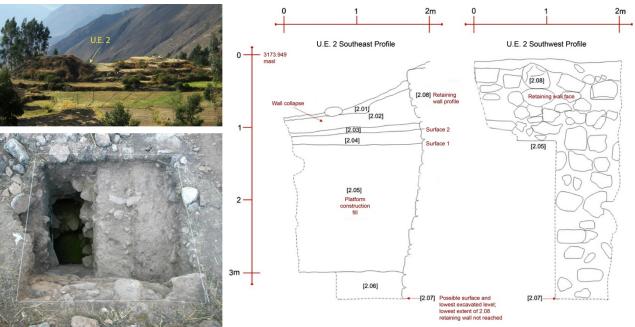


Figure 5.52 Test unit U.E. 2 in the Central Terrace Area, located along the northeast face of the Southwest Platform Area's outermost retaining wall. **Left Top:** Location of the U.E. 2 test pit. **Left Bottom:** Photograph of U.E. 2, from above and facing northeast, showing the retaining wall face PC-D1 (visible at bottom of photo) as well as witnesses of two surfaces from a later construction event, PC-F1 and PC-F2. The PC-D2 floor is slightly visible in the deepest excavated area, which is cast in shadow. **Right:** U.E. 2 southeast and southwest profiles. These profiles show the various fill and surface layers associated with retaining wall PC-D1. Note that

These profiles show the various fill and surface layers associated with retaining wall PC-D1. Note that excavations did not reach the retaining wall's base, but its base may be associated with floor PC-D2, which is the lowest level excavated (U.E. 2.07).



Figure 5.53 Left: Photograph facing southwest of the smooth PC-D2 floor. The floor may be near the foundation of the PC-D1 retaining wall (visible above the floor at upper center of photograph), or the wall may continue lower beneath it. **Right:** Photograph of person standing on PC-D2 floor, which provides a scale for its depth.

In sum, excavations in the Central Platform Area suggest that the PC-A enclosure was built upon a platform whose northeastern retaining wall was exposed in test unit U.E.

2. This construction area, PC-D, includes this wall and its associated floor, which was found below a later period of fill (see below). No date exists for the construction of PC-D because only the face and surface, respectively, were exposed of the wall and floor.

Late Perolcoto (Phases 2 and 3): The Middle Formative Period (1200-900 BC) and Late Formative Period (900-500 BC) at Hualcayán

This second data section of the chapter presents the construction and ritual activities uncovered in the Perolcoto mound and plaza complex during Perolcoto Phases 3 and 4. Evidence for these periods come from all excavated areas on and around the mound, in particular the Southwest Platform Area, the Central Terrace Area, the Northeast Platform Area, the Eastern Terrace Area, and the Sunken Plaza Area. This evidence is briefly summarized below, and then detailed in a section for each of these five architectural areas.

Perolcoto Phase 3 coincides with the Middle Formative Period (1200–900 BC).

Perolcoto Phase 3 is characterized by a new tradition of platform building on the Perolcoto mound following the filling in of the PC-A Mito-Kotosh enclosure, which occurred slightly earlier in the late Early Formative (Perolcoto Phase 2). A prominent platform was constructed in each of the Southwest and Northeast Platform Areas, which were abutted by flanking structures or platforms (see Figure 5.1 and Figure 5.2). These pronounced architectural shifts reflect the emergence of a new building tradition that emphasized raised spaces on the mound, which would have made them highly visible to individuals gathered around the mound. Accordingly, these platforms would have better facilitated

public performances, which contrasts the more private Mito rituals in enclosures where smaller groups would have gathered hidden from public view. These shifts begin during the early Middle Formative Period, and thus predate the appearance of Janabarriu-style ceramics and the regional spread of the Chavín religion, which did not occur until the Final Formative, or Perolcoto Phase 4. Nonetheless, the platforms that were constructed during Perolcoto Phase 3 were reused and remodeled throughout Perolcoto Phase 4. The end of Perolcoto Phase 4 is marked by the end of platform building on the Perolcoto Mound, the filling in or destruction of Perolcoto Phase 4 architecture, and the eventual appearance of "Huarás" White on Red ceramics during the Final Formative Period. These Cayán Phase 1 transformations to the mound are discussed in the following chapter (Chapter 6).

Late Perolcoto: The Southwest Platform Area

Due to looting and natural erosion at the summit of the Southwest Platform Area, Perolcoto Phase 3 and Phase 4 architecture was only recovered in approximately half of the 48 m² area excavated in Operation 2 (see Figure 5.13). Originally, however, architecture from this phase likely covered the entire platform summit. Excavations revealed a platform and room complex, PC-E, which was first built during Perolcoto Phase 3 and was then heavily remodeled during Perolcoto Phase 4 (Figure 5.54). PC-E was modified at least six times, and these modifications are labeled PC-E1 through PC-E6. PC-E's construction history is detailed below.

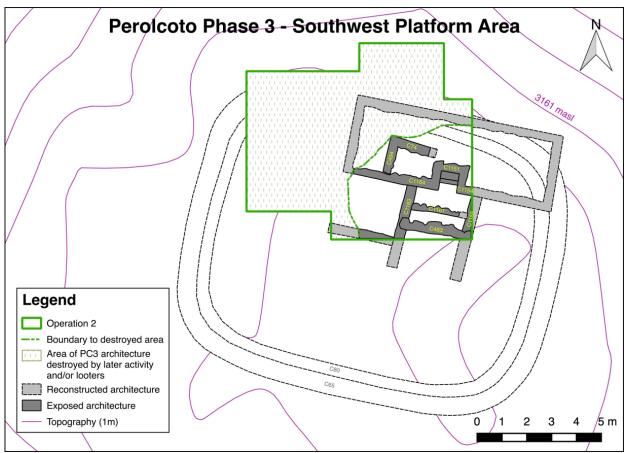


Figure 5.54 Map of excavated of PC-E architectural features uncovered in Operation 2, including the proposed extent of these features in light gray. A dotted outline of the PC-A enclosure illustrates the spatial relationship between PC-A and PC-E (Note: PC-A was buried before PC-E was built over it).

PC-E: Platform complex

PC-E was a complex of rooms abutting a rectilinear platform that was built on top of the PC-C fill (Figure 5.54; see also the upper features shown in Figure 5.40). PC-E1 was the complex's first construction phase, and consisted of a small rectangular platform built during Perolcoto Phase 3. Its original shape and size isn't known because the platform's southern and eastern walls were never recovered and only incomplete sections of its northern retaining wall, C74, and western retaining wall, C494, were uncovered. These retaining walls were partially destroyed and/or buried when the platform was rebuilt during construction phase PC-E2 (Figure 5.55). Because of these activities of destruction

and reconstruction during PC-E2, not much is known about the PC-E1 platform aside from its orientation, which maintained a similar alignment to the now buried PC-A enclosure below. Because the platform was found incomplete and its walls, particularly C494, were built haphazardly, it is possible that the PC-E1 platform was never completed or that it was partially destroyed during the construction of a larger platform, PC-E2, that was built over it. If it was a completed platform, however, it may have been quite small—if the platform's southern wall was at or near that of the PC-E2 platform's southern wall (C1164), it would have been only 1.6 m on its north-south axis.

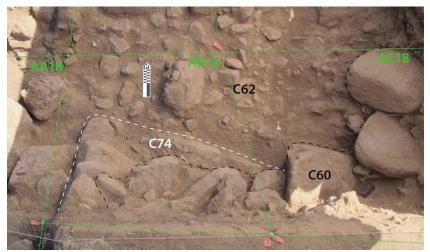


Figure 5.55 Photograph, facing north, of the C74 platform. It also shows the large stones of fill C60, which extended over the C74 platform, but were removed to expose the architecture below.

During construction phase PC-E2, which also occurred during Perolcoto Phase 3, the platform was refashioned to be larger and more elaborate (Figure 5.56). The platform's full extent was not recovered—none of its exterior corners were intact—but excavations revealed several features including a short staircase that was inset into the southern side of platform. The platform's southern retaining walls on either side of the staircase, C1164 (west) and C1154 (east) were found intact. The western wall of the earlier platform, C494,

was slightly truncated in order to build wall C1164, which also destroyed the southwest corner of the earlier platform. The northern retaining wall of the PC-E2 platform was not preserved, however, due to either natural erosion or looting activities. Nonetheless, the extent of the fill C60 suggests that the platform's north-south axis was approximately 2.6 m in diameter. Doubling the platform's length from the middle of the stairway to the preserved western extent of wall C1164, it can be estimated that the platform's east-west axis was over 7 m in diameter. The platform was 1 m high. Also, the PC-E2 platform established a new, slightly different orientation for architecture at the summit—changed to 10° from the 15° that had dominated during the early PC-A constructions. This new orientation was maintained throughout the subsequent modifications to the PC-E platform complex. Carbon taken from the rocky fill of the PC-E2 platform was radiocarbon dated to between 1385 and 1093 cal. BC (HU01-SWPA-4; Appendix A). PC-E2's fill was dated instead of its surface because the ongoing reuse of this structure made it difficult to find an area that was reliably associated with its construction. Moreover, datable materials were rare in the fill, which was composed of fairly clean soils and stone.

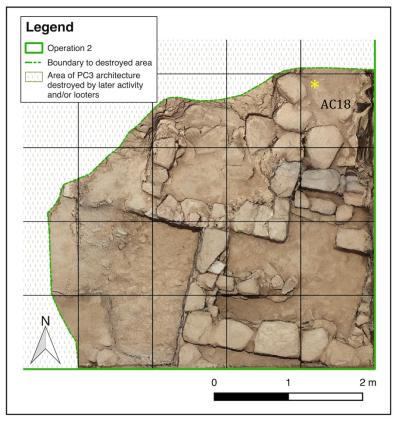


Figure 5.56 Orthophoto map of the PC-E architecture uncovered in Operation 2. The PC-E2 radiocarbon date HU01-SWPA-4 was recovered within the central platform's rocky fill, which is indicated by the yellow asterisk in the Suboperation AC18.

The staircase was framed by a stone ledge, C1151 (see map in Figure 5.54), that was slightly raised above the level of the platform so that a person accessing the platform would have to step over it as they entered. However, the function of the stairway seems to have not been simply an access to the platform, for a small hearth was located directly behind the stone ledge at the top of the stairway. Radiocarbon analysis from this hearth was dated to 896–596 cal. BC (HU01-SWPA-5; see Appendix A). Additional radiocarbon and other evidence suggest, rather surprisingly, that a later series of hearths continued to in this location centuries later during Cayán Phase 2, which will be discussed in the following

chapter. The hearths, perhaps collectively, charred the top of the stairway ledge's stones, coloring them ashy gray (Figure 5.57).



Figure 5.57 Photograph, facing southwest, showing the small hearth directly behind (north of) the stairway ledge on top of the PC-E2 platform. Notice the discoloration of the stone ledge.

PC-E3 is likely the first construction phase built during Perolcoto Phase 4, which changed PC-E from a platform to a platform complex. During PC-E3, a corridor leading to the stairway was added to the platform's south side (Figure 5.58). The corridor would have partially concealed individuals as they approached the platform, perhaps to give the effect to onlookers that the individuals were emerging from the mound itself. It is possible, however, that the corridor was constructed at the same time as the platform during PC-E2, but it was assigned its own construction phase because it may have been added years after the platform was first built. The 1.9 m wide passageway is formed by two parallel double-faced walls, C1163 (west) and C1155 (east), placed on either side of the stairway. Because the passageway extends into the southern profile of Operation 2, its length is unknown.

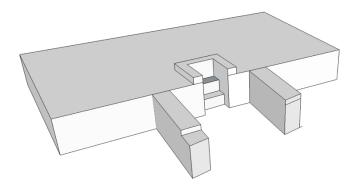


Figure 5.58 3D reconstruction of the PC-E3 platform and adjacent corridor. The full extent of the corridor's walls are unknown and are shown only to where they run into the southern profile of Operation 2. Likewise, the full extent of the platform is estimated, with each western (left) and eastern (right) extents being either destroyed from looting or unexcavated.

During construction phase PC-E4 the corridor between walls C1163 and C1155 was filled with rocks and soil (C1168) to create a raised pathway with at least one broad, terrace-like step leading to the main platform (Figure 5.59; Figure 5.60a). The surface and face of this step was found partially destroyed due to the mound's reuse during later periods (see the discussion of Cayán Phases 1 and 2 in the next chapter). Nonetheless, the step's form is indicated by the alignment of stones, C1161, which formed the lower coursing of the step's southern face .85 m from the main platform's southern edge. It is also indicated by the flat cut stones, C1163b, which were placed in a stepped fashion on top of the preexisting corridor wall C1163 and which became the top of the raised pathway's western boundary. Moreover, although the raised platform's surface was not intact in most areas, the level of its surface was clearly visible in the eastern profile of Operation 2 where the light brownish gray fill of the terrace-like step terminated. Dating the filling of the corridor was difficult because few materials were associated with it and because its surface was reused and remodeled later in the PC-E sequence. It therefore seemed beneficial to

date carbon from within the PC-E4 corridor fill. This analysis resulted in a date of 815–546 cal. BC (HU01-SWPA-6; Appendix A).

If the construction sequence of PC-E3 and E4 is correct as outlined above, to build the stepped pathway the builders would have also modified the upper coursings of the preexisting corridor walls C1163 and C1155 to truncate/lower them for each step. This conversion of the corridor into a raised pathway likely made an individual more visible to onlookers as they approached the main platform, and it also made it possible for more than one person at a time to access to the main platform for they would no longer be restricted by the narrow stairway. However, the stone frame around the stairway was left protruding above the surface of the platform.

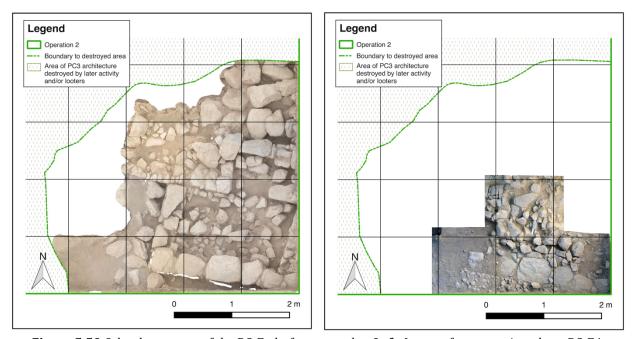


Figure 5.59 Othophoto maps of the PC-E platform complex. **Left:** Image of construction phase PC-E4, showing the rocky fill (C1168) placed inside of the corridor (lower right corner, south of the stairway) in order to convert the corridor into a raised platform. The image also shows the exposed stony fill inside the main platform, PC-E2, which is visible north of the stairway. **Right:** Partially destroyed step feature PC-E5. Image also shows the small stones used to level the area in front of the original step, which are seen along the southern extent of Operation 2.

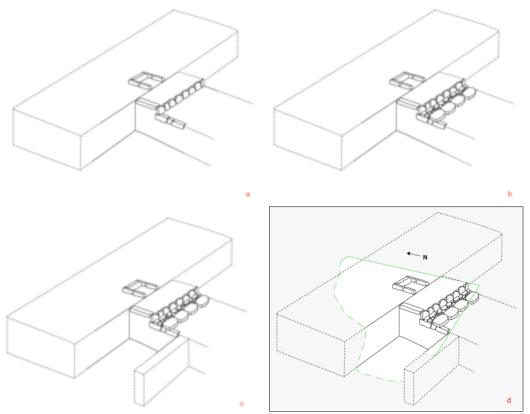


Figure 5.60 Idealized reconstruction of structure PC-E during construction phases E4 (a), E5 (b), and E6 (c). The area exposed through excavation is estimated in image d. Solid green line represents the eastern and southern extents of Operation 2, and the dotted green lines indicate the looters' cut.

During PC-E5, builders modified the C1161 step by adding a line of large (40-70 cm) and flat stones, C483, 1.55 m in front (south) of the preexisting stone face and also by placing small semi-shaped stones, C483b, in the space between the two stone alignments (C1161 and C483; Figure 5.59; Figure 5.60b). Although many of these features were disturbed by later activity on top of the platform, the raised pathway's surface was well preserved south of the C483 stone alignment (refer to map in Figure 3.46 for feature context names). The addition of C483 created a second step towards the main platform. Yet because the step was fairly low, the C483 modification made the overall terraced step more ornate. It is possible that C483 was part of the original step construction; however, because the boundary of the raised pathway (C1163b) aligns with the earliest proposed step

C1161—rather than C483—it seems more likely that the C483 step face was a later addition to the structure during PC-E5. During this phase, the area south of step C483 was also leveled by filling in the space with small pebbles (C1156). A carbon sample recovered from between the original stairway surface and these stones was analyzed with a date of 801–539 cal. BC (HU01-SWPA-7; Appendix A).

Finally, during construction phase PC-E6, builders added at least one wall, C1180, that divided the space west of the corridor/raised pathway (Figure 5.60c; see also Figure 5.54 and Figure 5.61). Wall C1180 abuts perpendicularly to the western face of wall C1163 and extends parallel to the main platform. The wall was truncated by looters, so its extent is unknown, but its length likely mirrors the extent of the main platform's southern wall, to which it is parallel. Moreover, like earlier modifications, it is unclear whether wall C1180 was added as part of an earlier construction phase or whether this wall was added late in the sequence. It is possible that similar walls abutted the east side of the raised pathway as well, but this area was not excavated.



Figure 5.61 Photograph of excavated features in Operation 2, with a birds-eye view facing north of structure PC-A (left and top), as well as the later and higher PC-E platform complex uncovered in the southwestern extent of the operation (lower right).

In sum, the PC-E platform constructions and modifications suggest a shift in ritual performance atop the Perolcoto mound during Perolcoto Phases 3 and 4. The new platform complex was relatively restricted; only a few people could have stood on it at a time, and the movement of individuals across this highly visible space would have added to the pageantry, which was enhanced by stairways and corridors. Finally, though some aspects of platform were modified through time, such as the addition of a raised corridor, the platform was used for a remarkably long time, beginning between 1400 and 1000 BC and continuing through the end of the Chavín-era.

Late Perolcoto: The Central Terrace Area

PC-F: Re-flooring and reuse of the Central Terrace Area

After an unknown period of time, the PC-D2 floor and a large portion of the PC-D1 retaining wall were covered by a thick layer of fill and capped by a floor, which together make up construction phase PC-F1 (see Figure 5.52, previous section). These features were exposed in the U.E.2 test unit, and excavated as contexts 2.05 (fill) and 2.04 (floor). The PC-F1 fill raised the Central Terrace by 1.75 m. This fill event also covered much of the PC-D1 platform wall face, leaving only the top 1 m of the wall visible. No carbon was dated from this context, but the lack of Janabarriu-style ceramics, the low frequency of ceramics in this fill overall, and the fill's position against the Southwest Platform Area, suggest that it was laid either during Perolcoto Phase 3 or earlier. Its proximity to the modern surface lends more support for a Perolcoto Phase 3 date. Nonetheless, the PC-D3 fill may be contemporaneous with the large PC-C fill event in the Southwest Platform Area which dates to late Perolcoto Phase 2.



Figure 5.62 Filling and re-flooring of the Central Terrace Area during PC-F1 and PC-F2. **Left:** Photograph of test unit U.E. 2, facing northeast, showing how the PC-F1 fill (left side; context 2.05) was covered with a less rocky floor (right side witness; context 2.04). **Right:** the PC-F2 floor (context 2.03), which covered the PC-F1 floor and was the last surface laid in the Central Terrace Area.

The Central Terrace Area was later resurfaced with a new floor during phase PC-F2 (context U.E. 2.03; Figure 5.62; see also Figure 3.44), covering PC-F1. While it isn't precisely known when the PC-F2 floor was laid, it likely occurred during Perolcoto Phase 4 because it was the final floor laid in the Central Terrace, and many Janabarriu style ceramic fragments were recovered from the terrace, and excavations in U.E. 2 did not recover these styles in any lower fills. The floor was found preserved beneath collapse from retaining wall PC-D1. The only decorated ceramic in PC-F2 was a Recuay-style sherd, though this sherd likely reflects reuse of the floor during Cayán Phase 2 rather than its construction during this period.

Late Perolcoto: The Northeast Platform Area

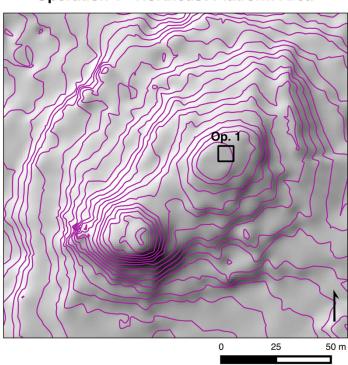
The earliest spaces uncovered in the Northeast Platform Area date to Perolcoto
Phase 4²⁰, although earlier phases are undoubtedly buried beneath these structures²¹. Five
Perolcoto Phase 4 architectural areas were uncovered in Operation 1 (Figure 5.63–Figure
5.65). Excavations in the Northeast Platform Area were carried out within excavation unit
Operation 1 which expanded the original test pit, U.E.3. Some of the Perolcoto Phase 4
constructions that were exposed in Operation 1 involved the construction and
modifications to a rectangular platform complex (PC-J and PC-K), in a form that shares
some similarities with platform complex PC-E in the Southwest Platform Area. But the
earliest architecture (PC-G through PC-I) is distinct from all other spaces identified at

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²⁰ There are still questions remaining about room complex PC-I, however, which will be discussed in the section on PC-I below.

²¹ The earliest layers exposed in the Northeast Platform Area are still approximately 9-10 meters above sterile, based on the height of the mound.

Hualcayán. The most notable distinction is a tradition of rebuilding—and keeping meticulously clean—a series of rustic rectangular enclosures (PC-I). Shallow pits filled with reddish-brown earth were often dug into the floors of these enclosures and a hearth abutted the exterior of the final enclosure. Outside this area of rustic structures were layers of compact ash alternating with fills, which suggests ritualized re-flooring episodes, each prepared using a strict building protocol (PC-H). A test pit inside Operation 1 (U.E.3) that extended below the lowest excavated PC-H ash floor revealed the burial of a child who was interred with paraphernalia likely used to ingest hallucinogens (PC-G). This section details these Perolcoto Phase 4 construction events in the Northeast Platform Area, grouped into structural complexes PC-I through PC-K.



Operation 1 - Northeast Platform Area

Figure 5.63 The location of Operation 1 in relation to the topography of mound M1.

Operation 1 - Northeast Platform Area

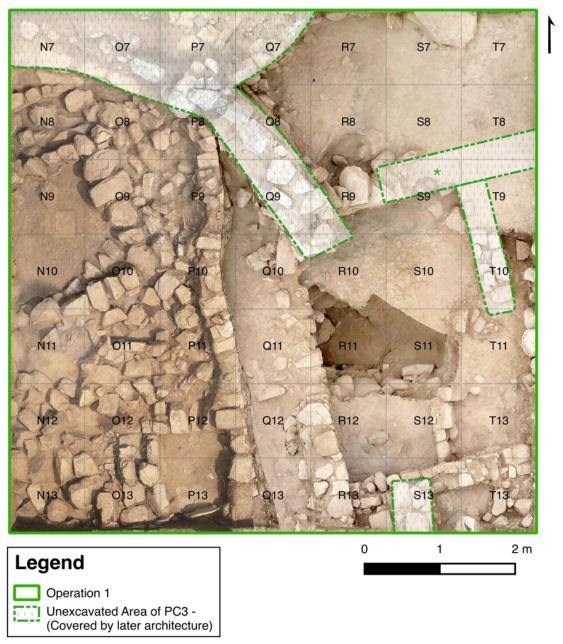


Figure 5.64 Orthophoto of Operation 1 showing some of the major architectural features of Perolcoto Phase 3. The unexcavated areas indicated are where later architecture, built during Cayán Phase 1 and Phase 2, was left exposed and covered earlier architecture. The green asterisk indicates the portion of a PC3 wall that was dismantled and rebuilt during Cayán Phase 1.

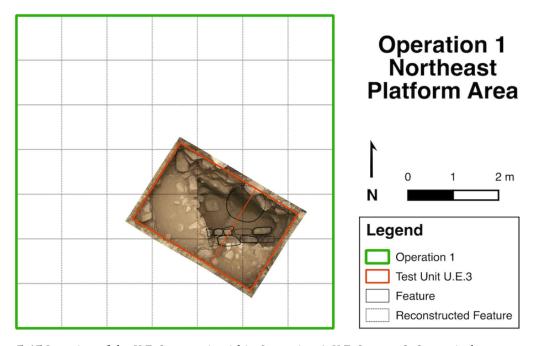


Figure 5.65 Location of the U.E. 3 test unit within Operation 1. U.E. 3 was a 2x2 m unit that was expanded southeast to 2x3 m. Orthophoto of U.E. 3 includes outlines of features discussed in section PC-I. Child burial PC-G was found in the lowest area of the test pit, near its center.

PC-G: Child burial

Architectural area PC-G includes the burial of a small child (U.E. 3.13) and a layer of stone (U.E. 3.12) that covered it (U.E. 3.10; Figure 5.66 and Figure 5.67). This burial was exposed in the lowest level excavated in test unit U.E. 3, in the area that later became Operation 1. Burial PC-G likely forms part of one of the many fill and floor events that constitute the subsequent PC-H construction phase above the burial: after the stones were placed over the burial, a layer of soil fill (U.E. 3.11; C952) was laid down, which was then capped by an ash-colored floor (C951; see PC-H1, below). The burial and the layer of stone and soil fill that covered it was distinct enough from the rest of the higher fill events to discuss it separately from PC-H, particularly because the burial may be associated with many other unique features or other burials that were not uncovered in the small area

exposed within the U.E. 3 test unit. The burial is labeled event PC-G1 and the stone layer above it is labeled PC-G2.



Figure 5.66 Test pit U.E.3, showing the position of the child cranium within the layer of stones that covered the postcranium. Photo taken from above and facing southeast.

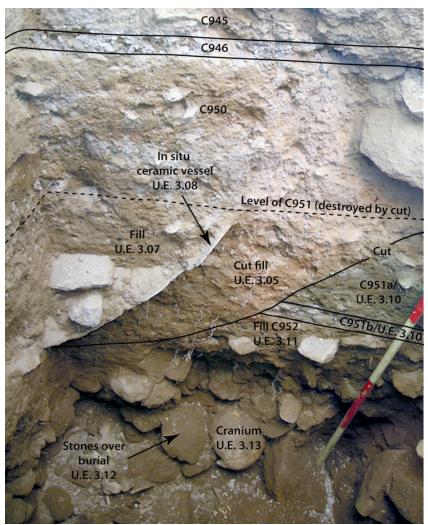


Figure 5.67 Detail of the southeast profile of test unit U.E.3 before expanding the unit to expose the entire burial PC-G. The image shows how the burial was covered with a layer of stones (U.E. 3.12), which was then covered by soil (U.E. 3.11) and a floor (U.E. 3.10). The image also shows how a later pit, cut during PC-H, penetrated the layers above the burial in order to place a large ceramic vessel (U.E. 3.07).

Based on dental eruption rates, the buried child was approximately 6 years (+/- 24 months) of age at the time of death. The child was placed in a fetal position, on roughly a north-south line, with its cranium towards the south (Figure 5.68 and Figure 5.69; Appendix H). The cranium was positioned face down and angled west. The body was laying over the left arm, which was outstretched to its right, and its right arm was bent inward with its right hand beneath the chest. Two perimortem fractures were documented: (1) a fracture on the occipital bone radiating from the foramen magnum, and (2) a Type 3

odontoid fracture on the C2 vertebra (axis), which resulted in the complete separation of the odontoid process from the rest of the C2 vertebra (Figure 5.70). These fractures may exhibit evidence of trauma due to an accidental fall causing the child's death, or due to violent (perhaps sacrificial) blunt force trauma. If from a fall, the burial would be a dedicatory offering of a child who died near the time of a construction event or prompting its construction. However, the evidence for possible perimortem trauma combined with the child's very strange position—placed on its side but face-down, which oddly contorts the spine, and laying over one outstretched arm with the other tucked beneath the body—are more suggestive of a sacrifice.

Nonetheless, Emily Sharp performed an *archaeothanatology* analysis—the study of how body elements shift due to decomposition of soft tissues—of the child's remains. Sharp concluded that the fracture was more likely post-mortem, and due the weight of the stones and soil against the crania soon after the time of death, based in part on how the crania had shifted slightly out of correct anatomical position. She also notes that "the inferior cervical vertebrae had already separated from the atlas before it disarticulated from the cranium," which suggests "that the body decomposed for some time before mourners placed rocks over the individual" (Sharp and Bria 2017). Thus, the manner of death appears to have been of natural, rather than violent causes.



Figure 5.68 The child burial PC-G1 after the removal of stone layer PC-G2 (U.E. 3.12). One of the three bone beads are visible at this stage of excavation.



Figure 5.69 Reconstructed skeleton of the PC-G1 burial. (Photograph and the layout of bone elements by Emily Sharp)



Figure 5.70 Image showing the two fractures on the child skeleton which are interpreted as evidence of postmortem, rather than peri-mortem damage. **Left:** Inferior view of the crania, with arrow showing the occipital fracture radiating from the foramen magnum. **Right:** Posterior view of the C2 vertebra (axis), with a Type 3 odontoid fracture (1 cm scale refers to the photograph of the C2 vertebra only). Though this kind of fracture is often associated with blunt-force trauma, the fractures appear to be associated with post-mortem stress on the body as stones and soil were placed around it. Photographs and interpretations courtesy of Emily Sharp. Axis fracture illustration from http://img.medscapestatic.com/pi/meds/ckb/62/7862.jpg.

Along with the fact that the body appears to have been moved to the mound after a period of partial decomposition (see above), the child's burial goods—a necklace strung with beads and perforated spoons—further suggest the special significance of this child and its burial in the mound. The objects associated with burial PC-G1 include three bone beads, two shell beads, and three bone spoons (Figure 5.71). All of these objects have a perforation suggesting that they were likely strung on one or more strings that have now decayed. The three bone beads are highly polished, and one shows linear scratches that could be due to its use as a tubular implement in addition to, or other than, its function as a bead (Figure 5.71 and Figure 5.72, A–C). The shell beads form a pair, each with a crescent shape and two perforations (Figure 5.71, D–E). The shell has a soft, flaky texture and is made of mother of pearl. Mother of pearl, or nacre—an iridescent inner layer of shell

produced on some mollusks—is associated with both saltwater and freshwater mollusks, but published examples from the ancient Andes originated from the Pacific Ocean; these specimens were thus likely traded inland from the coast (Bruhns, Burton, and Miller 1990; Jackson 2004).

The small bone spoons are the most elaborate objects in the burial—each has a unique form and decoration (Figure 5.71, F-H). The unique shape of each spoon is likely due in part to the particular shape of the bone element they were carved from, although the craftsmen of these objects surely intentionally selected particular bone elements from specific species in order to produce the resulting shape. The first spoon, spoon F, has an elongated, cylindrical form that comes to a curved point at the handle's tip. Three horizontal lines are incised around the handle, and the handle is perforated near the tip. The second spoon, spoon G, has a particularly odd shape. The spoon's "bowl"—the depression where substances are held—runs the length of the spoon rather than being hollowed out at one end. The spoon's handle was thus placed on the spoon's posterior side, and it has a curved shape. Curiously, the spoon's perforation was at the end of one side of the spoon's bowl rather than in the handle as in spoon F. This end of the spoon was also thicker than the other, and had a more squared shape. The third spoon, spoon H, has a wider bowl form than spoons F and G. Its curved handle is similar to the handle on spoon F, but the bowl widens from the base of the handle to create a spatula-like surface, which becomes extremely thin—approximately 2 mm—on the side that is broken (it was broken at the time of excavation). It also has a perforation in the bowl of the spoon, on the bowl's thicker side.

The three spoons' "bowls," or curved depressions, are very small and shallow, and cannot hold much substance. For this reason, it is very likely the spoons were ritual paraphernalia for administering special substances, perhaps snuffed hallucinogens. This function has been proposed for similar bone objects found at Chavín de Huántar, which Burger categorizes as spoon-type spatulas (Burger 1998:195). Burger also suggests these materials could be used with other powdered substances, such as pigments. The perforations in the bowl area, rather than on the handles, of spoons G and H suggest that substances would have to be carefully administered. Nonetheless, the presence of holes in the depressions suggests it was unlikely that the spoons held liquids; these spoons await detailed residue analysis²².

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²² None of the materials collected during the 2009 test season were analyzed for microresidues, for they would have required an additional permit and time and funds hindered this.

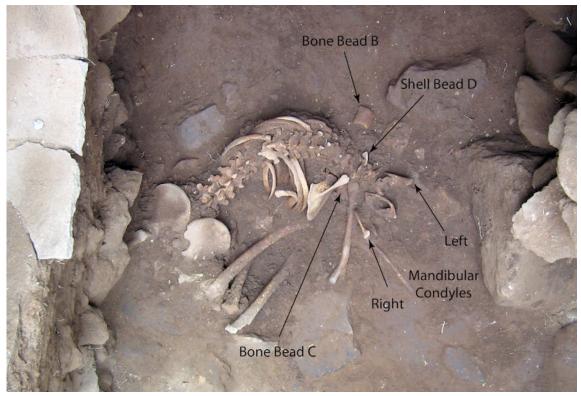


Figure 5.71 Objects found around the child's neck; Top left: three polished bone beads; Top right: two shell beads; Bottom: three bone spoons with perforations.



Figure 5.72 Left: The bone beads shown from the side. Right: Detail of bone bead C, showing its scratched and polished surface.

The position of the eight perforated objects strongly suggests the child wore these items as one or more necklaces that hung in front of the body when he or she was buried (Figure 5.73 and Figure 5.74). In particular, all of the objects, excepting one shell bead, were found on the anterior side of the body, vertically beneath or surrounding the cervical vertebra. First, spoons A and C were found beneath and anterior to the cervical vertebrae, with their perforations perfectly aligned (Figure 5.74). This is clear evidence that they were together on a string. The two shell beads were positioned extremely close to the vertebrae, and bead D is lodged between the left posterior C4 and C5 vertebrae (Figure 5.73). This may suggest that these shell beads were strung their own choker-style necklace, tied closely around the neck. Nonetheless, the position of the shell beads on either side of the cervical vertebra, and the bone spoons directly beneath or anterior to these vertebra, may indicate that the shell beads and spoons were strung together. The bone beads were slightly more dispersed. Two of these bone beads, beads A and B, were found on either side of the neck, and the third, bead C, was found below the right scapula (Figure 5.68 and Figure 5.73). These positions suggest they were on a string that was separate from the shell beads, and that the string was also longer.



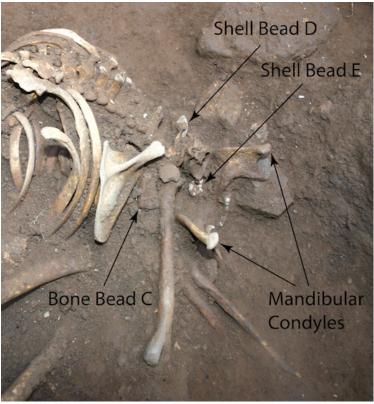


Figure 5.73 Images of the child burial after the cranium was removed, showing the position of two of the three bone beads and the two shell beads near the cervical vertebrae. Their positions suggest that these items were strung around the child's neck. (**Top**: immediately after the removal of the cranium. **Bottom:** After the removal of the upper cervical vertebrae.)



Figure 5.74 Images of the burial after removal of the cervical vertebrae, showing the location of the three perforated bone spoons. Like the bone and shell beads, their positions suggest the bone spoons were strung and hanging around the child's neck. Image at top also shows the location, beneath the right elbow joint, of one of the two teeth that were found displaced from the crania and mandible.

Finally, in addition to the objects already mentioned, the burial was accompanied by bone elements from one or more other human juveniles. In particular, there was at least one extra tibia laid with the PC-G1 child burial. In addition, a juvenile tooth not belonging to the burial was recovered from the soil surrounding the child (Figure 5.74). The partial remains (crania and vertebrae) of another child were also recovered in the layer of soft soil above the burial (C952), which included a left and right rib, additional rib fragments, unfused thoracic vertebrae, and parietal fragments from a child aged four or under (Appendix H; Figure 5.75). These additional bone elements may have been curated and brought from elsewhere at the site, or they may have been present due to the disturbance of an earlier nearby burial. The latter possibility is likely because excavations in the strata above the PC-G burial revealed that it was a common practice to excavate pits into existing floors during the subsequent PC-H constructions (see the following section).



Figure 5.75 Infant rib and cranial fragments recovered from PC-G (C952). **Left:** showing position of remains in Suboperation R10 (see next section on PC-G); remains are located southwest of the trowel. **Right:** detail of the infant remains.

At the end of PC-G burial event, the area above the body was covered with a layer of stones, followed by a brown soil fill (C952; 10YR 3/3) which was capped by an ash colored floor layer (C951; 10YR 5/2; see Figure 5.66). The fill and floor were most likely deposited immediately after the stones were laid over the burial because the stones were carefully placed around, rather than on top of the cranium, yet the cranium did not exhibit any notable signs of wear to suggest it was left exposed. This fill and floor event is included with PC-H, however, because it begins a sequence of re-flooring that continued for six phases.

In sum, the PC-G child burial and the recovery of other juvenile remains (see PC-H) in the community's principle temple points to how the death of children was likely an important event in Hualcayán community life. In particular, this child was carefully placed in the mound perhaps after being cared for elsewhere and after a period of slight decomposition (Sharp and Bria 2017). Moreover, it was buried wearing beads made from worked shells that likely originated in the Pacific Ocean: the use of such a rare resource in the burial of a child seems to suggest the child's preciousness in or importance to the community. Moreover, the bone spoons, similar to those used to ingest hallucinogenic substances, link this Hualcayán burial to the Chavín religion more broadly. Finally, the evidence that these spoons were strung onto a necklace that the child wore may also point to the participation of children in Chavín rituals—an aspect of Chavín practice not yet identified.

PC-H: Successive filling and flooring events with wall construction

Beginning with the fill and floor above the PC-G burial, the excavations in test unit U.E. 3 revealed a consistent practice of laying down orangish-brown (10YR 3/3 to 10YR 5/4) soil fill layers and covering them with light gray (usually 10YR 5/2) ashy floor layers. These successive fills and floors are grouped into construction PC-H. Six PC-H floors were exposed between the PC-G burial below and the later PC-K floor that covered them (C672/C591). Each of these six floors is assigned a construction phase in the PC-H sequence, beginning with the earliest and lowest recorded, PC-H1 (C951), and the latest and highest recorded, PC-H6 (C925). The sequence is illustrated in Figure 5.76 through Figure 5.80. Because the layering was consistent over time, excavations deeper than the PC-G burial would likely reveal earlier phases of this alternating fill and floor sequence. Rounded, concave pits were cut into several of these floors, which penetrated earlier fills and floors below. In one construction event, PC-H1, a large ceramic vessel was placed inside one of these pits, suggesting the others may have also held ceramic vessels that were later removed. Finally, walls are associated with two floors exposed in the U.E. 3 test pit (U.E. 3.09 and C935), and two vertically superimposed stone enclosures were found in the northeast extent of Operation 1 (comprised of lower wall C913 and upper walls C794, C795, and C912). Other stone features are likely buried in the unexposed areas of the Northeast Platform Area. Based on ceramic fragments and radiocarbon dates (see PC-H6), the PC-H area clearly dates to Perolcoto Phase 4.

The PC-H layers were primarily exposed in the test unit U.E. 3. Operation 1 was placed around U.E. 3 (Figure 5.65), but the more horizontal excavations in Operation 1 did not reach deep enough to expose large areas of activity during the PC-H phase. Therefore,

in order to better understand PC-H's construction history and recover associated artifacts before excavations ended, a small test unit extension was placed in Suboperation R10, extending just north of U.E. 3's northeastern profile (compare the north profile of U.E. 3 in Figure 5.76 and Figure 5.77, which show the PC-H layers before and after the test unit in R10, respectively).

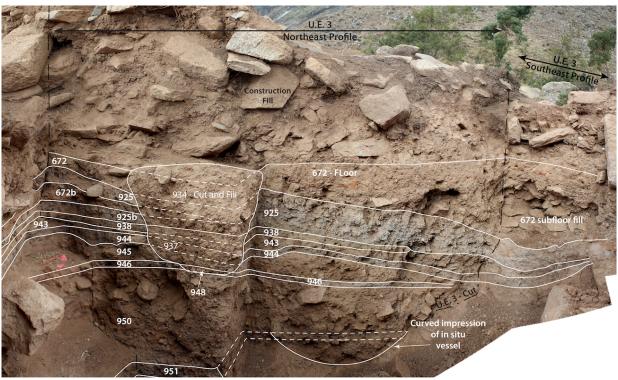


Figure 5.76 Northeast profile of the U.E. 3 test unit, showing the alternating fills and floors of PC-H (below floor C672; C672 was laid as part of PC-K). The image also shows how these layers slope downward as they extend toward the southeast profile, as well as how the slope of the higher layers are more pronounced than the lower layers. Above floor C672 is post-PC3 fill. Note that the area jutting out from the profile in the center left of image is where a witness of floor C672 was created in one corner of the test unit. Floors are indicated by C925, C938, C944, C946, and C951.

PC-H1 was the earliest fill (C952) and floor (C951) in the recorded sequence, and is associated with a wall (U.E. 3.09w) that may be part of an enclosure. As mentioned above, these layers were probably laid down soon after as the burial was covered with stones U.E. 3.12 during PC-G. The ashy floor layer was particularly thick (10 cm) in the area over the burial, and the layering of the ashy soil suggests the floor was resurfaced in this area;

farther north, there is only one layer of floor, which was just 4 cm thick. The wall built over floor C951 was 33 cm wide and made of mostly large (60x40x15 cm) upright stones, although one area was constructed of smaller (30 cm) stones (these smaller stones later collapsed during excavation; Figure 5.79 and Figure 5.80). The wall was built on an east-west alignment. One stone had slightly fallen over and another was missing at the time the wall was covered, suggesting it may have been partially dismantled.



Figure 5.77 Northern Profile of test pit in Suboperation R10 (center left), that extended north off of the original test pit U.E.3 (to the right of the R10 cut). The profile shows a sequence of alternating ash-colored floors (C925, C925b, C938, C944, C946, and C951) and brown fills (C627b, C943, C945, C950, and C952). Circular pits (C939, C939b, C947/C949, and U.E. 3.08) were cut into nearly all floors. A large vessel was left in situ in the lowest pit, which suggests the other pits may have once held ceramic vessels.



Figure 5.78 Photographic sequence of PC-H floors, part 1 (lowest and earliest to highest and latest).



Figure 5.79 Photographic sequence of PC-H floors, part 2 (lowest and earliest to highest and latest).



Figure 5.80 Left: Rectified photograph of the southeastern half of U.E. 3, showing the location of wall U.E. 3.09w on PC-H1 floor C951. The large ceramic vessel U.E. 3.08 was placed into a pit that was dug during the subsequent construction phase PC-H2. (Note: Post PC-H platforms are visible at the top and to the left. Leaving witnesses of these platforms changed U.E. 3's profiles on these sides from southwest and northwest to south and west, respectfully). **Right:** Oblique photograph of the ceramic vessel.

Construction phase PC-H2 covered PC-H1 with a new fill (C950) and floor (C946). Before these layers were placed, however, builders cut a large pit into the earlier, preexisting PC-H1 floor (C951) in order to position the base of a large ceramic vessel (U.E. 3.08). While it is possible that the placement of the vessel occurred as part of the earlier PC-H1 flooring event over the child burial, the extent of the cut, which was fairly wide around the vessel itself, does not seem concerned with preserving a newly laid floor (Figure 5.67). Instead, it seems that the vessel and the food consumption activities associated with it occurred after the initial use of PC-H1, perhaps immediately before the PC-H2 floor fill was laid. If so, this ceramic vessel may reflect a food consumption event tied to mobilizing labor for the construction of the new floor and any architecture associated with it. The vessel was quite large, 80 cm diameter, a size that is common in both storage and large-scale food serving.

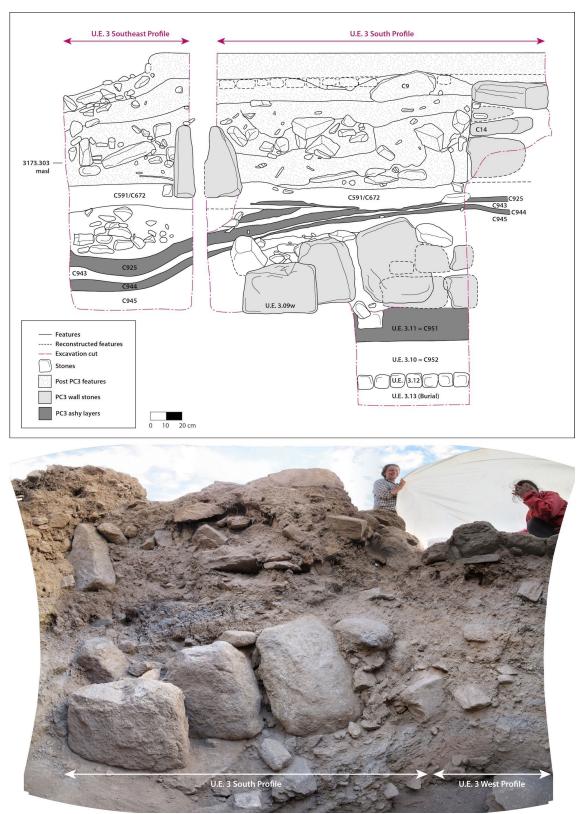


Figure 5.81 Top: Southeast and south profiles of test unit U.E. 3, showing how several ashy soil layers (C925, C944) were placed over wall U.E. 3.09w and also slope downward toward the east. **Bottom:** Photostitch of the southern and western profiles, produced by a Gigapan robotic camera mount.

The pit that was cut to place vessel U.E. 3.08 was significantly larger than the vessel itself in certain areas. Brownish-red soil (10YR 5/4) was placed inside the cut and around the vessel, and a layer of 1 cm thick reddish-orange clay lined the vessel's exterior, presumably to stabilize the base of the vessel in the ground (Figure 5.82). The rim of the vessel was broken off from the in situ base, and the rim sherds were never recovered. The top of the vessel was broken off precisely above where the clay lining for the base ended. Finally, a quartz crystal was placed inside the vessel before soil fill C950 was laid (Figure 5.83). This crystal was worked in a style that was also found in crystals from Janabarriu phase contexts at Chavín de Huántar (Burger 1998:435, Figure 433), and both Burger (1998) and Rick (1980:180) propose such types of quartz objects served ritual, rather than utilitarian needs.



Figure 5.82 Top: Detail showing how the outer surface of the PC-H2 in situ vessel (bracketed by blue lines) was lined with a layer of reddish-orange clay (bracketed by red lines). **Bottom:** Clay imprint after the vessel was removed, shown from above.



 $\textbf{Figure 5.83} \ \text{Worked quartz crystal found inside the in situ vessel U.E. 3.08}.$

Construction phases PC-H3 through PC-H6 continue the tradition of placing alternating fills and floors (Figure 5.76–Figure 5.78), with occasional pits cut into these floors. Floor C946 of construction phase PC-H3 was cut by a convex pit during PC-H4, suggesting a ceramic vessel may once have been placed here before the PC-H4 fill and floor were laid (filled with soil C947 and C949; Figure 5.76). A similar cut was made into the PC-H5 floor (C925b) during construction phase PC-H6 (filled with C939b; Figure 5.76). It is notable that the ashy floor layer C938, laid during construction phase PC-H4, was notably greenish gray (Munsell 2.5yr 4/4 "olive brown") in color. It isn't known what caused this green color, but it was not found anywhere else at the site. Finally, there was a line of stones associated with the last PC-H floor, C925. This line of stones, C936, was placed on a north-south axis, and may have been the base of a small wall that was later dismantled to its foundation (Figure 5.76 and Figure 5.78, images PC-H6).

The uppermost PC-H floors were cut by two pits made during the early stages of Cayán Phase 1. These activities will be discussed in greater detail in the next chapter, but it is worth mentioning here that the two cuts were made into the PC-K floor C672a, which was exposed and reused during Cayán Phase 1. The first of these two cuts were made along the northern profile of the R10 test unit, and is visible in the Figure 5.76 profile, marked as filled with soil C939 (see also the northern extent of images PC-H5 and PC-H6 in Figure 5.78). The second cut was along the northeastern profile of U.E. 3, visible in the Figure 5.76 profile, marked as filled with soil C934 and C937 (see also the southern extent of images PC-H3 through PC-H6 in Figure 5.77–Figure 5.78). These pits may have held ceramic vessels that were later removed based on their similarities with ceramic vessel U.E. 3.08.

The final floor, PC-H6, was radiocarbon dated to 806–540 cal. BC (HU01-NEPA-4; Appendix A).

In the northeast corner of Operation 1, two superimposed structures were uncovered, one that is associated with floor PC-H6 and a second lower structure that is likely associated with PC-H1 given its depth (Figure 5.84 and Figure 5.85). Only a small segment of the top of the lower structure, C913 (PC-H1), was uncovered. However, these two stones form a corner that matches the shape and alignment of the superimposed structure above it. The top of this lower wall is level with the top of the U.E. 3.09w wall found in test pit U.E. 3, and therefore is likely also associated with construction episode PC-H1 (Figure 5.84). Much more was uncovered of the later, upper structure. This upper structure (PC-H6) is formed by thee walls, C794, C795, and C912, that form the four sides of a rectilinear structure with a clay floor C907. The northern wall, C794, extends west beyond the enclosure, ending at a corner that turns north into the edge of the excavation unit, suggesting this enclosure is part of a larger agglutinated structure. The PC-H floors abut the enclosure on its west and south sides, forming the structure's external floor and the interior floor is 20 cm lower. Thus, these walls also serve as a retaining wall for the PC-H floors to its southwest. The small C935 wall segment that was found near the top of the R10 test unit is roughly level with the base of this structure, suggesting the enclosure was built around the time of construction phase PC-H6 or perhaps slightly earlier (Figure 5.85).

Operation 1 - Northeast Platform Area Legend Operation 1 Feature Reconstructed Feature Operation 1 Feature Reconstructed Feature

Figure 5.84 Map, with and without orthophoto background, of PC-H1 wall features, as well as the PC-H2 insitu ceramic vessel indicated by a circular outline. The green dashed line indicates the restricted area in which PC-H construction activities were uncovered in Operation 1; additional PC-H architecture is likely buried beneath later features.

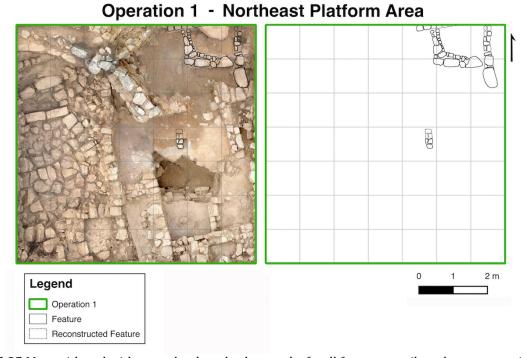


Figure 5.85 Map, with and without orthophoto background, of wall features attributed to construction phase PC-H6.

It is unknown what precise purpose these spaces served, but food consumption was likely one activity, suggested by the remains associated with its final use. A nearly complete neckless jar (*olla*) was smashed on top of the C907 clay floor inside the PC-H6 enclosure, although the vessel was likely placed just before the structure was filled during the construction of a platform during PC-K3 (see this section below). This vessel was unfortunately reconstructed before a fragment for sampling could be sent for microbotanical analysis so its contents are unknown. The olla was decorated with circle-and-dot motifs below the rim, which is a common Janabarriu (Chavín-affiliated) style (Figure 5.86).



Figure 5.86 Perolcoto Phase 3 reconstructed ceramic neckless jar (olla) AE-1836 recovered from the top of PC-H6 floor, C907 (Operation 1). This vessel has Janabarriu-style circle and dot designs below the rim. The vessel is shown from two angles.

The PC-H successive re-flooring events were likely associated with the rebuilding events of PC-I, a complex of rustic enclosures successively constructed atop an adjacent platform. In particular, the PC-H fills and floors abutted the face of the PC-I platform retaining wall, C13 (Figure 5.87). The association of activities and construction phases between PC-H and PC-I is not only indicated by the abutment of these features, but also by

the pattern in which the PC-H floors were laid. In particular, while the PC-H floors were level at their western extent in the area nearest and abutting the C13 platform, they are notably slumped downward towards their eastern extent away from the C13 platform. This pattern suggests that it was only important to properly lay down floors in the area nearest the platform. In fact, several ashy PC-H floors were somewhat haphazardly laid over the top of wall U.E. 3.09w, which is illustrated in the South profile drawing and photograph of U.E. 3 in Figure 5.69. In contrast, Figure 5.76 demonstrates how these same floors were very level in the area just outside of the C13 platform. It is possible that these ashy layers weren't floors at all, and were simply secondary deposits of ash, perhaps collected from hearths during cleaning. However, their hard and often smooth surfaces, as well as their careful preparation near the C13 platform suggest they were prepared and used as floors, but made in part through the careful production and preparation of ash.



Figure 5.87 Photograph, facing west, showing how the top and final PC-H floor, C925, abuts the PC-I platform wall, C13. The earlier PC-H floors are visible as horizontal layers in the profile below C925.

PC-I: Rustic enclosures and hearth on a platform

In the western portion of Operation 1, a series of rustic rectilinear enclosures were successively built on a rectangular platform, grouped as construction area PC-I. The PC-I enclosures were made by placing simple rows of stones only one course high. These lines of stones, which can roughly be considered walls, were often rebuilt in the same location as the previous structure, and are separated by layers of floor (e.g.,Figure 5.88). These rustic enclosures are the earliest and lowest structures that excavations uncovered in the western portion of Operation 1. It is therefore unclear whether the tradition of building these rustic structures continues deeper and earlier that those documented here.





Figure 5.88 Photograph, facing east, showing the general character of the PC-I rustic enclosures. Note that the higher stone walls (built during construction phase PC-I3) on the northern and southern sides of the enclosure shown were left as witnesses while excavations continued deeper to uncover the walls and floor of an earlier enclosure (construction phase PC-I2). These construction phases are vertically superimposed, with a 20 cm deep layer of soil separating them. **Right:** Photograph showing the floor levels and walls uncovered in construction phase PC-I3, which illustrates the general layout of the PC-I area. Before this photograph was taken, the eastern (right) extent of the floor was removed, exposing fill PC-I2 below.

The PC-I area was kept meticulously clean, and only clean soils were used to construct its fills and floors. Only 17 diagnostic ceramic fragments were recovered in the entire PC-I soil matrix, an area of approximately 11.5 m³. Three of these were decorated, of which only two can be attributed to a known style—Janabarriu. Both of the Janabarriustyle ceramics were found in the final platform fill that covered all PC-I structures during PC-J (C574 and C660). Based on the presence of the Janabarriu ceramics, only the filling in of the PC-I area—which created a level platform that was contained by retaining wall C13—can be attributed to Perolcoto Phase 4—this is reviewed in section PC-J). This filling event marks the end of the tradition of building and rebuilding the PC-I rustic enclosures on the mound, and occurred during PC-J.

A radiocarbon date from PC-I2 returned an error because it was extremely small, and unfortunately, this date had to be thrown out²³. Curiously, however, the date returned was 2205–1741 cal. BC (HU01-NEPA-1; Appendix A), which dates to the preceramic era of Perolcoto Phase 1. This date is certainly in the realm of possibilities given the low density of ceramics in PC-I, if we accept that some may have filtered down into these layers. However, the lack of evidence for Perolcoto Phase 2 and 3 activities and their close proximity to the modern surface makes this difficult to accept, given that the mound was otherwise heavily used and rebuilt during these subsequent periods.

PC-I's complex construction history indicates that PC-I's platform retaining wall, C13, was likely built up incrementally. No western face was uncovered on the C13 wall, revealing it to be a retaining wall throughout its use. Furthermore, excavations revealed

 $^{^{23}}$ Because so few organic materials were recovered from PC-I, a sample of extremely small carbon flakes was sent for analysis. The laboratory warned "proceed with caution".

that no earlier platforms were built and later buried by the construction of C13. Therefore, the most probable explanation is that with each construction phase, the existing structures were covered with fill while several coursings were added to the top of the C13 retaining wall in order to level the platform. The repeated rebuilding of floors and structures on the C13 platform would have made it necessary to build in this incremental fashion as each new floor raised the surface level. Due to this method of construction, although the PC-I structures were once built on top of the platform, they were found inside of the C13 retaining wall. Moreover, it seems probable that the C13 platform wall was also built up incrementally in order to maintain the platform's elevated position above the successively laid PC-H floors that abutted the platform on its eastern face (Figure 5.87).

All PC-I floors were either truncated or never placed at their easternmost extent, in the area directly behind the C13 wall face (Figure 5.89). Rocks and soil filled the area immediately behind the C13 wall at all levels. This fill behind C13 was distinct from the rocky fill that separated floors, in that it often contained smaller stones (approximately 10-30 cm long as opposed to 20-50 cm) and some refuse. These stones behind C13 were also placed in a more jumbled fashion, while those placed between floors were placed side by side and then covered with earth to create a new floor. Carbon from one of the later fill events was radiocarbon dated to between 754 and 408 cal. BC (HU01-NEPA-5; Appendix A), which corresponds primarily to the late Chavín-era.

The incremental construction of the C13 platform is also supported by the discoloration of the lower stones of the retaining wall's face, which is due to burning events in the PC-H floor area outside and east of the platform (Figure 5.87). Although the burning of the lower stones could indicate that they were simply closer to fire, the uneven

blackening may also be explained by the addition of new stones at some point after the burning activities took place. Alternatively, it is possible that the PC-I architecture was built upon a now destroyed platform, and was replaced with the C13 platform. This interpretation would explain why the PC-I floors were not preserved near the C13 wall; an irregular fill separated the structures and floors from the C13 retaining wall (Figure 5.89). It would also explain why several PC-I features do not align with C13. Nonetheless, at least in its latest construction, the proposal that the C13 platform was built up along with the construction of the rustic enclosures is evident by how the C13 platform was constructed directly over an existing structure in the far southeast extent of the exposed PC-I area. The eastern wall of this structure is covered by the top of the C13 wall, and its northern wall runs into and under these C13 stones (Figure 5.91). Therefore, it is probable that the C13 retaining wall is a product of both destruction and remodeling activities throughout its use. This complex construction history may also explain why the C13 wall began to buckle outward (eastward) towards the northern extent of its exposed area in Operation 1.

Operation 1 - Northeast Platform Area



Figure 5.89 Map, with and without orthophoto background, showing the exposed area of PC-I and several of its features, including retaining wall C13. The map also indicates the fill behind C13, in purple. Note that the northern area of PC-I runs beneath and is covered by later (Cayán Phase 2) architecture.



Figure 5.90 Photograph, facing west, of the C13 platform retaining wall. The white line indicates the separation of the slightly blackened (below) and not blackened (above) stones in the wall.



Figure 5.91 Photograph, facing east, of the southeast extent of the PC-I3 constructions. The image demonstrates how the C13 platform retaining wall was built directly over preexisting PC-I architecture in the area of the white asterisk.

Generally, the shape and size of these stones vary by wall segment, structure, and/or construction phase, but without an identifiable pattern through time or across space. For example, some walls were made of large, highly worked rectangular stones (40-70 cm). Other wall segments were made of highly irregular stones, mixing stones of various shapes, sizes and finish. In addition, the stones rarely formed a distinct edge or face on either side. Where the stones do form an edge, it is typically only on one side, suggesting a few walls may be retaining walls for small and low (approximately 20 to 30 cm high) platforms surrounding and abutting lower enclosure interiors. However, the floor and fill patterns do not support this clearly. Walls that have a straight face on only one side (or one in which one side is noticeable more regular even if not straight) primarily appear during construction phase PC-13, as demonstrated in Figure 5.92 (top). Some of these walls may have been part of low platforms, but not enough area was excavated to determine if many of these potential platforms had retaining walls on all sides.

It seems most likely that, the straight-sided edge of a single coursed wall points to the most important space that it defines, which is usually an interior space. For example in the upper right corner of Figure 5.92 (top), walls C567 and C570 (outlined in dark blue and green), define the space marked by surface C660. These walls have noticeably straight alignments facing inward, but not outward. Such arrangements of stone—with one straight and one irregular face—usually makes up the face of a platform retaining wall. For this reason, the area was confusing to excavate as we expected to discover platforms rather than stone alignments. For example, the rocky fill to the north (left) of wall C567b was presumed to be the interior fill of a platform faced by C567b until it became clear that it was simply an alignment of stone that was surrounded by rocky fill of a similar size and shape at the end of the structure's use. Given that these stones have a similar size and shape to the stones used in the wall alignments, it is possible that the rocky fill was taken from a dismantled superstructure of buildings, of which only the stone foundations were left in situ.

Adding to confusion during excavations was that the PC-I "wall" stones²⁴ were positioned in irregular alignments, as if placed flat on their sides rather than upright as one would expect (and as other walls at the site were constructed). This flat arrangement may suggest that the stones were moved to this position after being dismantled from an upright structure during a decommissioning/rebuilding event. One more specific possibility is that they were simply pushed over in order to lie more flat in preparation for the next building phase, requiring less fill to cover the structures than had they been left upright. A good candidate for this kind of decommissioning is wall C654 (Figure 5.92, top, outlined in

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²⁴ Though some alignments appear more wall-like than others, these "walls" are really single-course stone alignments.

yellow), whose stones clear make up an alignment, but appear to have been pushed inward, sitting at an angle. Stones in most other walls lay completely flat, however, suggesting there was a ritual protocol for dismantling these rooms before they were covered.

A related idea is that with each building phase, structures were completely dismantled, and stone were simply placed in rows, as a sort of a guide, to mark where the now-destroyed structure had stood before rebuilding a new structure above it. Yet most PC-I building events covered these alignments in their entirety with a new floor before rebuilding, though remarkably in similar positions. Even though they may not have been seen after being covered, they could have guided the building process until the moment when a new floor was placed. The overall pattern to this successive building *in place* seems to suggest both the precise positioning and the act of rebuilding these structures was ritually important in addition to maintaining these spaces nearly perfectly clean.

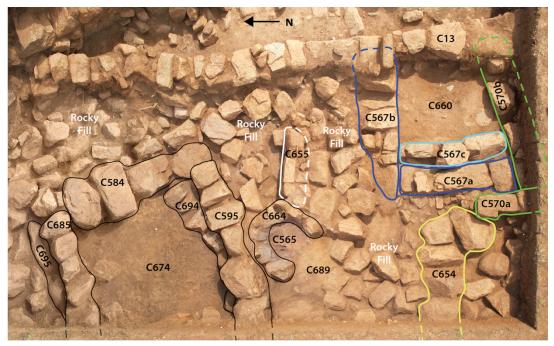




Figure 5.92 Top: Photomosaic of the PC-I3 rectilinear enclosures and hearth, shown partially covered by the PC-J1 rocky fill laid over the PC-I surfaces. The rectilinear enclosures had contained rocky fill as well, but that fill was removed before this photograph was taken. The area outlined in blue (C567) is one of several possible low platforms in the PC-I area, due to its interior face, especially since there is a second coursing of stones visible at its northern extent as it runs beneath C14. This would have created a rased platform around a sunken space in the area of floor C660. However, the evicence points more to that these were also alignments of stone on floors similar to those found elsewhere in PC-I. **Bottom:** Photograph, facing east, of the PC-I3 hearth (with ash context C565) and a small area of distinct, fine reddish-brown soil located to its east and along a small stone wall (C655). An ovoid hammer stone (AE500) is visible on the surface of the reddish-brown soil. The orthophoto at top shows the rocky fill directly beneath this fine soil; no other floor surface matching those elsewhere in PC-I was found below it.

The PC-I floors were not always uniform, and at times featured shallow pits or other irregular soil features filled with soil that was lighter or darker than the floors themselves (Figure 5.88 and Figure 5.93). In plan view, these soil features appeared similar to postholes, but they were usually too shallow, from 3 to 10 cm deep, to have served this purpose. Moreover, they had varied shapes—circular, rectangular, or irregular—and were commonly diffuse. Like the floors themselves, these features had clean, uniform soils and were void of artifacts. It is unclear what kinds of activities these features indicate, but some may be stains from the decomposition of organic remains. For example, the circular feature C685 (PC-12), which is seen near the top (eastern side) of Figure 5.88 (left image) may have been from an in situ gourd bowl. A piece of unfired clay was recovered from the interior of this feature. Soil from PC-11 (C691) and PC-12 (C684) was processed for microbotanical remains, which revealed at least two kinds of grasses (*Pooideae* and *Panicoideae*), bamboo (*Bambusoideae*), and maize (*Zea mays*).



Figure 5.93 PC-I floors and other soil features visible in the west profile of Operation 1, in the area of Suboperations N9 and N10.

In total, three construction phases were recovered in the PC-I excavations. PC-I1 was the lowest, and is difficult to discern. There are both refined dressed rectangular stones making up one wall, as well as other lines of stone made of roughly shaped stones. A grinding stone was used as one of the stones in the northeastern wall. In Figure 5.94, these stone alignments are seen surrounded by various stones that appear to be fill that was placed to cover the PC-I1 constructions. Certain stones in this fill appear to be stone alignments themselves, which makes understanding this construction phase more difficult. Although PC-I continued below these constructions, excavations did not continue below PC-I1.

PC-I2 is characterized by the placement of a new surface and at least one enclosure above PC-I1. Other structures are partially visible but buried under the north profile. More are likely below the later PC-I3 structures that were not excavated along the southern profile. Thus, only one enclosure can be identified. This new enclosure shifted its location

from the PC-I1 enclosure beneath it, whereby the rectangular cut stones of PC-I1 were buried in the center of the PC2-D2 structure, rather than beneath its new stone alignments (Figure 5.94).

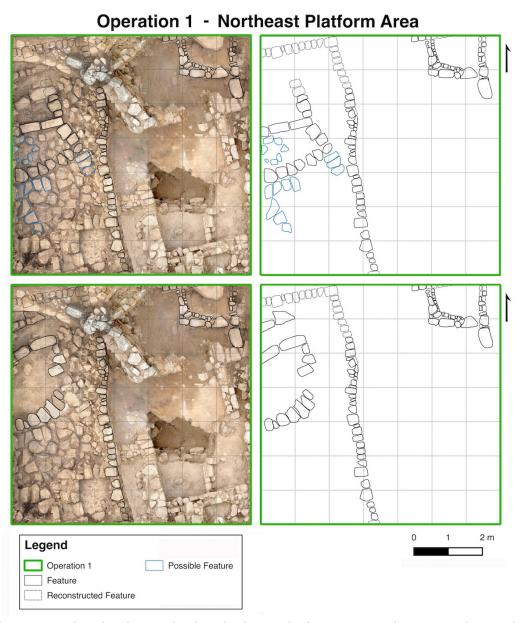


Figure 5.94 Map, with and without orthophoto background, of construction phases PC-I1 (top row) and PC-I2 (bottom row).

PC-I3 is the third and final PC-I constructions and is the best preserved. PC-I3 is characterized by placing a layer of fill to create a new floor over PC-I2 and construct a new

rectangular structure in the same location as the PC-I2 structure it covered. Other rectangular enclosures were found in the southern extent of the excavated area (Figure 5.95). In addition, a stone hearth was constructed, a feature not found elsewhere in the PC-I area. The northern side of the hearth was constructed against the stones of one enclosure, and a small wall runs east-west against the western port of the hearth. In the area between this wall and the enclosure to its north, a special area of very fine, reddish-brown soil (C657; 7.5YR 4/4) was placed, and on top of it, an in situ hammerstone (AE500). The soil itself was exceptionally clean (see Figure 5.92, bottom).

The analysis of PC-I soils and artifacts suggests that maize and potatoes were prepared in these spaces. The AE500 hammerstone was tested for residues, but the obtained starches were too deteriorated to identify. However, a lithic biface from PC-I3 floor C754 showed evidence of processing potato (*Solanum tuberosum*). A unifacial lithic fragment from PC-I2 floor C758 revealed evidence of maize (*Zea mays*) starches, and this tool may have been a scraper for shucking maize. Finally, the ash inside the hearth (C565) was floated to examine its remains. This analysis revealed only sardines (*Sardinops sagax*; n=12) and land snails (Bulimulidae; n=19) were burned here. While land snails are local, sardines are unequivocally from the Pacific Ocean. These items may have been cooked and consumed in the PC-I area. Nonetheless, the lack of these materials in the clean soils surrounding the hearth suggests they were either swept up and deposited inside the hearth's ash, or more likely, burned as offerings in the hearth.

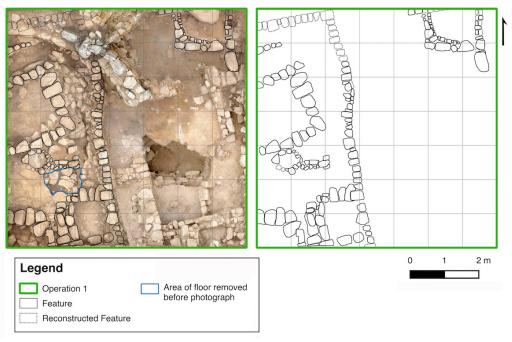


Figure 5.95 Map, with and without orthophoto background, of construction phase PC-I3.

PC-J: Platform complex covering PC-I and PC-G

During PC-J1, builders transformed the PC-I area or rustic enclosures into a flat, rectangular platform (Figure 5.92, Figure 5.96, and Figure 5.97). To build the platform, they raised the C13 retaining wall approximately 30 higher than the level of PC-I3, placed stony fill over the entire area of PC-I3 (that is, behind/west of C13), and then covered the area with soil to create a platform surface. During PC-J2, they built a double-sided wall perpendicular to the east side of C13. The preserved wall is small, however, and its complete form is unknown because it was truncated with the construction of the subsequent PC-K3 (see below). Only one coursing of this wall remained. During PC-J3 they refurbished the PC-J1 platform by covering C13 with a new retaining wall, C14. Finally, during PC-J4 and J5 they built a room complex and platform against the new C14 platform.

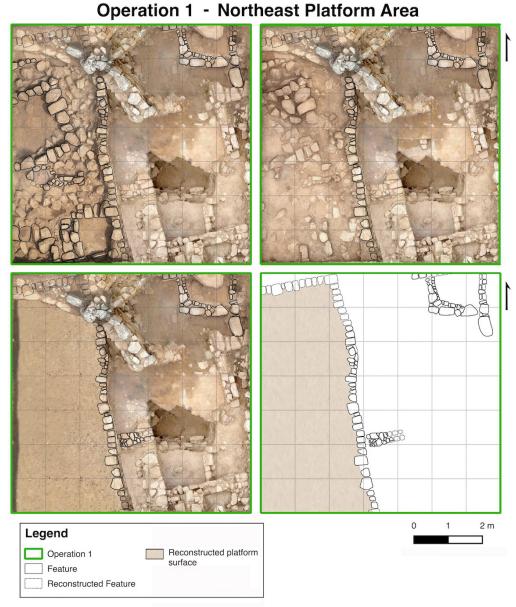


Figure 5.96 Top row: Orthophoto map of PC-J1 fill event over PC-I3, showing the two stages of filling. The left image shows how first, large stones were placed over the PC-I3 architecture. The right image shows how soil was then placed over this stony fill, and it is likely that at this stage the north-south retaining wall C13 was also raised to contain the fill. **Bottom row:** Orthophoto and map of the PC-J1 platform at its finished stage, after fill was placed over the PC-I3 architecture to create a level surface. The image also shows the PC-J2 wall segment that was constructed against the C13 platform. Note that because of the irregular manner in which the platform was excavated, a semi-artificial texture of the platform's surface was created in order to visualize the full extent of the platform in the orthomosaic.





Figure 5.97 Left: Photograph, facing south, of PC-I architectural shown partially covered with PC-J1 fill. **Right:** Photograph, facing north, showing the top of the PC-J1 platform (shown with a test excavation area begun in Suboperations P14 and Q14, seen in right foreground).

During PC-J3, the PC-J platform face was refurbished, likely due to buckling in C13. The platform was refurbished by placing a new retaining wall, C14, 1.1 m east of C13 (Figure 5.98). Although Operation 1 only uncovered evidence for this refurbishment on the eastern side of the Northeast Platform, it is likely that a new wall face was added to all of its four sides. The PC-J3 refurbishment thus expanded the size of the platform. However, it did not raise it: the top of C14 (PC-J3) was near the same height as C13 (PC-J1). Some PC-J2 structures that had abutted C13 were likely destroyed in order to expand the platform, as evidenced by the short wall segment (C927) found between the C13 and C14 retaining walls. A new floor, C672, is associated with the C14 and the walls and small side platform built against it²⁵. During PC-J4 a room complex was built against the refurbished C14

²⁵ Although it is likely that C672 was first laid down during PC-J1 in association with retaining wall C13 and was later refurbished when C14 was added, but these two layers in C672 could not be deciphered. The top of C672, however, rolls up against the PC-J3 and PC-J4 walls.

platform face, along with a smaller rectangular platform, PC-J5. PC-J3 through PC-J5 were likely built at the same time given that are associated with floor C672.

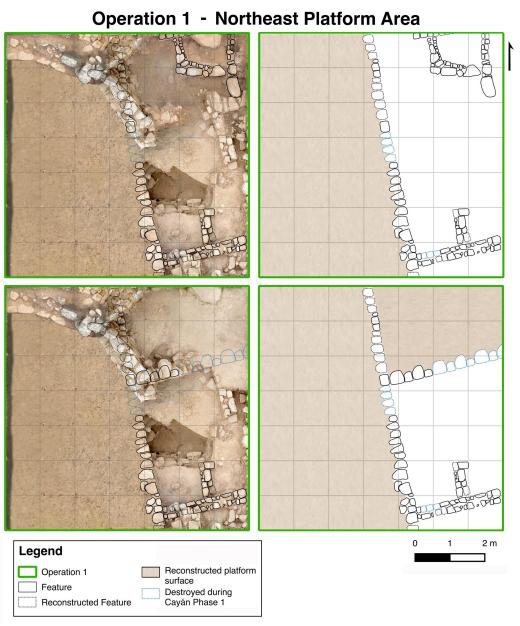


Figure 5.98 Top row: Orthophoto(left) and map (right) of the PC-J3 platform (faced with retaining wall C14) that covered and expanded the PC-J1 platform. Map also shows the addition of the PC-J4 walls (southeast corner of the operation) that abut the platform. The PC-H6 structures in the northeast corner of Operation 1 are still visible at this stage. **Bottom row:** Orthophoto and map showing the location of the smaller PC-J5 platform that flanked PC-J3 and covered the PC-H6 structures in the northwest corner. Note that in all images a semi-artificial texture was created to represent the PC-J3 platform's surface because the actual surface was excavated in an irregular manner.

Late Perolcoto: The Eastern Terrace Area

The Eastern Terrace Area is one of the many lower terraced areas that flank the Perolcoto mound (Figure 5.1). Excavation unit Operation 6 was the only excavation unit placed in these flanking terraces (Figure 5.2). Excavations revealed a Cayán Phase 2 (Recuay) tomb that was intrusive into a preexisting terrace. The terrace structure itself had a high concentration of Janabarriu-style ceramics, suggesting it was built during Perolcoto Phase 4.

PC-K: Structures on a terrace

PC-K is poorly understood, but is characterized by several walled structures that were built on a terrace in the East Terrace Area. Two parallel walls in particular were identified as dating to Perolcoto Phase 4, and are referred to collectively as PC-K1. These parallel walls are located in the northern area of Operation 6, just north of later Cayán Phase tomb chambers, which were intrusive into the mound and truncated the PC-K1 walls. In fact, the entire area of Operation 6 was modified and rebuilt during the Cayán Phase 2 for mortuary activities. These modifications make it difficult to fully reconstruct PC-K1, which was likely an extensive area of architecture on the mound that was covered during Cayán Phase 2 building activities. This is suggested in part by high amount of Janabarriustyle ceramics in the lower fills excavated in Operation 6, and there was a high concentration of Janabarriu styles in the fill between the PC-K parallel walls: 117 of the total 834 decorated sherds recovered from Op. 6 were Formative and 96 of these had Janabarriu circle motifs. This percentage is particularly significant because Operation 6 also

contained the highest concentration of Cayán Phase 2 (Recuay) ceramics on the mound, for it was reused for feasting activities around the tombs (see Chapter 6).

The fill (C250) between the PC-K1 parallel walls was fine and soft, which almost exclusively contained Janabarriu-style ceramics (Figure 5.99). This indicates that these walls were not only earlier than the later intrusive tombs, but that they were covered with fill before tomb construction began during Perolcoto Phase 4. However, the parallel walls could have been built during an earlier phase and only covered during Perolcoto Phase 3. Perolcoto Phase 4 building activities were likely extensive across the Eastern Terrace Area and other areas of the Perolcoto mound, but additional excavations are needed to understand their full extent.



Figure 5.99 Left: Photograph of Operation 6, facing north, showing the two parallel walls (top right of photograph) between which distinct soil (C250) was found with Janabarriu style ceramics. Identified as PC-K1, these walls likely date to Perolcoto Phase 4, and were truncated during Cayán Phase 2 by the construction of the semi-subterranean tombs visible in the lower area of the photograph. **Top and Bottom Right:**Janabarriu ceramic fragments found inside the C250 fill.

PC-L: Reuse of the Sunken Plaza Area

The excavations in Operation 5 revealed that construction began in the Sunken Plaza Area during Perolcoto Phase 1. However, it is still unclear when the sunken plaza itself was built and whether the PC-B2 retaining wall was originally built as part of the plaza or later incorporated into it (see section PC-B, above). Regardless, the building history of this area created a very unusual and irregular sunken plaza, which was straight on some sides, such as where the PC-B2 retaining wall was used, and curved in other areas. Although the study was unable to definitively confirm when the sunken plaza was built, it seems that floor PC-B3 (C169) was reused during Perolcoto Phase 4. This period of reuse is referred to as PC-L1. The earliest appearance of Chavín-era Janabarriu styles, such as vessels with circle-and-dot motifs, was at the surface of C169, that is, at the interface with the Cayán Phase 2 layer above it, C167 (see profiles in section PC-B, as well as Chapter 6). Similar Janabarriu ceramics were recovered from within this later fill (Figure 5.100).

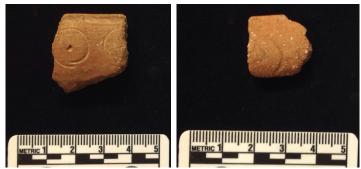


Figure 5.100 "Circle-and-dot" Janabarriu-style ceramic fragments from Operation 5, whose proveniences indicate a reuse of a preexisting Sunken Plaza floor during Perolcoto Phase 4. **Left:** Rim fragment from the interface of floor C169 (Perolcoto Phase 2 or 3) and fill C167 (Cayan Phase 2). **Right:** Similar rim fragment recovered from Cayan Phase 2 fill C167.

PC-L1 activities may have only included reuse of the sunken plaza, or it may have involved a major renovation of it. More excavations are needed in different areas of the Sunken Plaza Area in order to better define this construction history. At the moment, there are no radiocarbon dates to verify the construction of floor C169. Moreover, no decorated ceramics were recovered from within its fill. It is therefore completely possible that C169 was built during Perolcoto Phase 4, and not earlier as proposed in section PC-B.

Summary

This chapter reviewed the architectural, ritual, and material evidence for Hualcayán's earliest periods during Perolcoto Phases 1–4. The earliest documented period at Hualcayán is Perolcoto Phase 1, during which building at Hualcayán began and may have included the construction of a sunken circular plaza²⁶. On the Perolcoto mound, much of the Perolcoto Phase 1 architecture is stull buried, but excavations uncovered a large (12 m

²⁶ Or the construction of a terrace wall that would later be remodeled to become part of this plaza.

diameter) subrectangular²⁷ enclosure that is built according to the canons of the well-documented Mito architectural tradition (herein Mito-Kotosh) and in a similar fashion to the Mito temples at nearby La Galgada²⁸ (Bonnier 1997; Grieder et al. 1988; see Chapter 3).

During Perolcoto Phase 2, the community maintained yet repeatedly modified the Mito-Kotosh enclosure to increase an interior ledge, perhaps to differentiate the roles of ritual participants as fewer people could have stood near the sacred sunken central space (and its hearth). There is little information about other ritual spaces of this period because few excavation units were deep enough to expose them. However, it appears that the mound was likely raised during this period. Near the end of Perolcoto Phase 2, builders dramatically altered the Perolcoto mound when they covered the monumental Mito-Kotosh enclosure, creating a leveled platform. During these early periods, regional exchange systems were strong, evidenced by the presence of rare stone beads and shells.

The fill event at the end of Perolcoto Phase 2 ended all Mito-Kotosh-related activities on the mound—which were semi-private affairs inside tall-walled enclosures—began a new era of ritual practices that were centered on highly visible, yet restricted platforms on the mound that persisted throughout Perolcoto Phases 3 and 4. During Perolcoto Phase 3, builders added a raised rectangular platform at the highest point of the mound, perhaps to further emphasize the activities performed on top of it. The construction of this platform complex represents a strong break from earlier communal events on top the mound, shifting from spaces that were segmented but fairly inclusive within Mito-Kotosh enclosures, to spaces that served as highly visible, yet exclusive stages for public performance on top of the mound—a pattern that persisted into Chavín times.

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²⁷ Rectangular, but with rounded corners.

²⁸ Approximately ten meters of unexcavated architecture rests below this structure.

During Perolcoto Phase 4 they also remodeled and expanded this platform complex and incorporated Janabarriu-style, or Chavín-influenced, ceramic materials into their activities on the mound. In broad terms, the appearance of these styles reflects Hualcayán's participation in the Chavín political-religious network of communities. Less frequent wares, such as highly polished and engraved blackware ceramics (e.g., Figure 5.101) were likely imported from other communities, but many other Janabarriu ceramics were probably produced locally²⁹.



Figure 5.101 Example of blackware ceramic fragments from Perolcoto Phase 4 contexts that were likely imported. Left: artifact AE408 from Operation 1, which is a body sherd with an engraved motif. Right: Artifact AE175 from Operation 1, which is a fragment of a bottle.

On one end of the mound, however, people successively built, covered, and rebuilt a series of informal rooms, which they constructed by placing simple one-coursing alignments of irregularly shaped stones. They created floors by placing very fine soils and kept their surfaces impeccably clean, which suggests a ritual, rather than domestic

²⁹ A comprehensive paste analysis is currently underway for the Hualcayán ceramics. Most Janabarriu-style ceramics have an orangeish- or reddish-brown paste (produced in an oxidized environment), and are often coated with a reddish-brown slip.

function. In one instance, they built a hearth against a room's exterior wall where they burned fish from the Pacific coast, perhaps as a continuation of Kotosh ritual tradition, but in a highly altered form. This appears to have been a highly localized practice—there are no known similar examples from highland Ancash where hearths were built outside rather than inside structures. They eventually leveled this area's rustic rooms to create a level platform, and against it they periodically laid ash floors over fills containing the remains of small children. Finally, during either Perolcoto Phase 3 or 4, terraces were built across the entire mound and the sunken plaza area in order to cover many earlier structures and create a more cohesive, integrated, and unified ceremonial space in the Perolcoto sector.

Conclusions

The data from Hualcayán reveal how the early community practices cannot be neatly characterized into these two cultural periods or kinds of activities, even though Mito-Kotosh and Chavín guide the discussion of the Perolcoto Phases and serve to relate them to regional developments.

First, we must consider the evidence for the earliest community-building practices at Hualcayán. Though simple, the earliest materials and spaces documented, which include stone tools and maize remains in Perolcoto's Sunken Plaza Area, may reflect the kinds of practices, namely food production and consumption, that brought people together to produce a sense of place and shared experience. Though impossible to know the meaning of these practices without additional data, it is possible that these activities were ritually-focused from their beginnings. Maize has been consistently shown to be primarily a ceremonial food in the early coastal and highland Andes, and maize production at

Hualcayán may reflect people coming together not only to consume this food, put also produce it. These collective acts would have been instrumental is shaping Hualcayán, and Perolcoto in particular, as a place for social gatherings and the production of shared meaning through building, experimenting with new cultigens, and food-sharing (see Hastorf 2006).

Second, the excavations revealed how ongoing construction and ritual performances continuously reshaped the Perolcoto mound complex, revealing how people created or continued their own local traditions, such as the ongoing building of ash floors and child interment in the Northwest Platform Area. These traditions seem to have continued even as people participated in other practices that more aligned with regional traditions, such as the consumption of hallucinogenic substances—which are highly associated with Chavín. The repeated laying down of floors and fills contrasts with the stone spaces of Chavín de Huántar, which were modified mainly during moments of widespread remodeling of the mound complex, rather than built up incrementally through recurrent building activities.

Third, the data show how many of the architectural spaces and ritual practices that became important to Hualcayán's political, economic, and religious affiliations to the Chavín network did not appear through a simple process of religious adoption. In particular, the restrictive platforms that became stages for Chavín-era ritual performances on the Southwest Platform Area—which also covered and replaced Mito-Kotosh spaces and practices—predate the regional fluorescence of the Chavín religion and its associated material styles by approximately three hundred centuries. These data support how Chavín de Huántar, while exceptional in its scale, regional influence, and architectural, stylistic, and ritual ingenuity, emerged in Ancash through an already transformed and transforming

network of communities whose communal rituals were increasingly defined by pageantry and that reinforced distinctions between practitioners and participants who performed their social roles in distinct temple spaces.

The summary of Perolcoto Phases 1–4 largely focused on the ways local practices shaped how people came together to build and perform rituals on the Perolcoto mound. It also revealed how these practices align with the regional archaeological traditions of Mito-Kotosh and Chavín, which placed them within a broader social milieu. These results will be further explored in Chapter 7 when considering the evidence for community transformation over the *longue durée* at Hualcayán, but several processes are important to note here.

In particular, Chapter 7 discussion will explore in greater detail the material shifts that occurred over time, and contextualize these findings within regional developments in Ancash. First, however, the following chapter, Chapter 6, presents the post-Chavín era at Hualcayán, including the activities that decommissioned Chavín-era spaces and then inaugurated a new era of community practice at Hualcayán during the Final Formative and Early Intermediate Periods at Hualcayán.

CHAPTER 6

CULTIVATING COMMUNITY: THE FINAL FORMATIVE AND EARLY INTERMEDIATE PERIODS AT HUALCAYÁN

Chapter 5 reviewed evidence for how the early Hualcayán community focused their ritual and community practices in and around the Perolcoto mound complex by building a Mito-Kotosh, and later, a Chavín temple during the Perolcoto Phases (2400–500 BC). This chapter reviews the evidence for how, during the subsequent Cayán Phases (500 BC-AD 700), they profaned Chavín's exclusive spaces, built an expansive Recuay town, and decentralized their ritual practices by building and using compounds beyond the Perolcoto mound—establishing what is likely a more heterarchically-organized community of corporate factions, as argued below. It presents the excavation evidence that shows how they first dismantled, reused, and covered Chavín spaces on the Perolcoto mound and then moved their principal ritual spaces into dispersed agricultural areas, ending their 2000year-old tradition of centralized ritual and building in Perolcoto. It also describes how they simultaneously shifted their ritual economy away from a heightened focus on foreign ritual objects and foods, such as the Pacific marine objects and foods (mollusks, fish) that were long important to Chavín and pre-Chavín ceremonialism (and their displays of authority), and towards the production and ritual consumption (feasts) of local cultigens, which they consumed in vessels representing elites and ancestors. The chapter explores these changes in the built environment, ritual practices, and food production to consider how and why they emerged after Chavín. This chapter principally lays out the empirical evidence for these changes, while the following discussion chapter will further synthesize this material evidence within the historical context of long-term change at Hualcayán, exploring whether and how the Recuay-era people of Hualcayán established a distinctly new, corporately organized community by implementing a new agricultural regime and ritual program that was managed across distinct corporate groups.

This chapter is divided into four data sections. First, it presents the practices and spaces that transformed Hualcayán during Cayán Phase 1 (500 BC-AD 200)1 when onceexclusive Chavín temple spaces were intentionally destroyed and covered, Janabarriu ceramic styles were replaced with a white-on-red painted style called Huarás, and new cultigens were introduced into feasting rituals. Second, it reviews how and why, during Cayán Phase 2 (AD 200-700), the Recuay build a series of distinct D- and U-shaped room and plaza compounds within newly built agricultural terraces. It reviews the evidence that suggests they were used for food storage, burial, and ritual activities such as feasting. Moreover, these remains indicate a diversification of cultigens and the introduction of new feasting paraphernalia that included vessels featuring human effigies for storing and serving, and consuming chicha. The chapter will occasionally present the spaces and materials that date to two post-Recuay phases, Tzacpa Phases 1 and 2, which correspond to the Middle Horizon (AD 700–1000) and the Late Intermediate Period (AD 1000–1450). respectively (see Table 6.1). These late remains are presented where they were excavated along with Cayán Phase 2 (Recuay) materials in order to explore any long-term continuities in practice and uses of Recuay spaces. The areas with greatest continuity are domestic and mortuary spaces,² which are treated separately in the third section of the chapter. Finally, the fourth and final section will discuss the evidence for terrace and canal construction at

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¹ See Chapter 3 for disagreements on dating the appearance of Huarás materials after Chavín.

 $^{^2}$ Other kinds of post-Recuay contexts, such as non-mortuary ritual areas, have yet to be identified at Hualcayán.

Hualcayán, based on excavations in various features across the site. Though terraces and canals are difficult to date, the data suggest these constructions were most likely constructed during Cayán Phase 2 when nearly all other areas of the landscape were heavily rebuilt and transformed as a Recuay community was assembled at Hualcayán.

Table 6.1 Table of the phases discussed in Chapter 6.

| Hualcayán Phase | Period Code | Central Andean Chronological Phase | Estimated Time Span | Affiliated Cultural Tradition |
|--------------------|----------------|--|------------------------|----------------------------------|
| Cayán Phase 1 | CY1 | Final Formative Period- (initial) Early Intermediate P. | 500 BC-AD 200 | Huarás |
| Cayán Phase 2 | CY2 | Early Intermediate Period | AD 200-700 | Recuay |
| Tzacpa Phase 1 | TC1 | Middle Horizon | AD 700–1000 | Wari-influence |
| Tzacpa Phase 2 | TC2 | Late Intermediate Period | AD 1000-1450 | Akillpo |

This chapter will thus review the building and ritual practices, foodways, and materials that formed a Recuay community at Hualcayán after Chavín. These Cayán Phase architecture and materials are discussed and coded as CY1 and CY2, which refer to Cayán Phase 1 and Cayán Phase 2³, respectively (Table 6.1). Generally, Cayán Phase 1 aligns with the Huarás culture of highland Ancash and its white-on-red ceramic style, which spans the final centuries of the Early Horizon and first centuries of the Early Intermediate Period (500 BC-AD 200). Cayán Phase 2 is associated with the Recuay culture of highland Ancash, which is associated with the production of painted and modeled red ware and white kaolin clay ceramics, during the majority of the Early Intermediate Period through the first century of the Middle Horizon (AD 200–700). Architectural areas are coded with a letter and construction or event phases with a number, such that "CY-A2" would signify the second construction phase of architectural area A (A2), which was built and used sometime

³ and TC1 and TC2 for Tzacpa Phase 1 and 2.

during Cayán Phases 1 or 2⁴. All architectural areas and events/construction phases described in this chapter are listed in Table 6.2 (summary) and Table 6.3 (detail), and the locations of each excavation unit (Operation) is shown in Figure 6.1 and Figure 6.2.

Table 6.2 List of the Cayán and Tzacpa Phase structures and architectural complexes discussed in Chapter 6, along with their periods of use, locations, number of construction phases, and a brief description of each⁵.

| Code | Period | Area | Unit | Phases | Description |
|------|---------|------|--------------------|--------|--|
| CY-A | CY1 | SWPA | Op. 2 | A1-A3 | Deposition of ash and stone fill over PC-E |
| CY-B | CY1 | SWPA | Op. 2 | B1 | Ongoing activities on top of the PC-E platform |
| CY-C | CY1 | NEPA | Op. 1 | C1-C4 | Destruction, feasting, filling, and reconstruction of PC-J |
| CY-D | CY1 | NEPA | Op. 1 | D1-D3 | Ongoing fill and wall construction over CY-C |
| СҮ-Е | CY2 | SWPA | Op. 2 | E1-E3 | Feasting on top of the Southwest Platform |
| CY-F | CY2 | SWPA | Op. 2 | F1 | Construction of the final Southwest Platform |
| CY-G | CY2 | NEPA | Op. 1 | G1-G3 | Construction of the final Northeast Platform |
| СҮ-Н | CY2 | ETA | Op. 6 | H1-H4 | Intrusive tombs and mortuary feasting |
| CY-I | CY2 | SPA | Op. 5 | I1 | Filling of the Sunken Plaza to stabilize ancient structure |
| CY-J | CY2 | ANM | Op. 7 | J1-J4 | Construction and use of the central agricultural-ritual compound |
| СҮ-К | CY2 | ANM | Op. 4/13 /15-18 | K1-K2 | Construction and use of the eastern agricultural-ritual compound |
| CY-L | CY2-TP2 | HRA | Op. 22 | L1-L2 | House and Patio |
| CY-M | CY2-TP1 | MST | Op. 3 | N/A | Machay |
| CY-N | CY2-TP1 | MST | Op. 8 | N/A | Machay |
| CY-O | CY2-TP1 | MST | Op. 11 | N/A | Machay |
| CY-P | CY2-TP1 | MST | Op. 12 | N/A | Machay |
| CY-Q | CY2-TP1 | MST | Op. 19 | N/A | Machay |
| CY-R | CY2-TP1 | MST | Op. 20/ 21 | N/A | Chullpa and its surrounding walled patio |

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⁴ because there were some areas of heavy reuse between different phases, this naming scheme allows for greater flexibility if there needs to be any revisions in future seasons.

⁵ Abbreviations: (1) Column titles: "Area"=Architecture Area, "Unit"=Excavation Unit/Operation, and "Phase"=Construction Phase; (2) Periods: "CY1"-"CY2"=Cayán Phase 1 through 2; "TP1"-"TP2"=Tzacpa Phase 1 through 2; (3) Architecture Areas: "SWPA"=Southwest Platform Area, "NWPA"=Northwest Platform Area, "CTA"=Central Terrace Area, "SPA"=Sunken Plaza Area, "ETA"=Eastern Terrace Area, "ANM"=Area North of Mound. "HRA"=Hilltop Residential Area, "MST"=Mountainside Tombs; (4) Units: "Op"=Operation.

Table 6.3 List of the architectural areas and construction events discussed in Chapter 6, in general order of their construction history and their appearance in the text. A brief description is provided for each item. Column titles are abbreviated: "Code"=Architecture Code, "Unit"=Excavation Unit/Operation, and "Phase"=Construction Phase.

| Code | Unit | Phase | Brief Description | | | |
|-----------------------------------|-----------------------------------|--|---|--|--|--|
| | CAYÁN PHASE 1 | | | | | |
| CY1 - The Southwest Platform Area | | | | | | |
| CY-A | Op. 2 | Deposition of ash and stone fill over PC-E | | | | |
| | | CY-A1 | Ashy refuse deposited in the PC-E platform's flanking rooms | | | |
| | | CY-A2 | Stones placed on top of CY-A1 | | | |
| | | CY-A3 | Soil over stones | | | |
| СҮ-В | Op. 2 | | Ongoing activities on top of the PC-E platform | | | |
| | | CY-B1 | Decorated serving vessels indicate some feasting on PC-E | | | |
| CY1 - Th | CY1 - The Northeast Platform Area | | | | | |

| | | 01 113 | bon over brones |
|-----------|-----------|------------|--|
| CY-B | Op. 2 | | Ongoing activities on top of the PC-E platform |
| | | CY-B1 | Decorated serving vessels indicate some feasting on PC-E |
| CY1 - The | Northeast | Platform . | Area |
| CY-C | Op. 1 | | Destruction, feasting, filling, and reconstruction of PC-J |
| | | CY-C1 | Partial destruction of PC-J platform and walls |
| | | CY-C2 | Feasting in destroyed PC-J spaces |
| | | CY-C3 | C3-F's destroyed walls haphazardly reconstructed, new low wall built |
| | | CY-C4 | Feasting refuse smashed/covered with stones, rooms covered with fill |
| CY-D | Op. 1 | | Ongoing fill and wall construction over CY-C |
| | | CY-D1 | New surface and semi-circular feature |
| | | CY-D2 | Overlapping walls constructed |
| | | CY-D3 | Walls converted into low platforms |
| <u> </u> | | • | |

| | CAYÁN PHASE 2 | | | | |
|-----------|-----------------------------------|------------|---|--|--|
| CY2 - The | CY2 - The Southwest Platform Area | | | | |
| СҮ-Е | Op. 2 | | Feasting on top of the Southwest Platform | | |
| | | CY-E1 | Ongoing feasting on top of decommissioned platform complex PC-E | | |
| | | CY-E2 | Final food preparation and consumption event left in situ on PC-E | | |
| | | CY-E3 | Soil and refuse used to cover CY-E2 | | |
| CY-F | Op. 2 | | Construction of the final Southwest Platform | | |
| | | CY-F1 | New platform/fill completely covering PC-E and CY-A refuse | | |
| CY2 - The | e Northeast | t Platform | Area | | |
| CY-G | Op. 1 | | Construction of the final Northeast Platform | | |
| | | CY-G1 | New circular platform constructed over PC-J and CY-D | | |
| | | CY-G2 | Flanking platform added abutting the northeast exterior of CY-G1 | | |
| | | CY-G3 | Stone floor placed over CY-G2 | | |
| CY2 - The | East Terra | ace Area | | | |
| СҮ-Н | Op. 6 | | Intrusive tombs and mortuary feasting | | |
| | • | CY-H1 | Two-chambered tomb constructed, intrusive into PC-K | | |
| | | CY-H2 | Room complex built surrounding CY-H1 | | |
| | | СҮ-НЗ | Extensive feasting, remains left in situ and covered with fill | | |
| | | CY-H4 | Wall built over CY-H1/CY-H4, may post-date Cayán Phase 2 | | |
| CY2 - The | Sunken P | laza Area | | | |

| CY-I | Op. 5 | | Filling of the Sunken Plaza to stabilize ancient structure |
|---------------------------|----------------|------------|--|
| | | CY-I1 | Fill laid inside the Sunken Plaza; may include ritual activities |
| CY2 - Area North of Mound | | | |
| CY-J | Op. 7 | | Construction and use of the central ritual-agricultural compound |
| | | CY-J1 | Original construction of the compound as a rectilinear multi-room structure |
| | | CY-J2 | Addition of interior platforms containing human remains |
| | | CY-J3 | Major renovation of the compound into a D-shape, with an open patio surrounded by storage units; feasting associated with renovation |
| | | CY-J4 | External terrace raised, covering part of CY-J3's external wall. |
| СҮ-К | Op. 4/1 | 3/15-18 | Construction and use of the eastern ritual-agricultural compound |
| | | CY-K1 | Construction of the rectilinear U-shaped compound with an open patio flanked by corridors with storage units |
| | | CY-K2 | Corridors filled transforming them into walled platforms, abutting semi-circular platform added, southern terrace raised |
| CY2 - Hillto | op Reside | ntial Area | |
| CY-L | Op. 22 | | House and Patio |
| | | CY-L1 | Household and patio walls and floors constructed |
| | | CY-L2 | Small and low platform, perhaps for food processing, added to patio. |
| CY2 - Mou | ntainside | Tombs | |
| CY-M Op. 3 | | | Machay |
| CY-N | Op. 8 | | Machay |
| CY-O | Op. 11 | | Machay |
| CY-P | Op. 12 | | Chullpa-Machay |
| CY-Q | Y-Q Op. 19 | | Machay |
| CY-R | CY-R Op. 20/21 | | Chullpa and its surrounding walled patio |

| TZACPA PHASE 1 | | | | |
|--|---------------------------------------|-------|---|--|
| TP1 - Hilltop Residential Area | | | | |
| TP-A | P-A Op. 22 Terrace and house compound | | | |
| | | TP-A1 | Ongoing or intermittent reuse of CY-L1/H2 house and patio | |
| TP1 - Mountainside Tombs | | | | |
| All Cayán Phase 2 tombs (CY-M through CY-R) were also used during Tzacpa Phase 1 | | | | |

| TZACPA PHASE 2 | | | | |
|---|--|-------|--|--|
| TP2 - Hilltop Residential Area | | | | |
| TP-B | TP-B Op. 22 Terrace and house compound reuse | | | |
| | | TP-B1 | New floor constructed, covering the CY-L architecture; wall segment added over CY-L2 | |
| TP2 - Mountainside Tombs | | | | |
| Some tombs (CY-M through CY-R) may have been reused during Tzacpa Phase 2 | | | | |

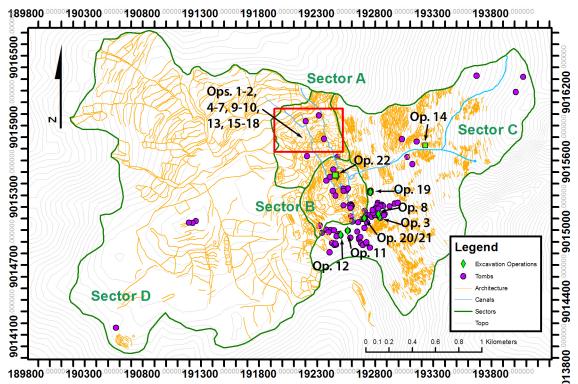


Figure 6.1 Map showing the location of excavation units in Hualcayán, all of which revealed a Cayán Phase 2 or later period of use (except Operation 14, which revealed no datable materials). The red box indicates the location of the more detailed map presented in the following figure.

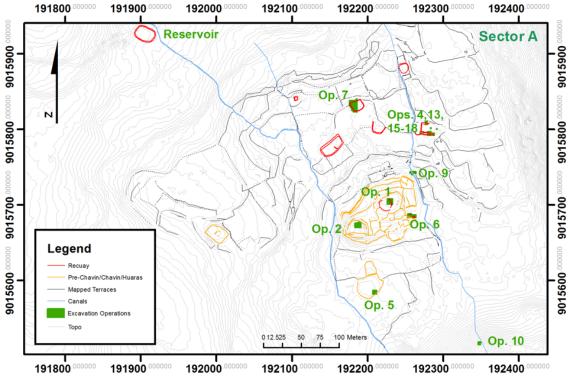


Figure 6.2 Map showing the location of excavation operations in Sector A, all of which revealed a Cayán Phase 1 or 2 period of use.

Cayán Phase 1 structures and materials were primarily uncovered within Operations 1 and 2 on the Perolcoto mound, in the Northeast and Southwest Platform Areas, respectively. Cayán Phase 1 ceramics were also occasionally recovered from other excavation units in very low numbers. In contrast, Cayán Phase 2 structures and materials were found in virtually all areas of the archaeological site, including all excavation units, Operations 1-22, which were placed in all Sectors (A-E) with the exception of Operation 14, a 1x1 m unit in a terrace of Sector C, which revealed no datable materials. In particular, Cayán Phase 2 architecture and materials were recovered from the uppermost layers of the Perolcoto mound in the Northeast and Southwest Platform Areas (Operations 1 and 2), the Eastern Terrace area (Operation 6), and the Sunken Plaza (Operation 5). Away from the Perolcoto mound, Cayán Phase 2 materials were uncovered in Sector A ritual compounds north of the mound (Operations 4, 7, 13, and 15-18), in Sector B domestic spaces (Operation 22), and in Sector B and C mortuary areas (Operations 3, 8, 11, 12, 19, 20, and 21). Tzacpa Phase 1 structures and materials were uncovered within Sector B domestic spaces (Operation 22), and in Sector B and C mortuary areas (Operations 3, 8, 11, 12, 19, 20, and 21).

It is important to briefly note the differences between decommissioning, destruction, and reuse—all of which occurred over the course of Cayán Phase 1 and Phase 2 activities at Hualcayán. I use *decommissioning* to indicate an action that renders a particular space unusable in an intentional, often ritualistic, manner. Decommissioning of spaces may occur through acts such as burying or covering them, sometimes proceeding the construction of a new structure. It may also involve smashing or breaking objects on

floors before covering these floors with a new one—rather than simply covering them without these kinds of practices. However, *destruction* is a more invasive and violent kind of decommissioning, and usually involves the dismantling of walls or the destruction of floors. Destructive and non-destructive decommissioning practices can be distinguished by clues such as the placement of offerings or the reverent treatment of a building; for example, Mito-Kotosh structures at the site of Piuru, were torn down to their foundations but it was always important to seal and thus protect the floor that was considered the temple's "altar" (Bonnier 1997). Finally, other practices may simply *reuse* or *repurpose* a structure by maintaining its form but changing the kinds of activities performed there.

Cayán Phase 1: The Final Formative and Initial Early Intermediate Period "Huarás" era at Hualcayán (500 BC–AD 200)

During Cayán Phase 1, people began to dramatically alter Perolcoto's structures. Most notably, they placed and left feasting remains within the spaces that were built and maintained clean during Perolcoto Phase 4, and covered them with refuse and new structures. In the Southwest Platform Area, they covered the spaces surrounding the PC-E platform with a thick layer of ash and stone—an act that permanently ended the use of the summit as a Chavín temple. In the Northeast Platform Area, they feasted directly within the spaces of the PC-J platform complex, dismantled sections of its walls, and then covered the area with refuse and rustic structures. These modifications to the mound and the practices associated with them are detailed below.

CY-A: Ash and large stone deposit over PC-E rooms

The end of the Chavín era at Hualcayán was first manifested on the summit of the Southwest Platform Area when people covered the open spaces surrounding the PC-E platform with ashy refuse (Figure 6.3; CY-A1, including contexts C1160, C1169, C1170, C1181, C1200, C1651, C1654, C1655, C1656, C1669, C1670, C1672-C1675) and sealed it with a layer of large stones (CY-A2; context C1169). The CY-A1 ash deposit included a variety of artifacts: including ceramics, lithics, animal bones, and burned botanicals (Figure 6.4-Figure 6.7). The range of artifacts and the pattern of their deposition, notably concentrations of carbon and artifacts, is the product of mixing existing refuse with in situ activities, perhaps burning and feasting. One area of the ash fill, in context C1160, had a concentration of camelid, guinea pig, viscacha, and deer bones, carbonized wood and plant stems of different species, including Schinus molle and pecan trees, and several hundred land snails⁶ (Figure 6.5, left). Microbotanical analysis of a soil sample from C1160 also revealed the presence of potato phytoliths. At the same level and a meter away from this concentration of materials was a dark, sooty lens with charcoal that indicates in situ burning (Figure 6.5, right).

⁶ The land snails were so numerous within the CY-A1 ash that we did not collect all of them. However, there were likely at least 200 individual snails.

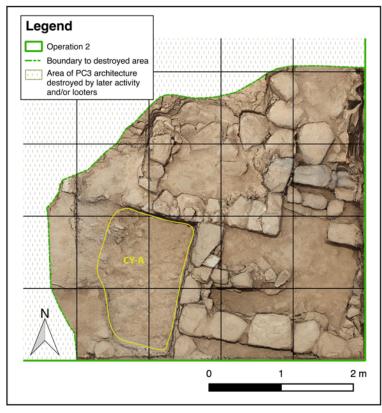


Figure 6.3 Map showing the location of the CY-A fill.



Figure 6.4 Ash layer placed inside a room in the PC-E platform complex. The ash ends at a looter's cut, which is roughly parallel to the PC-E platform, that was made by looters during the modern era.



Figure 6.5 Left: Photograph facing east, showing one concentration of land snails, carbonized wood, and ceramics recovered from ashy fill (CY-A1, foreground of image) over which large stones CY-A2 (background/top of image) were laid. **Right:** A concentration of dark ash and land snails.



Figure 6.6 Materials from the CY-A1 ashy fill. **Left:** groundstone tool placed at top of CY-A1 ash (C1169; AE-1738). **Right:** Camelid, land snail, and carbon remains (C1181; Camelid long bone: AE-1795).



Figure 6.7 Ceramic materials from the CY-A1 ashy fill. **Left:** Fragments of a small pot with burnished cross-hatched lines for exterior decoration (C1651). **Right:** Stirrup spout fragments (C1655).

The CY-A ash and stone deposit likely extended across the top of the Southwest Platform Area; however, due to the limited area excavated in Operation 2, which was further reduced by the looter's trench, the deposit was only uncovered in a room to the west of the PC-E platform's corridor. Although looters destroyed and disturbed much of the soil, the margin between the intact ash deposit and the looter's cut was well defined, leaving an area of approximately 2 m² of undisturbed soil in the area where it was placed against PC-E's platform walls (Figure 6.8 and Figure 6.9). The fill was about one meter deep, or near the same depth of the rooms surrounding the platform itself, with the large stones placed only in the upper 80 cm of the fill, capping the soft ash below.

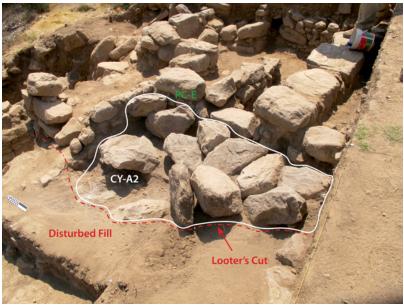


Figure 6.8 Annotated photograph of the layer of stones placed during CY-A2 over ash CY-A1; facing northwest.

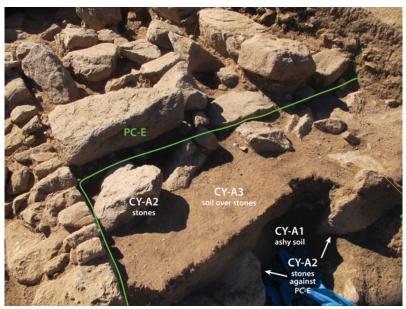


Figure 6.9 Annotated photograph of the approximate surface of the CY-A3 soil placed over the CY-A2 stones, facing southeast. Note that a clear interface between the CY-A3 soil and later Cayán Phase 1 and 2 activities was not encountered. The CY-A3 soil was soft and likely settled and shifted throughout these later periods of reuse.

The CY-A ashy fill contained ceramic refuse that is difficult to assign a precise date. There are clearly Perolcoto Phase 4 Chavín-affiliated styles (i.e. Janabarriu-style stamped and incised ceramics) in the CY-A fill. The fill also clearly predates the appearance of Huarás styles, but it also seems to mark the end of Chavín-era platform use; the fill therefore likely corresponds to the earliest post-Chavín practices. Two carbon samples were dated from the CY-A fill. The first was recovered from the top of this ashy deposit near the inner, undisturbed corner of the fill in Suboperation AA20, and dated to 786–540 cal. BC (HU01-SWPA-9). The second was from the lowest layer of ash, and dated to 798–539 cal. BC (HU01-SWPA-8).

Three possibilities could explain why carbon recovered from the CY-A ashy fill returned a Perolcoto Phase 4 or "Chavín Horizon" date, yet were associated with activities that ended Chavín practices on the mound. First, it is possible that the dated CY-A ash was part of an earlier, nearby midden deposited during Perolcoto Phase 4, and was redeposited

during Cayán Phase 1. However, some areas within the fill have concentrations of in situ burning, suggesting not all was transposed midden debris. Second, it is possible that the sampled carbon was from wood felled a century or more earlier than the moment of its burning and final deposit, such as a wooden post from a structure on the mound, which would have produced a date earlier than the fill event itself. However, botanical analysis of the carbon from the CY-A ashy soils contained at least nine species of wood and plants, and therefore the similar dates of the two analyzed carbon samples are not likely from the same old wood. Third, it is possible that the CY-A ash and refuse was produced during the *earliest* decades of Cayán Phase 1, which the study aligns with the post-Chavín era at Hualcayán—activities that break from long-standing Chavín practices—rather than an arbitrary date range.

The latter option, that the CY-A fill was laid in the initial decades or at least century of the post-Chavín era, is the most plausible for several reasons. First, it should be noted that conceptually the "end" of Chavín corresponds to the period in which Chavín de Huántar and its affiliated temples ceased to function as ceremonial centers—at least in the way in which they were able to widely draw people through pilgrimage or exotic resources as through trade and pilgrimage. Though the two CY-A AMS dates span the approximate period of Chavín influence between 900 and 500 BC, they may coincide with the period of sharp decline at the site of Chavín de Huántar that began around 550 BC and lasted until around 500 BC, evidenced by the covering of falling architecture (Rick et al. 2009). Scholars at Chavín de Huántar believe these acts may be linked to a cataclysmic event such as a large earthquake and landslides that destroyed the temple and undermined the authority of temple leadership or power of the oracle (Rick 2013). The carbon from the CY-A fill at

Hualcayán may have been created around this time; the later date ranges of the two AMS dates from Hualcayán—540 and 539 cal. BC (Figure 6.10)—fall, however narrowly, within the decade following 550 BC. The plausibility of these events occurring toward the latter part of each date range is made somewhat more likely because of the flattening of the calibration curve during this period. In particular, Rick et al. (2009) discuss how any date within the 95.4% probability (2 sigma) range produced by AMS dating is as likely as all others within the range because there is a significant plateau in the calibration curve *precisely* for the period of Chavín influence that is associated with Janabarriu ceramics. It is thus extremely difficult to use absolute dating to separate the *initial* post-Chavín but pre-Huarás activities that span the period between 550 and 400 BC from earlier activities that occurred during the period of Chavín influence⁷.

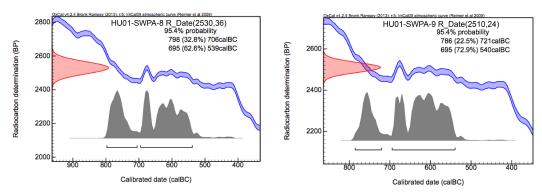


Figure 6.10 Calibration curves for the two dates from CY-A, showing the "plateau" spanning the Chavín and early post-Chavín eras between 800 and 400 BC (produced with OxCal).

Regardless of precisely when CY-A was laid, the implications of the dates is that the fill seems to have decommissioned and transformed much of the platform complex in the sense that the fill was not fill laid in order to create a new surface and structure, but instead to partially fill the spaces surrounding still-exposed platform features. At first the CY-A

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⁷ In the least, the AMS results do indicate a greater probability that the two carbon samples date to the second half of the date ranges returned, with a 62.6% (HU01-SWPA-8) and 72.9% (HU01-SWPA-9) probability that the carbon comes from between about 695 and 540 cal. BC. See Figure 6.10.

stone and ash fill seemed to be construction fill to amplify of the platform. However, Recuay remains smashed in situ during CY-E were found scattered across the PC-E platform in a pattern that terminated precisely at the edges of the platform, making it clear that the platform remained exposed after the side rooms were filled (see discussion in section CY-E, below). Because the CY-A fill was left exposed and not associated with the construction of a new floor above, it appears that the objective of those who laid the fill was likely to make the PC-E platform complex unusable by partially filling the surrounding rooms. Or rather, by laying the CY-A fill over the PC-E platform's spaces, they seemingly profaned the mound's summit, transforming it from a sacred space—which had been kept meticulously clean for hundreds of years—into a relic of the past.

CY-B: Feasting on the PC-E platform

During Cayán Phase 1, consumption events, likely feasts, were carried out on top of the still-exposed, but disturbed surface of the PC-E platform. Huarás-style serving wares, jars and bowls in particular, were recovered immediately on top of the platform surface (Figure 6.11). These remains were mixed with Cayán Phase 2 Recuay materials, however, making it difficult to isolate the complete feasting assemblage. Botanical and faunal samples were not identified from the CY-B activities due to the difficulty of separating these mixed contexts. The CY-B remains could be from activities carried out before, during, and/or after the deposition of the CY-A fill.

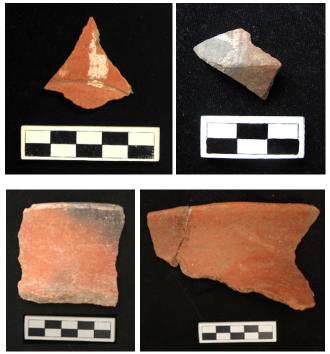


Figure 6.11 Photographs of the CY-B Huarás-style ceramics collected from the top of the PC-E platform.

Cayán Phase 1: Northeast Platform Area

The open rooms of the PC-J platform complex in the Northeast Platform Area provide the clearest and most detailed evidence for Huarás activities on the mound during Cayán Phase 1. The first activities, CY-C, were acts of destruction, whereby people dismantled sections of the PC-J platform complex. Then, they feasted within the complex and covered it with fill. After CY-D they repeatedly laid additional fills and built/rebuilt rooms and low platforms, which seem to suggest evidence for occasional and/or ongoing rituals by different groups. These construction activities continued over an indefinite

period of time during Cayán Phase 1 before being covered by a new and final platform (CY-G) during Cayán Phase 2.

CY-C: Destruction, feasting, reconstruction, and filling of the PC-J platform complex

CY-C includes a series of activities that occurred during the early post-Chavín phase on the mound. During CY-C1, people partially dismantled the PC-J walls and then feasted within and near these spaces during CY-C2. During and after the feasting activities, which may have occurred over the course of one or several days, they leveled destroyed areas of floor with fill, haphazardly reconstructed the destroyed walls and filled them with Huarás materials, and built new walls to delineate activity areas; these constructions are collectively described as CY-C3. During CY-C4, they used stones to smash the feast's refuse on the floor and filled the PC-J rooms with soil and stone fill. These four phases of activity occurred over a relatively short period of time, suggesting that the destruction, consumption, and rebuilding activities represent a ritual sequence.

During CY-C1, three of the four exposed corners of the PC-J platform complex were dismantled, denominated Destruction Areas A through C (Figure 6.12 and Figure 6.13). The first, Destruction Area A, was a 1.5 m section of the C14 retaining wall, in the area where C14 abutted the C583 platform retaining wall. The wall was destroyed by removing the stones that made up the platform face as well as excavating approximately a half meter into the platform fill behind the wall. The abutting floor, C672, was also disturbed in this area and along the face of the C583 wall. The soil was also charred, which is likely due to the subsequent CY-C2 cooking and feasting, but burning may have been part of the destruction activities as well (See section CY-C2). In Destruction Area C, several stones were removed

from the northern wall face of C40, near where it abuts the platform retaining wall C14 (Figure 6.14). The destroyed area was fairly small, approximately .65 m wide. Destruction Area B was the largest area destroyed (Figure 6.12 and Figure 6.13). The destroyed area includes a 2.5 m section⁸ of the C583 platform retaining wall as well as 10-40 cm of the platform fill behind it. The intrusive cut into the platform fill was irregular.

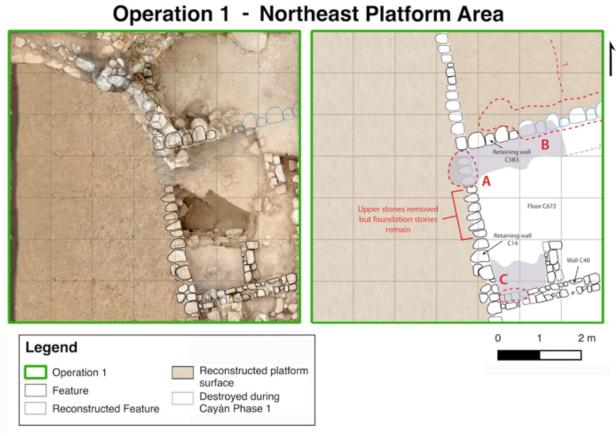


Figure 6.12 Orthophoto and map of the PC-J Platforms and walls. The image shows the three areas, A through C, that were destroyed during CY-C1.

 $^{^{8}}$ The destroyed area of the C583 wall extends into the eastern profile of Operation 1, so the destroyed area may be larger.



Figure 6.13 Annotated photograph, facing northwest, of Destruction Area A and part of Area B. Note that, at the stage of excavation shown, the CY-C2 feasting refuse and CY-C4 stones remain inside Destruction Area A, while all materials were removed in Destruction Area B. Red dashed lines indicate the destructive cuts made into PC-J architecture, and the dark blue dashed line indicates the area where the was floor destroyed and charred. Green lines indicate the foundations of retaining walls C14 and C583. The upper stones of C14 were also removed during CY-C1, but their foundation stones remain.



Figure 6.14 Annotated photograph, facing south, showing the extent of Destruction Area C into wall C40. Note the stones haphazardly placed inside the destruction area (labeled "a") and the ash-stained floor in front of them ("b"). The stones were placed during CY-C3, after a layer of ash was deposited over the floor during CY-C2. This ash is visible beneath the CY-C3 stones (Note: in the corner visible to the right, the floor rolls up onto the face of walls C40 and C14 and is intact).

Several lines of evidence suggest that the three Destruction Areas—rather than representing poorly conserved areas of wall masonry—were intentionally dismantled during CY-C1 and later reassembled during CY-C4. Destruction Area A was the most clearly destroyed because the C14 retaining wall had not been rebuilt during CY-C4 (as other destroyed walls were) and the CY-C2 Huarás refuse was found within the cavity that penetrated inside the PC-I platform (Figure 6.15). In Area C, the preservation of the adjacent floor (C672) revealed evidence of intentional destruction. In particular, the C672 floor rolls up onto the base of the C40 wall's face in all areas except in the area of jumbled stones, suggesting a disturbance (Figure 4.8). Moreover, the ashy refuse that was deposited over the C672 floor during CY-C2 was also found beneath the jumbled stones inside Destruction Area C, indicating that the C40 wall masonry had been destroyed/removed before the CY-C2 feasting activities began. In Area B, where a large section of wall C583 was removed, there were concentrations of Huarás-style refuse (1) within and below the stones used to rebuild the wall during CY-C3 and (2) inside the cut that was made into the PC-J5 platform fill behind the C583 retaining wall (Figure 6.16). The presence of these Huarás materials inside the cuts indicate that sections of PC-I were intentionally destroyed and rebuilt or filled with Huarás materials. The lack of Huarás ceramics in the rest of the PC-I fills behind these cuts further indicates that the PC-J platform complex was built during Perolcoto Phase 4 and was disturbed during Cayán Phase 1.

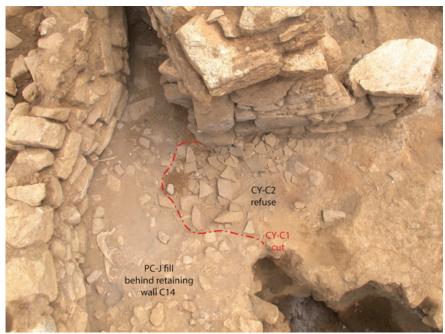


Figure 6.15 Annotated photograph, facing north, showing the base of the cut (red line) in Destruction Area A after the surrounding soils were excavated to the level of the CY-C2 refuse. The materials recovered west (left) of this cut pertained to Perolcoto Phase 4, while the materials inside and east (right) of the cut pertained to Cayán Phase 1.

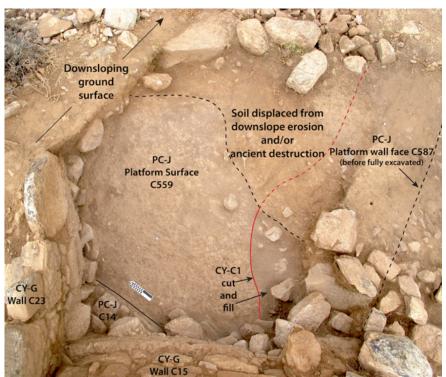


Figure 6.16 Annotated photograph of the northeast corner of Operation 1, taken from above and facing northeast. Huarás sherds were recovered from the soil inside and south the CY-C1 cut (red line), which was cut into and behind the PC-J platform retaining wall C587, but they were not recovered from the undisturbed PC-J fill (C559) behind the cut. The only exception is in the northeastern extent of Operation 1, where downslope erosion near the modern surface disturbed the platform's eastern side.

During CY-C2, after the three wall sections were dismantled, people feasted in the rooms⁹ of the PC-J platform complex and deposited the feast's refuse in the destroyed wall cavities (A-C) and on the exposed floor (C672). This refuse included Huarás-style decorated white on red ceramic bowls, large storage jars, animal bone fragments, carbon, and ash. We found many vessels that were broken in situ on the floor, and many others that, while not intact, had connecting fragments located close by. This suggests that much of the refuse on top of the C672 floor was deposited during a single event, shortly before it was covered with stones and fill during CY-C3. Two areas had the most concentrated remains, each consisting of one or more large storage vessels and decorated bowls. These two areas were (1) within Destruction Area A, and (2) immediately south of Destruction Area B, along the eastern profile of Operation 1. A less dense area of artifacts was recovered immediately north of Destruction Area C.

In Destruction Area A, the earth was burned and covered by a large jar (cántaro) and several decorated Huarás white on red bowls during CY-C2 (Figure 6.17). Mixed into this refuse were guinea pig and camelid remains (C915). The burned earth beneath the vessel may indicate cooking activities. Phytoliths of maize (*Zea mays*) and an unidentified grass (*Pooideae*) were recovered from the interior surface of a jar fragment that was found face down towards the bottom of the pile of smashed ceramics (Appendix F). This maize may have been prepared as well as consumed in this area, however no carbonized maize cobs or kernels were recovered from the flotation of these soils to suggest that maize was

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⁹Although only one open space in the PC-J complex was uncovered in Operation 1, the activities uncovered in this area are likely representative of larger events across the platform area, such as within other rooms that surrounded the PC-J3 (C14) platform.

cut or prepared near the fire. It therefore seems possible that the maize was not prepared in situ, but instead was brought to this area of the mound already prepared. This is consistent with archaeological and ethnographic examples of consumption events featuring chicha, where chicha needs to be prepared and fermented over several days in anticipation of its consumption (Allen 2008). Moreover, the fragmented large jar had a 24 cm diameter flaring rim and a 1 cm thickness, which is a type and size commonly used to store foods or ferment chicha in the Andes (Ikehara 2010:133). Although cooking may have occurred, the burning around these vessels is most likely associated with the end of the feast and the ongoing destruction and decommissioning activities. Extending between Destruction Areas A and B and along the C583 wall there was a continuous area of disturbed floor with scorched earth (C671; gray area in Figure 6.12) containing ash and carbon from alder wood (*Alnus sp.*). Although not all were charred, some fragments of the large jar had blackening on their broken edges indicating that some of this fire occurred after the feast was complete and the vessels broken (Figure 6.18). Radiocarbon sample HU01-NEPA-6 was recovered from a thin layer of ash in this context and dates to 353-46 cal. BC.



Figure 6.17 Left: Annotated photograph, facing north, showing the base of the cut in Destruction Area A after the surrounding soils were excavated to the level of the CY-C2 refuse. The materials recovered from the west

(left) of this cut pertained to Perolcoto Phase 4, while the materials inside and east (right) of the cut pertained to Cayán Phase 1. **Right:** Detail of the CY-C2 feasting refuse, facing west, showing how the smashed ceramics rolled up against wall C583.



Figure 6.18 Left: View from above of Destruction Area A, after feasting refuse removed. Dark areas indicate the burned and destroyed C672 floor within the cut. **Right:** Ceramic fragments from Destruction Area A, showing charring, including on the break of the fragment, which suggests some burning occurred after the vessel was broken.

Within Destruction Area B, feast participants also left a scatter of Huarás white on red broken bowls as well as fragmented animal bones and bone tools. They also dug a pit into the C672 floor in the area immediately south of the destroyed C583 retaining wall and placed two large storage vessels into this pit, one inside the other, with an approximately 2 cm space between them¹⁰ (Figure 6.19). The tops of the storage vessels were broken precisely where they protruded above the floor. At the exposed level, the inner vessel measured 70 cm in diameter. This placement of one vessel within another is not commonly practice in the Andes, and it is possible that further excavation will reveal only fragments creating the double vessel appearance. Nonetheless, a modern example from Nigeria reveals that placing vessels one inside the other and filling the space between them with moist soil produces a "double pot refrigerator," which Schenck (2009) suggests could have

 10 Alternatively, it is possible that the outer vessel was only a large fragment placed outside of the vessel on one side, creating only the appearance of a double-pot.

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aided the fermentation process of alcohol or extended the life of perishable goods (after Taylor 2002). At the end of its use, the vessel was filled; while the entire contents were not excavated, fragmented Huarás-style white on red ceramic bowls were found within the upper layers of soil within it. At least the upper ten centimeters were filled during Cayán Phase 2, based on the ceramics recovered. We did not excavate the vessel's interior fill beyond its upper ten centimeters, due to a lack of time, having uncovered it at the end of the final season of excavations. Therefore, the vessel's complete size and shape is unknown, as are the complete contents of its fill. However, analyses of the artifacts found on top and immediately surrounding the vessel indicate maize production and consumption (see below).



Figure 6.19 Pot, which may be one smaller pot placed inside a larger one, placed in cut into floor C672 during CY-C2. Decorated Huarás bowl fragments, some charred, were recovered from the floor surrounding the pot and on top of the soil inside the pot. Left: location of the pot along the eastern profile of Operation 1. Reconstructed wall C583 is visible to the right, and wall C579, subsequently built during CY-C3, is visible above (west). Right: detail showing the two parallel layers of ceramic, separated by soil.

Several decorated white on red bowls were scattered on the surface surrounding the double pot (C940/C941) as well as on top of the fill inside the vessel (C942). Many of the recovered fragments could be refitted or had unique designs suggesting they were from the same vessel. Some were charred and found in small areas of ash. We recovered only

part of the entire artifact concentration due to its location between the eastern profile of Operation 1 and a CY-C3 wall (C579). After the decorated bowls were deposited, stones were piled over the top of the storage vessel, associated with the activities of CY-C4 (C787; Figure 6.20). One of these stones was the base of a *mortero* or grinding stone, placed face up, and is likely associated with the activities it covers. Microbotanical analysis of this *mortero*, which was sampled in two areas of its inner surface, revealed maize starches (Appendix F). Camelid (n= 3) and guinea pig (n=1) remains were also recovered from this context (Appendix G).

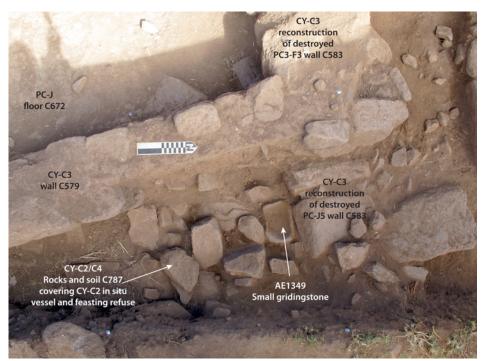


Figure 6.20 C787 soil and stones over the ceramic concentration. AE1349 grinding stone revealed maize starches in two surface areas tested.

Within Destruction Area C (wall C40) and on the adjacent C672 floor, a fire was burned, similar to that in Destruction Area A, and numerous Huarás white on red bowls and bone tool fragments were strewn across the floor (Figure 6.21–Figure 6.23). Where a smashed bowl was incomplete, connecting fragments were often found nearby on the floor.

The pattern of vessel fragmentation on the C672 floor indicates that the majority of vessels were deposited as whole vessels and smashed in place. Some activity moved these fragments around slightly, however, resulting in the partially articulated fragmentation that we uncovered. For example, a large portion of the scattered ceramic fragments visible in Figure 6.21 connect to large fragments collected during the excavation of the 2009 U.E. 3 test pit, which was (at the time) unknowingly placed in the center of the C672 floor¹¹. One bowl in particular, AE460¹², was highly fragmented and scattered across the C672 floor, suggesting that it may have been intentionally smashed and distributed. The vessel is unique for a Huarás bowl because it had a curved rather than flat base (compare to Ponte 2014:59, Figura 32), tricolor paint (red, white, and black), decoration on both its interior and exterior surfaces, and carefully painted iconographic images (Figure 6.23). The vessel's unusual characteristics and the care used to create it point to its special role, likely in feasting or to give offerings.

Though the center of the image is missing, the interior iconography of the AE460 decorated vessel suggests a central figure flanked by two double-tailed snakes, though more is needed to fully identify its form. The central figure may be a similar representation of the anthropomorphic deity represented on the ceramic in Figure 6.37 (note the individual's headdress or appendages curve inward in a similar way to the lines extending on either side of the figure shown in AE460; Figure 6.23). More likely, however, these

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¹¹ Once Operation 1 excavations began in 2011, the U.E. 3 fragments had been turned into the Museo Arqueológico de Ancash and could not be physically connected to the fragments from Operation 1 excavations. Nonetheless, their distinctive designs made it possible to reconstruct the bowls using photographs and drawings to determine that whole vessels had been smashed and strewn across the C672 floor.

 $^{^{12}}$ This vessel was collected as several different "Special Artifacts" and later reassembled. These pieces are AE460, 464, 467, 469, 478, 479, 493A, 494, 495, 717, 738, 912, and 1333. AE460 is used here to identify all these pieces, in addition to those recovered from general collections in 2009.

angular appendages may also be extending from a radiant bodiless head (Lau 2011: 208–209; Makowski and Rucabado 2000: 200; Hohmann 2003), which is common in later Recuay iconography and may represent venerated ancestors given their mix of human accoutrements like earspools and headdresses, yet a transcendent form as bodiless beings. Moreover, ancestors were commonly represented with snakes, snake-like felines, or more stylized wavy appendages extending from the tops of their heads, which the appendages in AE460 may represent. The double-tailed snakes shown on either side of the figure on AE460 are also similar to creatures commonly painted on Recuay ceramics in that they are triangle-headed snake-like figures being made up of two beings combined into one. However they are somewhat unique in that they seem to have a single head and two tails rather than a single body and two heads (bicephalic creature; see Wegner 2011).



Figure 6.21 Overhead photograph, facing north, of the ash, ceramics and bone tools on top of floor C672. Wall C40 is visible at the bottom of the image, and Destruction Area C (where a section of C40 was removed and then stones replaced in this cavity), is visible in the lower left (southwest) corner.



Figure 6.22 White on red painted or plain red burnished Huarás-style ceramics from Destruction Areas A through C and on the C672 floor. Images include specimens from CY-C2 and CY-C3. Note that some vessels had additional fragments than are not shown.



Figure 6.23 Rare Huarás-style Polychrome bowl, reconstructed from fragments that were recovered from across floor C672. All photographs are different views or fragments of the same vessel. **Left:** The reconstructed vessel's exterior and interior designs. **Right:** Additional fragments collected in 2009 test pit that could not be connected. The interior shot is oriented to the position that it fits on the vessel (i.e. lower right of the bowl as pictured at left).

During CY-C3, a series of building activities followed the CY-C2 feasting, although some of these activities likely occurred during the CY-C2 feasting episode. CY-C3 includes the placement of a shallow layer of fill in Destruction Area B, the reconstruction of Destruction Areas B and C, and the construction of a new wall, C579, over the shallow fill. First, a thin 10-20 cm layer of fill (C799) was placed over part of the destroyed wall and floor area of Destruction Area B, perhaps to cover or level parts of the destroyed floor (Figure 4.18). On top of this layer of soil, elongated stones were placed side by side to recreate the face of the destroyed C583 retaining wall (Figure 6.24). Concentrations of Huarás materials were recovered from within this wall. Next, and also atop the shallow fill, wall C579 was constructed against and perpendicular to the face of the reconstructed C583 wall (Figure 6.25). These activities are associated with the CY-C2 feasting, although the exact chronological association is not entirely clear. Nonetheless, two lines of evidence reveal that the reconstructed C583 stones and the C579 wall were built on top of soils deposited during Cayán Phase 1: the presence of Huarás-style white on red ceramics beneath and within the reconstructed C583 wall stones as previously mentioned, and also by the "floating" appearance of wall C579. That is, the base of wall C579 appears to "float" because it is separated from the C672 floor by 10-15 cm of soil, which was first deposited before C583 was rebuilt after its initial destruction (Figure 6.26 and Figure 6.27).



Figure 6.24 Photographs, facing northwest (context) and north (detail), showing how a layer of soil (C799) was placed within Destruction Area B, at a level above the C672 floor (visible in foreground). Detail at right shows the Huarás vessel fragment, lithic core, and marine shell recovered from the top of this fill, found immediately below the stones placed to reconstruct wall C583.



Figure 6.25 Photographs, facing northwest and north, showing the elongated parallel stones laid inside the C583 wall cavity in Destruction Area B.

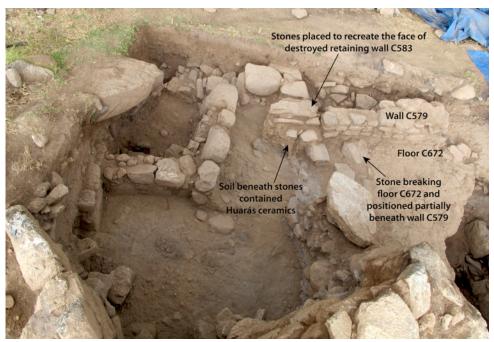


Figure 6.26 Photograph, facing east, showing how wall C579 is constructed against the reconstructed segment of wall C583. It also shows the disturbed area of floor C672 in this area.



Figure 6.27 Photographs, facing east (**top**) and northeast (**bottom**), showing how wall C579 was constructed over a layer of fill that was deposited over floor C672, and thus appears "floating" in profile. Top image also shows how wall C579 was constructed against and perpendicular to the reconstructed face of wall C583. Bottom photograph was taken after C583 stones were removed from Destruction Area B. Solid white lines show the CY-C3 fill, over which the C579 wall appeared to be "floating", and the dot and dash line indicates the area of disturbance and burning on the floor PC-J floor during CY-C.

The materials within the C799 fill and C680 material concentration show further evidence of feasting. Notably, the C799 fill located beneath the reconstructed C583 stones contained a base fragment of a Huarás bowl (AE-1813), a stone core, a bivalve mollusk shell (AE-1812; *Semele solida*), and camelid and viscacha remains (Figure 6.24; Appendix

G). Microbotanical analysis of the Huarás bowl revealed maize starches (Appendix F). Within the stacked wall stones above this fill was C680, which was a high-density of ceramic and other remains (Figure 6.28). The remains, which included mostly decorated bowls of standard size along with lithics, bone tools, and faunal remains, were refuse from feasting. These materials were deposited within the C583 wall during its reconstruction and before the entire room was filled during CY-C4. Maize starches recovered from a *mano* of a small *mortero* grinding stone indicate that maize processing took place. A soil sample from the interior of a bowl revealed maize phytoliths in addition to an unidentified grass (*Panicoideae*). A small stone tablet revealed quinoa (*Chenopodium quinoa*) and potato (*Solanum tuberosum*) residues (Appendix F). The tool's beveled edges and its flat and scratched surface suggest the tool may have served as a spatula, a knife, and a cutting board. In addition to camelid and guinea pig fauna, there was a single viscacha (*Lagidium peruanum*) humerus in the C680 deposit (Appendix G). Radiocarbon date HU01-NEPA-7 from C680 returned a range of 200–52 cal. BC (Appendix A).



Figure 6.28 Photographs of context C680. **Left:** Photograph showing the concentration of nearly complete ceramic vessels, faunal remains, and other artifacts within the C583 wall. **Right:** detail of a guinea pig crania and other bones found in situ inside a white on red ceramic bowl that was decorated with white S-shaped designs.

There was another artifact concentration behind the destroyed C583 in Destruction Area B that contained additional Huarás ceramics and faunal remains. Three ceramics with residue, including a decorated white on red Huarás style bowl (Figure 6.29) revealed maize starches. Wood from a *Buddleja* tree, prized for its hardness and ability to be carved, was recovered from this context (Appendix F). Guinea pig and camelid bones were also present (Appendix G).



Figure 6.29 A Huarás-style decorated ceramic fragment from behind wall C583 (in context C791) that revealed maize starches.

During CY-C4, the CY-C2/C3 feasting remains were smashed by stones; shortly after, the floor and the feasting refuse was covered by a layer of soil and stones approximately 30 cm thick. In addition to the stones that smashed the occasional bowl, clusters of stones were piled over the areas with high artifact concentrations (Figure 6.20, Figure 6.30, and Figure 6.31). The concentration of stones in the fill placed over the entire area was variable, making up 10% to 40% of the matrix. The consistency of the fill was also uneven and included large areas of semi-compact stony fill, pockets of soft fill with fewer stones (often near corners), and areas of compact soil with few stones. The latter had the consistency of

soil that had been laid while very wet, with white on red ceramic fragments and other artifacts tightly embedded within the soil matrix. This compact soil was mounded on the C672 floor in the area east of the U.E. 3 test pit. In addition, the fill south of the U.E. 3 test unit had markedly less stone than the fill to its north. In the southern area, additional floors and later CY-D structures were uncovered. It is not clear how the entire CY-C4 fill was contained on its eastern side because the eastern contexts of Operation 1 were highly eroded. Nonetheless, the fill may have been simply mounded and sloped on its eastern extent. A low retaining wall, C50, was found parallel to the eastern profile of Operation 1, which may have contained this fill, but it does not extend to the base of the fill, and may be associated with the subsequent building activities in CY-D.



Figure 6.30 Stones placed over feasting refuse in Destruction Area A. **Left:** First/lowest layer of stones. **Right:** Second, higher layer of stones.



Figure 6.31 Stones placed over feasting refuse on floor C672 near Destruction Area C. **Left:** Some of the stones placed immediately on top of white on red vessels. **Right:** View of ceramics smashed by these stones (note: some vessels flipped over in place to show their decoration).

CY-D: Fills with successive wall construction and feasting

During CY-D, a series of somewhat informal rooms and platforms were built on top of the CY-C4 fill. It is difficult to determine whether the use of these structures were ritual or domestic in nature because the refuse associated with them may have been transposed from elsewhere—few in situ remains were located on intact surfaces. The majority of this construction evidence was recovered to the south and east of the U.E. 3 test unit. The lowest uncovered feature, constructed during CY-D1, was a floor (C558) associated with upright stones arranged in a semi-circle (C557; Figure 6.32). Other stones were uncovered that may have completed a circular feature, but these had been toppled over. The upright stones may have formed a storage bin; the lack of ash suggests it was not a hearth.

Materials inside the C557 feature included camelid and deer remains.



Figure 6.32 New surface and semicircular stone feature 30 cm above fill CY-C4.

During CY-D2, more fill was laid and walls were constructed above CY-D1. These walls were double sided, usually only one or two coursing of stone high. These low walls often overlapped each other (Figure 6.33). There are three possible explanations for the arrangement and character of these walls: they were foundations for perishable structures that underwent repeated remodeling over time, they were haphazardly, likely expediently made walls to divide but not visually enclose different spaces, or they were taller walls that, with each remodeling, were torn down to their foundations so that the stones could be used for building new walls. Two walls can be grouped into CY-D2, although they were not likely built at the same time: C50 and C31. C50 was built first, and runs roughly north south, or perpendicular to wall C40 (PC-J5). C31 is slightly higher than C50 and runs perpendicular to it; C31 may have crossed over C50 or the two walls may have formed a corner. An informal floor, C30, was associated with wall C31 as well as walls C40 and C14, the tops of which were still visible (Figure 6.34).



Figure 6.33 Photomosaic of the Southeast corner of Operation 1, showing the cross-cutting walls of CY-D2.



Figure 6.34 Photograph of floor surface C30 associated with wall C31, facing north. The floor is eroded and sloping to the east (right).

During CY-D3, walls C50 and C31 were converted into retaining walls for low platforms, perhaps to cover the architecture below. The double-sided lower C50 wall was built up and faced only on its eastern size (Figure 6.35). Subsequently, the north-facing retaining wall C9 was built above and in alignment with the northern side of the C31 double sided wall. Retaining wall C9 was uncovered in poor conservation within the 2009 test pit U.E. 3 (Figure 6.36).



Figure 6.35 Wall C50, which was converted into a retaining wall. It runs north-south. Photograph facing west.



Figure 6.36 Cayán Phase 2 platform C9, which was built directly over and aligned with the northern face of wall C31. **Left:** Orthophoto of the uppermost Huarás platform in CY-D3, which was faced by retaining wall C9. Wall C9 was only preserved in test unit U.E. 3 (outlined in orange), and is visible in Suboperations R12 and S12. **Right:** Photograph of platform C9, facing northwest.

Within the CY-D3 fills were various Huarás-style ceramics mixed with earlier Janabarriu styles. In this mixed fill were two notable ceramic fragments. The first is AE-190, a bowl base with a flat base that features the body and face of a stylized personage, likely representing a deity, and was found in the upper CY-D3 fill (Figure 6.37). This fragment is notable because it is the second of two Huarás vessels with iconography (the other being the polychrome vessel discussed in CY-C2) at Hualcayán. Moreover, it is almost identical to the image on a vessel in the Museo de Ancash in Huaraz (see Gero 2001, Figure 4, Page 22 and Wegner 2011:23, Figure 1). The similarity of these two objects suggests regional interaction either by trade of decorated vessels produced in workshops within the Callejón de Huaylas Valley or in other ways that spread religious ideas and standards for craft production. The second fragment worth mentioning is AE-430/AE-449, a carefully incised gray bowl with a flat base that had linear incisions with colored powder or perhaps deteriorated paint (Figure 6.38). The incisions alternate between two colors that resemble types of ochre: pinkish red and yellow. It likely dates to late Perolcoto Phase 4, and was either curated or present in refuse and reused as fill during Cayán Phase 1.

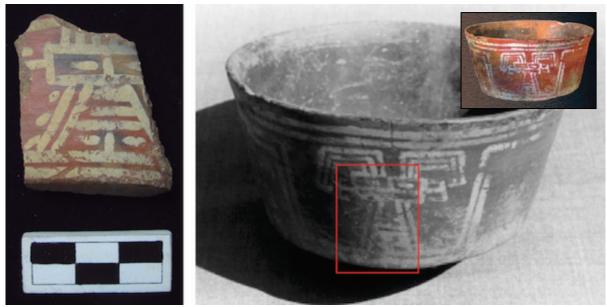


Figure 6.37 Left: Artifact AE-190, a base fragment collected from CY-D3 fills. **Right:** Huarás ceramic bowl of unknown provenience (photographed and presented by Gero 2001, Figure 4, Page 22; color thumbnail of same vessel from Wegner 2011:23, Figure 1).



Figure 6.38 Artifact AE-430/AE449, recovered from the CY-D3 fills, is a flat-based open bowl with incisions that are colored with alternating pinkish-red and yellow powder or paint.

Although definitive Cayán Phase 1 contexts were not excavated elsewhere at the site, Huarás-style ceramics were occasionally found in low quantities on the surface across the site, in tombs, and in excavated fills. In the excavation of the East Terrace Area (Operation 6), seven white on red sherds were mixed with other materials. Beyond the Perolcoto Mound, Huarás ceramics were rare. About five fragments were found in *machay* tombs, which may indicate the tombs were first built during this period, or it may simply suggest prior activity on the mountainside. One Huarás fragment was recovered during the Operation 22 excavation of a domestic patio group, which also suggests little direct Huarás occupation of the excavated area. More excavations are needed in the Hilltop Residential Area to understand the extent of the Huarás occupation at Hualcayán. Nonetheless, the distribution of Huarás materials across the site may suggest that the Cayán Phase 2 pattern of hilltop residence and mountainside tombs had its roots in Cayán Phase 1.

Overall, the Cayán Phase 1 activities provide crucial data on the transformation of ritual space and practice at Hualcayán and the reorganization of the Hualcayán community more broadly. More data are needed to explore changes in domestic and mortuary activities across the site, but the evidence from the summit of Perolcoto indicates detailed stages of transformation in community ritual practices in particular. That is, the data from Perolcoto suggest not only what *kind* of activities characterized Huarás ritual practice, but instead reveal several stages in a long-term process of change that unfolded over the course of several centuries between approximately 500 BC and AD 1.

The evidence suggests there was an initial decommissioning of Chavín sacred spaces by covering floors with ash and stone without the construction of new floors, likely

rendering them largely unusable for formal ceremonies as before. Then, perhaps one or two hundred years later, once Huarás styles has fully developed, the walls and floors of the Northwest Platform Area were systematically destroyed and filled with these new materials, suggesting these Huarás materials were crucial to the expression of a new kind of identity that was being expressed. In particular, these acts seem to inaugurate a new moment in the community, whereby small groups feasted, perhaps in a competitive fashion, in the spaces once likely more closely controlled by a few ritual practitioners in Chavín times. Foods—as will be discussed in Chapter 7—remain focused on potato, sweet potato, and maize as they did in Chavín times, but the foods obtained through trade, such as marine mollusks, all but disappear. The food economy thus becomes more local, but with little apparent change to the food production regime. Yet the group feasting during Cayán Phase 1 may have been an important moment for restructuring the community, which, as we will see below, became more segmented during Cayán Phase 2.

Cayán Phase 2: The Early Intermediate Period "Recuay" era at Hualcayán (AD 200–700)

During Cayán Phase 2, Hualcayán residents continued some ritual activities involving food preparation and consumption on top of the Perolcoto mound and built new platform structures in both the Southwest and the Northeast Platform Areas. These platforms formally covered all traces of the architecture associated with the Chavín religion as well as the haphazardly constructed modifications made to them during Cayán Phase 1. In the East Terrace Area, family groups reused the mound to bury their dead in semi-subterranean chambers—and perhaps in other undiscovered areas of the mound as well.

There is also ceramic evidence, which includes Recuay style kaolin and effigy vessel fragments, that they reused the Sunken Plaza Area for ritual activities during Cayán Phase 2. At this time, they also began to develop the area north of the mound, where local groups built agricultural terraces and a series of ritual-agricultural compounds where foods were stored, processed, and ritually consumed and offered. These complexes and the activities carried out within them are a major focus of this chapter because they point to how residents integrated their food production labor and ritual practices during Cayán Phase 2, yet segregated these practices from other local groups. Together these changes indicate a dramatic shift in community organization, practice, and identity, with the spaces and activities of one's group becoming the principle social body through which many ritual and economic tasks were performed and community successes celebrated.

The residents also built nucleated domestic patio groups in walled compounds on a hilltop located southwest of the Perolcoto mound complex—denominated the Hilltop Residential Area (Figure 6.39). They also built tombs, open spaces, and terraces on the hilltop. They built many more tombs and terraces across the mountainside above the hilltop and others below it on Hualcayán's large sloping plain. If these terraces date to the period of expansive construction across the site, then it is possible that during Cayán Phase 2 local people expanded their community landscape to five and a half square kilometers, perhaps in part to support a growing population, as well as perhaps through an effort to claim local autonomy through intensive production and occupation 13. This section reviews these Cayán Phase constructions and activities in detail below.

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¹³ Although the full extent of the Perolcoto Phase land use or population size is buried beneath much of the Cayán Phase architecture and therefore unknown, the distribution of ceramics across

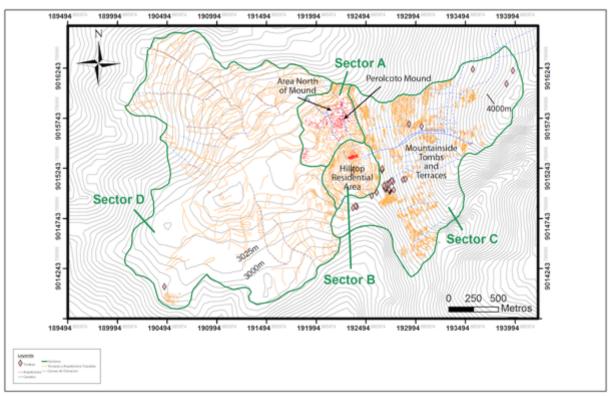


Figure 6.39 Map of Hualcayán showing Cayán Phase 2 areas mentioned in text.

Cayán Phase 2: Southwest Platform Area

Excavation data revealed two phases of activity on the Southwest Platform during Cayán Phase 2. The first, CY-E, is a period of unknown duration in which people periodically returned to the PC-E platform to carry out feasts. During CY-F they built a final platform to cover the entire PC-E complex which was still partially visible when its rooms were previously filled during CY-A. The CY-F fill was fairly uniform with few stones, and covered the remains of the last CY-E feast, which may have been performed by those who gathered to build the new platform.

Hualcayán suggests that Perolcoto activity was much more limited to the area immediately surrounding the Perolcoto mound.

CY-E: Feasting on top of the Southwest Platform

Excavations in Operation 1 uncovered several overlapping hearths and various scatters of fragmented Recuay-style serving wares and animal bone refuse on top of the PC-E platform. These features and remains suggest that people periodically returned to the top of the Southwest Platform Area for feasting during Cayán Phase 2. Because it is difficult to discern between the different events that produced these remains, they are discussed together as 'event' CY-E1. These CY-E features and materials are likely somewhat mixed with the preceding Cayán Phase 1 activities (CY-A) due to a continuation of periodic feasting on top of the still exposed PC-E platform. CY-E2 characterizes the final food consumption and feasting event, in which food preparation materials and other refuse was found in situ. CY-E3 characterizes the soil that was then placed to cover the CY-E2 remains.

Despite the ongoing long-term reuse of the PC-E platform, there was consistency in the use of different areas for particular tasks. Several overlapping hearths were created in the northern section of the platform, more or less in the area behind the PC-E stairway frame (Figure 6.40). Because the hearths were superimposed, it was difficult to distinguish their different horizontal extents during excavation, and all ash was collected as C477. Nonetheless, at least four different hearths were visible in profile, although many more fire events likely occurred in the areas not shown in Figure 6.41. The hearths are pit-shaped with no stone or clay frame.

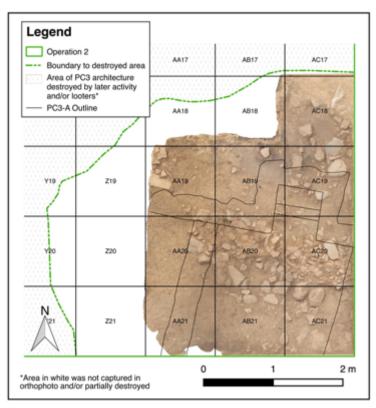


Figure 6.40 Map with orthophoto showing the distribution of the CY-E features. The top of hearth ash layer C477 is visible as a slightly gray area in Suboperations AB18-AC19. The C480 grinding stones placed above the ash are visible in the eastern extent of AC18 and AC19. The associated ceramic scatter C479 is visible in Suboperations AA20-AC21.



Figure 6.41 Photograph facing south showing the southern profile of Suboperations AA18 and AB18, indicating the superposition of the upper construction phases in the Southwest Platform Area. CY-E marks the C477 hearths that were located along these Suboperations. While the western extent of these hearths was destroyed by looters, the expansion of Operation 2 towards the east revealed that the hearths extend beyond this area shown here.

The material evidence suggests that the C477 hearths were associated with cooking and feasting. In particular, fragments of cooking and storage vessels (ollas and jars), decorated and undecorated Recuay, Chavín, and Huarás bowls, and a kaolin ceramic spoon fragment were recovered. In addition, expediently made flaked stone tools, guinea pig (*cuy*) and camelid bones, carbonized maize, and other unidentified carbon and faunal remains were recovered from the ash (Figure 6.42; Appendices F and G). Analysis of two ceramic fragments, a small jar and a bowl, revealed maize starches.



Figure 6.42 Left: kaolin bowl rim sherds from C477. **Right:** Kaolin spoon fragment and two lithic cores found in C477 immediately on top of stone ledge C1151, suggesting the ledge was still exposed when the area was reused during Cayán Phase 2.

An exciting result of the microbotanical analyses is that the kaolin ceramic spoon (AE1720) revealed maize starches that show signs of fermentation, indicating that it was used to serve maize chicha (Figure 6.43). This is the first evidence of its kind: though it has long been assumed that maize chicha was the dink of choice for Recuay libations, it has not been empirically proven. Moreover, spoons can now be confirmed as a tool used specifically for serving chicha.

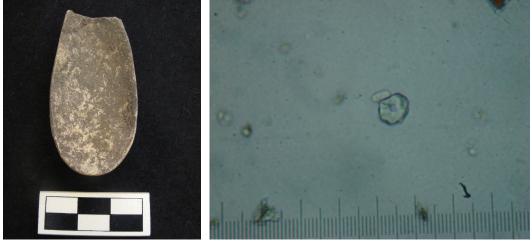


Figure 6.43 Left: Kaolin spoon fragment AE1720 from C477 that had the remains of fermented maize starches. Right: Microscopic view of a maize starch from the interior surface of AE1720 with signs of fermentation.

The C1151 stone ledge that framed the top of the PC-E stairway physically contained the C477 hearth on its southern side. This ledge also defined the hearth's vertical extent: the C477 ash began at the base of the stones and terminated at their surface, with the final hearth also covering the top of the stones (Figure 6.44). The stones were blackened from their exposure to these burning events (Figure 6.45). The C477 hearth ash was the thickest immediately north of the stone ledge and petered out in the other directions.

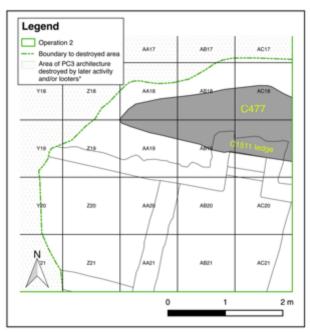


Figure 6.44 Map showing the extent of the C477 ash, which continues into the eastern profile of Operation 2. The C477 ash was contained by the C1151 ledge, except that the final hearth covered the top of these stones.



Figure 6.45 Photo facing south/southwest, showing the northern face of the charred stone ledge C1151 that borders the top of the PC-E stairway. The photograph was taken after the C477 hearths were excavated and removed. The original PC-E surface is visible in the foreground, north of the charred C1151 stones.

Carbon recovered from the lower portion of the hearth ash, below a charred stone immediately north of the C1151 stairway ledge, was radiocarbon dated to 896-596 cal. BC (HU01-SWPA-5)—Perolcoto Phase 4 (Figure 6.46). At first this early date was surprising given the prevalence of Recuay style ceramics within the ash, even though Perolcoto Phase styles were mixed into the ash. Although this early date could be due to burning old wood in a Cayán Phase 2 hearth, the five hundred to one-thousand-year date range between the end date of 596 cal. BC and the earliest possible Recuay activity of 1 AD suggests this is not extremely likely. Instead, it appears this ash was created during Perolcoto Phase 4, for the carbon was recovered in an area where the ash dipped 20 cm below the rest of the C477 ash, precisely behind the C1151 stone ledge. This deep pocket of Perolcoto Phase 4 ash north of the ledge is C498, and is associated with the PC-E platform fill C1165.

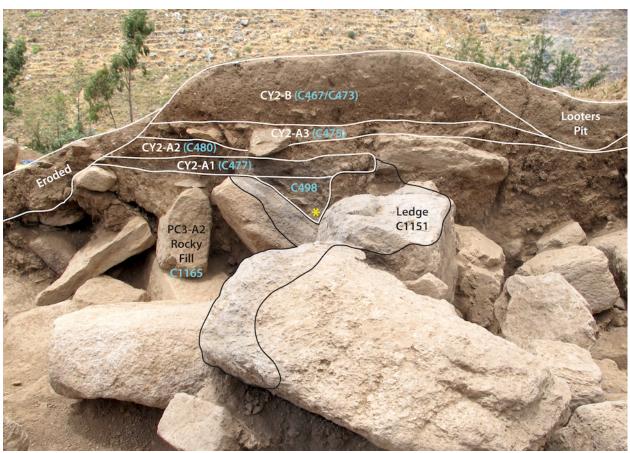


Figure 6.46 Facing east. White lines indicate layers. Black line shows extent of blackening on stones from fire. Notice how ash deposit C498 abuts C477 but dips below it. Based on diagnostic materials, ash deposit C477 is a result of Recuay activity during Cayán Phase 2, while AMS date HU01-SWPA-5 (yellow star) revealed that C498 was produced earlier, during Perolcoto Phase 4. C480 soil was laid over the C477 ash at the end of the CY-E activities.

Immediately above the C477 ash, two large stones for food preparation—one was a large worn *mano* (AE-1596), the other an unworked flat slab perhaps used as a cutting surface (AE-1597)—were laid along with a scatter of soil mixed with ash, animal bones, and ceramic fragments (C480/481/499; Figure 6.47). These remains are grouped as CY-E2. A mandible from a camelid, an estimated nine years of age, was left on top of the stone slab. Other faunal remains are scattered nearby, including additional camelid elements, deer, and *Bulimulidae* land snails. Microbotanical analysis of the flat stone slab (AE-1597) revealed maize starches, while the large *mano* (AE-1596) curiously revealed negative

results, which indicate that it was used to grind a food that does not produce identifiable starches or phytoliths or they were simply not preserved. Ceramic materials included bowls as well as ollas. A biface lithic tool and lithic cores were also recovered.



Figure 6.47 Left: Contexts C480 (with the C477/480 interface, collected as C499), with grinding stone AE-1596), stone slab AE-1597, and the camelid mandible left on top of the slab, AE-1592. AE-1597 was used for processing maize. Notice camelid foot bone in upper left. **Right:** Photo taken after the removal of grinding stone AE-1596 (and the upper fragment of AE-1597), showing that it was placed immediately on top of the C477 ash, and thus associated with the hearth's final use.

Just south of the hearth and food preparation area (C477/C480), and coeval with it during CY-E2, a large cluster of broken storage jars was deposited and later broken in situ (C479) (Figure 6.48). These vessels were arranged in an east-west alignment across the northern segment of the still exposed raised pathway of the PC-E platform. The jars were set against and on top of stones from the pathway, perhaps to stabilize them. It is clear that the ceramics were deposited while the top of the PC-E was still exposed based on the fact that the dense scatter terminates precisely where the platform ends (see Figure 6.44 map). Few artifacts beside the jar ceramics were recovered, and mainly included camelid bone elements. Interestingly, within the mix of stones and ceramics were two fragments of fired clay, one with cane impressions (Figure 6.49). These fragments may suggest that a wattle-

and-daub-type structure once stood here, although likely before the vessels were deposited, such as during the PC-E platform's first reuse in Cayán Phase 1. A single bone of an unidentified bird was recovered from a flotation sample, and a separate soil sample collected from beneath a jar fragment revealed maize starches and *Pooideae* grass phytoliths (Appendix F).



Figure 6.48 C479 jars in the foreground, C477 hearth and C480 artifacts in the background.



Figure 6.49 Wattle and daub-like fragment from C479, which has a cane or wood-like impression on its interior (left) and is smoothed flat on its exterior (right). Note that the image is a composite, showing both sides of the same artifact.

The scatter of stones (C488) beneath the smashed jars is the result of combined activities that occurred between Perolcoto Phase 4 and Cayán Phase 2 that are in part because of and precede this Recuay era (CY-E) feasting activity. In particular, they include the architecture and final Perolcoto Phase activities on the PC-E platform, the CY-A feasting, and the CY-E feasting. Once the C479 jars were removed, few artifacts remained over the stones, but included three camelid elements. On top of the C488 stones were two stone slabs that were similar in form and material to the slab found in C480 with maize starch residues. It is likely that these slabs were similarly used for processing foods (Figure 6.50). Carbon was recovered from below the jars, near where the soil around the stones abuts a light-colored layer of ash (C489). This carbon was intended to date CY-E, but the resulting date was between 773 and 417 cal. BC (HU01-SWPA-10), or during Perolcoto Phase 4. This early date from ash that was closely juxtaposed to in situ Recuay materials is good evidence that the top of the PC-E platform was exposed and reused for hundreds of years.

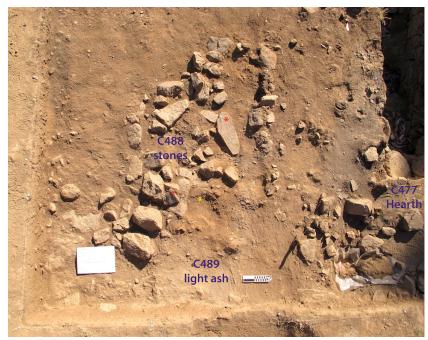


Figure 6.50 CY-E, showing the location of carbon HU01-SWPA-10 (yellow asterisk). Stone slabs are noted with red asterisks. Note the area of light gray ash for C489 and the dark charcoal-colored ash for C477.

Finally, during CY-E3, a layer of soil and refuse (C475) was placed over the artifact scatters and hearths of CY-E2 (including over C477, C479, and C480) (Figure 6.51). The boundary between the CY-E3 soil and the subsequent fill placed above it during CY-F was not well defined. During excavation, the CY-E3 soil, which was approximately 10-15 cm deep, was separated from the CY-F soil above it once the C479 scatter of jar fragments and other artifact concentrations began to appear. Therefore, CY-E3 may contain a mixture of artifacts from these different events, and may have been deposited at the same time as CY-F. The soil contained a variety of faunal remains, including thirty-seven camelid elements as well as guinea pig, viscacha, and other unidentified mammals. A lithic scraper was tested for microbotanical remains, but had a negative result.



Figure 6.51 View facing north of CY-E3 soil (C475) in the process of excavation to expose the CY-E2 broken ceramic jars (C479). The tops of several jar fragments are visible protruding above the top of C475.

CY-F: Final Platform construction in the Southwest Platform Area

CY-F is a platform built over CY-E3, and is the final construction event in the Southwest Platform Area. This platform was created by laying 30 cm of fairly uniform soil (C467/472/473), which was deeper in the areas surrounding the PC-E platform where it covered the CY-A fill (Figure 6.52). CY-F completely covers the CY-E3 refuse and soil fill below. As such, the CY-E2 food preparation areas, the CY-E3 layer of refuse and fill, and the final CY-F platform fill may have been deposited as part of the same sequence of events, perhaps over a single day or several days. The distinctive CY-F fill not only covered the refuse laid on top of the PC-E platform, but it also covered the CY-A fill that had covered the spaces beside the platform.



Figure 6.52 Photograph of Operation 2, facing southeast, showing how the CY-F fill was deposited over all exposed PC-A architecture, including in the spaces that surrounded the PC-A platform that had been previously filled during Cayán Phase 1 (CY-A ash and stone; visible in the foreground).

The platform fill contained few stones and a variety of artifacts. Ceramics were mixed Recuay, Huarás, and Janabarriu styles with a variety of forms, including bowls, jars, bottles, and ollas. Lithics included cores, biface tools, scrapers, and hammer stones. Faunal remains included guinea pig, deer, camelid, viscacha, dog (n=1), other unidentified mammals, and *Bulimulidae* land snail. In addition, there was a bead crafted from a long bone of a bird (AE-1568; Appendix G) (Figure 6.53).



Figure 6.53 Bone bead (AE-1568) recovered from CY-F context C467, which was made from the long bone of a bird.

The CY-F platform's form and extent is unclear because most of its retaining walls if they existed at all—were eroded. Only the southern retaining wall, which ran east-west at an orientation of 100°, was intact. The top of the Southwest Platform Area is roughly level but slopes down from east to west (from 3177 to 3176 masl). The intact southern retaining wall also aligns with Perolcoto Phase 4 architectural features, which suggests that it was either built to maintain the existing alignment, or it suggests that builders simply reused a preexisting Perolcoto Phase 4 wall to contain the CY-F fill, perhaps raising it slightly. The rest of the platform's shape can only be inferred, but the eroded sides form a roughly polygonal form, not unlike the final Cayán Phase 2 platform in the Northeast Platform Area, which were better preserved. The hypothetical locations of the CY-F walls are presented in Figure 6.54, and are estimated based on where the flat mound surface ends and the sloping eroded sides of the Southwest Platform Area begins. It is possible that retaining walls were never built, however, and the final shape of the Southwest Platform more reflects the preexisting form of the platform built during Perolcoto Phase 4, whereby the CY-F soil was laid to cover the refuse from Cayán Phase 2 activities and to decommission this space, but not to construct a true platform.



Figure 6.54 Cayán Phase 2 platform constructions in the Southwest and Northeast Platform Areas.

Cayán Phase 2: Northeast Platform Area

During Cayán Phase 2, people in Hualcayán built a new platform (CY-G1, with a small abutting side platform and room, CY-G2, which was reflowed during CY-G3) in the center of the Northeast Platform Area in order to cover the still exposed Perolcoto Phase 4 and Cayán Phase 2 constructions that flanked it. When they built this platform, which covered the still exposed PC-J platform complex, they changed the architectural form from rectilinear to roughly curvilinear (with some straight sides), perhaps to mimic the Southeast Platform's shape and create greater symmetry in the mound's dual form (Figure 6.55). They also built this final platform over the Cayán Phase 1 fill that had covered the earlier PC-J platform's flanking rooms. In this way, the sequence of building a Cayán Phase

2 platform over a Perolcoto Phase 4 platform and various Cayán Phase 1 fills is similar to the Southwest Platform Area¹⁴. Unlike in the Southwest Platform area, however, they did not leave in situ any refuse from cooking, feasting, or other activities before constructing the CY-G platform, or at least evidence of these activities were not exposed within the excavated area of Operation 1.



Figure 6.55 The yellow bracket indicates the full diameter of the CY-G curvilinear platform in the Northeast Area.

CY-G: Platform

CY-G includes three construction phases, CY-G1 through CY-G3. Phase CY-G1 is the construction of a somewhat curvilinear platform in the center of the Northeast Platform Area. Phase CY-G2 is the construction of a smaller flanking platform and room on the northeast side of CY-G1, which was then resurfaced with a stone floor during CY-G3.

 $^{^{14}}$ In the Southwest Platform Area, the sequence referred to is the PC-E platform, the CY-A fill, and the CY-F platform. This is parallel to the Northeast sequence of the PC-J platform, the CY-B fill, and the CY-G platform.

CY-G1 is the best preserved Cayán Phase 2 platform on the Perolcoto mound, and is the final construction phase in the Northeast Platform Area. The entire platform was visible on the surface and could be mapped without excavation; its fill depth varied, but was approximately 40 cm over the existing structures and fill. Its overall form can be described as curvilinear, but it has several linear segments, particularly on its western extent. Its diameter is 15.8 m on both its north-south and east-west axes, but an angular notch extends the northwest quadrant an extra 1.5 m. Operation 1 was placed in the northeast quadrant of the platform, partially inside of (southwest) and partially outside of (northeast) its curved wall, C15. C15 is a double-sided wall, but it also serves as a retaining wall for the platform's interior fills, C1-C4. The lower stones of C15 that contained the platform's fills were preserved around the entire structure, but the upper stones above the platform's surface were in various states of preservation. The best-preserved area of C15 is its far northeast segment, within Operation 1, which included a large upright stone that was at least 1.1 m tall. Perhaps of significance, this stone is opposite the Southwest Platform Area if one draws a centerline through both platforms. Excavations do not suggest the stone marked anything below, although the area north of the stone was destroyed by looting activity (wall segments protruding toward the north of the stone area were found truncated and the surrounding soils heavily disturbed) and it is possible that looters searched for or found a tomb there.





Figure 6.56 Top: Photograph of Operation 1, facing northwest, showing how the CY-G1 curvilinear platform (retaining wall C15 and fills C1-C4) was built over the rectilinear PC-I11 and PC-J3 platforms (retaining walls, C13 and C14, respectively) and Cayán Phase 1 fills. The architecture shown below context C4 was exposed during the excavation of test unit U.E. 3. **Bottom:** Same features, shown facing west.

The CY-G1 platform's fills (C1-C4) had a uniform consistency with few stones; these fills contained a variety of artifacts. Ceramic forms included bowls, plates, ollas, large and small jars, and bottles. Recuay-style ceramics—such as those made with kaolin clay—were numerous and appear for the first time in the Northeast Platform Area. The numerous earlier styles mixed within the fill included Perolcoto Phase 4 Formative styles and Cayán Phase 2 Huarás styles. Other remains included lithic cores, bifaces, and scraper tools, and

camelid, guinea pig, deer, and other unidentified mammals, including unidentified eventoed ungulates (*Artiodactyla*; Appendix G).

A platform and room, CY-G2/C3, was built against the northeast exterior of the CY-G1 platform wall (C15). These features were built to cover the PC-J5 side platform that abutted the larger PC-J5 platform. To build the CY-G2 platform, two layers of fill (C551/C553 soil and C555/C556 stone and soil) were laid directly over the earlier PC-J5 platform surface (C559). Once the platform's fills were laid, a thick floor (20 cm; C47) was built as the platform's surface and was bordered by a northward-curving wall made of medium to large stones (10-60 cm diameter; C23). During CY-G3, this floor was covered by a layer of soil (C42/C44) and capped by a stone floor (C32). The stone floor was made of stones of different shapes and sizes, but all had a worked flat surface. The northeastern extent of this floor and the entire platform was eroded on its northeastern extent; no retaining wall was recovered on this side.





Figure 6.57 Top Left: Photograph of CY-G2 features, facing southwest. Image shows how floor C47 and wall C23 were built against the CY-G1 curvilinear platform wall C15. Several artifacts were left on top of the C47 floor when the CY-G3 constructions covered it, including two camelid bones (AE412 and AE413), decorated kaolin ceramic (AE414), and a tablet-like stone tool that was used to process potato and maize (AE415). **Top Right:** Photograph facing northwest of stone floor C32, which was laid over floor C47 during CY-G3. The CY-G2 and C3 platform constructions were eroded on their northeastern extent, which is visible to the right of this photograph. **Bottom:** Photograph of stone floor C32, facing west. The looter's pit is visible on the left, and the eroded edge in the foreground.

The artifacts within the CY-G2 and CY-G3 fills contained a variety of Recuay-style ceramic artifacts mixed with earlier styles, in addition to a variety of other artifact refuse. Within the CY-G2 platform fills (C551/C553/C555/C556) and floor soil (C47) were guinea pig, camelid, viscacha, rabbit, and deer, as well as artiodactyla and other unidentified mammals. Land snail species *Systrophia sp.* and *Thaumastus sp.* were also present. Ceramic forms included a range of bowls, plates, jars, ollas, a spindle whorl, and a panpipe fragment,

and included Janabarriu, Huarás, and Recuay decorative styles. Lithics included cores and biface tools. Botanical remains included *Alnus sp.* and other unidentified carbonized woods. In addition, the C47 floor contained a bezoar stone, which is a hard kidney-stone mass that often forms in the gastrointestinal system of camelids. Ethnohistoric accounts of traditional societies in the Andes suggest these stones were valued as fertility objects, thought to ensure healthy and abundant herds (Brosseder 2014; after Castro de Trelles, 1992).

The CY-G3 fills (C42/C44) contained a variety of artifacts similar to those in CY-G2, though the smaller area that remained of these contexts after erosion produced fewer materials. Faunal remains included exclusively camelid elements. Artifacts placed on top of the C47 floor—deposited immediately before the CY-G3 fill (C44) was laid—were several artifacts, including decorated kaolin sherds (e.g., AE414), processed camelid long bones (AE412 and AE413), a multi-use stone tool with tablet-like surfaces (AE415). Microbotanical analysis of this stone tablet revealed maize and potato starches.



Figure 6.58 C44 artifacts recovered at the interface with floor C47. **Top:** ceramic bowl fragment AE414. **Bottom:** Processed camelid long bones with butchering marks AE 412 and AE413, and tablet-like stone tool AE415.

Excavations in Operation 6 revealed that during Cayán Phase 2 local groups—likely families—in Hualcayán reused and remodeled the lower flanking terraces of the Perolcoto mound for mortuary activities. We chose to excavate the East Terrace after we located subterranean chambers with human remains in this area. These excavations uncovered a Cayán Phase 2 architectural complex, CY-H, that included a double chamber semisubterranean tomb surrounded by walled spaces and small platforms. The extensive in situ feasting remains uncovered in these spaces provide the most comprehensive example of mortuary-related feasting practices at Hualcayán. The recovered human remains inside the mostly sealed tomb (with some modern disturbance from farming activities) also provide the only example from Hualcayán of an undisturbed single-phase Recuay mortuary unit; all other documented Recuay tombs were reused during Cayán Phase 3 (the Middle Horizon) or were completely looted, leaving only empty chambers.

The evidence reviewed below suggests that CY-H was a relatively intimate and non-elite tomb area that was likely used by a single family or a small extended family. This is evidenced by the presence of both subadult and adult individuals in the tomb (see Appendix H) as well as the tomb's small size and the lack of elite grave goods. As such, there is no indication that this family group held any particular precedence over the mound as a mortuary or other ritual space. Although CY-H was the only Recuay mortuary complex we documented on the mound's flanking terraces, other family groups likely built similar complexes on the mound.

CY-H: Mortuary complex with burials and feasting

The construction and use of the CY-H mortuary complex is divided into three primary phases, CY-H1 through CY-H3. During phase CY-H1, sections of the preexisting Perolcoto Phase 4 architecture PC-K were partially destroyed in order to construct two connected semi-subterranean tomb chambers. During CY-H2, a room complex was built adjacent to the tombs. During CY-H3, a feast was held just outside of the tomb, which was left in situ and immediately covered with stone and soil fill. A fourth phase, classified as CY-H4, includes the construction of a wall on top of the CY-H3 fill; this wall, which stands exposed on the surface, could not be accurately dated and may postdate Cayán Phase 2.

The two CY-H1 tomb chambers are arranged on an east-west axis and formed by a combination of stone retaining walls, double-sided walls with accesses, and capstone roofs. We named the chambers according to their locations—the East Chamber and the West Chamber. The chambers were in good preservation, although the East Chamber's roof was partially dismantled on its northern extent, which may be evidence of some looting or disturbance from farming activities.

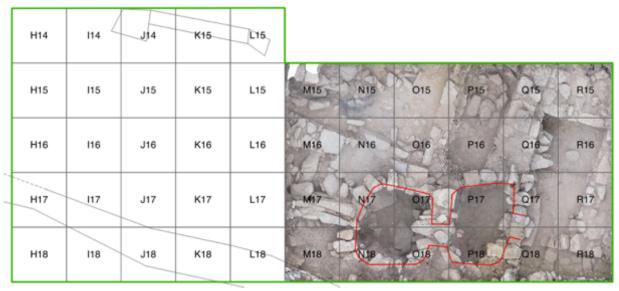


Figure 6.59 Map of Operation 6 Suboperations, showing the location of the CY-H1 tomb chambers and surrounding architecture. Orthophoto in the east (right) shows the initial area excavated before the unit was expanded towards the west.

The CY-H1 tomb was intrusive in to the PC-K terrace architecture, and was built by removing a section of the existing walls and excavating into terrace platforms and fills. After this destruction, retaining walls were placed in the cavity to line the tomb interior and to create the accesses. Analysis of the interior construction seams indicate that the East and West Chambers were constructed at the same time: the same wall formed the southern side of both chambers with the central access built perpendicular to it. Each chamber was approximately 2x2 m in size, and stood approximately one meter tall, measuring from the floor to the bottom of the roof's capstones. The tomb's roof was built by corbeling stones inward from the tomb's walls, and then placing large capstones over the center. The roof's capstones were removed in order to facilitate systematic excavation in the small chamber spaces.

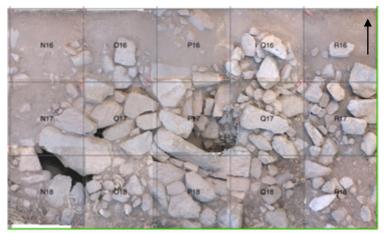




Figure 6.60 Top: Georeferenced mosaic of images showing the tombs after the overburden was removed. Notice the disturbance of the capstones in the northern roof of the East Chamber. Each Suboperation square is 1x1 m. **Bottom:** Composite photograph, facing south, of the tomb's capstones and surrounding collapse. Note the East Chamber's disturbed roof, visible at center left.



Figure 6.61 Photographic sequence of the West Chamber as the corbeled capstones were removed, illustrating the roof's construction technique. **Left:** The West Chamber before any stones were removed, showing the capstones in place; **Center**: West Chamber after the capstones were removed, showing how the corbeled stones extend inward from the chamber's walls; **Right:** The West Chamber's walls after the roof was entirely removed (excluding the stones covering the central access, right).

The East and West Chambers are connected by a rectangular access with a stone lintel, and a similar lintel forms the tomb's formal entrance on the eastern wall of the East Chamber. Given this layout, it is necessary to first pass through the East Chamber in order to enter the West Chamber. It is possible, however, that the West Chamber was accessed by removing of the roof's horizontal capstones. In addition, small objects could have been deposited through the spaces between the capstones. The eastern access is 46 cm tall and 46 cm wide, and the inter-chamber central access is 68 cm tall and 56 cm wide.



Figure 6.62 Left: The main tomb entrance on the eastern wall of the East Chamber. Photograph is taken from outside the tomb facing west. The image also shows the stones and soil used to block this entrance at the end of its use. **Right:** The central access between the East and West Chambers. Photograph is taken from inside the East Chamber facing west, with the West Chamber visible through the access.

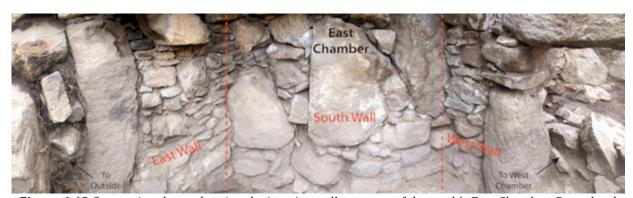


Figure 6.63 Composite photo, showing the interior wall masonry of the tomb's East Chamber. Dotted red lines indicate the chamber's corners. Notice that (1) there is a wall seam at the junction of the south and west walls, indicating how the access to the west chamber was built against the southern wall, whereas (2) there is no seam between the south and east walls; instead, this corner is curved.

The tomb's skeletal remains suggest that the tomb was used by a single family over the course of one or two generations. Bioarchaeological analysis of the human remains, performed by specialist Emily Sharp, revealed an MNI of nine individuals in the two chambers. The remains were identified as four adult and five subadult individuals (Appendix H). Of the adults, two are male, one is a probable male, and one is indeterminate. These results suggest the possibility that the tomb contained only male individuals. However, this claim cannot be supported without knowing the sex of the subadults and the one indeterminate adult. The mixed adult and subadult remains more likely represent a family unit (Appendix H).



Figure 6.64 Left: East Chamber before excavation, facing south. **Right:** detail of the East Chamber's human remains, facing south.



Figure 6.65 Left: West Chamber during excavation, facing northeast. Image shows a concentration of human remains in the northeast corner of the chamber. **Right:** detail of the concentration of human remains, facing north.



Figure 6.66 Human remains from inside the tomb included a perforated bone, perhaps worn as a pendant.

The grave goods placed in tomb CY-H1 suggest it was used by a non-elite group. In comparison to the fancy decorated pottery and elaborate metal objects recovered from tombs at other Recuay sites in Ancash, the materials were modest. The most complete vessels consisted of undecorated jars, small ollas, bowls, and plates, while decorated vessels were found only in smaller fragments¹⁵. In most cases, these decorated fragments did not connect to others inside the tomb, suggesting that some of the of decorated fragments may have fallen inside the tomb during activities held outside of the tomb, such as the CY-H3 feasting. Other remains included fragments of small metal objects, which appear to be simple tupu shawl pins. Lithics included a biface tool and several cores.

Macrobotanical and flotation analyses from the tomb revealed chili pepper (*Capsicum sp.*), peanut, achira (*Canna sp.*), Poaceae grass, and unidentified tubers, seeds, and flowers (Cruzado 2015; Appendix F). Many faunal remains likely entered and died in the tomb naturally, although some may have been placed with the burial. These include toads (*Bufo*

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¹⁵ Analysis of the majority of non-decorated materials could not be completed for Operation 6 due to a lack of time, in part due to the high quantity of decorated and in situ vessels collected as "Special Artifacts," which were given priority. Nonetheless, the Special Artifact ceramics collected both inside and outside of the tomb chambers were analyzed in full (100%). Some of the analyzed special artifacts were not decorated, however.

sp.) and other amphibians, birds (*Cyanocorax sp., Passeriforme*, and unidentified species) and duck (*Cairina moschata*), agouti and other rodents, and bats. In addition, modern pig bones were recovered, which are likely present due to modern farming disturbances and activities. Most interestingly a feline ulna was fashioned into a flute. Specialist Teresa Tham Rosales suggests the size of the feline bones indicate a wild mountain cat (*Felis colocolo*; Appendix G). Microbotanical analysis of five ceramic fragments revealed maize residues and a sixth fragment revealed potato residue. One of the maize residues had a well-preserved white paste, which may be an ancient form of *sango*, a dish made from maize flour (personal communication Victor Vásquez Sánchez). A grinding stone fragment was also tested, which revealed maize and potato starches (Appendix F).



Figure 6.67 Small undecorated jar broken in situ in the SE corner (left of doorway) of the E tomb C236 AE0233.



Figure 6.68 Ceramic with a thick white residue that could be an ancient example of the dish *sango*, a paste made from maize flour. The paste was laid over a thin layer of straw. (Sample from context C241, a ceramic concentration (CE-1190) found in the northeast corner of the East tomb chamber.

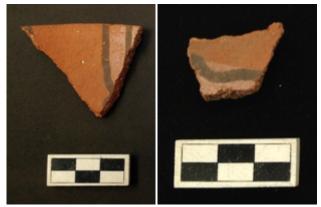


Figure 6.69 The two Middle Horizon (Tzacpa Phase 1) sherds recovered from inside the tomb. Both come from the eastern chamber of the tomb, which had an access way to the outside and was therefore more accessible than the western chamber.



Figure 6.70 Materials from inside the tomb chambers. **Left:** Metal tupu fragmet (AE228 from context C223). **Right:** Feline ulna flute, AE-223 (context C224). Based on size, it is likely of a mountain cat (*Felis colocolo*) or perhaps a small puma (*Felis concolor*).

During CY-H2, a large architectural complex was built around the CY-H1 tombs, consisting of low walls dividing space, and small rooms and platforms. The complex was primarily uncovered to the west of the tomb when Operation 6 was expanded in this area, although the complex is larger than Operation 6. The architecture maintains the same 100degree orientation of the Perolcoto Phase 4 walls they partially destroyed and reused. It is thus probable that the CY-H2 complex was built at the same time as the tombs, but because most structures could not be verified to the same construction phase as CY-H1 with absolute certainty, they were designated as a separate complex. Nonetheless, one wall (C621) extended outward (west) from, and was built into, the middle of the West Chamber's corbeled roof. In addition, an intact floor (C620) abutted both this wall and the outside of the tombs. These features suggest that at least some CY-H2 structures were built at the same time as the CY-H1 tombs. Construction fill included a variety of ceramic, lithic, and faunal remains. One notable artifact is a camelid metatarsal (AE1274), which otseometric analysis identified as alpaca, that had been perforated and may have been worn as a pendant. A fragment of a donut-shaped porro mace head was also recovered (AE245, C229). Although the artifact may also be an agricultural clodbreaker, microbotanical analysis revealed no starches or phytoliths to support this.



Figure 6.71 Left: Photograph of Operation 6, facing east, showing the area that was expanded west of the tomb. **Right:** The west area after excavations uncovered a complex of rooms and low walls.



Figure 6.72 Photograph of the western profile of Operation 6, detailing the rooms and platforms uncovered in the complex west of the tomb.



Figure 6.73 Left: Perforated alpaca metatarsal (AE1274), perhaps worn as a pendant. **Right:** *Porro* mace head fragment (AE245).



Figure 6.74 Floor C620. Notice wall C621, running east-west in the far right foreground, which was built across the tomb's walls, over which the tomb's roof was constructed.

The in situ remains of CY-H3 provided the greatest evidence for mortuary-related feasting at Hualcayán, as well as one of the richest contexts in terms of the variety of foods consumed. In CY-H3 (composed of contexts C211, 214, 215, 225, 231, 233, 237, 239, 244, 245, 246, 606, 617, 618, 619, 622, 623, 1001), multiple ceramic vessels were smashed in place, and found along with lithic, faunal, and botanical materials in a walled area just northwest of the tomb. This walled area was roughly 2 x 3 m defined by the northeastern wall of the tomb's West Chamber and four low walls (C248 to the north, C245/610 to the east, C621/642/1002 to the south, and C643/1003 to the west). Nearly all of the ceramic fragments, which included bowls, ollas, and jars, could be reconstructed into whole or nearly whole vessels, which suggests they were deposited after their use and covered shortly afterward without much disturbance. Moreover, they were mixed with a high variety of botanical and faunal remains as well as lithics, which are together indicative of in situ food preparation and consumption. The ceramics featured a variety of painted and modeled designs and iconography including condor and canine.



Figure 6.75 Photographs taken from above and facing west of the in situ smashed vessels in CY-H3, which are indicative of feasting immediately outside of the semi-subterranean tomb CY-H1. **Right:** Photograph showing three stages in the sequence of construction, feasting, and post-feast activities: 1) the floor outside the tomb used for the feast (cleared and visible in the upper left corner); 2) the ceramic and other feasting remains left or smashed on this floor (visible throughout), and 3) the soil and stones placed over the feasting remains to cover them at the end of the feast (visible in the lower half of the image, with larger remains shown partially exposed). **Left:** Photograph showing the CY-H3 remains that were uncovered in the area shown in the upper left of the photograph on the right; the photograph on the right shows this area after these materials were removed to expose the floor below.



Figure 6.76 Details of the CY-H3 remains.

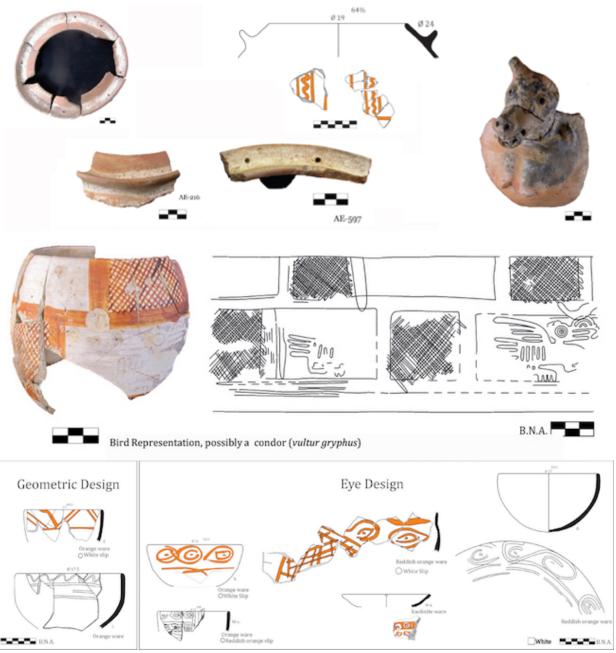


Figure 6.77 Illustrations and photographs of reconstructed vessels from CY-H3. Illustrations by Bryan Nuñez Acarpana (Nuñez 2012).

The foods consumed during feasting event CY-H3 were highly varied. Feasting remains included camelid (n=37) and guinea pig (n=3) in CY-H3 (Appendix G). One camelid long bone, either a right radius or right ulna, was carved into a flute. The majority of the in situ feasting remains were largely undisturbed, although modern plowing may have caused

some disturbance. Carbonized botanical remains included amaranth, quinoa, beans, prickly pear tuna cactus fruits (Opuntia sp.), potato, Dichondra sp. weed (Appendix F), which was perhaps brought with harvested foods or as fodder, and maize; maize remains included whole kernels (Appendix F). Several carbonized wood samples were also recovered, which, along with associated areas of ash, indicate that burning—likely cooking—occurred in this area. The specific wood species could not be identified, however. Microbotanical residue analysis of the base of an in situ jar or olla produced squash (*Cucurbita sp.*) and wild grass (*Pooideae*) phytoliths and maize starches, which suggests either the vessel was reused to cook or store various dishes, or that these ingredients were combined in a particular dish, such as a stew. Lithics included cores, flakes, a biface point, two hammerstones, a polishing stone, and a groundstone biface fragment. Microbotanical analysis of the groundstone biface produced squash remains. In addition, an unusual groundstone circular disk, perhaps a multipurpose tool, produced potato starches. A soil sample collected from amongst the ceramic scatter (C211) revealed maize starches and *Bambusoideae* phytoliths. Finally, carbon sample HU01-ETA-1, collected from within the smashed ceramics and botanical remains, was dated to between 441 and 607 cal. BC (Appendix A).



Figure 6.78 Left: Bowl reconstructed from various fragments scattered across two Suboperations (N16 and 016) outside the tomb. **Right:** In situ jar or pot with residue of squash, maize, and wild grass.



Figure 6.79 Left: Camelid flute AE265, C619, M16, found within concentration of smashed feasting refuse C619. **Middle:** AE586 groundstone disk. **Right:** AE248 (C231) groundstone bifacial point with squash phytoliths.

At the end of the feasting activity, ceramics were smashed with stones and covered with wet, cement-like soil. This is supported because the ceramics were found immediately below the stones that smashed them, and where stones were not placed, the ceramics were hard to excavate away from the soil that covered them. The stone and soil fill that covered the feast's smashed remains likely coincides with the covering of the CY-H1 tomb's entrance with fill and blocking the top of it with stones. Thus, the CY-H3 feast may reflect the tomb's closing ceremony. Since there is no evidence that the site of Hualcayán was abandoned at this time, it is possible that the Perolcoto mound had lost its importance as a place for family ceremonies as time went on. For example, perhaps this tomb was mostly sealed as a new family tomb was built elsewhere, especially as *chullpa* and *machay* tombs became more popular in late/post Recuay times.



Figure 6.80 Photo from above of the CY-H2 fill, facing slightly east. North is left.



Figure 6.81 CY-H2 stone and soil fill, placed immediately over the CY-H1 feast remains.



Figure 6.82 Evidence of filling and reflooring (C601) and blocking of the tomb entrance (C630), which likely at the same time.

CY-H4 is the final construction phase of Operation 6, which is characterized by a wall built over the CY-H3 fill. Its masonry was somewhat haphazardly arranged *pirca* construction. It is not clear whether this wall was built immediately or long after the CY-H3 event. However, it's placement over the fill covering the CY-H1 through H3 complex, including the fill and stone that sealed the tomb, likely reflects a moment in which the terrace was repurposed, likely during late Cayán Phase 2.



Figure 6.83 CY-H4 wall, showing how it was constructed over the earlier CY-H architecture.

Cayán Phase 2: Sunken Plaza Area

CY-I: Filling of the Sunken Plaza

During Cayán Phase 2, a new fill and surface (estimated 30 cm thick) was laid in the sunken plaza. This event, CY-I, is indicated by the appearance of Recuay style ceramics within the new fill (C167). Architectural collapse (C163) from the sunken plaza wall was found both on top of this surface and buried below it, suggesting, along with its gently

sloping surface, that this new surface may have been placed to stabilize the plaza's then two to three thousand-year-old architecture.



Figure 6.84 New surface in the sunken plaza (C167), showing architectural collapse.

Materials within the fill include undecorated and decorated Recuay style ceramics, including kaolin fragments and a face neck jar. These were also mixed with earlier styles, such as concentric circles, from Perolcoto Phase 4. Microbotanical analysis of two lithics—a crude bifacial point and an obsidian flake—revealed potato and maize starches, although these materials could be from earlier periods. The line of stones or wall segment C168 may pertain to this period or earlier.



Figure 6.85 Recuay style ceramics recovered from the C167 fill.

As the people of Hualcayán slowed¹⁶ activities on the Perolcoto mound during Cayán Phase 2, they began to intensively develop the area north of the mound for both ritual and agriculture. In particular, they built and transformed at least five multipurpose compounds that show evidence for ritual activities—including feasting, food offerings, and human burial—and agricultural food storage. Notably, the number of the compounds indicates a new division of ritual practice and a move away from the more centralized rituals on the Perolcoto mound. Moreover, they built these structures within an area of newly constructed bench terraces and canals that would have intensified agriculture by slowing erosion and allowing for controlled irrigation.

I identified five Cayán Phase 2 compounds north of Perolcoto with a distinct U-shape form (open on one side, either rectilinear or curvilinear walls) or D-shape form (walls on all sides combining one straight and one curved wall). I identified a sixth structure north of the mound, a 26 x 18 m sunken oval enclosure, to be a reservoir because an ancient canal segment leads to it; it is also distant from the other structures (Figure 7, Top, E7). The U and D-shaped structures, ranging from 15 to 22 m in length, are described as "compounds" because they are multi-room structures, although each varies in its construction style and layout. The distinctive "D" or "U" shape may be present in one of two

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¹⁶ Though ritual consumption and building practices on the mound continued into Cayán Phase 2, the evidence for this activity is notably sparser. However, intensive feasting may have continued on the mound, followed by cleaning of these spaces; middens need to be identified in order to fully appreciate the regularity and nature of these activities beyond the occasional feasting already described.

ways: (1) the shape of the compound's external wall, within which modular structures are found, or (2) the shape of a principal or central open enclosure that is abutted by other rectangular or curvilinear rooms.

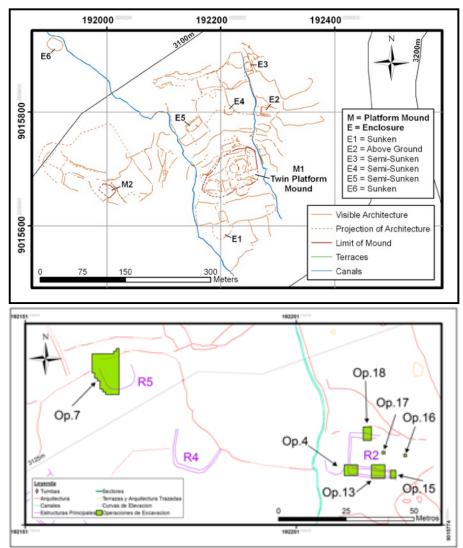


Figure 6.86 Top: Map of the Perolcoto mound and surrounding terrace and compounds. **Bottom:** Detail of the excavations in two compounds (Operations 7 and 4/13/15-18, respectively).

We excavated the two best preserved compounds: CY-J and CY-K. Excavations in Operation 7 uncovered 131 m^2 (30%) of the CY-J compound, which has a "D" shape and measures 26 x 16 m. Several small excavation units were placed in CY-K, and the combined

Operations 4/13/15/16/17¹⁷ uncovered 90 m² (40%) of the CY-K compound, which has a "U" shape and measures 14 x 16 m. Although the layouts of the CY-K and CY-J structures are distinct, excavations in them indicate that both of their forms—at least in their final iterations—consisted of an open plaza surrounded by corridors and agglutinated rooms. The difference between a "D" and "U" shape is whether a compound's fourth side was closed in by a wall, or left open with no wall.

CY-J: Central ritual-agricultural compound

CY-J is the largest of the compounds north of the Perolcoto mound. It is also the most centrally located within the sector of terraces and compounds north of the mound. The broad horizontal excavations in Operation 7 revealed an extensive area of the compound and its four principal construction phases, CY-J1 through CY-J4. These phases include the original construction of a rectilinear compound during CY-J1, the addition of various internal platforms containing human remains during CY-J2, the major renovation of the compound into a D-shaped patio surrounded by storage units during CY-J3, which featured a major feast and the deposit of human remains, and the construction of a new, higher bench terrace and canal around the compound's exterior during CY-J4.

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 $^{^{17}}$ This second structure was excavated by a cluster of smaller, detached excavation units of various sizes, Operations 4, 13, 15, 16, and 17. However, because Operations 15-17 were smaller test units or were not completely excavated, only "Operation 4/13" will be referred to in the text, although materials and architectural details uncovered in the other operations may be included in the description.

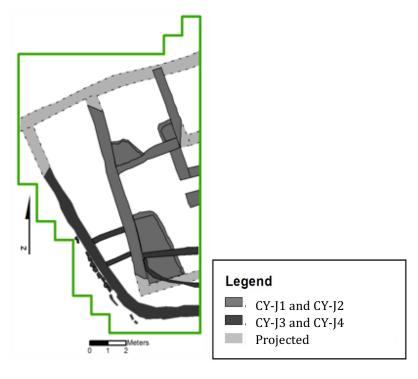


Figure 6.87 Map of Operation 7, showing the different phases of construction in the compound.

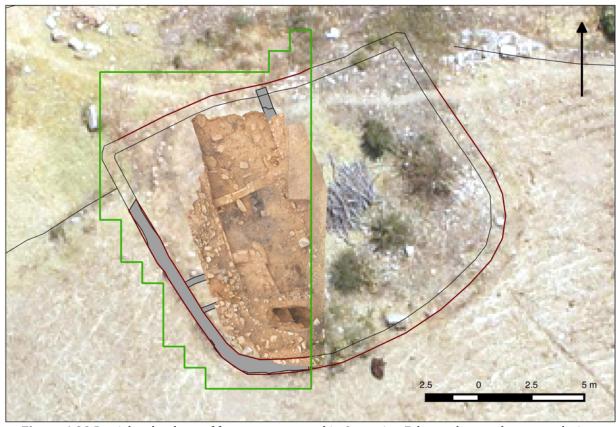


Figure 6.88 Partial orthophoto of features uncovered in Operation 7, layered over a lower resolution orthophoto created from balloon photography.

During CY-J1, a rectangular complex with interior room divisions was built. The compound was oriented to 163°. Two interior rooms were uncovered, as were the walls of several abutting rooms that were not excavated. These rooms were built over a stone drainage canal, which placed into a trench cut into the sterile soil below. This natural soil, which had a dense clay content, had also been leveled to serve as the structure's floor. A shallow layer of the same soil was used to prepare the floor, making it difficult to distinguish from the floor and from the sterile soil below. The rooms varied in size, or there may have been a larger open space of unknown size towards the south, which was placed against smaller rooms to the north that were about 3 m in diameter. The large space towards the south may have been an open patio, especially given that there was a corridor-like entrance leading from it (partially uncovered on its eastern extent). The northern room contained a grinding stone, and therefore may have been used to prepare food, although this grinding stone may have been added during the feasting activities associated with the CY-J3 construction phase.



Figure 6.89 Canal capstones below floor. Grinding stone visible in upper right, against the north wall.

During CY-J2, platforms of various sizes were added to the room interiors; one excavated contained a human cranium but it was likely placed at the time the structure was decommissioned in the next building phase. These platforms abutted existing walls and two flanked either side of the entrance to the exposed northern room.



Figure 6.90 Blue lines indicate location of interior platforms. Facing northwest.



Figure 6.91 Human cranium exposed during excavation of the northeastern interior platform. Facing southeast.

During CY-J3, the interior walls of this earlier compound were dismantled down to its foundations in order to transform the CY-J1 rectangular compound into an open D-shaped patio that was surrounded by a raised platform on its perimeter. On this raised perimeter platform, storage units were built. Although the inner walls were dismantled and covered, the compound's outer walls were repurposed, and became the inner wall of the perimeter platform. To create the level patio, a 60 cm layer of fill was laid over the dismantled walls and platforms.



Figure 6.92 Top: View, facing northeast, of the CY-J3 compound, showing its D-shape and interior patio. The west (left) excavated portion of the interior patio was extremely compact and flat and exposed only a few centimeters below the modern surface. **Middle:** View, facing southwest, of the CY-J3 compound's interior patio. The image also shows how the compound was built on top/as part of a raised terrace. **Bottom:** View, facing west, showing CY-J3 features from within the patio (middle foreground shows a cut made into floor to expose earlier architecture below).



Figure 6.93 Compound, showing one excavated storage structure in the west (left) arm of the D-shaped structure, added during CY-J3. Notice how the storage structures in the arm were built against the original exterior of the CY-J1 rectangular complex, creating two abutting double sided walls.



Figure 6.94 Left: One excavated space interpreted as a storage room, facing north/northwest. Image shows the last floor of the storage room; earlier floors were uncovered. Notice the bowl and lithic tool in the lower right of the room. **Right:** Detail of the in situ bowl and lithic on the floor of the storage room.

During this major renovation of the CY-J compound—that is, after the destruction of its interior walls but before the patio's construction fill was laid—the builders held a large

feast, and burned large areas of floor that charred caches of agricultural products, perhaps as offerings. The ceramic materials deposited included a large variety of forms, such as bowls, jars, bottles, and cooking and storage pots; many of these vessels were decorated. These activities—feasting and filling—appear to be part of the same event because the feasting remains were left in situ and then covered with fill. Carbon from floor refuse was dated to between AD 415 and 574 (HU01-NPC-3; Appendix A).



Figure 6.95 Detail of burning and in situ feasting refuse. Stone slabs above north arrow may have been placed to stabilize cooking pots.



Figure 6.96 Left: Additional image of concentrated refuse and burning/cooking during CY-J3. **Right:** View of the first layer of soil and stone fill used to cover feasting remains during CY-J3, showing how this fill was deposited directly over the feasting remains.



Figure 6.97 Photograph (facing northwest) taken of the CY-J3 post feast fill as it was excavated, which shows how the new flat surface of the D-shaped patio/plaza was built by covering earlier architecture with fill.

A variety of human, animal, and mythical beings were represented on the vessels used in the CY-J3 feast. These vessels were often smashed in place, while others were strewn about the floor. Human effigies were modeled on large and small jars as well as on

bottles and cups (discussed in greater detail below). Vessels were also decorated with modeled animal heads¹⁸, and included representations of bats, camelids, and perhaps felines. Finally, a common Recuay mythical creature, the "moon animal," which is also called a crested feline, was painted on the interior of a bowl (AE2018) in a fashion similar to vessels recovered by Terrence Grieder at the site of Pashash (Grieder 1978; p. 163, Figure 168). The vessels were accompanied by musical instruments, including ceramic panpipes and whistles signaling that these vessels were likely used in a ritual or festive setting.



Figure 6.98 Ceramics smashed on floor after general ceramic scatter removed. While ceramics were broken and scattered across the entire floor, some areas were more clustered than others, which are shown here, pedestaled above the floor.

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¹⁸ It is possible that these were not simply animal head ornaments, but were part of more complete animal effigy vessels, whereby the animal's body made up of the body of the vessel (similar to the canine effigy pot from Operation 6). These vessels have yet to be reconstructed, however.



Figure 6.99 Modeled animal effigy fragments from ceramic vessels collected from CY-J3. Includes bat (top left and right), camelid (top center) and feline (toothy grimace, bottom). The toothy grimace was identified as feline based on comparisons with complete vessels documented elsewhere; the inset image is one example of several vessels found by Grieder at Pashash (1978:87, Figure 60) which have a feline head and a serpent body (image shown is from Lau 2011:209, Figure 56).



Figure 6.100 Ceramic bowl AE2018 from CY-J3, whose interior was painted with the image of the "moon animal" or "feline with crested head" common in Recuay iconography. Compare the fragmented design to the interior of a bowl recovered from Pashash (right; Grieder 1978; p. 163, Figure 168).



Figure 6.101 Musical instruments from PC-J. Left: Ceramic whistle (AE1885). Right: Panpipe fragments.

Of the human effigy vessels that could be identified with certainty, all represent male elite personages. Elite males are identifiable by design elements like modeled earspools, headdresses, and decorated textiles (Lau 2011:203). Though many seem to show representations of living elites seated in positions of authority (e.g., Figure 6.102 B), the naked body of an individual shown on one double chambered bowl and the grimacing human face (bared teeth) of a pedestal base jar suggest that some of these personages may represent deceased individuals, perhaps revered ancestors. In particular, nakedness has been proposed by Lau (2008; 2011: 197-198) to indicate a deceased individual, often represented on stone sculptures. Moreover, an individual represented on one of these vessels is wearing a "fanlike collar" which is rare on ceramic effigies (Hohmann 2010:62). These collars are interpreted as the common funerary attire for the dead and are more typically found on Recuay stone effigies that feature a seated (and mostly naked) male individual (Lau 2011:185, 198). Most stone effigies, either with or without the collar, are believed to represent dead ancestors in the form of a mummy bundle (Lau 2011:198).



Figure 6.102 Modeled human effigy vessels collected from CY-J3. Vessel A: Large face-neck jar with ear spools. Vessels B and C: Seated elite figures; Vessel B is more complete, and shows earspools and a headdress. These vessels may represent the living or the recently deceased, perhaps as they would be prepared for burial; vessel C wears a "fanlike collar" that was likely a common funerary wrapping (Lau 2011:185,198). Vessel D: A double-chambered bowl or cup modeled and painted to represent a naked male (arms, feet, and genitalia) standing on the head of another individual who has no defined body parts. The individual on top has a headdress and earspools, whereas the individual at the bottom only has pierced holes.



Figure 6.103 Recuay effigies from highland Ancash with elements that bear similarity to the human effigy vessels recovered from CY-J3, especially vessels B and C in Figure 6.102. Image A: Bottle with seated elite male from the Jancu tomb near Huaraz, which is similar in overall design to vessel B (image from Lau 2000:197, Figure 18). Images B and C: Two bottles representing elite males wearing fanlike collars, similar to vessel C. The bottle at center-left is an earlier Huarás-style according to Lau 2011:134, Figure 26). Bottle at center right presented by Hohmann (2010:62, Figure 26). Image D: Stone sculpture, which shows a similar fanlike collar.



Figure 6.104 Fragments of ceramic human effigies collected from CY-J3. Image A: The back of an effigy bottle featuring a seated individual, showing a jaguar pelt textile hanging down the back. Images B and C show vessels that have pierced ears with no earspools, while many bottle fragments shown in Image D have ear earspools. Earspools made of a perishable material, such as wood, may have been placed in the pierced hollow ears of vessels B and C, or they denote individuals who once had these earspools, such as deceased elites). Image E: Sun-baked human face modeled in kaolin clay and painted with vertical white lines beneath the eyes. The nose has been flattened and distorted, likely during deposition. On the interior surface, fingerprints are visible in the soft, unbaked clay, and a clay piece was added to the back as well, likely to attach the face to another piece of clay that was not recovered.

These individuals thus appear to be represented at different stages of living community leader and deceased progenitor, and the ritual they were combined in may relate to the process of transforming from living leader to community or group ancestor. For example, there may be a meaningful distinction between human effigies fashioned with earspools and those with only earspool holes. Broadly, numerous studies of Recuay iconography suggest that only elite men could wear earspools in Recuay society to clearly

marked their status and authority (Cromphout 2014; Gero 2001; Hohmann 2010; Lau 2011; Reichert 1977). Recuay representations of individuals with the pierced holes for earspools are rare, and have previously been identified on Recuay vessels fashioned in the coastal Gallinazo/Vicus style, as discussed by Hohmann (2010:148), and on a Recuay vessel identified by George Lau which has a bodiless head and a possible Moche-style headdress (see Figure 6.105); Lau interprets this vessel to represent a Moche individual that has had his earspools—a sign of status and authority—stripped from his ears (Lau 2011, Plate 9).



Figure 6.105 Recuay vessel with possible representation of a Moche captive or trophy head, with "stripped ear ornaments" (Lau 2011, Plate 9).

However, the corpus of effigy imagery from CY-J3 suggests there is much more meaning behind the choices to represent elite male¹⁹ individuals *with earspools* and or *with pierced holes but without earspools*—at least in the context of the ritual space/event of CY-J3. In particular, I suggest that earspools in this context primarily signify living and/or recently deceased and that pierced earlobes represent a transformed or transforming state of an individual, such as into ancestor status. The state of transformation or transcended status of the individual may also be indicated by showing the individual as either naked

¹⁹ Whether showing an earspool or a pierced earlobe, these representations denote elite status because only elites could wear earspools/pierce their ears (see Lau 2011:203).

(deceased) or clothed (living or recently deceased and prepared for burial). This association between nakedness and deceased status is largely demonstrated. But the association with earholes has not been demonstrated, likely because it is rare. Yet the double chambered bowl shown in Figure 6.102D may hold the key to unraveling the meaning of these representations. The effigy of the upper chamber has earspools, a headdress, and arms (broken), feet, and genitalia. This individual is shown sitting on the head of another effigy, comprising the lower chamber, who has a less defined form—only a globular body or head—and has empty pierced ears. The juxtaposition of earspools and pierced on a single vessel (Figure 6.102D) surely indicates an intentional choice to communicate distinctions between the individuals represented—rather than a stylistic convention or haphazard choice of the artist. Note, for example, that the effigy vessels shown in Figure 6.102B and Figure 6.104C were likely made by the same artist, but one has earspools, and the other has just pierced earlobes). I thus suggest the possibility that the combination of distinctions between earspools/pierced lobes and clothed/unclothed reflect elites who are at different stages of existence: living individuals (who are presumed or aspire to one day become ancestors), transforming, recently deceased individuals, and individuals who have completed the transformation process and are considered ancestors.

Accordingly, these effigy vessels seem to have been essential to feasting rituals that either celebrated the process of ancestor transformation or perhaps *actively aided* the recently dead to transform into powerful ancestors. These elite personages appear on bottles, bowls, ollas, and large jars—vessels used at different stages of the preparation, serving, and consumption of food—perhaps to symbolize the generosity and fertility of the ancestors as foods were provided and accepted during the feast. If the dead did in fact need

help from the living to become and remain ancestors, these feasts likely also nourished them to ensure their proper transformation and increase their power.

Human remains were also buried inside the compound at the time it was transformed into a D-shaped patio: an infant was buried on top of a dismantled wall, a juvenile within a doorway, and a disembodied adult cranium next the secondary burial of an adult bodu, amongst other remains, were buried within rooms—though some body elements in platforms may have been placed during CY-2 (see above). Other poorly preserved human remains were found buried around the structure's exterior—some discovered by modern farmers who deposited the remains on top of the outer wall—although it is difficult to determine when these individuals were buried outside of the structure without further investigation. Regardless, the choice to bury the dead of all ages within and around this structure speaks to its importance, perhaps at the level of a kinship group who built and used it. The secondary remains throughout suggest that at the time the structure was converted to a D-shaped plaza, people may have brought family members to be buried within the structure. None of the human remains, nor those found elsewhere in the CY-J structure, were associated with grave goods.



Figure 6.106 Human remains found in CY-J.



Figure 6.107 Left: Infant remains, visible in foreground, that were placed on a dismantled wall and covered with fill during CY-J3. **Right:** detail of the poorly preserved crania fragment and other bones of the infant.

Materials including ceramics, lithics, and food remains collected from CY-J3 indicate in situ food processing, preparation, and consumption with a focus on the consumption of cultivated plants. First, the ceramic assemblage included both cooking/storage and serving

vessels, such as ollas and jars (cooking and storage or fermentation) and bottles, bowls, cups, and spoons (serving and consumption), respectively (see Chapter 7 for an elaborated discussion of this assemblage). Many ceramic vessels fall into the category of *pacchas*, or vessels used in serving fluids, especially chicha, in ceremonies (e.g. Figure 6.109). Lithics included hammerstones, bifacial tools, cores, flakes, and unmodified stones that showed signs of use (Appendix E). Residues on seven hammerstones and a flake (likely flaked from a used tool for sharpening) indicated that maize was ground and likely shucked during food preparation activities in this space. All this evidence is indicative of expedient tool production for food processing associated with the feast. Residue analysis of five ceramic fragments, including bowls, jars, and a *kanchero* or dipper, all confirmed the consumption of maize, which may indicate the preparing, serving, and consumption of maize in a liquid substance such as chicha.



Figure 6.108 Examples of food preparation and serving vessels from CY-J3. **Image A:** a large drinking cup; **Images B and C:** two spoon fragments; **Image D:** and a small cooking pot showing signs of cooking on interior, perhaps toasting.



Figure 6.109 Examples of *paccha* serving vessels from CY-J3, which were used to serve chicha. **Images A and B:** Two views (side and top) of a reconstructed disk-shaped *paccha* jar, likely from a vessel similar to **Image C** (Eisleb 1975; 85). **Image C:** Drawing and photograph of a fragment of an open bowl with rim flange (and perhaps with a coniform handle as shown in **Image D** (top), copied from Lau 2011:144, Figure 29). This specimen has a feline-headed snake or young catfish represented as if swimming along the rim (much like the example shown in **Image D** (bottom) from Pashash; Grieder 1978:139, Figure 133).

The botanical remains from CY-J3 were highly varied, and faunal remains were present but do not seem to have been the central focus of the meal. Carbonized botanicals included molle, potato, maize, peanut, walnut, beans, and quinoa. Unidentified woods were also found, likely used for fuel. Several grasses and weedy plants (*Poaceae*, *Abutilon sp.*, *and Dichondra sp.*) were also present, perhaps brought either for animal fodder or collected while harvesting the crops that were brought to the space for consumption (See Appendix F). Camelid coprolites were present as well, which support the idea that they were brought, fed, and likely slaughtered here. Microbotanical analysis of four soil samples also showed

the presence of potatoes, maize, and grasses (Appendix F). Faunal remains included birds (n=26), guinea pig (n=12), camelid (n=119), deer (n=4), and a few other unidentified mammal bone elements.



Figure 6.110 Carbonized maize cobs (left) and potatoes (right) from CY-J3.



Figure 6.111 Carbonized peanuts (left) and beans (right) from CY-J3.

The prevalence and variety of cultivated botanical remains, in comparison to faunal remains, suggests that agricultural products were of central importance during the CY-J3 feast. Moreover, a complete bowl and chipped stone tool with maize starches were recovered from the upper floor (C346) of a storage room in the west "arm" of the D-shaped

corridor. Together these remains indicate that in addition to being a place for group feasting, this compound was a place to store and process foods, likely by the same individuals who feasted here.

During the final construction phase, CY-J4, the terrace surrounding the CY-J structure was expanded, and a canal was built abutting the outer CY-J3. In Suboperations N16, O16, and O17, we placed a 2.50 m test pit along this outer wall, which confirmed that this CY-J4 terrace was built against the CY-J3 outer wall, approximately 1 m higher than the original surface below it. The construction of this terrace buried what was likely an earlier terrace near the same level as the original floor of the CY-J1 structure. Accordingly, the construction of the CY-I4 terrace permanently covered the lower 80 cm of CY-I3's outer wall. The lower soils, buried beneath this terrace, was radiocarbon dated to between AD 264 and 504 (HU01-NPC-2; Appendix A). The canal built on top of it moved water along and against the exterior of this wall on top of the new terrace, to divert either rain or irrigation water against and around the structure. The terrace is still used by the modern Hualcayán community to grow maize and beans; amongst other things, their plowing up against the structure has likely destroyed much of the canal. Nonetheless, a 2 m section of its stone floor was preserved, along with two upright stones that formed the exterior canal wall ledge. This canal suggests that builders and users of the surrounding terrace took care to maintain the compound—further suggesting that the terrace construction occurred during Cayán Phase 2 and later. The disturbance of modern farming also displaced several burials, which were found jumbled on top of the outer CY-J3 platform wall. Given the locations in which these were found, it is believed that they were originally buried outside of the structure near the surface of the CY-J4 terrace.



Figure 6.112 Photograph, facing southwest, of the 2x.50 m test unit that was excavated into the CY-J4 terrace and along the CY-J3 outer wall.



Figure 6.113 Canal feature on the external face, added during CY-J4. Only two upright stones of the canal's outer wall remained in place, although the stone floor of this feature was preserved along a two-meter area against the exterior of CY-J3's platform. **Left:** Complete view of preserved segment. Notice the canal's basal stones along the structure's exterior, and a small section (two upright stones) of the canal's preserved outer wall towards the back of these basal stones, twenty centimeters from the structure's exterior. **Right:** top-down photograph detailing the two preserved upright stones that formed the canal's exterior wall. The canal was not excavated to its base in this area due to the fragile preservation of these upright stones.



Figure 6.114 Two concentrations of human remains found lying on top of the CY-J3 platform wall, on its southern (image at left) and southwestern side (image at right).

CY-K: Eastern ritual-agricultural compound, "Plaza de las Huancas"

CY-K is the second compound we excavated and the farthest east of all the compounds we identified in the area north of the Perolcoto mound. Rather than having a D-shaped form with a curving outer wall like the previously described CY-J compound, CY-K is rectilinear and is open rather than walled on its eastern side, giving it an angular U-shaped form. The most notable characteristic of the CY-K compound is its standing stones, giving it its name "Plaza de las Huancas". Although traces of additional masonry were few, it is likely that smaller stone masonry originally formed completed walls with a *huanca pachilla* style; modern farmers often collect field stones for construction projects, which could explain why the stones are missing. The compound is aligned and parallel to a stone canal located several meters from its western boundary. In recent decades, the modern community has used concrete to refurbish this canal, but its stone features appear ancient. Moreover, the canal borders a ramped platform that leads through the agricultural terraces

toward the compound. Canal sections that cross beneath this ramp have not been refurbished and show four sides of cut stone slabs.

Rather than opening a large horizontal excavation, several small excavation operations, Operation 4, 13, and 15-18, were placed inside the CY-K compound. It should be noted that the field season ended before Operations 17 and 18 could be completed, and only the humus layers were removed. Therefore, Operations 4 (7x6 m) and 13 (5x5 m), both located in the southern half of the compound, yielded the most information about CY-K, with test Operations 15 and 16 (1x1 m each) providing additional information from the compound's central patio.

Excavations in the "Plaza de las Huancas" compound revealed two construction phases, CY-K1 and CY-K2. During phase CY-K1 the rectilinear U-shaped compound was built along with the terrace on which it sits. During CY-K2 the compound's corridors were filled and turned into walled platforms. In addition, a small semi-circular platform was built against the compound and the terrace behind the structure was raised, partially covering the compound's southern wall.



Figure 6.115 Photographs, facing northeast, of the CY-K structure dubbed "Plaza de las Huancas". Notice the structure's alignment with the canal to its west. This canal has been refurbished in recent decades with concrete.



Figure 6.116 Photographs of the area and features north of the "Plaza de las Huancas" compound. **Left:** Photograph facing southwest and toward the direction of the compound, showing ramped pathway that led to the compound. **Middle and Right:** Although many canals have been refurbished with concrete for modern use, some segments, such as this stone canal beneath the ramped pathway, remain intact (wooden pole stored inside is modern, however).

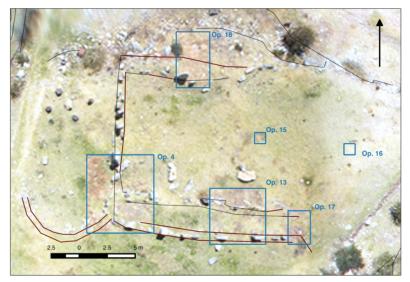


Figure 6.117 Map of CY-K structure and the location of excavation units.

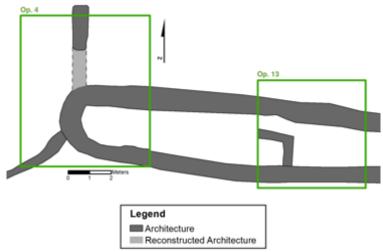


Figure 6.118 Map showing the location of Operations 4 and 13 and a detail of CY-K's southern corridor.



Figure 6.119 Photograph from inside the CY-K compound's central patio, looking south towards Operations 4 (right) and 13 (left) after they were filled with back dirt. The lower terraces of the Perolcoto mound are visible behind the structure and to the right.

Phase CY-K1 includes the construction of nearly the entire compound. The northern and southern "arms" of this U-shaped form were formed by U-shaped corridors that were curved and closed on their western side and open to the east. These two corridors were connected by a wall of standing stones on its western side, and contained small structures approximately 1 m wide. Together the three sides—the two U-shaped corridors and the western wall of standing stones—formed an open central patio or plaza that was open on its eastern side. This compound was constructed atop a terrace built to level the natural slope, which sloped down from south to north. The structure appears to have been built at the same time as this terrace, for the compound's southern extent was built directly on top of sterile clay subsoil, whereas the northern extent was built atop the terrace's artificial fill.

Based on the botanical evidence of cultigens in the corridors, I interpret the small structures inside the corridor as storage rooms, much like those added to the outer CY-I structure. In particular, of the lithics tested from CY-K, Operation 4 revealed all maize starches and only one tool with potato starches, while in Operation 13 only potato starches were found. This may suggest a division of storage based on crop type with some mixing: three soil samples from Operation 13 revealed maize, potato, and grasses (*Pooideae*). Walnut was also recovered from Operation 13 (Appendix F). In Operation 4, flotation recovered several weeds that are commonly collected inadvertently with harvesting. In both operations, a high variety of lithic tools including cores, bifacial and unifacial tools, at various states of production as well as hammerstones were also found, suggesting foods were processed in these spaces (Appendix E). Obsidian flakes were also present. Few animal bones were recovered, also suggesting that the space focused on the processing and storage of agricultural products (Appendix G). Ceramic remains included decorated styles and forms (bowls, jars, and plates) commonly used in feasting, which suggest the CY-K compound was also a place for ceremonial food consumption. These include a painted faceneck jar that may represent an elite or ancestor. However, these representations are far fewer than those found in CY-I. Nonetheless, fewer remains were left in situ in CY-K and it is possible that similar rituals were held in both spaces. The storage room excavated in CY-J revealed a radiocarbon date of AD 225-446 (HU01-NPC-1, Appendix A), a date range that is earlier than the conversion of CY-J into an open plaza (HU01-NPC-3, which is AD 415-574).



Figure 6.120 Photograph, facing east, of CY-K's southern corridor and excavation Operation 4.



Figure 6.121 Left: Photograph of CY-K's southern corridor exposed within Operation 13, showing its internal structures and features. **Left:** Corridor, facing west. **Right:** Detail of a storage room inside the corridor, facing southwest.



Figure 6.122 Face neck jar fragment with an appliquéd and painted ear and eye of a human face.

During CY-K2, a low semi-circular platform feature was added to the compound, which extends west from the southwest corner of the main compound. In addition, a new floor was added inside the southern corridor, covering the interior storage bins and raising the corridor into a walled platform. The terrace south of the compound was also filled, covering the lower 40 cm of the CY-K's southern exterior.



Figure 6.123 Exposed surface of CY-K2 in the southern corridor. **Left:** Operation 4, looking north-northwest, and viewed from the exterior of CY-K2. **Right:** Operation 13, looking south-southeast and viewed from inside the CY-K central patio.



Figure 6.124 Left: A test unit in the southeast corner of Operation 13 revealed how the CY-K2 terrace covered much of the compound's exterior wall. This test unit is visible in the far lower right of the photograph, facing north. Notice the discoloration of the exposed stone and wall at the level of the terrace. **Right:** Detail of test unit, facing east.

Cayán Phase 2-Tzacpa Phase 2: Recuay and Post-Recuay continuities at Hualcayán (AD 200-1450)

Cayán Phase 2-Tzacpa Phase 2: Hilltop Residential Area

The community landscape of Hualcayán expanded greatly during Cayán Phase 2 when residents built extensive house compounds and other areas for gathering on the hilltop south of the Perolcoto mound. The Hilltop Residential Area was the main area of household occupation at Hualcayán, although the sector also contained tombs, open areas, and terraces. A thick wall defines the area on the top of the hill on its western side, which had only a single entrance to the residential sector. The entrance curved inward towards the doorway. Local people indicated that there were two feline tenon heads flanking this entrance, one on either side of a white lintel stone, although these features were removed years ago. The lintel is currently located near the entrance, but out of place. One of the two

tenon heads was moved to a school in Carranca, which is a village located just below Hualcayán; the location of the second tenon head is unknown and is believed to be in the possession of a collector. The tenon head observed in Carranca was nearly identical to those from the Katiamá tomb near Pariamarca (see Chapter 3), suggesting they may have been made by the same artist, especially given that the sites are within a day's walking distance (about eight kilometers).



Figure 6.125 Monumental curved entrance to the Hilltop Residential Area, shown from the exterior (left; facing northeast) and interior (right; facing northwest). A white granite lintel stone originally crossed the top of the entrance, and was flanked on either side by a carved feline tenon head.



Figure 6.126 View of the eastern face of the Hilltop Residential Area, showing the large wall (long arrow) and monumental entrance to this area (below asterisk). The entrance's displaced white lintel stone is visible just below the entrance (short arrow). Terraces are visible on the hillside. Photograph is facing southeast.

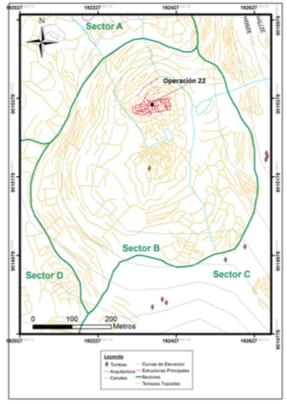


Figure 6.127 Map of Hilltop Residential Area (Sector B).

The remainder of this section on the Sector B hilltop reviews the excavation of one house and patio complex, Operation 22, which is located near the summit of the Hilltop Residential Area. The floor and fill of this house and patio complex contained mostly Recuay materials, dating the structure to Cayán Phase 2, but these spaces were reused during the Middle Horizon, or Tzacpa Phase 1, and then buried beneath a later floor that was laid during the Late Intermediate Period, or Tzacpa Phase 2. This Tzacpa Phase 2 occupation represents Hualcayán's final phase of occupation, although the Akillpo ceramics associated with Tzacpa Phase 2, and are used to date these late occupations, likely continued into the Late Horizon, or until the time of Spanish contact. Excavations also revealed that the Cayán Phase 2 house complex was built over earlier structures facing a different orientation, although the period of its construction is unknown. Several Perolcoto

Phase 4 (Janabarriu) and Cayan Phase 1 (Huarás) ceramics indicate the buried structure dates to one or both of these earlier periods.

CY-L: Terrace and house compound

The house room and its adjacent patio excavated in Operation 22 is one of many "patio groups" documented on Hualcayán's residential sector, which is located on the hilltop at the base of the steep mountainside. Although households were documented across the hilltop, residences were centered in a large walled compound on the northern hilltop. Inside this walled area were terraces themselves surrounded by walls, and these terraces and walls separated the residential sector into three main segments, which were connected by various pathways, entrances, and stairways. The highest point of these rectangular compounds was a rectangular compound towards the east, which was built on top of an artificial platform. The second tier below this rectangular compound is to its west and has a roughly semi-circular shape. We placed Operation 22 on this second-tier terrace near its western extent. While excavations reached surface levels in Operation 22, they did not reach sterile due to a lack of time.

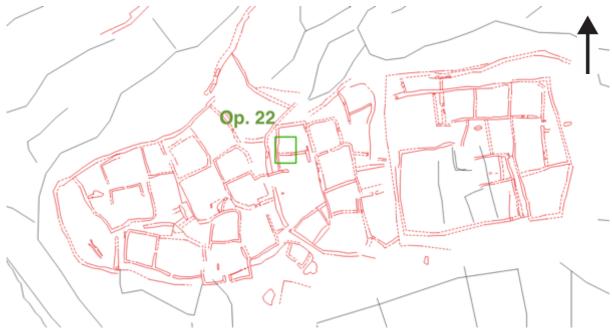


Figure 6.128 Map of hilltop residential structures in Sector B, indicating the location of Operation 22 (4x5 m). Domestic rooms range from 5 m to 6 m in diameter.



Figure 6.129 Photograph of the hilltop residential structures in Sector B, viewed from the mountainside above facing west. Notice the rectangular platform at the highest point.

Within Operation 22, two Cayán Phase 2 construction and use phases were documented, CY-L1 and CY-L2. All other constructions in the area pre-date or post-date Cayán Phase 2.

The structure buried below CY-L1 was only partially uncovered, and is the top of a wall that has a different orientation (25°) than subsequent architecture (70°). This feature may date to an earlier period within Cayán Phase 2, but it most likely pre-dates it, dating either to Cayán Phase 1 or Perolcoto Phase 4: ceramic styles that pertain to these phases were recovered from CY-L1's fills, which were placed immediately over it. While no definitive period can be assigned to the feature, this construction is assigned a preliminary code of PC-M1.



Figure 6.130 Top Left: Photograph, facing south, of the PC-M1 wall corner buried below the CY-L1 surface. The corner is visible in the far left (southeast extent of Operation 22). The wall was not fully excavated, and may date to Perolcoto Phase 4 or Cayán Phase 1, based on the presence of Janabarriu- and Huarás-style ceramics in the CY-L1 fill that covered the structure. **Top Right:** Pre-Cayán Phase 2 ceramics collected from CY-L1. Top row ceramics are Janabarriu-styles; bottom left is a formative panpipe; bottom right is a Huarás-

style sherd. The predominance of Janabarriu styles suggests the buried architecture is from Perolcoto Phase 4. **Bottom:** Map showing position of PC-M1 in blue, which is oriented towards Perolcoto.

Phase CY-L1 includes building up the terrace to cover the earlier architecture and laying a surface (C1610 (lower)/1611/1612). The terrace wall was not cleared or excavated, but from the surface an upper wall was visible, indicating that the terrace was an enclosed space. Recuay-style decorated vessels were common in the CY-L1 fills, and a large ceramic scatter was left on the surface. It was unclear whether the surface architecture on the terrace was built over the CY-L1 surface, or whether it post-dates it—simply built directly on top of the surface. Nonetheless, the addition of a low ledge (C1620) on top of the CY-L1 surface aligns with the east-west wall built in the center of the unit, suggesting they were used at the same time. Thus, although some modifications were made to the structure in later periods, this structure appears to date to Cayán Phase 2, although there is the possibility that the entire house room north of this wall was added to the larger patio during Tzacpa Phase 2 when the entire residential area was reoccupied.



Figure 6.131 House floor (background) and adjacent patio (foreground) excavated in Operation 22. Notice the low platform pictured in the west, along the patio's interior wall. The two horizontal stones placed in the wall may be the entrance into the structure.



Figure 6.132 Photographs of Recuay-style ceramics recovered from CY-L1 fills and on top of its floor.

Although the periods after Cayán Phase 2 are not central to this dissertation, the architectural phases for these periods are briefly named and described here, in part to show that the western wall was a late addition and to briefly characterize the site's final phases of occupation. After CY-L1 and CY-L2, there was ongoing, or perhaps intermittent,

reuse of the existing spaces during Tzacpa Phase 1 activity, as evidenced by a few Middle Horizon styles. This activity is collectively grouped as TP-A1. The next and final construction phase uncovered in Operation 22 dates to Tzacpa Phase 2, and is labeled TP-B1. TP-B1 includes the reuse of the existing wall architecture, perhaps with some modification and the laying of fill to level the area over CY-L2 and create a new floor. In addition, the western wall was extended southward in the patio space. This wall was built over the CY-L2 ledge and the new floor.

The Tzacpa Phase 1 ceramic styles are of a local, tri-color (red-black-white) Middle
Horizon style. In addition, there were several mold-made objects with a late Middle
Horizon or perhaps early Late Intermediate Period coastal style, and these were most likely
traded from the coast. Their presence in a household context suggests that representing
foreign connections in household contexts became an important source of authority at this
time. Colander fragments also suggest that chicha production occurred here.

The decorated ceramics of the Tzacpa Phase 2 are affiliated with the regional Akillpo style—an archaistic style that mimicked Janabarriu stamped circles. What distinguishes the two styles are the quality of the vessel and when the vessel was stamped during its production: Janabarriu-style ceramics are usually more finely made and stamps are impressed on leather-hard smoothed or burnished paste, whereas Akillpo styles are roughly smoothed and stamps are impressed on very wet paste. Moreover, Akillpo decorations often appear on everyday cooking and storage vessels, whereas Janabarriu styles commonly appear on serving vessels such as bowls and small ollas. One interesting example of an Akillpo circle and dot vessel uses a thick black paint or slip over the sherd's surface after it was stamped, seemingly to mimic Janabarriu fine blackwares that were

produced in a reduced environment, a technique requiring more control over the firing process that was not used in Akillpo pottery.



Figure 6.133 Photograph, facing west, of the TP-B1 surface.



Figure 6.134 Photographs of Middle Horizon and Late Intermediate Period ceramics recovered from TP-A and TP-B phases, respectively. **Left:** Middle horizon tricolor bowl fragments, made in a local style, although the sherd on the left may be Wari-influenced. **Center:** Late Intermediate Period Akillpo-style ceramics, excluding the mold-made piece in the lower left corner, which is likely a coastal import. The figure to the lower right represents the head of a llama or alpaca, which is similar in style to the *conopa* figurines found near the modern city of Carhuaz and recently studied by Patricia Rojo Villacorta at UNASAM. **Right:** Image of a Carhuaz camelid *conopa* figurine (from http://www.perueduca.pe/heroes-con-escuela/camino-al-museo).



Figure 6.135 Photograph, facing west, of the western wall in the southernmost extent of Operation 22. The image shows (behind and at a level down on quarter from the top of the whiteboard) how the TP-B1 wall (uppermost wall) was extended to cover the top of the CY-L2 ledge, which is shown here excavated and visible only in profile aside from the stones forming its face.

Notably, a concentration of viscacha (*Lagidium*) coprolites on the TP-B floor near the TP-B1 wall suggests a viscacha was tied up here; these coprolites were not common elsewhere in the Operation. Near these coprolites was a crude hammerstone and a larger horizontal stone placed against the TP-B wall, perhaps used as a food processing surface. Moreover, three viscacha bone elements were found in the TP-B1 levels and were not recovered in the CY-L levels below, linking these coprolites to viscacha consumption.



Figure 6.136 Photographs, facing west, showing the context and detail of the concentration of *Lagidium* coprolites. Yellow arrows point to coprolites visible in the photograph. The artifact pictured is a roughly shaped grinding stone, on which maize starches were recovered (LI-164).

A comparison of the faunal and botanical remains from CY-L, TB-A, and TB-B contexts show several continuities and differences. First, faunal remains are similar, both featuring a predominance of camelid supplemented by guinea pig. A notable difference is the occasional presence of viscacha and deer in TP-A contexts. A single cattle bone in the well-buried CY-L levels suggest some modern disturbance, although minimal. Grinding stones and bifacial tools from both periods revealed maize, and one CY-L1 bifacial tool revealed maize starches, maize phytoliths, and potato starches. Alder (*Alnus sp.*) trees were used for wood in both periods, but only one sample could be identified for Tzacpa Phase 1 contexts with no other wood species identified for this period. Overall, Cayán Phase 2 activities seem to have involved more of a variety of wood species, which included walnut and molle trees. Walnut *fruits* were also recovered in CY-L levels, along with carbonized beans and maize. The presence of decorated Recuay-style serving wares known to be used in feasts in CY-L suggest the possibility that some commensal feasting occurred in the patio and/or house during Cayán Phase 2.

The Cayán Phase tombs are extensive on the mountainside above the Hilltop Residential Area, and agricultural terraces cover nearly all of the mountainous terrain at Hualcayán. Recuay ceramics were found on the surface of nearly all areas at Hualcayán, as well as in all excavation units. This section will briefly review the excavations carried out in several mortuary and agricultural areas to provide a broader context to the ritual architecture and materials previously described. These tombs have received prior study through the BA, MA, MS, and PhD research of several collaborators, and additional details are available therein: ceramic, macrobotanical, and flotation analyses (as well as syntheses of other tomb contents), Elizabeth Cruzado (MA, 2015); Lithics analyses, Robert Connolly (presented as appendix within Cruzado 2015); human skeletal analyses, Pink (PhD, 2013), Sharp (PhD, in progress), Stokes (BA, 2014), Witt (BA, 2012); textile and perishable materials, M. Elizabeth Gravalos (MS, 2015); and landscape analysis of tombs (Norgon 2012). These and other studies have been presented at conferences, and include additional contributions by Julie Lesnik (see also Lesnik and Sams 2014), Liz Digangi, Sara Becker, Jessica Pantel, Lisa Calabria, Ann Laffey, Amy Anderson, and Nicole Thiemann. Finally, Theresa Tham performed the faunal analysis for Rebecca Bria, which includes remains from the tombs discussed here, and Rebecca Bria and Felipe Livora performed survey and surface collection of these tombs before excavations began (Livora and Bria 2012).

The project performed excavations in six mountain slope tombs in Operations 3, 8, 11, 12, 19, and 20/21²⁰. Five of these tombs were *machays* (Operations 3, 8, 11, 12, and 19), which are tombs with one or more walled chambers built beneath a natural boulder, and one was a rectangular *chullpa* (Operation 21), which is an above ground, roofed stone structure. The Operation 21 *chullpa* is the largest of its kind at the site, and was built on a terrace surrounded by a walled patio, excavated as Operation 20. The *machays* and *chullpa* all have stone entrances that allowed for ongoing access to interior chambers, as well as a terrace or platform surrounding the entrance of the tomb for mortuary activities. These and other tombs were found in all areas of the terraced mountainside, which may link mortuary practices and beliefs to agricultural activities. All tombs at Hualcayán present some looting, with varying degrees of disturbance.

CY-M: *Machay*

Machay CY-M (excavated as Operation 3; 19m²) is a multi-chambered, multi-storied tomb with at least six chambers containing a MNI of 49 individuals (Appendix H; Figures Figure 6.137–Figure 6.139). Human remains included both adult and sub-adult men and women. Looters appear to have destroyed much of the superstructure, and exposed chambers indicate that more chambers may lie below the exposed surface. The tomb chambers are constructed below a very large boulder, which is reddened on its face. The tomb itself was plastered (leaving a complete footprint in one area of the mortar; Figure 6.140) and painted white (see Pink 2013).

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 $^{^{20}}$ Operations 20/21 are located in the area between Sectors B and C, in the topological dip between the hilltop and the mountainside above it.

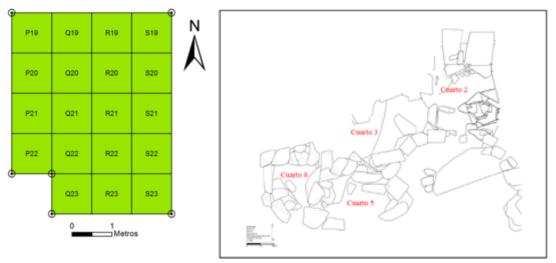


Figure 6.137 Schematic of excavated suboperations (left) and drawn map of chambers (right) in *Machay* CY-M. Five main chambers are denoted as Cámara 1–5 (see also Pink 2013).



Figure 6.138 Exterior (top left) and interior (top right and bottom) of *Machay* CY-M during excavations (see also Pink 2013). The image at top right shows three sub-chambers found within Chamber 2 (see **Figure 6.137**) believed to hold specific individuals, one of which (bottom right) was found in situ (see **Figure 6.139**).



Figure 6.139 Undisturbed cyst-like sub-chamber inside *Machay* CY-M (Chamber 2) which held the remains of a woman over the age of 40. The cyst was capped with a flat stone (see also Pink 2013).



Figure 6.140 Footprint discovered in the wall mortar of *machay* CY-M (see also Pink 2013).

The materials recovered from *machay* CY-M span Perolcoto Phase 4 through Tzacpa Phase 1 (or the Late Formative through Middle Horizon; 900 BC–AD 1000)²¹, though the majority of artifacts date to Tzacpa Phase 1 and have a clear affiliation with the Middle Horizon Wari imperial style, including polychrome *kero* drinking cups and tie-dye textiles (Figure 6.144 through Figure 6.146; see Cruzado 2016; Livora and Bria 2012; Grávalos 2014; Pink 2013; Pink and Bria 2012). In particular, several Janabarriu-influenced Late

²¹ These results differ somewhat from the chronological span established by Cruzado (2015), who states the ceramic evidence does not include Formative period ceramics, includes only one white on red (or Huarás) fragment, and has remains dating to the Late Intermediate Period. Moreover, I interpret gray colored moldmade ceramics as coastal imports that likely date to the late Middle Horizon rather than Late Intermediate Period, though some of these may be from the early Late Intermediate Period

Formative styles were recovered as well as some white-on-red ceramic fragments (Figure 6.141 and Figure 6.142). The presence of the Formative Period ceramics may indicate an early period of construction for this tomb; however without more evidence (such as securely dated human remains or carbon from sealed contexts) these are best interpreted as intrusive, and were likely present in the soils during the tomb's construction. Moreover, while the white-on-red ceramic fragments may indicate an initial use of the tomb during Cayán Phase 1, these may not be Huarás style, but instead a late Recuay archaistic revival of white-on-red styles (see discussion in Lau 2002), and thus date to the end of Cayán Phase 2; "Classic" Recuay decorated wares were not recovered, but they may have been looted and some undecorated ceramics appear to have a kaolin mix (Figure 6.143). The tomb's Tzacpa Phase 1 materials, which include Wari-influenced polychromes (Figure 6.144) and mold-made coastal imports (Figure 6.145), are the most abundant in the tomb. Fine decorated textile remains also point to a Tzacpa Phase 1 (Middle Horizon) use for the tomb as well as a high status of the individuals buried there (Figure 6.146).



Figure 6.141 Perolcoto Phase 4 Janabarriu-influenced styles excavated from *Machay* CY-M (see also Pink 2013)



Figure 6.142 Cayán Phase 1 Huarás or late-Recuay style white on red painted vessels excavated from *Machay* CY-M (see also Cruzado 2016; Pink 2013).



Figure 6.143 Possible Cayán Phase 2 vessels from *Machay* CY-M, based on paste qualities (see also Cruzado 2016; Pink 2013).



Figure 6.144 Middle Horizon Wari-style ceramics from the CY-M *machay*, which were either made locally (emulation of state styles) or traded from regional Wari-sponsored production centers in the Callejón de

Huaylas (samples include materials surface collected and excavated in Operation 3; see also Cruzado 2016; Gomez 2015; Livora and Bria 2010; and Pink 2013).



Figure 6.145 Left: Middle Horizon-era mold-made ceramics from the CY-M *machay* (see also Cruzado 2016; Gomez 2015; Pink 2013), which were likely imported from the coast where mold-made objects were common. **Right:** A face-neck jar fragment from Cerro La Cruz (Vogel 2012:111, Figure 5.7), in a style that is transitional between Moche and Lambayeque, or perhaps from around AD 900.

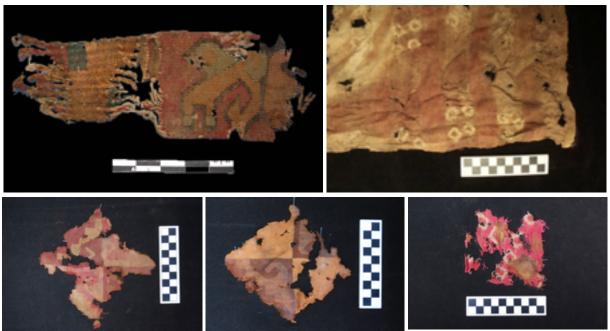


Figure 6.146 Sample of textile materials from the CY-M *machay* (see also Grávalos 2014; and Pink 2013). Analysis by Grávalos (2014) suggests the slit and dovetail tapestry woven belt has a Middle Horizon aesthetic (top left), and the tie-dye fragments (top and bottom right) are known Wari-influenced styles of this period. The stepped fret checkerboard motif of the two fragments in the lower left (dovetail and slit tapestry) also likely date to the Middle Horizon, through they could be late Recuay given that the Recuay commonly wore checkerboard design textiles.

Machay CY-M shows more foreign goods and styles than any other tomb documented at Hualcayán, and therefore may be that of an elite group who held alliances with the Wari or with other individuals who were tied to the interregional trade-network that emerged alongside Wari expansion. Lau states that due to the arrival of Wari into the Callejón de Huaylas, "by the mid to late Middle Horizon (ca. a.d. 800) coastal-style exotics — press-molded and polished monochrome wares — became more important to groups of the Cordillera Negra and Callejón de Huaylas. (Lau 2011: 260). Comparisons of the CY-M materials to existing literature confirm a likely date between around 800 and 1000 AD (see Figure 6.145).

Other remains include musical instruments, personal items such as bags, needles, and tweezers (Figure 6.147). Notably, metal pins were ceremoniously folded over, perhaps signaling the end of their lives along with the life of the individuals who once used them. Faunal remains (excluding intrusive species such as birds, bats, and viscacha) included guinea pig, camelid, and two marine mollusks (Appendix G), though the majority of these remains were guinea pigs. Botanical remains documented by Elizabeth Cruzado included maize, achira, chili pepper, coca, peanut, mate, cane, bean, guayaba, and two species of gourd (Cruzado 2016).



Figure 6.147 Sample of non-ceramic materials recovered from the CY-M *machay* (see also Grávalos 2014 and Pink 2013). **Top:** Folded metal needles and reed panpipe. **Bottom:** Leather bag and bone needles.

CY-N: Machay

Machay CY-N (surface collected as Operation 8) is a single-chambered tomb containing a MNI of 14 individuals (Witt 2012; Witt et al 2012; Appendix H). The tomb was heavily disturbed from looting, but excavations uncovered a partially intact infant bundle. The machay has a looter's hole in its southern side, but originally had a single entrance. Though heavily looted, surface collections uncovered a nearly complete infant burial found wrapped in grasses, undecorated textiles, and placed on a reed mat. We recovered basketry, textiles, and a single ceramic sherd, which appears to be a fragment of a painted Recuay-style vessel, for its clay contains white kaolin. Botanical remains include maize,

peanut, gourd, grasses, and avocado (Appendix F; Cruzado 2016). Faunal remains included guinea pig, a few camelid remains, and intrusive and unidentified mammals (Appendix G).



Figure 6.148 Photograph and drawing of the inner chamber of *Machay* CY-N (see also Witt 2012).



Figure 6.149 Photograph of a partially intact infant mummy bundle and mat from inside *Machay* CY-N (see also Witt 2012).



Figure 6.150 Artifacts from *Machay* CY-N (see also Cruzado 2016; Grávalos 2014; Pink 2013; and Witt 2012). **Left:** basket weave. **Right:** kaolin ceramic fragment.

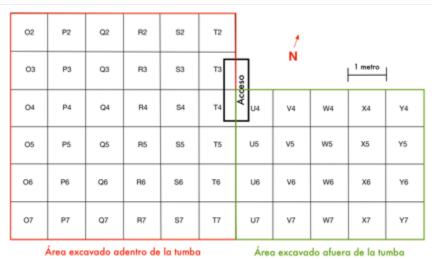
CY-0: *Machay*

Machay CY-O (excavated as Operation 11; approximately 20 m²) is a large, singlechambered tomb containing a MNI of 14 individuals (Appendix H). The tomb was built under a very large boulder and was heavily disturbed from looters entering through the side of the structure rather than its single access. Nonetheless, excavations revealed high quantities of perishable remains, such as cord and rope, which were likely used to wrap now-looted mummy bundles. Diagnostic ceramic remains included several white-on-red bowl fragments, a black resist-ware bowl, and a closed body, black polished, and moldmade vessel (Figure 6.154; see also Cruzado 2016). Cruzado (2016:18) considers the white-on-red vessels to pertain to the Huarás-style of the Final Formative, and some specimins may date to this early period. But they may also date to the late Recuay phase (see Lau 2004:191), especially given their association with a late Recuay post-fire black resist bowl (see examples in Lau 2010 and a description of this technique in Lau 2011:140). Also present was a rare polished mold-made blackware vessel fragment, which was likely a coastal import from the Middle Horizon. These remains date the tomb to the period between the end of Cayán Phase 2 and the beginning of Tzacpa Phase 1. Botanical

remains inside CY-O include maize, gourd, and grasses (Appendix F; Cruzado 2016). Faunal remains included mostly guinea pig along with a few camelid bones with some modern intrusive species present (Appendix G).



Figure 6.151 Views of the exterior of Machay CY-O, facing west.



Area excavado disera de la lomba

Figure 6.152 Schematic suboperation drawing of excavations carried out inside and outside of *Machay* CY-0.



Figure 6.153 Photograph, facing northeast, of the CY-O machay entrance, before and after excavation.

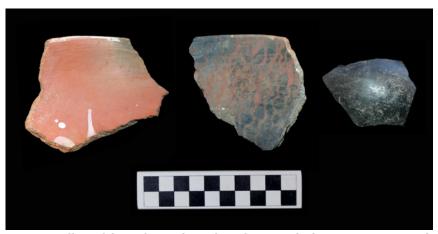


Figure 6.154 Ceramics collected from the surface of *Machay* CY-P before excavations. Left: Huarás or late Recuay style white-on-red rounded bowl, featuring a unique, perhaps abstract design. It most likely dates to the late Recuay phase based on its overall form and design (see Lau 2004:191), as well as its association with later materials (see additional, perhaps earlier white-on-red examples in Cruzado 2016). Middle: Late Recuay style bowl with black resist design. Right: Fragment of a polished blackware mold-made closed vessel, likely dating to the Middle Horizon and imported from the coast.

CY-P: Machay

Machay CY-P was originally a single chamber beneath a large boulder but was then expanded to include a second rectangular chamber in front of it, giving it a hybrid form that may be considered a "chullpa-machay" (though several machays at the site share a similar form but are now destroyed, such as CY-Q). A single access leads into each of the two tomb

chambers from the center of the *machay* walls. This tomb was heavily looted, disturbing much of the soil in the tomb.

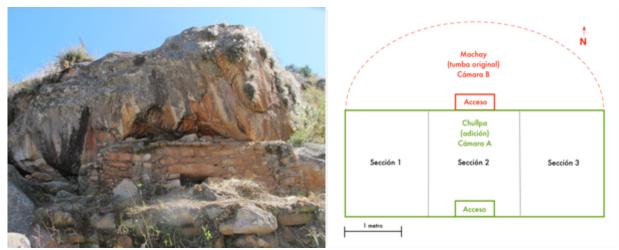


Figure 6.155 Left: Photograph of the exterior face of *Machay* CY-P, facing north. **Right:** Schematic map of *Machay* CY-P's chambers.



Figure 6.156 Photographs of the interior of CY-P's chamber A, including views into Chamber B. **Left:** Chamber A, facing east, with the access to the exterior visible on the right, and the access to Chamber B visible on the left. **Right:** A view of Chamber B from Chamber A, seen through the access that connects the two chambers, facing north.

A complete human mummy was recovered out of an MNI of 25 individuals (Appendix H). Looters had stripped the textiles from the mummy—an elderly woman in a flexed position—but the rope binding her body at death remains. Moreover, the grasses placed against her skin before wrapping left clear markings, and nearby we recovered a fragment of a large textile that was bundled and tied (though it had been cut by looters,

presumably as they searched for goods or decorated textiles inside the bundle). Together this evidence suggests an order of preparing the bundle: positioning the body in a flexed position, wrapping the body with rope, covering it with grasses, and then wrapping it with textiles that were bound and tied, likely at the top of the bundle (see also Grávalos 2014. Botanical remains include maize, gourd, grasses, and agave (Appendix F; Cruzado 2016). Faunal remains included guinea pig, camelid, and deer, though other likely intrusive remains were found, such as viscacha and birds (Appendix G).



Figure 6.157 Left: Photographs of what remains of an adult female mummy bundle from CY-P that was stripped of its wrappings except for cordage that bound her legs and arms close to her body. Markings against her skin reveal that the mummy was wrapped with grasses before textiles. **Right:** Knotted textile that was likely tied at the top of a mummy bundle to hold together its wrappings. This textile was likely cut off by looters in order to access the mummy (see also Grávalos 2014).



Figure 6.158 A "linked bag made of vegetable fiber" (Gravalos 2014:94) recovered from *Machay* CY-P. These bags typically open lengthwise and have been found at Hualcayán closed by a twig pushed through two overlapping sides of the opening. Cordage is often found tied to the ends of these bags, suggesting they may have been hung up by their ends like a hammock (see Gravalos 2014).

CY-Q: Machay

Like *Machay* CY-P, *Machay* CY-Q was originally a single cave chamber beneath a large boulder but was then expanded to include a second rectangular chamber in front of it. This gave it a somewhat hybrid form that may be considered a "chullpa-machay". The outer structure contained three chambers and was plastered and painted red. The front walls of these chambers were heavily destroyed by looters in order to gain access inside. Surface collections in the tomb (Operation 19) revealed few remains, and the skeletal sample had an MNI of 5. The large size of the tomb, and the apparent need to expand it by building additional chambers in the front, suggests it originally held many more burials. More human remains would likely be uncovered through intensive excavations. Ceramic remains included a white on red convex plate or shallow bowl that seems to post-date the Huarás phase, based on its form and dull surface treatment (see discussion in Lau 2004:191). No animal or botanical remains were recovered through surface collection.



Figure 6.159 *Machay* CY-Q exterior and ceramics. **Left:** Exterior of *machay* CY-Q, showing its partially destroyed outer chambers that contained human remains. Behind these chambers, is a large open cave where ceramic fragments and disturbed human remains were also found. The outer chambers were plastered and painted red. **Right:** A white-on-red style convex plate or shallow bowl recovered from the main open cave chamber. This style more closely reflects the late Recuay style documented at Chinchawas (Lau 2004:191) than Final Formative Period Huarás styles.

CY-R: Chullpa and patio

CY-R is a *chullpa* and patio complex excavated as Operation 21 (*chullpa* structure and interior) and Operation 22 (patio/exterior). The *chullpa* is 5.4 meters wide across its southern face, which has a single entrance, and is 5.3 meters long. It has four chambers, which likely functioned as three burial chambers and an entry chamber for mortuary activities or offerings inside the main access (see Figure 6.161, chamber A). Before excavations began, the *chullpa* had been looted and much of its soil was upturned. The human remains had an MNI of 21 individuals (Appendix H).

Materials from within and outside of *chullpa* CY-R indicate use across three phases: Cayán Phase 2, Tzacpa Phase 1, and Tzacpa Phase 2. Excavations inside the *chullpa* revealed Cayán Phase 2 and Tzacpa Phase 1 artifacts (see Cruzado 2016), while excavations in the surrounding patio revealed Cayán Phase 2 through Tzacpa Phase 2 artifacts. The Cayán Phase 2 (Recuay) artifacts included kaolin wares and the Tzacpa Phase 1 (Middle Horizon) remains, which were the most numerous, included painted polychrome bowls in *both* local (usually red/orange-white-black tricolor) and Wari-influenced styles. The remains suggest that the Middle Horizon was the *chullpa*'s main period of use, but also that it was likely built during the transition between Cayán Phase 2 and Tzacpa Phase 1. They also suggest the occupants or their family members had a strong affiliation with the Wari—either emulating their styles or acquiring materials from them. Finally, Akillpo ceramic styles, such as jars with tall necks and flaring rims with appliqued *adornos* positioned below the neck indicate that Tzacpa Phase 2 (Late Intermediate Period) activities also occurred in the patio. However, radiocarbon dates are needed from human remains inside

the *chullpa* to determine whether people continued to bury their dead in this tomb or whether they returned for other activities during this later period.

Other remains from within the *chullpa* included a miniature loom, as well as textile fragments featuring a variety of colors. The best preserved of these is a multi-colored bag. Botanical remains included maize, peanut, gourd, and avocado, which were likely food offerings (Cruzado 2016; Appendix F). In addition, a large groundstone fragment had maize residues, and two biface lithic fragments revealed maize and potato, respectively (Appendix F). These materials indicate food preparation was a part of the mortuary ceremony and occurred near the tomb.



Figure 6.160 Northern face of *chullpa* CY-R after clearing.

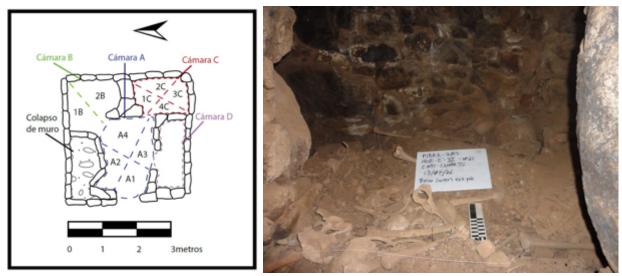


Figure 6.161 Left: Schematic drawing (from Cruzado and Bria 2014) of CY-R's internal chambers (cámara), showing the sub-chamber suboperation-like partitions we used to divide the collection of remains during excavation. **Right:** Photograph of the interior of CY-R Chamber D before human remains were removed.



Figure 6.162 Middle Horizon polychrome ceramic fragments from inside *chullpa* CY-R. The three sherds on the left are of a local Middle Horizon tricolor style, featuring wavy lines and colored bands (see Cruzado 2016 for reconstructed portions), whereas the five sherds forming a column on the far right are made in a distinctly Wari-influenced multicolored geometric style.



Figure 6.163 Left: Ceramic and metal artifacts recovered from the patio outside *chullpa* CY-R. Ceramics include Recuay kaolin (top left), a local-style black on red closed vessel (top center, likely Middle Horizon), and a Wari-influenced Middle Horizon style polychrome jar (top center), and an Akillpo syle jar with a tall neck and animal *adornos* (right). Metal objects include a metal axe fragment and a thin, folded sheet that probably formed part of a *tupu* garmet pin (bottom row at left). **Right:** example of a complete Akillpo jar from the Callejón de Huaylas with a similar form as the one shown from CY-R (image from Burger and Salazar 2015).



Figure 6.164 Perishable materials from *chullpa* CY-R, which included a miniature loom (left) and a polychrome three-cornered bag (right; see also Grávalos 2014).

Excavations in the patio surrounding the tomb were carried out in order to define the outer *chullpa* structure and identify the activities held within this enclosed space (see review of datable materials above). Most excavated materials consisted of disturbed soils and wall collapse near the tomb, but many artifacts were likely from the interior of the tomb and later moved by looters, based on the recovery of artifacts similar to those recovered from within the *chullpa*. Alternatively, these similarities may link the remains inside the tomb to other activities, such as feasting and food preparation, outside the tomb.

Regardless, both the patio wall and *chullpa* shared a single platform terrace and are clearly associated, with the patio likely forming a gathering space for mortuary rituals.



Figure 6.165 Wall surrounding *chullpa* CY-R, which created an enclosed patio (excavated as Operation 20) around the *chullpa*. Photograph facing west; *chullpa* is located to the left of the image's frame. Note that the large stone in the middle of the patio was fractured—like intentionally—away from the large stone along which the patio wall was built. The stone may have formed a table-like surface.

Terraces, Canals, and Associated Features

Several terrace and canal features, as well as nearby structures, were excavated in order to explore their construction techniques and recover diagnostic materials that would help date their construction (Figure 6.166 and Figure 6.167; see also map Figure 6.1–Figure 6.2). However, because of a combination of mixed terrace fills, disturbed soils, and/or non-diagnostic materials, it was difficult to assign precise dates to these features. For this reason, structure codes and periods were not assigned. These excavations included Hualcayán Operations 9, 10, and 14, as well as six test excavations in the site of Ragapunta

(HU03-Operations 1–6), which is a site located at the eastern extent of Hualcayán's Sector C that is adjacent to a spring that was a source of water for ancient Hualcayán²².

These excavation units were placed in different areas of the landscape (see Figure 6.167). Operations 9 and 10 were excavated on terraces around (Operation 9) or adjacent to (Operation 10) the same canal that runs along the eastern side of the Perolcoto complex in Sectors A and B, respectively (Figure 6.166–Figure 6.169). Operation 14 was placed hallway up the steep slope in Sector C (Figure 6.170). Finally, the six test units (1x1 m or 1x2 m) at Ragapunta were placed in three areas: an isolated structure located immediately southwest of Ragapunta's spring (HU03 Operations 1–3); in structures on the settlement's highest terrace (HU03 Operations 4–5); and in a structure on a lower terrace (HU03 Operation 6; Figure 6.171–Figure 6.173).



Figure 6.166 Photographs of the studied canal system. **Left:** Photograph taken near Operation 10, facing southeast. Notice upright stones to the right of the individual standing on a terrace. **Right:** Photograph taken between Operations 9 and 10, facing southeast.

 22 Though the continuous terraces in Hualcayán's Sector C link Hualcayán and Ragapunta directly, Ragapunta is a nucleated settlement on a ridge and was therefore designated as its own site.

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Figure 6.167 Hualcayán canal system with excavation units and features indicated.

Operation 9 was placed across canal just northwest of the Perolcoto mound and included its surrounding terrace complex (Figure 6.168). The soils did not contain modern construction fills, and was the most intact of the terraces excavated, though the canal stones may have been remodeled or repaired in modern times. Soils contained diagnostic ceramics that dated to Perolcoto Phase 4 (39%, n=21) and Cayán Phase 2 (25%, n=13)23, making it likely that the terrace and/or canal was constructed by or during Cayán Phase 2.

²³ 19 of 53 sherds could not be assigned a period.



Figure 6.168 Operation 9 before (left, facing south) and after (right, facing southeast) excavation.

Operation 10 was placed east of the Perolcoto mound complex, on a lower terrace of the Sector B hilltop and a section of the canal that was made up of large boulders (Figure 6.169). This location was selected because it was the seemingly most intact section of the hillside's canal; modern residents had rebuilt the higher sections with concrete. The fills in Operation 10 revealed few dateable remains and what appeared to be modern gravel fill that may have been dumped by current residents when they were reinforcing a nearby section of the canal with concrete. However, it is possible that this fill was ancient; additional terrace excavations may clarify typical terrace construction techniques. Three stones were also uncovered, which once formed part of the terrace face; however, they were displaced and collapsing. Overall, few results could be concluded from the Operation 10 excavations.



Figure 6.169 Operation 10 before (left, facing southeast) and after (right, facing east) excavation. **Left:** Excavations were carried out on the terrace just above and to the right (south) of where the water is shown running over large stones. **Right:** Excavations south of the canal, showing the light, gravelling fill and three displaced terrace facing stones (center of photograph).

Operation 14 was placed in Sector C, on the steep mountainside above the rest of the site. Excavations produced few materials and shallow cultural soils (Figure 6.170).



Figure 6.170 Operation 14, located in a narrow terrace on the mountainside in Sector C (facing north).

Finally, the excavations at Ragapunta (HU03 Operations 1–6), were conducted in order to understand and date the structures built next to Hualcayán's closest source of water (Figure 6.171–Figure 6.173). This water source is a now-dry spring (*puquio*) that is located at 3900 masl and was canalized to flow towards Hualcayán. Ragapunta is located

on a steep ridge just west and southwest of the spring's origin and east of Hualcayán's sector C, between 3800 and 3900 masl. All Ragapunta units revealed extremely shallow soils with no diagnostic materials, making it difficult to assign a date or function to its construction. Additional excavations are needed. However, based on structure size and arrangement, Ragapunta was likely primarily a habitation site, or perhaps a refuge. A large rectangular structure immediately west of the *puquio* may have had a special purpose given its isolation and association with the *puquio* (see Figure 6.172, indicated in red). Shallow soils and few materials made it impossible to clarify its use, however.



Figure 6.171 Panorama photographs of Ragapunta (site HU03), located above Hualcayán and abutting Hualcayán Sector C. Top: View facing south of Ragapunta (lower-middle of image). The large mountainside canal is visible in the middle-foreground, seen running downhill from west to east (left to right). Bottom: View of Ragapunta, facing southwest. The gently sloping plateau of Hualcayán's Sector D is visible in the background (right half of image).

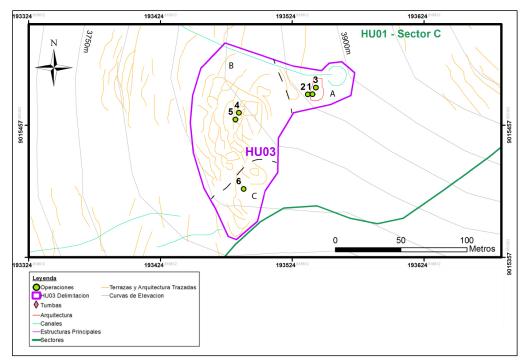


Figure 6.172 Excavation test units in Ragapunta (HU03) near the now-dry spring (*puquio*). Operations 1–3 are located in a structure that isolated from the rest of the settlement, immediately below and west of the *puquio*. This structure, indicated in red, is larger than the presumed household structures in the other sectors of the site.



Figure 6.173 Photographs of Ragapunta test excavation units. **Left and Center:** Ragapunta excavation unit HU03-Op1 before (left) and after (center) excavation. **Center:** The excavated subsurface soils visible in the unit are primarily sterile soil, below a very shallow use-surface. Right: Surface of test unit HU03-Op2, showing the character and depth of nearly all surfaces in Ragapunta.

In sum, the terrace and canal excavations at Hualcayán and Ragapunta were largely inconclusive. The best material evidence, however, comes from Operation 9 near Perolcoto. Operation 9, which was placed across a canal and its surrounding terrace, revealed diagnostic ceramics that predate the Middle Horizon (Janabarriu and Recuay style

ceramics), suggesting a Cayán Phase 2 (Recuay-era) construction. It is nonetheless possible that Recuay materials may have filtered down into a Perolcoto Phase terrace, or that Tzacpa Phase 1 builders may have used soils with these earlier materials. Nonetheless, a Cayán Phase 2 date coincides with the other major transformations to the Hualcayán landscape, which include the construction of the ritual-storage complexes north of the Perolcoto mound, which were aligned with the same canal excavated in Operation 9.

Summary

The data presented in this chapter trace how the people of Hualcayán reconfigured and reorganized the spaces and materials of their community during the Huarás era, or Cayán Phase 1 (Final Formative) and Recuay era, or Cayán Phase 2 (Early intermediate Period). The data also reveal how the production of new Huarás and Recuay spaces, practices, and materials mark a dramatic transformation in the Hualcayán community with a legacy that extended into Tzacpa Phase 1 (Middle Horizon) and Tzacpa Phase 2 (Late Intermediate Period), particularly in terms of habitation and mortuary traditions.

During Cayán Phase 1, Hualcayán's residents partially destroyed Chavín spaces, reused these spaces for feasts, and filled rooms with refuse and new structures. They also replaced the Chavín-affiliated Janabarriu ceramics with painted white-on-red Huarás styles. These activities of rebuilding and feasting on the mound are interpreted as a combination of decommissioning, destruction, and reuse events, many of which were meant to infuse the mound with a new "Huarás" community identity and a local authority

that was not bound by the constrained practices once maintained on the (likely sacred)

Perolcoto Mound.

These Huarás era changes were traced in different areas of the Perolcoto mound and at different points in time. In the Southwest Platform Area of Perolcoto, they first burned and placed ashy refuse in the rooms surrounding the highest central platform previously a ritually clean space—during CY-A. During CY-B, they feasted on top of the still exposed Chavín phase platform surface, which was likely part of an ongoing tradition of these kinds of practices that continued into Recuay times. Later, they intensively reused and modified the Northeast Platform Area of the mound, where they systematically destroyed several corners of the Chavín era platforms and walls and conducted feasting activities in these spaces. They then smashed and burned their feasting refuse in the now destroyed wall cavities and haphazardly rebuilt the walls before covering the floor with ash and fill. During the following centuries (CY-D), they periodically reused the area for feasts and built new rustic spaces as part of these activities. These activities are more difficult to reconstruct, but the ephemeral nature of the structures and the often-decorated assemblages point mostly to intermittent activities such as feasting, perhaps combined some domestic-related activities.

The evidence does not entirely eliminate the possibility that the later²⁴ Cayán Phase 1 walls in the Northeastern Platform Area (CY-D) were built and used as domestic spaces, or that some intermittent *domestic-like* activities occurred here—such as lunchtime meals during work activities in the nearby agricultural fields²⁵. The evidence to precisely reconstruct the CY-D activities is simply lacking, having been heavily disturbed by later

²⁴ The earlier Huarás phase activities show clear evidence of ritualized feasting and rebuilding, however.

Recuay modifications to the mound as well as modern erosion. Nonetheless, there is little evidence for clearly delineated household structures, at least in the areas excavated. More excavations could clarify these late Huarás practices; however, the current interpretation is that the low and overlapping walls and features uncovered in CY-D reflect the ongoing and long-term construction of semi-ephemeral spaces in the Northeast Platform Area over the course of Cayán Phase 1.

During Cayán Phase 2, local people ended a tradition of feasting on the mound (CY-E) by covering the Southwest Platform Area with a layer of fill (CY-F), which created a flat surface on top of the mound and covered all exposed Perolcoto Phase 4 architecture.

Similarly, in the Northwest Platform Area they built a roughly curvilinear platform during CY-G, which covered the existing Cayán Phase 1 refuse and the still-exposed Perolcoto Phase 4 structures. Around this time, at least one family group built semi-subterranean tombs in the East Terrace Area of the Perolcoto mound (CY-H), where they buried and feasted with the dead. People also refurbished the Sunken Plaza Area during Cayán Phase 2 by placing soils to raise the floor and stabilize the crumbling plaza wall (CY-I).

The people of Hualcayán also built and rebuilt many areas beyond the Perolcoto complex during Cayán Phase 2, drastically changing the local landscape. In particular, they built at least five multi-purpose compounds with distinctive D- or U-shape layouts in an area of agricultural terraces north of the Perolcoto Mound. Excavations in two compounds, CY-J and CY-K, revealed that they had exterior corridors with small rooms containing botanical remains, ceramics, and chipped stone tools. These remains suggest that people used the small rooms primarily for storing food, which were placed around an open patio or plaza gathering space. Though the overall form of CY-K was likely built in one episode

with small modifications made to the inside of its corridors, the CY-J's open form was constructed after two construction episodes, and later modified at least once more. The construction event that transformed it into an open patio with storage rooms involved a large feasting event, which included the preparation and burning of many diverse cultigens, such as maize, potatoes, sweet potatoes, beans, and peanuts, which were consumed in a variety of vessels featuring the faces of elite and/or ancestral individuals.

More broadly, excavations as well as observations of surface artifacts and structures revealed that much of the standing architecture in the Hilltop Residential Area (Sector B) and Mountainside Tomb area (Sector C) was built and used during Cayán Phase 2 and then was reused during Tzacpa Phases 1 and 2.

First, excavations revealed that the people of Hualcayán built over, expanded, and reoriented the Hilltop Residential Area during Cayán Phase 2, evidenced by the construction history of the CY-L house and patio. CY-L's original foundations and floors are associated with Recuay-style ceramics and are built over an earlier structure that was likely used during Cayán Phase 1 and Perolcoto Phase 4 based on the presence of both Janabarriu and Huarás-style ceramics in the lower fills. Notably, this buried structure was most closely aligned with structures on the summit of the Perolcoto mound's Southwest Platform Area dating to Perolcoto Phase 2–4. This suggests that the buried structure—and others like it on the hilltop—may have been built during the Perolcoto Phases. The Cayán Phase 2 household constructions like CY-L then covered these earlier spaces and shifted the hilltop to a new orientation, away from Perolcoto and aligned with the canal extending down the mountainside (see also Chapter 7).

The presence of decorated serving vessels, especially bowls, within the CY-L excavated house and patio indicate that feasting may have been an important requirement of domestic kinship or community-wide practices of affiliation—perhaps on formal occasions or as customs of hospitality. This may have been particularly important amongst elites whose role was to provide for the community. CY-L is located near Sector B's summit, which was dominated by a presumably elite household complex built atop a large rectangular platform (30.5 m x 33.6 m). CY-L may have been a semi-elite residence based on both its proximity to this monumental house compound and the evidence for domestic feasting. Such household feasts may have been elite-related practices, as represented in the ceramic house effigies that feature a central male figure and his attendants engaged in libations, often offering them to the central figure (discussed by Lau 2011).

The CY-L domestic complex was reused during Tzacpa Phase 1 and then slightly modified and again reused by occupants during Tzacpa Phase 2, suggesting that the Cayán Phase 2 household structures established a domestic pattern that was maintained for centuries after their construction, at least in terms of division of space.

Continuities between Cayán Phase 2, Tzacpa Phase 1, and Tzacpa Phase 2 are also visible in the use, elaboration, and reuse of mountainside tombs, with the majority likely constructed during late and terminal Recuay transformations occurring between the end of Cayán Phase 2 and the beginning of Tzacpa Phase 1. All tombs were open sepulchers—

machay or chullpa—that were reused over several centuries and contained multiple individuals of various ages and sexes, suggestive of family units. Though many of these tombs were built during the late Recuay-era, their main period of use was Tzacpa Phase 1, evidenced by the tricolor and polychrome vessels associated with the Middle Horizon in

general, and Wari-influenced styles in particular. These new material styles, the appearance of *chullpas*, and the influx of traded wares from the coast suggest that at least some family groups, particularly those associated with *Chullpa* CY-R and *Machay* CY-M, had links to long distance trade networks and perhaps foreign individuals themselves.

Finally, though terrace and canal excavations were largely inconclusive, the construction of terraces can be associated with the expansion of Recuay architecture during Cayán Phase 2 based on architectural alignments. Moreover, artifacts that are distinctively post-Recuay have yet to be found within terrace fills, though this could be due to sampling. In addition, terrace systems may have continued to expand during the Middle Horizon.

Overall, these Cayán Phase 1 and 2 remains suggest that people at Hualcayán greatly expanded and transformed their domestic, ritual, and agricultural activities after Chavín. Chapter 7 will further discuss these findings, focusing on how they changed their spaces, foods, and ritual practices to transform their community across Hualcayán's prehistoric occupation. However, a few general trends and crucial transitional practices are summarized below.

The evidence from Cayán Phase 1 contexts on the mound indicate that the appearance of a local Huarás identity at Hualcayán didn't simply occur through the diffusion of a new aesthetic style and adoption of a new system of beliefs. Instead, the decommissioning and then destruction and rebuilding episodes in the Chavín era spaces on the Perolcoto mound point to how a new local identity and authority was infused in place by first covering and then depositing materials *directly into its walls*, transforming these community spaces from the inside. Moreover, the subsequent and ongoing practices of

rebuilding ephemeral structures hearkens back to the earlier Perolcoto Phase 4 activities that occurred in the same precise area of the Northeast Platform, where floors and rustic structures were continuously rebuilt (PC-H and PC-I). These Perolcoto Phase 4 ritual-building activities were coeval with Chavín-related practices elsewhere at the site but represent an entirely local practice that continued until a final Chavín era construction phase, PC-J, put an end to these practices by creating a permanent platform complex. This sequence of events—1) the end of a local tradition of ongoing building (PC-H and PC-I) with the construction of a permanent platform complex (PC-J) in late Chavín times, 2) the ritually elaborate feasting and destructive decommissioning of PC-J after the end of Chavín (CY-C), and 3) the resuming but reinterpretation of a practice of ritual building in this area (CY-D) suggest a strong local social memory and a rejection of Chavín as local people reestablished a more independent authority during Cayan Phase 1.

Such transformations through building and feasting continue to remake the community during Cayán Phase 2, and are best characterized by the activities performed during CY-J3. During CY-J3, people gathered to feast and rebuild a multiuse compound into open patio with storage rooms. This was not, however, a mundane work-party performed only in order to pool labor and complete the task of building. Through the use of elaborate imagery, symbolic libations, and the gathering together of diverse materials and foods, this construction labor was linked to the overall goals, wealth, prosperity, and fecundity of the group, whose assembly reinforced the authority of the leaders and ancestors who provided it. This is suggested in particular by the numerous elite and ancestor effigy vessels from which food was stored, prepared, served, and consumed—at each stage in the feast. These effigies, combined with the foods brought to and consumed in the feast, served to redefine

and reaffirm the affiliations that structured the group and the community at large, between its leader(s), its ancestors, and its living descendants, *as well as* the spaces, materials, and results (quite literally, the "fruits") of their labor.

The next chapter explores these spaces, materials, and practices in greater detail and over the *longue durée*—spanning from Hualcayán's Formative Period origins to the Huarás and Recuay transformations after Chavín (as well as the legacy of these transformations in the post-Recuay era)—in order to discuss how the Hualcayán community was reassembled across its prehistoric occupation.

CHAPTER 7

BUILDING, RITUAL, AND ECONOMY OVER THE *LONGUE DURÉE* AT HUALCAYÁN: SUMMARY AND DISCUSSION OF FINDINGS

In this study, I have examined diverse data from Hualcayán to address an enduring anthropological question: how and why do communities form and transform? To address this question, I traced the local and long-term processes through which the people of Hualcayán established distinct ritual traditions, economic practices, ecologies, and group affiliations: first as they participated in the Mito-Kotosh and Chavín social networks of the Initial, Early, Middle, and Late Formative Periods (2300–500 BC; Chapter 5), and second as they invented and performed new Huarás and Recuay communities during the Final Formative Period, Early Intermediate Period, and afterward¹ (500 BC–AD 700; Chapter 6). The previous two chapters presented a detailed history of these processes and the practices that defined them, by tracing how they were constituted through distinct construction, ritual, and other events and phases identified in the archaeological record.

In this chapter, I summarize and discuss the findings presented in Chapters 5 and 6, with the primary goal of revealing long-term patterns in the Hualcayán data and their implications for community formation through time. I do this by comparing, over the *longue durée* of Hualcayán's nearly 4000-year occupation, the practices of building and ritual performance (Part I; i.e., changes in space, labor coordination, proxemics) and food production, ritual objects, and ritual consumption (Part II; i.e. changes in the diversity of

¹ Late Recuay and post-Recuay continuities and transformations were also discussed in Chapter 6; the broader importance of these continuities during the Middle Horizon and Late Intermediate Period (AD 700–1450) will be further discussed in this chapter.

cultigens and domesticated fauna, practices of feasting and offerings, etc.). By evaluating these changes in building, performance, food production, and ritual consumption, the chapter addresses the third set of questions outlined in Chapter 1, *The Changing Practices of Community at Hualcayán* (see also Chapter 4). This diachronic analysis explores how the Hualcayán community was assembled in new ways through time—through both citation² and moments of innovation—redefining its group affiliations and engendering a renewed sense of place. Finally, the chapter also compares the study's findings to preexisting data from highland Ancash in order to identify when and how local people participated in widespread networks and when they asserted distinctly local traditions. In so doing, the analysis will explore how regional traditions through time were rooted in community politics and practices at places like Hualcayán.

Part I: Building and Ritual Performance

Early Perolcoto (2300–1200 BC): Mito-Kotosh and early regional interaction

The first millennium of communal gatherings at Hualcayán was largely defined by rituals in Mito-Kotosh enclosures, which places it within a regional social network of community interaction. The evidence for this includes strong similarities between the architectural layouts of Hualcayán and other Initial and Early Formative Period Mito-Kotosh temples, especially nearby La Galgada,³ as well as the presence of non-local exchanged goods, such as rare stone objects and marine foods or shells (see Part II). The building practices in particular reveal how people at Hualcayán represented these regional

 2 Repeated practices that are nonetheless transformed through their reproduction in a new moment (Fowler 2017; Lucas 2012).

³ A walking distance through *quebradas* of likely 70 to 80 km (though located 60 km apart as the crow flies).

connections within local sacred spaces. Equally, however, modifications to a long-used Mito-Kotosh enclosure expose how ritual participants became increasingly separated and distinguished, pointing to a shift in local politics during this era.

Several striking parallels between the masonry styles, building forms, and especially layouts of the Perolcoto and La Galgada mound complexes—similarities not shared by all contemporary Mito-Kotosh temples—point to a possible close relationship between the communities that built them. However, it is important to note that, despite these architectural similarities, there were also important differences that support the generally accepted idea that Kotosh-Mito temples were not controlled by a state or polity, but were instead built and maintained by independent communities who shared a core set of building and ritual conventions that they elaborated on in slightly different ways (Bonnier 1997).

For example, early masonry styles at Hualcayán and La Galgada bear some important similarities and distinctions. At both sites, architectural façades featured carefully placed horizontal rows of medium to large quarried stones that were separated by rows of smaller chinking stones, which also filled the spaces between larger stones⁴ (Figure 7.1). In addition, builders of both sites used a construction technique of placing large upright stones to create a wall's base and lower facade (Figure 7.2; Grieder et al. 1988). Nonetheless, many large stones at Hualcayán are flat on the bottom and curved at the top, while at La Galgada they are more rectangular in shape (See Figures 3.3 and 3.4). In addition, the Hualcayán style commonly features several rows of the smaller chinking stones between rows of large stones, while the La Galgada style usually features only single

 $^{^4}$ La Galgada construction switched from waterworn cobbles to quarried stone around 2200 BC.

rows of chinking stones. Moreover, the decorative hanging corbel stones on La Galgada facades (visible in Figure 7.1), the plastered walls, and frequent niches on temple enclosures are all absent at Hualcayán (although Figure 7.2 demonstrates the possibility for destroyed niche and poorly preserved ledge mortar). Finally, at Hualcayán, PC-A's interior ledge, which could have functioned as a shelf, is much more pronounced (40 cm wide) than the interior dados inside enclosures at La Galgada, which were likely more decorative.



Figure 7.1 Left: Image of the external facade of the Kotosh-Mito temple mound of La Galgada (Image from Grieder, Bueno Mendoza et al. 1988; Fig. 44). **Right**: External facade of the PC-A enclosure in the Southwest Platform Area of Hualcayán's Perolcoto mound.



Figure 7.2 Images of wall masonry at La Galgada (left; Grieder et al 1988, Figure 52) and Perolcoto (right; structure PC-A) show how, at both sites, the wall foundations were constructed with large upright stones that were surrounded by small chinking stones.

Beyond some parallels in masonry style, there are more notable parallels between the size, form, and layout of La Galgada's mound complex and its ritual enclosures (see especially the most prominent North Mound, floor levels 20 and 30; Grieder et al. 1988) and Hualcayán's Perolcoto mound (especially the PC-A enclosure in the Southwest Platform). In particular, PC-A's sub-rectangular form, tall wall (~2 meters), and rectilinear inner ledge resemble many of La Galgada's Initial Formative temple enclosures (Figure 7.3). Moreover, PC-A's layout is similar to that of structures on La Galgada's North Mound. This comparison suggests that PC-A, like the central structure on La Galgada's North Mound, may have had a single entrance, atrium plaza, and stairway access on the southeastern side of the Southwest Platform Area⁵ (Figure 7.3). Other enclosures may have also flanked the PC-A enclosure to its east and west, as they did at the larger central structure on La Galgada's North Mound.

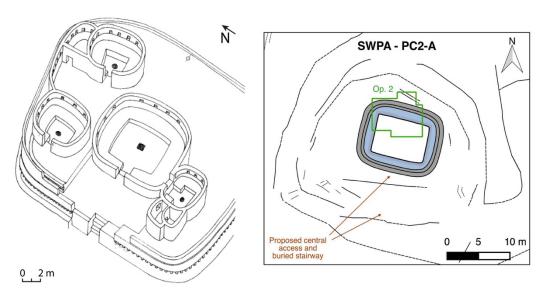


Figure 7.3 Left: Reconstruction of the sub-rectangular enclosures on the summit of the North Mound at La Galgada (image from Grieder 1982:103; scale and north arrow modified). **Right:** GIS reconstruction of the PC-A subrectangular enclosure (showing construction phase PC-A2) and its placement in the Southwest Platform

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⁵ No entrance was recovered on the excavated northeastern and northwestern sides of the PC-A enclosure, but the southwestern side was not excavated and an entrance may be buried on this side.

Area. Arrows indicate the possible location of the structure's buried access and stairway on its southwestern side based on comparisons with La Galgada.

The collective evidence from Hualcayán (Perolcoto), La Galgada, and a third site, Huaricoto, points to a broad architectural tradition in the northern Callejón de Huaylas valley that favors a sub-rectangular form. Huaricoto⁶, which is located in the central Callejón de Huaylas valley south of Hualcayán, belongs to the categorically broad Kotosh tradition, whereby people gathered on artificial mounds to conduct fire rituals, but not in Mito-style spaces with split-level floors: Huaricoto's hearths are found on level floors or at the center of simple, small enclosures with rounded corners. Moreover, Huaricoto's enclosures are comparatively small⁷—its largest Kotosh enclosure is three and half meters in diameter and less than a meter tall—and its masonry styles are more varied and less formal than the La Galgada and Perolcoto examples (Burger and Salazar Burger 1985). Nonetheless, the people who built Huaricoto's ritual enclosures clearly shared a preference with the builders of Hualcayán and La Galgada for the sub-rectangular form (e.g., Figure 7.4). In contrast, Mito-Kotosh temples in the upper Huallaga valley at the sites of Kotosh, Wairajirca, and Shillacoto have, exclusively, a rectangular form (Bonnier 1997; Izumi and Terada 1972). Based on the geographic distribution of these sites⁸, it is likely that shared

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⁶ Like Hualcayán, Huaricoto had a much longer occupation than La Galgada, spanning the entire Formative Period (including the Late Preceramic or Initial Formative Period).

⁷ Burger and Salazar-Burger (1985) point out that while nearly all of La Galgada's formal ritual enclosures were built during the Late Preceramic Period (Initial Formative), Huaricoto's largest and most formal enclosures were built later. Further excavations may reveal a similar late formalization of ritual enclosures at Perolcoto, but its architectural similarities with La Galgada, which was abandoned during the Early Formative, point to an earlier adoption of more monumental enclosures and also a similar time frame for their eventual rejection of the Kotosh-Mito tradition.

⁸ Perolcoto is roughly equidistant between Huaricoto and La Galgada in the Callejón de Huaylas valley, and travel times are relatively short between them: one could arrive at either site from Hualcayán within a two-day walk (that is, if one were to spend these days walking directly to the destination and not stopping to spend time in other communities along the way).

preferences developed in each valley through close interaction between people who worshiped at nearby temples, perhaps facilitated through trade and the exchange of ritual knowledge.

A consideration of these similarities and distinctions between these Kotosh and Mito-Kotosh temple forms⁹ suggest that people across the north-central highlands produced local variants within a regional system; neither the Mito nor the broader Kotosh network of temples was centrally controlled. 10 On the one hand, Mito-Kotosh clearly involved a highly specific architectural and likely ritual canon, based on the traits these temples share that other Kotosh temples do not. On the other hand, particular architectural forms and features are shared between specific Mito and Kotosh temples. For example, a trait shared between Huaricoto and Perolcoto that is absent from La Galgada is the presence of drainage canals outside of ritual enclosures. Although Hualcayán's Mito-Kotosh architecture (PC-A) is notably different than the smaller enclosures at Huaricoto, the canal added during construction phase PC-A6 follows a similar pattern of canal construction as that which Burger and Salazar-Burger (1985) documented at Huaricoto (Figure 7.4). Many canals at Huaricoto were built to drain rainwater, but the authors suggest that some canals likely had a religious instead of utilitarian purpose, perhaps because they were used to direct the flow of fluids (e.g., water, libations) during agricultural fertility rites. The PC-A6 canal may have served either purpose.

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⁹ Similarities and distinctions in materials and foods will be discussed in Part II.

¹⁰ Though Burger and Salazar [1980:29–30] suggest they may have been linked, perhaps hierarchically, as through relationships of "kinship".



Figure 7.4 Left: Image of a canal segment at Huaricoto, located between two Kotosh tradition hearths (Image from Burger 1992:119, Figure 109). **Right:** Canal segment uncovered outside (north) of the PC-A enclosure.

A comparison of mound forms from across the northern Callejón de Huaylas valley and neighboring highlands suggests broader affiliations and social divisions between communities during the Initial and Early Formative Periods (Figure 7.5–Figure 7.7). More precisely, the distribution of distinct mound forms points to separate building traditions in the Cordillera Blanca and the Cordillera Negra. For example, the elongated and curved shape of the mound at Chupacoto, located in the Cordillera Negra, bears a strong similarity to the newly discovered Kareycoto mound, also in the Cordillera Negra (Navarro Vega and Munro 2017). In the northern Cordillera Blanca, there is a distinct building tradition represented by the sites of Perolcoto and La Galgada. Moreover, all of these higher altitude mounds are different from the mounds at Tumshukayko and Inkawain, which are situated on the valley floor of the Callejón de Huaylas¹¹. It is my argument that, in building these

¹¹ Although Mito-Kotosh architecture and practices were widespread, the current evidence from sites like Tumsukayko (Bueno Mendoza 2004; 2005) suggests that not all ritual communities adopted them. Tumsukayko is located at the valley floor of the northern Callejón de Huaylas in the city of Caraz and is the

distinct mounds at different elevations and ecological zones, communities created and emplaced distinct identities and affiliations. Based on the geographic distribution of the mounds, it is also possible that the builders intentionally created recognizable social distinctions between communities on the "left", "right", and "center" of the Santa River and its tributaries¹² (Figure 7.7).

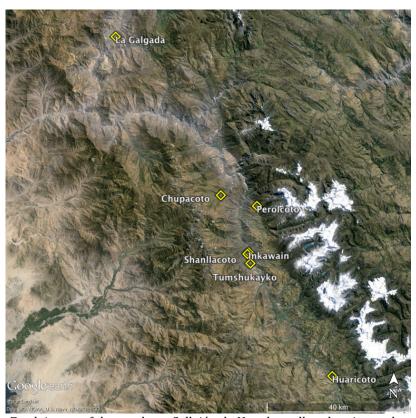


Figure 7.5 Google Earth image of the northern Callejón de Huaylas valley showing early mound sites (Note: additional mound sites recorded by Grieder et al.(1988) near La Galgada are not included on this map).

nearest of the non-Kotosh-Mito mound complexes (it can be reached within a day's walk from Perolcoto). Based on its complex architecture and its large size, Tumshukakyo is believed to have featured highly formalized ritual activities that were, at least for a time, of regional importance (Bueno Mendoza 2004; 2005). It underwent monumental reconstruction for 500 to 700 years during the Initial Formative (Bueno Mendoza 2004), which is a brief period in comparison to other sites that continued into the Early, Middle, and/or Late Formative Periods (e.g. La Galgada, Huaricoto, and Perolcoto at Hualcayán). The smaller unexcavated mound sites of Inkawain and Shanllacoto lie just north of Tumshukayko.

¹² Left and right are used subjectively here and could be flipped (left as right and right as left); they could also be based in the directions of east and west.



Figure 7.6 Google Earth images of early mound sites in highland Ancash near to Hualcayán (within and beyond the Callejón de Huaylas). North is up on all images. Top: Hualcayán (left) and La Galgada (right). Middle: Early mound sites on the valley floor of the Callejón de Huaylas valley: Tumshukayko (left) and Inkawain (center), both located north of Caraz, and Huaricoto (right) located near Marcará and shown partially covered by a modern walled field. Bottom: Early mound sites in the upper elevations of the Cordillera Negra: Chupacoto (left), in the Callejón de Huaylas valley, and the mound Karecoto (right), located in the headwaters of the Nepeña Valley (see Navarro and Munro, 2017).

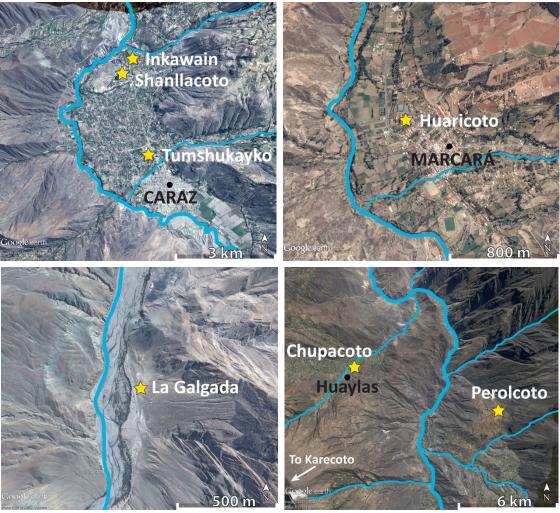


Figure 7.7 Geographic locations of early mound sites near Hualcayán (modern towns in black). Top row: Inkawain, Shanllacoto, Tumshukayko, and Huaricoto are on gently sloping plains near or at the valley bottom, overlooking the Santa River in the Callejón de Huaylas. Bottom left: La Galgada is located at a valley bottom overlooking the Chuquicara river in a norther tributary of the Callejón de Huaylas valley. Bottom right: In stark contrast to the other mound sites, Chupacoto and Perolcoto (Hualcayán) are located high above the valley floor in the Callejón de Huaylas.

Within this regional pattern, striking similarities in overall site layout once again strongly link Perolcoto to La Galgada over its other neighbors. In particular, the layout of the Perolcoto mound complex with its two prominent platforms and off-center sunken plaza has close parallels to La Galgada's entire two-mound complex, which has a circular plaza in front of its most prominent North Mound (Figure 7.8). Although Perolcoto is a single mound with two prominent platforms, excavations revealed that several large fill

events brought together the Southwest and Northeast Platform Areas mounds¹³. It is thus plausible that Perolcoto originally consisted of two side by side platform mounds—one larger (southwest) and one smaller (northeast)—that were later connected to create a single mound, while still maintaining the two areas as distinct ritual spaces.



Figure 7.8 Left: Artistic reconstruction of La Galgada's North Mound (center of image) and South Mound (lower right) and its circular plaza in front of the larger North mound. **Right:** Photograph of Hualcayan's Perolcoto mound (facing northwest) showing its two prominent platforms to the southwest (left) and northeast (right).

These comparisons between architectural forms across the northern Callejón de
Huaylas valley, in addition to the evidence for trade items (discussed in Part II), reveals a
complex network of interacting communities that exchanged materials and ideas in
complex ways. More to the point, the evidence suggests there was nothing close to a
monolithic tradition across the highlands, even amongst neighboring temples. Nonetheless,
within this complex network of interaction, certain communities were more closely

¹³ There are over three meters of fill placed between the two platform areas (at its upper extent) in the Central Platform Area. This fill directly abutted the external retaining wall of the Southwest Platform Area (central Platform Area). The leavest flowed by the fill place to the trial three trials are the trials and the southwest platform.

(wall U.E. 2.08). The lowest floor found beneath this fill abutted the retaining wall, suggesting that the platform upon which the Kotosh-Mito structure(s) once stood was at least three meters tall. Excavations did not continue below this lowest floor (PC-F1), and therefore, the wall could potentially be taller.

affiliated, as evidenced by the similarities between the Perolcoto mound at Hualcayán and the mounds at La Galgada.

There is no evidence that Hualcayán was either dominated by or dominant over other communities in this network; instead, Hualcayán was one of many peer communities. Scholars have demonstrated that Mito-Kotosh temples were linked in a number of ways, especially by trade and an overall shared religious ideology (Burger and Salazar 1980; Piscitelli 2014). But how were particular—and often precise—ideas and details about ritual building and practice exchanged between Mito-Kotosh communities? Though exogamous marriage alliances between Mito-Kotosh communities have not been directly proposed, the movement of marriage partners, ethnographically and ethnohistorically usually women in the Andes and Amazon, and their visiting family members may explain these close links in temple spaces in the absence of evidence for hierarchical control. Such marriage relationships may have underlain a system of perceived "kinship" between temples, such as Burger and Salazar (1980) proposed based on ethnohistoric comparisons.

Clearly, acts of construction brought people together at early places like Hualcayán; building and rebuilding monumental spaces and in ways that could be visibly linked to other communities required local labor coordination and consensus. At the same time, regional affiliations were mediated through these negotiated building forms and the exchange of resources. But how does Perolcoto's building history reveal these local, negotiated practices? Moreover, what other practices and materials were essential to "building" a community at Hualcayán?

The current earliest evidence for human activity at Hualcayán corresponds to the Initial Formative Period (also known as the Late Preceramic Period) sometime between

2464 and 2297 cal. BC. This date is associated with the processing of maize, which is indicated by starch grain residues on stone tools (Appendices A and F). Around this time, construction projects began in the Perolcoto mound and plaza complex, evidenced by a poorly preserved stepped feature, and terrace wall (PC-B) that was later (or perhaps immediately¹⁴) incorporated into the complex's sunken plaza¹⁵.

However, it is likely that these initial construction events at Hualcayán were rooted in or related to the Mito-Kotosh religious tradition. Excavations uncovered an Initial Formative Period Mito-Kotosh temple enclosure (PC-A) on the nearby Perolcoto mound with a date of only 160 to 375 years later than the earliest activities documented in the area that later became the sunken plaza¹⁶. The enclosure is a twelve-meter wide Mito-style building (PC-A) located in the Perolcoto mound's Southwest Platform Area. It has a rectangular form and features an internal ledge, probably for Mito-Kotosh fire rituals in the center of the structure that remain covered by deep fill. The PC-A enclosure's sub-rectangular form, its masonry style of alternating rows of large and small cut stones, and its features, such as an internal ledge (or dado) and split-level floor, are all similar to La

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¹⁴ Though the origin of the sunken plaza cannot be dated with certainty using the current evidence, it is possible that it was first constructed during the Initial Formative Period later remodeled during subsequent periods.

¹⁵ It is clear that construction began in the Perolcoto complex during the Initial Formative, though the specific architectural features associated with this early period—in particular the sunken plaza—are less well-defined and will be investigated in a subsequent project (see Chapter 8). Archaeologists currently disagree over whether sunken plazas were associated with early temple construction in the highlands, or whether these features begin to appear in the highlands with the spread of Chavín (Grieder, Bueno Mendoza et al. 1988, Burger and Salazar 2008). The current evidence certainly indicates an early collective construction project; however, because the sunken plaza was built by incorporating an Initial Period terrace into its form, and because the only feature excavated in the plaza was precisely against this terrace, there is not sufficient evidence to assign a firm date to the sunken plaza.

¹⁶ Earliest documented activities in the Sunken Plaza area are between 2464–2297 cal. BC, and the earliest documented activities in the Perolcoto mound (Southwest Platform Area) are between 2138–1922 cal. BC.

Galgada.¹⁷ A radiocarbon date from a platform structure demonstrates construction between 2138 and 1922 cal. BC (Appendix A).

In comparison to Mito-Kotosh chambers from other sites, the enclosure among the largest¹⁸, with an estimated diameter of twelve meters and walls approximately two meters high. Its size suggests considerable labor would have been pooled to construct it. Similar to the final Kotosh enclosure at La Galgada (Floor 30; Grieder et al. 1988) PC-A's large size may reflect a trend towards social and ritual integration during the Early and Middle Formative Periods at Hualcayán. Furthermore, its ample size would have provided a space for larger communal gatherings.

Over a span of nearly eight hundred years, PC-A was rebuilt several times by adding and then altering the size and shape of the upper floor platform (epicaust) that surrounded the central sunken floor (pericaust). These platform additions inside PC-A created ample space for standing in an area that is set apart from the structure's central floor. Each modification created a larger, peripheral area that was significantly higher than the increasingly smaller, central floor below, where, presumably, a ritual hearth was located. Bonnier (1997) and others (Burger 1992; Contreras 2010) suggest that the upper epicaust of Mito temples likely provided space for performance, sitting, or standing while viewing and venerating the central fire with the lower floor maintained as an exclusive area for the

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¹⁷ Excavations in the PC-A enclosure did not extend to the center of PC-A to confirm whether it had a hearth, which is the focal point of Mito-Kotosh rituals, because the center of the structure was deeply buried below construction fill that supported Middle and Late Formative Period structures. Still, the structure closely resembles the Mito-Kotosh temples at the ritual center of La Galgada, which is located in a northern tributary of the Callejón de Huaylas Valley about a two-day's walk from Hualcayán (ninety-four kilometers along the Santa and Tablachaca river drainages). This is a travel estimate if not stopping along the way to visit individuals in other communities, which would have been likely in most scenarios.

¹⁸ The largest Mito structure ever found was at Shillacoto, which had a diameter of fifteen meters (Izumi et al. 1972), but others have a range between five and twelve meters. The final, centrally located chamber at La Galgada had an external diameter of nine by twelve meters (Grieder et al 1988:31).

fire. In the case of PC-A, the successive modifications of the upper epicaust markedly increase the outer viewing platform and reduce the inner sacred floor. The outer platform was increased from an estimated fifteen square meters to fifty square meters, and the inner floor was reduced from a ninety square meters area to a more restricted forty square meters.

The PC-A space structured proxemics that elicited participants' interaction but also marked some degree of distinction between them. In other words, the construction of increasingly taller and wider platforms inside PC-A may have materialized some form of social distinctions, perhaps based in kin, age, or status, between the ritual practitioners, who tended to the fire, and other ritual participants. In short, the architectural shifts influenced the spatial practices and proxemics of the participants, altering the ways that these participants viewed and contributed to a ceremonial event. However, there is no absolute evidence, such as elite burials, of increasing inequality or status distinction. Hence, at present, it appears this was an inclusive space meant to mark the roles between ritual specialists, which may have been either rotating and changing or permanent. This is consistent with the fact that the PC-A enclosure was both monumental and built in the center of the Southwest Platform Area. The structure reflects a degree of consensus among local groups though which they collectively chose to emphasize this particular Mito space, PC-A, over others on the mound. This centrality, coupled with the comparably large 12 m diameter of the PC-A enclosure, suggests that its builders and participants sought to integrate larger groups into more centralized ritual events.

The above review of similar features across the northern Callejón de Huaylas valley recreates Hualcayán's near-regional social milieu during the Initial through Late Formative Periods. It indicated that, while practices of mound building and Kotosh rituals were widespread, variation in mound architecture reflects how each nascent community drew on and refashioned these practices in their own ways. The explosion of mound building in the Initial Formative, a time when most of the first villages were settled in the highlands (Burger 1992), strongly suggests that people came together to construct these ritual sites and, in doing so, concretized a new form of social identity—a locally rooted community. What is more, the evidence for shared traditions of mound building indicated that these communities, such as Hualcayán, participated in a broader sphere of social interaction and shared cultural knowledge, or a macro-community.

The similarities between Hualcayán and nearby sites thus indicate a strong network in which communities not only shared materials but also exchanged ideas—of material production, temple construction, and the religious ideas linked to them, which may have been facilitated through marriage or other social alliances. The changes to the final Mito-Kotosh temple space created spatial divisions between principal and peripheral ritual participants within temple enclosures, which may point to a transformation in social organization as new social roles and social divisions emerged in the community. These trends, which involved increasing distinction between kinds of ritual participants and the influx of foreign goods (see Part II), continued and intensified during the Middle and Late Formative Periods (Late Perolcoto).

Late Perolcoto (1200–500 BC): Platform expansion, child burial, and the local emergence of Chavín

The Perolcoto area remained a focus of community activity, though it was transformed into a different kind of ritual space. After approximately 500 years of modifying the PC-A Mito-Kotosh temple, the people at Hualcayán dramatically ended the Mito-Kotosh tradition, when they buried the temple and other areas of the Perolcoto mound and created new ritual spaces. This was a major construction event, raising the mound over three meters in both the Southwest and Central Platform Areas. Fills were laid in a single process, rather than incrementally; this is evident both in the stacking of fills along the wall face and then filling the interior, as well as the deposition of different fragments of the same ceramic vessel in different fill layers.

This fill event (PC-C) is significant because it marks the end of the Mito-Kotosh tradition at Hualcayán. The fill event occurred between 1415 and 1295 cal BC, or the latter centuries of the Early Formative Period (Appendix A). This date comes from carbon collected from an in situ deposit of smashed cooking pots that were found smashed below a rock and next to a grinding stone just below the top of the PC-C fill. These vessels indicate in situ preparation and consumption of maize and potato (see Chapter 5). Because these remains were only found near the top of the fill, and were clustered in a small deposit along with tools for food preparation, this consumption event was likely held to celebrate the completion of the filling and the new platform structure that it produced. Once people filled and covered the Mito-Kotosh temple and related spaces on the mound, they constructed the PC-E platform complex—a central platform flanked by rooms—in the Southwest

Platform Area between 1385 and 1093 cal BC (Appendix A). The PC-E platform complex was modified several times over the course of six to seven hundred years, from the early Middle Formative Period (Perolcoto Phase 3) to the end of the Chavín-era during the Late Formative Period (Perolcoto Phase 4).

The reconstruction process changed Perolcoto from an inclusive to a more exclusive space. During the Middle Formative, the platform at the center of the complex is estimated to have been approximately 20 square meters¹⁹, which would have accommodated far fewer people than the 90 square meters of the earlier Mito-Kotosh temple. Moreover, walls concealed the central platform from onlookers, creating a more restricted ritual space. However, though the platform was a restricted space for entry, an individual who stood in this space would have been visible from nearly all locations around the mound. To further emphasize the position of specific people, builders constructed two walls against the platform to form a narrow corridor leading to the platform's steps (see Chapter 3). This would have partially concealed individuals—presumably ritual practitioners—from view, and perhaps provided a greater sense of pageantry to the performances. Later, these spaces were accentuated when builders filled the corridor and leveled it to create a raised pathway, perhaps for more visible processions to the main platform. Around this time a broad terrace was built below the mound to accommodate large groups around the sunken plaza, who would have witnessed these processions and these individuals standing atop the platform (Figure 7.9). Hence, the data suggest that the central platform became an area where specific people could demonstrate or perform their ability to enter this longrecognized powerful place.

¹⁹ The platform's western extent was destroyed by looters, and the eastern extent was not fully excavated.

The construction of this platform, along with other similar modifications to Perolcoto created spaces that sharply contrasted the earlier Mito-Kotosh tradition. Rather than providing spaces for communal gatherings, the PC-E platform focused attention on individuals or small groups of actors who emerged from hidden chambers or ascended to prominent spaces within a procession. Overall, the evidence suggests a shift from more inclusive, group-oriented spaces during the Mito-Kotosh phases (e.g., PC-A) to spaces that literally heightened the authority of specific individuals or groups (PC-E).

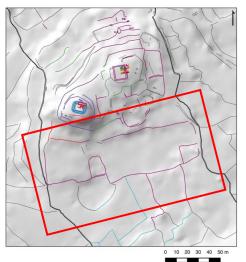




Figure 7.9 Left: Map of the Perolcoto mound complex. Red box indicates the broad terraces built between and around the mound and sunken plaza during Perolcoto Phase 4. **Right:** Photograph taken from the Central Terrace Area on the Perolcoto Mound, looking south, showing the broad terrace in the foreground.

The data also indicate that a new tradition of platform building spread throughout the region prior to the advent of the Chavín religion. The abandonment of Perolcoto's Mito-Kotosh enclosure(s)²⁰ by 1300 BC predates the regional expansion of Chavín by at least several centuries. When reflecting on these data in comparison with sites like La Galgada, where Mito-Kotosh temples were also covered with platforms during the Early Formative Period, and Chavín de Huántar, where massive platform and gallery complexes were built

²⁰ Other enclosures likely existed on the Perolcoto mound but these have not been uncovered.

during the Middle Formative Period, it becomes apparent that a new tradition of platform building became common at both small and large community temples by the Middle Formative Period. It is well-established that Chavín de Huántar became an important pilgrimage center during the Late Formative Period, and became a generative center of many new innovations in ritual practice, religious beliefs, construction techniques, and material styles.

Yet by tracing the growth of platform complexes at communities like Hualcayán before the so-called Chavín era of the Late Formative Period, it becomes clear that the regional fluorescence of the Chavín religion, at least according to the notion that Chavín emanated mainly outward from the temple of Chavín de Huántar, may not have been the most important moment of conversion in communities across the north-central highlands. Instead, a more dramatic shift appears to have occurred when the more egalitarian and corporate practices of Mito-Kotosh were abandoned and replaced by more socially stratified ritual performances in spaces that juxtaposed exclusivity. Though differing sharply from earlier Mito-Kotosh rituals, the origins of these distinctions between ritual participants and practitioners—whether they were organized hierarchically or heterarchically—can be traced to the modifications made to PC-A's inner platforms, which increasingly divided ritual space and highlighted the distinct roles of different participants. Moreover, at this time there is an influx of foreign objects, such as rare stones and jet mirrors, that would have reinforced distinctions between those who wore them and knew how to use them (see Part II).

Moreover, evidence for building and rebuilding rustic floors and ritual enclosures in Perolcoto's Northwest platform provides evidence for highly localized community practices

during the Chavín era at Hualcayán²¹. These ongoing and perhaps cyclical building practices are not known to other Chavín era temples. Chavín-affiliated Janabarriu ceramics were nonetheless associated with these layers and activities. Moreover, human burials were essential to this local Chavín-era practice. The floor fills of PC-H contained infants and children, which were interred as both primary and secondary burials. No cut marks were identified to suggest activities such as the "cannibalistic" processing of bodies suggested for disarticulated human assemblages at Chavín de Huántar (Lumbreras 2007:300–310). At Hualcayán, people may have simply displaced and moved these bones when they dug pits into floors in which the children were unknowingly buried. A third alternative is that these remains were transposed from another burial context, and then placed in the mound during a re-flooring event. Regardless, the evidence of child remains in multiple layers reflects child bodies were essential to the spaces and practices of Chavín-era rituals at Hualcayán. Although commingled with Chavín affiliated ceramics (see Part II), these building and burial practices are highly unique to Hualcayán.

Despite the persistence of this highly localized tradition of communal building and child burial during the Chavín era, the bodily position and adornments of a complete child (PC-G) buried within these floors may nonetheless point to regional connections and shared practices. First, the body was positioned face-down and flexed. This is a generally rare position to lay the dead, but was used to bury priestly individuals at the coeval site of Kuntur Wasi in the northern highlands²² (Figure 7.11; Onuki 1995; 1997; 2000). The child

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²¹ In particular, the Northeast Platform Area was built up by placing alternating layers of brown soil and ashy floors (PC-H) that were laid against the face of a platform was also incrementally constructed (PC-I). The floors were informal in that they were simply mounded against the platform, thinning out as they extended away from it.

²² Bioarchaeologist Emily Sharp first recognized this similarity in burial position and the interpretation that the child could be a priest or shaman in training.

burial at Hualcayán does not include the elaborate adornments as found in these high-status burials at Kuntur Wasi—where individuals were adorned with elaborate gold crowns and earrings and thousands of stone beads—but he or she was instead buried with special ritual objects and adornments from foreign places. These objects included a necklace made from marine shell and polished bone, and three spoons for snuffing hallucinogens (see Part II). These remains may suggest that the child was a priest or shaman in training, or that local people treated the child to a "priestly" burial for other reasons.



Figure 7.10 Left: Elite burial at Kuntur Wasi (Onuki 1997:99, Figure 31). **Right:** PC-G child burial at Hualcayán after cranium was removed. Notice the position of the mandible at right, which shows how the head was face down even through the body was twisted such that its legs were to the side rather than below the body.

More broadly, the inclusion of child bodies in the ongoing construction of mound floors and fills in the Northwest Platform Area links communal building with the renewal of the community itself through the birth and death of its members. The ceramic vessels and storage pits were cut into the ash floors also indicate food consumption, particularly of maize, potato, and beans, as part of this building process. In this way, child burial was

essential to the building process, and the renewal of the community was achieved through integrated and entrained practices of human interment, feasting, and building. In short, the labor for rebuilding the mound in the Northeast Platform Area was an important *cooperative* practice that coexisted alongside more *exclusive* Chavín-era performances carried out on platform spaces in the Southwest Platform Area.

Nonetheless, the ongoing tradition of rebuilding was abruptly ended with the construction of a new platform in the Northeast Platform Area during the later centuries of the Late Formative Period. This construction event, PC-J, covered the rustic enclosures and ash floors that had long characterized communal practice in this space and transformed it into a flat-topped rectangular platform with abutting structures. This structure was conceptually similar to the PC-E platform and room complex in the Southwest Platform Area, but larger, at an estimated 148 square meters vs. PC-E's 20 square meters (Figure 7.11).

Operation 1 - Northeast Platform Area

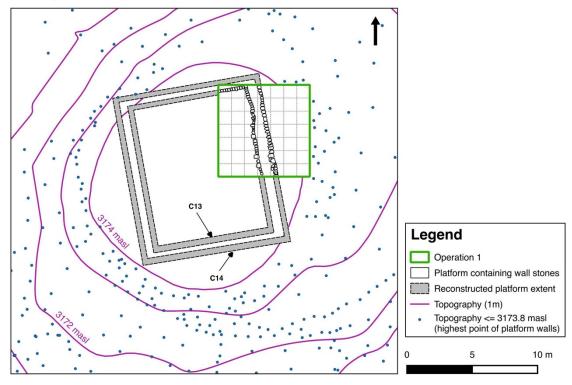


Figure 7.11 Map showing how the size of the PC-J platform was estimated. Total station points with elevations below the top of the final PC-J platform are indicated with blue dots. They suggest that abutting room likely abutted the Perolcoto Phase 4 platform(s) on all sides, similar to the structures uncovered in Operation 1 on the platform's eastern side. They also suggest the location of the platform's corners.

Because of the new platform's ample size, the Northeast Platform Area's communal use, which had long been defined by collective, informal, and ongoing practices of building, may not have been lost with this change. First, rather obviously, this large construction event would have required communal labor to transform the area into a more fixed architectural space, and as such, would have involved broad negotiations over how to cover their long-revered space. Second, the new platform could accommodate large group events, as opposed to the more restricted activities held for hundreds of years on the relatively small platform on the opposite, Southwest side of the mound. Moreover, though the specific kinds of events and performances held in these two areas are unclear, the distinct spatial

forms and building histories suggest that the two sides of the mound continued to contrast different kinds of practices, and perhaps, kinds of local authority: communal and priestly.

Being paired, both were recognized as legitimate.

In considering a more long-term history of building on the mound, ongoing shifts in the mound's form, its features, and the orientation of its structures together reflect the necessity to constantly build, and through this labor, attribute value to the mound. In total, the study documented at least eight distinct Formative Period orientations (Figure 7.12–Figure 7.13 Figure 7.14). Though small changes in orientation may not hold great significance, some changes clearly reflect important transitional moments in the community. Likewise, the maintenance of particular orientations for long periods are unlikely to have occurred through happenstance given that ongoing building activities would have provided ample chances for change.

For example, when builders covered the PC-A Mito-Kotosh enclosure during PC-C and then begin a new tradition of platform building on top of this space during PC-E, they made an effort to maintain a similar ten degrees east of north orientation in the Southwest Platform Area. In contrast, when builders fashioned the Late Formative Period platform of the Northeast Platform Area, they reoriented the entire mound to seventy-seven degrees east of north, and aligned it with the many simultaneously built platform terraces that covered early architecture across the mound. As these terraces were built, disparate areas of the mound became more integrated as a single structure. Nonetheless, the ten-degree orientation of the Southwest Platform remained as the rest of the mound was rebuilt.²³ Given that the Southwest platform (PC-E) would have been at least five hundred years old

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²³ The Southwest Platform Area had orientations ranging from zero to thirty-three degrees, while the rest of the mound was built primarily at orientations ranging from sixty-five to seventy degrees.

by this moment in time, it is significant that the structure was maintained, and perhaps attests to a valued balance between forces or concepts of change and permanence in the community. As builders added new platforms and terraces to cover many standing structures, they created a more ordered, permanent, and fixed temple structure. It is possible that a growing priestly class ordered these constructions. However, without more evidence for strict, hierarchically organized social roles, the present evidence indicates collective decision-making and labor, though perhaps these practices were mediated by ritual specialists in some ways.

Perolcoto Mound M1 and Sunken Plaza

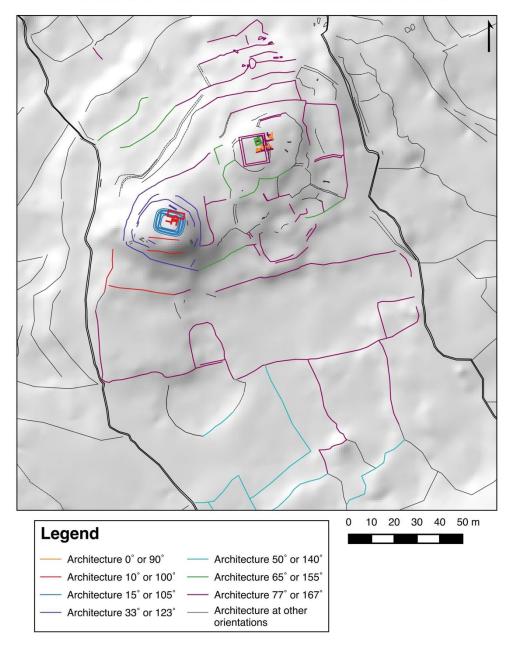
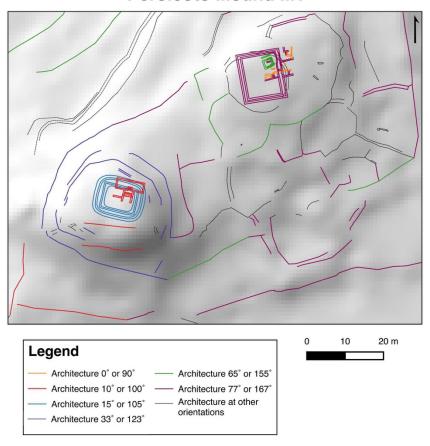


Figure 7.12 Map of the Perolcoto mound complex, showing the orientations of various excavated and superficial architectural features.

Perolcoto Mound M1



Southwest Platform Area

Northeast Platform Area

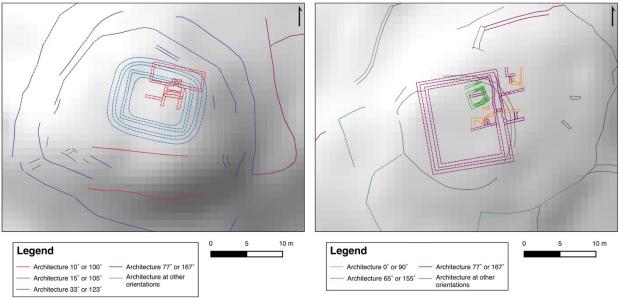


Figure 7.13 Maps details showing the architectural orientations of excavated and superficial architectural features on the Perolcoto Mound. **Top:** View of the entire mound. **Bottom Left:** The Southwest Platform Area. **Bottom Right:** The Northeast Platform Area.



Figure 7.14 The final form of the Perolcoto mound. Photograph taken from the Sector B mountainside, facing southwest. Notice the angled "V"-shaped terrace in front (south) of the mound that was likely built during the Late Formative as the two sides of the mound were united; an asterisk marks the area just left (south) of the center of the "V" and in front of the sunken plaza. Also notice the mound's dual form.

In sum, for the majority of its history, Perolcoto was a place where people assembled to ritually build and (re)order sacred communal spaces, making the mound more than a stage for ritual performance: it was a place for social and physical reproduction, whereby building—and the labor coordination it required—was as much a part of the ritual performance of community as was the offering of children. In turn, the offering of children and other materials was part of the building process. Thus, in building the mound, they built a community.

Cayán Phase 1 (500 BC-AD 200): Huarás destruction, decommissioning, and reuse

Whereas scholars typically define the Formative Period Andes (from the Initial to the Late Formative Periods, 3000–500 BC) in terms of religious traditions, such as Kotosh, Mito, or Chavín (e.g., Bonnier 1997; Burger 1992; Kaulicke 2010), they commonly discuss the Final Formative and Early Intermediate Periods (500 BC–AD 700) in terms of regional "cultures," such as Huarás and Recuay. In many ways, these distinctions are rooted in the extensive differences between early communities centered on religious mound complexes, and later communities in which monumentality is transferred to new forms, such as the house. Regardless, the transition between Formative and later communities in Ancash is poorly understood, and we still do not understand how people drew upon or rejected previous local practices in an effort to shape a new way of life after Chavín.

Current evidence suggests that the Chavín religious tradition disintegrated on a regional scale around 500 BC, during the beginning of what I term the Cayán Phase 1 at Hualcayán. At Chavín de Huántar, a large earthquake and landslide affected much of the temple, and some archaeologists argue that this event undermined the authority of the shamans who communicated the will of their god and the ability to control "nature" and environmental forces (Rick 2013). After this event, people appear to have rejected preexisting beliefs and practices, depositing trash or building houses in previously sacred spaces, such as Chavín de Huantar's sunken circular plaza (Lumbreras 1972; 2007).

Hualcayán provides an unprecedented comparative perspective on whether and how the process of Chavín's collapse occurred at and affected an outlying temple. At Hualcayán, people decommissioned Chavín materials and spaces in a different way than at Chavín de Huántar. At Hualcayán, they discarded Chavín ritual objects and replaced them with white-on-red Huarás-style ceramics (see Part II), but they also *continued* to utilize the

mound for activities²⁴. They did not abandon the mound. These activities manifested what can be considered a *systematic killing and conversion of Chavín spaces*.

This process of killing and conversion was complicated, and requires a detailed rendering to understand its social significance. In the Southwest Platform Area of the Perolcoto mound (phase CY-A), people burned refuse and created a thick layer of ashy refuse in the rooms surrounding the mound's highest central platform (PC-E), which was previously a clean space. This was the earliest act of conversion on the mound, likely near 500 BC.²⁵ The evidence suggests that feasting was important to this act of conversion. Areas of concentrated burning (black areas with high carbon content) within the ash indicate that much of this material was burnt in situ, and not transposed from other areas. The ash was capped with large stones that rendered the space unusable for performance activities. This was not a single event, suggesting a new ritual protocol within the space. Over the following centuries, people periodically returned to feast on top of the stillexposed Chavín platform, and this practice that continued into Recuay times (CY-B and CY-E). In short, the Southwest Platform was repurposed and redefined in ways that at once decommissioned the space as a Chavín platform, and ushered in a new kind of collective activity.

The transformation of the Northeast Platform Area (CY-C) was more complex, especially because the evidence shows a more precise and calculated set of practices to convert the space. People dismantled corners of Chavín-era platforms and walls and then feasted or left offerings in these particular spaces. They placed ash and fill in nearby rooms,

 24 In a manner similar to other temples such as at Kuntur Wasi (Copa phase; Inokuchi 2014), where they filled temple spaces with then reused the mound for new rituals.

²⁵ Based on carbon dates that are coeval with Chavín itself. See Chapter 2, section CY-A.

and when doing so, they destroyed the corners of the rooms and smashed Huarás-style pots with food residues and remains (see Part II) in the resulting cavities. Immediately after this destruction and feasting event, people smashed rocks over the feasting remains, rebuilt the destroyed corners by placing dismantled rocks within them, and then filled the room with stone and sediment.

After this initial process of decommissioning, people continued to hold feasts in and reconstruct the Northeast Platform Area. They continued to cover Chavín spaces with new platforms and structures, often by erecting small, seemingly ephemerally-occupied spaces (CY-D). These spaces were often hastily constructed with irregular fitted stones and crude walls, as if they were meant to be quickly modified during or immediately preceding an event or gathering. This can be interpreted as a kind of appropriation of the mound. Small groups sought to develop spaces for gathering or collective practice, continually redefining the mound while underscoring their new autonomy and authority. Hence, in rebuilding and repurposing the mound, they manifested a separate and decidedly local identity.

Essential to this process was the use and intentional deposition of Huarás materials inside the Chavín-era spaces. The presence of these materials indicates that the initial Cayán Phase activities were part of a ceremonial conversion of the Chavín space from the inside out. In other words, the Chavín spaces were not simply filled with Chavín materials, as if the mound were decommissioned to simply kill it or create a new platform. Instead, the evidence suggests it was necessary to *convert* and *resignify* the power of the temple ritually and the Chavín deity that the temple embodied. For the people who participated in this conversion, practices of rebuilding and deposition quite literally manifested and marked an intentional change from a previous to a new era.

What is perhaps most interesting in the Final Formative Cayán Phase is a shift from the *orthodoxy* of the Chavín religion, which by the end of the Late Formative Period had been instrumental in formalizing activities on the mound, to a ritual and labor practice that was mostly *orthopraxy*. That is, t was important for these people to repeatedly participate I collective building consumption practices *in this place*. The place itself was essential to these practices, and crucial to a change in both community and politics. This place, and these practices, brought people together in coordinated action. Though earlier practices and places were essential to this process of rebuilding, it seems as though earlier religious iconography and priestly distinctions were discarded. They were replaced with new materials and signs, which often feature the abstract motif of a central figure with a radiating face (see Chapter 6, Figure 6.37). These central figures may represent ancestors rather than a central deity (see Wegner 2011:22–25).

Cayán Phase 2 (AD 200–700): Configuring a Recuay landscape

Beginning around 200 AD, another major change occurred at Hualcayán. At this time, people began rebuilding Hualcayán into a vast town by constructing residential and agricultural complexes. The change entailed the decentralization of ritual activities into several enclosures. It also involved the initiation of a more formal "ritual economy" of food production, which meant that ritual practices were directly connected to spaces of economic production, and no longer situated in discrete temples or platforms.

First, the evidence demonstrates that the mound was still used for some feasts or offerings, but it was no longer a ritual focal point. Specifically, during CY-E people repeatedly feasted on the still-exposed Chavín-era platform PC-E. Then they held a final

feast in which they smashed large Huarás storage vessels in place before covering the entire area with ash, soil, and stone fill. This fill, CY-F, created a new, flat surface for the Southwest Platform Area. Laying this fill completely decommissioned the Chavín-era platform, hiding it from view. Similarly, builders emplaced a platform, CY-G, to cover the entire Northeast Platform Area. This platform had a roughly circular shape, which greatly departed from the rectilinear Chavín and then crude Cayán Phase 1 architecture.

The mound was further transformed during the mid-Cayán Phase 2 when several individuals were interred in the lower East Terrace Area, CY-H. The tomb complex comprised two semi-subterranean and interconnected chambers. The chambers were relatively small, suggesting they were used by a single family or group. Feasts were staged in an adjacent room complex, and these consumption events included many locally produced items (see Part II).

Other building projects signaled the beginning of a new Recuay form of spatial organization and its attendant practices or ideals. During Cayán Phase 2, a large residential building project began in the hilltop area of Sector B. The houses had a new orientation—70 degrees instead of the earlier 25-degree orientation—and this indicates that they were new structures meant to contrast an earlier settlement layout. Indeed, the new layout of Sector B was modular, with terraces and walls separating distinct residential compounds. This layout is similar to the clusters of residential compounds at later Recuay sites, such as Yayno and Aukispukio (Chapter 2). Also, Sector B contains many tombs, often in close proximity to the houses, revealing a new spatial organization that evoked and manifested an intimate relationship between the physically dead and the living (Bowen and Bria

2015). In contrast to Chavín, during the Recuay era, mummified bodies and their structures became essential and visible parts of daily life.

These changes in spatial organization coincided with the construction of a massive agricultural complex with a canal system (Figure 7.15 and Figure 7.16), linked to a glacial lagoon, Laguna Cullicocha, six kilometers away (Figure 7.17). Again, changes in ritual and economic infrastructure were inseparable and part of the same process. The canal system also led to other nearby Recuay sites (Ramrash), which demonstrates the creation of a broader community, beyond the structures and mounds of single sites (Tzacpa Phase 1). That is to say, the necessities of canal building, cleaning, and water distribution would have likely linked people together across these discrete spaces, establishing a common social and labor schedule. The canal system was built incrementally. It first connected to a large spring, which is now dry, located on the mountainside above Hualcayán. People redirected and canalized water from this spring, which had previously flowed south, so that it coursed northwest towards Hualcayán (Figure 7.19). Eventually builders joined the canalized spring with the canal from the Cullicocha lagoon forming a kind of "tinkuy" ²⁶ and a massive waterfall (Figure 7.18 and Figure 7.19). Survey activities found small canal segments across the terraced mountainside, along with the narrow, stone-faced bench terraces, and this further demonstrates that the canal itself created labor dependencies among farmers and social groups who worked in different fields. Similar to the *subaks* of Bali, this was a kind of social infrastructure that linked people together into a multi-sited community.

²⁶ In Quechua, *tinkuy* refers to a place where to things come together.

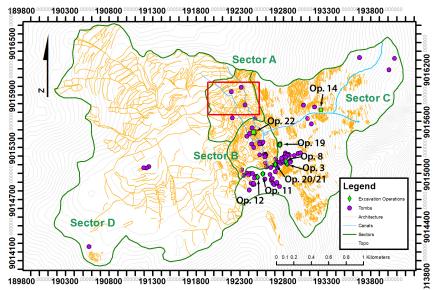


Figure 7.15 Map of Hualcayán showing the extent of terraces and canals at the site. Though many landscape features may have been built after the Recuay-era (Cayán Phase 2), the majority of surface material across the site are Recuay styles. Detail in red box in Figure below.

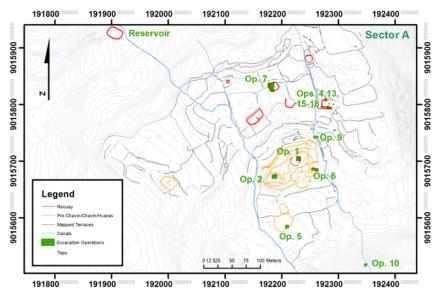


Figure 7.16 Map of several terraces and canals near the Perolcoto Mound and several Recuay-era structures north of the mound (indicated in red).



Figure 7.17 Annotated photograph, facing east, of Hualcayán and its surrounding features. The image shows the location of ancient canals (many of which the modern community has refurbished and reuses) and their sources.



Figure 7.18 Photographs, facing east, of the waterfall canal above Hualcayán. **Left:** general view of canal route along the mountainside. **Center:** Upper segment of canal. **Right:** Lower segment of canal.

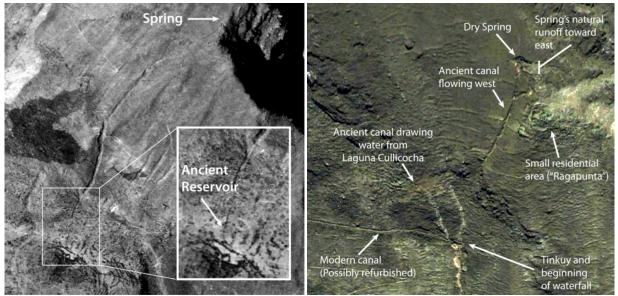


Figure 7.19 Left: Aerial photograph from 1962 showing an oval reservoir at the base of the mountainside canal that is now destroyed and covered by a modern concrete reservoir. **Right:** Google Earth satellite image of the canalized spring above Hualcayán.

Several ritual enclosures were built at the same time as the canal, indicating that ceremonial and agricultural life were intertwined. North of Perolcoto, people constructed five D or U shaped compounds directly in fields and next to canals. Residents aligned the compounds with terraces and irrigation canals, suggesting that they constructed the ritual and agricultural features simultaneously and intended to integrate corporate group feasting directly with agricultural production. Despite similarities in their form and alignment, these D and U shaped compounds bore distinct architectural features and designs, suggesting that each one was built by and meant to embody a distinct corporate kin/lineage or work group.

More specifically, the compounds rooted distinct groups in particular plots of land, combining ritual and economic practices that socially produced and reproduced the corporate group. The two enclosures excavated, CY-J and CY-K, were spaces for agricultural

labor *and* feasts. This evidence, which include food storage, processing, and feasting with a variety of plant and ceramic materials, are reviewed in Part II and synthesized below.

Other features further indicate how people of Hualcayán intensively transformed their local physical environment to establish direct links between particular corporate groups and agricultural resources. For instance, they built more than 100 above ground tombs, each of which served as an ossuary for multiple, likely related individuals, on the terraced hillside where their canals carried water from the glacial lagoons to agricultural fields below. Moreover, it appears that houses on the Hilltop Residential Area were rebuilt to face the main canal that brought water to their fields (see Chapter 6). Finally, both the tombs and houses were organized in modular groups, some of which were walled, which reflects similar kinds of lineage, kin, or work group distinctions that was apparent in the ritual-storage compounds.

Overall, the Recuay architecture reveals a community of well-defined and interrelated corporate groups assembled and manifested through a variety of ritual and economic practices. Statistical analyses substantiate this point, showing discrete, non-random clusters of tombs that likely correspond to defined social groups (Norgon 2012). An accessibility study (Bowen and Bria 2015) indicates that tombs within residential areas were segmented according to house clusters, perhaps kin units. Houses in Sector B were also built in agglutinated walled compounds, which suggests the presence of well-defined groups who were closely affiliated to each other on a larger community scale. Evidence for shared practices among these corporate groups is visible in the prevalence of fancy, likely feasting wares in household excavations and in surface scatters throughout the residential sector suggests. In particular, it is likely that inter or intra-corporate group domestic rituals

were essential to forming and maintaining the wider social fabric of the community; these practices would have been mutually formed through other rituals, such as feasts within the ritual-agricultural compounds (see Part II), agricultural labor, and building activities.

In sum, the people of Hualcayán began intensively remodeling their physical environment after the Huarás phase to both intensify food production through the extensive construction of terraces and irrigation canals, and to segment community practices in discrete locations of the local landscape. The movement of ritual practices from a central place on the Perolcoto mound and into dispersed compounds suggests that Recuay people placed an increasing importance on marking spatial and social differences. These distinctions began during the Huarás Phase with ephemeral rooms marking spaces on the mound and continued with the construction of Recuay Period compounds, where differences in architecture and construction practices elicited social differences. For example, the standing stones and angular corners of CY-K compound stands in sharp contrast to the stone masonry and curved corners of the CY-J compound (Figure 7.20). This segmentation is visible not only in these compounds, but also in the layout of households, which are clustered in to walled sections of multiple patio groups, in the Hilltop Residential complex. This evidence from Hualcayán also complements insights into other Recuay sites, such as Yayno, where kin groups built discrete apartment-like compounds (Figure 7.21; see also Chapter 3). While it is possible that the early iterations of the CY-K and CY-I compounds functioned as households, similar to those at Yayno, their reconstruction into open plaza spaces surrounded by storage rooms during the middle of the Recuay sequence is clear.



Figure 7.20 CY-K and CY-J ritual-agricultural compounds, showing their distinct angular (left, CY-K) and curvilinear (right-CY-J) forms.

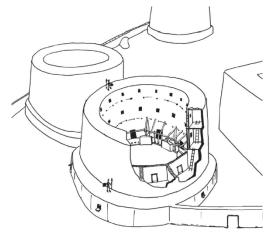


Figure 7.21 Recreation of apartment-like compounds at Yayno. Lau 2010.

The differences in the way these compounds were constructed coupled with their dispersal amongst newly built agricultural features strongly suggests that the people who gathered in Hualcayán's Recuay compounds sought to delineate the boundaries of their group. Moreover, these constructions, and the storage, burial, and feasting activities held there (see Part II) explicitly link their group to the agricultural labor and ritual practices that defined its membership through participation. This claim will be further developed below.

Part II: Food Production, Ritual Objects, and Ritual Consumption

This section explores the *longue durée* of shifting materials and practices at Hualcayán from a second, related perspective: by tracing the foods and other materials produced and ritually consumed through time and across space at the site. The materials presented with each construction phase in Chapters 5 and 6 are compared to reveal trends through time. The discussion begins, once again, with Hualcayán's earliest inhabitants.

Early Perolcoto (2300–1200 BC): Maize, potato, and early regional exchange

The material evidence suggests that specialized food production and consumption was coupled with the earliest building and ritual practices at Hualcayán. In particular, it is clear that maize and other cultigens were significant to the earliest collective building activities at Hualcayán. Maize starch residues were recovered from two lithic tools (one flaked stone, one groundstone²⁷) that were recovered from the earliest layers of the site. These tools were deposited just before or as construction began at Perolcoto. Potatoes were also present within these and other contexts, suggesting that they were often consumed together with maize, but prepared in separate vessels (Appendix F)²⁸.

Though maize and potatoes would later become widely produced in the Andes (e.g., see Pearsall 2008), the strong local preference for these foods, especially for their paired consumption, may have been based in local, rather than regionally shared preferences. The current evidence from the adjacent coast for the period between 2500-2100 BC

²⁸ Potatoes may have been cultivated alongside maize at the founding of the Hualcayán community, but more

excavations and sampling is needed to show this in the site's earliest contexts.

 $^{^{27}}$ The particular stone material of these tools has not been identified.

(Preceramic VI) indicates that each community—even neighboring communities in similar ecological zones—invested in distinct foods that in turn shaped early cultural practices (Hastorf 2006)²⁹. Though few robust food studies exist from this period in the highlands, a comparison of the evidence from the Initial and Early Formative Periods at La Galgada (Grieder et al. 1988) and this study's preliminary food analyses from these same periods at nearby Hualcayán suggests a similar distinction in highland community preferences. In particular, the extensive macrobotanical study from La Galgada indicates people there were highly focused on the production of cotton and squash, amongst other secondary cultigens like beans and fruit, and seemingly did not produce or consume maize or potatoes (or any other tubers) such as at Hualcayán³⁰. Its temple constructions are nonetheless highly similar to Hualcayán's architectural layout—more than any other documented Mito-Kotosh temple—suggesting a close connection between these communities. The differences in food production and consumption practices and preferences thus appear to have been important in distinguishing them as distinct communities engaged in particular coordinated practices in particular places. More botanical data are needed to more fully understand these distinctions. What is clear, however, is that once introduced, both maize and potatoes consistently appear in every period of Hualcayán's occupation, from the Initial Formative Period into late prehistory (Appendix F).

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²⁹ Hastorf suggests these crops were adopted through a constellation of practices that included gifting, the movement of women for marriage, and the "development of a horticultural mindset" (Hastorf 2006:98). ³⁰ Just one maize cob and one *Solanum sp.* seed were recovered from extensive analyses of well-preserved desiccated remains at La Galgada (Smith 1988). Overall, the distinctions between La Galgada and Hualcayán may have been due to early specialization based on the different elevations and environments of these settlements: La Galgada is located in a drier valley and at a lower elevation (1100 masl) than Hualcayán (3100 masl). While potatoes may not have been highly suitable for cultivation at La Galgada, maize could have been grown at La Galgada.

In empirical terms, these data contribute to our understanding of the early spread of maize in the central Andean highlands at least as early as the Initial Formative Period.

Maize was consumed along the northern and central coast of Peru for millennia after it was introduced from Ecuador (as early as 6775–6540 cal. BP; Dillehay 2017; Grobman et al. 2011). But the crop was not cultivated in highland Peru until a later date. Indeed, maize has been reliably documented in only three highland locations for this period: the site of Waynuna (highland coast) and caves in Ayacucho, both located far from Hualcayán in the south-central Peruvian Andes (Hastorf 2006; Logan et al 2012; Perry et al 2006) as well as a single maize cob at the extensively excavated site of La Galgada³¹ (see Hastorf 2006:114, figure 3.4). Hence, highland communities were still adopting new cultigens or developing horticulture. What is more, maize may not have been extensively cultivated; scholars have argued that it was primarily used during ritual gatherings, and not as a staple or major calorie source³² (Hastorf 2006:114–115; see also Burger and van der Merwe 1990; Tykot et al. 2006).

Beyond foods, the material evidence from Hualcayán also indicates that early inhabitants participated in broad exchange networks. Finds in Early Perolcoto Mito-Kotosh contexts included lowland and non-local materials such as anchovies, sardines, mollusks, jet, obsidian, beads made of Pacific shell, and blue sodalite. This evidence is similar to what Terence Grieder and Alberto Bueno (1982; Grieder et al. 1988) recovered at La Galgada, though their evidence included remains that could not preserve at Hualcayán: marine shell,

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³¹ Maize has also been recovered from Pre-Ceramic levels in Guiterrero Cave, located in highland Ancash, but these contexts were disturbed (Lynch 1980).

³² Data from Initial Formative Period domestic spaces at Hualcayán are needed in order to understand the use of these crops outside of the Perolcoto complex. This is a lacuna in our understanding of the Preceramic/Initial Formative Period in the highlands overall. Few households have been excavated and the presence of foods like maize only in temple contexts may be due to sampling.

non-local blue and green stone objects, a monkey offering, and exotic bird feathers—materials that came from both the coast and the Amazon. Grinder and Bueno suggested that La Galgada's inhabitants were key brokers in a system of long-distance exchange between the coast, the highlands, and the Amazon. Overall, the assemblage of exchanged items at Hualcayán demonstrate that people in highland Ancash participated in an exchange system that was intertwined with a shared set of religious and ritual practices, with the majority of these objects, especially beads, denoting the special status or role of those who adorned their bodies with them.³³ Because many of these objects were found in the fill event PC-C, which may include a mix of both late Early Perolcoto and early Late Perolcoto refuse and intentionally placed objects, they are presented and discussed together below.

Late Perolcoto (1200–500 BC): Local and regional materials and practices

The Late Perolcoto architectural evidence—which begins with the filling in (PC-C) of the last Mito-Kotosh temple (PC-A)—presented in Part I revealed a series of complex spatial transformations that delineated new kinds of social roles within the community of ritual participants at Hualcayán. The exchange and acquisition of foreign goods further underscored growing distinctions between these groups, giving greater authority to particular ritual specialists.

In particular, special objects, many made from non-local materials, were associated with the PC-C fill and the PC-E platform complex, including jet mirrors, marine shell spatulas, obsidian flakes, and blue, green, and white stone beads (Figure 7.22). These

³³ It is difficult to determine whether Hualcayán and La Galgada shared pottery production technologies or styles because Grieder et al. (1988) presented few examples of ceramics.

goods, however, were rare, which suggests that most Hualcayán community members did not have access to them³⁴. Beads in particular likely indicated the special roles of the individuals that wore them³⁵.



Figure 7.22 Special tools and non-local materials from the PC-C and PC-E constructions in Operation 2. **Top:** (From left) Three worked bone items, including a spatulas made of camelid longbones (AE-2720 and AE-1786), and a fragment of an object of unknown function, perhaps a pin adoorned with a bird motif, fashioned from a *Odocoileus virginianus* longbone (AE-2724); obsidian flakes; quartz crystal bifacial point and flake. **Middle:** Worked and knapped jet fragments; bivalve and gastropod marine mollusk shells (From left: *Protothaca thaca* (AE-2706 and AE-2709) and *Fusinus dupetitthouarsi* (AE-2713). **Bottom:** Worked stone beads likely made from sodalite, chrysocolla, and marine shell.

Scholars such as Burger (2012) and Sayre et al. (2016) have suggested that foreign objects supported claims to authority not simply obtaining these materials, but through having specialized knowledge about how to acquire them, how to shape them into special objects (e.g., stones into finished objects like beads or mirrors) and how to properly wear

³⁴ Although the analyses have yet to identify the source of stone adornments from Hualcayán, obsidian sourcing analysis found that other samples from Ancash were procured in the South-Central highlands (Burger et al. 2000; 2005). This demonstrates that some people at Hualcayán had inter-regional relationships at the same time as the architectural renovations.

³⁵ Though beads may have been attached to portable objects, individuals wearing beads are shown in Chavínera human representations and found worn by elite individuals—along with gold crowns—at sites like Kuntur Wasi in the northern highlands.

or use them during ritual events. Thus, the presence of foreign objects in the Early and Middle Formative Period contexts on the Perolcoto mound lends support to the idea that certain individuals, perhaps ritual specialists, gained increasing authority during the millennia before Chavín. In fact, the majority of foreign objects recovered from Perolcoto were excavated from *pre-Chavín* layers³⁶.

Finely made bone spatulas and spoons, appearing in both Middle and Late

Formative contexts, also constituted an important part of the Late Perolcoto ritual

assemblage (Figure 7.22 (top) and Figure 7.23). Similar objects were recovered from

Chavín de Huántar, and are believed to be paraphernalia for preparing and consuming

hallucinogenic snuff (Burger 1992:200–201; Mesía 2007:133–4; Torres 2008).

Microbotanical and chemical analyses have yet to identify particular substances from the

Chavín tools (Sayre 2014), but iconographic evidence suggests that a psychoactive powder

was likely made from the plant known as *vilca* (*Anadenanthera colubrina*). The most

compelling evidence from Hualcayán for the use of psychoactive plants comes from the

objects strung around the neck of a child that was buried in the mound during Perolcoto

Phase 4 (PC-G, discussed below). These objects included three perforated spoons (Figure

7.23).

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³⁶ The absence of foreign materials in Chavín deposits may be due, in part, to the methods by which Chavín-era spaces were ritually cleaned, or the use of relatively clean soils rather than midden deposits as construction fill.



Figure 7.23 Three bone spoons worn by the child in the Chavín-era burial PC-G of Hualcayán.

In addition to platform constructions and hallucinogenic paraphernalia, an affiliation with Chavín is suggested by the widespread distribution of Janabarriu ceramics at Hualcayán. The most common Janabarriu motifs found at Hualcayán are the stamped circle and dot or double-circle designs. Excavations recovered these Janabarriu-style ceramics in Late Formative contexts and fills across Hualcayán. Further evidence comes from a definitively Chavín-related monolith fragment (Figure 7.24, top left), purportedly from the District of Santa Cruz in the Province of Huaylas, which a collector recently repatriated to the province's museum in Caraz, Peru (Querevalu 2014:182). Santa Cruz was surveyed during this study's preliminary phase of research (see Chapter 4), but no Chavín temples were documented. Hence, Hualcayán is currently the probable location of origin for the monolith.³⁷

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³⁷ Although it is possible that the elderly collector forgot where he acquired it (Steve Wegner, personal communication).

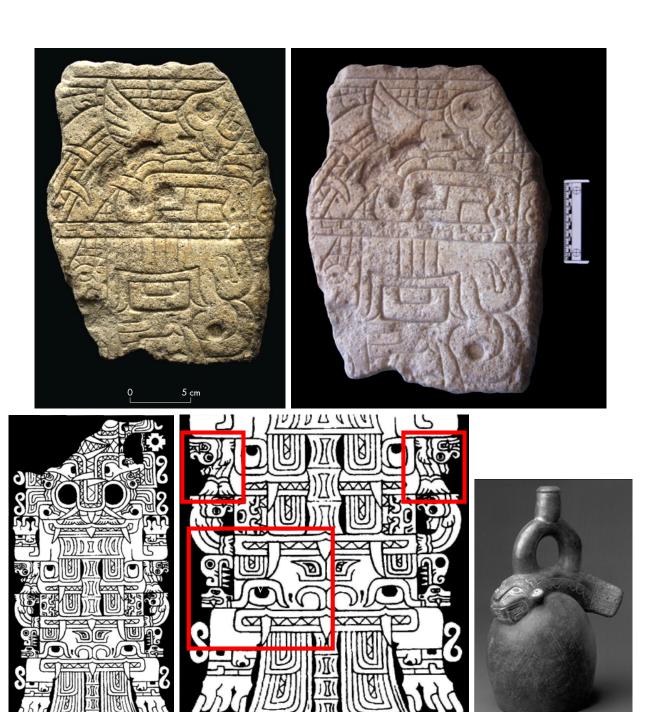


Figure 7.24 Top: Two images of an intricately carved stone monolith purportedly from the District of Santa Cruz (Huaylas, Ancash) that seems to show the face of Chavín's main deity with a headdress of snake, fanged fish, and other toothed element. This stone, which was held by a collector for many years, was recently repatriated to the Huaylas provincial museum in Caraz, Peru. The person who donated the stone claimed its provenience was the district of Santa Cruz, which is where Hualcayán is located. (The two photographs are taken with different light sources and reveal distinct features; photograph at left is from Gamboa 2016:13, Figura 4; Photograph at right a modified verion of a photo courtosy of José Querevalú and is presented in Querevalú 2014). Bottom Left and Center: Detail of the Yauya stela from Conchucos, which features the "Master of the Fishes" deity, who is represented with fishes swimming alongside it and snake elements extending from its face (image from Burger 2008:166, figure 6.4). Bottom Right: a Cupisnique stirrup bottle with a feline-headed fish identified as a life catfish (Jones 2010:109, Figure 5).

The monolith embodies different Chavín beings, including what is often called the main deity—a snarling, fanged god—as well as a cayman fish or moon deity (Rowe 1967). In general, the monolith's design elements include intricate Chavín artistic techniques that are often used to represent these deific figures, such as contour rivalry (two adjacent figures sharing the same contour lines) and "metaphorical substitution" (a being or object representing a part of another being [Burger 1992:146–148]). In particular, the figure on the Santa Cruz monolith bears snakes as hair, similar to the Lanzón at Chavín de Huántar, which is an instantiation of the main deity. The monolith also includes the rare inclusion of a fanged or feline-headed fish, which is somewhat more common in Cuspisnique than Chavín imagery (see Jones 2010; Figure 7.24, top right). This fish appears to be leaping or swimming, from left to right, along an arced stream of water that is itself fanged. The fish motif suggests the monolith is in fact a related Chavín deity associated with fish and the moon—the so-called "Master of the Fishes" deity (Lathrap 1985:246) or supernatural Cayman (Rowe 1967) from the Yauya stela (see discussion in Burger 2008). The Yauya stela has a fish or fish-like vertebral column and is flanked by eight small fish that swim alongside the central figure (Figure 7.24, bottom). In addition to these stylistic elements, the Santa Cruz monolith features a cayman-like face formed by two incurving snakes that lie between the lower face and the fish, just above the horizontal line running through the middle of the fragment. Though stylistically distinct from the Santa Cruz fragment, its iconographic elements seem to indicate a similar being (compare to the alternative analyses of this stela by Gamboa 2016 and Querevalú Ulloa 2014:182–193).

The Santa Cruz monolith, even if found in the general vicinity of the Province of Huaylas, would seem to firmly place Hualcayán within the regional network of Chavín

temples, ³⁸ objects, and artisans. That is, the monolith helps substantiate the direct evidence from Hualcayán for participation in a Chavín-era sphere of interaction, which includes Janabarriu ceramic styles, hallucinogenic paraphernalia, exchanged raw materials and finished objects, and rituals that juxtaposed hidden and public performances.

Despite these many changes in the Chavín era, other material assemblages at Hualcayán remained broadly static before and after the adoption of Chavín, with some notable exceptions. First, the percentage of ceramic forms are nearly identical in pre-Chavín and Chavín era sample, with bowls making up 69.19% (PC2-3; Pre-Chavín) and 66.95% (PC4; Chavín) of the total assemblage, respectively. Moreover, the overall percentage of serving vessels is similar at 70.27% (PC2-3) and 69.54% (PC4). The only major difference between the two periods is that the Chavín era assemblage had four drinking cups, or *keros* (Figure 7.25).

³⁸ Or perhaps even pre-Chavín, as Jorge Gamboa (2016) suggests.

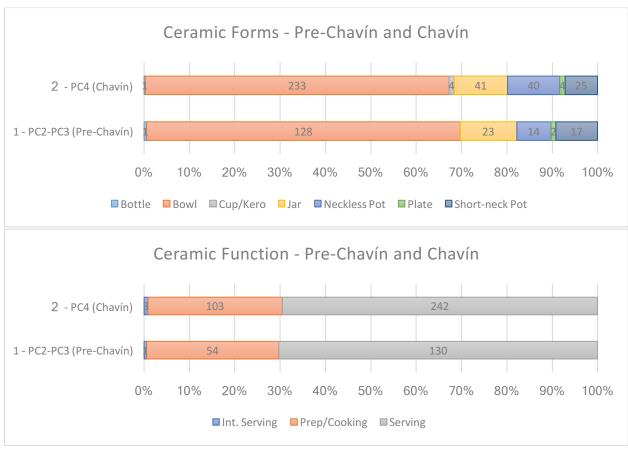


Figure 7.25 The aggregate ceramic assemblage for Perolcoto Phases 2–3 and Perolcoto Phase 4, respectively. **Top:** Percentage and NISP of forms per period. **Bottom:** Percentage and NISP of serving vs. non-serving wares. Bottles and other "intermediate serving" wares were given their own category. The assemblages are highly similar, except that the Chavín-era (Perolcoto Phase 4) assemblage containes 4 drinking cups. The majority of both assemblages consists of serving wares, in particular bowls.

Moreover, botanical evidence also remains relatively similar for pre-Chavín and Chavín-era contexts, suggesting that the ritual practices of Chavín were not strongly integrated with local economic practices, like agriculture. There is evidence, however, for a slight diversification of the foods produced for ritual consumption during the Chavín-era. In particular, bean (*Phaseolus vulgaris*), quinoa (*Chenopodium quinoa*), and sweet potato (*Ipomoea batatas*) were added to the already prevalent maize (*Zea mays*) and potato (*Solanum tuberosum*). Nonetheless, the study only recovered one sample of each of these

three new cultigens, which could be due to the limited use of items acquired via trade or because of preservation bias³⁹. It is likely that the antecedent production of maize and potatoes, established near the founding of the community itself, continued during Chavín times, but was supplemented by these other foods to varying degrees throughout the Formative Period (Figure 7.26–Figure 7.27, Table 7.1). For example, the concentration of cooking pots with the residues of maize and potato at the end of fill event PC-C signified a continued commitment to the production of the two cultigens that had been important to ceremonial gatherings since the initial activities at the site.

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³⁹ For example, flotation revealed few remains for the Formative Period contexts, with Early Perolcoto phase contexts the least well preserved. Moreover, microbotanical remains revealed the best results (i.e., most samples were positive for one or more starches or phytoliths, but foods like quinoa and beans did not need processing with stone tools and we cannot expect to find their residues on them).

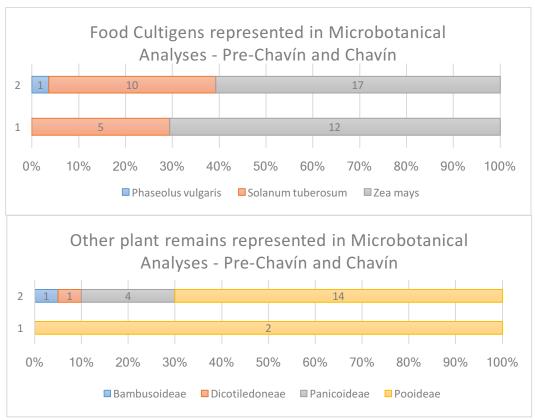


Figure 7.26 Other plant remains (NISP) recovered from microbotanical analyses of tools, ceramics, and soils from Pre-Chavín (Perolcoto Phase 2 and 3="1" on Table) and Chavín (Perolcoto Phase 4="2" on table) contexts.

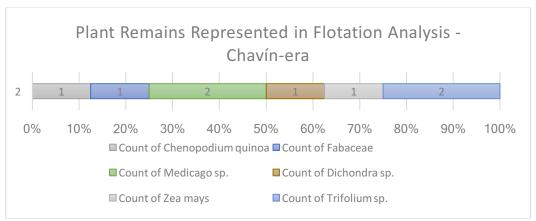


Figure 7.27 Plant remains (NISP) recovered through flotation and macrobotanical identification of Chavínera (Perolcoto Phase 4="2" on table) contexts. Pre-Chavín contexts did not reveal macrobotanical remains, and may have been poorly preserved due to their antiquity.

Table 7.1 Additional taxa identified from plant remains collected in situ for Perolcoto phase 4 (Chavín-era).

| Taxa, PC4 | Grams |
|--------------------|-------|
| Phaseolus vulgaris | 0.16 |
| Ipomoea batatas | 0.29 |

Nonetheless, meat procurement practices were in flux: the hunting of deer decreased, camelid production increased, and, surprisingly, foreign foods, such as marine mollusks, decreased in consumption during the Chavín era (Figure 7.28 and Figure 7.29). While increased domestication of camelids has been observed at other sites in Ancash (e.g., Miller and Burger 1995), the community's growing investment in locally produced and controlled sources of protein may have superseded efforts to acquire foreign materials and foods like shellfish. Such a claim largely conflicts with the overarching narrative of heightened interregional economic interaction during the Late Formative and the desire to participate in regional networks. At Hualcayán, local people were perhaps independent agents in this regional network, picking and choosing the ways in which they engaged with others and the regionally-recognized traditions of the time, namely Chavín. Alternatively, foreign materials may have been carefully deposited during the Chavín era in spaces still unexcavated at Hualcayán.

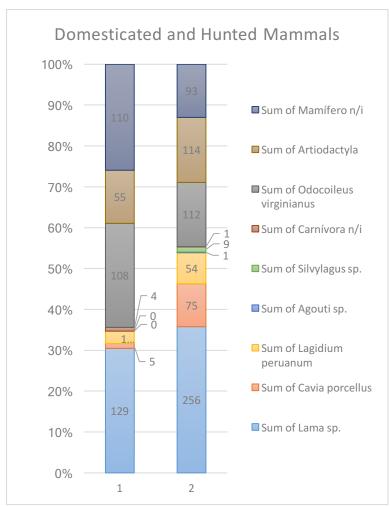


Figure 7.28 Relative percentages and NISP of fauna from Pre-Chavín (Perolcoto Phase 2 and 3="1" on Table) and Chavín (Perolcoto Phase 4="2" on table) assemblages. Together they show a trend toward an increase in domestication/domestic consumption (*Lama sp.* and *Cavia porcellus*) and a decreased in hunting/wild animal consumption.

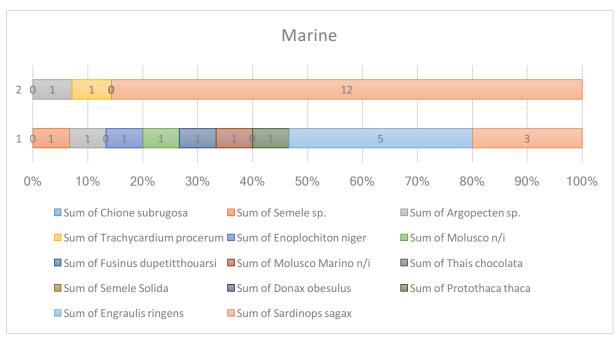


Figure 7.29 Breakdown of marine species from Pre-Chavín (Perolcoto Phase 2 and 3="1" on chart) and Chavín (Perolcoto Phase 4="2" on chart) assemblages. Note a sharp decrease in the diversity of foreign species during the Chavín era.

Cayán Phase 1 (500 BC-AD 200): Transformation through ritual refuse

Cayán Phase 1 marks a distinct shift in ritual practice, probable gathering size, and food production and consumption as "Huarás" cultural materials gain popularity and Chavín spaces are rejected. Part I described how people during the Cayán Phase 1 systematically destroyed and then rebuilt Chavín spaces on the summit of the Perolcoto mound. Important to these acts of destruction and building was the new white on red style ceramic serving bowls. Specifically, these new Huarás materials were essential to a series of practices (CY-C) that transformed the Chavín temple into a distinctly Huarás space that was no longer obligated to the theocratic authority or supranatural powers associated with Chavín religious beliefs. In particular, the prescriptive rituals that had once maintained the

mound as a ritually clean space during Chavín times were abandoned when walls were destroyed at their corners and refuse was deposited within them and on their floors. Yet this refuse was not haphazardly transposed trash; it was the remains of feasting and offerings that had been intentionally smashed after the Chavín walls were dismantled. These findings invoke a set of practices meant to both convert and redefine the mound. As part of this, people broke a bowl with iconography suggesting the face of a radiant figure common to later Recuay mythology (Figure 7.30), and then distributed sherds from this bowl across the room's floor in a layer of ash.

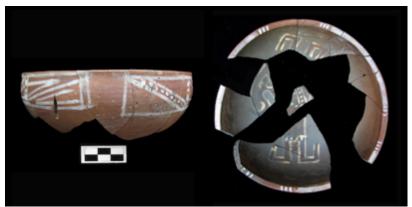


Figure 7.30 Reconstructed smashed bowl, which was found strewen across a floor within a thin ash layer during CY-C.

Moreover, the dismantled walls—now filled with feasting remains that were distinctly non-Chavín in their appearance and essence—were not simply covered, but built anew, creating a definitively new kind of space. Furthermore, fine ash was strewn across the floors, which included a variety of food remains including beans, sweet potato, bottle gourd, maize, viscacha, camelids, guinea pig, and deer—a new variety of foods that had not been recovered from earlier contexts. Large jars and maize residues point to the consumption of maize beer. As these foods nourished the people who rebuilt the mound,

they may have also served as offerings that intended to feed the mound itself (see Salas and Mannheim 2015).

The CY-C materials described above reflect consumption patterns across the Perolcoto mound during Cayán Phase 1, and more importantly, suggests more tightly integrated practices of economic production and ritual practice. In short, local *domesticated* products are found in the and across the mound, in contrast to the non-local goods that largely characterized Chavín practices. The overall sample from the mound indicates that camelid consumption remains about the same as before (33.97% of all consumed mammals in CY1, 35.80% in PC4) but domesticated guinea pig appears much more frequently, making up 26.72% of consumed mammals.

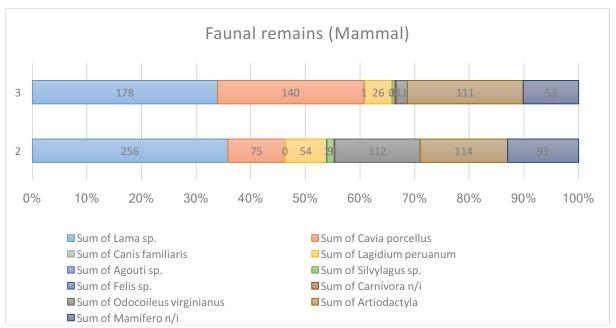


Figure 7.31 Comparison of domesticated and hunted mammals present in Perolcoto Phase 4 (Period "2") and Cayán Phase 1 (Period "3") contexts on the Perolcoto mound

Table 7.2 Notable shifts from Perolcoto Phase 4 to Cayán Phase 1 in the consumption of several common domesticated (D) and wild (W) animal species.

| | PC4 | CY1 |
|-----------------|--------|--------|
| Camelid (D) | 35.80% | 33.97% |
| Guienia pig (D) | 10.49% | 26.72% |
| Vizcacha (W) | 7.55% | 4.96% |
| Deer (W) | 15.66% | 2.10% |

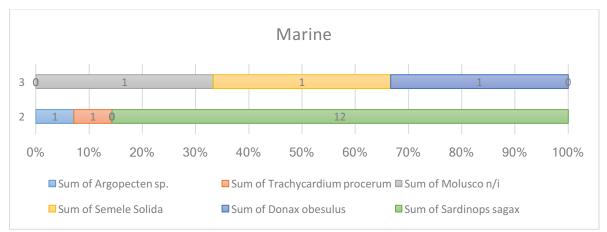


Figure 7.32 Comparison of non-local marine resources present in Perolcoto Phase 4 (Period "2") and Cayán Phase 1 (Period "3") contexts on the Perolcoto mound.

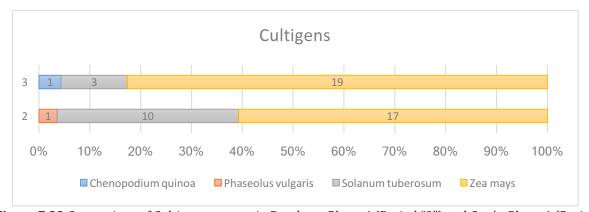


Figure 7.33 Comparison of Cultigens present in Perolcoto Phase 4 (Period "2") and Cayán Phase 1 (Period "3") contexts on the Perolcoto mound.

This increase is accompanied by the decreased consumption of wild hunted animals, such as deer and viscacha (Figure 7.31 and Table 7.2). Pacific marine resources continue to

be present, though in lower quantities, and this either reflects the emergence of a new regional trade network, the reuse of earlier shell objects, or the decreased value of non-local trade items (Figure 7.32). Finally, residue and botanical analysis reveals a heavier focus on maize and potato with an occasional occurrence of foods like quinoa (Figure 7.33). The broader significance of these shifts in consumption and their links to the Recuay emergence during Cayán Phase 2 are discussed below.

Cayán Phase 2 (AD 200–700): Agricultural labor as ritual labor

As described in Part I, the people of Hualcayán dramatically transformed their built environment during Cayán Phase 2, building extensive agricultural fields, canal systems, household complexes, ritual compounds, and tombs—all of which segmented interactions between local people across the landscape. As part of this transformation, new foods and storage procedures were introduced that lead to increased food diversity and security. Moreover, these changes are coupled with new ritual practices and art forms, such as elaborate libation rituals involving maize chicha that was consumed from human effigy jars and feasts involving the consumption of a wide range of foods. The evidence suggests that these new consumption practices were instrumental to both venerating one's ancestors and celebrating the labor of one's lineage.

Two excavated ritual-storage compounds, CY-J and CY-K, provide the greatest evidence for these new Recuay practices and their meanings. These were spaces for agricultural labor *and* feasts, located within the newly constructed agricultural fields. In particular, we found evidence for large-scale food preparation (hearths, grinding stones,

and cooking vessels), storage (small, cell-like rooms with plant remains and tools) and production (serving vessels, micro- and macrobotanicals, and processed animal bones).

First, the final construction phase for both compounds consisted of storage compartments surrounding an internal plaza or patio. In the storage rooms, we found numerous botanical remains, especially of maize and potato, along with flaked stone food processing tools. There were also a number of agricultural-related weeds in these spaces, suggesting that residents used the storage rooms and patios to process these and other agricultural products, perhaps combining feasting with the tasks of harvesting. These practices, and evidence of agricultural labor more broadly, increase dramatically from Chavín times: whereas Recuay contexts had nine total weed species (*Medicago sp., Chenopodium sp., Amaranthus sp., Solanum sp., Trifolium sp., Dichondra sp., Abutilon sp., Asteraceae*, and *Boehmeria sp.*), Chavín-era ritual spaces revealed only three such weed species (*Medicago sp., Dichondra sp., and Trifolium sp.*). This represents a 200% increase in the presence of these species associated with ritual practices (see Table 7.3, above).

Much of this evidence for the integration of ritual and agricultural practices comes from the ritual-storage compounds themselves, where in situ ritual refuse and offerings were found in association with weeds whose presence is attributable to food processing. The richest evidence for feasting is associated with the construction event that converted the first compound into an open plaza (CY-J3). The participants left the remains from these activities in situ below a thick layer of construction fill. This made it possible to recreate the feasting and building event.

Locally produced cultigens were essential to this feast. Analyses found maize, beans, potatoes, peanuts, walnuts, molle, camelids, and guinea pig. The evidence clearly shows

that this was a feast and not a trash deposit. Grinding stones, flaked tools, and hearths indicate the preparation of maize, potato, and sweet potato within the compounds. Faunal analyses, an in particular the presence of camelid coprolites, show that people likely killed and butchered animals on site. Moreover, the CY-J assemblage featured a high density of ceramics bearing representations of human images, which are typically found in mortuary settings (Lau 2011). The proliferation of these human figures in this context points to activities focused on the veneration of local lords and ancestors.

The assemblage of materials associated with Recuay feasts was also highly elaborate and diverse in comparison to earlier assemblages. Materials included spoons and serving vessels, such bottles, bowls, and cups. All of these were more common to Recuay contexts than Chavín or Huarás. In particular, vessels classified as "intermediate serving" vessels, such as bottles and bowls, increase during Cayán Phase 2, as do unique Recuay forms like *escudillas* and dippers (Figure 7.35–Figure 7.37). The microbotanical analyses of ceramics and soils revealed high quantities of maize in the feasting assemblage, suggesting the use of maize *chicha* beer—an interpretation further suggested by the shape of starches from two Recuay feasting contexts—one from a ceramic spoon made of fine kaolin clay that was recovered next to the CY-E hearth (C477) on the Southwest Platform Area (AE-1720; Figure 7.38) and another from a ceramic fragment recovered from the mortuary-related feast on the East Terrace Area (C221, AE-221A; see Appendix F). Together these remains suggest that there was a greater focus on the performance of feasting and the elaboration of or emphasis on each step in the production and consumption of foods.

The overall diversity of cultigens consumed in CY-J and CY-K indicates that a new kind of agricultural economy was being consumed and celebrated in these compounds. The

diversity of foods in Recuay assemblages contrasts the relatively few cultigens consumed in Chavín and Huarás rituals. This new diversity indicates that, in part, agricultural diversification defined Recuay social life and constituted Recuay ritual practice. First, there is a 40% increase in the number of food-related plant taxa (n=7) in Recuay contexts in comparison to Chavín era ritual contexts (n=5). Even more strikingly, there is a two-fold increase in overall foods consumed, that is, cultigens along with wild and/or tended foods from trees and cacti (n=10 total food species in Recuay contexts, n=5 species in Chavín contexts; Table 7.3). It is possible that the difference in diversity for Chavín and Recuay era contexts may be even greater; only one specimen is identified for each of two Chavín-era cultigens—Chenopodium quinoa and Phaseolus vulgaris—suggesting that only three cultigens—Zea Mays, Solanum tuberosum, and Ipomoea batatas—were common in early ritual contexts. The data thus suggest the possibility that there was a strict ritual protocol in place during Chavín (and earlier) times, which emphasized a few core local foods mixed with a variety of non-local foods (cf. Hastorf 2006). These comparisons of food diversity point to how Chavín-era preferences for particular, local agricultural produced were replaced by a new affinity towards showcasing the breadth of foods one's group could produce.

Table 7.3 Comparison of plant taxa 'richness' (number of unique taxa) between excavated Chavín-era (Perolcoto Phase 4), Huarás-era (Cayán Phase 1), and Recuay-era (Cayán Phase 2) contexts at Hualcayán. The data show a general trend towards greater diversity and in situ food processing within ritual spaces. All samples were collected from ritual contexts. Richness counts reflect all taxa that appeared in these contexts via macrobotanical and microbotanical analyses (combined).

| Chavín-era Plant remains | | | |
|--------------------------|--------------------|-------------------------|--|
| Use | Taxa | Common name/description | |
| Food cultigen | Zea mays | maize | |
| Food cultigen | Chenopodium quinoa | quinoa | |
| Food cultigen | Solanum tuberosum | potato | |
| Food cultigen | Ipomoea batatas | sweet potato | |
| Food cultigen | Phaseolus vulgaris | common bean | |

| Agricultural weed or fodder | Medicago sp. | legume family | |
|-----------------------------|---|---|--|
| Agricultural weed or fodder | Dichondra sp. | small flowering plants | |
| Agricultural weed or fodder | Trifolium sp. | clover | |
| Plant unknown use | Fabaceae | legume family, flowering plants | |
| Plant unknown use | Dicotiledoneae | class of flowering plants | |
| Plant unknown use | Escallonia sp. | flowering evergreen shrubs | |
| Plant unknown use | Buddleja sp. | flowering bush | |
| Plant unknown use | Bambusoideae | grass - wet areas | |
| Plant unknown use | Panicoideae | grass (Poaceae) subfamily | |
| Plant unknown use | Pooideae | grass (Poaceae) Subfamily | |
| Wood for burning | Schinus molle | molle tree wood | |
| Wood for burning | Pouteria sp. | flowering tree (includes lucuma, caimito) | |
| Wood for burning | Polylepis sp. | polyepsis tree wood | |
| Wood for burning | Juglans sp. | walnut tree wood | |
| Wood for burning | Alnus sp. | alder tree wood | |
| | 20 unique taxa | | |
| | 5 food cultigens | | |
| | 3 agricultural weed or fodder 7 flower, shrub, grass, or herb of unknown use | | |
| | | | |
| | 5 wood species | | |

| Huarás-era Plant Remains | | | |
|--|-------------------------------|----------------------------|--|
| Use | Taxa | Common name/description | |
| Food cultigen | Zea mays | maize | |
| Food cultigen | Solanum tuberosum | potato | |
| Food cultigen | Chenopodium quinoa | quinoa | |
| Agricultural weed or fodder | Medicago sp. | legume family; alfalfa | |
| Plant unknown use | Escallonia sp. | flowering evergreen shrubs | |
| Plant unknown use | Buddleja sp. | flowering bush | |
| Plant unknown use | Panicoideae | grass (Poaceae) subfamily | |
| Plant unknown use | Pooideae | grass (Poaceae) Subfamily | |
| Wood for burning | Schinus molle | molle tree wood | |
| Wood for burning | Juglans sp. | walnut tree wood | |
| Wood for burning | Polylepis sp. | polyepsis tree wood | |
| Wood for burning | Alnus sp. | alder tree wood | |
| | 12 unique taxa | | |
| | 3 food cultigens | | |
| | 1 agricultural weed or fodder | | |
| 4 flower, shrub, grass, or herb of unknown use | | | |
| | 4 wood species | | |

| Recuay-era Plant Remains | | |
|-----------------------------|--------------------|-------------------------|
| Use | Taxa | Common name/description |
| Food cultigen | Zea mays | maize |
| Food cultigen | Solanum tuberosum | potato |
| Food cultigen | Ipomoea batatas | Sweet potato |
| Food cultigen | Phaseolus vulgaris | common bean |
| Food cultigen | Chenopodium quinoa | quinoa |
| Food cultigen | Cucurbita sp. | squash/gourd |
| Food cultigen | Arachis hypogaea | peanut |
| Food cultigen | Schinus molle | molle fruit |
| Food cultigen | Opuntia sp. | cactus fruit |
| Food cultigen | Juglans sp. | walnut fruit |
| Agricultural weed or fodder | Medicago sp. | legume family; alfalfa |
| Agricultural weed or fodder | Chenopodium sp. | chenopodium weed |
| Agricultural weed or fodder | Amaranthus sp. | amaranth weed |
| Agricultural weed or fodder | Solanum sp. | wild solanum weed |
| Agricultural weed or fodder | Trifolium sp. | Clover |

| Agricultural weed or fodder | Dichondra sp. | small flowering plants | |
|-----------------------------|--|---|--|
| Agricultural weed or fodder | Abutilon sp. | flowering herb shrub or tree | |
| Agricultural weed or fodder | Asteraceae | flowering plant | |
| Agricultural weed or fodder | Boehmeria sp. | green leafy plants | |
| Plant unknown use | Scirpus sp. | wetland weeddeposited in situ as whole flower | |
| Plant unknown use | Bambusoideae | grass - wet areas | |
| Plant unknown use | cf. Magnolia sp. | flowering plant | |
| Plant unknown use | Pooideae | grass (Poaceae) Subfamily | |
| Plant unknown use | Poaceae | grass (family included maize/bamboo) | |
| Wood for burning | Schinus molle | molle tree wood | |
| Wood for burning | Juglans sp. | walnut tree wood | |
| Wood for burning | Alnus sp. | alder tree wood | |
| | 25 unique taxa | *Schinus molle and Juglans sp. | |
| | 10 food cultigens* | appear as both fruits and wood. | |
| | 9 agricultural weed or fodder | | |
| | 5 flower, shrub, grass, or herb of unknown use | | |
| | 3 wood species* | | |

Despite the overall trend toward greater diversification—at least in the consumption of these foods—from Chavín to Recuay times, there was a slight reduction of cultigen diversity (n=3) during the Huarás phase. The reduced diversity may be due to the small sample size for Huarás-era contexts. But it may also reflect an actual decrease in the overall investment in coordinated and community-wide agricultural production after Chavín. Indeed, people may have invested more individual or family-based labor in food production. Evidence in support of this argument includes a sharp increase in the consumption and perhaps production of guinea pigs, which do not require coordinated labor. Overall, such a pattern of more individualized or small-scale food production and consumption may reflect a demographic shift during the Huarás Phase, whereby the social and economic relationships that supported local food production broke down, or were simply reorganized, alongside the regional breakdown of Chavín regional politics.

Nonetheless, the Recuay at Hualcayán was marked by a substantial change from earlier ways of life in terms of increased, rather than decreased, investment in coordinated food production. In considering the longer-term trends from Chavín to Recuay, there is a

steady increase in camelid production and a marked decrease in hunting, which suggests more coordinated husbandry practices (Figure 7.34). Changes in age-at-death profiles over time for camelids could not be determined because all identifiable mandibles were from Recuay contexts or later. 40 Nonetheless, the age-at-death profile for Recuay-era camelids, of which half (n=5 of 10) were between neonate and 1 year 3 months old, points to local infant mortality and culling, which in turn suggests the local management of camelids (see Appendix G).

⁴⁰ Age at death was measured through teeth only (Appendix G).

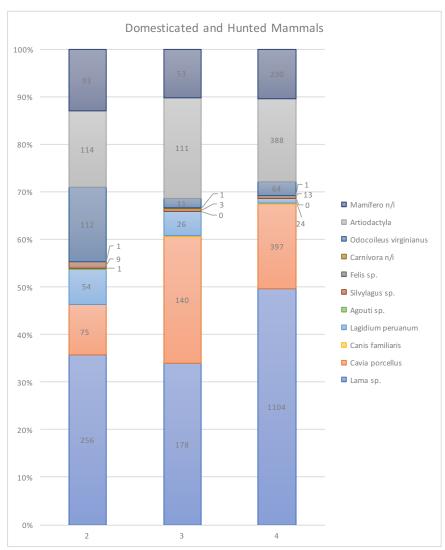


Figure 7.34 Faunal remains from Chavín (2), Huarás (3), and Recuay (4) times at Hualcayán.

Feasting assemblages reflect the increased diversity in both plant and animal foods. The assemblage of ceramic objects associated with Recuay feasts is highly elaborate and includes spoons and serving vessels, like bottles, bowls, and cups, all of which are much more common than in Chavín and Huarás contexts. In particular, vessels classified as "intermediate serving" vessels, such as bottles and bowls, increase during Cayán Phase 2, as do unique Recuay forms like *escudillas* and dippers (Figure 7.35–Figure 7.37). Moreover,

the microbotanical analyses of ceramics and soils revealed high quantities of maize in the feasting assemblage, suggesting the use of maize beer, or *chicha*—an interpretation further suggested by the shape of starches from two Recuay feasting contexts—one from a ceramic spoon made of fine kaolin clay that was recovered next to the CY-E hearth (C477) on the Southwest Platform Area (AE-1720; Figure 7.38) and another from a ceramic fragment recovered from the mortuary-related feast on the East Terrace Area (C221, AE-221A; see Appendix F). Together, these remains suggests that there was a greater focus on the performance of feasting and the elaboration of each step in the production and consumption of foods.

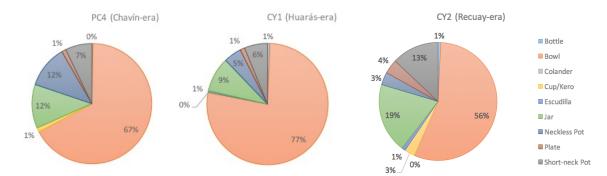


Figure 7.35 Percentage distribution of ceramic types by period. The data show that the Perolcoto Phase 4 assemblage included a range of serving vessels and a majority of bowls (some of which are small neckless ollas classified as incurving bowls). During Cayán Phase 1, bowls increased in prevalence to 77% of the assemblage. Finally, during Cayán Phase 2, there was a considerable elaboration of feasting paraphernalia.

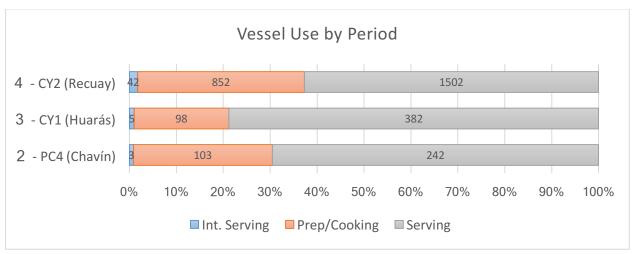


Figure 7.36 Serving vessel percentages by period.



Figure 7.37 Ritual ceramic assemblage from CY-J3 showing the diversity of vessels used.



Figure 7.38 Spoon fragment recovered from near the CY-E hearth (C477) on the Southwest Platform Area (Left: shown in situ next to lithic tools; Right: detail of fine kaolin clay), which revealed fermented maize starches, indicating chicha production.

Despite these marked changes in the ingredients of feasting materials, there is some continuity in ritual practices across Chavín to Recuay times. Hualcayán residents placed adult and infant burials within the CY-J compound during a Cayán Phase 2 construction episode—just as they buried community members (notably children) within the PC-G and PC-H construction phases of the Northeast Platform Area during Perolcoto Phase 4. The CY-J burials were found in many parts of the compound: 1) inside platforms, 2) inside the construction fill that transformed the compound into an open plaza with storage units, and 3) in the soils surrounding the compound. These were primary and secondary burials, suggesting that the deeply rooted practice of including bodies in construction fill was essential to assembling the enclosures.

The burials also coincided with the introduction of vessels bearing human figures, perhaps ancestors or kin group leaders. These vessels personify individuals of status or ancestors and are found on large jars for food preparation and storage, on smaller serving bottles, and on bowls used for individual consumption. Crafters even produced some

effigies as part of the event, as indicated by the recovery of a painted but unbaked clay figurine, which bore the fingerprints of its maker. The ubiquity of these figures within the enclosures suggest that they explicitly invoked the sponsors of the feasts or the generally recognized person who embodied a kin or work group (Figure 7.39; see Chapter 4).



Figure 7.39 Elite and/or ancestor effigies from CY-J3. The fragment of a modeled human face on the left is made from unbaked clay. Notice the painted vertical white line below the left eye.

These figures can be identified as ancestor effigies for particular lineage or kin groups. They all contain elements, like earspools and headdresses, which identify them as figures bearing the marks of authority, whether they represent actual individuals or fictive progenitors. That is, the figures may not represent a particular "lineage ancestor" (e.g., a grandfather or a heroic chief), inasmuch as they may represent or embody a generalized "person" that was thought to be the essence of a kin or agricultural labor group.

Ethnohistoric and modern accounts indicate the likelihood that these personages involved a combination of myth and reality (DeLeonardis and Lau 2004). I propose that they may be based in both a separate class of higher authorities as well as an embodiment of social labor and ritual. In short, I argue that the ceramic effigies at Hualcayán, which are represented in various states of transformation from human to ancestor embody and

manifest social differences between the ritual-storage compounds and their attendant lands—differences that were rooted in lineage and labor.

Particular Recuay vessels from the ritual-storage compounds suggest a distinction between living and physically dead persons, pointing to newly-recognized or emphasized relationship between the living and the dead, as well as the process of ritually-propitiated conversion needed to transform the living into the recently dead (mummies) and the mummies into authoritative ancestors. One double-chambered bowl (Figure 7.39, far right) shows a naked man atop another anthropomorphic figure. The figure at the top bears earspools and is shown naked complete with arms, feet, and genitals. The figure at the bottom lacks these bodily features except ears, which only shows holes where earspools were once placed. Based on the juxtaposition of these figures in a single vessel, I propose that the naked human evokes at the top is a recently deceased person who is "standing on the shoulders of" an ancestral predecessor who has long lost his need for such bodily features (and elite accoutrements) in his transformed state.

These effigies, their discovery in one of several discrete compounds, the broader documented patterns of familial mortuary activities at adjacent tomb chambers, and the construction of walled, agglutinated residential compounds, lend support to the claim that distinct corporate groups with particular histories and leaders constructed and used these spaces. Furthermore, this evidence suggests that, at least in part, these group members based their affiliation on a recognized and shared ancestry. Broadly, these ideas are drawn from the extensive research conducted on Recuay ancestor veneration practices (e.g., DeLeonardis and Lau 2004; Lau 2002; 2008; 2011; 2016). However, the unique evidence for 1) the processes of human-ancestor transformation represented in the ceramic

iconography, and 2) their use in feasts were associated with agricultural/food processing activities (rather than mortuary activities) extends our understanding of the meaning, practices, and materials through which Recuay communities were assembled. That is, ancestor veneration and feasting was part of a broader set of ritual-economic practices that linked the fertility, land, labor, products, and progenitors of one's lineage.

Synthesis: Hualcayán community practices over the longue durée

This synthesis explores the results of the study against the third set of questions outlined in Chapter 1⁴¹, *The Changing Practices of Community at Hualcayán*, which asked how and when the practices of building, performance, food production, and ritual consumption shifted through time. It provides a narrative account of how these social, ritual, and economic practices—and the materials and spaces they produced—interlinked in different ways to assemble and transform a community at Hualcayán before, during, and after the Chavín to Recuay transition. The regional and theoretical implications of these results⁴² will be explored in Chapter 8.

The stone tools and maize remains in Perolcoto's Sunken Plaza Area reflect the earliest kinds of gatherings at Hualcayán. These remains were simple—the stone tool maize processing—but their presence alone, starting between 2462 and 2297 BC (HU01-SPA-1; Appendix A), may point to agricultural practices intended to support consumption events in the nascent Perolcoto mound complex. Scholars have long recognized maize as an

⁴¹ These questions are also detailed in Chapter 4.

 $^{^{42}}$ Which address the study's first and second set of research questions on *The Chavín to Recuay Transition* and *Community Formation*, respectively,

important ceremonial crop in the Andes, noting how maize was not typically not consumed on a daily basis until the Early Intermediate Period or later (Burger and van der Merwe 1990; Hastorf 2006; Tykot et al. 2006). The production and inferred consumption of maize thus may have been the binding practice that brought people together at Hualcayán: Hualcayán may have become a place to grow as well as enjoy such previously rare crops. Such collective acts would have been instrumental is shaping Hualcayán as a place for social gatherings and the production of shared meaning through building, experimenting with new cultigens, and food-sharing (see Hastorf 2006). Moreover, these early soils appear directly associated with early public architecture, in the form of a stepped platform in the area that later became Perolcoto's sunken plaza.

The excavations did not reveal enough of these early contexts to understand how Mito-Kotosh ritual spaces and practices first emerged at Hualcayán; yet the concrete evidence for a Mito-Kotosh mound structure of an estimated ten meters high by 2138–1922 BC (see HU01-SWPA-1; Appendix A) indicate that the community experienced sweeping growth within a century or two: people were not only gathering in Perolcoto, but building monuments in order to do so. The evidence also indicates that maize maintained its importance as a ritual crop, along with potato and sweet potato, though it is unclear what role these foods played in people's everyday diets at Hualcayán.

The reconstruction of the Perolcoto mound between the Early and Middle Formative Periods (~1200 BC), which ended Mito-Kotosh ceremonies in enclosures and began a new practice of ritual performances on restricted platforms, involved a local shift in ritual authority and the proxemics of ritual participation. Accordingly, this shift did not occur as people converted to an externally emplaced Chavín religion, nor did it occur

without any precedent in local practice. Instead, this transition, which happened centuries before Chavín began exporting its brand of religious practice and belief, and was part of a regional transformation in religious practice and interregional interaction. That is, it appeared before and contributed to what became Chavín, undergirded by centuries of acquiring exotic materials and foods, indicated by the presence of rare stone beads and marine mollusks, and practicing shamanic practices such as hallucinogenic trance, indicated by the presence of scooped bone spatulas thought to be used for taking snuff, before the Late Formative (before ~900 BC).

These shifts in ritual authority are also reflected in the modifications to the community's last and most prominent Mito-Kotosh temple enclosure. The modifications involved the construction of increasingly higher and broader inner platforms that would have restricted movement between those standing on them and those attending to the sacred hearth below. The platforms may point to tensions between the long-standing tradition of largely egalitarian Mito-Kotosh rituals and the growing authority and specialized role of ritual leaders, who increasingly performed their roles physically apart, albeit subtly, from others gathered in ritual events.

These social distinctions were made more concrete when builders covered their Mito-Kotosh temple and built a platform on the mound's Southwestern summit during the early Middle Formative Period. With this platform, ritual performers would have been more spatially segregated from other ritual participants, who likely gathered in the broad areas of the mound and plaza area below. Nonetheless, these increasing social distinctions and the displays of ritual authority performed on prominent platform structures in the Southwest Platform Area were paired with the ongoing practices of communal, informal,

and cyclical building, burning, cleaning, and burial⁴³ on the opposite end of the mound in the Northeast Platform Area.

It was these distinct, coexisting practices—ongoing collective performances of building and burial on one side (Northeast), and a fixed, formal platform for the performances of a few people on the other (Southeast)—that produced the Perolcoto mound's dual form during the Late Formative Period, rather than dual elite or other paired social collectivities. Tensions likely existed between these communal building and restricted performance practices and their uses as community spaces, for during the final centuries of the Chavín era, the communal building space of the Northwest Platform Area was covered with a broad, fixed platform. This construction definitively ended the practices that ensured possibly community-wide regeneration through collective acts, and which would have likely renewed a commitment to place.

The long-term perspective, traced from Mito-Kotosh to Chavín, thus suggests that the tensions between 1) a communally-held authority (i.e. authority assumed collectively and connected to place through activities such as building, cleaning, and burying) and 2) the authority of ritual specialists (i.e. authority engendered through performances of specific individuals) were percolating long before the Chavín-era shifts that transformed the Perolcoto mound into a series of imposing platform spaces.

Similarly, the subsequent emergence of the Huarás and Recuay community at Hualcayán cannot be fully understood without tracing its development over the *longue* durée. First, Huarás ritual practices at Hualcayán during the Final Formative Period (1–500)

⁴³ Successive floors were laid, indicating building, but these floors were informal and made with very ashy soils. Thus, they reflect large episodes of burning outside of the excavated area, which were then cleaned, and processed in order to lay the floors. Burial practices, perhaps associated with food consumption (indicated by intrusive pits and in situ pots) likely occurred before each construction event began.

BC) are in many ways defined by the need to transform the architectural features—and likely the supranatural forces—of Chavín spaces through destructive decommissioning, feasting, and rebuilding practices that incorporated distinctly new kinds of materials like painted ceramics and placed them within the destroyed wall cavities.

It is surely no coincidence, though at first counter-intuitive, that these intensive Huarás decommissioning practices occurred in the Northeast Platform Area and *not* the Southwest Platform Area where a small platform and room complex was maintained⁴⁴ for over a millennium as an exclusive space and symbol of sacred authority (whether of supranatural or human form). Instead, the area that Huarás groups intensively and thoughtfully transformed was the platform complex in the Northeast Platform Area, which has been built near the end of the Chavín sequence and covered the area previously used for seemingly inclusive rituals of floor construction and child burial. It is interesting, then, that a new tradition of Huarás rebuilding, although distinct in its materials and execution, began anew once the Chavín platform complex had been decommissioned. These practices attest to the social memory of community practices in this particular space and its importance as a place for community regeneration.

Between about AD 1–100, these Huarás practices eventually gave way to a new kind of ritual practice that emerged in the Recuay phase, which established direct links between communal ritual activities, such as ancestor veneration practices and feasting, with the activities of food production. This occurred in part by constructing new gathering spaces within agricultural fields. Huarás structures on top of the Perolcoto mound were also

⁴⁴ The platform was modified in small ways, but the core platform structure was more or less maintained.

covered with platform surfaces—the final constructions on the mound's summit—where feasts were held overlooking the ritual and agricultural lands below.

The Recuay compounds at Hualcayán explicitly indexed agricultural land and activities. Builders constructed the compounds at the same time as the terraces and irrigation canals, which suggests that the Recuay directly integrated feasting into the spaces of agricultural production. The association of Recuay compounds with new terraces and the symmetrical form of the landscape between two canals indicates that residents not only built these features together but that they were intended to link ritual and agricultural production. This new layout was likely the result of a coordinated, community-wide construction event—a fulfillment of a common goal. Discrete kin groups defined their autonomy in the compounds and, in doing so, laid claim to specific lands. Hence, the construction of compounds and the food production rituals that they contained, detached authority from traditional religious spaces on the ceremonial mound. In these practices people manifested and brought into being a land and lineage or kin group linked through labor, food resources, and ritual and economic orthopraxy, which depended on claims of common ancestors and their living representatives as well as on the resources they produced.

The evidence remains unclear as to what kind of authority these leaders may have held in this community, though it seems their authority was decentralized much like the collectivities they represented: there was unlikely to have been one "chief" but many lineage leaders or representatives who vied for authority and aimed to achieve it in both life and in death. The current evidence from nearby tombs cannot confirm whether some of these people were elevated as elites or ancestors because they have been heavily looted.

Nonetheless, it appears that the ceramic effigies of adorned male leaders and ancestors came mainly *after* and *out of* the process of change that brought about the spatial and social distinctions builders inscribed into the landscape. That is, these effigies appear after at least most of the dispersed ritual-storage compounds and agricultural terraces had already been constructed. We can thus see that the recognition of individual leadership came centuries after the beginning of a long process of decommissioning, building, destruction, rebuilding, reorganization, and the eventual implementation of a new food production regime. Within the CY-J ritual-storage compound alone, there are at least 200 years of building and use before effigies appear in significant quantities⁴⁵. In many ways, this pattern of change parallels the shift from Mito-Kotosh to Chavín, in that the stylistic markers and iconographic content of Chavín arrives centuries after the community had adopted other kinds of practice, such as performances on raised platforms and the use of exotic goods in ceremonies.

Conclusion

This chapter traced the long-term process of community formation at Hualcayán by exploring practices of building, performance, food production, and ritual consumption, over nearly 4000 years. This long-term analysis reveals that community transformations cannot be understood apart from past practices, which shape (enabling and hindering) all subsequent acts and social developments. Moreover, it reveals how changes in one domain, such as religious conversion or agricultural intensification, should not be considered in

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⁴⁵ Although the identification and excavation of the compound's associated middens would further clarify the shifting frequencies of these kinds of vessels through time. And the initial use of the compound.

isolation as if it can alone drive social change. Rather, the material and ideological components of social life are imbricated into daily practice, and people shape cultural meanings and values as they enter into, mark, and solidify their relationships to other people, things, lands, and places. Community, in essence, does not simply emerge from the recognition of kinship or the discursive declaration of a collective group's identity. It is continually formulated and negotiated in practices through which people, for instance, work together to construct a compound, harvest fields, prepare a meal, or venerate a deity.

Apart from the long-term history of community transformation it offers, what is striking and exemplary about the material from Hualcayán is how during the Recuay period we see how people explicitly developed and recognized, in the forms of discrete ritual-storage compounds, lands, households, and tomb clusters, the practices that at once drew them together and distinguished them. They did so with no apparent centralized authority or regional standard—they developed a community and a political landscape from the ground up, stone by stone.

CHAPTER 8

CONCLUSIONS: THE LABOR OF COMMUNITY AT HUALCAYÁN

This study has explored how ritual and economic labor intertwine to assemble communities by framing interactions, creating interdependencies, and shaping meaning between people and non-human actors such as plants, animals, land, temples, and deities. This final chapter evaluates the evidence presented in this dissertation against the study's theoretical concerns and research questions regarding the process of community formation and the Chavín to Recuay transition at Hualcayán, respectively¹. It builds on the interpretations and synthesis in Chapter 7, which revealed when and how particular spaces, materials, and practices transformed over Hualcayán's *longue durée*. It then uses the study's results to reconsider anthropological approaches to Andean communities and the traditions that are often claimed to have sustained them. Finally, it details potential avenues for future research at Hualcayán and within Highland Ancash.

Community Formation and the Chavín to Recuay Transition at Hualcayán

The study hypothesized that the emergence of a Recuay community at Hualcayán was linked to the development of a ritual-agricultural system (i.e. a ritual economy) that emphasized kin-relationships and practices, specifically (1) membership within, (2) ritual

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¹ As outlined in Chapter 1, the study was organized by three interconnected levels of inquiry, divided into three sets of questions: (1) anthropological questions of community formation, (2) cultural-historical questions about the Chavín to Recuay transition in Highland Ancash, and (3) analytical questions that examine how particular community practices, spaces, and materials changed through time in ancient Hualcayán. This chapter responds to the first and second set of questions, while the third set of questions, which were linked to particular archaeological practices and their material correlates (Chapter 4), guided the exploration of data presented in Chapter 7.

and economic labor obligations to, and (3) the food resources produced by one's kin group. This hypothesis was linked to several questions that aimed to expose particular changes in (1) space and social organization, (2) ritual and economic materials and labor, and (3) regional interaction during the Chavín to Recuay transition. Responses to each set of questions are introduced before presenting an interpretive summary of the Chavín to Recuay transition at Hualcayán. The evidence below is based on the data presented in Chapters 5–7 and the appendices.

Space and Social Organization

Through what types of changing spaces and practices did Chavín communities become Recuay communities? How did communities shift from being mostly regionally-focused and centralized societies with theocratic authorities to being more locally-focused and segmented societies with corporate kin-based authorities?

The study revealed how social segmentation was first visible in the small-scale and somewhat disordered feasting events carried out on the Perolcoto mound during the Huarás Phase, ending the presumed more formal and cohesive events that had characterized the Pre-Chavín and Chavín eras². At first, the people of Hualcayán decommissioned Chavín temple spaces by dismantling, reconstructing, and filling them.

These were not acts of indiscriminate demolition: this decommissioning was part of a ritual event that involved removing stones from platform corners, feasting, and depositing Huarás ceramic and food remains inside the destroyed corners before replacing the stones as if to ritually 'kill' and then apparently breathe new life into the Chavín structures. In the

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² These questions here address only the Chavín to Recuay transition; see Chapter 7 for a more long-term view of changing community organization and practices.

centuries that followed, people continued to feast on the mound in smaller, less coordinated consumption events using Huarás materials, for which they built small semi-permanent spaces.

As Recuay kaolin ceramic styles appear, marking the formation of what we can identify as Recuay cultural identity, so do ritual, economic, mortuary, and domestic activities become more segmented at Hualcayán. In particular, groups begin building discrete ritual-food storage spaces, terraced fields, and household compounds during the Recuay period. First, they covered the Perolcoto mound with two new platforms and seem to have used these platforms for some feasting activities. Moreover, small groups, likely families, converted other areas of the mound to tombs where they held intimate feasts and burial rites. These constructions were part of a broader project to rebuild the entire local landscape; local people reoriented and segmented their living spaces into walled sectors, built over one hundred *machay* tombs, constructed bench terraces and irrigation canals to increase agricultural production, and, performed ancestor veneration feasting rituals using effigy vessels in segregated ritual-food storage compounds built within the terraced fields (see next section). This new focus on group activities and spaces—i.e., separate lands, agricultural practices, and ancestor veneration rituals—points to how group divisions became more formalized. Moreover, this segmentation suggests that people sought to strengthen their bonds to those they lived, labored, and worshiped with, rather than prioritizing hierarchical, community-wide social structures.

Ritual and Economy

How did the people of highland Ancash change their food production and ritual consumption practices as they established a "Recuay" social organization after Chavín? What economic and ideational shifts occurred as communities grew demographically?

The study examined diachronic changes in macrobotanical, microbotanical, and faunal remains coupled with analyses of changing materials (e.g., ceramics), and architectural spaces to reveal changes and innovations in food production and ritual practice over time. First, during the Huarás phase, people infused Chavín structures with new material styles as they decommissioned them, depositing Huarás white on red ceramics and feasting remains into destroyed cavities on the Perolcoto mound. This and subsequent feasts focused heavily on maize, likely *chicha* libations, which were served from large jars. These transformations and practices point to how the substance of materials—new kinds of pottery, foods, and spaces—was essential to asserting a new community identity after Chavín.

Subsequently, they intensified and extensified agriculture by constructing bench terraces fed by irrigation canals (see above), and diversified food production by growing and consuming foods such as beans, peanut, cactus, walnut, and quinoa in addition to the maize, potato, and sweet potato that had long been central, especially ritual, ingredients during Chavín and earlier times (Appendix F). These diverse foods were often consumed in single events, which suggests multi-cropping and/or storage rather than seasonality.

Moreover, local people steadily increased camelid domestication and consumed both llama and alpaca, which they supplemented with guinea pig (Appendix G). These changing

foodways, especially the multi-cropping activities of several groups of people, would have provided a more secure, local food source, lowering risk (Marston 2011).

These food practices by discrete groups were also linked to the development of Recuay commensalism and ancestor veneration, practiced in ritual-storage compounds dispersed within the agricultural fields. Feasting rituals featured numerous images of elites and ancestors on libation vessels, from which participants consumed maize beer, signaling an ideological and ideational shift in the materials, spaces, and practices of the community. For instance, in the Recuay era, agricultural fertility was achieved not only by laboring in irrigated fields, but also through ceremonial libations rituals that were focused on transforming group leaders into ancestors (see Chapters 6 and 7). Although illustrious elite and ancestor images prevail in the iconography, these were more than elite spaces: the evidence for the secondary burial of children and adults³ as well as evidence for food storage and food processing suggests these spaces were established by and for to the kin group that gathered there—composed of its living, physically dead, and transcended ancestral members. These practices contrast the more inclusive but hierarchically segregated rituals of the Chavín era, in which foreign objects and regional symbols (e.g., obsidian and Janabarriu pottery) in central spaces provided the material means for the perpetuation of the community.

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³ Human remains analysis is ongoing; sex profiles are not currently available (Appendix H).

Local-Regional Interaction

How did Late Formative communities like Hualcayán, which participated in the Chavín sphere but was not a major regional center, experience and contribute to the end of Chavín and the emergence of Recuay?

By focusing on long-term changes at Hualcayán, which had a deep history of its own pre- and non-Chavín local practices and spaces, the research assembles a more holistic and local account of how shifting traditions of building, ritual, and food production labor intersected and contributed to the Chavín decline and Recuay emergence. First, the evidence suggests how "Chavín" ritual spaces and practices did not emerge in a moment of conversion when Chavín's influences spread across Peru around 900 BC. Instead, this conversion occurred centuries earlier, when they filled in their Mito-Kotosh temple and began theatrical performances on mound-top platforms. Moreover, other practices, such as the ongoing reflooring and child burial on the mound, are not known to other Chavín temples, though they largely define Chavín-era ritual at Hualcayán. Nonetheless, their use of snuff spoons, coastal foods, and the prevalence of Janabarriu ceramics suggests that Hualcayán did participate in the Chavín sphere of interaction in which religious beliefs, materials, and practices were shared. Moreover, the evidence suggests that local systems of authority were challenged and replaced towards the end of the Chavín era. Notably, the aforementioned Huarás acts of destruction to decommission the mound occurred precisely the areas in which "non-Chavín" spaces, such as where the mound was continuously rebuilt, had been converted to formal platforms in the late Chavín era. This Huarás transformation was coupled by the appearance of intensive maize consumptions well as

new vessel styles, pointing to how local people reclaimed space and instituted new types of ceremony as part of the rejection of this religious authority, but not of the mound itself.

The Changing Dynamics of Community at Hualcayán

The results of this study largely support the hypothesis that a Recuay community at Hualcayán was borne as local people oriented their ritual practices more toward food production. This was part of a broader project to decentralize the community by interlinking the ritual and economic activities, products, and members of one's labor group to their membership in a particular lineage or other corporate group.

The Practices of Community

The data from Hualcayán reveal how the end of Chavín and the beginning of Huarás at Hualcayán were not predicated on a "collapse" of community, whereby an entirely new community subsequently emerged that was divorced from its past spaces, materials, and practices. Instead, the Huarás period at Hualcayán was characterized by active building and ritual practices that involved decommissioning of existing Chavín-era platform complexes, filling and rebuilding these complexes using new materials, and then returning to a mode of ritual in which informal feasting and building events brought people together in coordinated action on the mound.

In particular, during the Huarás era they covered rooms of the Southwest Platform complex, which had been used as the principal space for restricted elite performances during Chavín and pre-Chavín times⁴, and then elaborately dismantled, feasted in, and deposited new kinds of materials (most notably, white on red painted ceramics) in the

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⁴ CY-B activities in the PC-E platform complex.

destroyed cavities of the Northeast platform complex⁵. While the main structure of the Southwest Platform Area had been maintained and used for around 700 years, the Northeast platform was built towards the end of the Chavín sequence (perhaps around 700 BC⁶) and had covered an area long used for communal rites of renewal. These rites of renewal were manifested in repeated cycles of informal building, feasting, and burying children⁷. Following the elaborate decommissioning of the Northeast platform, Huarás-era groups⁸ returned to many of these practices, using this space for periodic and informal building, filling, and feasting while leaving the Southwest platform largely intact⁹. Moreover, while the Huarás era community all but stopped acquiring and consuming foreign foods and objects like Pacific mollusks after Chavín, they continued to focus their production and ritual consumption activities on maize and potato as they had earlier in the Formative Period, thus continuing other kinds of cooperative and shared symbolic practices that had long defined the Hualcayán community. These practices suggest how the community's past was still an intimate a part of the Huarás-era community. Not only was there a strong social memory of past practices, but many of the spaces and practices that tied the community together—the production and ritual consumption of maize and potatoes, and events of communal construction focused primarily on renewing, rather than

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⁵ CY-C activities in the PC-J platform complex.

⁶ A plateau in the calibration curve falls precisely across the period of regional Chavín influence (900–500 BC) and precise dates within this range are not currently available.

⁷ Construction areas PC-G, PC-H, and PC-I.

⁸ Additional excavations would reveal the overall scale of these activities in the Northeast Platform Area and clarify whether these were different groups of people or community-wide events.

⁹ The evidence for Huarás activities are somewhat unclear on the Southwest platform, but decorated Huarás jars and bowls suggest activities continued on its surface during the Final Formative Period. However, evidence for intensive Recuay era feasting on the same platform suggest the decorated Huarás ceramics likely reflect similar activities that began after Chavín and continued into Recuay times.

raising or redesigning the mound—were still very much a part of the community, albeit transformed.

I thus argue that the Hualcayán community was assembled and transformed both through practices of ritual affiliation and through coordinated labor. *Practices of affiliation* are the social interactions that make group membership explicit, and usually occur during celebratory events, feasts, and other highly charged, non-quotidian ritual gatherings (Yeager 2001, inter alia; see chapter 2). At Hualcayán, such practices of affiliation are visible in the Chavín and Huarás period rites of renewal described above, as well as in the Recuay period feasts that centered on consuming maize chicha from elite and ancestor effigy vessels, offering and consuming a diverse array of agricultural products and camelid meat, and burying the dead¹⁰. Though these acts reflect practices of affiliation, they also index or directly link to various forms of communal labor, such as the labor needed to build and irrigate terraces to grow agricultural products; to build the ritual-storage complex (e.g., CY-J and CY-K) for which the feast was held; or to transform maize into chicha. All of these practices required negotiated, meaningful, conscious, and cooperative social interactions and cannot be relegated entirely to the realm of unconscious habitus (see Yeager 2001:125).

Nonetheless, when people share in the production of spaces, crafts, ritual, and foods, their labor produces community as much as it is shaped by it. Such shared labor practices are commonly referred to as *communities of practice* (e.g., Lave and Wenger 1991; Roddick 2015; Sassaman and Rudolphi 2001; Wenger 1998). Though the latter is nearly always applied to craft production, such as of textiles and ceramics, it has also been used to

¹⁰ For example, in compounds CY-J and CY-K.

understand collective building practices and technologies (Evans and Knight 2001; Roddick 2015). Perhaps we can further extend the concept of communities of practice to include the production of food. For example, planting, irrigating, and harvesting technologies, and food storage, processing techniques, preferences, and consumption practices have been widely shown to be important in the construction of identity and community (e.g., Hastorf 2003, 2006; Hastorf and Weismantel 2007; Morrison 2006; Smith 2006; Twiss 2012), and thus the proper techniques for growing, cooking, and serving foods should define a social group in similar ways through chains of practice that are both learned and negotiated—regardless of whether these foods end up on a daily plate or in a special feast.

The Infrastructure of Community

Hence, an anthropological focus on precapitalist communities, which often sustain themselves through their primary production on their own land, *requires* an intensive inquiry into agricultural and pastoral practices. Such practices are not only at the roots of these self-sustaining local communities, but also they are altered and negotiated over time. We might think of water and irrigation rights in the ancient and modern Andes, and how conflicts over water are raised and resolved (or not) when people come together during collective labor projects, such as canal maintenance. Disputes over the equal flow of water are common, and the movement of water must be constantly negotiated as people expand fields, change their food preferences, or undergo seasonal and climatic change. All of these factors, in tandem, alter the flow of water and the movement of soils (Herrera 2011; Mitchell 1976; Mitchell and Gulliet 1994; Lane 2006). Likewise changes in water sources and increased soil erosion can have immediate political effects, shaping perceptions of the public good and influencing particular kinds of community decisions about land use and

resource distribution (Bauer and Kosiba 2016). Thus, as people labor to produce food, meaningful relationships and material dependencies develop between themselves and others, and with the land, plants, and animals that emerge through these acts of labor. In this light, food production is much more than a simple extension of tradition. At Hualcayán, the evidence for commingled agricultural infrastructure indicates broadly coordinated labor (above the level of the household) and the conscious blurring of what earlier scholars assumed to be separate "profane" everyday labor practices and "sacred" or ritually charged activities (see Durkheim for earlier approach; see Bradley for recent critique). As recently noted, this distinction between "profane" and "sacred" is a social construction, that becomes manifest in different ways at different times, and should not be assumed or applied a priori to all prehistoric and historical contexts (Boivin 2009, Bradley 2006, Bruck 2004).

The linkages between ritual and the labor at Hualcayán indicate an expanded notion of 'infrastructure'. Scholars have traditionally discussed food production infrastructure, such as terraces and canals, and activities, such as irrigation, as the *economic* means through which communities adapted to their environments and elites controlled and intensified crop production. This approach replicates a Marxist dichotomy between base and superstructure (Marx and Engels 1970 [1846]) that defines public rituals and civic-ceremonial spaces as ideological or superficial means through which leaders justified and legitimated collective labor projects (see Chapter 2). In contrast, this study has considered how the construction of agricultural infrastructure, and its close pairing with technological and ritual innovations, was together essential to the transformation of Hualcayán into a new kind of community during the Recuay period. Investigation of the area north of the

Perolcoto mound indicates that local people reorganized their community when they focused attention away from their long-revered mound and built discrete and spatially segregated ritual/storage compounds¹¹ into newly constructed terraces. An intimate connection between agricultural labor and ritual labor lay at the basis of this community.

The materials recovered from these Recuay compounds indicate corporate groups feasting with ceramic effigies of persons that may be community representatives or ancestor figures¹². The evidence suggests that the compounds were used by separate kinor work-based groups who recognized and personified their distinct and semi-autonomous roles within the community. Spaces in the compounds included a diverse array of agricultural products, suggesting that these Recuay groups and their representatives marked their autonomy through the construction, control, and coordinated use of nearby agricultural infrastructure and the products these efforts produced. Moreover, the transformation of persons into ancestors—an iconographic theme suggested by people shown at different stages of wearing their clothing and other accoutrements—appears to be linked to the production of food and rituals that celebrated the generosity and vitality of *mallqui* (venerated ancestors), group leaders (perhaps potential or aspiring *mallqui*), and the productive success of the corporate group as a whole.

I contend that, by constructing spaces that intentionally integrated the spaces and tasks of agriculture and ritual, the people of Hualcayán constituted a new community order that was grounded in a new kind of infrastructure that ensured the collective labor to produce resources and propitiate land, dieties, and kin. Production in this instance

11 E.g., CY-J and CY-K

 $^{^{12}}$ Who are identified by their earspools, headdresses, elaborate textiles (elites), or combinations of these features with other qualities or states of being, such as nakedness (ancestors).

required not only the cooperation of group members to tend fields, clean canals, and harvest plants, but also to ritually aid deceased persons, by way of food offerings and maize chicha libations, to transform into *mallqui* who would in turn ensure productive conditions for their descendants. The landscape, in this case, was alive with growing plants, flowing water, human and animal bodies, and agentive ancestors. Such relationships of reciprocity between *mallquis* and their descendants, and a *mallqui's* inalienable rights over land and animals, is well documented in the early Colonial period of highland Ancash (Duviols 1986; Lau 2008:1031). Thus, just as food production activities were not indirect support tasks for political rituals like Recuay feasts, food production infrastructure was not simply a backdrop or "vehicle" through which political actors advanced their agendas.

This study suggests that roots of these beliefs and practices may be quite deep in Ancash, beginning or flourishing by the Early Intermediate Period (Lau 2008; DeLeonardis and Lau 2004). Iconographic evidence further supports this point. In fact, the anthropomorphic beings that appear on Huarás ceramics during the Final Formative Period (see chapter 6) in some ways, such as lines radiating from the head, resemble Recuay representations of beings that that may represent transcendent ancestors or other deities (Figure 8.1) (Hohmann 2003; Wegner 2011:22). These representations appear in Ancash soon after Chavín practices fade, indicating that the end of Chavín may have been due in part to a change in the symbolic meaning of objects of worship. At this time, it seems people began recognizing the authority of more personal human or human-like progenitors (e.g., mummified *mallqui*) rather than general and esoteric deities with whom only priests could communicate.

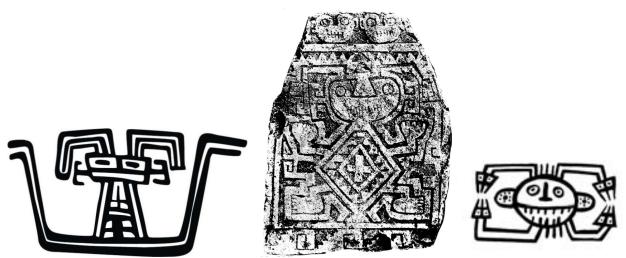


Figure 8.1 Huarás and Recuay iconography that may represent related beings. **Left:** Huarás (Wegner 2011:23, Figure 1). **Center:** Likely transitional between Huarás and Recuay (Grieder 1978:149, Figure 148). **Right:** Recuay (Lau 2011:208, Figure 55c).

Indeed, ancestor or personified images become commonplace by the Early
Intermediate Period, and at Hualcayán, they appear with the construction of terraces and their associated ritual-storage compounds. The diversity of these images, in fact, matches the diversity of architecture and ritual space. Hence, the shift from Chavín to Recuay appears to be a centrifugal change, from a central temple and deity to a dispersed array of ritual and economic spaces that were linked together through practices, dependencies, and kin relations. Within the new ritual-agricultural economy of the Recuay community, diversity was prized: maize and potatoes (including sweet potatoes) were still important, but were now part of a larger corpus of ritually consumed foods that included squash, peanuts, quinoa, beans, walnuts, cactus, and molle berry.

These agricultural and feasting practices, though likely segmented by corporate group, were also linked to broader community practices. If we only consider the ritual structures investigated, it appears that these were largely unaffiliated groups aside from the proximity of their practices and spaces. However, when considering the agricultural

infrastructure, it becomes clear that food production practices would have necessarily integrated these groups into a broader community, especially at specific times, such as when the irrigation system needed repair and cleaning. Platforms, terraces, and open structures on the Hilltop Residential Area likely provided additional ritual venues for intergroup practices of affiliation or other labor tasks.

In sum, these data from Hualcayán suggest how community comprising human and non-human things, places, and beings was created in the social interactions and practices through which people built and cared for their essential infrastructure. In Chavín times, though fields and canals existed, it was the building and ceremonial maintenance of a communal temple—what we might consider ritual infrastructure—as well as the acquisition and use of foreign objects and foods that assembled a community around a centralized space on the Perolcoto mound. The mound was a focal point. In Recuay times, this focus shifted towards the maintenance of diverse and dispersed agricultural features, which included spaces for food storage and feasting. Altogether, the landscape grounded labor, kinship, and community. The construction and use of local infrastructure was therefore not a mere reflection of political aggrandizement or population growth, even if these processes were present: they were also vibrant (sensu Bennett 2009) components of the community.

The legacy of Hualcayán's infrastructure endures today, as the Recuay terraces, and even the Perolcoto mound, still shape the boundaries of family (often extended kin) landholdings in modern Hualcayán. The modern Hualcayán community is a collectivity of families who maintain their own fields and grow and sell their own agricultural products. Yet the maintenance of the irrigation system is one of the integrative practices that require

consensus and cooperation, which is often achieved through airing grievances over equal water access at community meetings and other gatherings. In these ways, both corporate kin-based autonomy and the social affiliations of the broader community can be understood as rooted in the local infrastructure and agricultural practices of both ancient and modern Hualcayán.

Ritual Economy and Community

In light of these data, we can reconsider and further specify the term "ritual economy." On the one hand, ritual economy is a theoretical framework for understanding the way that meaningful social affiliations and structures of power are formed by means of economic or ritual manipulation (Wells and McAnany 2008). On the other hand, we may identify particular communities, societies, or periods in time in which ritual becomes tightly interwoven with the production of economic goods, or where the economy is largely geared toward the production of objects and spaces to support ritual events (e.g., the Negara theater state; Geertz 1980). In any community, one may find resources that support ritual practices, and concerns of group vitality and fertility are important ritual themes cross-culturally. However, when labor activities like food production become the primary focus and foundation of ritual action, such a society could be considered to have "a ritual economy". At Hualcayán, ritual economic practices in Chavín times focused on the acquisition and production of rare objects that were mostly the purview of ritual leadership. In the Recuay era, ritual shifted toward the practices of everyday food production, likely focused on perpetuating the cycles of life extending between water, land, and plants and the perpetuation of kin groups and their ancestors. In this way, we can suggest that "a ritual economy of food production" formally developed in Recuay times. At

Hualcayán the ritual economy was focused principally on the production of crops, but such ritual economies may have operated differently in other Ancash communities, such as within agro-pastoralist communities at higher elevations.

Ritual and Economy: The Labor of Community

In this study, I argue that to examine community is to inquire into the ongoing ritual and economic labor practices that frame interactions, create interdependencies, and shape meaning between people and non-human actors such as plants, animals, land, temples, and deities. I have applied this argument to the Chavín to Recuay transition, which has been described as a period of regional "collapse" and regeneration, and have thereby challenged the top-down assumption that communities disintegrate, transform, or emerge *only in reaction* to external forces (such as the breakdown of a political network), population pressures (such as with climate change), or elite competition (as opposed to non-elite practices). Such assumptions tend to obscure and overlook actions at the grassroots: social, ritual, and economic practices, as well as the things and spaces they produce, that introduce new forms of social interaction in local places and across a broader group of social and material actors.

Indeed, the evidence from Hualcayán points to how the process of community formation occurs in particular situated interactions that assemble people and things at different scales through time and space. At Hualcayán, the ongoing process of community formation was explored and revealed through a variety of interlinking practices—notably building, performance, food production, and ritual consumption—that yielded change both

during events, such as the production of space through feasting and architectural renovation, and over the *longue durée*, such as the ecological transformations that occurred by intensifying and diversifying agriculture (cf. Harris 2017; see also Braudel 1972 DeLanda 2006; Robb & Harris 2013; Robb & Pauketat 2013). Hualcayán, an ancient place of agricultural, ceremonial, habitational, and mortuary activities that resonated with social value for nearly 4000 years, was well-suited to explore how these different "domains" and scales of practice, as well as the materials they produced, interlinked to assemble a community in different ways through time.

In particular, I have stressed the transformative potential of the collective ritual and economic labor practices and materials through which the people of Hualcayán established consent and group membership, both within a particular kin or status group and among a broader community of builders, ritual participants, and food producers. I examined how every day and periodic community practices, such as building terraces, processing harvests, reflooring structures, burying the dead, and participating in feasts, can mediate and shape social affiliations and local structures of authority, and how these activities provide insight into the local practices that lead to regional transformations. I explored how these ritual and economic practices, and the negotiations over land and labor that they entail, can simultaneously generate social consent and social difference (i.e. within and between corporate groups), establishing the bonds and the boundaries that lie at the foundations of a community.

In this way, communities emerge and transform through ritual and economic labor—the ongoing and intentional 'work,' that brings together and shapes meaning between different combinations of people, spaces, things, organisms, deities,

infrastructures, memories, and places (e.g., lineages, temples, ceramic vessels, crops, ancestors, irrigation systems, myths, and villages, respectively) (cf. McAnany and Wells 2008; Harris 2014). Ritual and economic labor not only subsume each other in the production of community, such as in how ritual events require the procurement of special foods or the production of ritual objects, but they also subsume other "domains" of practice, such as growing and cooking food for daily meals within the home, or hosting feasts in exclusive spaces to establish elite political affiliations. A focus on ritual and economic labor thus aims to generate a holistic approach to community formation by exposing how they are, quite literally, produced. That is, a focus on labor more directly links the process of community formation to the products—the things and spaces—that underlie social interaction between people. In so doing, people and things are not approached as "symmetrical," or balanced in their agency (e.g., Latour 2005; Webmoor and Witmore 2008); people assemble and enact community (cf. Marsh 2016), even as non-human beings and things shape this interaction.

Hualcayán in Broader Perspective

The discussion above reviewed how the study at Hualcayán builds on and contributes to anthropological theories of community formation and ritual economy. This section explores how the Hualcayán data and the study's theoretical approach enrich our understanding of the concepts of community and tradition in the Andes.

Andean Communities in Anthropological Perspective

The long-term study of prehistoric community formation at Hualcayán reveals how communities are assembled with each action and are thus always in flux. They also reveal the danger of applying generalized or historical understandings of Andean communities to the prehistoric past. An important revelation of the study warns against essentialized understanding of communities: for instance, the Initial Formative Period community at Hualcayán was clearly not the same community—in terms of social organization, infrastructure, and ritual focus—that existed during Chavín, Recuay, or late prehistoric times. The Hualcayán community, like all assemblages, was constantly unfolding, changing, and morphing into another kind of community. Thus, to suggest that prehistoric Hualcayán fits a specific, preconceived and transhistorical model of Andean community organization would not only be in error, but also it would detract from the history of this site, in particular the important innovations and struggles Hualcayán's people.

The ethnohistoric and contemporary *ayllu*, which has been richly documented in numerous case studies, including in late prehistoric contexts (e.g., Allen 1988; Bastien 1985[1978]); Silverblatt 1987; Wernke 2013), is commonly used as a model for understanding many Andean communities through time. As reviewed in Chapter 2, historic and modern *ayllus* are landholding collectives that identify as kin and recognize a common human or non-human ancestor. In light of the data from Hualcayán, it is clear that many of the organizational concepts of the *ayllu*—namely collective landholdings and common ancestors—have deep roots in the Andes that manifested in different ways through time. George Lau (2010) has considered the similarities between the historic *ayllu* of highland

Ancash and Recuay social organization. Both were often segmented into several groups and displayed a belief in ancestors, as evidenced by feasting with effigies of persons (and later, with the deceased in *chullpa*). It is possible that many of the formative characteristics of the *ayllu* emerged during the Early Intermediate Period—an idea proposed by Bill Isbell (1997). The dramatic innovations in food production, building forms, and ritual practice identified at Hualcayán make this an interesting possibility. For example, feasting with ancestor effigies *in the fields* aligns with the overarching organizational foundations of an *ayllu*: segmented social organization, shared kin-group landholdings, and collective labor responsibilities to cultivate the land.

Moreover, although there is evidence for segmented social organization at Recuay sites, key characteristics of historic *ayllu*, such as dual organization into paired moieties, are not clearly borne out in the current data at Hualcayán or in other Recuay communities. For example, the current data from north of the Perolcoto mound suggest multiple landholding collectives—at least four—were involved in agriculture and ancestor veneration practices. At Yayno, a large Recuay settlement located on the opposite side of the Cordillera Blanca from Hualcayán, there are multiple—nearly fifty—residential units that likely organized as house societies, though square and circular forms may indicate broader kin groups (Lau 2010, 2011). Nonetheless, there is some evidence for dual spatial forms built during the Recuay period, such as in the Hilltop Residential Area at Hualcayán, which was built across two smaller partially modified and terraced hillocks (**Figure 8.2** and **Figure 8.3**). Moreover, canal water flowed from the mountainside canal through and

dividing the northern and southern sub-sectors. ¹³ Surface structures also suggest distinct activities. The northern hillock is composed of three agglutinated residential clusters, and the southern area had mixed mortuary and civic-ceremonial spaces with some households, suggesting the two hillocks may reflect distinct areas of practice and/or dual social entities ¹⁴. Future research will clarify the organization principles in the residential areas. These areas, and the ritual-storage compounds, clearly connote segmentary organization, even if dual social organization must be more carefully considered, and should not be expected to appear wholesale with other *ayllu*-specific traits such as ancestor veneration and collective landholdings.



Figure 8.2 The Hilltop Residential Area (Sector B), viewed from Sector C and facing west, showing the northern (right) and southern (left) terraced hillocks.

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¹³ Additional excavations would clarify the construction history and function of the southern area, which may have originally had more households in Recuay times but was rebuilt in later periods to include the open spaces now visible on the surface.

 $^{^{14}}$ Although two Recuay-era platforms were built on top of the Perocloto mound, they were built over existing dual platforms.



Figure 8.3 Sector B facing south, showing the southern hillock (background) as viewed from the northern hillock (foreground). The hillocks are terraced, but natural boulder clusters on top of some areas suggests the hillocks are partially natural. Note that a modern bulldozer cleared much of the standing architecture between the hillocks in order to construct the modern reservoir.

But why, for example, do we see dual mound forms appear early in the history of Andean complexity and what significance do they have? Dual forms are usually understood in terms of two equal or ranked sociopolitical units (i.e. *hanan-hurin*), or embodiments of opposing but complimentary forces, such as the two arms of coastal U-shaped temples, the paired chambers at Mito-Kotosh, or the pair of crossed hands at Kotosh (Burger 1992:132–133; Dillehay and Netherly 1986; Isbell 1976). There is this intriguing pattern, but it is tenuous to attribute them to *ayllu* or symbolic organization. Data from the Perolcoto mound suggests the dual spaces of the Chavín era reveal distinct kinds of practice. That is, rather than representing discrete socio-political units, the dual spaces manifested two kinds of authority: one based in a community-wide, or collectively shared ethos and experience (Northeast Platform Area), and the other based in priestly actions and their connections to an esoteric world (Southwest Platform Area). The communal spaces of the

Northwest Platform Area were informal, cyclically rebuilt, and included the remains of children. These constructions indicate shared experiences, and perhaps, collective rites of renewal. Conversely, the platform on the Southwest Platform Area was restricted and fixed, being largely unchanged for nearly seven hundred years aside from a few modifications to structures surrounding the platform (see chapters 5 and 7). This contrast between an informal, unrestricted, and constantly changing space, and a formal, restricted, and largely unchanging restricted space perhaps reflects the recognized importance of both: (1) the common goals of collective action and community regeneration, and, (2) the need for religious authorities (or the deities they represented) to mediate the environmental and supernatural forces that affected the community. 15

However, this division in space and practice on the mound does not necessarily suggest a class distinction or a dual *ayllu* organization. Practices in these two areas of the mound likely occurred at distinct moments, and had complementary purposes. It is possible that these distinct spaces and rituals may be related to dual-faith practices, which are characterized by the coexistence of two systems of belief and practice and are common in situations of religious conversion (e.g., Drew 2011). Nonetheless, tensions between these dual practices were likely growing during the Chavín era, for the cyclical building activities in the Northeast area were abruptly ended with the construction of a platform complex that covered these spaces with formal floors and rooms. This suggests a successful effort, perhaps by Chavín-affiliated authorities, to unify practices on the mound. And yet, these changes were reversed soon after the end of Chavín during the Huarás phase when the

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¹⁵ This kind of dual community authority was likely an alternative to other manifestations of dual social organization and representations of opposing but complementary forces in the Formative Andes (see Netherly and Dillehay 1986).

Northeast Platform was dismantled and the area was returned to a communal space for building and feasting. Overall the data changes in community integration and architectural organization, which at times existed in balance with and at other times was at odds with the dominant religious authorities and practices of the Late Formative Period. This case shows tension, and some degree of push and pull, between different spaces and their attendants, illustrating the countervailing tendencies of conflict and cooperation that are often built into a dualistic social structure.

Results of the Hualcayán study also stress the importance of conducting detailed food analyses when seeking to understand the processes of community formation. This is largely because food production activities are a form of coordinated social labor, and hence, an understanding of food production yields insights into changes in social organization. The botanical results from Hualcayán suggest the heightened investment in and diversification of the agrarian landscape in the Recuay era, as well as new ritual practices and forms of community organization that were linked to agriculture. These data shift our understanding of how Recuay communities were organized and what they valued. Prior evidence had been primarily based in ceramic and faunal analyses, which suggested the Recuay most highly prized the production and consumption of camelid meat, and that maize was grown primarily for feasting and chicha. The botanical data from Hualcayán have thus broadened our understanding of what it meant to be a Recuay community. Each corporate group within the broader community probably was assembled through distinct labor and ritual practices and food preferences that established and communicated their autonomy and source of authority.

More broadly, the study's approach and results, which revealed the ongoing process of community transformation, suggests the importance of multi-scalar archaeological analysis, which (1) investigates archaeological sites with long-term occupations, (2) focuses on transitional phases, and (3) documents modifications to space and practice in order to examine small-scale as well as large-scale shifts in community organization.

First, sites with long-term occupations like Hualcayán are valuable for linking together regional data from sites occupied for shorter periods of time. This is not to suggest that shorter occupation sites are less valuable—in fact, the creation and abandonment of places through time suggests ruptures in local and regional politics and/or environmental changes that need to be explored. But it is nonetheless important to understand how a particular group of people dealt with or produced these changes to recreate their communities over the long term as they negotiated their connections to a specific place and one another, such as at Hualcayán across the Chavín to Recuay transition. Micro-regional studies like valley surveys can also get at these processes, but more assumptions must be made in order to trace a community's transformation as they resettled in new locations. These approaches are better for assessing regional patterns in community organization than the process of community transformation during these periods of change.

Second, the data from Hualcayán reveal the importance of studies on transitional "cultures" or societies like Huarás. Though Huarás contexts have commonly appeared during excavations of Chavín or Recuay settlements, they are not usually the primary focus of study. Scholarship has first sought to unravel the fluorescence and inner workings of Chavín and Recuay. Now that our understanding of these regional cultures has matured, it is an exceptional time to further investigate Huarás—which persisted for five or six

hundred years—about as long as Chavín and Recuay. While such periods of transition are often cast as unstructured epochs, material culture and settlement patterns indicate social innovations and networks. For example, evidence of ceramic standardization across highland Ancash suggests a high-degree of social, religious, or political integration and a shared regional identity. Further investigations are necessary to understand how these regional networks may have caused the demise of Chavín.

Finally, the study at Hualcayán reveals how communities are shifting and internally diverse assemblages of people, things, and places. As such, a focus on particular practices and events demonstrates how communities change even during periods of relative stability, such as during the long period in which the Hualcayán community practiced the Mito-Kotosh tradition¹⁶. These practices and events reveal the ongoing negotiation and transformation of community practices and social organization. Close attention to these small-scale changes thus eschews the tendency to characterize an ancient community in terms of long periods of "stasis" that are punctuated by periods of change. Such viewpoints perpetuate an older Durkheimian and Boasian view that traditions and communities are relatively static entities that change only relative to external influence or rare internal innovations. Rather, we might see a community as a claim that people stake at particular moments and during specific events—they build and reify their community when they raze the structures of a long-recognized temple or when they participate in labor to dig and clean a canal. These moments require a degree of coordination and negotiation. Conflict coincides with cooperation as boundaries and connections are established. In these

¹⁶ Constructions PC-I.

moments, a community, which is a specific assemblage of people and things connected through practice, is born and solidified.

Andean Traditions in Anthropological Perspective

The evidence for architectural modifications from Perolcoto mound shed new light on what might be called "traditions" in the Andes. Research on the Andean Formative Period in particular has long focused on the emergence of regional "religious traditions" to explain the rise of complex societies (e.g., Bonnier 1997; Burger 1992, 2008). The majority of scholarship has concentrated on defining the monumental spaces and theatrical rites of Mito, Kotosh, and Chavín. This regional approach can obscure how and why local people developed, altered, and replaced particular ritual practices and spaces. At Hualcayán, much of the Formative Period data attest to the contestation and transformation of ritual space, even during the periods dominated by Mito-Kotosh and Chavín. Such examples indicate that scholars of the ancient Andes might look beyond the horizons and the regional traditions that have long dominated the literature, to understand the local politics and processes that defined "religious traditions" within particular communities. Such an approach can provide needed comparative information into how and why such traditions are accepted, transformed, and rejected. (DiPaolo Loren 2001; Pauketat 2001). To state this another way, archaeological traditions often serve to only bracket, rather than underscore, the incremental events that move history forward as new practices are negotiated against existing norms (Matthews 2002, DiPaolo Loren 2001). Traditions are constructed in local and inter-community interactions (Dillehay 2007; Mills 2015; Roddick and Stahl 2015; Wenger 1998).

Social interactions in a community are framed by people's expectations for correct behavior, but they are also both shaped and constrained by materials, such as landscape features, spaces, and objects. It follows then, that in order to understand how both communities are constituted we might examine tradition as a local process through which people seek to rearticulate these key relationships between people, land, and things. An archaeological focus on community, then, cannot declare that all changes in material assemblages are necessarily changes in community. Such a perspective would render meaningless the term "community", expanding it to mean all social relationships and interactions. Hence, it is important to concentrate on those events and processes wherein people seek to change the materials that constrain or shape their social life (what might be called "tradition") in an effort to constitute a new assemblage of people, places, and materials (what might be called "community"). This perspective requires us to examine how people do not simply selectively choose and manipulate the particular tenets of a regional tradition that they adopt from elsewhere, but how they produce regional traditions by building them in particular places.

In the study of community formation at Hualcayán, I have explored traditions less as regional phenomena of shared beliefs and repeated practices, and more as a negotiated process that was essential to how people forged a community. I focused on the practices—ritual, food production, and construction. In particular, I revealed how these practices built social spaces such as the Perolcoto mound, which was transformed through the "bundling" (Keane 2005; Pauketat 2013; Swenson 2015; *inter alia*; see chapter 2) of stones, clays, foods, and human bodies. These architectural modifications not only reshaped space, but also brought together people and materials in new arrangements and combinations. Such

practices might be called the affirmation of community structure, and they stand in stark contrast to the kind of invention of community structure that occurs in the Recuay period.

Enacted on Perolcoto, these practices of rebuilding would have provided a powerful and emotional venue for affirming the community (Bell 1992; Dillehay 2007; Hodder 2010; Keane 2010; Pauketat 2013; Swenson 2015). They evoked a shared, valued past linked to the social and physical spaces of the mound. In contrast, during the later Recuay period, people defined a new community by declaring and grounding their relationships to the world around them. In building terraces and feasting in compounds, they recognized and brought together particular social relationships between people, animals, plants, mountains, water, and the dead.

In this way, an understanding of communities as more-than-human assemblages brings greater clarity to what we might call traditions. At Hualcayán, past structures were key to present practices. Chavín era performances literally built upon and stood atop earlier spaces for community gathering. Recuay agricultural ritual was significant to the people at Hualcayán precisely because it contrasted the centrality of the long-occupied mound. These past structures and objects were not just a passive "tradition" that anchored the community. Rather they were points of reference that continued to play parts in how the community was constituted and realized. The study at Hualcayán has highlighted how diverse economic and ritual labor assembled people and structures in ways that contrasted the present in relation to past structures, even though these relations were always "becoming" (Harris 2014:90). Each new child burial and floor laid in the Northeast Platform Area or each feast performed in Recuay compounds may have cited (Butler 1993; Jones 2007; Lucas 2012) previous practices and places. But also, relatedly, the death of

these children and the feasts that produced harvests would have been different experiences undergirded distinct kinds of social interactions or ideas of community (Fowler 2017). We cannot simply reduce these different interactions to a simple definition of "Andean community" or "peasant social structure," and to do so is to do violence to history. In different ways, these practices evoked the past of the site while also reassembling the social world for the people of Hualcayán.

Future Directions

With its long-term occupation, Hualcayán provides many potential avenues for future research. Some of these research endeavors will clarify and expand the results from the present study, while others extend it in new directions.

First, future research will more closely examine Hualcayán's Hilltop Residential Area (Sector B) to reconstruct household practices during the Recuay Period to compare with the practices documented in the compounds. It is possible, for example, that the foods and rituals recorded in the compounds differed greatly from everyday foodways, and such a finding would shed further light on the degree to which economic and ritual activity were integrated at the site. For instance, if household assemblages and foods are markedly different than those found in the compounds, this might suggest that ritual practices were most sharply focused on food production in the fields, rather than the social reproduction practices that characterize households. Excavations would also document and compare Formative Period households to Recuay era houses, in order to reconstruct long-term community transformations through the lens of domestic practice.

Another direction of future research is to look into the ritual origins of Andean complex communities in highland Ancash during the Initial Formative Period (Late Preceramic). This work continues excavations in the lowest levels of the Perolcoto mound where we found the remains of a Mito-Kotosh temple, as well as in the sunken plaza, where we discovered the earliest evidence for maize processing in highland Ancash. In seeking to decipher the roots of religion, plant cultivation, and community, the project builds on the current study by seeking to understand how religion is constructed relative to particular historical events and long-term processes. Moreover, it combines botanical analyses in these early temple spaces with lake-core analyses from a nearby lagoon to compare food production at Hualcayán with evidence for regional patterns in the northern Callejón de Huaylas Valley.

A final avenue of future research will focus on the circulation of people and materials between neighboring and distant communities during the Early Intermediate Period through (1) systematic survey within the region, (2) excavations at the site of Pariamarca, a massive Recuay ritual center and fortress located nine kilometers from Hualcayán, and (3) archaeometric analyses of materials from Hualcayán, Pariamarca. The project will seek to document networks of production, exchange, and interaction. This research addresses the question of how to define Recuay on both a local and a regional scale. George Lau has cogently suggested Recuay can be best described as a "commonwealth" of people and communities with shared interests and values, perhaps a kind of "imagined community." But what kinds of practices and materials established these shared interests across a broader social field, and how did these articulate with the local practices of community formation and social distinction that defined groups at places like

Hualcayán? How did notions of community intersect with regional identities? The proposed studies of regional patterns of production, exchange, and interaction will seek to answer these questions.

Appendix A

Radiocarbon Dates (AMS)

Table A.1 AMS Radiocarbon dates from Hualcayán. All samples charcoal and analyzed by Direct AMS in Bothell, WA. Calibration completed through $0xCal\ 4.2.4$, using calibration IntCal09 (Bronk Ramsey 2013). See Rodriguez Kembel and Hass (2013) and Rick et al. (2009) for a discussion of why this Northern Hemisphere calibration curve is more accurate than using a Southern Hemisphere calibration curve. 1σ cal dates are used in this study, but 2σ cal dates are also provided.

| | | | | | Cal09 .4%) | IntCal09 | (68.2%) | |
|--------------|--------------|-------|------------------|-------------|---------------|-------------|---------|--------|
| | | | | 1σ cal date | | 2σ cal date | | |
| Lab number | Sample | δ13C | 14C age BP | from | to | from | to | |
| D-AMS 008217 | HU01-ETA-1 | -24.9 | 1513±21 | 441 | 607 | 541 | 590 | |
| D-AMS 015766 | HU01-NPC-3 | -3.6 | 1565±37 | 415 | 574 | 434 | 540 | |
| D-AMS 015764 | HU01-NEPC-1 | -13.7 | 1589±39 | 395 | 560 | 426 | 534 | |
| D-AMS 008218 | HU01-NPC-2 | -17.6 | 1654±23 | 264 | 504 | 356 | 424 | |
| D-AMS 015767 | HU01-NPC-1 | -5.9 | 1697±35 | 255 | 416 | 261 | 401 | AD |
| D-AMS 008211 | HU01-NEPA-7 | -18.3 | 2112±25 | -200 | -52 | -179 | -95 | BC |
| D-AMS 015761 | HU01-NEPA-6 | -5.6 | 2127±38 | -353 | -46 | -203 | -61 | |
| D-AMS 015754 | HU01NEPA-5 | -13.5 | 2447±37 | -754 | -408 | -742 | -414 | |
| D-AMS 015757 | HU01-SWPA-10 | -18.8 | 2485±35 | -773 | -417 | -761 | -540 | |
| D-AMS 008214 | HU01-SWPA-9 | -21.9 | 2510±24 | -786 | -540 | -767 | -560 | |
| D-AMS 015769 | HU01-SWPA-8 | -12.5 | 2530±36 | -798 | -539 | -789 | -566 | |
| D-AMS 015759 | HU01-SWPA-7 | -11.7 | 2539±39 | -801 | -539 | -794 | -568 | |
| D-AMS 015763 | HU01-NEPA-4 | -15.2 | 2550±41 | -806 | -540 | -798 | -592 | |
| D-AMS 015762 | HU01-NEPA-3 | -8.1 | 2566±38 | -811 | -546 | -804 | -597 | |
| D-AMS 008212 | HU01-NEPA-2 | -17.4 | 2567±24 | -806 | -594 | -797 | -767 | |
| D-AMS 015765 | HU01-SWPA-6 | -13.1 | 2571±40 | -815 | -546 | -806 | -597 | |
| D-AMS 015758 | HU01-SWPA-5 | -9.8 | 2615±40 | -896 | -596 | -818 | -776 | |
| D-AMS 015756 | HU01-SWPA-4 | -13.3 | 2990±38 | -1385 | -1093 | -1301 | -1132 | |
| D-AMS 008213 | HU01-SWPA-3 | -19.8 | 3078±21 | -1415 | -1295 | -1401 | -1316 | |
| D-AMS 008215 | HU01-SWPA-2 | -16.7 | 3291 <u>±</u> 24 | -1624 | -1505 | -1608 | -1529 | |
| D-AMS 015760 | HU01-NEPA-1 | -25.0 | 3611±86 | -2205 | -1741 | -2134 | -1832 | error* |
| D-AMS 015768 | HU01-SWPA-1 | -12.2 | 3649±38 | -2138 | -1922 | -2121 | -1954 | |
| D-AMS 008216 | HU01-Op5-1 | -16.7 | 3887±23 | -2464 | -2297 | -2457 | -2344 | |

^{*} Lab error due to poor quality/small sample: "proceed with caution"

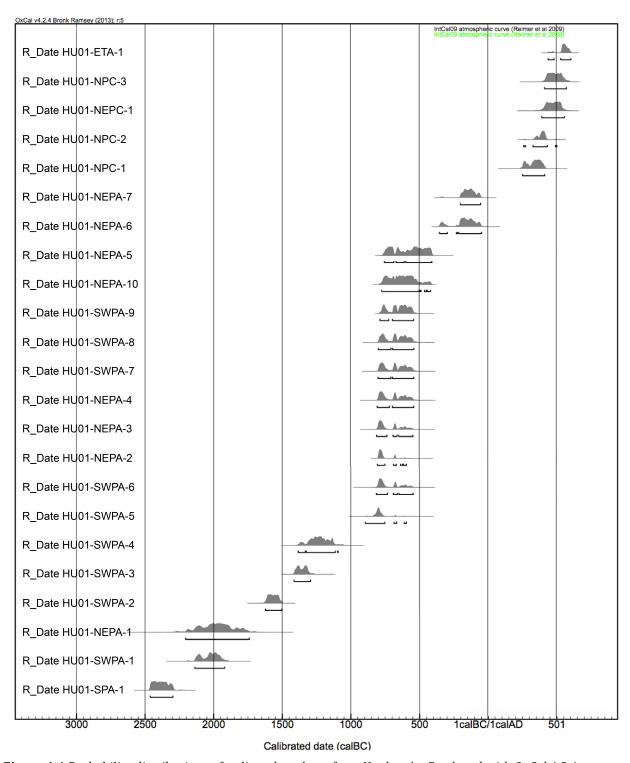


Figure A.1 Probability distributions of radiocarbon dates from Hualcayán. Produced with OxCal 4.2.4.

Appendix B

Sites Surveyed

Table B.1 List of sites surveyed and their estimated periods of occupation based on surface features and material scatters. Codes assigned during survey. Names of sites are included if one was provided by local residents. Data are modified from Rivas Otaíza and Bria 2010.

| | | Period of Occupation | | | | | | | | | |
|------|--------------|----------------------|------------------|-------------------|-----------------|-----------------|--------------|--|--|--|--|
| | Name | Forma- tive | Early Interm. | Middle Horizon | Late Interm. | Late Horizon | Un- known | | | | |
| Site | Caserón | | X | | | | | | | | |
| AC02 | | | X | | | | | | | | |
| AC03 | Rico Punta | | | | | | X | | | | |
| AC04 | | | | | | | X | | | | |
| AC05 | Patrón Pampa | | Х | | | | | | | | |
| AC06 | | | | | | | X | | | | |
| AC07 | | | | | | | X | | | | |
| AC08 | | | | | X | | | | | | |
| AU01 | Aukispukio | | X | X | | | | | | | |
| HY01 | Chupacoto | X | X | | | | | | | | |
| HY02 | | | X | | | | | | | | |
| HY03 | Cashacoto | | X | | | | | | | | |
| HY04 | Parian Punta | | X | X | | | | | | | |
| HU01 | Hualcayán | X | X | X | X | | | | | | |
| HU02 | Cruz Punta | | | | | | X | | | | |
| HU03 | Ragapunta | | | | | | | | | | |
| HU04 | Ramrash | | | | | | | | | | |
| SC01 | Wayumarca | | X | | | | | | | | |
| SC02 | | | | | | | X | | | | |
| SC03 | Katiamá | | X | X | | | | | | | |
| SC04 | Campanacoto | | | | X | | | | | | |
| SC05 | Pariamarca | X | X | X | X | X | | | | | |
| SC06 | | | X | | | | | | | | |
| SC07 | | | | X | Х | | | | | | |
| SC08 | | | | | | | Х | | | | |
| SC09 | | | | | | _ | Х | | | | |
| PC01 | Ushnucorral | | | X | X | _ | _ | | | | |
| PC02 | | | | | | | X | | | | |
| PC03 | | | | X | X | | | | | | |
| PC04 | Wancotay | | X | X | X | | | | | | |
| | | X = Pro | bable Desigi | nation x = P | ossible Desig | nation or Un | known | | | | |

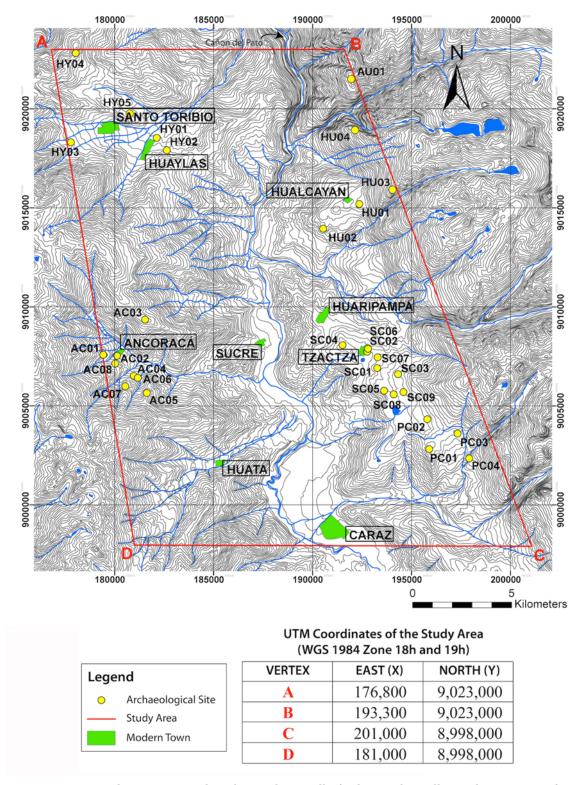


Figure B.1 Study area centered on the northern Callejón de Huaylas Valley in the Province of Huaylas. Sites surveyed are indicated in yellow. Survey was opportunistic and not systematic or full-coverage.

CODE AND NAME OF SITE: AC01 "Caserón"

GENERAL LOCATION: District of Mato, West of Ancoracá

UTM COORDINATES: E: 179422 / N: 9007587

MASL1: 3450 - 3550

STATE OF CONSERVATION: VERY POOR

DESCRIPTION:

ACO1 is located on a narrow spur between the gorges Mare Tullma and Paccho Uran, west of the modern town of Ancoracá. It is in relatively poor condition due to the activities of modern agriculture as well as vegetation growth. Stone-faced terraces are the most visible features at the site. Of the existing standing architecture, enclosures range between two to five meters in diameter. Near the site's uppermost extent is a raised feature that may be covered with an eroded artificial platform. Ceramic materials included kaolin wares, suggesting occupation during the Early Intermediate Period. The site likely extends higher than documented but could not be reached due to time.

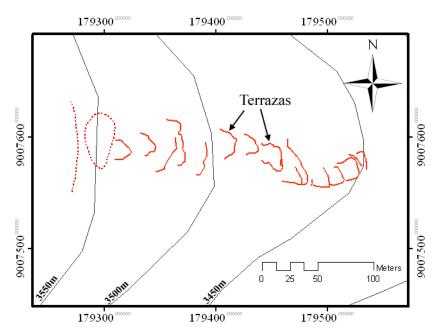


Figure B.2 GPS recording of ridge top terraces at AC01.

-

¹ Meters above sea level.

CODE AND NAME OF SITE: AC02"

GENERAL LOCATION: Dist. Mato, Acoracá UTM COORDINATES: E: 180121 / N: 9007534

MASL: 3252

STATE OF CONSERVATION: Destroyed

DESCRIPTION:

This site is destroyed; the area is now part of a modern house and patio.

There are only a few lines of stone indicating ancient structures that once stood here, as well as accounts by the home's owner for what was there before construction began. Landowners found ceramic fragments and a complete stone sculpture by the house's inhabitants, which were shown to us during survey. These materials indicate an occupation during the Early Intermediate Period. They include Recuay-style ceramic cone handles and a complete Recuay-style sculpture, perhaps an ancestor idol, representing a naked seated male who is shown chewing coca and either carrying something on his back or with a deformed spine (Figure B.3).



Figure B.3 A Recuay-style stone sculpture found by the landowners, which shows a seated man chewing coca.

CODE AND NAME OF SITE: ACO3 "Rico Punta"

GENERAL LOCATION: Dist. Mato, North of Ancoracá

UTM COORDINATES: E: 181531 / N: 9009363

MASL: 4014

STATE OF CONSERVATION: Regular

DESCRIPTION:

This site is located on the highest point of a mountain crest at the extreme north of the modern town of Ancoracá. The site consists of a complex of terraces and rectangular rooms surrounding two circular platforms. The platforms have diameters of 7 m (eastern platform) and 10 m (western platform) (Figure B.4). The architecture is surrounded by a perimeter wall that is open towards the east (a \sim 25 m opening). Curiously, there were no surface artifacts at the site. Its layout with two platforms strongly suggests a ceremonial function.



Figure B.4 AC03, Western platform and terraces. View facing southeast.

CODE AND NAME OF SITE: AC04

GENERAL LOCATION: Dist. Mato, South of Ancoracá

UTM COORDINATES: E: 180968 / N: 9006522

MASL: 3212 - 3291

STATE OF CONSERVATION: Poor

DESCRIPTION:

This site is located on a narrow ridge and extends approximately 1.5 ha. It is characterized primarily by terraces, though more structures were once present according to local informants. Several looter's pits were visible, ranging from 2 to 5 m diameter and up to a depth of 5 m. One preserved feature is a small platform (2m \times 3m) with a staircace (Figure B.5).



Figure B.5 ACO4, detail of platform and stairway. Facing south.

CODE AND NAME OF SITE: AC05 "Patrón Pampa"

GENERAL LOCATION: Dist. Mato, Southeast of Ancoracá, Southwest of Sucre

UTM COORDINATES: E: 181621 / N: 9005657

MASL: 3350-3693

STATE OF CONSERVATION: Poor

DESCRIPTION:

Patrón Pampa (AC05) is a poorly preserved, large and steep ridgetop settlement covering approximately 8 ha. It is located north of the Quebrada

Huarhuash. It is currently used for grazing animals, which has contributed to its destruction. The site was separated into two Sectors, A and B, connected by a stone pathway, which runs along the top of the ridge (Figure B.6). Material remains were few, making it difficult to assign a period of occupation. Along the pathway connecting Sectors A and B are three deep vertical pits (~3 meters deep), parts of which were stone-lined, suggesting subterranean tomb chambers.

Sector A (E: 181520 / N: 9005390) is located in the southern section of the ride. There were various agglutinated rectangular rooms built on terraces. Several grinding stones were visible on the surface, suggesting habitation activities.

Sector B (E: 181703 / N: 9005966) is located towards the north end of the ridge, and below Sector A. Sector B also has various habitation structures.



Figure B.6 AC05, se indica los sectores A y B. Vista Sureste.

CODE AND NAME OF SITE: AC06

GENERAL LOCATION: Dist. Mato, Southeast of Ancoracá

UTM COORDINATES: E: 181172 / N: 9006420

MASL: 3136

STATE OF CONSERVATION: Poor

DESCRIPTION:

AC06 is located near the lowest point within a quebrada. It has walls and rooms that are very destroyed. It was difficult to see many features at the site due to the heavy vegetation, which also made it impossible to detect the site's extent.

CODE AND NAME OF SITE: AC07

GENERAL LOCATION: Dist. Mato, Southeast of Ancoracá

UTM COORDINATES: E: 180539 / N: 9005992

MASL: 3487

STATE OF CONSERVATION: Very Poor

DESCRIPTION:

This is a very small and destroyed site that consisted of terraces on top of a ridge (Figure B.7).



Figure B.7 AC07, facing south.

CODE AND NAME OF SITE: AC08

GENERAL LOCATION: Dist. Mato, South of Ancoracá UTM COORDINATES: E: 180026 / N: 9007139

MASL: 3361

STATE OF CONSERVATION: Very Poor

DESCRIPTION:

This site is characterized by partially destroyed *chullpa* mortuary structures built on a terraced hillside (Figure B.8). Many of the chullpa were used as corrals, and others were collapsed. Ceramics include *Akillpo* incised and stamped ceramics with a coastal Casma influence, which likely date to the Late Intermediate Period.



Figure B.8 AC08, vista de terrazas y chullpas reutilizadas (izquierda). Vista este.

CODE AND NAME OF SITE: HY01 "Chupacoto"

GENERAL LOCATION: Dist. Huaylas, Town of Huaylas

UTM COORDINATES: E: 182126 / N: 9018537

MASL: 2724

STATE OF CONSERVATION: Regular to Poor

DESCRIPTION:

Sector A includes a prominent stepped platform mound, measuring 370 x 150 m around its base. Rocky outcrops on the northern side suggest the mound takes advantage of a natural rise in the topography. Much of the mound's surface architecture has been destroyed by modern houses built decades ago. The mound has an axis of 58° west and is divided into two parts, "Chupagrande" y "Chupachico," which are formed by two elevated platforms at either end of the mound structure.

Chupagrande (Figure B.9) is the largest of the two mounds, which an approximate height of 10-15 meters. Fine stonework is common, including large cut stones that may have served as lintels or entryways (Figure B.10). Chupachico is located approximately 200 m to the northeast of Chupagrande and is significantly lower in height, perhaps 5-8 m high.

Ceramics from Sector A included incised and painted ceramics dating to the Formative, including Janabarriu and Huarás styles, as well as finely-painted tricolor Recuay kaolin wares. Stone sculptures depicting decapitated heads, which were documented by Thompson decades ago (1962), are still on display in the District of Huaylas's municipal building. These show a strong connection to the Sechín style of the Casma Valley (Figure B.11). Other sculptures o display clearly pertain to the Recuay, and are tenon heads featuring felines. An additional tenon head likely pertains to the Late Formative Period. These remains, the latter of which are purported to come from Chupacoto, suggest a continuous use of the mound from at

least as early as the Early/Middle Formative Period through the Early Intermediate Period.

Sector B (E: 182058.284 / N: 9018192.521) is located directly south of Sector A and is known by the name "Tokash." Sector B is currently used for agriculture and is a flat open field, perhaps an ancient plaza, and adjacent terraces.



Figure B.9 HY01A, Chupacoto. Photo (facing northeast) shows the largest segment of the mound, called "Chupagrande".



Figure B.10 Example of fine stonework near the mound at Chupacoto.



Figure B.11 Photograph of stone sculpture housed in the municipality of the District of Huaylas. Sculture includes a Recuay-style feline tenon head (left) and two stones, perhaps building facades, featuring grimacing decapitated heads. The style of the latter pieces pertain to Sechín in the Casma valley (center and right).

CODE AND NAME OF SITE: HY02 GENERAL LOCATION: Dist. Huaylas

UTM COORDINATES: E: 182633 / N: 9017914

MASL: 2793

STATE OF CONSERVATION: Regular

DESCRIPTION:

This is a large *chullpa* funerary structure built on top of a platform. The chamber has three looted chambers (A, B, and C), each with an access facing north, but without accesses connecting the chambers directly (Figure B.12). Based on Construction seams, Chambers A and B appear to constitute the original construction, while Chamber C was added at a later date.

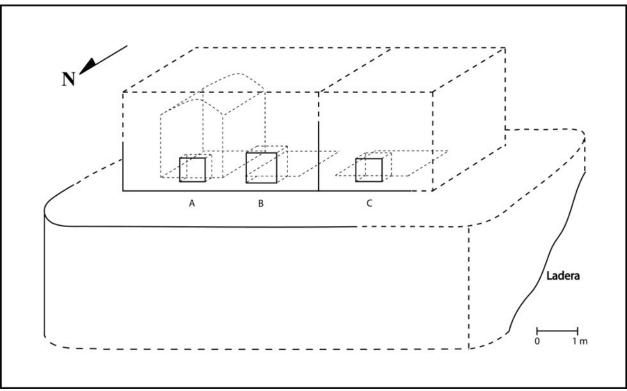


Figure B.12 Reconstruction of HY01 chullpa, Tomb T1. An example of the general form of the chambers' interiors is indicated in the leftmost chamber.

CODE AND NAME OF SITE: HY03 "Cashacoto" GENERAL LOCATION: Dist. Santa Toribio UTM COORDINATES: E: 177790 / N: 9018318

MASL: 3150

STATE OF CONSERVATION: Regular to Poor

DESCRIPTION:

Cashacoto is a mortuary and habitation site with two sectors, A and B. Sector A has two chullpa (though more likely exist) as well as structures that may have served as households. One of these chullpa has a unique form, and is made by stacking large cut stones in a pyramid-like form. Sector B is a terraced ridge top with structures and flat spaces, across an area of 7.5 ha (Figure B.13). *Wanka-pachilla* masonry suggests the site pertains to the Early Intermediate Period (Recuay).



Figure B.13 Site HY03, Cashacoto, Sector B, facing east.

CODE AND NAME OF SITE: HY04 "Parian Punta"

GENERAL LOCATION: Dist. Santo Toribio

UTM COORDINATES: E: 178037 / N: 9022821

MASL: 3565

STATE OF CONSERVATION: Regular

DESCRIPTION:

Parian Punta is a very large site, covering an area of about 100 ha. The site is distributed across three hilltops, defining three Sectors, A, B, and C (Figure B.14). The site has notable *wanka-pachilla* masonry and kaolin ceramics, indicating it is affiliated with the Recuay, though some chullpa, which are found across the site, may date to the Middle Horizon.

Sectors A and B are both topped with platforms. In Sector A, the uppermost platform is 40 m at its longest dimension. On the hillside, a platform façade has impressive *wanka-pachilla* masonry into which at least four niches were built.

Despite the number of niches, the local name for this wall is "Tres Ventanas" (Figure B.14). Sector B is similar to and seemingly paired with Sector A, with an upper platform measuring 33 meters at its longest dimension. Below the Sector B hilltop is a long wall with numerous trapezoidal observation windows, spaced approximately 7-10 m apart. The windows are .70 m tall and between .35 and .50 m wide at the top. It is possible this was an Inka defensive feature, for each window extends over a cliff. Finally, Sector C, also known as "Lic Lic Pampa," is characterized by a large chullpa on the summit of its hilltop.



Figure B.14 HY04, Parian Punta, showing the location of Sectors A and B, facing east.



Figure B.15 Platform wall with niches in Sector A referred to as "Tres Ventanas."

CODE AND NAME OF SITE: HU01 "Hualcayan"

GENERAL LOCATION: Dist. Santa Cruz

UTM COORDINATES: E: 192358 / N: 9015200

MASL: 2700-3800

STATE OF CONSERVATION: Regular to Poor

DESCRIPTION:

Hualcayán is described and studied at length in this dissertation. The core of the site in Sectors A and B is shown in Figure B.16. M1–M4 indicate major artificial platforms at the site; the Perolcoto mound is indicated by M1 (Figure B.16).

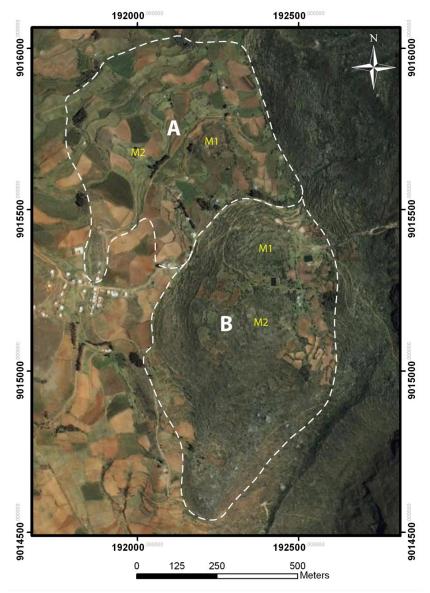


Figure B.16 HU01 Hualcayán, satellite image from Google Earth. Sectors A and B are outlined in white.

CODE AND NAME OF SITE: HU02 "Cruz Punta"

GENERAL LOCATION: Dist. Santa Cruz

UTM COORDINATES: E: 190534 / N: 9013954

MASL: 2965

STATE OF CONSERVATION: Regular

DESCRIPTION:

Cruz Punta is a hilltop site characterized by rooms on all sides and a poorly preserved plaza feature on its northeast side (Figure B.17). The site is approximately 2 ha and overlooks the base of the Callejón de Huaylas valley below. It can also see Hualcayán from its peak. A metal trumpet was found on the surface of the site, along with Akillpo ceramics, indicating Cruz Punta may have served as a Late Intermediate Period lookout, making communication or warning calls through sound.



Figure B.17 HU02, Cruz Punta, facing west.

CODE AND NAME OF SITE: SC01 "Wayumarca"

GENERAL LOCATION: Dist. Santa Cruz, Comunidad de Tzactza

UTM COORDINATES: E: 193259 / N: 9006910

MASL: 3239

STATE OF CONSERVATION: Poor

DESCRIPTION:

Wayumarka is a hilltop site, overwhich an artificial platform has been built.

On the eastern extent of the long platform there is a higher, smaller platform that creates a mound-like shape. Farther east is a now destroyed chullpa. Numerous ceramics associated with the Early Intermediate Period were recovered.



Figure B.18 SC01, facing south.

CODE AND NAME OF SITE: SC02

GENERAL LOCATION: Dist. Santa Cruz, Comunidad Tzactza

UTM COORDINATES: E: 192761 / N: 9007741

MASL: 3099

STATE OF CONSERVATION: Regular

DESCRIPTION:

This is a unique site, made up of large, semi-shaped and natural boulders around which a circular structure is built (Figure B.19). The two largest boulders

measure approximately $5.5 \times 2.5 \text{ m}$ and $3 \times 1.5 \text{ m}$, respectively. These are likely huancas stones, around which offerings were often made (Bazán 2007).



Figure B.19 SC02, Facing northeast.

CODE AND NAME OF SITE: SC03 "Cementario Katiamá" GENERAL LOCATION: Dist. Santa Cruz, Community of Tzactza

UTM COORDINATES: E: 194311 / N: 9006605

MASL: 3400

STATE OF CONSERVATION: Regular to Poor

DESCRIPTION:

Cemetery with two sectors: Sector A, a large, well-known large *chullpa*, known as "Katiamá" and Sector B, which is made up of various *machay* tombs under boulders. Katiamá was previously documented by Zacky (1978 and 1987) but with

few details. We recorded two floors and 11 or 12 chambers in the "mega-chullpa," which was built over a large platform measuring 34 x24 m. It had three feline tenon heads on either side of the *chullpa*, which were removed in previous decades.



Figure B.20 SC03 Sector A, Katiamá *chullpa*, facing north.

CODE AND NAME OF SITE: SC04 "Campanacoto"

GENERAL LOCATION: Dist. Santa Cruz, Community of Tzactza

UTM COORDINATES: E: 191513 / N: 9008074

MASL: 3193

STATE OF CONSERVATION: Regular to Poor

DESCRIPTION:

This habitation site is located on a sloping hilltop. A modern tower has destroyed the central sector, which is purported to have been a colonial church. Domestic ceramics and numerous grinding stones cover the site, as well as some ceramics that appear to be roof tiles—further suggesting an early Colonial occupation.



Figure B.21 SC04, Vista noroeste.

CODE AND NAME OF SITE: SC05 "Pariamarca"

GENERAL LOCATION: Dist. Santa Cruz, Community of Tzactza, Sector Pariamarca

UTM COORDINATES: E: 193609 / N: 9005770

MASL: 3307

STATE OF CONSERVATION: Regular to Poor

DESCRIPTION:

This site is described at length in Chapter 4. The four principle sectors of

Pariamarca, Sectors A–D, are indicated in the figure below.

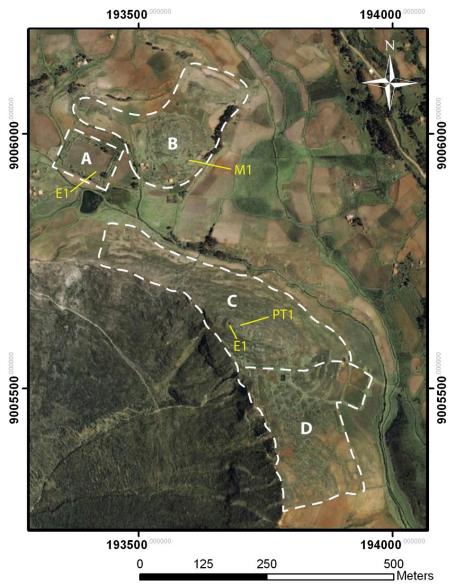


Figure B.22 SC05, Google Earth satellite image with Sectors A–D drawn (E=Estructura (Structure), M=Mound, PT=Plataform).

GENERAL LOCATION: Dist. Santa Cruz, Community of Tzactza

UTM COORDINATES: E: 192796 / N: 9007889

MASL: 3111

STATE OF CONSERVATION: Very Poor

DESCRIPTION:

SC06 is a small mortuary cluster, characterized by a few small *machay* tombs.

No remains were found inside them, however.



Figure B.23 SC06 tomb, facing east.

GENERAL LOCATION: Dist. Santa Cruz, Community of Tzactza

UTM COORDINATES: E: 193286 / N: 9007455

MASL: 3188

STATE OF CONSERVATION: Very Poor

DESCRIPTION:

SC07 is a group of two *chullpas*, separated by 10 m, that are extremely destroyed (Figure B.24).

Tomb 1: (E: 193285.8 / N: 9007455.0) 4.08 x 2.63 m.

Tomb 2: (E: 193297.8 / N: 9007442.9) 5.40 x 4.10 m.



Figure B.24 SC07, Tomb 1, facing north.

GENERAL LOCATION: Dist. Santa Cruz, Community of Tzactza

UTM COORDINATES: E: 194091 / N: 9005589

MASL: 3311

STATE OF CONSERVATION: Regular to Poor

DESCRIPTION:

Small cemetery cluster with approximately 10-20 *machay* on a hillside. Many are currently used for storage and are in a poor state of conservation.



Figure B.25 SC08, facing northeast.

GENERAL LOCATION: Dist. Santa Cruz, Community of Tzactza, sector Rayanpampa

UTM COORDINATES: E: 194588 / N: 9005706

MASL: 3400

STATE OF CONSERVATION: Mal

DESCRIPTION:

SC09 is an extremely large enclosure measuring 159 x 48 m. The walls are well preserved, with sections reaching more than 2 m in height. It may have functioned as a large corral, and is associated with the Inka occupation of Pariamarca. Some wall segments have protruding stones which form steps to enter and exit the structure.



Figure B.26 SC09, wall segment, facing southeast.

CODE AND NAME OF SITE: PC01 "Ushnucorral"

GENERAL LOCATION: Dist. Caraz

UTM COORDINATES: E: 195885 / N: 9002822

MASL: 3640

STATE OF CONSERVATION: Regular to Poor

DESCRIPTION:

Ushnucorral is an archaeological complex with six sectors, Sectors A-F, located near the village of Pampacocha. Much of the site was covered in wheat which made it difficult to document surface finds.

Sector A (E: 196297.9 / N: 9003415.4; 3628 m) is a group of about 20 agglutinated rooms in a poor state of conservation. The rooms range in size from 6 m to 12 m in diameter. There is a central space that may be a small plaza, which measures 25 m x 15 m. The best preservation is toward the southeast of the possible plaza, while the rest of the sector is in more poorly preserved. In total, the area covers $100 \text{ m} \times 50 \text{ m}$.

Sector B (E: 196203.9 / N: 9003152.7; 3619m) is a destroyed *chullpa*, measuring approximately 4×4 m, that is built on a square platform measuring approximately 8×8 m.

Sector C (E: 196105.6 / N: 9003084.1; 3653m), locally called "Caja Rumi," is a group of 6 to 8 *chullpa* built in a line, with regular to poor preservation. The number of chullpa is unclear due to the poor preservation of many structures, as some walls may indicate chamber divisions, whereas others may be exterior walls. Some chullpa clearly have two chambers while others may have three.

Sector D (E: 195965.6 / N: 9003040.9; 3646m) is a large sector that appears to be an area of habitation with agglutinated rooms. The sector measures 100 m x 90 m. It has both small rooms and large spaces that may have serves as plazas, and there are corridors running through the settlement. One possible plaza measures 20 m x 30 m. Entryways are often marked by standing stones (Figure B.27).

Sector E (E: 195884.8 / N: 9002821.9; 3657m) measures 160 m x 100 m and is located on and around a hill. At the summit of the hill is a large square platform that measures 33 m x 33 m wide and 2 m high (Figure B.28).

Sector F (E: 195767.4 / N: 9003056.5; 3639m) is an oval enclosure on a separate hilltop overlooking a precipice. The oval enclosure measures 22 m x 14 m, and may have functioned as a corral, plaza, or lookout.



Figure B.27 PC01, Sector D, detail of one access to a possible plaza space, facing southwest.



Figure B.28 PC01 Sector E, showing rectangular platform on top of a hill. Facing south.

CODE AND NAME OF SITE: PC02 GENERAL LOCATION: Dist. Caraz

UTM COORDINATES: E: 195790 / N: 9004325

MASL: 3470

STATE OF CONSERVATION: Regular to Poor

DESCRIPTION:

PC02 is a dispersed three sector site.

Sector A (E: 195611.772 / N: 9004285.823; 3451m) consists of only one chullpa that is very destroyed.

Sector B (E: 195,790.242 / N: 9,004,325.385; 3492m) is an area of stone-faced terraces with some standing structures that were in a poor state of preservation due to modern agricultural activities (Figure B.29).

Sector C (E: 195914.11 / N: 9004281.712; 3497m) is an area of terraces with poorly preserved rectangular structures, similar to Sector B.



Figure B.29 PC02, Sector B, facing east.

CODE AND NAME OF SITE: PC03

GENERAL LOCATION: Dist. Caraz, Community Cruz del Mayo, Sector Yuco

UTM COORDINATES: E: 197321 / N: 9003606

MASL: 3545

STATE OF CONSERVATION: Regular

DESCRIPTION:

PC03, which is located just west of the Quebrada Caballococha, is a terraced slope with numerous tombs overlooking a very large open space with perimeter walls suggesting it possible a plaza. There are various *machay* y *chullpas* (which

were not all recorded and quantified due to time) on the terraced hillside. The open plaza has preserved wall segments that define the open space, which is void of architecture except a small platform built around a boulder near the center. Though earlier divisions may have separated the space, the total area measures 185 m x 135 m in diameter, though it is more irregular on its southwest side. Given the large quantity of tombs in this area, which is not far from another large mortuary complex, Wancotay (PC04, below), it is possible that the plaza was used for gatherings focused on funerary activities.



Figure B.30 PC03, facing north.

CODE AND NAME OF SITE: PC04 "Wancotay"

GENERAL LOCATION: Dist. Caraz, Community Cruz del Mayo, Sector Yuco

UTM COORDINATES: E: 197904 / N: 9002354

MASL: 3350

STATE OF CONSERVATION: Regular

DESCRIPTION:

Wancotay is a large mortuary complex. The site is built across two steep and prominent ridges that are separated by a deep ravine called Quebrada Wancotay.

Sector A is to the north (E: 197,814.462 / N: 9,002,536.561; 3426m) of the quebrada, and Sector B (E: 197,989.567 / N: 9,002,063.441; 3350m) is to the south (Figure B.31). Each hilltop is terraced with platforms on its summit, though these are more structured on the narrower Sector A. *Machay* tombs are intermixed into many of the side and lower terraces, and it is likely that the terraces were built in order to structure the mortuary landscape rather than for agricultural purposes, though these activities are likely linked. In addition to numerous *machay* in both sectors, Sector B also has many rectangular "dolmen" type tombs, which are formed by finely cut stone slabs. All tombs are looted, unfortunately.

The Wancotay cemetary complex, which is characterized by *machay* and dolmen tombs, stands in sharp contract to another major cemetary to its south at the site of Pueblo Viejo Wandoy, which is characterized by mostly chullpa and some earlier suberranean chambers. These two major cemetaries are separated by the prominent Quebrada Paron. Thus, there is likely a functional or ethnic distinction between them: based on material remains, both cemetaries span the Early Intermediate Period and Middle Horion Period and were likely contemporaries.

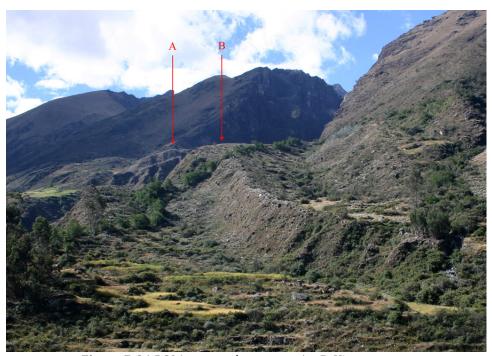


Figure B.31 PC04, puntas de sectores A y B. Vista noreste.

Appendix C

Excavation Context Summaries

* Estimated Period: These broad temporal categories were assigned based on the diagnostic ceramic remains recovered in each context as well as the context's position in a partially dated stratigraphic sequence.

0= Initial Formative (i.e. Late Preceramic Mito-Kotosh-era; 2300–1800 BC);

1=Early to Middle Formative (i.e. Mito-Kotosh and/or late Pre-Chavín-era; 1800–900 BC);

2=Late Formative (i.e. Chavín-era; 900-500 BC);

3=Final Formative (i.e. Huarás-era; 500/400 BC-1 BC);

4=Early Intermediate Period (i.e. Recuay-era; AD 1-700)

5=Middle Horizon (i.e. Wari-era; AD 700-1000)

6=Late Intermediate Period (i.e. Akillpo styles; AD 1000-1450+)

** **Disturbance of Context:** This category indicates where contexts may present a mixing of soils and artifacts were due to a natural or human disturbance or when a period designation could not be assigned with reasonable confidence.

D=Disturbed (in antiquity or in modern times)

C=Collapse or fill

S=Surface

U=Unknown Period

| Op. | Context | Estimated Period* | Disturbance of Context** | Brief Description/Category |
|-----|---------|----------------------|--------------------------|---------------------------------------|
| | | 1 0110 01 | 01 001100110 | |
| 1 | C-0001 | 4 | S/D | humus (disturbed) |
| 1 | C-0002 | 4 | D | platform surface/collapse (disturbed) |
| 1 | C-0003 | 4 | D | fill (disturbed) |
| 1 | C-0004 | 4 | | platform surface/fill |
| 1 | C-0005 | 2 | | fill |
| 1 | C-0006 | 2 | | fill |
| 1 | C-0007 | N/A | | fill (unexcavated) |
| 1 | C-0008 | N/A | | fill (unexcavated) |
| 1 | C-0009 | 4 | | fill |
| 1 | C-0010 | 4 | | fill |
| 1 | C-0011 | N/A | | fill (unexcavated) |
| 1 | C-0012 | N/A | | fill (unexcavated) |
| 1 | C-0013 | 2 | | retaining wall |
| 1 | C-0014 | 2 | | retaining wall |
| 1 | C-0015 | 4 | | wall |
| 1 | C-0016 | 3 | | fill |
| 1 | C-0017 | 4 | С | collapse (likely disturbed) |
| 1 | C-0018 | 4 | | wall foundation |
| 1 | C-0019 | 4 | | wall foundation |
| 1 | C-0020 | 3 | | fill |
| 1 | C-0021 | 3 | | wall segment |
| 1 | C-0022 | 3 | С | collapse |
| 1 | C-0023 | 4 | | wall and fill (number assigned twice) |

| 1 | C-0024 | 3 | | fill |
|-----|------------------|------------|---------|---|
| 1 | C-0024 | 3 | | fill; ceramic cluster in fill |
| 1 | C-0026 | 4 | С | collapse |
| 1 | C-0027 | 4 | C | collapse |
| 1 | C-0027 | 3 | | fill |
| 1 | C-0028 | 2 | | wall |
| 1 | C-0027 | 3 | | surface (floor) |
| 1 | C-0030 | 3 | | wall |
| 1 | C-0031 | 4 | | stone floor |
| 1 | C-0032 | 4 | С | collapse |
| 1 | C-0033 | 4 | C | collapse |
| 1 | C-0034 | 4 | C | collapse |
| 1 | C-0033 | 2 | C | fill |
| 1 | C-0030 | 3 | | fill; ceramic cluster in fill |
| 1 | C-0037 | 4 | С | collapse mixed with fill |
| 1 | C-0038 | 3 | C | floor |
| 1 | C-0039 | 2 | | wall |
| 1 | C-0040 C-0041 | 4 | | fill |
| 1 | C-0041 C-0042 | 4 | | fill |
| 1 | C-0042 C-0043 | 3 | | fill |
| 1 | | 4 | | fill |
| 1 | C-0044 C-0045 | 4 | C/D | collapse (disturbed) |
| 1 | C-0045 C-0046 | 3 | C/D | fill |
| 1 | C-0046 C-0047 | 4 | | floor |
| 1 | | 4 | | |
| 1 | C-0048 | 3 | D | fill and/or collapse (not excavated) fill |
| 1 | C-0049 | 2 | D | |
| 2 | C-0050 | 4 | D | wall |
| 2 | C-0051 | 4 | | humus/disturbed disturbed fill |
| 2 | C-0052 | 4 | D D | disturbed fill |
| 2 | C-0053 | | D | hearth |
| 2 | C-0054 | 4 2 | D | disturbed fill |
| | C-0055 | | D | |
| 2 2 | C-0056 | 2/3/4 2 | U D? | ash |
| | C-0057 | | D! | stone fill hearth |
| 2 2 | C-0058 C-0059 | 2 2 | D | fill |
| 2 | | 2 | D? | stone fill |
| 2 | C-0060 | 2 | D? D | fill |
| 2 | C-0061 | 2 | D D | fill |
| 2 | C-0062 | 1 | D | fill |
| 2 | C-0063 | 1 | | fill |
| 2 2 | C-0064 C-0065 | 1 | | wall |
| 2 | C-0065 C-0066 | 1 | | fill |
| 2 | | 1 | | fill |
| 2 2 | C-0067 | | | |
| 2 2 | C-0068 | 1 | | ceramic concentration fill |
| 2 | C-0069 C-0070 | 1 1 | | fill |
| 2 | C-0070 C-0071 | 1 | | floor |
| 2 | C-0071 C-0072 | 1 | D | |
| 4 | L-00/2 | 1 1 | ע | disturbed fill (dist. In antiquity?) |

| 2 C-0073 1 floor 2 C-0074 1 wall foundation 2 C-0075 1 wall 2 C-0076 1 wall 2 C-0077 1 fill 2 C-0078 1 fill 2 C-0079 1 wall (ledge) 2 C-0080 1 wall (ledge) 2 C-0081 1 floor 2 C-0082 1 fill 2 C-0083 1 canal 2 C-0084 1 canal 2 C-0085 1 C fill/collapse | |
|---|--|
| 2 C-0075 1 fill 2 C-0076 1 wall 2 C-0077 1 fill 2 C-0078 1 fill 2 C-0079 1 wall (ledge) 2 C-0080 1 wall (ledge) 2 C-0081 1 floor 2 C-0082 1 fill 2 C-0083 1 fill 2 C-0084 1 canal | |
| 2 C-0076 1 wall 2 C-0077 1 fill 2 C-0078 1 fill 2 C-0079 1 wall (ledge) 2 C-0080 1 wall (ledge) 2 C-0081 1 floor 2 C-0082 1 fill 2 C-0083 1 fill 2 C-0084 1 canal | |
| 2 C-0077 1 fill 2 C-0078 1 fill 2 C-0079 1 fill 2 C-0080 1 wall (ledge) 2 C-0081 1 floor 2 C-0082 1 fill 2 C-0083 1 fill 2 C-0084 1 canal | |
| 2 C-0078 1 fill 2 C-0079 1 fill 2 C-0080 1 wall (ledge) 2 C-0081 1 floor 2 C-0082 1 fill 2 C-0083 1 fill 2 C-0084 1 canal | |
| 2 C-0079 1 fill 2 C-0080 1 wall (ledge) 2 C-0081 1 floor 2 C-0082 1 fill 2 C-0083 1 fill 2 C-0084 1 canal | |
| 2 C-0080 1 wall (ledge) 2 C-0081 1 floor 2 C-0082 1 fill 2 C-0083 1 fill 2 C-0084 1 canal | |
| 2 | |
| 2 C-0082 1 fill 2 C-0083 1 fill 2 C-0084 1 canal | |
| 2 C-0083 1 fill canal | |
| 2 C-0084 1 canal | |
| | |
| 2 d d d d d d d d d d d d d d d d d d | |
| 2 C-0086 1 subfloor fill | |
| 2 C-0087 4 D humus/looters dirt | |
| 2 C-0088 4 D humus/looters dirt | |
| 2 C-0089 3 D? fill | |
| 2 C-0090 3 D? fill | |
| 2 C-0091 3 D? fill | |
| 2 C-0092 3 D? fill | |
| 2 C-0093 1 D fill | |
| 2 C-0094 3 ash fill | |
| 2 C-0095 1 plaster on wall | |
| 2 C-0096 3 ash fill | |
| 2 C-0097 3 D fill | |
| 2 C-0098 3 D fill | |
| 2 C-0099 1 D fill | |
| 2 C-0100 1 D disturbed fill | |
| 3 C-0101 4/5 D tomb | |
| 3 C-0102 4/5 D tomb | |
| 3 C-0103 4/5 D tomb | |
| 3 C-0104 4/5 D tomb | |
| 3 C-0105 4/5 D tomb | |
| 3 C-0106 4/5 D tomb | |
| 3 C-0107 4/5 D tomb | |
| 3 C-0108 4/5 D tomb | |
| 3 C-0109 4/5 D tomb | |
| 3 C-0110 4/5 D tomb | |
| 3 C-0111 4/5 D tomb | |
| 3 C-0112 4/5 D tomb | |
| 3 C-0113 4/5 D tomb | |
| 3 C-0114 4/5 D tomb | |
| 3 C-0115 4/5 D tomb | |
| 3 C-0116 4/5 D tomb | |
| 3 C-0117 4/5 D tomb | |
| 3 C-0118 4/5 D tomb | |
| 3 C-0119 4/5 D tomb | |
| 3 C-0120 4/5 D tomb | |
| 3 C-0121 4/5 D tomb | |

| | | _ | | | |
|---|---|--------|-----------|-----|----------------------------|
| | 3 | C-0122 | 4/5 | D | tomb |
| | 3 | C-0123 | 4/5 | D | tomb |
| | 3 | C-0124 | 4/5 | D | tomb |
| | 3 | C-0125 | 4/5 | D | tomb |
| | 3 | C-0126 | 4/5 | D | tomb |
| | 3 | C-0127 | 4/5 | D | tomb |
| | 3 | C-0128 | 4/5 | D | tomb |
| | 3 | C-0129 | 4/5 | D | tomb |
| | 3 | C-0130 | 4/5 | D | tomb |
| | 3 | C-0131 | 4/5 | D | tomb |
| | 3 | C-0132 | 4/5 | D | tomb |
| | 3 | C-0133 | 4/5 | D | tomb |
| | 3 | C-0134 | 4/5 | D | tomb |
| | 3 | C-0135 | 4/5 | D | tomb |
| | 3 | C-0136 | 4/5 | D | tomb |
| | 3 | C-0137 | 4/5 | D | tomb |
| | 3 | C-0138 | 4/5 | D | tomb |
| | 3 | C-0139 | 4/5 | D | tomb |
| | 3 | C-0140 | 4/5 | D | tomb |
| | 3 | C-0141 | 4/5 | D | tomb |
| | 3 | C-0142 | 4/5 | D | tomb |
| | 3 | C-0143 | 4/5 | D | tomb |
| | 3 | C-0144 | 4/5 | D | tomb |
| | 3 | C-0145 | 4/5 | D | tomb |
| | 3 | C-0146 | 4/5 | D | tomb |
| | 3 | C-0147 | 4/5 | D | tomb |
| | 3 | C-0148 | 4/5 | D | tomb |
| | 3 | C-0149 | 4/5 | D | tomb |
| | 3 | C-0150 | 4/5 | D | tomb |
| | 3 | C-0151 | 4/5 | D | tomb |
| | 5 | C-0151 | 4+ | С | humus and collapse |
| | 3 | C-0152 | 4/5 | D | tomb |
| | 5 | C-0152 | 4+ | S/C | humus and collapse |
| | 5 | C-0153 | 4+ | C/U | depositional soil/collapse |
| | 5 | C-0154 | 4+ | C/U | depositional soil/collapse |
| | 5 | C-0155 | 3/4 | Ŭ | wall |
| | 5 | C-0156 | 2 | C/U | depositional soil/collapse |
| | 5 | C-0157 | 2 | C/U | depositional soil/collapse |
| | 5 | C-0158 | 4+ | Ŭ | gravel lens |
| | 5 | C-0159 | 4+ | C/U | depositional soil/collapse |
| | 5 | C-0160 | 4+ | Ŭ | rock pile (semi-modern?) |
| | 5 | C-0161 | 4+ | C/U | depositional soil/collapse |
| | 5 | C-0162 | 0/1/2/3/4 | Ŭ | dry stony fill |
| | 5 | C-0163 | 2/3/4 | C/U | depositional soil/collapse |
| | 5 | C-0164 | 2/3/4 | Ŭ | wall |
| | 5 | C-0165 | 2/3/4 | C | wall collapse |
| | 5 | C-0166 | 2/3/4 | C | wall collapse |
| | 5 | C-0167 | 4 | | fill with surface |
| | 5 | C-0168 | 3/4 | U | line of stones/wall |
| • | ı | • | ' ' | | · |

| 5 | C-0169 | 2 | | fill with surface |
|---|--------|---|-----|--------------------------------------|
| 5 | C-0170 | 0 | | fill with surface |
| 5 | C-0171 | 0 | | sterile |
| 6 | C-0201 | 4 | S/C | Humus/collapse |
| 6 | C-0202 | 4 | D | depositional soil/modern disturbance |
| 6 | C-0203 | 4 | C | collapse |
| 6 | C-0204 | 4 | S/C | humus/collapse |
| 6 | C-0205 | 4 | C | collapse |
| 6 | C-0206 | 4 | G | possible surface/floor |
| 6 | C-0207 | 4 | С | tomb - upper collapse |
| 6 | C-0208 | 4 | C | tomb - upper collapse |
| 6 | C-0209 | 4 | G | tomb |
| 6 | C-0210 | 4 | | fill |
| 6 | C-0211 | 4 | | fill over ceramics |
| 6 | C-0212 | 4 | | fill |
| 6 | C-0213 | 4 | | tomb |
| 6 | C-0214 | 4 | | fill |
| 6 | C-0215 | 4 | | ash lens |
| 6 | C-0216 | 4 | | wall |
| 6 | C-0217 | 4 | | fill |
| 6 | C-0218 | 4 | | tomb |
| 6 | C-0219 | 4 | | tomb |
| 6 | C-0220 | 4 | | tomb |
| 6 | C-0221 | 4 | | tomb |
| 6 | C-0222 | 4 | | tomb |
| 6 | C-0223 | 4 | | tomb |
| 6 | C-0224 | 4 | | tomb |
| 6 | C-0225 | 4 | | ceramic cluster in fill |
| 6 | C-0226 | 4 | | circular stone feature |
| 6 | C-0227 | 4 | | tomb |
| 6 | C-0228 | 4 | | tomb |
| 6 | C-0229 | 4 | | fill |
| 6 | C-0230 | 4 | | fill |
| 6 | C-0231 | 4 | | surface/floor |
| 6 | C-0232 | 4 | | tomb |
| 6 | C-0233 | 4 | | ashy soil |
| 6 | C-0234 | 4 | | tomb |
| 6 | C-0235 | 4 | | tomb |
| 6 | C-0236 | 4 | | tomb |
| 6 | C-0237 | 4 | | burned clay |
| 6 | C-0238 | 4 | | tomb |
| 6 | C-0239 | 4 | | ash lens |
| 6 | C-0240 | 4 | | tomb |
| 6 | C-0241 | 4 | | tomb |
| 6 | C-0242 | 4 | С | collapse/fill |
| 6 | C-0243 | 4 | | possible surface/floor |
| 6 | C-0244 | 4 | | fill |
| 6 | C-0245 | 4 | | wall segment |
| 6 | C-0246 | 4 | | loose soft soil fill |

| 6 | C-0247 | 4 | | stone-lined pit |
|---|------------------|-----|---|-----------------|
| 6 | C-0247 | 4 | | wall |
| 6 | C-0248 C-0249 | 4 | | fill |
| 6 | C-0247 | 2 | | fill |
| 8 | C-0251 | 4/5 | D | tomb |
| 8 | C-0251 | 4/5 | D | tomb |
| 8 | C-0253 | 4/5 | D | tomb |
| 8 | C-0254 | 4/5 | D | tomb |
| 8 | C-0255 | 4/5 | D | tomb |
| 8 | C-0256 | 4/5 | D | tomb |
| 8 | C-0257 | 4/5 | D | tomb |
| 8 | C-0258 | 4/5 | D | tomb |
| 8 | C-0259 | 4/5 | D | tomb |
| 8 | C-0260 | 4/5 | D | tomb |
| 8 | C-0261 | 4/5 | D | tomb |
| 8 | C-0262 | 4/5 | D | tomb |
| 8 | C-0263 | 4/5 | D | tomb |
| 8 | C-0264 | 4/5 | D | tomb |
| 8 | C-0265 | 4/5 | D | tomb |
| 8 | C-0266 | 4/5 | D | tomb |
| 8 | C-0267 | 4/5 | D | tomb |
| 8 | C-0268 | 4/5 | D | tomb |
| 8 | C-0269 | 4/5 | D | tomb |
| 8 | C-0270 | 4/5 | D | tomb |
| 8 | C-0271 | 4/5 | D | tomb |
| 8 | C-0272 | 4/5 | D | tomb |
| 8 | C-0273 | 4/5 | D | tomb |
| 8 | C-0274 | 4/5 | D | tomb |
| 8 | C-0275 | 4/5 | D | tomb |
| 8 | C-0276 | 4/5 | D | tomb |
| 8 | C-0277 | 4/5 | D | tomb |
| 8 | C-0278 | 4/5 | D | tomb |
| 8 | C-0279 | 4/5 | D | tomb |
| 8 | C-0280 | 4/5 | D | tomb |
| 8 | C-0281 | 4/5 | D | tomb |
| 8 | C-0282 | 4/5 | D | tomb |
| 8 | C-0283 | 4/5 | D | tomb |
| 8 | C-0284 | 4/5 | D | tomb |
| 8 | C-0285 | 4/5 | D | tomb |
| 8 | C-0286 | 4/5 | D | tomb |
| 8 | C-0287 | 4/5 | D | tomb |
| 8 | C-0288 | 4/5 | D | tomb |
| 8 | C-0289 | 4/5 | D | tomb |
| 8 | C-0290 | 4/5 | D | tomb |
| 8 | C-0291 | 4/5 | D | tomb |
| 8 | C-0292 | 4/5 | D | tomb |
| 8 | C-0293 | 4/5 | D | tomb |
| 8 | C-0294 | 4/5 | D | tomb |
| 8 | C-0295 | 4/5 | D | tomb |

| 8 | C-0296 | 4/5 | D | tomb |
|---|--------|-----|-----|-------------------------------------|
| 8 | C-0297 | 4/5 | D | tomb |
| 8 | C-0297 | 4/5 | D | tomb |
| 8 | C-0299 | 4/5 | D | tomb |
| 8 | C-0300 | 4/5 | D | tomb |
| 7 | C-0300 | 4 | S/C | humus/collapse |
| 7 | C-0301 | 4 | D | depositional soil |
| 7 | C-0302 | 4 | C | collapse |
| 7 | C-0303 | 4 | C | collapse |
| 7 | C-0304 | 4 | C | collapse |
| 7 | C-0305 | 4 | C | collapse |
| 7 | C-0307 | 4 | G | construction fill |
| 7 | C-0308 | 4 | | ceramic concentration |
| 7 | C-0309 | 4 | | concentration of bone |
| 7 | C-0310 | 4 | | depositional soil surrounding canal |
| 7 | C-0311 | 4 | | wall foundation |
| 7 | C-0312 | 4 | | wall |
| 7 | C-0313 | 4 | | canal base |
| 7 | C-0314 | 4 | | canal wall |
| 7 | C-0315 | 4 | | platform surface |
| 7 | C-0316 | 4 | | wall |
| 7 | C-0317 | 4 | | wall |
| 7 | C-0318 | 4 | | surface outside structure |
| 7 | C-0319 | 4 | | fill |
| 7 | C-0320 | 4 | | fill |
| 7 | C-0321 | 4 | | retaining wall |
| 7 | C-0322 | 4 | | retaining wall |
| 7 | C-0323 | 4 | | line of stones/wall |
| 7 | C-0324 | 4 | | retaining wall |
| 7 | C-0325 | 4 | | retaining wall (terrace) |
| 7 | C-0326 | 4 | | ceramic concentration |
| 7 | C-0327 | 4 | | line of stones/wall |
| 7 | C-0328 | 4 | | retaining wall |
| 7 | C-0329 | 4 | | fill |
| 7 | C-0330 | 4 | | retaining wall |
| 7 | C-0331 | 4 | | retaining wall |
| 7 | C-0332 | 4 | | wall |
| 7 | C-0333 | 4 | | retaining wall |
| 7 | C-0334 | 4 | | line of stone |
| 7 | C-0335 | 4 | | retaining wall |
| 7 | C-0336 | 4 | | canal |
| 7 | C-0337 | 4 | | wall |
| 7 | C-0338 | 4 | | fill |
| 7 | C-0339 | 4 | С | collapse |
| 7 | C-0340 | 4 | | burial |
| 7 | C-0341 | 4 | | fill |
| 7 | C-0342 | 4 | | line of stone |
| 7 | C-0343 | 4 | С | collapse |
| 7 | C-0344 | 4 | | fill |

| 1 7 | C 0245 | l 4 | 1 | |
|-----|--------|-------|----|-------------------------------------|
| 7 | C-0345 | 4 | | possible niche feature |
| 7 | C-0346 | 4 | | fill |
| 7 | C-0347 | 4 | | ceramic concentration |
| 7 | C-0348 | 4 | | ash/carbon |
| 7 | C-0349 | 4 | | ash/carbon |
| 7 | C-0350 | 4 | 0 | ash/carbon |
| 4 | C-0351 | 4 | S | humus |
| 4 | C-0352 | 4 | S | humus |
| 4 | C-0353 | 4 | | fill |
| 4 | C-0354 | 4 | | fill |
| 4 | C-0355 | 4 | | wall |
| 4 | C-0356 | 4 | | curved wall |
| 4 | C-0357 | 4 | | wall |
| 4 | C-0358 | 4 | | fill |
| 4 | C-0359 | 4 | 0 | wall |
| 4 | C-0360 | 4 | С | wall collapse |
| 4 | C-0361 | 4 | | fill |
| 4 | C-0362 | 4 | | fill |
| 4 | C-0363 | 4 | C | collapse |
| 4 | C-0364 | 4 | С | collapse |
| 4 | C-0365 | 4 | | fill |
| 4 | C-0366 | 4 | | fill |
| 4 | C-0367 | 4 | | stone feature |
| 4 | C-0368 | 4 | | fill |
| 4 | C-0369 | 4 | S | humus |
| 4 | C-0370 | 4 | S | humus |
| 4 | C-0371 | 4 | | fill |
| 4 | C-0372 | 4 | | sterile surface cut to level floor |
| 4 | C-0373 | 4 | 0 | wall |
| 4 | C-0374 | 4 | C | collapse |
| 9 | C-0401 | 2/3/4 | S | humus |
| 9 | C-0402 | 2/3/4 | S | fill |
| 9 | C-0403 | 2/3/4 | D | canal wall and outer retaining wall |
| 9 | C-0404 | 2/3/4 | D | canal wall and outer retaining wall |
| 9 | C-0405 | 2/3/4 | D | fill |
| 9 | C-0406 | 2/3/4 | D | depositional soil with collapse |
| 9 | C-0407 | 2/3/4 | D | fill |
| 9 | C-0408 | 2/3/4 | D | fill |
| 9 | C-0409 | 2/3/4 | D | fill |
| 9 | C-0410 | 2/3/4 | Б. | surface with collapse |
| 9 | C-0411 | 2/3/4 | D | fill |
| 9 | C-0412 | 2/3/4 | С | collapsed terrace retaining wall |
| 2 | C-0451 | 3 | D | disturbed fill |
| 2 | C-0452 | 1 | D | disturbed fill |
| 2 | C-0453 | 1 | | fill |
| 2 | C-0454 | 1 | Б. | fill |
| 2 | C-0455 | 1 | D | fill |
| 2 | C-0456 | 1 | D | floor? |
| 2 | C-0457 | 1 | D | |

| 2 | C-0458 | 1 | | floor |
|------|------------------|---------|---------|---|
| 2 | C-0459 | 1 | D | looters' soil |
| 2 | C-0457 | 2 | Ь | retaining wall |
| 2 | C-0460 C-0461 | 2 | D? | fill |
| 2 | C-0461 | 1 | D: D | fill/looters soil |
| 2 | C-0462 | 1 | Ь | fill |
| 2 | C-0463 | 1 | | stone fill |
| 2 | C-0465 | 1 | D | fill/looters soil |
| 2 | C-0466 | 1 | Ь | fill |
| 2 | C-0467 | 4 | S | 4 humus |
| 2 | C-0467 | 4 | 3 | 4 humus |
| 2 | C-0469 | 4 | | 4 surface/fill |
| 2 | C-0407 | 1 | D | disturbed fill |
| 2 | C-0470 | 1 | Ь | subfloor fill |
| 2 | C-0471 C-0472 | 4 | | fill |
| 2 | C-0472 C-0473 | 4 | | fill |
| 2 | C-0473 | 1 | | fill |
| 2 | C-0474 C-0475 | 4 | | fill above ceramic scatter |
| 2 | C-0473 | 4 | | fill |
| 2 | C-0470 | 4 | | hearth |
| | C-0477 | 4 | | near tii |
| 2 | lower | 2 | | hearth |
| 2 | C-0478 | 4 | | fill/surface |
| 2 | C-0478 | 4 | | large ceramic scatter |
| 2 | C-0477 | 4 | | grinding stones area |
| 2 | C-0480 C-0481 | 4 | | floor/fill near ceramic scatter |
| 2 | C-0481 C-0482 | 2 | | Rocks filling platform |
| 2 | C-0482 C-0483 | 2 | | step retaining wall |
| 2 | C-0483 | 2 | | platform fill |
| 2 | C-0485 | 4 | | ash lens |
| 2 | C-0486 | 4 | | part of hearth |
| 2 | C-0487 | 4 | | ash part of hearth 477 |
| 2 | C-0487 | 2/3/4 | | stones below smashed ceramics |
| 2 | C-0489 | 2/3/4 | | orange heated soil |
| 2 | C-0490 | 2/3/4 | | top of platform fill |
| 2 | C-0491 | 2/3/4 | | top of platform fill |
| 2 | C-0492 | 2 | | top of platform fill |
| 2 | C-0493 | 4 | | feature within hearth C477 |
| 2 | C-0494 | 2 | | rock wall |
| 2 | C-0495 | 4 | | ash lens |
| 2 | C-0496 | 2 | | ash lens |
| 2 | C-0490 | 2 | | small stone fill in front of step |
| 2 | C-0498 | 4 | | stone ring-hearth associated with C477? |
| 2 | C-0499 | 4 | | surface associated with hearth |
| 2 | C-0477 | 1 | | disturbed fill |
| 10 | C-0500 | 2/3/4 | S | Humus |
| 10 | C-0502 | 2/3/4 | D | fill |
| 10 | C-0502 | 2/3/4 | D | fill |
| 10 | C-0504 | 2/3/4 | | poorly preserved terrace retaining wall |
| 1 10 | 1 0 0001 | 1 2/3/1 | I | posta, proserved terrace retaining wan |

| 10 | C-0505 | 2/3/4 | D | fill |
|-----|------------------|-------|----|------------------------------|
| 10 | C-0506 | 2/3/4 | D | fill |
| 10 | C-0507 | 2/3/4 | D | fill |
| 10 | C-0508 | 2/3/4 | D | fill |
| 10 | C-0509 | 2/3/4 | 5 | Canal boulders |
| 1 | C-0551 | 4 | | fill |
| 1 | C-0552 | 2 | | fill |
| 1 | C-0553 | 4 | | fill |
| 1 | C-0554 | 3 | | fill |
| 1 | C-0555 | 4 | | fill |
| 1 | C-0556 | 4 | | fill |
| 1 | C-0557 | 3 | | circular stone feature |
| 1 | C-0558 | 3 | | floor/surface |
| 1 | C-0559 | 3 | | floor/surface |
| 1 | C-0560 | 3 | | fill (unexcavated) |
| 1 | C-0561 | 3 | | fill (unexcavated) |
| 1 | C-0562 | 3 | | fill |
| 1 | C-0563 | 2 | | wall/stone line |
| 1 | C-0564 | 3 | | fill |
| 1 | C-0565 | 2 | | hearth ash |
| 1 | C-0566 | 2 | D? | fill |
| 1 | C-0567 | 2 | | wall |
| 1 | C-0568 | 2 | | fill |
| 1 | C-0569 | 2 | | fill |
| 1 | C-0570 | 2 | | wall |
| 1 | C-0571 | 2 | | fill |
| 1 | C-0572 | 2 | | semicircle of flat stones |
| 1 | C-0573 | 2 | | fill |
| 1 | C-0574 | 2 | | fill |
| 1 | C-0575 | 2 | | fill |
| 1 | C-0576 | 2 | | ash lens |
| 1 | C-0577 | 2 | | fill |
| 1 | C-0578 | 3 3 | | fill with collapse |
| 1 1 | C-0579 | 4 | | wall Eroded fill (disturbed) |
| 1 | C-0580 C-0581 | 3 | | Fill |
| 1 | C-0581 | 3 | | fill (disturbed) |
| 1 | C-0582 | 3 | | wall |
| 1 | C-0584 | 2 | | fill |
| 1 | C-0585 | 2 | | wall |
| 1 | C-0586 | 2 | | fill |
| 1 | C-0587 | 2 | | wall |
| 1 | C-0588 | 2 | | fill |
| 1 | C-0589 | 3 | | ash lens |
| 1 | C-0590 | 2/3/4 | С | fill/collapse |
| 1 | C-0591 | 3 | | floor |
| 1 | C-0592 | 2/3/4 | U | Ashy fill |
| 1 | C-0593 | 2/3/4 | U | fill |
| 1 | C-0594 | 2 | | fill |

| 1 4 | C 0505 | 1 2 | | |
|-----|------------------|--------|-----|---|
| 1 1 | C-0595 | 2 2 | | wall fill |
| _ | C-0596 | | | |
| 1 | C-0597 | 2 2 | | fill fill |
| 1 | C-0598 | | 11 | |
| 1 | C-0599 | 2 | U | fill fill |
| 1 | C-0600 | 3 | | |
| 6 | C-0601 | 4 | | surface/floor, extends into tomb entryway soil lens with bone |
| 6 | C-0602 | 4 | | |
| 6 | C-0603 | 4 4 | | tomb |
| 6 | C-0604 C-0605 | 4 | | fill fill |
| 6 | C-0605 | 4 | | ash lens |
| 6 | C-0606 C-0607 | 4 | | tomb |
| 6 | C-0607 C-0608 | 4 | | |
| 6 | | 4 | | possible surface/floor fill |
| 6 | C-0609 C-0610 | 4 | | wall |
| 6 | C-0610 C-0611 | 4 | | |
| 6 | C-0611 C-0612 | 4 | | surface/floor wall |
| 6 | C-0612 | 4 | | stone-lined pit, intrusive into floor |
| 6 | C-0613 | 4 | | fill |
| 6 | C-0614 C-0615 | 4 | | fill |
| 6 | C-0616 | 4 | | tomb |
| 6 | C-0617 | 4 | | ceramic concentration over floor |
| 6 | C-0617 | 4 | | large ceramic vessel |
| 6 | C-0619 | 4 | | ash lens |
| 6 | C-0620 | 4 | | surface/floor |
| 6 | C-0621 | 4 | | wall |
| 6 | C-0621 | 4 | | ash lens |
| 6 | C-0623 | 4 | | ceramic concentration within depression in floor |
| 6 | C-0624 | 4 | | wall |
| 6 | C-0625 | 4 | | ledge |
| 6 | C-0626 | 4 | | probable surface/floor |
| 6 | C-0627 | 4 | | wall of tomb, main access |
| 6 | C-0628 | 4 | | wall |
| 6 | C-0629 | 4 | | fill over floor |
| 6 | C-0630 | 4 | | stones blocking tomb access |
| 6 | C-0631 | 4 | | possible surface/floor |
| 6 | C-0632 | 4 | | possible surface/floor |
| 6 | C-0633 | 4 | S/C | humus/collapse |
| 6 | C-0634 | 4 | S/C | humus/collapse |
| 6 | C-0635 | 4 | S/C | humus/collapse |
| 6 | C-0636 | 4 | S/C | humus/collapse |
| 6 | C-0637 | 4 | Ć | collapse |
| 6 | C-0638 | 4 | D | depositional soil |
| 6 | C-0639 | 4 | D | depositional soil |
| 6 | C-0640 | 4 | | semi-circle of rocks |
| 6 | C-0641 | 4 | | fill |
| 6 | C-0642 | 4 | | wall |
| 6 | C-0643 | 4 | | stone line |

| 6 | |
|---|--|
| 6 C-0646 4 stone feature 6 C-0647 4 fill 6 C-0648 4 fill 6 C-0649 4 fill 6 C-0650 4 fill 1 C-0651 3 fill 1 C-0652 3 fill 1 C-0653 3 fill 1 C-0654 2 fill/possible rock line wall 1 C-0655 2 wall 1 C-0656 2 fill 1 C-0657 2 fill 1 C-0658 2 fill 1 C-0669 2 fill 1 C-0660 2 fill 1 C-0663 2 fill 1 C-0664 2 stone hearth 1 C-0667 3 fill 1 C-0668 3 fill 1 C-0669 | |
| 6 C-0647 4 fill 6 C-0648 4 fill 6 C-0649 4 fill 6 C-0650 4 fill 1 C-0651 3 fill 1 C-0652 3 fill 1 C-0653 3 fill 1 C-0654 2 fill/possible rock line wall 1 C-0655 2 fill 1 C-0656 2 fill 1 C-0657 2 fill 1 C-0658 2 fill 1 C-0659 2 fill 1 C-0660 2 fill 1 C-0661 2 fill 1 C-0662 2 fill 1 C-0663 2 fill 1 C-0666 3 fill 1 C-0667 3 fill 1 C-0668 3 fill 1 C-0669 3 fill | |
| 6 C-0648 4 fill 6 C-0650 4 fill 1 C-0651 3 fill 1 C-0652 3 fill 1 C-0653 3 fill 1 C-0654 2 fill/possible rock line wall 1 C-0655 2 fill 1 C-0656 2 fill 1 C-0657 2 fill 1 C-0658 2 fill 1 C-0669 2 fill 1 C-0660 2 fill 1 C-0661 2 fill 1 C-0662 2 fill 1 C-0663 2 fill 1 C-0665 3 fill 1 C-0666 3 fill 1 C-0668 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0672 3 floor | |
| 6 C-0649 4 fill 6 C-0650 4 fill 1 C-0651 3 fill 1 C-0652 3 fill 1 C-0653 3 fill 1 C-0654 2 fill/possible rock line wall 1 C-0655 2 fill 1 C-0656 2 fill 1 C-0657 2 fill 1 C-0658 2 fill 1 C-0668 2 fill 1 C-0660 2 fill 1 C-0661 2 fill 1 C-0662 2 fill 1 C-0663 2 fill 1 C-0665 3 fill 1 C-0665 3 fill 1 C-0667 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0672 3 floor | |
| 6 C-0650 4 fill 1 C-0651 3 fill 1 C-0652 3 fill 1 C-0653 3 fill 1 C-0654 2 fill/possible rock line wall 1 C-0655 2 wall 1 C-0656 2 fill 1 C-0657 2 fill 1 C-0658 2 fill 1 C-0659 2 fill 1 C-0660 2 fill 1 C-0661 2 fill 1 C-0662 2 fill 1 C-0663 2 fill 1 C-0664 2 stone hearth 1 C-0665 3 fill 1 C-0666 3 fill 1 C-0667 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0672 3 fill <tr< td=""><td></td></tr<> | |
| 1 C-0651 3 fill 1 C-0652 3 fill 1 C-0653 3 fill/possible rock line wall 1 C-0654 2 wall 1 C-0655 2 fill 1 C-0656 2 fill 1 C-0657 2 fill 1 C-0658 2 fill 1 C-0659 2 fill 1 C-0660 2 fill 1 C-0661 2 fill 1 C-0662 2 fill 1 C-0663 2 fill 1 C-0663 2 fill 1 C-0665 3 fill 1 C-0666 3 fill 1 C-0667 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0672 3 floor 1 C-0674 2 surface/floor <td></td> | |
| 1 C-0652 3 fill 1 C-0653 3 fill/possible rock line wall 1 C-0655 2 wall 1 C-0656 2 fill 1 C-0657 2 fill 1 C-0658 2 fill 1 C-0659 2 fill 1 C-0660 2 fill 1 C-0661 2 fill 1 C-0662 2 fill 1 C-0663 2 fill 1 C-0664 2 stone hearth 1 C-0665 3 fill 1 C-0666 3 fill 1 C-0667 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0672 3 floor 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0653 3 fill 1 C-0654 2 fill/possible rock line wall 1 C-0655 2 wall 1 C-0656 2 fill 1 C-0657 2 fill 1 C-0658 2 fill 1 C-0659 2 fill 1 C-0660 2 fill 1 C-0661 2 fill 1 C-0662 2 fill 1 C-0663 2 fill 1 C-0664 2 stone hearth 1 C-0665 3 fill 1 C-0666 3 fill 1 C-0667 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0672 3 floor 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0654 2 fill/possible rock line wall 1 C-0655 2 wall 1 C-0656 2 fill 1 C-0657 2 fill 1 C-0658 2 fill 1 C-0659 2 fill 1 C-0660 2 fill 1 C-0661 2 fill 1 C-0662 2 fill 1 C-0663 2 fill 1 C-0664 2 stone hearth 1 C-0665 3 fill 1 C-0666 3 fill 1 C-0667 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0672 3 floor 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0655 2 wall 1 C-0656 2 fill 1 C-0657 2 fill 1 C-0658 2 fill 1 C-0659 2 fill 1 C-0660 2 fill 1 C-0661 2 fill 1 C-0662 2 fill 1 C-0663 2 stone hearth 1 C-0665 3 fill 1 C-0666 3 fill 1 C-0667 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0672 3 floor 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0656 2 fill 1 C-0657 2 fill 1 C-0658 2 fill 1 C-0659 2 fill 1 C-0660 2 fill 1 C-0661 2 fill 1 C-0662 2 fill 1 C-0663 2 fill 1 C-0664 2 stone hearth 1 C-0665 3 fill 1 C-0666 3 fill 1 C-0667 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0672 3 floor 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0657 2 fill 1 C-0658 2 fill 1 C-0659 2 fill 1 C-0660 2 fill 1 C-0661 2 fill 1 C-0662 2 fill 1 C-0663 2 fill 1 C-0664 2 stone hearth 1 C-0665 3 fill 1 C-0666 3 fill 1 C-0667 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0671 3 ash lens 1 C-0672 3 fill 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0658 2 fill 1 C-0669 2 fill 1 C-0661 2 fill 1 C-0662 2 fill 1 C-0663 2 fill 1 C-0664 2 stone hearth 1 C-0665 3 fill 1 C-0666 3 fill 1 C-0667 3 fill 1 C-0668 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0672 3 floor 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0659 2 fill 1 C-0660 2 fill 1 C-0661 2 fill 1 C-0662 2 fill 1 C-0663 2 fill 1 C-0664 2 stone hearth 1 C-0665 3 fill 1 C-0666 3 fill 1 C-0667 3 fill 1 C-0668 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0671 3 ash lens 1 C-0672 3 floor 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0660 2 fill 1 C-0661 2 fill 1 C-0662 2 fill 1 C-0663 2 fill 1 C-0664 2 stone hearth 1 C-0665 3 fill 1 C-0666 3 fill 1 C-0667 3 fill 1 C-0668 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0671 3 ash lens 1 C-0672 3 floor 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0661 2 fill 1 C-0662 2 fill 1 C-0663 2 fill 1 C-0664 2 stone hearth 1 C-0665 3 fill 1 C-0666 3 fill 1 C-0667 3 fill 1 C-0668 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0671 3 ash lens 1 C-0672 3 floor 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0662 2 fill 1 C-0663 2 fill 1 C-0664 2 stone hearth 1 C-0665 3 fill 1 C-0666 3 fill 1 C-0667 3 fill 1 C-0668 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0671 3 ash lens 1 C-0672 3 floor 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0663 2 fill 1 C-0664 2 stone hearth 1 C-0665 3 fill 1 C-0666 3 fill 1 C-0667 3 fill 1 C-0668 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0671 3 ash lens 1 C-0672 3 floor 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0664 2 stone hearth 1 C-0665 3 fill 1 C-0666 3 fill 1 C-0667 3 fill 1 C-0668 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0671 3 ash lens 1 C-0672 3 floor 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0665 3 fill 1 C-0666 3 fill 1 C-0667 3 fill 1 C-0668 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0671 3 ash lens 1 C-0672 3 floor 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0666 3 fill 1 C-0667 3 fill 1 C-0668 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0671 3 ash lens 1 C-0672 3 floor 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0667 3 fill 1 C-0668 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0671 3 ash lens 1 C-0672 3 floor 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0668 3 fill 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0671 3 ash lens 1 C-0672 3 floor 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0669 3 fill 1 C-0670 2 fill 1 C-0671 3 ash lens 1 C-0672 3 floor 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0670 2 fill 1 C-0671 3 ash lens 1 C-0672 3 floor 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0671 3 ash lens 1 C-0672 3 floor 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0672 3 floor 1 C-0673 2 fill 1 C-0674 2 surface/floor | |
| 1 C-0673 2 1 C-0674 2 surface/floor | |
| 1 C-0674 2 surface/floor | |
| | |
| 1 C 0675 2 humand couth below beauth | |
| 1 C-0675 2 burned earth below hearth | |
| 1 C-0676 2 fill | |
| 1 C-0677 2 fill or surface | |
| 1 C-0678 2 fill | |
| 1 C-0679 2 fill | |
| 1 C-0680 3 fill/artifact cluster | |
| 1 C-0681 2 wall | |
| 1 C-0682 3 fill | |
| 1 C-0683 3 floor/surface | |
| 1 C-0684 2 subfloor fill | |
| 1 C-0685 2 fill in circular feature | |
| 1 C-0686 2 outter edge of burned feature | |
| 1 C-0687 2 fill | |
| 1 C-0688 2 wall | |
| 1 C-0689 2 surface/floor | |
| 1 C-0690 2 fill/possible surface | |
| 1 C-0691 2 fill/possible surface | |
| 1 C-0692 2 wall | |

| 1 4 1 | 1 0000 | l 6 | 1 | 11.6 1 631 |
|-------|--------|-----|-----|--|
| 1 | C-0693 | 2 | | wall foundation fill |
| 1 | C-0694 | 2 | | wall |
| 1 | C-0695 | 2 | | wall |
| 1 | C-0696 | 2 | | fill |
| 1 | C-0697 | 2 | | Hearth stones |
| 1 | C-0698 | 2 | | fill |
| 1 | C-0699 | 2 | | wall/fill |
| 1 | C-0700 | 2 | | fill |
| 11 | C-0701 | 4/5 | S/C | tomb humus/collapse |
| 11 | C-0702 | 4/5 | S/C | exterior humus/collapse |
| 11 | C-0703 | 4/5 | C/D | tomb collapse (looter destruction) |
| 11 | C-0704 | 4/5 | C/D | exterior collapse (looter destruction) |
| 11 | C-0705 | 4/5 | D | soil on top of dismantled wall |
| 11 | C-0706 | 4/5 | D | soil on top of dismantled wall |
| | | | | exterior of tomb; original humus buried by |
| 11 | C-0707 | 4/5 | S | looters' debris |
| 11 | C-0708 | 4/5 | D | wall |
| 11 | C-0709 | 4/5 | D | tomb soil with majority of cultural material |
| 11 | C-0710 | 4/5 | C/D | exterior collapse (looter destruction) |
| 1 | C-0751 | 2 | | ash lens |
| 1 | C-0752 | 2 | | wall |
| 1 | C-0753 | 2 | | wall |
| 1 | C-0754 | 2 | | surface/floor |
| 1 | C-0755 | 2 | | possible surface |
| 1 | C-0756 | 2 | | fill |
| 1 | C-0757 | 3 | U | fill and collapse |
| 1 | C-0758 | 2 | | fill or surface |
| 1 | C-0759 | 3 | U | fill |
| 1 | C-0760 | 2 | | ash lens |
| 1 | C-0761 | 2 | | ash lens |
| 1 | C-0762 | 2 | | ash lens |
| 1 | C-0763 | 2 | U | ash lens |
| 1 | C-0764 | 2 | | fill/possible surface |
| 1 | C-0765 | 2 | | stone circle |
| 1 | C-0766 | 2 | | fill |
| 1 | C-0767 | 2 | | fill |
| 1 | C-0768 | 2 | | fill |
| 1 | C-0769 | 2 | | fill |
| 1 | C-0770 | 2 | | fill |
| 1 | C-0771 | 2 | | fill |
| 1 | C-0772 | 2 | | fill |
| 1 | C-0773 | 2 | | fill |
| 1 | C-0774 | 2 | | ash lens |
| 1 | C-0775 | 2 | | fill |
| 1 | C-0776 | 2 | | wall fill |
| 1 | C-0777 | 2 | | fill (likely unexcavated) |
| 1 | C-0778 | 2 | | fill (likely unexcavated) |
| 1 | C-0779 | 2 | | fill |
| 1 | C-0780 | 2 | | wall |

| 1 1 | C-0781 |] 2 | U | fill |
|-----|------------------|-----|---|--------------------------|
| 1 1 | C-0781 C-0782 | 3 | U | fill |
| 1 | C-0782 C-0783 | 2 | | fill |
| 1 | C-0783 C-0784 | 2 | | fill |
| 1 | C-0784 C-0785 | 2 | S | fill |
| 1 | C-0786 | 2 | 3 | wall |
| 1 | C-0786 C-0787 | 3 | | fill |
| 1 | C-0787 C-0788 | 2 | | ashy fill |
| 1 | C-0788 | 2 | | fill |
| 1 | C-0789 C-0790 | 2 | | fill |
| 1 | C-0791 | 3 | | artifact concentration |
| 1 | C-0791 | 2 | | wall |
| 1 | C-0793 | 3 | | ashy fill |
| 1 | C-0794 | 2 | | wall |
| 1 | C-0795 | 2 | | wall |
| 1 | C-0796 | 2 | | fill |
| 1 | C-0797 | 2 | | fill |
| 1 | C-0798 | 2 | U | lens |
| 1 | C-0799 | 3 | G | fill |
| 1 | C-0800 | 4 | | fill |
| 7 | C-0801 | 4 | | fill |
| 7 | C-0802 | 4 | | ash/carbon |
| 7 | C-0803 | 4 | | infant burial |
| 7 | C-0804 | 4 | | wall |
| 7 | C-0805 | 4 | | wall |
| 7 | C-0806 | 4 | | fill over floor |
| 7 | C-0807 | 4 | С | collapse/fill |
| 7 | C-0808 | 4 | | wall |
| 7 | C-0809 | 4 | | ash/carbon |
| 7 | C-0810 | 4 | | ash/carbon |
| 7 | C-0811 | 4 | | burial - likely complete |
| 7 | C-0812 | 4 | | burial - no cranium |
| 7 | C-0813 | 4 | | ash/carbon |
| 7 | C-0814 | 4 | | ash/carbon |
| 7 | C-0815 | 4 | | ceramic concentration |
| 7 | C-0816 | 4 | | ceramic concentration |
| 7 | C-0817 | 4 | | ceramic concentration |
| 7 | C-0818 | 4 | | ceramic concentration |
| 7 | C-0819 | 4 | | fill |
| 7 | C-0820 | 4 | | fill |
| 7 | C-0821 | 4 | | fill |
| 7 | C-0822 | 4 | | ash/carbon |
| 7 | C-0823 | 4 | | stone feature |
| 7 | C-0824 | 4 | | ceramic concentration |
| 7 | C-0825 | 4 | | ceramic concentration |
| 7 | C-0826 | N/A | | Unexcavated |
| 7 | C-0827 | 4 | | fill |
| 7 | C-0828 | 4 | | compact fill |
| 7 | C-0829 | 4 | | ash/carbon |

| 1 | Ī | 1 1 | | |
|---|--------|-----|---|----------------------------------|
| 7 | C-0830 | 4 | | cut/soil |
| 7 | C-0831 | 4 | | ash/carbon |
| 7 | C-0832 | 4 | | fill |
| 7 | C-0833 | 4 | | retaining wall |
| 7 | C-0834 | 4 | | surface/floor |
| 7 | C-0835 | 4 | | fill |
| 7 | C-0836 | 4 | | platform fill |
| 7 | C-0837 | 4 | | soil with ash/carbon |
| 7 | C-0838 | 4 | | floor/surface |
| 7 | C-0839 | 4 | | cut/soil |
| 7 | C-0840 | 4 | | platform fill |
| 7 | C-0841 | 4 | | ceramic concentration |
| 7 | C-0842 | 4 | | floor with ash and debris |
| 7 | C-0843 | 4 | | ceramic concentration |
| 7 | C-0844 | 4 | | ceramic concentration |
| 7 | C-0845 | 4 | | ceramic concentration |
| 7 | C-0846 | 4 | | wall |
| 7 | C-0847 | 4 | | fill |
| 7 | C-0848 | 4 | | fill |
| 7 | C-0849 | 4 | | green-blue sediment inside canal |
| 7 | C-0850 | 4 | | fill (unexcavated) |
| 1 | C-0901 | 3 | | fill |
| 1 | C-0902 | 3 | | destroyed wall stones |
| 1 | C-0903 | 3 | | destroyed wall stones |
| 1 | C-0904 | 2 | U | possible floor/surface |
| 1 | C-0905 | 3 | | fill |
| 1 | C-0906 | 3 | | ashy fill |
| 1 | C-0907 | 3 | | floor/surface |
| 1 | C-0908 | 2 | U | artifact concentration |
| 1 | C-0909 | 3 | | shallow depression |
| 1 | C-0910 | 3 | | ashy fill |
| 1 | C-0911 | 3 | U | fill |
| 1 | C-0912 | 2 | | wall |
| 1 | C-0913 | 2 | | wall |
| 1 | C-0914 | 2 | D | fill |
| 1 | C-0915 | 3 | | artifact concentration |
| 1 | C-0916 | 2 | U | artifact concentration |
| 1 | C-0917 | 2 | | ashy fill |
| 1 | C-0918 | 2 | | fill |
| 1 | C-0919 | 3 | | ashy fill |
| 1 | C-0920 | 2 | | surface/floor |
| 1 | C-0921 | 2 | | fill |
| 1 | C-0922 | 2 | | fill |
| 1 | C-0923 | 3 | | ash lens |
| 1 | C-0924 | 3 | | ash lens |
| 1 | C-0925 | 2 | | ashy fill |
| 1 | C-0926 | 2 | | ash lens |
| 1 | C-0927 | 2 | | wall |
| 1 | C-0928 | 2 | | ash lens |

| 1 | C-0929 | 2 | I | fill |
|-----|------------------|-----|---|------------------------|
| 1 1 | C-0929 C-0930 | 2 | | stone feature |
| 1 | | 2 | | fill |
| 1 | C-0931 C-0932 | 2 | | stone feature |
| 1 | C-0932 C-0933 | 2 | | fill |
| 1 | C-0933 C-0934 | 2 | | fill |
| 1 | C-0934 C-0935 | 2 | | wall |
| 1 | C-0935 C-0936 | 2 | | fill |
| 1 | C-0936 C-0937 | 2 | | fill |
| 1 | C-0937 C-0938 | 2 | | ashy fill |
| 1 | C-0938 | 2 | | fill |
| 1 | C-0939 | 3 | | artifact concentration |
| 1 | C-0941 | 3 | | fill |
| 1 | C-0942 | 3 | | fill |
| 1 | C-0943 | 2 | | fill |
| 1 | C-0944 | 2 | | ashy fill |
| 1 | C-0945 | 2 | | fill |
| 1 | C-0946 | 2 | | ashy fill |
| 1 | C-0947 | 2 | | fill |
| 1 | C-0948 | 2 | | fill |
| 1 | C-0949 | 2 | | fill |
| 1 | C-0950 | 2 | | fill |
| 1 | C-0951 | 2 | | ashy fill |
| 13 | C-0951 | 4 | S | Humus |
| 1 | C-0952 | 2 | | fill |
| 13 | C-0952 | 4 | S | Humus |
| 13 | C-0953 | 4 | | surface/floor |
| 13 | C-0954 | 4 | S | root disturbance |
| 13 | C-0955 | 4 | S | root disturbance |
| 13 | C-0956 | 4 | C | collapse |
| 13 | C-0957 | 4 | | fill |
| 14 | C-0958 | N/A | S | humus and soil |
| 14 | C-0959 | N/A | | sterile |
| 13 | C-0960 | 4 | S | root disturbance |
| 13 | C-0961 | 4 | S | Humus |
| 13 | C-0962 | 4 | S | root disturbance |
| 13 | C-0963 | 4 | D | disturbed soil |
| 13 | C-0964 | 4 | | surface/floor |
| 13 | C-0965 | 4 | С | collapse |
| 13 | C-0966 | 4 | | wall |
| 13 | C-0967 | 4 | | wall |
| 13 | C-0968 | 4 | | fill |
| 13 | C-0969 | 4 | D | modern cut |
| 13 | C-0970 | 4 | | fill |
| 13 | C-0971 | 4 | | fill |
| 13 | C-0972 | 4 | | fill |
| 13 | C-0973 | 4 | | fill |
| 13 | C-0974 | 4 | | fill |
| 13 | C-0975 | 4 | | fill |

| 1 1 | Ī | i - | İ | |
|-----|------------------|-----|------|-------------------------------------|
| 13 | C-0976 | 4 | | fill |
| 13 | C-0977 | 4 | | fill |
| 13 | C-0978 | 4 | | wall |
| 13 | C-0979 | 4 | | fill |
| 13 | C-0980 | 4 | | surface/floor inside square feature |
| 13 | C-0981 | 4 | | fill |
| 13 | C-0982 | 4 | | sterile |
| 13 | C-0983 | 4 | | ceramic concentration over floor |
| 13 | C-0984 | 4 | | sterile |
| 13 | C-0985 | 4 | | possible retaining wall |
| 13 | C-0986 | 4 | | stone line |
| 13 | C-0987 | 4 | | sterile |
| 13 | C-0988 | 4 | | fill |
| 13 | C-0989 | 4 | | fill |
| 13 | C-0990 | 4 | | stone fill |
| 13 | C-0991 | 4 | | ash lens |
| 13 | C-0992 | 4 | | ash lens |
| 13 | C-0993 | 4 | | ash lens |
| 6 | C-1001 | 4 | | ceramic concentration |
| 6 | C-1002 | 4 | | wall |
| 6 | C-1003 | 4 | | wall |
| 6 | C-1004 | 4 | | fill |
| 6 | C-1005 | 4 | | fill |
| 6 | C-1006 | 4 | С | collapse |
| 6 | C-1007 | 4 | C | collapse |
| 6 | C-1008 | 4 | 3 | unfired clay concentration |
| 6 | C-1009 | 4 | | ceramic concentration |
| 6 | C-1010 | 4 | | ash layer with artifacts |
| 6 | C-1011 | 4 | | animal remains |
| 6 | C-1012 | 4 | S/C | humus/collapse |
| 6 | C-1013 | 4 | 5/ G | stone fill |
| 6 | C-1014 | 4 | | ash layer |
| 6 | C-1015 | 4 | С | collapse |
| 6 | C-1015 | 4 | C | ash |
| 6 | C-1017 | 4 | | stone feature |
| 6 | C-1017 | 4 | | stone feature |
| 6 | C-1019 | 4 | | stone feature |
| 6 | C-1019 | 4 | | fill |
| 6 | C-1020 | 4 | | ash lens |
| 6 | C-1021 C-1022 | 4 | | possible stone surface/floor |
| 6 | C-1022 C-1023 | 4 | | line of stones, maybe wall |
| 6 | C-1023 C-1024 | 4 | | line of stones, maybe wall |
| 6 | C-1024 C-1025 | 4 | С | collapse |
| | | 4 | L | _ |
| 6 | C-1026 | _ | | possible stone surface/floor |
| 6 | C-1027 | 4 | | fill |
| 6 | C-1028 | 4 | | three walls |
| 6 | C-1029 | 4 | | floor |
| 6 | C-1030 | 4 | | stone surface |
| 6 | C-1031 | 4 | | fill with artifact concentration |

| 6 | |
|--|--|
| 6 | |
| 6 | |
| 6 | |
| 6 | |
| 6 | |
| 6 C-1039 4 floor 6 C-1040 4 area of clay 2 C-1151 2 platform wall 2 C-1152 4 fill over platform 2 C-1153 2 fill inside platform 2 C-1154 2 platform wall 2 C-1155 2 corridor wall 2 C-1156 2 platform fill 2 C-1157 2 platform stony fill N area 2 C-1158 2 platform wall 2 C-1159 2 fill 2 C-1160 2 ashy fill outside platform 2 C-1161 2 stone ledge (step) 2 C-1162 2 fill inside platform 2 C-1163 2 corridor wall 2 C-1164 2 platform wall 3 C-1165 2 platform fill N of stairway | |
| 6 C-1040 4 area of clay 2 C-1151 2 platform wall 2 C-1152 4 fill over platform 2 C-1153 2 fill inside platform 2 C-1154 2 platform wall 2 C-1155 2 corridor wall 2 C-1156 2 platform fill N area 2 C-1157 2 platform wall 2 C-1158 2 platform wall 2 C-1160 2 ashy fill outside platform 2 C-1161 2 stone ledge (step) 2 C-1162 2 fill inside platform 2 C-1163 2 corridor wall 2 C-1164 2 platform wall 2 C-1165 2 platform fill N of stairway | |
| 2 C-1151 2 platform wall 2 C-1152 4 fill over platform 2 C-1153 2 fill inside platform 2 C-1154 2 platform wall 2 C-1155 2 corridor wall 2 C-1156 2 platform fill 2 C-1157 2 platform stony fill N area 2 C-1158 2 platform wall 2 C-1169 2 ashy fill outside platform 2 C-1161 2 stone ledge (step) 2 C-1162 2 fill inside platform 2 C-1163 2 corridor wall 2 C-1164 2 platform fill N of stairway | |
| 2 C-1152 4 fill over platform 2 C-1153 2 fill inside platform 2 C-1154 2 platform wall 2 C-1155 2 corridor wall 2 C-1156 2 platform fill 2 C-1157 2 platform stony fill N area 2 C-1158 2 platform wall 2 C-1159 2 fill 2 C-1160 2 ashy fill outside platform 2 C-1161 2 stone ledge (step) 2 C-1162 2 fill inside platform 2 C-1163 2 corridor wall 2 C-1164 2 platform fill N of stairway | |
| 2 C-1153 2 fill inside platform 2 C-1154 2 platform wall 2 C-1155 2 corridor wall 2 C-1156 2 platform fill 2 C-1157 2 platform stony fill N area 2 C-1158 2 platform wall 2 C-1159 2 fill 2 C-1160 2 ashy fill outside platform 2 C-1161 2 stone ledge (step) 2 C-1162 2 fill inside platform 2 C-1163 2 corridor wall 2 C-1164 2 platform wall 2 C-1165 2 platform fill N of stairway | |
| 2 C-1154 2 platform wall 2 C-1155 2 corridor wall 2 C-1156 2 platform fill 2 C-1157 2 platform stony fill N area 2 C-1158 2 platform wall 2 C-1159 2 fill 2 C-1160 2 ashy fill outside platform 2 C-1161 2 stone ledge (step) 2 C-1162 2 fill inside platform 2 C-1163 2 corridor wall 2 C-1164 2 platform wall 2 C-1165 2 platform fill N of stairway | |
| 2 C-1155 2 corridor wall 2 C-1156 2 platform fill 2 C-1157 2 platform stony fill N area 2 C-1158 2 platform wall 2 C-1159 2 fill 2 C-1160 2 ashy fill outside platform 2 C-1161 2 stone ledge (step) 2 C-1162 2 fill inside platform 2 C-1163 2 corridor wall 2 C-1164 2 platform fill N of stairway | |
| 2 C-1156 2 platform fill 2 C-1157 2 platform stony fill N area 2 C-1158 2 platform wall 2 C-1159 2 fill 2 C-1160 2 ashy fill outside platform 2 C-1161 2 stone ledge (step) 2 C-1162 2 fill inside platform 2 C-1163 2 corridor wall 2 C-1164 2 platform fill N of stairway | |
| 2 C-1157 2 platform stony fill N area 2 C-1158 2 platform wall 2 C-1159 2 fill 2 C-1160 2 ashy fill outside platform 2 C-1161 2 stone ledge (step) 2 C-1162 2 fill inside platform 2 C-1163 2 corridor wall 2 C-1164 2 platform wall 2 C-1165 2 platform fill N of stairway | |
| 2 C-1158 2 platform wall 2 C-1159 2 fill 2 C-1160 2 ashy fill outside platform 2 C-1161 2 stone ledge (step) 2 C-1162 2 fill inside platform 2 C-1163 2 corridor wall 2 C-1164 2 platform wall 2 C-1165 2 platform fill N of stairway | |
| 2 C-1159 2 fill 2 C-1160 2 ashy fill outside platform 2 C-1161 2 stone ledge (step) 2 C-1162 2 fill inside platform 2 C-1163 2 corridor wall 2 C-1164 2 platform wall 2 C-1165 2 platform fill N of stairway | |
| 2 C-1160 2 ashy fill outside platform 2 C-1161 2 stone ledge (step) 2 C-1162 2 fill inside platform 2 C-1163 2 corridor wall 2 C-1164 2 platform wall 2 C-1165 2 platform fill N of stairway | |
| 2 C-1161 2 stone ledge (step) 2 C-1162 2 fill inside platform 2 C-1163 2 corridor wall 2 C-1164 2 platform wall 2 C-1165 2 platform fill N of stairway | |
| 2 C-1162 2 fill inside platform 2 C-1163 2 corridor wall 2 C-1164 2 platform wall 2 C-1165 2 platform fill N of stairway | |
| 2 C-1163 2 corridor wall 2 C-1164 2 platform wall 2 C-1165 2 platform fill N of stairway | |
| 2 C-1164 2 platform wall 2 c-1165 2 platform fill N of stairway | |
| 2 C-1165 2 platform fill N of stairway | |
| | |
| 1 Z 1 U-1100 1 Z 1 Stone corner tot biattoring | |
| 2 C-1167 2 platform stony fill N area | |
| 2 C-1168 2 lower fill inside corridor | |
| 2 C-1169 2 ashy stony fill outside platform | |
| 2 C-1170 2 dark ashy fill outside platform | |
| 2 C-1171 1 D disturbed fill | |
| 2 C-1172 1 Mito-Kotosh retaining wall | |
| 2 C-1173 1 fill inside C1172 | |
| 2 C-1174 1 fill inside C1172 | |
| fill between C1172 and 1179 (may be partially | |
| 2 C-1175 1 disturbed) | |
| 2 C-1176 1 D disturbed line of rocks | |
| 2 C-1177 1/2 D soil near western extent of Op2 | |
| stone line, may be retaining wall disturbed by | |
| 2 C-1178 1 D looters | |
| 2 C-1179 1 D Mito-Kotosh retaining wall | |
| 2 C-1180 2 wall abutting platform | |
| 2 C-1181 2 dark ashy fill outside platform | |
| 2 C-1182 1 fill over floor (inside Mito-Kotosh enclosure) | |
| 2 C-1183 1 fill inside Mito-Kotosh enclosure | |
| 2 C-1184 1 fill | |
| 2 C-1185 1 fill | |
| 2 C-1186 1 fill | |
| 2 C-1187 1 fill | |
| 2 C-1188 1 disturbed fill | |

| 1 2 | C 1100 | 1 1 | | cu l |
|-----|--------|--------|---|--|
| 2 | C-1189 | 1 | | fill |
| 2 | C-1190 | 1 | | retaining wall |
| 2 2 | C-1191 | 1 1 | | fill |
| | C-1192 | | D | fill fill |
| 2 | C-1193 | 1 | D | |
| 2 | C-1194 | 1 | | fill |
| 2 | C-1195 | 1 | | fill |
| 2 | C-1196 | 1 | | fill |
| 2 | C-1197 | 1 | | fill, maybe floor |
| 2 | C-1198 | 1 | | fill |
| 2 | C-1199 | 1 | | fill |
| | C 1200 | 2 | | ash lens in fill outside platform with a LOT of |
| 2 | C-1200 | 2 | 0 | material |
| 16 | C-1251 | 4 | S | humus |
| 16 | C-1252 | 4 | | fill |
| 16 | C-1253 | 4 | | fill |
| 16 | C-1254 | 4 | 0 | sterile |
| 18 | C-1255 | 4 | S | humus |
| 18 | C-1256 | 4 | | depositional soil/fill |
| 17 | C-1260 | 4 | S | humus |
| 17 | C-1261 | 4 | | fill |
| 17 | C-1262 | 4 | _ | sterile |
| 15 | C-1263 | 4 | S | humus |
| 15 | C-1264 | 4 | S | humus |
| 15 | C-1265 | 4 | | wall |
| 18 | C-1270 | 4 | | wall |
| 18 | C-1271 | 4 | | wall |
| 18 | C-1272 | 4 | | fill |
| 18 | C-1273 | 4 | | collapsed wall |
| 18 | C-1274 | 4 | | retaining wall |
| 7 | C-1301 | 4 | | retaining wall |
| 7 | C-1302 | 4 | | retaining wall |
| 7 | C-1303 | 4 | | canal capstones under floor C842 |
| 7 | C-1304 | 4 | | canal side stones (southwest side) |
| 7 | C-1305 | 4 | | canal side stones (northeast side) |
| 7 | C-1306 | 4 | | artifact concentration |
| _ | | | | concentration of carbonized beans on top of west |
| 7 | C-1307 | 4 | | arm |
| 7 | C-1308 | 4 | | retaining wall |
| 7 | C-1309 | 4 | | retaining wall |
| 7 | C-1310 | 4 | | canal base (?) |
| 7 | C-1311 | 4 | | wall |
| 7 | C-1312 | 4 | | soil and botanicals |
| 7 | C-1313 | 4 | | soil between walls |
| 7 | C-1314 | 4 | | fine soil |
| 7 | C-1315 | 4 | | stone feature |
| 7 | C-1316 | 4 | | retaining wall |
| 7 | C-1317 | 4 | | burial (unexcavated - perhaps woman and child) |
| 7 | C-1318 | 4 | | infant burial |

| 1 7 | L C 1210 | l 4 | l | |
|-----|----------|-------|------|--------------------------------------|
| 7 | C-1319 | 4 | | wall |
| - | C-1320 | 4 | | concentration of stones over sterile |
| 7 | C-1321 | 4 | | surface/floor |
| 7 | C-1322 | 4 | | surface in storage room |
| 7 | C-1323 | 4 | | soil on top of west arm |
| 7 | C-1324 | 4 | | surface/floor with ash |
| 7 | C-1325 | 4 | | remodeled wall |
| 7 | C-1326 | 4 | | retaining wall |
| 19 | C-1351 | 4 | 0.45 | tomb |
| 20 | C-1401 | 4/5/6 | S/D | humus |
| 20 | C-1402 | 4/5/6 | D | tomb exterior patio/looters soil |
| 20 | C-1403 | 4/5/6 | | tomb exterior patio |
| 20 | C-1404 | 4/5/6 | | tomb exterior patio |
| 20 | C-1405 | 4/5/6 | | tomb exterior patio rock line |
| 21 | C-1451 | 4/5/6 | | tomb - chullpa interior |
| 22 | C-1601 | 6 | S | Room - humus |
| 22 | C-1602 | 6 | S | Room - humus |
| 22 | C-1603 | 6 | S | Patio - humus |
| 22 | C-1604 | 6 | S | Patio - humus |
| 22 | C-1605 | 6 | | Room |
| 22 | C-1606 | 6 | | Patio |
| 22 | C-1607 | 6 | | Room |
| 22 | C-1608 | 6 | | Patio |
| 22 | C-1609 | 6 | | Room |
| 22 | C-1610 | 4/5/6 | U | Room |
| 22 | C-1611 | 4 | | Room |
| 22 | C-1612 | 4 | | Room |
| 22 | C-1613 | 6 | | Room |
| 22 | C-1614 | 4 | | Room - ash lens |
| 22 | C-1615 | 6 | | Patio |
| 22 | C-1616 | 4 | | E-W wall |
| 22 | C-1617 | 4/5/6 | U | N-S wall |
| 22 | C-1618 | 6 | | Patio - area of coprolites |
| 22 | C-1619 | 6 | | Patio - Stone on floor |
| 22 | C-1620 | 4 | | Patio - low ledge wall |
| 22 | C-1621 | 4 | | Patio - ledge soil |
| 22 | C-1622 | 4 | | Patio |
| 22 | C-1623 | 3 | | Patio - Top of early buried wall? |
| 22 | C-1624 | 4 | | Patio - ash lens |
| 22 | C-1625 | 4/5/6 | U | Patio |
| 22 | C-1626 | 4 | | Room |
| 22 | C-1627 | 4 | | Patio |
| 22 | C-1628 | 4 | | Room |
| 22 | C-1629 | 4 | | Patio |
| 22 | C-1630 | 4 | | Room |
| 22 | C-1631 | 4 | | Room |
| 22 | C-1632 | 4 | | Room |
| 22 | C-1633 | 4 | | Room - ash |

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|----|---------------------|-------|---|---|
| 22 | C-1634 | 4 | | Room |
| 22 | C-1635 | 4 | | Room |
| 22 | C-1636 | 4 | | Room |
| 22 | C-1637 | 4 | | Patio |
| 22 | C-1638 | 3 | | Patio - Early buried wall corner |
| 22 | C-1639 | 4 | | Patio |
| 22 | C-1640 | 3 | | Patio - Rectangular stone in E11 |
| 22 | C-1641 | 4 | | Patio - ash lens |
| 22 | C-1642 | 4 | | Patio |
| 22 | C-1643 | 4 | | Patio |
| 22 | C-1644 | 4 | | Patio |
| 22 | C-1645 | 4 | | Patio |
| 22 | C-1646 | 4 | | Patio |
| 22 | C-1647 | 4 | | Room |
| 22 | C-1648 | 4 | | Patio |
| 2 | C-1651 | 2 | | ash lens outside platform |
| 2 | C-1652 | 1 | D | fill |
| 2 | C-1653 | 1 | | fill |
| 2 | C-1654 | 2 | | fill outside platform |
| 2 | C-1655 | 2 | | fill outside platform |
| 2 | C-1656 | 2 | | ashy fill outside platform |
| 2 | C-1657 | 2 | | wall with small stones |
| 2 | C-1658 | 1 | | fill |
| 2 | C-1659 | 1 | | fill |
| 2 | C-1660 | 1 | | fill |
| 2 | C-1661 | 1 | | fill |
| 2 | C-1662 | 1 | | fill |
| 2 | C-1663 | 1 | | floor? |
| 2 | C-1664 | 1 | | floor? |
| 2 | C-1665 | 1 | | fill |
| 2 | C-1666 | 1 | | fill |
| 2 | C-1667 | 1 | | fill below inner Mito-Kotosh wall |
| 2 | C-1668 | 1 | | fill below inner Mito-Kotosh wall |
| 2 | C-1669 | 2 | | ashy fill outside platform |
| 2 | C-1670 | 2 | | ashy fill outside platform |
| 2 | C-1671 | 1 | | Floor fill below inner Mito-Kotosh wall |
| 2 | C-1672 | 2 | | fill outside platform |
| 2 | C-1673 | 2 | | fill outside platform |
| 2 | C-1674 | 2 | | fill outside platform |
| 2 | C-1675 | 2 | | fill outside platform |
| 2 | C-1676 | 1 | | fill below inner Mito-Kotosh wall |
| 2 | C-1677 | 1 | | wall (renumbering of C65) |
| 2 | C-1678 | 1 | | floor? |
| 2 | C-1679 | 1 | | fill |
| 12 | C-1079 C-Surface | 4/5/6 | D | tomb |
| 22 | C-Surface | | S | patio |
| 77 | G-Surface | 4/5/6 | J | pauo |

Appendix D

Ceramic Remains

Ceramic analysis was a collaborative effort, and was aided by the work of Elizabeth Cruzado Carranza, Bryan Núñez Aparcana, and Erick Casanova Vasquez, among others. Ceramic remains were principally analyzed for their form, function, and affiliation with known styles. Form analysis included identifying specific vessel forms (bowls, plates, cups, jars, ollas, etc.). These forms were then grouped into three function categories: preparation vessels (i.e. cooking, brewing; jars, ollas, colanders, etc.), serving vessels (i.e. consuming, drinking; bowls, plates, cups, etc.), and intermediate serving vessels (i.e. pouring; bottles, *escudillas*, etc.). Finally, a style affiliation was also assigned, which allowed for diachronic analyses of vessel function. Plainware sherds were grouped by period where the contexts they were found in could be reliably assigned to a particular period.

Table D.1 Form/Function analysis categories.

| Food Prep. (i.e. cooking, storing, brewing, etc.) | Serving (i.e. distributing, consuming, etc.) | Int. Serving (i.e. pouring) |
|--|---|-----------------------------|
| jars | bowls | bottles |
| short necked pots (olla) | plates | escudillas |
| neckless pots (olla) | cups | pacchas |
| colanders | | |

Additional formal attributes were recorded, and full analysis of these remains is ongoing with the goal of identifying local and regional types based on their production techniques. These additional attributes include:

Table D.2 Ceramic attributes collected.

| Length | Rim Form | Base Form | Production Errors | Decoration Technique |
|--------------------|-----------------|-------------------------|---------------------------|-----------------------------|
| Width | Rim Elaboration | Base Diameter | Residue or Soot? | Decoration Location Int. |
| Thickness | Rim Everted | Base % | Color Pattern | Decoration Location Ext. |
| Weight | Rim Diameter | Foot Form | Colors (Int/Ext/Paste) | Decoration Motif |
| Vessel Fragment | Rim % | Handle Form/Location | Temper | Known Style? |
| Vessel Form | Lip Form | Forming Technique | Temper Size | |
| Vessel Shape | Neck Form | Surface Treatment | Temper % | |

The form, function, and style/period analysis revealed the following results, which are discussed in Chapters 5, 6 and 7. Details on the ceramic styles present and the use of particular vessels is discussed throughout the dissertation. The data presented here include ceramics from Operations 1, 2, 4, 5, 7, 13, 15, 16, 17, and 18. Areas with mixing, especially tombs, were excluded because the main goal was to observe changes through time.

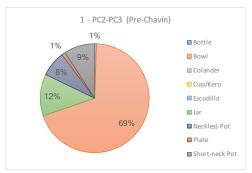
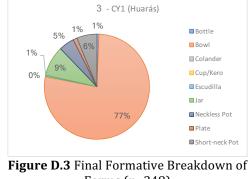


Figure D.1 Early-Middle Formative Period Breakdown of Forms (n=185)



Forms (n=348)

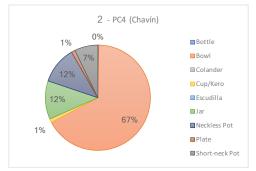


Figure D.2 Late Formative Period Breakdown of Forms (n=485)

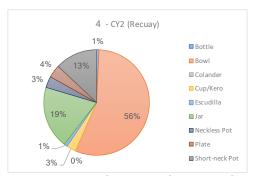


Figure D.4 Early Intermediate Period Breakdown of Forms (n=2396)

Table D.3 Vessel forms by period.

| | 1 - PC2-PC3 (Pre-Chavín) | 2 - PC4 (Chavín) | 3 - CY1 (Huarás) | 4 - CY2 (Recuay) | Grand Total |
|----------------|-----------------------------|---------------------|---------------------|---------------------|-------------|
| Bottle | 1 | 1 | 3 | 18 | 23 |
| Bowl | 128 | 233 | 375 | 1337 | 2073 |
| Colander | | | | 1 | 1 |
| Cup/Kero | | 4 | 1 | 69 | 74 |
| Escudilla | | | 2 | 24 | 26 |
| Jar | 23 | 41 | 45 | 459 | 568 |
| Neckless Pot | 14 | 40 | 23 | 83 | 160 |
| Plate | 2 | 4 | 6 | 94 | 106 |
| Short-neck Pot | 17 | 25 | 30 | 311 | 383 |
| Grand Total | 185 | 348 | 485 | 2396 | 3414 |

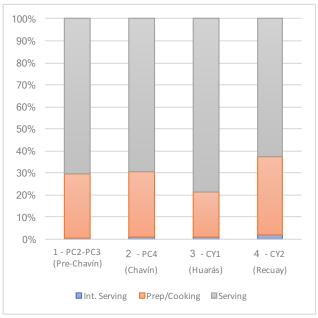


Figure D.5 Percentage of vessels by function and period.

Table D.4 Vessel function by period.

| Function | 1 - PC2-PC3 (Pre-Chavín) | 2 - PC4 (Chavín) | 3 - CY1 (Huarás) | 4 - CY2 (Recuay) | Grand Total |
|--------------------|-----------------------------|---------------------|---------------------|---------------------|-------------|
| Int. Serving | 1 | 3 | 5 | 42 | 51 |
| Prep/Cooking | 54 | 103 | 98 | 852 | 1107 |
| Serving | 130 | 242 | 382 | 1502 | 2256 |
| Grand Total | 185 | 348 | 485 | 2396 | 3414 |
| | | | | | |
| Int. Serving | 1% | 1% | 1% | 2% | |
| Prep/Cooking | 29% | 30% | 20% | 36% | |
| Serving | 70% | 70% | 79% | 63% | |

Appendix E

Lithic Remains

Lithic Data Recording and Analysis at the Hualcayán Site

By Robert P. Connolly, January 12, 2017

The methods reported below are those I used in the analysis of the lithic materials excavated from Hualcayán between 2011 and 2014. Noteworthy is the general lack of published studies of non-sculptural/architectural lithic assemblages recovered from prehistoric sites in highland Ancash, Peru. Limited references for northern Peruvian highland lithic assemblages (e.g., Downey 2010: 77-95; Lau 2001:377-394) were consistent with my initial observations of the lithic tool assemblage at Hualcayán - ground stone manos and metates (morteros/batanes) and an expedient flake technology. Specifically, Downey's cited work at Cerro Icchal several hundred kilometers north of Hualcayán reports the data quite similar to those used for the Hualcayán assemblage. Lau's chipped stone assemblage from the nearby Ancash site of Chinchawas is focused primarily on raw material sources and divisions of the artifact type (e.g., flake, tool, bladelet). The data record and the analysis of the Hualcayán chipped stone assemblage aligns closely with that reported by Downey and is based on my previous data recording and analysis of chipped stone assemblages (e.g., Connolly 1991, 1999, 2004, 2012).

Research Objectives

The development of the chipped stone analysis methods and measures focused on addressing the following questions and expectations.

- 1. Which lithic assemblage characteristics best provide evidence for specific technological and functional inferences?
- 2. What classifications and characteristics of the Hualcayán lithic assemblage provide the most unambiguous interpretation of specific activity areas, for intrasite comparisons, and for intersite comparisons?
- 3. The expectations for specific activities as reflected in flint artifacts are discussed below. Note that the types listed below are not necessarily mutually exclusive, may co-occur in combination, or may be encountered as isolated outlier zones.

Habitation zones are expected to contain the widest array of all lithic artifact attributes based on the presumed non-specialized and multi-task nature. Habitation zones are also expected to contain low to moderate densities of lithic materials, regularly maintained cooking and structure zones that are virtually "clean" of artifacts.

Lithic reduction stations are expected to contain a more restricted range of artifact and raw material types reflecting one or more specific manufacturing trajectories. Density of artifacts is expected to be high. Use-wear rates should be low.

Nonlithic material processing zones are expected to contain a proportionately greater number of formal tools and a high rate of use-wear. Lithic artifact densities should be moderate to low, reflecting a space maintained for the processing of other materials.

Lithic dumping zones are characterized by containing the highest density of artifacts in a sharply circumscribed area. Such zones are expected in association with any of the above zone types. Variability in the assemblage is dependent on the associated activity type.

Special purpose zones, admittedly a catch-all category not easily placed within another zone type, are expected to contain highly anomalous lithic deposits. Conventional reporting refers to such contexts as "ritual" whereas this report uses the less loaded term "specialized."

The task of addressing these questions and expectations forms the basis of the following methods for the analysis of the Hualcayán lithic assemblage. A voluminous discussion in lithic analysis has focused on the reliability of inferring type or stage of reduction based on debitage form (e.g., Amick and Mauldin 1989; Henry and Odell 1989; Odell 1996; Prentiss 1998; Sullivan and Rozen 1985). Models that rely on the presence or absence of cortex (White 1963) are problematic. No consistent percentage of cortex on the exterior surface of lithic debitage has been established for the assignment of materials to either primary, secondary, or tertiary stages of reduction. Sullivan and Rozen (1985:757) report the wide range of cortical variation that different analysts have used in assigning debitage to the same stage of reduction. In addition, analysts use various reduction sequence typologies that are not comparable. A cursory examination of the literature reveals a bewildering array of flake types, often undefined by the author. The current situation makes intersite comparison of lithic assemblages difficult, to say the least, and incomplete or imprecise at best.

White's flake typology (1963), which served as the basis for a large portion of lithic analysis since the early 1960s, does not account for the completeness of a flake. Therefore, in White's typology, a flake fragment with an exterior surface completely covered by cortex will be assigned to the primary decortication category on the assumption that the unobserved portion of the flake also retains cortex over the entire exterior surface. This assumption may not be warranted in all cases. Depending upon the typology used and the corresponding cortex presence requirements for establishing a specific stage of reduction (see Sullivan and Rozen

1985:757), the unobserved portion of the flake may or may not affect assignment to a primary, secondary, or tertiary stage. Again, the ambiguity may result in tenuous intersite comparisons. This is especially problematic with samples, such as the Hualcayán lithics, that contain a large percentage of incomplete flakes and debris.

In addition, raw materials obtained from tabular bedded sources or as nodules will differentially reflect the presence or absence of a distinguishable cortex. When cortex is present, variation in nodule size affects the amount of cortex present. Smaller nodules contain more cortex per volume than larger nodules. Therefore, the ratio of cortical to non-cortical flakes is greater for small as opposed to larger nodules.

This discussion does not invalidate or ignore the interpretative value of cortical variation in lithic debitage assemblages. The intention is to establish comparable units of analysis that aid in intersite and interobserver comparisons. Establishing the completeness of a debitage artifact as a first step in the analysis of lithic assemblages alleviates some problems discussed thus far. When the unit of analysis is consistent, whether an analyst chooses to assign 50-70% or only 100% cortical flakes to the primary reduction stage, the designation is less problematic. The basis for such an assignment is technological interpretation. The initial designation of completeness, however is an interpretation-neutral categorization.

The analysis of metric attributes (length, width, thickness, and weight) among comparable units of analysis of lithic debitage provides supporting evidence for inferences regarding type of reduction (primary vs. secondary). Neither size nor any other single characteristic of lithic debitage can be the sole determinant for

inferences about the type of reduction activity. In general, however, primary reduction should be represented by larger and heavier debitage than secondary reduction (McGimsey, Odell, and Wiant 1986:197). Different reduction stages should be observable in the clustering of metric attributes within and between assemblages.

In consideration of the previous discussion and the stated goals of the current research, the following debitage typology developed by Sullivan and Rozen (1985:758-759), based on the completeness of individual artifacts, is used for the analysis of chipped stone artifacts from Hualcayán:

Complete Flakes are debitage that have a single interior surface as indicated by positive percussion features such as ripple marks, force lines, or a bulb of percussion. Complete flake margins also must be intact with either a distal hinge or feather termination. A point of applied force must be present. Sullivan and Rozen (1985:758) state that a missing striking platform indicates the absence of a point of applied force. This requirement would eliminate those flakes whose platforms shattered during detachment from the core material. The current analysis does not consider platform attributes. The metric variables derived from the complete flake category are length, width, thickness, and weight. The presence or absence of a striking platform is not crucial to these variables. For this study, a striking platform is not required to judge a flake complete, so long as a bulb of percussion is present and the absence of a striking platform does not affect the measurement of flake length by more than 2 mm. The estimate pertains only to flakes with crushed or

collapsed platforms. A generalized reconstruction of flake form determined the 2 mm estimate and is considered approximate.

Proximal Flakes meet the same criteria as complete flakes except their margins are not intact. Therefore, this category includes flakes that terminate distally in a step fracture or lack their distal portions because of breakage from use or other cultural or natural processes.

Flake Fragments exhibit single interior surfaces as defined above but do not possess intact margins or evidence of a point of applied force.

Debris accommodates those lithic artifacts that do not exhibit single interior surfaces, intact margins, or points of applied force. This category includes what analysts refer to as "shatter," "fragments," "angular fragments" (Stafford 1985:259), "nonorientable fragments" (Prentiss and Romanski 1989:89), or "chunks" (Tomka 1989:137). This category can perhaps best be described as containing indeterminate lithic materials resulting from the manufacture of chipped stone artifacts.

Complete flake length, width, thickness, and weight measurements were recorded for each artifact. Weight was measured to the nearest 0.1 gram using a digital balance. Length, width, and thickness were recorded using a 6 inch digital caliper. The measurements used for this study are based on Wiant and Odell

(1986:177) and are as follows:

- 1) Length Length of flake on a line perpendicular to the striking platform, measured to the nearest millimeter.
- 2) Width Maximum width measured perpendicularly to the longitudinal axis, measured to the nearest millimeter.
- 3) Thickness At a point approximately one-half of the flake length distal to the bulb of percussion, measured to the nearest millimeter.
- 4) Weight Measured to the nearest 0.1 gram.

Artifacts that could not be oriented reliably to the point of applied force (e.g., core material, debris, flake fragments) were oriented such that lengths were the greatest measure, width the second largest measure, and thickness the smallest measure.

Relative thickness

Relative thickness (Sullivan and Rozen 1985:765) is a measure of a complete flake defined as the sum of the flake's length and width divided by the flake's thickness. This variable describes flake morphology for generating broad

interpretations of reduction stage. However, relative thickness cannot stand alone as a reliable and valid measure. For example flakes with the following values and different shapes yield the same relative thickness:

| length | = | 20 | length | = | 40 |
|--------------------|---|----|--------------------|---|----|
| width | = | 16 | width | = | 20 |
| thick | = | 3 | thick | = | 5 |
| | | | | | |
| relative thickness | = | 12 | relative thickness | = | 12 |

However, factoring in weight allows for the recognition of the different morphology of the two flakes, providing a more robust description of artifact form. The utility of the mean value of a sample's relative thickness in combination with the sample's mean weight of complete flakes is useful in providing a general measure of the reduction stage represented. This assertion is based on a large to small, primary to tertiary reduction continuum.

To summarize, a debitage typology based on completeness best suits the Hualcayán lithic assemblage for several reasons. First, categories are mutually exclusive, interpretation-neutral, and the analysis accommodates the full range of variation in a lithic debitage assemblage (Rozen and Sullivan 1989b: 179-181; Sullivan and Rozen 1985:759). Second, after sorting debitage into mutually exclusive categories, inferences can be made based on variation in raw material, cortex, use-wear, and other attributes using comparable rather than unknown or

dissimilar units of analysis. Third, mutually exclusive categories that accommodate the full range of variation in a lithic debitage assemblage can be most profitably employed in intrasite and intersite comparisons. Fourth, the typology captures variation at the assemblage rather than the artifact level.

Other Artifact Types

Bifacially Worked Tools. As is true in virtually all archaeological excavations, bifacially worked tools account for a minute proportion of the total Hualcayán lithic assemblage. The biface category includes all those artifacts that are of a known formal biface type, invasively flaked (flaking not restricted to the periphery), or exhibit evidence of the intentional shaping of at least one edge. Where appropriate, individual bifacial artifacts will be discussed for making technological, functional, or cultural inferences. Metric attributes were recorded for all bifaces.

Core Material. A core, in the most simplistic terms, refers to a lithic artifact that retains evidence of flake detachment (White 1963:6). Cores, therefore, exhibit only negative percussion features (Rozen and Sullivan 1989a). As with other lithic types, analysts evaluate cores by a number of different characteristics. Analysts use the terms "exhausted" and "remnant" cores or core "nuclei" (e.g., McNerney 1987:71; White 1963:6) to denote artifacts that can no longer be flaked because of their reduced state. The type "core fragment" may represent the further reduction of presumably exhausted cores. The most readily available distinctions of cores are

those artifacts that exhibit prepared platforms and a spherical or conical shape and multidirectional flake cores that do not necessarily have prepared platforms and whose flakes are more fortuitously and randomly removed (McNerney 1987:75).

Other Variables Included in Analysis

Use-Wear and Retouch. Tentatively and for experimental purposes, baseline use-wear analysis of the Hualcayán lithic assemblage will employ the "Low-Power Approach" described by Odell and Odell-Vereecken (1980). Their method is the least speculative approach, the easiest to perform, and provides the required information for the problems addressed in this chapter. The primary concern is establishing the incidence of use-wear in specific contexts. Artifacts are examined using a 10 to 40 power magnification.

Use-wear is often reflected in microflaking along an artifact's edge.

Microflaking that results from the intentional retouch of an artifact may appear similar to edge damage caused by using an artifact for processing materials.

Microflaking that results from use-wear is generally smaller, less regularly spaced, and often concentrated on the projecting aspects of the artifact (Odell and Odell-Vereecken 1980:96). Microflaking from spontaneous "retouch" or edge-damage can be confused with use-wear or intentional retouch. This form of edge-damage is not related to prehistoric activity but results from natural processes, excavation techniques, or the transportation and analysis of excavated materials. Such damage will most commonly result in random flake scar patterns, particularly on projecting

edges. In order to account for spontaneous retouch, use-wear analysis prudently requires a minimum of three contiguous flake scars on an artifact's edge before an object is judged to exhibit traces of use-wear. Amount of use-wear will be recorded on a scale of 1 to 4 and refers to an average of the percent of occurrence on all edge damaged surfaces (i.e., 1 = < 25%, 2 = 26-50%, 3 = 51-75%, and 4 = 76-100%).

Within a specific recovery context, the occurrence of edge-damage at the assemblage level can be determined by the relative proportion of artifacts that exhibit traces of use-wear. In addition to artifact type, different raw materials may exhibit different traces of edge damage from similar uses. Therefore, control for raw material will enhance inferences made from this analysis. Finally, working materials such as meat, flesh or other soft materials may not result in edge damage without a protracted period of use, if at all, therefore conservatively biasing any interpretations.

The methods outlined above are considered the most appropriate in general nonspecialized use wear studies at Hualcayán for two reasons. First, the "Low-Power Approach" addresses the immediate questions of amount and intensity of use for the lithic artifacts examined. Given the time constraints and facilities available, this approach was also the most suitable choice because the procedure is the easiest to perform and has a greater validity and reliability than "High-Power" approaches. Second, determining the amount and intensity of use of Hualcayán's artifacts provides data for both intrasite and intersite comparisons. As discussed below, the ability to actually examine the artifacts for traces of use-wear was extremely limited due to the unwashed condition of the materials.

Cortex Amount. The presence of cortex is often used as a measure of reduction stage. A large number of artifacts whose exteriors are covered with cortex can be indicative of early reduction sequences and a low number can indicate that lithic materials were initially reduced off-site and that only later stage reduction occurred as evidenced by a particular assemblage. Although reliance on cortex as a sole indicator of reduction is problematic, as discussed above, presence/absence is useful as a single indicator. Although many analysts insist that the exterior surface of a flake be covered entirely by cortex to constitute what is referred to as a "primary decortication flake," the apparent lowest amount of coverage considered valid for this type of flake is 70% (Sullivan and Rozen 1985).

The amount of cortex present on lithic debitage can be used to infer primary reduction. As argued above, complete flakes provide the most meaningful indication of cortex presence. This does not preclude, however, comparing the presence of cortex among other comparable units of analysis, or within a given context. To provide the most complete data on which to base interpretations, the cortex present on the exterior surfaces of all lithic artifacts was recorded on a scale of 1 - 10 (1 = 10% coverage, 10 = 100% coverage).

Raw Material – As there was no comparative sample available for recording raw material, only color and obvious types were noted. Further, as the Hualcayán lithic assemblage remains unwashed, color and material type often could not be reliably determined.

Application Considerations

The following will impact any interpretations:

- Detail of analysis not available from other reports of sites for comparable intersite comparisons.
- The analysis includes the examination of 3766 chipped stone or flaked artifacts. The volume of soil/excavation units is not considered in this report. Therefore density considerations are not proposed. That is, the intensity of a specific activity based on the quantity of lithic artifacts present is not meaningfully proposed beyond presence or absence based on quantity. Simply comparing 50 objects from one context to a similar quantity in another context cannot be made meaningful in terms of "more" or "less than" than other contexts without some consideration of volume or spatial extent of the context from which the materials were recovered.
- The percentages of individual artifact types of the total recovered from
 within an individual Operation may be compared to the percentages of
 individual artifact types recovered from other Operations. Given the
 available data, these comparisons will provide the robust inter-Operation
 comparisons of the Hualcayán site.
- As noted in the methods section above, the unwashed condition of the lithic material at the time of data recording precluded more than cursory observations of raw material and use-wear.

Data Analysis

I will report general analysis results of specific measures for the Hualcayán lithic assemblage and significant findings by individual operation. Given the quantity and distribution of lithic materials across the entire collection assemblage, the condition of the assemblage as previously reported, I emphasize the preliminary nature of the results. Although "preliminary nature" is often used as a means to discount any inferences from the results, in this report, the interpretive findings are clearly stated with the requisite caveats. In so doing, the interpretations, though preliminary, are completely valid and reliable.

Relative Thickness

Tables 1 and 2 report the relative thickness of complete flakes by operation and period, respectively. Values are not computed for operations with less than 18 complete flakes. Although the quantities are quite variable by operation, there is no indication that the mean or median values reported in Table 1 or 2 are necessarily skewed based on quantity. That is, the variation in mean and median values is a genuine reflection of variation in the operation samples and not simply an artifact of sample size. This conclusion is supported by the arrangement of both relative thickness and weight median and mean values along an axis of quantity. The distribution appears random.

A 5% trim mean value was used for comparing the operation samples to account for a single large flake that could greatly skew the average of a 50 piece

sample. At the same time, median value tends to mask real variation beyond the individual outlier in a sample. Therefore the 5% trim mean will produce the most descriptive value for the an entire operation sample for the purposes of this report.

Based on these considerations, the following observations are noted for the relative thickness measure:

- Figure 1 shows the distribution of relative thickness by weight volumes plotted for both operation and periods.
- Operations 6 and 7 are clear outliers. Operation 6 position is that of large (39 x 26 mm), thick (7.9 mm) heavy (13.5 g) flakes. Operation 7 contains similar values but are on average only half as thick (3.39 mm). Both values suggest the initial reduction in manufacturing of stone or the creation of flake tools in an expedient flake technology. The Operation 5 value represents slightly smaller flakes but considerably thinner (2.8) and weighing less (4.4g).
- The remainder of the operation samples group together as a typical assemblage that includes a full range of reduction processes.
- The relative thickness by period does not contain any outliers through time
 with the single sample of 10 artifacts from pre-ceramic levels. The very small
 quantity of this sample precludes further consideration.

Tools & Cores

The Hualcayán lithic assemblage is noteworthy for the limited number of well-formed tools and the reliance on expedient flake technology and crudely

formed bifacial and unifacial tools. These assertions are consistent with the data presented in Tables 3 – 6. Because of the considerable variation in sample size by operation, Tables 5 and 6 provide the most useful data for comparing operations.

Coupled with the discussion of relative thickness, Operation 7 is noteworthy for the amount of cores from which presumably, the large flakes recovered in the operation were struck. Of note are the nine unmodified tool forms that exhibited evidence of use-wear. Table 7 shows evidence of use-wear on both total artifacts and tools from all operations. As noted above, the traces of use-wear are likely very underreported in the assemblage. Of particular note, in combination with other measures is the amount reported for Operation 7.

Groundstone Artifacts

Tables 8 – 9 report the distribution of ground stone tools in the artifact assemblage (though this table represents only a sample of groundstone artifacts, as many were not available for study at the time of analysis).

Interpretation by Operation

Conclusions:

- Operations 6 & 7 stand out as special activity areas that are well-maintained with a substantive quantity of tools, expedient flakes, use-wear and cores.
- There does not appear to be a substantive difference in any measures by period.
- The remainder of the assemblage reflects a general expedient flake

technology with a modest amount of simply formed tools.

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| | Complete Flake | | ole 1 kness and We | eight by Operation | n |
|-----------|-----------------|---------------|-----------------------|--------------------|--------|
| Operation | Count | Relative Thic | ek (mm) | Weight (g) | |
| | | Mean – 5% | Median | Mean – 5% | Median |
| 1 | 103 | 9.0 | 8.5 | 5.2 | 3.2 |
| 2 | 18 | 12.2 | 11.0 | 5.6 | 3.0 |
| 3 | 1 | | | | |
| 4 | 2 | | | | |
| 5 | 25 | 15.6 | 15.0 | 4.2 | 3.0 |
| 6 | 49 | 19.7 | 19.3 | 8.4 | 3.0 |
| 7 | 72 | 8.8 | 8.4 | 12.1 | 7.0 |
| 9 | 1 | | | | |
| 11 | 1 | | | | |
| 12 | 2 | | | | |
| 13 | 39 | 8.2 | 8.2 | 4.8 | 3.0 |
| 16 | 1 | | | | |
| 18 | 1 | | | | |
| 20 | 1 | | | | |
| 22 | 38 | 11.8 | 11.6 | 6.3 | 6.0 |
| | | | | | |
| All | 475 (6 missing) | 11.7 | 10.0 | 10.0 | 4.0 |

| Table 2 Complete Flake Relative Thickness and Weight by Period | | | | | | | | | | |
|--|-------|------------------------------------|------------------|-----------|--------|--|--|--|--|--|
| Period | Count | Relative Thickness (mm) Weight (g) | | | | | | | | |
| | | Mean – 5% | Median | Mean – 5% | Median | | | | | |
| 0 | 10 | 16.4 | 15.5 | 2.2 | 2.0 | | | | | |
| 1 | 33 | 12.9 | 12.5 | 4.8 | 3.0 | | | | | |
| 2 | 55 | 9.00 | 8.33 | 3.8 | 3.0 | | | | | |
| 3 | 25 | 8.6 | 8.6 8.25 5.7 3.0 | | | | | | | |
| 4 | 229 | 11.7 | 10.3 | 7.3 | 4.0 | | | | | |

| 4 – 6 | 38 | 11.8 | 11.6 | 6.3 | 6.0 |
|-------|----|------|------|-----|-----|
| | | | | | |

| | Table 3 | | | | | | | | | | |
|-----------|---------------|-------------|--------------|--------------|-------------|---------|--------------|--|--|--|--|
| | То | ol Type & T | Total Lithic | Quantity b | y Operation | 1 | | | | | |
| Operation | All Lithic | Scraper | Core | Used Core | Biface | Uniface | Unmod Use | | | | |
| 1 | 718 | 3 | 63 | 3 | 56 | 10 | 6 | | | | |
| 2 | 702 | 1 | 65 | 1 | 42 | 7 | 1 | | | | |
| 3 | 53 | | 8 | 1 | 1 | 1 | | | | | |
| 4 | 218 | 4 | 33 | 1 | 25 | 4 | 5 | | | | |
| 5 | 164 | | 17 | | 2 | 1 | | | | | |
| 6 | 540 | | 58 | | 12 | 2 | | | | | |
| 7 | 398 | 3 | 58 | 2 | 12 | 6 | 9 | | | | |
| 9 | 62 | | 2 | 4 | 2 | | | | | | |
| 12 | 13 | | 1 | | 2 | | | | | | |
| 13 | 414 | | 34 | | 10 | 2 | | | | | |
| 18 | 14 | | 2 | | | 1 | | | | | |
| 20 | 20 | | 4 | | 2 | 1 | | | | | |
| 22 | 177 | 1 | 17 | | 5 | 1 | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| | Table 4 Tool Type and Total Lithic Quantity by Period | | | | | | | | | | | |
|--------|---|---------|------|--------------|--------|---------|--------------|--|--|--|--|--|
| Period | All Lithic | Scraper | Core | Used Core | Biface | Uniface | Unmod Use | | | | | |
| 0-1 | 222 | | 25 | | 14 | 1 | 2 | | | | | |
| 2 | 451 | 1 | 30 | | 10 | 5 | 1 | | | | | |
| 3 | 142 | 1 | 11 | 2 | 20 | 1 | 3 | | | | | |
| 4 | 2034 | 9 | 227 | 2 | 49 | 18 | 16 | | | | | |
| 4-6 | 310 1 16 5 1 | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Table 5 | | | | | | | | | | | | |
|--|----------|---------|------|------|--------|---------|-----------|--|--|--|--|--|
| Tool Type Percentage of Total Lithic Percentage by Operation | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| Operation | Tool % | Scraper | Core | Used | Biface | Uniface | Unmodifed | | | | | |
| | of Total | | | Core | | | Use | | | | | |
| 1 | 19.6 | <.01 | 8.8 | .01 | 7.8 | 1.3 | <.01 | | | | | |
| 2 | 16.6 | <.01 | 9.3 | <.01 | 6.0 | <.01 | <.01 | | | | | |
| 3 | 20.0 | | 16.9 | 1.8 | 1.8 | 1.8 | | | | | | |
| 4 | 33.0 | 1.8 | 15.1 | <.01 | 11.4 | 1.8 | 2.2 | | | | | |
| 5 | 12.2 | | 12.5 | | 1.2 | 0.4 | | | | | | |
| 6 | 13.3 | | 10.9 | | 2.2 | 0.3 | | | | | | |
| 7 | 22.6 | 0.7 | 18.8 | 0.5 | 3.0 | 1.5 | 2.3 | | | | | |
| 9 | 12.9 | | 3.0 | 7.2 | 3.0 | | | | | | | |
| 12 | 23.1 | | 7.6 | | 15.4 | | | | | | | |
| 13 | 11.1 | | 8.2 | | 2.4 | 0.5 | | | | | | |
| 18 | 21.4 | | 14.3 | | | 7.1 | | | | | | |
| 20 | 35.0 | | 20.0 | | 10.0 | 5.0 | | | | | | |
| 22 | 13.5 | 0.5 | 9.6 | | 2.8 | 0.5 | | | | | | |

| | Table 6 Tool Type Percentage of Total Lithic Percentage by Period | | | | | | | | | |
|--------|---|---------|------|------|--------|---------|-----------|--|--|--|
| Period | Tool % | Scraper | Core | Used | Biface | Uniface | Unmodifed | | | |
| | of Total | | | Core | | | Use | | | |
| 0-1 | 18.9 | | 11.3 | | 6.3 | 0.4 | 0.9 | | | |
| 2 | 10.4 | 0.2 | 6.7 | | 2.2 | 0.9 | 0.2 | | | |
| 3 | 26.7 | 0.7 | 2.4 | 1.4 | 14.1 | 0.7 | 2.1 | | | |
| 4 | 4 15.8 0.4 11.2 <0.1 2.4 0.9 0.8 | | | | | | | | | |
| 4-6 | 7.4 | 0.3 | 5.2 | | 1.6 | 0.3 | | | | |

| | Table 7 | |
|------------|-------------------------------|--------------------------|
| Evidence o | f Use Wear Total & on Tools b | by Operation |
| Operation | Total Ct. of Op. Use-Wear | Ct. of Use-Wear on Tools |
| 1 | 21 | only |
| 1 | 31 | 22 |
| 2 | 19 | 12 |
| 3 | 1 | 1 |
| 4 | 17 | 12 |
| 5 | 5 | 1 |
| 6 | 13 | 4 |
| 7 | 12 | 10 – 8 on unmodified |
| | | "tools" |
| 9 | 1 | 1 |
| 12 | 2 | 0 |
| 13 | 9 | 5 |
| 15 | 1 | 1 |
| 20 | 2 | 2 |
| 21 | 1 | 1 |
| 22 | 4 | 2 |
| | | |
| | | |
| | | |
| | | |

| Table 8 Groundstone | | | | | |
|----------------------|-----------------------|-----------|--|--|--|
| Key for below tables | Description | Total Ct. | | | |
| 1 | Platter or plate | 6 | | | |
| 2 | Whorl | 5 | | | |
| 3 | Metate | 5 | | | |
| 4 | Mano | 36 | | | |
| 5 | Hammerstone | 39 | | | |
| 6 | Polishing Stone | 16 | | | |
| 7 | Projectile point form | 7 | | | |
| 8 | Baton | 3 | | | |
| 9 | Bead, ornament | 5 | | | |
| 10 | Hoe, axe | 4 | | | |
| 11 | Mace | 1 | | | |
| 12 | Bola weight | 8 | | | |

| Table 9 Quantity of Groundstone Type by Operation | | | | | | | | |
|---|---|---|---|-----|--------|---|----|----|
| Groundstone Type | | | | Ope | ration | | | |
| | 1 | 2 | 4 | 6 | 7 | 8 | 13 | 22 |
| Platter or plate | 2 | 1 | | 2 | | | 1 | |
| Whorl | 3 | | | | | | | |
| Metate | | 1 | | 1 | | | | |
| Mano | 2 | 7 | | 5 | 7 | | | |
| Hammerstone | 2 | 6 | 3 | 8 | 6 | | 2 | 1 |
| Polishing Stone | 4 | 1 | | 4 | 1 | | | |
| Projectile point form | 1 | 2 | | 1 | 2 | 1 | | |
| Baton | | 1 | | | 2 | | | |
| Bead, ornament | | 1 | | 1 | 2 | | | |
| Hoe, axe | 1 | 1 | 1 | | | | | |
| Mace | | | | | | | | |
| Bola weight | | | | 1 | | | | |

Tool types by Operation

| tooltype | | | | |
|-----------|-----------|---------|-------|------------|
| Operation | Frequency | Percent | Valid | Cumulative |

| | | | Percent | Percent | | |
|------|---------|--------|---------|---------|-------|-------|
| | Valid | 1.00 | 2 | 1.9 | 4.0 | 4.0 |
| | | 1.10 | 1 | 1.0 | 2.0 | 6.0 |
| | | 2.00 | 25 | 24.3 | 50.0 | 56.0 |
| | | 2.10 | 8 | 7.8 | 16.0 | 72.0 |
| | | 3.00 | 2 | 1.9 | 4.0 | 76.0 |
| | | 4.00 | 2 | 1.9 | 4.0 | 80.0 |
| | | 4.10 | 7 | 6.8 | 14.0 | 94.0 |
| | | 5.00 | 3 | 2.9 | 6.0 | 100.0 |
| | | | 50 | 48.5 | 100.0 | 100.0 |
| | Minning | Total | | | 100.0 | |
| | Missing | System | 53 | 51.5 | | |
| 4.00 | Total | 103 | 100.0 | 2 | 7 | 7 |
| 1.00 | Valid | .00 | 1 | .2 | .7 | .7 |
| | | 1.00 | 2 | .4 | 1.4 | 2.1 |
| | | 1.10 | 1 | .2 | .7 | 2.8 |
| | | 2.00 | 40 | 7.9 | 28.2 | 31.0 |
| | | 2.10 | 20 | 3.9 | 14.1 | 45.1 |
| | | 2.20 | 3 | .6 | 2.1 | 47.2 |
| | | 3.00 | 2 | .4 | 1.4 | 48.6 |
| | | 3.10 | 1 | .2 | .7 | 49.3 |
| | | 4.00 | 15 | 3.0 | 10.6 | 59.9 |
| | | 4.10 | 23 | 4.5 | 16.2 | 76.1 |
| | | 4.20 | 15 | 3.0 | 10.6 | 86.6 |
| | | 4.30 | 3 | .6 | 2.1 | 88.7 |
| | | 5.00 | 10 | 2.0 | 7.0 | 95.8 |
| | | 6.00 | 6 | 1.2 | 4.2 | 100.0 |
| | | Total | 142 | 28.0 | 100.0 | |
| | Missing | System | 366 | 72.0 | | |
| | Total | 508 | 100.0 | | | |
| 2.00 | Valid | .00 | 2 | .4 | 1.7 | 1.7 |
| | | 1.00 | 1 | .2 | .8 | 2.5 |
| | | 2.00 | 44 | 9.0 | 37.0 | 39.5 |
| | | 2.10 | 21 | 4.3 | 17.6 | 57.1 |
| | | 3.00 | 1 | .2 | .8 | 58.0 |
| | | 4.00 | 13 | 2.7 | 10.9 | 68.9 |
| | | 4.10 | 21 | 4.3 | 17.6 | 86.6 |
| | | 4.20 | 8 | 1.6 | 6.7 | 93.3 |
| | | 5.00 | 6 | 1.2 | 5.0 | 98.3 |
| | | 5.10 | 1 | .2 | .8 | 99.2 |
| | | 6.00 | 1 | .2 | .8 | 100.0 |
| | | Total | 119 | 24.4 | 100.0 | |
| | Missing | System | 368 | 75.6 | | |
| | Total | 487 | 100.0 | | | |
| 3.00 | Valid | 2.00 | 8 | 30.8 | 72.7 | 72.7 |
| | | 4.00 | 1 | 3.8 | 9.1 | 81.8 |
| | | 5.00 | 1 | 3.8 | 9.1 | 90.9 |
| | | 6.00 | 1 | 3.8 | 9.1 | 100.0 |
| | | Total | 11 | 42.3 | 100.0 | |
| | Missing | System | 15 | 57.7 | | |
| | Total | 26 | 100.0 | | | |

| | | | | ĺ | | ı |
|------|---------|--------|-------|-------|-------|-------|
| 4.00 | Valid | 1.00 | 4 | 3.3 | 5.6 | 5.6 |
| | | 2.00 | 33 | 27.3 | 45.8 | 51.4 |
| | | 3.00 | 1 | .8 | 1.4 | 52.8 |
| | | 4.00 | 14 | 11.6 | 19.4 | 72.2 |
| | | 4.10 | 1 | .8 | 1.4 | 73.6 |
| | | 4.20 | 10 | 8.3 | 13.9 | 87.5 |
| | | 5.00 | 4 | 3.3 | 5.6 | 93.1 |
| | | 6.00 | 5 | 4.1 | 6.9 | 100.0 |
| | | Total | 72 | 59.5 | 100.0 | |
| | Missing | System | 49 | 40.5 | | |
| | Total | 121 | 100.0 | | | |
| 5.00 | Valid | 2.00 | 5 | 4.1 | 25.0 | 25.0 |
| | | 2.10 | 12 | 9.9 | 60.0 | 85.0 |
| | | 4.10 | 1 | .8 | 5.0 | 90.0 |
| | | 4.20 | 1 | .8 | 5.0 | 95.0 |
| | | 5.00 | 1 | .8 | 5.0 | 100.0 |
| | | Total | 20 | 16.5 | 100.0 | |
| | Missing | System | 101 | 83.5 | | |
| | Total | 121 | 100.0 | | | |
| 6.00 | Valid | .00 | 1 | .3 | 1.4 | 1.4 |
| | | 2.00 | 16 | 5.0 | 21.9 | 23.3 |
| | | 2.10 | 42 | 13.1 | 57.5 | 80.8 |
| | | 4.00 | 5 | 1.6 | 6.8 | 87.7 |
| | | 4.10 | 3 | .9 | 4.1 | 91.8 |
| | | 4.20 | 3 | .9 | 4.1 | 95.9 |
| | | 4.30 | 1 | .3 | 1.4 | 97.3 |
| | | 5.00 | 1 | .3 | 1.4 | 98.6 |
| | | 5.10 | 1 | .3 | 1.4 | 100.0 |
| | | Total | 73 | 22.7 | 100.0 | |
| | Missing | System | 248 | 77.3 | | |
| | Total | 321 | 100.0 | | | |
| 7.00 | Valid | 1.00 | 3 | 1.0 | 3.3 | 3.3 |
| | | 2.00 | 46 | 15.6 | 51.1 | 54.4 |
| | | 2.10 | 2 | .7 | 2.2 | 56.7 |
| | | 2.20 | 10 | 3.4 | 11.1 | 67.8 |
| | | 3.00 | 2 | .7 | 2.2 | 70.0 |
| | | 4.00 | 5 | 1.7 | 5.6 | 75.6 |
| | | 4.10 | 4 | 1.4 | 4.4 | 80.0 |
| | | 4.20 | 3 | 1.0 | 3.3 | 83.3 |
| | | 5.00 | 5 | 1.7 | 5.6 | 88.9 |
| | | 5.20 | 1 | .3 | 1.1 | 90.0 |
| | | 6.00 | 9 | 3.1 | 10.0 | 100.0 |
| | | Total | 90 | 30.6 | 100.0 | |
| | Missing | System | 204 | 69.4 | | |
| | Total | 294 | 100.0 | 33.1 | | |
| 8.00 | Missing | System | 1 | 100.0 | | |
| 9.00 | Valid | 2.00 | 2 | 6.9 | 25.0 | 25.0 |
| 3.00 | V GIIG | 4.00 | 1 | 3.4 | 12.5 | 37.5 |
| | | 4.10 | 3 | 10.3 | 37.5 | 75.0 |
| | | 5.00 | 1 | 3.4 | 12.5 | 87.5 |
| | | 0.00 | | 0.4 | 12.0 | 07.0 |

| | | 5.10 | 1 | 3.4 | 12.5 | 100.0 |
|-------|------------|----------|-------|-------|-------|-------|
| | | Total | 8 | 27.6 | 100.0 | |
| | Missing | System | 21 | 72.4 | | |
| | Total | 29 | 100.0 | | | |
| 11.00 | Missing | System | 5 | 100.0 | | |
| 12.00 | Valid | 2.10 | 1 | 12.5 | 33.3 | 33.3 |
| 12.00 | Valla | 4.00 | 1 | 12.5 | 33.3 | 66.7 |
| | | 4.20 | 1 | 12.5 | 33.3 | 100.0 |
| | | Total | 3 | 37.5 | 100.0 | |
| | Missing | System | 5 | 62.5 | | |
| | Total | 8 | 100.0 | 02.0 | | |
| 13.00 | Valid | 2.00 | 21 | 11.4 | 45.7 | 45.7 |
| 10.00 | Valla | 2.10 | 5 | 2.7 | 10.9 | 56.5 |
| | | 2.20 | 8 | 4.3 | 17.4 | 73.9 |
| | | 4.00 | 5 | 2.7 | 10.9 | 84.8 |
| | | 4.10 | 4 | 2.2 | 8.7 | 93.5 |
| | | 4.20 | 1 | .5 | 2.2 | 95.7 |
| | | 5.00 | 2 | 1.1 | 4.3 | 100.0 |
| | | Total | 46 | 25.0 | 100.0 | 100.0 |
| | Missing | System | 138 | 75.0 | 100.0 | |
| | Total | 184 | 100.0 | 7 3.0 | | |
| 14.00 | Valid | 2.00 | 100.0 | 50.0 | 100.0 | 100.0 |
| 14.00 | Missing | System | 1 | 50.0 | 100.0 | 100.0 |
| | Total | 2 | 100.0 | 30.0 | | |
| 15.00 | Valid | 2.00 | 7 | 35.0 | 87.5 | 87.5 |
| 10.00 | Valid | 5.00 | 1 | 5.0 | 12.5 | 100.0 |
| | | Total | 8 | 40.0 | 100.0 | 100.0 |
| | Missing | System | 12 | 60.0 | 100.0 | |
| | Total | 20 | 100.0 | 00.0 | | |
| 16.00 | Valid | 2.00 | 2 | 22.2 | 100.0 | 100.0 |
| 10.00 | Missing | System | 7 | 77.8 | 100.0 | 100.0 |
| | Total | 9 | 100.0 | 77.0 | | |
| 17.00 | Valid | 2.00 | 3 | 42.9 | 100.0 | 100.0 |
| 11.00 | Missing | System | 4 | 57.1 | 100.0 | 100.0 |
| | Total | 7 | 100.0 | 01.1 | | |
| 18.00 | Valid | 2.10 | 2 | 22.2 | 66.7 | 66.7 |
| 10.00 | Valla | 5.00 | 1 | 11.1 | 33.3 | 100.0 |
| | | Total | 3 | 33.3 | 100.0 | 100.0 |
| | Missing | System | 6 | 66.7 | 100.0 | |
| | Total | 9 | 100.0 | 00.7 | | |
| 20.00 | Valid | 2.00 | 1 | 5.9 | 14.3 | 14.3 |
| 20.00 | Valla | 2.10 | 3 | 17.6 | 42.9 | 57.1 |
| | | 4.00 | 1 | 5.9 | 14.3 | 71.4 |
| | | 4.10 | 1 | 5.9 | 14.3 | 85.7 |
| | | 5.10 | 1 | 5.9 | 14.3 | 100.0 |
| | | Total | 7 | 41.2 | 100.0 | 100.0 |
| | Missing | System | 10 | 58.8 | .00.0 | |
| | Total | 17 | 100.0 | 50.0 | | |
| 21.00 | Valid | 5.00 | 100.0 | 50.0 | 100.0 | 100.0 |
| 21.00 | Missing | System | 1 | 50.0 | 100.0 | 100.0 |
| | iviissiiiy | Jysteili | 1 | 50.0 | | |

| | Total | 2 | 100.0 | | | |
|-------|---------|--------|-------|------|-------|-------|
| 22.00 | Valid | 1.10 | 1 | .8 | 4.2 | 4.2 |
| | | 2.00 | 3 | 2.5 | 12.5 | 16.7 |
| | | 2.10 | 14 | 11.7 | 58.3 | 75.0 |
| | | 4.00 | 1 | .8 | 4.2 | 79.2 |
| | | 4.20 | 4 | 3.3 | 16.7 | 95.8 |
| | | 5.00 | 1 | .8 | 4.2 | 100.0 |
| | | Total | 24 | 20.0 | 100.0 | |
| | Missing | System | 96 | 80.0 | | |
| | Total | 120 | 100.0 | | | |

Tool types by period

| tooltype | | | | | | |
|----------|-----------|--------------|---------|------------|------------|--------------|
| | | | Valid | Cumulative | | |
| period | Frequency | Percent | Percent | Percent | | |
| | Valid | 1.00 | 2 | .7 | 1.8 | 1.8 |
| | | 1.10 | 1 | .4 | .9 | 2.7 |
| | | 2.00 | 47 | 17.2 | 42.0 | 44.6 |
| | | 2.10 | 20 | 7.3 | 17.9 | 62.5 |
| | | 2.20 | 2 | .7 | 1.8 | 64.3 |
| | | 3.00 | 3 | 1.1 | 2.7 | 67.0 |
| | | 3.10 | 1 | .4 | .9 | 67.9 |
| | | 4.00 | 8 | 2.9 | 7.1 | 75.0 |
| | | 4.10 | 14 | 5.1 | 12.5 | 87.5 |
| | | 4.20 | 4 | 1.5 | 3.6 | 91.1 |
| | | 4.30 | 1 | .4 | .9 | 92.0 |
| | | 5.00 | 7 | 2.6 | 6.3 | 98.2 |
| | | 5.10 | 2 | .7 | 1.8 | 100.0 |
| | | Total | 112 | 40.9 | 100.0 | |
| | Missing | System | 162 | 59.1 | | |
| | Total | 274 | 100.0 | | | |
| -1.00 | Valid | 2.10 | 1 | 20.0 | 100.0 | 100.0 |
| | Missing | System | 4 | 80.0 | | |
| | Total | 5 | 100.0 | | | |
| .00 | Valid | 2.00 | 3 | 4.0 | 30.0 | 30.0 |
| | | 2.10 | 5 | 6.7 | 50.0 | 80.0 |
| | | 4.10 | 1 | 1.3 | 10.0 | 90.0 |
| | | 6.00 | 1 | 1.3 | 10.0 | 100.0 |
| | | Total | 10 | 13.3 | 100.0 | |
| | Missing | System | 65 | 86.7 | | |
| | Total | 75 | 100.0 | | | |
| 1.00 | Valid | 2.00 | 7 | 4.7 | 21.9 | 21.9 |
| | | 2.10 | 10 | 6.7 | 31.3 | 53.1 |
| | | 4.00 | 6 | 4.0 | 18.8 | 71.9 |
| | | 4.10 4.20 | 5 2 | 3.4 | 15.6 | 87.5 |
| | | 5.00 | 1 | 1.3 | 6.3 3.1 | 93.8 96.9 |
| | | 5.00 | 1 | .1 | ა. I | 90.9 |

| | | 6.00 | 1 | .7 | 3.1 | 100.0 |
|------|---------|--------|-------|------|-------|-------|
| | | Total | 32 | 21.5 | 100.0 | 100.0 |
| | Missing | System | 117 | 78.5 | 100.0 | |
| | Total | 149 | 100.0 | | | |
| 1.40 | Valid | 2.00 | 2 | 5.1 | 20.0 | 20.0 |
| | | 2.10 | | 2.6 | 10.0 | 30.0 |
| | | 4.10 | 2 | 5.1 | 20.0 | 50.0 |
| | | 4.20 | 5 | 12.8 | 50.0 | 100.0 |
| | | Total | 10 | 25.6 | 100.0 | |
| | Missing | System | 29 | 74.4 | | |
| | Total | 39 | 100.0 | | | |
| 2.00 | Valid | 1.00 | 1 | .4 | 2.1 | 2.1 |
| | | 2.00 | 20 | 7.2 | 42.6 | 44.7 |
| | | 2.10 | 10 | 3.6 | 21.3 | 66.0 |
| | | 4.00 | 1 | .4 | 2.1 | 68.1 |
| | | 4.10 | 9 | 3.2 | 19.1 | 87.2 |
| | | 5.00 | 5 | 1.8 | 10.6 | 97.9 |
| | | 6.00 | 1 | .4 | 2.1 | 100.0 |
| | | Total | 47 | 16.9 | 100.0 | |
| | Missing | System | 231 | 83.1 | | |
| | Total | 278 | 100.0 | | | |
| 2.30 | Valid | 2.00 | 1 | 14.3 | 50.0 | 50.0 |
| | | 2.20 | 1 | 14.3 | 50.0 | 100.0 |
| | | Total | 2 | 28.6 | 100.0 | |
| | Missing | System | 5 | 71.4 | | |
| | Total | 7 | 100.0 | | | |
| 2.40 | Valid | 2.00 | 3 | 5.4 | 20.0 | 20.0 |
| | | 2.10 | 2 | 3.6 | 13.3 | 33.3 |
| | | 4.00 | 2 | 3.6 | 13.3 | 46.7 |
| | | 4.10 | 5 | 8.9 | 33.3 | 80.0 |
| | | 5.00 | 3 | 5.4 | 20.0 | 100.0 |
| | | Total | 15 | 26.8 | 100.0 | |
| | Missing | System | 41 | 73.2 | | |
| | Total | 56 | 100.0 | | | |
| 3.00 | Valid | 1.10 | 1 | .8 | 2.6 | 2.6 |
| | | 2.00 | 7 | 5.9 | 18.4 | 21.1 |
| | | 2.10 | 4 | 3.4 | 10.5 | 31.6 |
| | | 3.00 | 2 | 1.7 | 5.3 | 36.8 |
| | | 4.00 | 7 | 5.9 | 18.4 | 55.3 |
| | | 4.10 | 6 | 5.0 | 15.8 | 71.1 |
| | | 4.20 | 6 | 5.0 | 15.8 | 86.8 |
| | | 4.30 | 1 | .8 | 2.6 | 89.5 |
| | | 5.00 | 1 | .8 | 2.6 | 92.1 |
| | | 6.00 | 3 | 2.5 | 7.9 | 100.0 |
| | | Total | 38 | 31.9 | 100.0 | |
| | Missing | System | 81 | 68.1 | | |
| | Total | 119 | 100.0 | | | |
| 3.40 | Valid | .00 | 1 | 2.2 | 4.0 | 4.0 |
| | | 2.00 | 8 | 17.8 | 32.0 | 36.0 |
| | | 2.10 | 3 | 6.7 | 12.0 | 48.0 |

| | | 4.00 | 5 | 11.1 | 20.0 | 68.0 |
|------|---------|--------|-------|------|-------|-------|
| | | 4.10 | 2 | 4.4 | 8.0 | 76.0 |
| | | 4.20 | 2 | 4.4 | 8.0 | 84.0 |
| | | 5.00 | 3 | 6.7 | 12.0 | 96.0 |
| | | 5.10 | 1 | 2.2 | 4.0 | 100.0 |
| | | Total | 25 | 55.6 | 100.0 | 100.0 |
| | Missing | System | 20 | 44.4 | 100.0 | |
| | Total | 45 | 100.0 | 77.7 | | |
| 3.50 | Valid | 2.00 | 6 | 33.3 | 66.7 | 66.7 |
| 0.00 | Valid | 3.00 | 1 | 5.6 | 11.1 | 77.8 |
| | | 4.00 | 1 | 5.6 | 11.1 | 88.9 |
| | | 5.00 | 1 | 5.6 | 11.1 | 100.0 |
| | | Total | 9 | 50.0 | 100.0 | 100.0 |
| | Missing | System | 9 | 50.0 | 100.0 | |
| | Total | 18 | 100.0 | 30.0 | | |
| 4.00 | Valid | .00 | 3 | .2 | .8 | .8 |
| 1.00 | Valid | 1.00 | 9 | .7 | 2.5 | 3.4 |
| | | 2.00 | 150 | 12.4 | 42.0 | 45.4 |
| | | 2.10 | 59 | 4.9 | 16.5 | 61.9 |
| | | 2.20 | 18 | 1.5 | 5.0 | 66.9 |
| | | 3.00 | 2 | .2 | .6 | 67.5 |
| | | 4.00 | 33 | 2.7 | 9.2 | 76.8 |
| | | 4.10 | 24 | 2.0 | 6.7 | 83.5 |
| | | 4.20 | 23 | 1.9 | 6.4 | 89.9 |
| | | 4.30 | 2 | .2 | .6 | 90.5 |
| | | 5.00 | 16 | 1.3 | 4.5 | 95.0 |
| | | 5.10 | 1 | .1 | .3 | 95.2 |
| | | 5.20 | 1 | .1 | .3 | 95.5 |
| | | 6.00 | 16 | 1.3 | 4.5 | 100.0 |
| | | Total | 357 | 29.6 | 100.0 | |
| | Missing | System | 848 | 70.4 | | |
| | Total | 1205 | 100.0 | | | |
| 4.50 | Valid | 2.10 | 2 | 33.3 | 100.0 | 100.0 |
| | Missing | System | 4 | 66.7 | | |
| | Total | 6 | 100.0 | | | |
| 4.60 | Valid | 1.10 | 1 | .8 | 4.3 | 4.3 |
| | | 2.00 | 3 | 2.5 | 13.0 | 17.4 |
| | | 2.10 | 13 | 11.0 | 56.5 | 73.9 |
| | | 4.00 | 1 | .8 | 4.3 | 78.3 |
| | | 4.20 | 4 | 3.4 | 17.4 | 95.7 |
| | | 5.00 | 1 | .8 | 4.3 | 100.0 |
| | | Total | 23 | 19.5 | 100.0 | 100.0 |
| | Missing | System | 95 | 80.5 | 100.0 | |
| | | i - | | 60.5 | | |
| | Total | 118 | 100.0 | | | |

Flake Comparison – Relative Thickness

| Case Processing Summary | | | | | | | |
|-------------------------------|-----------|-------|---------|-------|---------|-----|---------|
| | | Cases | | | | | |
| | | Valid | Missing | Total | | | |
| | Operation | N | Percent | N | Percent | Ν | Percent |
| rel_thick | 1.00 | 103 | 99.0% | 1 | 1.0% | 104 | 100.0% |
| | 2.00 | 118 | 100.0% | 0 | 0.0% | 118 | 100.0% |
| | 3.00 | 1 | 100.0% | 0 | 0.0% | 1 | 100.0% |
| | 4.00 | 2 | 100.0% | 0 | 0.0% | 2 | 100.0% |
| | 5.00 | 25 | 100.0% | 0 | 0.0% | 25 | 100.0% |
| | 6.00 | 49 | 98.0% | 1 | 2.0% | 50 | 100.0% |
| | 7.00 | 72 | 96.0% | 3 | 4.0% | 75 | 100.0% |
| | 9.00 | 1 | 100.0% | 0 | 0.0% | 1 | 100.0% |
| | 11.00 | 1 | 100.0% | 0 | 0.0% | 1 | 100.0% |
| | 12.00 | 2 | 100.0% | 0 | 0.0% | 2 | 100.0% |
| | 13.00 | 39 | 100.0% | 0 | 0.0% | 39 | 100.0% |
| | 16.00 | 1 | 100.0% | 0 | 0.0% | 1 | 100.0% |
| | 18.00 | 1 | 100.0% | 0 | 0.0% | 1 | 100.0% |
| | 20.00 | 1 | 100.0% | 0 | 0.0% | 1 | 100.0% |
| | 22.00 | 38 | 100.0% | 0 | 0.0% | 38 | 100.0% |

| Descriptives a,b,c,d,e,f,g | | | | _ | |
|----------------------------|-----------|-----------------------|----------------|--------|--|
| | Operation | Statistic | Std. Error | | |
| rel_thick | 1.00 | Mean | 9.2447 | .33666 | |
| | | 95% Confidence | Lower Bound | 8.5769 | |
| | | Interval for Mean | Upper Bound | 9.9125 | |
| | | 5% Trimmed Mean | 9.0302 | | |
| | | Median | 8.5000 | | |
| | | Variance | 11.674 | | |
| | | Std. Deviation | 3.41675 | | |
| | | Minimum | 3.90 | | |
| | | Maximum | 22.00 | | |
| | | Range | 18.10 | | |

| | - | 1 | |
|------|------------------------|---------|---------|
| | Interquartile Range | 4.53 | |
| | Skewness | 1.057 | .238 |
| | Kurtosis | 1.077 | .472 |
| 2.00 | Mean | 12.5403 | .56255 |
| | 95% | Lower | 11.4262 |
| | Confidence | Bound | 11.4202 |
| | Interval for | Upper | 13.6544 |
| | Mean | Bound | |
| | 5% | 40.0004 | |
| | Trimmed | 12.0201 | |
| | Mean | 11 0000 | |
| | Median | 11.0000 | |
| | Variance | 37.343 | |
| | Std. Deviation | 6.11089 | |
| | Minimum | 2.00 | |
| | Maximum | 40.00 | |
| | Range | 38.00 | |
| | Interquartile Range | 8.58 | |
| | Skewness | 1.458 | .223 |
| | Kurtosis | 3.248 | .442 |
| 4.00 | Mean | 6.2500 | .25000 |
| | 95% | Lower | |
| | Confidence | Bound | 3.0734 |
| | Interval for | Upper | 9.4266 |
| | Mean | Bound | 3.7200 |
| | 5% | | |
| | Trimmed | | |
| | Mean | 6 2500 | |
| | Median | 6.2500 | |
| | Variance | .125 | |
| | Std. Deviation | .35355 | |
| | Minimum | 6.00 | |
| | Maximum | 6.50 | |
| | Range | .50 | |
| | Interquartile | .50 | |
| | Range | | |
| | Skewness | | |
| | Kurtosis | | |
| 5.00 | Mean | 15.7617 | 1.08262 |
| | 95% | Lower | |
| | Confidence | Bound | 13.5272 |
| | Interval for | Upper | 17.0004 |
| | Mean | Bound | 17.9961 |
| | 5% | 15.6616 | |
| | Trimmed | 10.0010 | |

| Median | | | Mean | | |
|--|--|------|---------------|---------|---------|
| Variance 29.302 Std. Deviation 5.41311 | | | | 15.0000 | |
| Std. Deviation Minimum 6.75 Maximum 27.00 Range 20.25 Interquartile Range Skewness 286 .464 Kurtosis 670 .902 Skewness 286 .464 Kurtosis 17.7526 Swammer 19.7082 Swammer 19.7082 Swammer 19.7082 Swammer 19.7082 Swammer 19.7082 Swammer 19.7082 Swammer 10.92 Skewness 1.129 .340 Kurtosis 1.547 .668 7.00 Mean 9.2430 .46357 95% Swammer 10.92 Skewness 1.129 .340 Kurtosis 1.547 .668 7.00 Mean 9.2430 .46357 95% Swammer 10.1673 5% Trimmed 8.8698 Mean Median 8.4375 Variance 15.472 Std. Deviation Minimum 4.08 Maximum 24.00 Range 19.92 Interquartile Range 4.60 Swammer 4.60 Swammer 19.92 Interquartile Range 4.60 Swammer 4.60 Swam | | | | | |
| Deviation Minimum 6.75 Maximum 27.00 Range 20.25 Interquartile Range Skewness .286 .464 Kurtosis .670 .902 Mean 20.4109 1.32212 95% Lower Confidence Interval for Mean Median 19.7082 Mean Median 19.7082 Mean Median 19.2500 Variance 85.652 Std. Deviation Range 10.92 Skewness 1.129 .340 Kurtosis 1.547 .668 7.00 Mean 9.2430 .46357 Mean Median 9.2430 .46357 10.1673 5% Trimmed Range Range 10.1673 5% Trimmed Mean Median 8.4375 Variance 15.472 Std. Deviation Minimum 4.08 Maximum 24.00 Range 19.92 Interquartile Range 19.92 Interquartile Range 19.92 Interquartile Range 4.60 Range 4.60 Range Range 4.60 Range Range 4.60 Range Range 4.60 Range Range Range 4.60 Range Range 4.60 Range Ran | | | | | |
| Maximum 27.00 Range 20.25 Interquartile Range Skewness .286 .464 Kurtosis .670 .902 | | | Deviation | 5.41311 | |
| Range | | | Minimum | 6.75 | |
| Interquartile Range Skewness 286 .464 Kurtosis .670 .902 6.00 Mean 20.4109 1.32212 95% Lower Bound 17.7526 Interval for Mean 19.7082 Mean 19.7082 Mean Median 19.2500 Mean 19.2500 Variance 85.652 Std. Deviation 9.25482 Minimum 6.67 Maximum 49.00 Range 42.33 Interquartile Range 10.92 Skewness 1.129 .340 Kurtosis 1.547 .668 7.00 Mean 9.2430 .46357 95% Lower Bound 10.1673 S% Trimmed Mean 10.1673 S% Trimmed Me | | | Maximum | 27.00 | |
| Range Skewness .286 | | | Range | 20.25 | |
| Skewness | | | - | 8.92 | |
| Kurtosis 670 .902 | | | | .286 | .464 |
| Mean 20.4109 1.32212 95% Lower Round 17.7526 | | | | | |
| 95% Confidence Interval for Mean 5% Trimmed Median Median 19.7082 Mean Median 19.2500 Variance Std. Deviation Minimum 4.00 Range Interquartile Range Skewness 1.129 Skewness 1.129 Skewness 1.129 Shewness 1.1 | | 6.00 | | | |
| Confidence Interval for Mean | | | | | |
| Mean Bound 23.0692 | | | Confidence | Bound | 17.7526 |
| Trimmed Median 19.7082 Mean Median 19.2500 Variance 85.652 Std. Deviation Minimum 6.67 Maximum 49.00 Range 42.33 Interquartile Range 10.92 Skewness 1.129 .340 Kurtosis 1.547 .668 Kurtosis 1.547 .668 Tonfidence Interval for Mean 9.2430 .46357 95% Confidence Interval for Mean Bound 10.1673 5% Trimmed 8.8698 Mean Median 8.4375 Variance 15.472 Std. Deviation Minimum 4.08 Maximum 24.00 Range 19.92 Interquartile Range 4.60 Residue 19.92 Interquartile Range 4.60 Residue 19.25482 Deviation Median 4.60 Residue 19.25482 Deviation 4.60 Residue 19. | | | | | 23.0692 |
| Median 19.2500 Variance 85.652 Std. 9.25482 Deviation 9.25482 Minimum 6.67 Maximum 49.00 Range 42.33 Interquartile 10.92 Skewness 1.129 Skewness 1.547 .668 7.00 Mean 9.2430 .46357 95% Lower Confidence Bound Interval for Upper Mean 8.3187 Trimmed 8.8698 Mean 4.673 Variance 15.472 Std. 3.93349 Deviation 4.08 Maximum 24.00 Range 19.92 Interquartile 4.60 Range 4.60 | | | Trimmed | 19.7082 | |
| Variance 85.652 Std. Deviation 9.25482 Minimum 6.67 Maximum 49.00 Range 42.33 Interquartile Range Skewness 1.129 .340 Kurtosis 1.547 .668 | | | | 19 2500 | |
| Std. Deviation Minimum 6.67 Maximum 49.00 Range 42.33 Interquartile Range 10.92 Skewness 1.129 .340 Kurtosis 1.547 .668 7.00 Mean 9.2430 .46357 95% Lower Bound 8.3187 Upper Mean Upper Bound 10.1673 5% Trimmed Mean 8.8698 Mean 8.38698 Mean Median 8.4375 Variance 15.472 Std. Deviation 3.93349 Minimum 4.08 Maximum 24.00 Range 19.92 Interquartile Range 4.60 4.60 | | | | | |
| Deviation Minimum 6.67 | | | | | |
| Maximum 49.00 Range 42.33 Interquartile Range 10.92 Skewness 1.129 .340 Kurtosis 1.547 .668 7.00 Mean 9.2430 .46357 95% Lower Bound 8.3187 Interval for Mean Upper Bound 10.1673 5% Trimmed 8.8698 Mean Median 8.4375 Variance 15.472 Std. Std. 3.93349 Auximum Minimum 4.08 Auximum Ange 19.92 Interquartile Range Interquartile Range 4.60 | | | | 9.25482 | |
| Range | | | Minimum | 6.67 | |
| Interquartile Range 10.92 | | | Maximum | 49.00 | |
| Range Skewness 1.129 .340 | | | Range | 42.33 | |
| Skewness 1.129 .340 Kurtosis 1.547 .668 7.00 Mean 9.2430 .46357 95% | | | - | 10.92 | |
| 7.00 Mean 9.2430 .46357 95% Lower Bound 10.1673 5% Trimmed 8.8698 Mean Median 8.4375 Variance 15.472 Std. Deviation Minimum 4.08 Maximum 24.00 Range 19.92 Interquartile Range 4.60 Range 4.60 | | | | 1.129 | .340 |
| 95% Lower Bound Confidence Interval for Mean Upper Bound 5% Trimmed Mean Median 8.8698 Mean Median 8.4375 Variance 15.472 Std. 3.93349 Minimum 4.08 Maximum Maximum 24.00 Range Interquartile Range 4.60 Range | | | Kurtosis | 1.547 | .668 |
| Confidence Interval for Mean Bound Upper Bound 10.1673 5% Trimmed 8.8698 Mean Median 8.4375 Variance 15.472 Std. Deviation Minimum 4.08 Maximum 24.00 Range 19.92 Interquartile Range 4.60 | | 7.00 | Mean | 9.2430 | .46357 |
| Interval for Mean | | | | | 8.3187 |
| 5% Trimmed 8.8698 Mean Median 8.4375 Variance 15.472 Std. 3.93349 Deviation 4.08 Maximum 24.00 Range 19.92 Interquartile Range 4.60 | | | | Upper | 10.1673 |
| Median 8.4375 Variance 15.472 Std. 3.93349 Deviation 4.08 Minimum 4.08 Maximum 24.00 Range 19.92 Interquartile Range 4.60 | | | 5% Trimmed | | |
| Variance 15.472 Std. 3.93349 Deviation 4.08 Minimum 4.08 Maximum 24.00 Range 19.92 Interquartile Range 4.60 | | | | 8.4375 | |
| Deviation 3.93349 Minimum 4.08 Maximum 24.00 Range 19.92 Interquartile Range 4.60 | | | Variance | | |
| Minimum 4.08 Maximum 24.00 Range 19.92 Interquartile Range 4.60 | | | | 3.93349 | |
| Maximum 24.00 Range 19.92 Interquartile Range 4.60 | | | Minimum | 4.08 | |
| Interquartile 4.60 | | | | | |
| Interquartile 4.60 | | | | | |
| | | | Interquartile | 4.60 | |
| Skewness 1.561 .283 | | | Skewness | 1.561 | .283 |

| | • | Kurtosis | 3.153 | .559 |
|---|-------|---------------|---------|---------|
| | 12.00 | Mean | 8.5000 | .50000 |
| | | 95% | Lower | |
| | | Confidence | Bound | 2.1469 |
| | | Interval for | Upper | |
| | | Mean | Bound | 14.8531 |
| | | 5% | | |
| | | Trimmed | | |
| | | Mean | | |
| | | Median | 8.5000 | |
| | | Variance | .500 | |
| | | Std. | 70744 | |
| | | Deviation | .70711 | |
| | | Minimum | 8.00 | |
| | | Maximum | 9.00 | |
| | | Range | 1.00 | |
| | | Interquartile | | |
| | | Range | . | |
| | | Skewness | | |
| | | Kurtosis | | |
| | 13.00 | Mean | 8.2865 | .43996 |
| | | 95% | Lower | |
| | | Confidence | Bound | 7.3959 |
| | | Interval for | Upper | |
| | | Mean | Bound | 9.1772 |
| | | 5% | | |
| | | Trimmed | 8.2262 | |
| | | Mean | | |
| | | Median | 8.1667 | |
| | | Variance | 7.549 | |
| | | Std. | 0.74750 | |
| | | Deviation | 2.74753 | |
| | | Minimum | 2.92 | |
| | | Maximum | 14.33 | |
| | | Range | 11.42 | |
| | | Interquartile | 0.00 | |
| | | Range | 2.92 | |
| | | Skewness | .376 | .378 |
| | | Kurtosis | 235 | .741 |
| | 22.00 | Mean | 12.4079 | 1.00553 |
| | | 95% | Lower | |
| | | Confidence | Bound | 10.3705 |
| | | Interval for | Upper | 14 4450 |
| | | Mean | Bound | 14.4453 |
| | | 5% | | |
| | | Trimmed | 11.8246 | |
| | | Mean | | |
| I | | | | |
| | | Median | 11.6667 | |

| | Std. Deviation | 6.19851 | |
|---|------------------------|---------|------|
| | Minimum | 4.00 | |
| | Maximum | 31.00 | |
| | Range | 27.00 | |
| | Interquartile Range | 6.00 | |
| | Skewness | 1.503 | .383 |
| | Kurtosis | 2.478 | .750 |
| a. rel_thick is constant when Operation = 3.00. It has been omitted. b. There are no valid cases for rel_thick when Operation = 8.000. Statistics cannot be computed for this level. c. rel_thick is constant when Operation = 9.00. It has been omitted. d. rel_thick is constant when Operation = 11.00. It | | | |
| has been omitted. e. rel_thick is constant when | | | |
| Operation = 16.00. It has been omitted. | | | |
| f. rel_thick is constant when Operation = 18.00. It has been omitted. | | | |
| g. rel_thick is constant when Operation = 20.00. It has been omitted. | | | |

| Case Processing Summary | | | | | | | |
|-------------------------------|-----------|-------|---------|-------|---------|-----|---------|
| | | Cases | | | _ | | |
| | | Valid | Missing | Total | | | |
| | Operation | N | Percent | Ν | Percent | Ν | Percent |
| weight | 1.00 | 104 | 100.0% | 0 | 0.0% | 104 | 100.0% |
| | 2.00 | 118 | 100.0% | 0 | 0.0% | 118 | 100.0% |
| | 3.00 | 1 | 100.0% | 0 | 0.0% | 1 | 100.0% |
| | 4.00 | 2 | 100.0% | 0 | 0.0% | 2 | 100.0% |

| 5.00 | 25 | 100.0% | 0 | 0.0% | 25 | 100.0% |
|-------|----|--------|---|------|----|--------|
| 6.00 | 50 | 100.0% | 0 | 0.0% | 50 | 100.0% |
| 7.00 | 75 | 100.0% | 0 | 0.0% | 75 | 100.0% |
| 8.00 | 1 | 100.0% | 0 | 0.0% | 1 | 100.0% |
| 9.00 | 1 | 100.0% | 0 | 0.0% | 1 | 100.0% |
| 11.00 | 1 | 100.0% | 0 | 0.0% | 1 | 100.0% |
| 12.00 | 2 | 100.0% | 0 | 0.0% | 2 | 100.0% |
| 13.00 | 39 | 100.0% | 0 | 0.0% | 39 | 100.0% |
| 16.00 | 1 | 100.0% | 0 | 0.0% | 1 | 100.0% |
| 18.00 | 1 | 100.0% | 0 | 0.0% | 1 | 100.0% |
| 20.00 | 1 | 100.0% | 0 | 0.0% | 1 | 100.0% |
| 22.00 | 38 | 100.0% | 0 | 0.0% | 38 | 100.0% |

| Descriptives a,b,c,d,e,f,g | | | | |
|----------------------------|-----------|------------------------|----------------|---------|
| | | | Std. | |
| | Operation | Statistic | Error | |
| weight | 1.00 | Mean | 6.9817 | 1.00641 |
| | | 95% Confidence | Lower Bound | 4.9858 |
| | | Interval for Mean | Upper Bound | 8.9777 |
| | | 5% Trimmed Mean | 5.2169 | |
| | | Median | 3.2000 | |
| | | Variance | 105.337 | |
| | | Std. Deviation | 10.26336 | |
| | | Minimum | 1.00 | |
| | | Maximum | 66.00 | |
| | | Range | 65.00 | |
| | | Interquartile Range | 6.40 | |
| | | Skewness | 3.614 | .237 |
| | | Kurtosis | 15.552 | .469 |
| | 2.00 | Mean | 8.0182 | 1.37400 |
| | | 95% Confidence | Lower Bound | 5.2971 |
| | | Interval for Mean | Upper Bound | 10.7394 |
| | | 5% Trimmed Mean | 5.5799 | |
| | | Median | 3.0000 | |
| | | Variance | 222.770 | |
| | | Std. Deviation | 14.92549 | |
| | | Minimum | 1.00 | |

| | = |
|---|----------|
| Interquartile 7.00 | \dashv |
| Range 7.00 Skewness 5.205 .2 Kurtosis 33.225 .4 | ı |
| Skewness 5.205 .2 Kurtosis 33.225 .4 | |
| Kurtosis 33.225 .4 | 223 |
| | 142 |
| 1.00 Weart 0.0000 1.000 | |
| 95% Lower | |
| Confidence Bound -9.70 |)62 |
| Interval for Linner | |
| Mean Bound 15.70 | 162 |
| 5% | |
| Trimmed . | |
| Mean | |
| Median 3.0000 | |
| Variance 2.000 | |
| Std. 1.41421 | |
| Deviation | |
| Minimum 2.00 | |
| Maximum 4.00 | |
| Range 2.00 | _ |
| Interquartile | |
| Range Skewness . | \dashv |
| Kurtosis . | \dashv |
| 5.00 Mean 4.4400 .702 | |
| 95% Lower | |
| Confidence Bound 2.99 | 000 |
| Interval for Linner | |
| Mean Bound 5.89 | 100 |
| 5% | T |
| Trimmed 4.2222 | |
| Mean | |
| Median 3.0000 | |
| Variance 12.340 | |
| Std. 3.51283 | |
| Deviation | |
| Minimum 1.00 | |
| Maximum 12.00 | |
| Range 11.00 | |
| Interquartile 6.50 | |
| Range Skewness .748 .4 | 164 |
| I | 164 |
| | 002 |
| | 36 |
| 95% Lower Confidence Bound 6.00 |)89 |
| Interval for Unner | |
| | 111 |

| | | 50 / | | |
|--|-------|------------------------|----------------|---------|
| | | 5% Trimmed | 0.4000 | |
| | | Mean | 8.4889 | |
| | | Median | 3.0000 | |
| | | Variance | 438.488 | |
| | | Std. | 430.400 | |
| | | Deviation | 20.94011 | |
| | | Minimum | 1.00 | |
| | | Maximum | 113.00 | |
| | | Range | 112.00 | |
| | | Interquartile Range | 9.00 | |
| | | Skewness | 3.189 | .337 |
| | | Kurtosis | 11.734 | .662 |
| | 7.00 | Mean | 15.4533 | 2.47483 |
| | - | 95% Confidence | Lower Bound | 10.5221 |
| | | Interval for Mean | Upper Bound | 20.3845 |
| | | 5% Trimmed Mean | 12.1370 | |
| | | Median | 7.0000 | |
| | | Variance | 459.359 | |
| | | Std. Deviation | 21.43267 | |
| | | Minimum | 1.00 | |
| | | Maximum | 109.00 | |
| | | Range | 108.00 | |
| | | Interquartile Range | 18.00 | |
| | | Skewness | 2.600 | .277 |
| | | Kurtosis | 7.198 | .548 |
| | 12.00 | Mean | 12.5000 | 1.50000 |
| | | 95% Confidence | Lower Bound | -6.5593 |
| | | Interval for Mean | Upper Bound | 31.5593 |
| | | 5% Trimmed Mean | | |
| | | Median | 12.5000 | |
| | | Variance | 4.500 | |
| | | Std. Deviation | 2.12132 | |
| | | Minimum | 11.00 | |
| | | Maximum | 14.00 | |
| | | Range | 3.00 | |
| | | Interquartile | 3.00 | |
| | | micrquarile | • | |

| Skewness | | | Range | | | Γ |
|--|-----------------------|-------|-----------|---------|---------|---|
| Kurtosis | | | | | | |
| 13.00 Mean 6.3846 1.47568 95% Lower Bound 1.47568 1.47568 95% Lower Bound 9.3720 5% Trimmed 4.8533 Mean Median 3.0000 Variance 84.927 Std. Deviation Maximum 52.00 Range 51.00 Interquartile Range Skewness 3.707 .378 Kurtosis 16.137 .741 22.00 Mean 7.2368 1.12228 95% Lower Bound 1.1228 95% Lower Bound 1.1228 95% Confidence Interval for Mean Median 6.0000 Variance 47.861 Std. Deviation Minimum 1.00 Maximum 36.00 Range 35.00 Interquartile Range 6.25 Range 35.00 Interquartile Range 35.00 Interquartile Range 35.00 Interquartile Range 6.25 Range 35.00 Interquartile Range 35.00 Interquartile Range 6.25 Range 35.00 Interquartile Range 6.25 Range 35.00 Interquartile 30.00 Interquartile 3 | | | | · | | 1 |
| 95% Lower Bound 3.3973 | | 13.00 | | 6 3846 | 1 47568 | 1 |
| Confidence Interval for Mean Sound S | | 13.00 | | | 1.47300 | 1 |
| Interval for Mean Sound Sound Sound Sound Sound Median Sound Sound Median Sound | | | | 3.3973 | |
| Mean Bound 5% | | | | | | Ì |
| Trimmed Median 3.0000 Variance 84.927 Std. 9.21559 Minimum 1.00 Maximum 52.00 Range 51.00 Interquartile Range Skewness 3.707 .378 Kurtosis 16.137 .741 22.00 Mean 7.2368 1.12228 95% Lower Bound 4.9629 Interval for Mean Bound 9.5108 5% Trimmed 6.3275 Mean Median 6.0000 Variance 47.861 Std. Deviation Minimum 1.00 Maximum 36.00 Range 35.00 Interquartile Range 35.00 Interquartile Range 6.25 Range 35.00 Interquartile Range | | | Mean | | 9.3720 | |
| Mean Median 3.0000 Variance 84.927 Std. Deviation 9.21559 Minimum 1.00 Maximum 52.00 Range 51.00 Interquartile Range 5.00 Skewness 3.707 .378 Kurtosis 16.137 .741 22.00 Mean 7.2368 1.12228 95% Lower Bound 4.9629 Interval for Mean Bound 9.5108 5% Trimmed 6.3275 Mean Median 6.0000 Variance 47.861 Std. Deviation Minimum 1.00 Maximum 36.00 Range 35.00 Interquartile Range 6.25 | | | 5% | | | |
| Median 3.0000 Variance 84.927 Std. | | | Trimmed | 4.8533 | | |
| Variance 84.927 Std. Deviation 9.21559 | | | Mean | | | |
| Std. Deviation Deviation Minimum 1.00 Maximum 52.00 Range 51.00 Interquartile Range Skewness 3.707 .378 Kurtosis 16.137 .741 22.00 Mean 7.2368 1.12228 95% Lower Bound 1.12228 95% Lower Bound 1.12228 95% Lower Bound 1.12228 95% Trimmed Bound 9.5108 5% Trimmed 6.3275 Mean Median 6.0000 Variance 47.861 Std. Std. Std. Std. Deviation Minimum 1.00 Maximum 36.00 Range 35.00 Interquartile Range 6.25 Range Range Range 6.25 Range | | | Median | 3.0000 | | |
| Deviation 9.21559 | | | Variance | 84.927 | | |
| Maximum 52.00 Range 51.00 Interquartile Range 5.00 Skewness 3.707 .378 Kurtosis 16.137 .741 22.00 Mean 7.2368 1.12228 95% Lower Bound 4.9629 Confidence Interval for Mean Upper Bound 9.5108 5% Trimmed 6.3275 Mean Median 6.0000 Variance 47.861 Std. Std. 6.91819 6.91819 Minimum 1.00 Maximum Maximum 36.00 Range Interquartile Range 6.25 | | | | 9.21559 | | |
| Range 51.00 | | | Minimum | 1.00 | | |
| Interquartile Range S.00 Skewness 3.707 .378 Kurtosis 16.137 .741 | | | Maximum | 52.00 | | |
| Range S.00 | | | Range | 51.00 | | |
| Kurtosis 16.137 .741 | | | | 5.00 | | |
| Mean 7.2368 1.12228 95% Lower Bound 4.9629 | | | Skewness | 3.707 | .378 | |
| 95% Lower Confidence Bound Interval for Mean Upper Bound 5% Trimmed Trimmed Median 6.0000 Variance 47.861 Std. 6.91819 Minimum 1.00 Maximum 36.00 Range 35.00 Interquartile Range 6.25 | | | Kurtosis | 16.137 | .741 | |
| Confidence Bound Upper Mean Bound Upper Bound S% Trimmed 6.3275 Mean Median 6.0000 Variance 47.861 Std. Deviation Minimum 1.00 Maximum 36.00 Range 35.00 Interquartile Range 6.25 Range Range Range 4.9629 | | 22.00 | Mean | 7.2368 | 1.12228 | |
| Confidence Bound Upper Mean Bound 9.5108 | | | | Lower | 4 9629 | |
| Mean Bound 9.5108 5% Trimmed 6.3275 Mean Median 6.0000 Variance 47.861 Std. 6.91819 Minimum 1.00 Maximum 36.00 Range 35.00 Interquartile 6.25 Range 6.25 | | | | Bound | 4.0020 | Ļ |
| 5% Trimmed 6.3275 Mean Median 6.0000 Variance 47.861 Std. Deviation Minimum 1.00 Maximum 36.00 Range 35.00 Interquartile Range 6.25 Range | | | | | 9.5108 | |
| Trimmed 6.3275 Mean Median 6.0000 Variance 47.861 Std. Deviation 6.91819 Minimum 1.00 Maximum 36.00 Range 35.00 Interquartile Range 6.25 | | | | Bouriu | | |
| Mean Median 6.0000 Variance 47.861 347.861 Std. 6.91819 6.91819 Minimum 1.00 1.00 Maximum 36.00 35.00 Interquartile 6.25 Range 6.25 | | | | 6 3275 | | |
| Variance 47.861 Std. 6.91819 Deviation 1.00 Minimum 36.00 Range 35.00 Interquartile 6.25 Range 6.25 | | | | 0.0270 | | |
| Variance 47.861 Std. 6.91819 Deviation 1.00 Minimum 36.00 Range 35.00 Interquartile 6.25 Range 6.25 | | | Median | 6.0000 | | |
| Std. 6.91819 Deviation 1.00 Minimum 36.00 Range 35.00 Interquartile Range 6.25 | | | Variance | | | |
| Deviation | | | Std. | 0.04040 | | 1 |
| Maximum 36.00 Range 35.00 Interquartile Range 6.25 | | | Deviation | 0.91819 | | |
| Range 35.00 Interquartile Range 6.25 | | | Minimum | 1.00 | | |
| Interquartile Range 6.25 | | | Maximum | 36.00 | | 1 |
| Range 6.25 | | | Range | 35.00 | | 1 |
| | | | | 6.25 | | |
| Skewiiess 2.400 .303 | | | Skewness | 2.408 | .383 | |
| Kurtosis 7.591 .750 | | | Kurtosis | 7.591 | .750 | |
| a. weight is constant | a. weight is constant | | | | | - |
| when Operation = | · · | | | | | |
| 3.00. It has been | | | | | | |
| omitted. | | | | | | |
| b. weight is constant when Operation = | _ | | | | | |
| 8.00. It has been | | | | | | |
| omitted. | | | | | | |
| c. weight is constant | | | | | | |

| when Operation = 9.00. It has been omitted. |
|---|
| d. weight is constant when Operation = 11.00. It has been omitted. |
| e. weight is constant when Operation = 16.00. It has been omitted. |
| f. weight is constant when Operation = 18.00. It has been omitted. |
| g. weight is constant when Operation = 20.00. It has been omitted. |

Period

| Case Processing Summary | | | | | | | |
|-------------------------------|--------|-------|---------|-------|---------|-----|---------|
| | | Cases | | | • | | |
| | | Valid | Missing | Total | | | |
| | period | N | Percent | N | Percent | N | Percent |
| weight | -1.00 | 1 | 100.0% | 0 | 0.0% | 1 | 100.0% |
| | .00 | 10 | 100.0% | 0 | 0.0% | 10 | 100.0% |
| | 1.00 | 33 | 100.0% | 0 | 0.0% | 33 | 100.0% |
| | 1.40 | 10 | 100.0% | 0 | 0.0% | 10 | 100.0% |
| | 2.00 | 55 | 100.0% | 0 | 0.0% | 55 | 100.0% |
| | 2.30 | 3 | 100.0% | 0 | 0.0% | 3 | 100.0% |
| | 2.40 | 4 | 100.0% | 0 | 0.0% | 4 | 100.0% |
| | 3.00 | 25 | 100.0% | 0 | 0.0% | 25 | 100.0% |
| | 3.40 | 3 | 100.0% | 0 | 0.0% | 3 | 100.0% |
| | 3.50 | 3 | 100.0% | 0 | 0.0% | 3 | 100.0% |
| | 4.00 | 232 | 100.0% | 0 | 0.0% | 232 | 100.0% |
| | 4.60 | 38 | 100.0% | 0 | 0.0% | 38 | 100.0% |

| Descriptives ^a | | | | |
|---------------------------|--------|------------------------|----------------|--------|
| | period | Statistic | Std. Error | |
| weight | .00 | Mean | 2.3000 | .44845 |
| | | 95% Confidence | Lower Bound | 1.2855 |
| | | Interval for Mean | Upper Bound | 3.3145 |
| | | 5% Trimmed Mean | 2.2222 | |
| | | Median | 2.0000 | |
| | | Variance | 2.011 | |
| | | Std. Deviation | 1.41814 | |
| | | Minimum | 1.00 | |
| | | Maximum | 5.00 | |
| | | Range | 4.00 | |
| | | Interquartile Range | 2.25 | |
| | | Skewness | .801 | .687 |
| | | Kurtosis | 378 | 1.334 |

| 1.00 | Mean | 6.6970 | 1.93673 | Π |
|------|---------------|----------|---------|---|
| 1.00 | 95% | Lower | 1.50070 | 1 |
| | Confidence | Bound | 2.7520 | |
| | Interval for | Upper | | |
| | Mean | Bound | 10.6420 | |
| | 5% | 2000 | | T |
| | Trimmed | 4.8283 | | |
| | Mean | | | |
| | Median | 3.0000 | | 1 |
| ŀ | Variance | 123.780 | | 1 |
| i | Std. | | | 1 |
| | Deviation | 11.12566 | | |
| | Minimum | 1.00 | | 1 |
| | Maximum | 61.00 | | 1 |
| ŀ | Range | 60.00 | | 1 |
| i | Interquartile | | | 1 |
| | Range | 6.00 | | |
| | Skewness | 3.974 | .409 | |
| İ | Kurtosis | 18.357 | .798 | 1 |
| 1.40 | Mean | 6.3000 | 1.29142 | 1 |
| | 95% | Lower | | i |
| | Confidence | Bound | 3.3786 | |
| | Interval for | Upper | | İ |
| | Mean | Bound | 9.2214 | |
| | 5% | | | |
| | Trimmed | 6.2778 | | |
| | Mean | | | |
| | Median | 5.0000 | | |
| | Variance | 16.678 | | |
| | Std. | 4.08384 | | |
| | Deviation | 4.00304 | | |
| | Minimum | 1.00 | | |
| | Maximum | 12.00 | | |
| | Range | 11.00 | | |
| | Interquartile | 7.50 | | |
| | Range | 7.50 | | |
| | Skewness | .366 | .687 | |
| | Kurtosis | -1.591 | 1.334 | |
| 2.00 | Mean | 5.5600 | 1.26696 | |
| | 95% | Lower | 2.0400 | |
| | Confidence | Bound | 3.0199 | |
| | Interval for | Upper | 0 1001 | |
| | Mean | Bound | 8.1001 | |
| | 5% | | | |
| | Trimmed | 3.8242 | | |
| | Mean | | | • |
| | Median | 3.0000 | | 1 |
| | Variance | 88.285 | | |
| | | | | |

| | Deviation | | | |
|------|------------------------|---------|---------|---|
| | Minimum | 1.00 | | |
| | Maximum | 56.00 | | |
| | Range | 55.00 | | |
| | Interquartile | 33.00 | | |
| | Range | 4.00 | | |
| | Skewness | 3.932 | .322 | |
| | Kurtosis | 17.190 | .634 | |
| 2.30 | Mean | 10.6667 | 3.75648 | |
| | 95% | Lower | -5.4961 | |
| | Confidence | Bound | -0.4001 | Ш |
| | Interval for | Upper | 26.8295 | |
| | Mean | Bound | 20.0200 | |
| | 5% | | | |
| | Trimmed | • | | |
| | Mean | 44.0000 | | |
| | Median | 11.0000 | | |
| | Variance | 42.333 | | |
| | Std. Deviation | 6.50641 | | |
| | Minimum | 4.00 | | |
| | Maximum | 17.00 | | |
| | Range | 13.00 | | |
| | Interquartile | | | |
| | Range | | | |
| | Skewness | 230 | 1.225 | |
| | Kurtosis | | | |
| 2.40 | Mean | 5.5000 | 1.84842 | |
| | 95% | Lower | 3825 | |
| | Confidence | Bound | 3023 | |
| | Interval for | Upper | 11.3825 | |
| | Mean | Bound | 11.0020 | Ц |
| | 5% | | | |
| | Trimmed | 5.5556 | | |
| | Mean | 0.0000 | | |
| | Median | 6.0000 | | |
| | Variance | 13.667 | | |
| | Std. Deviation | 3.69685 | | |
| | Minimum | 1.00 | | |
| | Maximum | 9.00 | | |
| | Range | 8.00 | | |
| | Interquartile Range | 7.00 | | |
| | Skewness | 475 | 1.014 | |
| | Kurtosis | -2.716 | 2.619 | |
| 3.00 | Mean | 6.9440 | 1.69741 | |
| 0.00 | 95% | Lower | | |
| | Confidence | Bound | 3.4407 | |
| | | | | _ |

| | | Interval for Mean | Upper Bound | 10.4473 | |
|---|------|------------------------|----------------|----------|---|
| | | 5% | | | |
| | | Trimmed | 5.7711 | | |
| | | Mean | | | |
| | | Median | 3.0000 | | |
| | | Variance | 72.030 | | |
| | | Std. | 0.40705 | | |
| | | Deviation | 8.48705 | | |
| | | Minimum | 1.00 | | |
| | | Maximum | 38.00 | | |
| | | Range | 37.00 | | |
| | | Interquartile Range | 8.25 | | |
| | | Skewness | 2.332 | .464 | |
| | | Kurtosis | 6.651 | .902 | |
| | 3.40 | Mean | 8.2667 | 2.28133 | |
| | | 95% | Lower | | Ì |
| | | Confidence | Bound | -1.5491 | |
| | | Interval for | Upper | 10 0004 | |
| | | Mean | Bound | 18.0824 | |
| | | 5% | | | |
| | | Trimmed | | | |
| | | Mean | | | |
| | | Median | 9.0000 | | |
| | | Variance | 15.613 | | |
| | | Std. | 3.95137 | | |
| | | Deviation | | | |
| | | Minimum | 4.00 | | |
| | | Maximum | 11.80 | | |
| | | Range | 7.80 | | |
| | | Interquartile | | | |
| | | Range | 222 | 4.005 | |
| | , | Skewness | 806 | 1.225 | |
| - | 0.50 | Kurtosis | | 45 50000 | |
| | 3.50 | Mean | 17.0000 | 15.50269 | |
| | | 95% Confidence | Lower | -49.7027 | |
| | | Interval for | Bound | | |
| | | Mean | Upper Bound | 83.7027 | |
| | | 5% | Dound | | H |
| | | Trimmed | | | |
| | | Mean | | | |
| | | Median | 2.0000 | | |
| | | Variance | 721.000 | | |
| | | Std. | | | |
| | | Deviation Deviation | 26.85144 | | |
| | | Minimum | 1.00 | | |
| | | Maximum | 48.00 | | |
| | | | . 5.00 | | |

| Range | 47.00 | |
|---|--|--|
| | | |
| | | |
| Skewness | 1.729 | 1.225 |
| | | |
| 00 Mean | 10.2879 | 1.12194 |
| | | |
| Confidence | Bound | 8.0774 |
| Interval for | Upper | 40.400 |
| Mean | Bound | 12.4985 |
| 5% | | |
| Trimmed | 7.3084 | |
| Mean | | |
| Median | 4.0000 | |
| Variance | 292.032 | |
| Std. | 17 00006 | |
| Deviation | 17.00080 | |
| Minimum | 1.00 | |
| Maximum | 113.00 | |
| Range | 112.00 | |
| Interquartile | 0 00 | |
| Range | 0.00 | |
| Skewness | 3.564 | .160 |
| Kurtosis | 14.627 | .318 |
| Mean Mean | 7.2368 | 1.12228 |
| 95% | Lower | 4.9629 |
| Confidence | Bound | 4.9029 |
| | | |
| Interval for | Upper | 0.5108 |
| | Upper Bound | 9.5108 |
| Interval for Mean 5% | Bound | 9.5108 |
| Interval for Mean 5% Trimmed | | 9.5108 |
| Interval for Mean 5% Trimmed Mean | Bound 6.3275 | 9.5108 |
| Interval for Mean 5% Trimmed Mean Median | 6.3275 6.0000 | 9.5108 |
| Interval for Mean 5% Trimmed Mean Median Variance | Bound 6.3275 | 9.5108 |
| Interval for Mean 5% Trimmed Mean Median Variance Std. | 6.3275 6.0000 | 9.5108 |
| Interval for Mean 5% Trimmed Mean Median Variance Std. Deviation | 6.3275 6.0000 47.861 6.91819 | 9.5108 |
| Interval for Mean 5% Trimmed Mean Median Variance Std. Deviation Minimum | 6.3275 6.0000 47.861 6.91819 | 9.5108 |
| Interval for Mean 5% Trimmed Mean Median Variance Std. Deviation Minimum Maximum | 6.3275 6.0000 47.861 6.91819 1.00 36.00 | 9.5108 |
| Interval for Mean 5% Trimmed Mean Median Variance Std. Deviation Minimum Maximum Range | 6.3275 6.0000 47.861 6.91819 | 9.5108 |
| Interval for Mean 5% Trimmed Mean Median Variance Std. Deviation Minimum Maximum Range Interquartile | 6.3275 6.0000 47.861 6.91819 1.00 36.00 | 9.5108 |
| Interval for Mean 5% Trimmed Mean Median Variance Std. Deviation Minimum Maximum Range Interquartile Range | 6.3275 6.0000 47.861 6.91819 1.00 36.00 35.00 6.25 | |
| Interval for Mean 5% Trimmed Mean Median Variance Std. Deviation Minimum Maximum Range Interquartile Range Skewness | 6.3275 6.0000 47.861 6.91819 1.00 36.00 35.00 6.25 2.408 | .383 |
| Interval for Mean 5% Trimmed Mean Median Variance Std. Deviation Minimum Maximum Range Interquartile Range | 6.3275 6.0000 47.861 6.91819 1.00 36.00 35.00 6.25 | |
| Interval for Mean 5% Trimmed Mean Median Variance Std. Deviation Minimum Maximum Range Interquartile Range Skewness | 6.3275 6.0000 47.861 6.91819 1.00 36.00 35.00 6.25 2.408 | .383 |
| Interval for Mean 5% Trimmed Mean Median Variance Std. Deviation Minimum Maximum Range Interquartile Range Skewness | 6.3275 6.0000 47.861 6.91819 1.00 36.00 35.00 6.25 2.408 | .383 |
| Interval for Mean 5% Trimmed Mean Median Variance Std. Deviation Minimum Maximum Range Interquartile Range Skewness | 6.3275 6.0000 47.861 6.91819 1.00 36.00 35.00 6.25 2.408 | .383 |
| | Kurtosis Mean 95% Confidence Interval for Mean 5% Trimmed Mean Median Variance Std. Deviation Minimum Maximum Range Interquartile Range Skewness Kurtosis Mean | Interquartile Range Skewness 1.729 |

| Case Processing Summary | | | | | | | |
|-------------------------------|--------|-------|---------|-------|---------|-----|---------|
| | | Cases | | | • | | |
| | | Valid | Missing | Total | | | |
| | period | N | Percent | N | Percent | N | Percent |
| rel_thick | -1.00 | 1 | 100.0% | 0 | 0.0% | 1 | 100.0% |
| | .00 | 10 | 100.0% | 0 | 0.0% | 10 | 100.0% |
| | 1.00 | 33 | 100.0% | 0 | 0.0% | 33 | 100.0% |
| | 1.40 | 10 | 100.0% | 0 | 0.0% | 10 | 100.0% |
| | 2.00 | 55 | 100.0% | 0 | 0.0% | 55 | 100.0% |
| | 2.30 | 3 | 100.0% | 0 | 0.0% | 3 | 100.0% |
| | 2.40 | 4 | 100.0% | 0 | 0.0% | 4 | 100.0% |
| | 3.00 | 25 | 100.0% | 0 | 0.0% | 25 | 100.0% |
| | 3.40 | 3 | 100.0% | 0 | 0.0% | 3 | 100.0% |
| | 3.50 | 2 | 66.7% | 1 | 33.3% | 3 | 100.0% |
| | 4.00 | 229 | 98.7% | 3 | 1.3% | 232 | 100.0% |
| | 4.60 | 38 | 100.0% | 0 | 0.0% | 38 | 100.0% |

| Descriptives ^a | | | | | |
|---------------------------|--------|------------------------|----------------|---------|--|
| | | | Std. | | |
| | period | Statistic | Error | | |
| rel_thick | .00 | Mean | 16.5167 | 1.39586 | |
| | | 95% Confidence | Lower Bound | 13.3590 | |
| | | Interval for Mean | Upper Bound | 19.6743 | |
| | | 5% Trimmed Mean | 16.4630 | | |
| | | Median | 15.5000 | | |
| | | Variance | 19.484 | | |
| | | Std. Deviation | 4.41410 | | |
| | | Minimum | 11.00 | | |
| | | Maximum | 23.00 | | |
| | | Range | 12.00 | | |
| | | Interquartile Range | 8.13 | | |
| | | Skewness | .334 | .687 | |
| | | Kurtosis | -1.239 | 1.334 | |
| | 1.00 | Mean | 13.2655 | .99710 | |
| | | 95% Confidence | Lower Bound | 11.2345 | |
| | | Interval for Mean | Upper Bound | 15.2965 | |
| | | 5% Trimmed Mean | 12.9270 | | |

| | N 4J* | 40.5000 | | |
|------|------------------------|----------------|---------|---|
| | Median | 12.5000 | | |
| | Variance | 32.809 | | |
| | Std. Deviation | 5.72789 | | |
| | Minimum | 4.75 | | |
| | Maximum | 28.00 | | |
| | Range | 23.25 | | ĺ |
| | Interquartile Range | 9.71 | | |
| | Skewness | .749 | .409 | 1 |
| | Kurtosis | .140 | .798 | 1 |
| 1.40 | Mean | 13.5333 | 2.26869 | 1 |
| | 95% Confidence | Lower Bound | 8.4012 | |
| | Interval for Mean | Upper Bound | 18.6655 | |
| | 5% Trimmed Mean | 12.8241 | | |
| | Median | 11.9583 | | 1 |
| | Variance | 51.469 | | 1 |
| | Std. Deviation | 7.17422 | | |
| | Minimum | 7.83 | | 1 |
| | Maximum | 32.00 | | 1 |
| | Range | 24.17 | | 1 |
| | Interquartile Range | 6.27 | | |
| | Skewness | 2.218 | .687 | |
| | Kurtosis | 5.475 | 1.334 | |
| 2.00 | Mean | 9.3814 | .57434 | |
| | 95% Confidence | Lower Bound | 8.2299 | |
| | Interval for Mean | Upper Bound | 10.5329 | |
| | 5% Trimmed Mean | 9.0293 | | |
| | Median | 8.3333 | | |
| | Variance | 18.142 | | |
| | Std. Deviation | 4.25939 | | |
| | Minimum | 2.00 | | ĺ |
| | Maximum | 24.00 | | ĺ |
| | Range | 22.00 | | ĺ |
| | Interquartile Range | 4.50 | | |
| | Skewness | 1.445 | .322 | 1 |
| | Kurtosis | 2.166 | .634 | 1 |
| 2.30 | Mean | 10.1667 | 2.40370 | |
| | 95% | Lower | 1756 | |
| | | | | |

| | | Cantidanas | Dawad | | 1 |
|----------|------|----------------------|----------------|---------|----------|
| | | Confidence | Bound | | |
| | | Interval for Mean | Upper Bound | 20.5090 | |
| | - | 5% Trimmed | Dound | | |
| | | Mean | | 1 | |
| | - | Median | 11.5000 | | |
| | | Variance | 17.333 | | |
| | | Std. | 17.555 | | |
| | | Deviation | 4.16333 | i | |
| | - | Minimum | 5.50 | | |
| | - | Maximum | 13.50 | | |
| | - | Range | 8.00 | | |
| | - | Interquartile | 0.00 | | |
| | | Range | • | i | |
| | | Skewness | -1.293 | 1.225 | |
| | | Kurtosis | | | 1 |
| | 2.40 | Mean | 9.0042 | 1.64402 | ĺ |
| | | 95% | Lower | | |
| | | Confidence | Bound | 3.7722 | |
| | | Interval for | Upper | | |
| | | Mean | Bound | 14.2362 | |
| | | 5% Trimmed | 0.0744 | | |
| | | Mean | 8.8741 | | |
| | | Median | 7.8333 | | |
| | | Variance | 10.811 | | |
| | | Std. | 2 20004 | i | |
| | _ | Deviation | 3.28804 | | |
| | | Minimum | 6.60 | i | |
| | | Maximum | 13.75 | i | |
| | | Range | 7.15 | i | |
| | | Interquartile | 5.78 | i | |
| | _ | Range | 3.70 | | |
| | _ | Skewness | 1.592 | 1.014 | |
| <u> </u> | | Kurtosis | 2.380 | 2.619 | |
| 3 | 3.00 | Mean | 8.6440 | .58921 | |
| | | 95% | Lower | 7.4279 | |
| | | Confidence | Bound | , 3 | |
| | | Interval for | Upper | 9.8601 | |
| | | Mean | Bound | | |
| | | 5% Trimmed | 8.6059 | 1 | |
| | | Mean | 0.0500 | | |
| | | Median | 8.2500 | | |
| | | Variance | 8.679 | | |
| | | Std. Deviation | 2.94603 | 1 | |
| | | | 2.00 | | |
| | | Minimum | 3.90 | | |
| | | Maximum | 14.00 | | |
| | | Range | 10.10 | | |
| | | Interquartile | 4.25 | | <u> </u> |

| | Range | | | |
|------|------------------------|-------------------|--------------|--|
| | Skewness | .488 | .464 | |
| | Kurtosis | 651 | .902 | |
| 3.40 | Mean | 12.3750 | 1.31123 | |
| | 95% Confidence | Lower Bound | 6.7332 | |
| | Interval for Mean | Upper Bound | 18.0168 | |
| | 5% Trimmed Mean | | | |
| | Median | 12.3333 | | |
| | Variance | 5.158 | | |
| | Std. Deviation | 2.27112 | | |
| | Minimum | 10.13 | | |
| | Maximum | 14.67 | | |
| | Range | 4.54 | | |
| | Interquartile Range | | | |
| | Skewness | .083 | 1.225 | |
| | Kurtosis | | | |
| 3.50 | Mean | 13.4167 | 2.08333 | |
| | 95% Confidence | Lower Bound | - 13.0546 | |
| | Interval for Mean | Upper Bound | 39.8879 | |
| | 5% Trimmed Mean | | | |
| | Median | 13.4167 | | |
| | Variance | 8.681 | | |
| | Std. Deviation | 2.94628 | | |
| | Minimum | 11.33 | | |
| | Maximum | 15.50 | | |
| | Range | 4.17 | | |
| | Interquartile Range | | | |
| | Skewness | | | |
| | Kurtosis | | | |
| 4.00 | Mean | 12.5079 | .49101 | |
| | 95% Confidence | Lower Bound | 11.5404 | |
| | Interval for Mean | Upper Bound | 13.4754 | |
| | 5% Trimmed Mean | 11.7035 | | |
| | Median | 10.3333 | | |
| | Variance Std. | 55.209 7.43027 | | |
| | olu. | 1.43027 | | |

| | | Deviation | | | |
|--|------|------------------------|----------------|---------|--|
| | | Minimum | 2.92 | | |
| | | Maximum | 49.00 | | |
| | | Range | 46.08 | | |
| | | Interquartile Range | 8.33 | | |
| | | Skewness | 1.931 | .161 | |
| | | Kurtosis | 4.914 | .320 | |
| | 4.60 | Mean | 12.4079 | 1.00553 | |
| | | 95% Confidence | Lower Bound | 10.3705 | |
| | | Interval for Mean | Upper Bound | 14.4453 | |
| | | 5% Trimmed Mean | 11.8246 | | |
| | | Median | 11.6667 | | |
| | | Variance | 38.422 | | |
| | | Std. Deviation | 6.19851 | | |
| | | Minimum | 4.00 | | |
| | | Maximum | 31.00 | | |
| | | Range | 27.00 | | |
| | | Interquartile Range | 6.00 | | |
| | | Skewness | 1.503 | .383 | |
| | | Kurtosis | 2.478 | .750 | |
| a. rel_thick is constant when period = -1.00. It has been omitted. | | | | | |

Appendix F

Botanical Remains

Appendix F. 2, Macrobotanical Remains; and Appendix F. 3, Microbotanical Remains.

Victor Vásquez Sánchez and Teresa Rosales Tham conducted these analyses at the Arqueobios Laboratory in Trujillo, Peru, with Victor leading the analysis of botanical remains and Teresa leading the analysis of faunal remains in the flotation samples. Their lab results are presented below along with additional tables produced by the author from these data. Table F.1 summarizes the botanical taxa identified through these analyses.

Table F.1 Macrobotanical and microbotanical remains identified from Hualcayán.

| Flotation Analysis (faunal re | mains were also recovered; those are p | resented in Appendix F1 and Appendix G) |
|-------------------------------|--|---|
| Taxa | Part Identified | Common Name |
| Chenopodium quinoa | seed | quinoa |
| Phaseolus vulgaris | seed | fijol/common bean |
| Passiflora mollissima | seed | poroksa |
| Zea mays | seed | maiz/maize |
| Opuntia sp. | seed | tuna/cactus fruit |
| Medicago sp. | seed | |
| Abutilon sp. | seed | |
| Boehmeria sp. | seed | |
| Dichondra sp. | seed | |
| Asteraceae | seed | |
| Amaranthus sp. | seed | Amaranth |
| Chenopodium sp. | seed | Quenopodium |
| Solanum sp. | seed | |
| Trifolium sp. | seed | trebol/Clover |
| Fabaceae | | |
| cf. Magnolia sp. | seed | |
| Scirpus sp. | seed | junco |
| Linum sp. | seed | lino/flax |
| Prosopis sp. | seed | algarrobo |

| Macrobotanical Analysis | - Carpology (Fruit and Seeds) | |
|--------------------------------|-------------------------------|---------------------|
| Taxa | Part Identified | Common Name |
| Phaseolus vulgaris | seed | frijol/bean |
| Arachis hypogaea | pods y seeds | mani |
| Ipomoea batatas | | camote/sweet potato |
| Solanum tuberosum | | papa/potato |
| Zea mays | seed | maiz/maize |
| Lagenaria siceraria | fruit | mate/calabash |
| Schinus molle | fruit | molle |
| Juglans sp. | fruit | nogal/walnut |
| Phaseolus sp. | seed | |
| Seed n/i | seed | |
| Herbáceas n/i | | |
| Vegetal n/i | seed | |

| Macrobotanical Analys | is - Anthracology (Wood Charco | al) |
|-----------------------|--------------------------------|------------------|
| Taxa | Part Identified | Common Name |
| Juglans sp. | wood | nogal/walnut |
| Alnus sp. | wood | aliso/alder |
| Polylepis sp. | wood | queñoa/polyepsis |
| Escallonia sp. | wood | chachacomo |
| Mimosa sp. | wood | |
| Schinus molle | wood | molle |
| Buddleja sp. | wood | |
| Pouteria sp. | wood | lúcuma/caimito |
| Asteraceae | wood | |
| Poaceae | wood | |
| Carbón n/i | | |

| Microbotanical Analysis (| of Ceramics, Lithics, and | Soils) |
|---------------------------|---------------------------|---------------------|
| Taxa | N/A | Common Name |
| Bambusoideae | | |
| cf. Ipomoea batatas | | camote/sweet potato |
| Chenopodium quinoa | | quinoa |
| Cucurbita sp. | | calabaza/mate |
| Dicotiledoneae | | |
| Panicoideae | | |
| Phaseolus vulgaris | | frijol/bean |
| Pooideae | | |
| Solanum tuberosum | | papa/potato |
| Zea mays | | maiz/maize |
| Zea mays (moderno) | | maiz/maize |
| Almidón N/I | | |
| Dañado N/I | | |
| Fitolito N/I | | |
| Mineral N/I | | |

Appendix F.1

Flotation Analysis

Table F1.1 Faunal and botanical remains recovered from flotation analysis. Analysis by Victor Vásquez Sánchez and Teresa Rosales Tham, Arqueobios Laboratory (Trujillo, Peru).

Guide to context period designations:

Context Periods

- 0 Initial Formative (Mito-Kotosh)
- 1 Early-Middle Formative (Mito-Kotosh)
- 2 Late Formative (Chavín)
- 3 Final Formative (Huarás)
- 4 Late Intermediate Period (Recuay)
- 5 Middle Horizon (Wari-influence)
- 6 Late Intermediate Period (Akillpo)

Mixed Contexts

- 90 (Periods 1 and 2 mixed in mound fills)
- 91 (Periods 2, 3, and 4 mixed in mound fills)
- 92 (Periods 4 and 5 mixed in tombs)
- 93 (Periods 4, 5, and 6 mixed in house/patio fills)

Faunal:

99 (Unknown Period)

| Estimated Period | Operation | Context | eg EL45 FL39 |
|------------------|--|------------------|--------------------|
| 4 | Op 1 | C-0003 | FL45 |
| 4 | Op 1 | C-0018 | FL39 |
| 4 | Op 1 | C-0019 C-0024 | FL43 FL7 |
| 3 | Op 1 | C-0024 | FL7 |
| 4 | Op 1 Op 1 Op 2 Op 2 Op 2 Op 2 | C-0053 | FL50 FL51 |
| 4 | Op 2 | C-0054 | FL51 |
| 2 | Op 2 | C-0058 | FL57 FL53 |
| | Op 2 | C-0060 | FL53 |
| 2 | Op 2 Op 2 Op 2 Op 2 | C-0062 | FL52 |
| 1 | Op 2 | C-0066 | FL54 |
| 1 | Op 2 | C-0067 | FL59 |
| 1 | Op 2 | C-0071 | FL56-55 |
| 1 | Op 2 Op 2 | C-0075 | FL58 |
| 3 | Op 2 | C-0094 | FL64 |
| 3 | Op 2 Op 2 | C-0096 | FL-60 |
| 3 | Op 2 | C-0096 | FL63 |
| 4 | Op 5 | C-0152 | FL99 |
| 4 | Op 5 | C-0153 | FL108 |
| 2 | Op 5 | C-0157 | FL106 |
| 4 | Op 5 | C-0158 | FL101 |
| 4 | Op 5 | C-0158 | FL107 |
| 91 | Op 5 | C-0162 | FL100 |
| 91 | Op 5 | C-0162 | FL103 |
| 91 | Op 5 | C-0162 C-0167 | FL105 |
| 4 | Op 5 | C-016/ | FL109 |
| 0 | Op 5 | C-0171 | FL110 |
| 4 | Op 6 | C-0210 | FL212 |
| 4 | Op 6 | C-0211 | FL216 |
| 4 | Op 6 | C-0211 | FL217 |
| 4 | Op 6 | C-0211 C-0215 | FL231 FL214 |
| 4 | Op 6 | | |
| 4 | Op 6 | C-0231 C-0237 | FL233 FL180 |
| | Op 6 Op 6 | | |
| 4 | Op 6 | C-0237 C-0242 | FL243 FL222 |
| 4 | Op 6 | C-0242 C-0246 | |
| 2 | Op 6 | C-0246 C-0250 | FL189 |
| | Op 6 | | FL226 |
| 4 | Op 7 | C-0302 | FL152 |
| 4 | Op 7 | C-0340 | FL215 |

| Drepanostomella | Systrophia sp. | Thaumastus sp. | Scutalus mariop | Drymaeus sp. | Bostryx sp. | Bulimulidae | Engraulis ringen | Sardinops sagax | Passeriformes | Ave N/I | Cavia porcellus | Lama sp. | Mamifero N/I | Insecto N/I | Reptil N/I | Rodentia | Muridae |
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| Drepanostomella sp. | Systrophia sp. | Thaumastus sp. | Scutalus mariopenai | Drymaeus sp. | Bostryx sp. | Bulimulidae | Engraulis ringens | Sardinops sagax | Passeriformes | Ave N/I | Cavia porcellus | Lama sp. | Mamifero N/I | Insecto N/I | Reptil N/I | Rodentia | Muridae | |
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| 1 | Op 2 | C-0455 | FL61 |
| 1 | Op 2 | C-0458 | FL62 |
| 1 | Op 2 | C-0458 C-0463 | FL62 FL33 |
| 1 | Op 2 | C-0464 | FL5 |
| 1 | Op 2 | C-0466 | FL34 |
| 4 | Op 2 | C-0467 | FL6 |
| 1 | Op 2 | C-0470 | FL10 |
| 1 | Op 2 | C-0471 | FL4 |
| 4 | Op 2 | C-0472 | FL2 |
| 4 | Op 2 | C-0463 C-0464 C-0466 C-0467 C-0470 C-0471 C-0472 C-0473 | FL29 |
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| 4 | Op 2 | C-0477 | FL13 |
| 4 | Op 2 | C-0477 | FL15 |
| 4 | Op 2 | C-0477 C-0479 | FL8 |
| 4 | Op 2 | C-0479 | FL32 |
| 4 | Op 2 | C-0481 | FL18 |
| 2 | Op 2 | C-0482 | FL14 |
| 2 | Op 2 | C-0482 | FL28 |
| 91 | Op 2 Op 2 Op 2 | C-0484 C-0488 | FL17 |
| 91 | Op 2 | C-0488 | FL19 FL36 |
| 91 | Op 2 | C-0488 C-0489 | FL38 |
| 91 | Op 2 | C-0490 | FL19 |
| 91 | Op 2 | C-0491 | FL19 FL26 |
| 2 | Op 2 | C-0492 | FL16/FL37 |
| 4 | Op 2 | C-0493 | FL22 |
| 2 | Op 2 | C-0494 | FL23 |
| 4 | Op 2 | C-0495 | FL25 |
| 4 | Op 2 | C-0499 | FL21 |
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| 3 | Op 1 | C-0589 | FL31 |
| 91 | Op 1 | C-0593 | FL181 |
| 91 | Op 1 | C-0593 | FL6 |
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| 2 | Op 1 | C-0596 | FL20 |
| 3 | Op 1 | C-0600 | FL16 |
| 4 | Op 6 | C-0602 | FL238 |
| 4 | Op 6 | C-0606 | FL194 |
| 4 | Op 6 | C-0614 | FL175 |
| 4 | Op 6 | C-0615 | FL188 |
| 4 | Op 6 | C-0617 | FL111 |
| 4 | Op 6 | C-0617 | FL113 |
| 4 | Op 6 | C-0617 | FL128 FL180 |
| 4 | Op 6 | C-0617 C-0617 | FL180 |
| 4 | Op 6 On 6 | C-0617 | FL184 FL218 |
| 4 | Op 6 Op 6 | C-0617 | FL219 |
| 4 | Op 6 | C-0617 | FL224 |
| 4 | Op 6 | C-0617 | FL228 |
| 4 | Op 6 | C-0617 | FL229 |
| 4 | Op 6 | C-0617 | FL230 |
| 4 | Op 6 | C-0617 | FL244 |
| 4 | Op 6 | C-0618 | FL137 |
| 4 | Op 6 | C-0619 | FL176 |
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| Drepanostomella sp. Systrophia sp. | I haumastus sp. Scutalus mariopenai | Drymaeus sp. | Bostryx sp. | Bulimulidae | Engraulis ringens | Sardinops sagax | Passeriformes | Ave N/I | Cavia porcellus | Lama sp. | Mamifero N/I | Insecto N/I | Reptil N/I | Rodentia | Muridae |
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| 3 | Op 6 | C-0636 C-0653 | FL39 |
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| 2 | Op 1 | C-0663 C-0666 | FL5 |
| 3 | Op 1 | C-0666 | FL32 |
| 3 | Op 1 | C-0667 C-0671 | FL29 |
| 3 | Op 1 | C-0671 | FL11 |
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| 3 | Op 1 | C-0680 | FL24 |
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| 3 3 2 2 | Op 1 | C-0684 | FLO FL53 |
| 2 | Op 1 | C-0684 | FL61 |
| 2 | Op 1 | C-0685 | FL52 |
| 2 | Op 1 | C-0685 C-0688 | FL54 |
| 2 | Op 1 | C-0689 | FL62 |
| 2 | Op 1 | C-0690 | FL63 |
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| 2 | Op 1 | C-0690 | FL60 |
| 2 | Op 1 | C-0699 C-0700 C-0754 C-0763 C-0770 | FL59 FL55 |
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| 2 | Op 1 | C-0763 | FL65 |
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| 2 | Op 1 | C-0776 | FL68 FL66 |
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| 2 | Op 1 | C-0789 | FL73 |
| 2 | Op 1 Op 1 | C-0793 C-0796 | FL71 FL85 |
| 2 | Op 1 | C-0797 | FL86 |
| 3 | Op 1 | C-0799 | FL90 |
| 4 | Op 1 | C-0800 | FL81 |
| 4 | Op 7 | C-0802 | FL146 |
| 4 | Op 7 | C-0807 | FL161 |
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| 4 | Op 7 | C-0822 | FL191 |
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| 4 | Op 7 | C-0831 | FL193 |
| 4 | Op 7 | C-0832 | FL185 |
| 4 | Op 7 | C-0841 | FL131 |
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| | Drepanostomella sp. | Systrophia sp. | Thaumastus sp. | Scutalus mariopenai | Drymaeus sp. | x sp. | Bulimulidae | Engraulis ringens | Sardinops sagax | Passeriformes | l/ | Cavia porcellus | sp. | ω Mamifero N/I | 0 N/I | I/N | ıtia | 36 |
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| Ŀ | Drepa | Systro | Thaun | Scutal | Dryma | Bostryx sp. | Bulim | Engra | Sardir | Passe | Ave N/I | Cavia | Lama sp. | Mamif | Insecto N/I | Reptil N/I | Rodentia | Muridae |
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| ш́ | Ō | Context | PL134 FL78 FL75 |
| 1 | On 7 | C-0849 | FI 13/I |
| - | Op 1 | 0-0049 | T L 134 |
| 3 | Op 1 | C-0901 | FL/8 |
| 3 | Op 1 | C-0902 C-0903 | FL75 |
| 3 | Op 1 | C-0903 | FL120 |
| 3 | On 1 | C-0903 | FI 02 |
| 2 | Op 1 | C 0000 | FL92 FL77 |
| 3 2 3 | Op i | C-0904 | FL// |
| 3 | Op 1 | C-0905 | FL82 |
| 3 | Op 1 | C-0909 | FL80 FL121 FL47 FL49 |
| 3 2 | Op 1 | C-0914 | FL121 |
| 3 | On 1 | C-0915 | FI 47 |
| 2 | Op 1 | 0-0010 | FL 40 |
| | Op i | C-0916 | FL49 |
| 3 | Op 1 | C-0919 | FL48 |
| 2 | Op 1 | C-0925 | FL48 FL115 FL118 |
| 2 | Op 1 | C-0930 | FL118 |
| 2 | On 1 | C-0936 | FL100 |
| 2 | 05.4 | C 0000 | FL96 |
| | Oh I | 0-0938 | 1,50 |
| 2 | Up 1 | C-0943 | FL94 |
| 2 | Op 1 | C-0944 | FL94 FL95 |
| 2 | Op 1 | C-0945 | FL117 |
| 2 | On 1 | C-0946 | FL116 |
| 2 | Or 1 | C-0050 | FL98 |
| - | Ορ 1 | 0-0900 | FL98 |
| 2 | ∪p 1 | U-0951 | FL9/ |
| 2 2 2 2 2 2 2 2 2 4 4 | Op 13 | C-0964 | FL269 |
| 4 | Op 13 | C-0964 | FI 271 |
| 4 | O Op 7 Op 1 Op 1 Op 1 Op 1 Op 1 Op 1 Op 1 Op 1 Op 1 Op 1 Op 1 Op 1 Op 1 Op 1 Op 1 Op 1 Op 1 Op 2 | C-0903 C-0904 C-0905 C-0909 C-0914 C-0915 C-0916 C-0919 C-0925 C-0930 C-0938 C-0944 C-0944 C-0944 C-0946 C-0950 C-0950 C-0950 C-0964 C-0970 C-0973 C-1159 C-1159 C-1169 C-1173 C-1184 C-1188 C-1181 C-1191 C-1193 C-1193 C-1194 C-1200 C-1253 C-1254 C-1307 C-1307 | FL270 FL268 FL267 |
| 4 | Op 10 | C 0070 | FL260 |
| 4 | Op 13 | C-0973 | FL200 |
| 4 | Op 13 | C-0980 | FL267 |
| 4 | Op 6 | C-1016 | FL40 |
| 2 | Op 2 | C-1156 | FL127 |
| 2 | On 2 | C-1159 | FI 126 |
| 2 | Op 2 | C 1160 | FL 122 |
| | Op 2 | 0-1100 | T L 122 |
| 2 | Op 2 | C-1169 | FL124 |
| 1 | Op 2 | C-1173 | FL207 FL40 FL127 FL126 FL122 FL124 FL35 |
| 1 | Op 2 | C-1175 | FL13 |
| 1 | Op 2 | C-1183 | FL13 FL10 FL14 FL16 FL15 FL12 |
| 1 | On 2 | C-1184 | FI 1/ |
| 1 | 0-2 | C 1107 | FL1C |
| | Op 2 | C-1100 | FLIO |
| 1 | Op 2 Op 2 | C-1191 | FL15 |
| 1 | Op 2 | C-1193 | FL12 |
| 1 | Op 2 | C-1193 | FL17 |
| 1 | Op 2 Op 2 | C-1194 | FL18 |
| 1 | Op 2 | C 1109 | FL38 |
| | Op 2 | C-1190 | FL30 |
| 2 | Op 2 | C-1200 | FL19 |
| 4 | Op 16 | C-1253 | FL272 |
| 4 | Op 16 Op 16 | C-1254 | FL273 |
| 4 | Op 7 | C-1307 | FL222 |
| 4 | Op 7 Op 7 | C-1307 | FL224 |
| 4 | Op 7 | C-1307 | FL216 |
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| 6 | Op 22 | C-1605 | FL23 |
| 6 | Op 22 | C-1606 | FL20 |
| 6 | Op 22 | C-1607 | FL22 |
| 93 | Op 22 | C-1610 | FL25 |
| 4 | Op 22 | C-1611 | FL26 |
| 4 | | | FL32 |
| | Op 22 | C-1612 | |
| 6 | Op 22 | C-1613 | FL21 |
| 4 | Op 22 | C-1614 | FL24 |
| 4 | Op 22 | C-1621 | FL34 |
| 4 | Op 22 | C-1622 | FL27 |
| 4 | Op 22 | C-1624 | FL31 |
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| 93 | Op 22 | C-1625 | FL28 |
| 4 | Op 22 | C-1627 | FL30 |
| 4 | Op 22 | C-1628 | FL33 |
| 4 | Op 22 | C-1629 | FL29 |
| 4 | Op 22 | C-1630 | FL35 |
| 2 | Op 2 | C-1651 | FL37 |
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| 1 | Op 2 | C-1653 | FL9 |
| 2 | Op 2 | C-1656 | FL8 |
| 1 | Op 2 | C-1660 | FL41 |
| 1 | Op 2 | C-1661 | FL7 |
| 1 | Op 2 | C-1662 | FL6 |
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| 1 | Op 2 | C-1663 | FL45 |
| 1 | Op 2 | C-1664 | FL40 |
| 1 | Op 2 | C-1666 | FL47 |
| 1 | Op 2 | C-1667 | FL46 |
| 1 | Op 2 | C-1668 | FL42 |
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| ı | Drepanostomella sp. □ | Systrophia sp. | Thaumastus sp. | Scutalus mariopenai | Drymaeus sp. | → Bostryx sp. | Bulimulidae | Engraulis ringens | Sardinops sagax | Passeriformes | Ave N/I | Cavia porcellus | Lama sp. | Mamifero N/I | Insecto N/I | Reptil N/I | Rodentia | Muridae |
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| Estimated Period | Operation | Context | Sample |
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| 2 | Op 2 | C-1669 | FL39 |
| 2 | Op 2 Op 2 | C-1672 | FL45 |
| 2 | Op 2 | C-1675 | FL43 |

| Drepanostomella sp. | Systrophia sp. | Thaumastus sp. | Scutalus mariopenai | Drymaeus sp. | Bostryx sp. | Bulimulidae | Engraulis ringens | Sardinops sagax | Passeriformes | Ave N/I | Cavia porcellus | Lama sp. | Mamifero N/I | Insecto N/I | Reptil N/I | Rodentia | Muridae |
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Table F1.1 Faunal and botanica Tham, Arqueobios Laboratory (

Guide to context period designations:

Context Periods

- 0 Initial Formative (Mito-Kotosh)
- 1 Early-Middle Formative (Mito-Kotosh
- 2 Late Formative (Chavín)
- 3 Final Formative (Huarás)
- 4 Late Intermediate Period (Recuay)
- 5 Middle Horizon (Wari-influence)
- 6 Late Intermediate Period (Akillpo)

Mixed Contexts

- 90 (Periods 1 and 2 mixed in mound fi
- 91 (Periods 2, 3, and 4 mixed in moun
- 92 (Periods 4 and 5 mixed in tombs)
- 93 (Periods 4, 5, and 6 mixed in house
- 99 (Unknown Period)

| Estimated Period | Operation | Context | Sample FL45 FL39 | Botanical: |
|------------------|-----------|---------|------------------------|------------|
| 4 | Op 1 | C-0003 | FL45 | |
| 4 | Op 1 | C-0018 | FL39 | |
| 4 | Op 1 | C-0019 | FL43 | |
| 3 | Op 1 | C-0024 | FL7 | |
| 4 | Op 2 | C-0053 | FL50 | |
| 4 | Op 2 | C-0054 | FL51 | |
| 2 | Op 2 | C-0058 | FL57 | |
| 2 | Op 2 | C-0060 | FL53 | |
| 2 | Op 2 | C-0062 | FL52 | |
| 1 | Op 2 | C-0066 | FL54 | |
| 1 | Op 2 | C-0067 | FL59 | |
| 1 | Op 2 | C-0071 | FL56-55 | |
| 1 | Op 2 | C-0075 | FL58 | |
| 3 | Op 2 | C-0094 | FL64 | |
| 3 | Op 2 | C-0096 | FL-60 | |
| 3 | Op 2 | C-0096 | FL63 | |
| 4 | Op 5 | C-0152 | FL99 | |
| 4 | Op 5 | C-0153 | FL108 | |
| 2 | Op 5 | C-0157 | FL106 | |
| 4 | Op 5 | C-0158 | FL101 | |
| 4 | Op 5 | C-0158 | FL107 | |
| 91 | Op 5 | C-0162 | FL100 | |
| 91 | Op 5 | C-0162 | FL103 | |
| 91 | Op 5 | C-0162 | FL105 | |
| 4 | Op 5 | C-0167 | FL109 | |
| 0 | Op 5 | C-0171 | FL110 | |
| 4 | Op 6 | C-0210 | FL212 | |
| 4 | Op 6 | C-0211 | FL216 | |
| 4 | Op 6 | C-0211 | FL217 | |
| 4 | Op 6 | C-0211 | FL231 | |
| 4 | Op 6 | C-0215 | FL214 | |
| 4 | Op 6 | C-0231 | FL233 | l |
| 4 | Op 6 | C-0237 | FL180 | |
| 4 | Op 6 | C-0237 | FL243 | l |
| 4 | Op 6 | C-0242 | FL222 | l |
| 4 | Op 6 | C-0246 | FL189 | ł |
| 2 | Op 6 | C-0250 | FL226 | 1 |
| 4 | Op 7 | C-0302 | FL152 | |
| 4 | Op 7 | C-0340 | FL215 | J |

| | Amaranthus sp. | Chenopodium sp. | Chenopodium quinoa | Phaseolus vulgaris | Fabaceae | & Medicago sp. | Abutilon sp. | cf. Magnolia sp. | Boehmeria sp. | 25 Dichondra sp. | Asteraceae | Opuntia sp. | Passiflora mollissima | Solanum sp. | Zea mays | Scirpus sp. | Tufolium sp. | Linum sp. |
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| 4 | Op 7 | C-0341 | FL153 |
| 4 | Op 7 | C-0348 | FL159 |
| 4 | Op 7 | C-0350 | FL166 |
| 4 | Op 7 | C-0350 | FL246 |
| 4 | Op 4 | C-0353 | FL95 |
| 4 | Op 4 | C-0358 | FL98 |
| 4 | Op 4 | C-0361 | FL97 |
| 4 | Op 4 | C-0366 | FL93 |
| 4 | Op 4 | C-0369 | FL201 FL202 |
| 4 | Op 4 | C-0370 | FL202 |
| 4 | Op 4 | C-0374 | FL204 |
| 1 | Op 2 | C-0454 | FL66 |
| 1 | On 2 | C-0455 | |
| 1 | On 2 | C-0458 | FL61 FL62 |
| 1 | Op 2 | C-0463 | FI 22 |
| 1 | Op 2 | C-0463 | I LOO |
| 1 | Op 2 | C-0404 | FL33 FL5 FL34 |
| 4 | Op 2 | C-0400 | FL34 FL6 |
| | Op 2 | C-0353 C-0358 C-0361 C-0366 C-0369 C-0370 C-0374 C-0454 C-0455 C-0458 C-0463 C-0464 C-0466 C-0470 C-0471 C-0472 C-0473 C-0474 | FL0 |
| 1 | Op 2 | C-0470 | FL10 FL4 |
| 1 | Op 2 | C-04/1 | FL4 |
| 4 | Op 2 | C-0472 | FL2 FL29 |
| 4 | Op 2 | C-0473 | FL29 |
| 1 | Op 2 | C-0474 | FL3 |
| 4 | Op 2 Op 2 Op 2 Op 2 Op 2 Op 2 Op 2 Op 2 | C-0475 | FL3 FL11 FL12 FL13 FL15 FL8 FL32 FL18 FL14 FL28 |
| 4 | Op 2 | C-0475 | FL12 |
| 4 | Op 2 | C-0475 C-0477 C-0477 C-0477 C-0479 C-0481 C-0482 | FL13 |
| 4 | Op 2 | C-0477 | FL15 |
| 4 | Op 2 | C-0477 | FL8 |
| 4 | Op 2 | C-0479 | FL32 |
| 4 | Op 2 | C-0481 | FL18 |
| 2 | Op 2 | C-0482 | FL14 |
| 2 | Op 2 | C-0482 C-0484 | FL28 |
| 2 | Op 2 | C-0484 | FL17 |
| 91 | On 2 | C-0488 | FL19 |
| 91 | Op 2 | C-0488 C-0488 | FL36 |
| 91 | Op 2 | C-0489 | FL38 |
| 91 | On 2 | C-0489 C-0490 C-0491 C-0492 | FL19 |
| 91 | On 2 | C-0491 | FL26 |
| 2 | On 2 | C-0492 | FL16/FL37 |
| 4 | On 2 | C-0493 | FL22 |
| 2 | Op 2 | C-0493 C-0494 C-0495 | FL23 |
| 4 | Op 2 | C 0495 | FL25 |
| 4 | Op 2 | C-0499 | FL21 |
| 4 | Op 2 | | FL42 |
| 3 | Op 1 | C-0555 C-0562 | FL41 |
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| | Op 1 | | FL34 |
| 2 | Op 1 | C-0565 | |
| | Op 1 | C-0565 | FL35 |
| 2 | Op 1 | C-0565 | FL36 |
| 2 | Op 1 | C-0584 | FL33 |
| 2 | Op 1 | C-0585 | FL57 |
| 3 | Op 1 | C-0589 | FL31 |
| 91 | Op 1 | C-0593 | FL181 |
| 91 | Op 1 | C-0593 | FL6 |
| 2 | Op 1 | C-0594 | FL3 |
| 2 | Op 1 | C-0596 | FL20 |
| 3 | Op 1 | C-0600 | FL16 |
| 4 | Op 6 | C-0602 | FL238 |
| 4 | Op 6 | C-0606 | FL194 |
| 4 | Op 6 | C-0614 | FL175 |
| 4 | Op 6 | C-0615 | FL188 |
| 4 | Op 6 | C-0617 | FL111 |
| 4 | Op 6 | C-0617 | FL113 |
| 4 | Op 6 | C-0617 | FL128 |
| 4 | Op 6 | C-0617 | FL180 |
| 4 | Op 6 | C-0617 | FL184 |
| 4 | Op 6 | C-0617 | FL218 |
| 4 | Op 6 | C-0617 | FL219 |
| 4 | Op 6 | C-0617 | FL224 |
| 4 | Op 6 | C-0617 | FL228 |
| 4 | Op 6 | C-0617 | FL229 |
| 4 | Op 6 | C-0617 | FL230 |
| 4 | Op 6 | C-0617 | FL244 |
| 4 | Op 6 | C-0618 | FL137 |
| 4 | Op 6 | C-0619 | FL176 |
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| Botan | ical: | Amaranthus sp. | Chenopodium sp. | Chenopodium quinoa | Phaseolus vulgaris | Fabaceae | Medicago sp. | Abutilon sp. | cf. Magnolia sp. | Boehmeria sp. | □ Dichondra sp. | Asteraceae | Opuntia sp. | Passiflora mollissima | Solanum sp. | Zea mays | Scirpus sp. | Trifolium sp. | Linum sp. |
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| 4 Op 6 C-0632 FL197 4 Op 6 C-0636 FL39 3 Op 1 C-0663 FL19 2 Op 1 C-0660 FL14 2 Op 1 C-0660 FL19 2 Op 1 C-0663 FL5 3 Op 1 C-0667 FL29 3 Op 1 C-0667 FL29 3 Op 1 C-0671 FL11 3 Op 1 C-0671 FL27 3 Op 1 C-0671 FL23 3 Op 1 C-0671 FL23 3 Op 1 C-0671 FL23 3 Op 1 C-0680 FL22 3 Op 1 C-0680 FL22 3 Op 1 C-0680 FL22 3 Op 1 C-0680 FL25 3 Op 1 C-0680 FL25 3 Op 1 C-0680 FL25 3 | timated Period | peration | ntext | mple |
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| 4 Op 6 C-0632 FL197 4 Op 6 C-0636 FL39 3 Op 1 C-0663 FL19 2 Op 1 C-0660 FL14 2 Op 1 C-0660 FL19 2 Op 1 C-0662 FL19 3 Op 1 C-0667 FL29 3 Op 1 C-0667 FL29 3 Op 1 C-0671 FL11 3 Op 1 C-0671 FL27 3 Op 1 C-0671 FL28 3 Op 1 C-0671 FL23 3 Op 1 C-0671 FL23 3 Op 1 C-0680 FL22 3 Op 1 C-0680 FL22 3 Op 1 C-0680 FL23 3 Op 1 C-0680 FL25 3 Op 1 C-0680 FL25 3 Op 1 C-0680 FL25 3 | 4 | Op 6 | C-0620 | FL182 |
| 4 Op 6 C-0632 FL197 4 Op 6 C-0636 FL39 3 Op 1 C-0663 FL19 2 Op 1 C-0660 FL14 2 Op 1 C-0660 FL19 2 Op 1 C-0662 FL19 3 Op 1 C-0667 FL29 3 Op 1 C-0667 FL29 3 Op 1 C-0671 FL11 3 Op 1 C-0671 FL27 3 Op 1 C-0671 FL28 3 Op 1 C-0671 FL23 3 Op 1 C-0671 FL23 3 Op 1 C-0680 FL22 3 Op 1 C-0680 FL22 3 Op 1 C-0680 FL23 3 Op 1 C-0680 FL25 3 Op 1 C-0680 FL25 3 Op 1 C-0680 FL25 3 | 4 | Op 6 | C-0622 | FL179 |
| 4 Op 6 C-0632 FL197 4 Op 6 C-0636 FL39 3 Op 1 C-0663 FL19 2 Op 1 C-0660 FL14 2 Op 1 C-0660 FL19 2 Op 1 C-0662 FL19 3 Op 1 C-0667 FL29 3 Op 1 C-0667 FL29 3 Op 1 C-0671 FL11 3 Op 1 C-0671 FL27 3 Op 1 C-0671 FL28 3 Op 1 C-0671 FL23 3 Op 1 C-0671 FL23 3 Op 1 C-0680 FL22 3 Op 1 C-0680 FL22 3 Op 1 C-0680 FL23 3 Op 1 C-0680 FL25 3 Op 1 C-0680 FL25 3 Op 1 C-0680 FL25 3 | 4 | Op 6 | C-0626 | FL198 |
| 4 Op 6 C-0632 FL197 4 Op 6 C-0636 FL39 3 Op 1 C-0663 FL19 2 Op 1 C-0660 FL14 2 Op 1 C-0660 FL19 2 Op 1 C-0662 FL19 3 Op 1 C-0667 FL29 3 Op 1 C-0667 FL29 3 Op 1 C-0671 FL11 3 Op 1 C-0671 FL27 3 Op 1 C-0671 FL28 3 Op 1 C-0671 FL23 3 Op 1 C-0671 FL23 3 Op 1 C-0680 FL22 3 Op 1 C-0680 FL22 3 Op 1 C-0680 FL23 3 Op 1 C-0680 FL25 3 Op 1 C-0680 FL25 3 Op 1 C-0680 FL25 3 | 4 | Op 6 | C-0628 | FL190 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 4 | Op 6 | C-0629 | FL235 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 4 | Op 6 | C-0632 | FL197 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 3 | Op 6 | C-0653 | FL39 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 2 | Op 1 | C-0660 | FL14 |
| 3 Op1 C-0793 FL/1 2 Op1 C-0797 FL86 2 Op1 C-0797 FL86 3 Op1 C-0799 FL90 4 Op1 C-0800 FL81 4 Op7 C-0807 FL161 4 Op7 C-0809 FL171 4 Op7 C-0812 FL144 4 Op7 C-0812 FL205 4 Op7 C-0812 FL205 4 Op7 C-0812 FL219 4 Op7 C-0812 FL219 4 Op7 C-0812 FL219 4 Op7 C-0821 FL184 4 Op7 C-0821 FL184 4 Op7 C-0821 FL184 4 Op7 C-0822 FL178 4 Op7 C-0822 FL178 4 Op7 C-0822 FL178 4 Op7 C-0822 FL178 4 Op7 C-0822 FL178 4 Op7 C-0822 FL187 4 Op7 C-0822 FL197 4 Op7 C-0822 FL197 4 Op7 C-0822 FL191 4 Op7 C-0822 FL191 4 Op7 C-0822 FL191 4 Op7 C-0822 FL191 4 Op7 C-0821 FL198 | 2 | Op 1 | C-0662 | FL19 |
| 3 Op1 C-0793 FL/1 2 Op1 C-0797 FL86 2 Op1 C-0797 FL86 3 Op1 C-0799 FL90 4 Op1 C-0800 FL81 4 Op7 C-0807 FL161 4 Op7 C-0809 FL171 4 Op7 C-0812 FL144 4 Op7 C-0812 FL205 4 Op7 C-0812 FL205 4 Op7 C-0812 FL219 4 Op7 C-0812 FL219 4 Op7 C-0812 FL219 4 Op7 C-0821 FL184 4 Op7 C-0821 FL184 4 Op7 C-0821 FL184 4 Op7 C-0822 FL178 4 Op7 C-0822 FL178 4 Op7 C-0822 FL178 4 Op7 C-0822 FL178 4 Op7 C-0822 FL178 4 Op7 C-0822 FL187 4 Op7 C-0822 FL197 4 Op7 C-0822 FL197 4 Op7 C-0822 FL191 4 Op7 C-0822 FL191 4 Op7 C-0822 FL191 4 Op7 C-0822 FL191 4 Op7 C-0821 FL198 | 2 | Op 1 | C-0663 | FL5 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 3 | Op 1 | C-0666 | FL32 |
| 3 Op1 C-0793 FL/1 2 Op1 C-0797 FL86 2 Op1 C-0797 FL86 3 Op1 C-0799 FL90 4 Op1 C-0800 FL81 4 Op7 C-0807 FL161 4 Op7 C-0809 FL171 4 Op7 C-0812 FL144 4 Op7 C-0812 FL205 4 Op7 C-0812 FL205 4 Op7 C-0812 FL219 4 Op7 C-0812 FL219 4 Op7 C-0812 FL219 4 Op7 C-0821 FL184 4 Op7 C-0821 FL184 4 Op7 C-0821 FL184 4 Op7 C-0822 FL178 4 Op7 C-0822 FL178 4 Op7 C-0822 FL178 4 Op7 C-0822 FL178 4 Op7 C-0822 FL178 4 Op7 C-0822 FL187 4 Op7 C-0822 FL197 4 Op7 C-0822 FL197 4 Op7 C-0822 FL191 4 Op7 C-0822 FL191 4 Op7 C-0822 FL191 4 Op7 C-0822 FL191 4 Op7 C-0821 FL198 | 3 | Op 1 | C-0667 | FL29 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 3 | Op 1 | C-0671 | FL11 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 3 | Op 1 | C-0671 | FL26 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 3 | Op 1 | C-0671 | FL27 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 3 | Op 1 | C-0671 | FL30 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 3 | Op 1 | C-0672 | FL114 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 3 | Op 1 | C-0680 | FL12 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 3 | Op 1 | C-0680 | FL22 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 3 | Op 1 | C-0680 | FL23 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 3 | Op 1 | C-0680 | FL24 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 3 | Op 1 | C-0680 | FL25 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 3 | Op 1 | C-0680 | FL8 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 2 | Op 1 | C-0684 | FL53 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 2 | Op 1 | C-0685 | FI 52 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 2 | Op 1 | C-0688 | FL54 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 2 | Op 1 | C-0689 | FL62 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 2 | Op 1 | C-0690 | FL63 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 2 | Op 1 | C-0691 | FL56 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | | Op 1 | C-0696 | FL60 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 2 | Op 1 | C-0699 | FL59 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | | Op 1 | C-0700 | FLOO |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 2 | Op 1 | C-0754 | FI 65 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | | Op 1 | C-0770 | FI Q2 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 2 | Op 1 | C-0771 | FL119 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 2 | Op 1 | C-0772 | FL67 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 2 | Op 1 | C-0773 | FL68 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 2 | Op 1 | C-0776 | FL66 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 3 | Op 1 | C-0782 | FL93 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 4 Op 7 C-0831 FL198 | 2 | Op 1 | C-0783 | FL/U |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL189 4 Op 7 C-0822 FL189 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 | 2 | Op 1 | C-0785 | FL88 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL189 4 Op 7 C-0822 FL189 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 | 2 | Op 1 | C-0788 | FL84 |
| 3 Op 1 C-0793 FL/1 2 Op 1 C-0797 FL86 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL178 4 Op 7 C-0822 FL189 4 Op 7 C-0822 FL189 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0821 FL198 | 2 | Op 1 | C-0789 | FL73 |
| 2 Op 1 C-0797 FL86 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL186 4 Op 7 C-0807 FL161 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL196 4 Op 7 C-0822 FL145 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL197 4 Op 7 C-0821 FL199 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL183 4 Op 7 C-0831 FL183 | 3 | Op 1 | C-0793 | |
| 3 Op 1 C-0799 FL90 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0807 FL161 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL215 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL189 4 Op 7 C-0831 FL189 4 Op 7 C-0832 FL187 | | | | |
| 4 Op 1 C-0800 FL81 4 Op 7 C-0802 FL146 4 Op 7 C-0807 FL161 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL196 4 Op 7 C-0822 FL145 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL191 4 Op 7 C-0832 FL189 4 Op 7 C-0831 FL189 4 Op 7 C-0832 FL185 | | | | |
| 4 Op 7 C-0802 FL146 4 Op 7 C-0807 FL161 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL196 4 Op 7 C-0822 FL145 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL189 4 Op 7 C-0831 FL189 4 Op 7 C-0832 FL187 | | | | |
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| 4 Op 7 C-0809 FL171 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL219 4 Op 7 C-0812 FL184 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL196 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL191 4 Op 7 C-0822 FL197 4 Op 7 C-0831 FL189 4 Op 7 C-0831 FL189 4 Op 7 C-0832 FL185 | _ | | | |
| 4 Op 7 C-0812 FL144 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL196 4 Op 7 C-0822 FL145 4 Op 7 C-0822 FL187 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL197 4 Op 7 C-0832 FL189 4 Op 7 C-0831 FL189 4 Op 7 C-0832 FL185 | | | | |
| 4 Op 7 C-0812 FL205 4 Op 7 C-0812 FL214 4 Op 7 C-0812 FL219 4 Op 7 C-0821 FL184 4 Op 7 C-0821 FL196 4 Op 7 C-0822 FL145 4 Op 7 C-0822 FL174 4 Op 7 C-0822 FL197 4 Op 7 C-0822 FL197 4 Op 7 C-0832 FL189 4 Op 7 C-0831 FL189 4 Op 7 C-0832 FL185 | _ | | | |
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| 4 Op / C-0841 FL131 | | | | |
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| 4 Op 7 C-0842 FL143 4 Op 7 C-0844 FL220 | | | | |
| 4 Op 7 C-0847 FL147 | | | | |
| 4 Op 7 C-0848 FL133 | | | | |

| Bota | nical: | Amaranthus sp. | Chenopodium sp. | Chenopodium quinoa | Phaseolus vulgaris | Fabaceae | Medicago sp. | Abutilon sp. | cf. Magnolia sp. | Boehmeria sp. | Dichondra sp. | Asteraceae | Opuntia sp. | Passiflora mollissima | Solanum sp. | - Zea mays | Scirpus sp. | Trifolium sp. | Linum sp. |
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| 4 | Op 7 | C-0849 | FL134 |
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| 3 | Op 1 | C-0905 | FL82 |
| 3 | Op 1 | C-0909 | FL80 |
| 2 | Op 1 | C-0914 | FL121 |
| 3 | Op 1 | C-0915 | FL47 FL49 |
| 2 | Op 1 | C-0916 | FL49 |
| 3 | Op 1 | C-0919 | FL48 FL115 |
| 2 | Op 1 | U-0920 | FL110 |
| 2 | Op 1 | C-0930 C-0936 | FI 100 |
| 2 | Op 1 | C-0938 | FI 96 |
| 2 | Op 1 | C-0943 | FL94 |
| 2 | Op 1 | C-0944 | FL95 |
| 2 | Op 1 | C-0945 | FL117 |
| 2 | Op 1 | C-0946 | FL116 |
| 2 | Op 1 | C-0936 C-0938 C-0943 C-0944 C-0945 C-0946 C-0950 C-0951 C-0964 | FL98 |
| 2 | Op 1 | C-0951 | FL97 |
| 4 | Op 13 | C-0964 | FL118 FL100 FL96 FL94 FL95 FL117 FL116 FL98 FL97 FL269 FL271 FL270 FL268 |
| 4 | Op 13 | C-0964 C-0970 C-0973 | FL271 |
| 4 | Op 13 | C-0970 | FL270 |
| 4 | Op 13 | C-0973 | FL268 |
| 4 | Op 13 | C-0980 C-1016 C-1156 C-1159 | FL267 |
| 4 | Op 6 | C-1016 | FL40 FL127 |
| 2 | Op 2 | C-1156 | FL127 FL126 |
| 2 | Op 2 | C-1159 | FL126 FL122 |
| 2 | Op 2 | C-1160 | EI 12/ |
| 1 | Op 2 | C-1109 | FI 35 |
| 1 | On 2 | C-1175 | FL35 FL13 FL10 FL14 FL16 |
| 1 | Op 2 | C-1183 | FL10 |
| 1 | Op 2 | C-1184 | FL14 |
| 1 | Op 2 | C-1188 | FL16 |
| 1 | Op 2 | C-1191 | FL15 |
| 1 | Op 2 | C-1193 | FL12 |
| 1 | Op 2 | C-1160 C-1169 C-1173 C-1175 C-1183 C-1184 C-1188 C-1191 C-1193 C-1193 C-1194 C-1198 | FL15 FL12 FL17 FL18 FL38 |
| 1 | Op 2 | C-1194 | FL18 |
| 1 | Op 2 | C-1198 | FL38 |
| 4 | Op 16 | C-1196 C-1200 C-1253 C-1254 C-1307 C-1307 C-1322 | FL19 FL272 |
| 4 | Op 16 | C-1254 | FI 273 |
| 4 | Op 16 Op 7 Op 7 Op 7 | C-1307 | FL273 FL222 |
| | Op 7 | C-1307 | FL224 |
| 4 | Op 7 | C-1322 | FL216 |
| 6 | Op 22 | C-1605 | FL23 |
| 6 | Op 22 | C-1606 | FL20 |
| 6 | Op 22 | C-1607 | FL22 |
| 93 | Op 22 | C-1610 | FL25 |
| 4 | Op 22 | C-1611 | FL26 |
| 6 | Op 22 | C-1612 C-1613 | FL32 FL21 |
| 4 | Op 22 Op 22 | C-1613 | FL21 |
| 4 | Op 22 | C-1621 | FL34 |
| 4 | Op 22 | C-1622 | FL27 |
| 4 | Op 22 | C-1624 | FL31 |
| 93 | Op 22 | C-1625 | FL28 |
| 4 | Op 22 | C-1627 | FL30 |
| 4 | Op 22 | C-1628 | FL33 |
| 4 | Op 22 | C-1629 | FL29 |
| 4 | Op 22 | C-1630 | FL35 |
| 2 | Op 2 | C-1651 | FL37 |
| 1 | Op 2 | C-1653 | FL9 FL8 |
| | Op 2 Op 2 | C-1656 C-1660 | FL8 FL41 |
| 2 | | C-1661 | FL41 |
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| 1 | Op 2 Op 2 | C-1662 | FI 6 |
| 1 | Op 2 | C-1662 C-1663 | FL6 FL45 |
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| | Botanical: | Amaranthus sp. | Chenopodium sp. | Chenopodium quinoa | Phaseolus vulgaris | Fabaceae | Medicago sp. | Abutilon sp. | cf. Magnolia sp. | Boehmeria sp. | Dichondra sp. | Asteraceae | Opuntia sp. | Passiflora mollissima | Solanum sp. | Zea mays | Scirpus sp. | Trifolium sp. | Linum sp. |
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| Estimated Period | Operation | Context | Sample |
| 2 | Op 2 | C-1669 | FL39 |
| 2 | Op 2 Op 2 | C-1672 | FL45 |
| 2 | Op 2 | C-1675 | FL43 |

| Botanical: |
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| 3 | | Amaranthus sp. |
| 5 | | Chenopodium sp. |
| 7 | | Chenopodium quinoa |
| 70 | | Phaseolus vulgaris |
| 1 | | Fabaceae |
| 37 | | Medicago sp. |
| 21 | | Abutilon sp. |
| 8 | | cf. Magnolia sp. |
| 1 | | Boehmeria sp. |
| 97 | | Dichondra sp. |
| 3 | | Asteraceae |
| 4 | | Opuntia sp. |
| 0 | | Passiflora mollissima |
| 4 | | Solanum sp. |
| 21 | | Zea mays |
| 4 | | Scirpus sp. |
| 33 | | Trifolium sp. |
| 15 | | Linum sp. |
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TOTALS:



ANÁLISIS DE RESTOS DE FAUNA Y VEGETALES RECUPERADAS EN MUESTRAS DE FLOTACION, PIARA-2015

Por

Víctor F. Vásquez Sánchez¹ Teresa E. Rosales Tham²

- Trujillo, Noviembre 2015 -

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1. MÉTODOS DE ESTUDIO

a. ANÁLISIS ARQUEOZOOLÓGICO

i. Acondicionamiento e Identificación Taxonómica:

La identificación taxonómica de los restos de gasterópodos terrestres aislados de las muestras de flotación se realizó utilizando manuales, colecciones comparativas y trabajos especializados sobre este grupo de invertebrados como: Breure (1978, 1979) y Ramírez *et al*, (2001).

La utilización de la bioinformática mediante la consulta con los bancos de datos de Animal Diversity (http://www.animaldiversity.ummz.umich.edu), FAO (http://www.fao.org), ITIS (http://www.fao.org) entre otras, permitió acceder a las muestras de esqueletos craneales y post-craneales de fauna Neotropical, para su comparación respectiva en cuanto a datos morfológicos y osteométricos.

b. ANÁLISIS ARQUEOBOTÁNICO

i. Restos Microbotanicos: Acondicionamiento e Identificación Taxonómica, Cantidad de Restos.

Todas las evidencias fueron acondicionadas para su identificación taxonómica. Los criterios adoptados para la identificación taxonómica de los diversos restos botánicos abarcaron lo siguiente:

- a) la morfología externa: la identificación taxonómica se realizó mediante el microscopio estereoscopio, y se basa en el examen global sobre un conjunto de muchos caracteres de la variabilidad biológica de los restos, estas se fundamentan sobre los principios de la anatomía comparada.
- b) la comparación de algunos caracteres biométricos de los restos.

El examen de los restos botánicos a partir de los caracteres morfológicos permitió discernir los rasgos característicos del género o especie vegetal a que pertenecen. También se utilizó bibliografía especializada como: Bonavía (1982), Buxo (1997), Esau (1977), Macbride (1943), Mostacero y Mejía (1993), Metcalfe (1960), Pearsall (1989, 1992), Sagástegui (1973), Sagástegui y Leiva (1993), Soukup (1987), Towle (1961), Weberbauer (1945) e Yacovleff y Herrera (1934-35), Ugent y Ochoa (2006), Martín y Barkley (2000).

La identificación taxonómica de los restos se realizó mediante el uso de un Microscopio Estereoscópico de 50X y la mayoría de las especies fueron fotografiados para su validación taxonómica. Todos los restos identificados fueron cuantificados según su proveniencia estratigráfica y contextual. Al final se agruparon todas las cantidades de restos microbotánicos identificados.

2. RESULTADOS

Se presenta a continuación los resultados obtenidos de los análisis de los restos de fauna y vegetales, aislados de las muestras de flotación de las excavaciones arqueológicas realizadas en PIARA.

2.1 Restos de Fauna

Sistemática y Taxonomía

A continuación se presenta la sistemática y taxonomía de la fauna identificada a partir de los restos de fauna recuperados en PIARA, mediante la flotación.

Phyllum Mollusca

Clase Gastropoda

Sub-Clase Pulmonata

Familia Bulimulidae

Bostryx sp.
Scutalus mariopenai
Drymaeus sp.
Familia Systrophiidae
Drepanostomella sp.
Systrophia sp.
Familia Megaspiridae
Thaumastus sp.

Phyllum Chordata

Super-Clase Pisces

Familia Engraulidae

Engraulis ringens "anchoveta"

Familia Clupeidae

Sardinops sagax sagax "sardina"

Clase Aves

Orden Passeriformes "pájaros"

Clase Mammalia

Orden Rodentia
Familia Muridae
Familia Caviidae
Cavia porcellus

avia porcellus "cuy"

Familia Camelidae

Lama sp. "camélido doméstico

2.2 Restos Vegetales

Sistemática y Taxonomía

Se presenta la sistemática y taxonomía de los restos de vegetales recuperados de las muestras de suelo procesadas mediante flotación de PIARA.

División XVII Angiospermae

Clase I: Dicotyledoneae

Familia Cactaceae

Opuntia sp. "tuna"

Familia Chenopodiaceae

Chenopodium quinoa "quinua"
Chenopodium sp. "quenopodio"

Familia Amaranthaceae

Amaranthus sp. "amaranto"

Familia Fabaceae

Prosopis sp. "algarrobo"
Trifolium sp. "trebol"

Medicago sp.

Phaseolus vulgaris "frijol"

Familia Malvaceae

Abutilon sp.

Familia Linaceae

Linum sp. "lino"

Familia Convolvulaceae

Dichondra sp..

Familia Urticaceae

Boehmeria sp.

Familia Magnoliaceae

cf. Magnolia sp.

Familia Passifloraceae

Passiflora mollissima "poroksa" (quechua)

Familia Solanaceae

Solanum sp.

Familia Asteraceae

Clase II: Monocotyledoneae

Familia Poaceae

Zea mays "maíz"

Familia Cyperaceae

Scirpus sp. "junco"

2.3 Cuantificación según Sitios

Tabla Nº 1. Fauna y vegetales aislados e identificados de las muestras de flotación de PIARA-2015

| Taxa | | Opera | ción 1 | | | | | | | Ope | ración 2 | <u> </u> | | | | |
|-----------------------|------|-------|--------|-----|-----|------|------|------|------|------|----------|----------|------|------|----|-------|
| | С3 | C18 | C19 | C24 | C53 | C54 | C58 | C60 | C62 | C66 | C67 | C71 | C75 | C94 | С | 96 |
| FAUNA | FL45 | FL39 | FL43 | FL7 | | FL51 | FL57 | FL53 | FL52 | FL54 | FL59 | FL56-55 | FL58 | FL64 | | FL-60 |
| Drepanostomella sp. | | | | | | | | 1 | | | | | | | | |
| Systrophia sp. | | | | | | | | 3 | | 2 | | | 4 | | | 1 |
| Thaumastus sp. | | | | | | | | | | | | | | | 25 | |
| Scutalus mariopenai | | | | | | | | | | | | | | | | |
| Drymaeus sp. | | | | | | | | | | | | | | | 1 | |
| Bostryx sp. | | | | | | | | | | | | | | 6 | | |
| Bulimulidae | | | | | 4 | | 2 | 2 | | 1 | | | 5 | | | 10 |
| Insecto N/I | | | | | | | | | | | | | | | | |
| Reptil N/I | | | | | | | | | | | 1 | | | | | |
| Engraulis ringens | | | | | | | | | | | | | | | | |
| Sardinops sagax | | | | | | | | | | | | | 2 | | | |
| Passeriformes | | | | | | | | | | | | | | | | |
| Ave N/I | | | | | | | | | | | | | | | | |
| Rodentia | 1 | | | | | | | | | | | | | | | |
| Muridae | | | | 1 | 1 | | | | | 2 | | | | | | |
| Cavia porcellus | | | | | | | | | | | | | 1 | | | |
| Lama sp. | | | | | | | | | | | | | | 1 | | |
| Mamifero N/I | | | | | 2 | 2 | | | | | | | | | | |
| VEGETALES | | | | | | | | | | | | | | | | |
| Amaranthus sp. | | | | | | | | | | | | | | | | |
| Chenopodium sp. | 1 | | | | | | | | | | | | | | | |
| Chenopodium quinoa | | | | | | | | | | | | | | | | |
| Trifolium sp. | | 1 | | | | | | | | | | | | | | |
| Medicago sp. | | | | | | | | | | | | | | | | |
| Abutilon sp. | | | | | | | | | | | | | | | | |
| Phaseolus vulgaris | | | | | | | | | | | | | | | | |
| Fabaceae | | | | | | | | | | | | | | | | |
| Boehmeria sp. | | | | | | | | | | | | | | | | |
| cf. Magnolia sp. | | | | | | | | | | | | | | | | |
| Linum sp. | | | | | | | | | | | | | | | | |
| Dichondra sp. | 2 | | | | | | | | | | | | | | | |
| Opuntia sp. | | | | | | | | | | | | | | | | |
| Passiflora mollissima | | | | | | | | | | | | | | | | |
| Asteraceae | | | | | | 1 | | | | | | | | | | |
| Solanum sp. | | | | | | | | | | | | | | | | |
| Zea mays | | | | | 1 | | | | | | | | | | | |
| Scirpus sp. | | | | | | | | | | | | | | | | |

| Taxa | | | | | Oı | peració | n 5 | | | | | | | | | | | | Opera | ición 6 | | | | | | | |
|-----------------------|------|------|------|-------|----|---------|-------|------|-------|------|------|------|------|------|-------|-------|-------|------|-------|---------|------|-------|-----|------|-------|-------|-------|
| | C151 | C152 | C153 | C157 | | 158 | | C162 | | C167 | C171 | C206 | C208 | C210 | | C211 | | C214 | _ | C229 | C231 | C: | 237 | C239 | C242 | C246 | C250 |
| FAUNA | | | | FL106 | | | FL103 | | FL100 | | | | | | FL231 | FL216 | FL217 | | FL214 | | | FL243 | | | FL222 | FL189 | FL226 |
| Drepanostomella sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | 13 |
| Systrophia sp. | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | 12 |
| Thaumastus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scutalus mariopenai | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Drymaeus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bostryx sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bulimulidae | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Insecto N/I | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reptil N/I | | | | | | | | | | | | | | | 10 | | | | 3 | | | | | | | | |
| Engraulis ringens | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sardinops sagax | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Passeriformes | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ave N/I | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rodentia | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Muridae | | | | | | | | | | | | | | 2 | | | 3 | | | | | 1 | | | | 2 | |
| Cavia porcellus | | | | | | | | | | | | | | | | 1 | | | | | 2 | | | | | | |
| Lama sp. | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | |
| Mamifero N/I | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | |
| VEGETALES | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Amaranthus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chenopodium sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chenopodium quinoa | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trifolium sp. | | | | 10 | | | | | | | | | | | | | 1 | | | | | | | | | | |
| Medicago sp. | | 30 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Abutilon sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Phaseolus vulgaris | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fabaceae | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Boehmeria sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| cf. Magnolia sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Linum sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dichondra sp. | | | 25 | 11 | 2 | 50 | | | | 4 | | | | | | 1 | | | | | | | | | | | |
| Opuntia sp. | | | | | | | | | | | | | | | | | | | 4 | | | | | | | | |
| Passiflora mollissima | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Solanum sp. | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zea mays | | | | | | 2 | | | | | | | | | | | | | | | 1 | | | | | | |
| Scirpus sp. | | 4 | | | | | | | | | | | | | | | | | | | | | | | | | |

| Taxa | | | Operac | ción 7 | | | | | Operac | ción 4 | | | | | | | | | | | | | | | | | | | Ор | eración | 2 | | | | | | | | | | | | | | |
|-----------------------|-------|-------|--------|--------|------------|--------|------|------|--------|--------|-------|-------|-------|------|------|------|------|------|--------|------|------|------|------|------|------|------|------|------|-----|---------|------|------|------|------|------|------|------|------|------|------|-----------|------|------|------|--------|
| | C302 | C340 | C341 | C348 | C350 | C353 | C358 | C359 | C361 | C366 | C369 | C370 | C374 | C482 | C454 | C455 | C458 | C463 | 3 C464 | C466 | C467 | C470 | C471 | C472 | C473 | C474 | C4 | 475 | | C477 | | C479 | C481 | C482 | C484 | C4 | 88 | C489 | C490 | C491 | C492 | C493 | C494 | C49 | 5 C499 |
| FAUNA | FL152 | FL215 | FL153 | FL159 | FL166 FL24 | 6 FL95 | FL98 | } | FL97 | FL93 | FL201 | FL202 | FL204 | FL28 | FL66 | FL61 | FL62 | FL33 | FL5 | FL34 | FL6 | FL10 | FL4 | FL2 | FL29 | FL3 | FL11 | FL12 | FL8 | FL13 | FL15 | FL32 | FL18 | FL14 | FL17 | FL19 | FL36 | FL38 | FL19 | FL26 | FL16/FL37 | FL22 | FL23 | FL25 | FL21 |
| Drepanostomella sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Systrophia sp. | | | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Thaumastus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scutalus mariopenai | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Drymaeus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bostryx sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bulimulidae | | | | | | | | | | | | | | | 2 | 10 | 5 | 4 | 2 | 2 | 1 | | 2 | | | 2 | | | | 4 | | | | | | | | | | | | | 1 | | 10 |
| Insecto N/I | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reptil N/I | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | L | |
| Engraulis ringens | | | | | | | | | | | | | | | | | | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| Sardinops sagax | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | L | |
| Passeriformes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ave N/I | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | |
| Rodentia | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | |
| Muridae | | 2 | | | 1 | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| Cavia porcellus | | | | | | | | | | | | | | | | | | | | | | | | | | | | 7 | | | 4 | | | | | | | | | | | | 2 | | |
| Lama sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mamifero N/I | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 1 | | | | | | | | | | | | | | | |
| VEGETALES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Amaranthus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chenopodium sp. | | | | | | | | | | | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | L | |
| Chenopodium quinoa | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | L | |
| Trifolium sp. | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | L | |
| Medicago sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Abutilon sp. | 20 | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Phaseolus vulgaris | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fabaceae | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Boehmeria sp. | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| cf. Magnolia sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Linum sp. | | | | | | | | | | | | | 10 | | | | | Ĺ | | Ĺ | | | | | | | | | | | | | | | | | | | | | | | Ĺ | L | |
| Dichondra sp. | | | 1 | | | | 1 | | | | | | | | | | | Ĺ | | | | | | | | | | | | | | | | | | | | | | | | | Ĺ | L | |
| Opuntia sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Passiflora mollissima | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Solanum sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zea mays | | | | 1 | | | | | | | | | | | | | | Ĺ | | Ĺ | | | | | | | | | | 1 | | | | | | | | | | | | L | Ĺ | L | |
| Scirpus sp. | 20 | | 1 | 1 | | 2 | 1 | | | | L | 5 | 10 | | | | | Ĺ | | | | | | | | | | | | 1 | | | | | | | | | | | | L | Ĺ | L | |

| Taxa | | | | | | | Oner: | ación 1 | | | | | | | | | | | | | | | | | | Or | peración | 16 | | | | | | | | | | | \neg |
|-----------------------|------|--------------|------|------|--------------|------|-------|---------|--------------|-----|--------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------|----------------|----------|-------|-------|-------|-------|-------|-------|---------|-------|---------------|---------------|---------------|--------|
| Idad | OFFE | OECO | OFFI | 1 | OFFE | | · | | 0500 | 01 | -00 | CEDA | CENC | 0000 | 0000 | cene | C614 | CCAE | | | | | | 0 | 247 | V _I | Jeraului | 10 | | | 0040 | 0040 | 0000 | 0000 | cene | cenn | cenn | 0000 | 0000 |
| FAUNA | C000 | C562 FL41 | FL9 | FL34 | C565 FL35 | FL36 | FL33 | FL57 | C589 FL31 | FL6 | 593 FL181 | FL3 | FL20 | FL16 | FL238 | FL194 | FL175 | FL188 | FL244 | FL230 | FL228 | FL229 | FL218 | FL224 | 617 FL219 | FL113 | FL184 | FL128 | FL111 | FL180 | FL137 | FL176 | FL182 | L FL179 | FL198 | C020 FL190 | C029 FL235 | C632 FL197 | FL39 |
| Drepanostomella sp. | | 4 | | | | | | | 4 | | | | | | | | | | | | | | | | | | 1 | | | | | 2 | | | | | | | |
| Systrophia sp. | 12 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | |
| Thaumastus sp. | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | \Box | |
| Scutalus mariopenai | | | | | | | | | | | | 1 | | | | 2 | | | | 2 | | | | | | | | | | | | | | | | 1 | | | |
| Drymaeus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bostryx sp. | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | |
| Bulimulidae | | | | 10 | 5 | 4 | | | | 5 | 10 | | | 4 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Insecto N/I | | | | | | | | | | | | | | | | | | 2 | | | 1 | | | | | | | | | | | | | | | | | П | |
| Reptil N/I | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | П | |
| Engraulis ringens | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sardinops sagax | | | | 5* | 5 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Passeriformes | | | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | |
| Ave N/I | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | |
| Rodentia | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Muridae | 1 | | | | | | | | | | | | | 2 | | | 2 | | | | | | 1 | 2 | | | | | 4 | | | | | | | 2 | | 3 | |
| Cavia porcellus | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | | | | | | | | | | |
| Lama sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mamifero N/I | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | | | | | | |
| VEGETALES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Amaranthus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | | | | | | | |
| Chenopodium sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chenopodium quinoa | | | | | | | | | | | | | | | | | | | | 1 | | 1 | | | | | | | | | | | | | | | | | |
| Trifolium sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Medicago sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Abutilon sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Phaseolus vulgaris | | | | | | | | | | | | | | | | | | | | | | | | 2 | 2 | | | | | | | | | | | | | | |
| Fabaceae | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Boehmeria sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| cf. Magnolia sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Linum sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dichondra sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Opuntia sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Passiflora mollissima | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | | | |
| Solanum sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | |
| Zea mays | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 1 | | | | | | 1 | 1 | | | | 2 | | |
| Scirpus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Taxa | | | | | | | | | | | | | | | | | | | | | | | | 0 | peració | n1 | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------|------|------|------|------|------|------|------|------|------|-------|--------|--------|--------|-------|-----|-------|-------|-------|-------|-----|------|------|------|------|---------|------|------|------|------|------|------|------|------|-------|------|------|------|------|------|------|------|------|------|------|------|------|---------|------|
| | C653 | C660 | C662 | C663 | C666 | C667 | , | | 06 | 71 | | C67 | 2 | | | 068 | 30 | | | Ī | 068 | 4 | C685 | C688 | C689 | C690 | C691 | C696 | C699 | C700 | C754 | C763 | C770 | C771 | C772 | C773 | C776 | C782 | C783 | C784 | C785 | C788 | C789 | C793 | C796 | C797 | C799 | C800 |
| FAUNA | FL10 | FL14 | FL19 | FL5 | FL32 | FL29 | FL27 | FL11 | 1 FL | 26 FL | 28 FL3 | 0 FL11 | 14 FL2 | 2 FL8 | FL1 | 2 FL2 | 3 FL2 | 24 FI | L25 F | L89 | FL61 | FL53 | FL52 | FL54 | FL62 | FL63 | FL56 | FL60 | FL59 | FL55 | FL58 | FL65 | FL92 | FL119 | FL67 | FL68 | FL66 | FL93 | FL70 | FL69 | FL88 | FL84 | FL73 | FL71 | FL85 | FL86 | FL90 | FL81 |
| Drepanostomella sp. | | | | | | | | | 1 | 1 | 1 1 | | | | | | İ | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | 2 | L | |
| Systrophia sp. | | | | | | | | | 1 | | | | 8 | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | |
| Thaumastus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scutalus mariopenai | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Drymaeus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bostryx sp. | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 1 | | | 3 | | | | | 2 | 2 | | | |
| Bulimulidae | | | | | | | 4 | | | 1 | 1 4 | 4 | | | | | | | | | | | | | | | | | | | | 4 | 5 | 3 | 5 | 5 | | 4 | 6 | | | 6 | 1 | 6 | 8 | 2 | 2 | 1 |
| Insecto N/I | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reptil N/I | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ĺ | | | |
| Engraulis ringens | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ĺ | | | |
| Sardinops sagax | | | | | | | | | L | | | | | | L | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Ш | L | Ш |
| Passeriformes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ave NI | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | L | |
| Rodentia | 1 | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Muridae | | 1 | | | | | | | | | | | 3 | | 10 | 10 | 1 | | | | | | | | | | | | | | | | 1 | | | 1 | | 2 | | | | | | 4 | | | | 1 |
| Cavia porcellus | | | | | | | 2 | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | 1 | | | | | 1 | | 1 | | | 1 | | <u></u> | |
| Lama sp. | | | | | | | | | L | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Ш | L | Ш |
| Mamifero N/I | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | 1 | | | | | | | | | | | | Ш | L | Ш |
| VEGETALES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Amaranthus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Ш | L | Ш |
| Chenopodium sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Ш | Ш | L | |
| Chenopodium quinoa | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | Ш | Ш | L | Ш |
| Trifolium sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Ш | Ш | L | Ш |
| Medicago sp. | | | | | | | | | | | | | | | | | | | | | 3 | | | | | | | 3 | | | | | | | | | | | | | | | | | | Ш | L | Ш |
| Abutilon sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Ш | L | Ш |
| Phaseolus vulgaris | | | | | | | | | | | | | | | | | | | | _ | | | | | | | | | | | | | | | | | | | | | | | | | | Ш | L | Щ |
| Fabaceae | | | 1 | | | | | | L | 1 | | | | | | | | 1 | | | | | | | | | | | | | | Ш | | | | | | | | | | | | | Ш | Ш | L | Щ |
| Boehmeria sp. | | | | | | | | | 1 | 1 | | | | | | | | 1 | | _ | | | | | | | | | | | | | | | | | | | | | | | | | Ш | Ш | L | Щ |
| cf. Magnolia sp. | | | | | | | | | 1 | 1 | | | | | | | | 1 | | _ | | | | | | | | | | | | | | | | | | | | | | | | | Ш | Ш | L | Щ |
| Linum sp. | | | | | | | | | L | 1 | | | | | | | | 1 | | _ | | | | 2 | 1 | | | | | | | | | | | | | | | | | | | | Ш | Ш | L | Щ |
| Dichondra sp. | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Ш | Ш | L | Щ |
| Opuntia sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Ш | Ш | L | Щ |
| Passiflora mollissima | | | | | | | | | L | 1 | | | | | L | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | Ш | Ш | L | Щ |
| Asteraceae | | | | | | | | | L | 1 | | | L | | | | | 1 | | _ | | | | | | | | | | | | Ш | | | | | | | | | | | | | Ш | Ш | L | Ш |
| Solanum sp. | | | | | | | | | L | 1 | | | L | | | | | 1 | | _ | | | | | | | | | | | | Ш | | | | Щ | | | | | | | | | Ш | Ш | L | Щ |
| Zea mays | | 1 | | | | | | | L | 1 | | | L | | L | | | 1 | | _ | | | | | | | | | | | | Ш | | | | Щ | | | | | | | | | | Ш | L | Ш |
| Scirpus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | oxed | L | |

| Taxa | | | | | | | | | | | 0 | peració | n 7 | | | | | | | | | | | | | | | | Opera | ición 1 | | | | | |
|-----------------------|-------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|-------|------|-------|---------|-------|------|------|------|-------|
| | C802 | C807 | C809 | | C | 812 | | 8 | 21 | | | C822 | | | С | 831 | C832 | C841 | C842 | C844 | C847 | C848 | C849 | C901 | C902 | C9 | 03 | C904 | C905 | C909 | C914 | C915 | C916 | C919 | C925 |
| FAUNA | FL146 | 6 FL161 | FL171 | FL205 | FL144 | FL214 | FL219 | FL184 | FL196 | FL197 | FL191 | FL174 | FL187 | FL14 | FL193 | FL189 | FL185 | FL131 | FL143 | FL220 | FL147 | FL133 | FL134 | FL78 | FL75 | FL92 | FL120 | FL77 | FL82 | FL80 | FL121 | FL47 | FL49 | FL48 | FL115 |
| Drepanostomella sp. | | | | | | | | | | | | | | | | | | | | | | | 1 | | 1 | 1 | | | | | 1 | | | 1 | |
| Systrophia sp. | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | 1 | | | | | | | |
| Thaumastus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scutalus mariopenai | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Drymaeus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bostryx sp. | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | 2 | 2 | | | |
| Bulimulidae | | | | 1 | | 4 | 3 | | | | | | | | | | | | 4 | | | | | | | | | 6 | 5 | 5 | 6 | 6 | 8 | 4 | 3 |
| Insecto N/I | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reptil N/I | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | |
| Engraulis ringens | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sardinops sagax | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Passeriformes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ave N/I | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rodentia | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Muridae | | | | 6 | 20 | 40 | 20 | | | | 2 | 1 | | | | | | | | | | | | | | 1 | | | | | | | | | |
| Cavia porcellus | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| Lama sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | 1 | |
| Mamifero N/I | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | |
| VEGETALES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Amaranthus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chenopodium sp. | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | |
| Chenopodium quinoa | | | | | | | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trifolium sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Medicago sp. | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | |
| Abutilon sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Phaseolus vulgaris | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fabaceae | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Boehmeria sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| cf. Magnolia sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Linum sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dichondra sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Opuntia sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Passiflora mollissima | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Solanum sp. | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | |
| Zea mays | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scirpus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Taxa | | | | | Opera | ción 1 | | | | | | Op | peración | 13 | | Operación 6 |
|-----------------------|-------|------|-------|------|-------|--------|-------|-------|------|------|-------|-------|----------|-------|-------|-------------|
| | C930 | C934 | C936 | C938 | C943 | C944 | C945 | C946 | C950 | C951 | CS | 964 | C970 | C973 | C980 | C1016 |
| FAUNA | FL118 | FL99 | FL100 | FL96 | FL94 | FL95 | FL117 | FL116 | FL98 | FL97 | FL271 | FL269 | FL270 | FL268 | FL267 | FL40 |
| Drepanostomella sp. | | | | | 1 | | | | | | | | | | | |
| Systrophia sp. | | | | | | | | | | | | | | | | |
| Thaumastus sp. | | | | | | | | | | | | | | | | |
| Scutalus mariopenai | | | | | | | | | | | | | | | | |
| Drymaeus sp. | | | | | | | | | | | | | | | | |
| Bostryx sp. | | | 1 | | | | | | | | | | | | | |
| Bulimulidae | 5 | | 2 | | 4 | 4 | 2 | | 2 | 2 | | | | | | 1 |
| Insecto N/I | | | | | | | | | | | | | | | | |
| Reptil N/I | | | | | | | | | | | | | | | | |
| Engraulis ringens | | | | | | | | | | | | | | | | |
| Sardinops sagax | | | | | | | | | | | | | | | | |
| Passeriformes | | | | | | | | | | | | | | | | |
| Ave N/I | | | | | | | | | | | | | | | | |
| Rodentia | | | | | | | | | | | | | | | | |
| Muridae | | | | | | 1 | | | | | | | | | | |
| Cavia porcellus | | | | | | | | | | | | | | | | |
| Lama sp. | | | | | | | | | | | | | | | | |
| Mamifero N/I | | | | | | | | | | | | | | | | |
| VEGETALES | | | | | | | | | | | | | | | | |
| Amaranthus sp. | | | | | | | | | | | | | | | | |
| Chenopodium sp. | | | | | | | | | | | | | | | | |
| Chenopodium quinoa | | | | | | | | | | | | | | | | |
| Trifolium sp. | | | | | | | | | | | | | | | | |
| Medicago sp. | | | | | | | | | | | | | | | | |
| Abutilon sp. | | | | | | | | | | | | | | | | |
| Phaseolus vulgaris | | | | | | | | | | | | | | | | |
| Fabaceae | | | | | | | | | | | | | | | | |
| Boehmeria sp. | | | | | | | | | | | | | | | | |
| cf. Magnolia sp. | | | | | | | | | | | | | | | | 8 |
| Linum sp. | | | | 1 | | | | 1 | | | | | | | | |
| Dichondra sp. | | | | | | | | | | | | | | | | |
| Opuntia sp. | | | | | | | | | | | | | | | | |
| Passiflora mollissima | | | | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | | | | |
| Solanum sp. | | | | | | | | | | | | | | | | |
| Zea mays | | | | | | | | | | | | | 1 | | | |
| Scirpus sp. | | | | | | | | | | | | | | | | |

| Taxa | | | | | | | | Opera | ción 2 | | | | | | | | Opera | ción 16 | | peraciór | n 7 |
|-----------------------|---------|---------|--------|--------|-------|-------|-------|--------|--------|--------|-------|--------|-------|-------|-------|---------|--------|---------|--------|----------|----------|
| | C1156 | C1150 | C1160 | C1160 | C1173 | C1175 | C1182 | | | C1188 | C1101 | C1 | 103 | C1104 | C1198 | C1200 | | | | 307 | C1322 |
| | | FL126 | | | | FL13 | | FL10 | FL14 | FL16 | | FL12 | _ | FL18 | | | | FL273 | | | |
| Drepanostomella sp. | 1 L 121 | 1 L 120 | I LIZZ | 1 L124 | 1 L33 | ILIJ | I LIZ | 1 L 10 | 1 L 14 | 1 L 10 | ILIJ | 1 L 12 | I LII | 1 L10 | 1 L30 | 1 1 1 3 | I LZIZ | I LZI J | I LZZZ | 1 LZZ4 | 1 LZ 10 |
| Systrophia sp. | | | | | | | | | | | | | | | | 2 | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| Thaumastus sp. | | | | | | | | | | | | | | | | | | | | | |
| Scutalus mariopenai | | | | 1 | | | | | | | | | | | | | | | | | |
| Drymaeus sp. | | | | _ | | | | | | | | | | | | | | | | | |
| Bostryx sp. | | | 40 | 2 | | | | | | • | | | | _ | | | | | | | |
| Bulimulidae | | | 10 | | | | | | | 3 | | | | 1 | 4 | 4 | | | | | |
| Insecto N/I | | | | | | | | | | | | | | | | | | | | | |
| Reptil N/I | | | | | | | | | | | | | | | | | | | | | |
| Engraulis ringens | | | | | | | | 1 | | | | | | | | | | | | | |
| Sardinops sagax | | | | | | | | | | | | | | | | | | | | | <u> </u> |
| Passeriformes | | | | | | | | | | | | | | | | | | | | | |
| Ave N/I | | | | | | | | | | | | | | | | | | | | | |
| Rodentia | | | | | | | | | | | | | | | | | | | | | |
| Muridae | | | | | | | | | | | | | | 1 | | 3 | | | | | |
| Cavia porcellus | | | | 1 | | | | | | | | | | | | | | | | | |
| Lama sp. | | | | | | | | | | | | | | | | | | | | | |
| Mamifero N/I | | | | | | | | | | | | | | | | | | | | | |
| VEGETALES | | | | | | | | | | | | | | | | | | | | | |
| Amaranthus sp. | | | | | | | | | | | | | | | | | | | | | |
| Chenopodium sp. | | | | | | | | | | | | | | | | | | | | | |
| Chenopodium quinoa | | | | | | | | | | | | | | | | | | | | | 1 |
| Trifolium sp. | | | | | | | | | | | | | | | | | | | | | |
| Medicago sp. | | | | | | | | | | | | | | | | | | | | | |
| Abutilon sp. | | | | | | | | | | | | | | | | | | | | | |
| Phaseolus vulgaris | | | | | | | | | | | | | | | | | | | 15 | 50 | 1 |
| Fabaceae | | | | | | | | | | | | | | | | | | | | | |
| Boehmeria sp. | | | | | | | | | | | | | | | | | | | | | |
| cf. Magnolia sp. | | | | | | | | | | | | | | | | | | | | | |
| Linum sp. | | | | | | | | | | | | | | | | | | | | | |
| Dichondra sp. | | | | | | | | | | | | | | | | | | | | | |
| Opuntia sp. | | | | | | | | | | | | | | | | | | | | | |
| Passiflora mollissima | | | | | | | | | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | | | | | | | | | |
| Solanum sp. | | | | | | | | | | | | | | | | | | | | | |
| Zea mays | | | | | | | | | | | | | | | | | | | 3 | | |
| Scirpus sp. | | | | | | | | | | | | | | | | | | | | | |

| Taxa | | | | | | | | Opera | ción 22 | | | | | | | | | | | | | | Opera | ción 2 | | | | | | |
|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|
| | C1605 | C1606 | C1607 | C1610 | C1611 | C1612 | C1613 | C1614 | C1621 | C1622 | C1624 | C1625 | C1627 | C1628 | C1629 | C1630 | C1651 | C1653 | C1656 | C1660 | C1661 | C1662 | C1663 | C1664 | C1666 | C1667 | C1668 | C1669 | C1672 | C1675 |
| FAUNA | FL23 | FL20 | FL22 | FL25 | FL26 | FL32 | FL21 | FL24 | FL34 | FL27 | FL31 | FL28 | FL30 | FL33 | FL29 | FL35 | FL37 | FL9 | FL8 | FL41 | FL7 | FL6 | FL45 | FL40 | FL47 | FL46 | FL42 | FL39 | FL45 | FL43 |
| Drepanostomella sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Systrophia sp. | | | | | | | | | 1 | | | | | | | | | | 1 | | | | | | | | | | | |
| Thaumastus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scutalus mariopenai | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Drymaeus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bostryx sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bulimulidae | | | | | | | | | | 2 | | | | | | | 5 | | 5 | 2 | | | | | | | 2 | 4 | 5 | 4 |
| Insecto N/I | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reptil N/I | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | |
| Engraulis ringens | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | |
| Sardinops sagax | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Passeriformes | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | |
| Ave N/I | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rodentia | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Muridae | | | | | | | | | | | | | | | 1 | | | | 3 | | | | | | | | | 2 | 2 | |
| Cavia porcellus | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lama sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mamifero N/I | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VEGETALES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Amaranthus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chenopodium sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chenopodium quinoa | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trifolium sp. | 15 | | | | | | | | | | | | | | | | | | 4 | | | | | | | | | | | |
| Medicago sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Abutilon sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Phaseolus vulgaris | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fabaceae | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Boehmeria sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| cf. Magnolia sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Linum sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dichondra sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Opuntia sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Passiflora mollissima | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Solanum sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Zea mays | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | |
| Scirpus sp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

3. COMENTARIOS

De todas las muestras de flotación obtenidas de las excavaciones, se han aislado e identificado un total de 1105 restos, de los cuales, 733 restos corresponden a fauna, y 372 restos a vegetales.

La diversidad de taxas identificados para ambos tipos de restos (fauna y vegetales), indica que se han identificado un total de 29 taxas, de los cuales 11 taxa son de fauna (moluscos terrestres, peces marinos y mamíferos) y 16 taxa son de vegetales (hierbas y algunas plantas cultivadas).

De los moluscos terrestres identificados, *Bostryx sp. Scutalus mariopenai* y *Thaumastus sp.*, habitan sobre la superficie de los promontorios rocosos de ambientes xerofiticos o secos, y presentan gran actividad con episodios de lluvias y húmedad. *Scutalus mariopenai* es una especie de caracol de tierra cuyo nombre específico *mariopenai* es en honor al Dr. Mario Peña González, un famoso malacólogo de Lima, siendo la localidad tipo Catzcal (09° 54' 43' S 077° 49' 40' W), Región Ancash, Perú.



Figura 1.- Scutalus mariopenai alimentándose en la superficie de un cactus.

Por lo tanto la presencia de estas tres especies en el sitio, pueden indicar episodios húmedos y la recolecta de estos moluscos de ambientes xericos y de bosques con hojarasca donde se encuentra también *Thaumastus*. *Scutalus mariopenai* tiene características psicotrópicas cuando son consumidos.

Otro caracol terrestre, pero que vive en ambientes con mayor vegetación es *Drymaeus sp.*, luego tenemos los pequeños caracoles terrestres como *Drepanostomella sp.*, y *Systrophia sp.*, los cuales habitan los suelos de zonas boscosas húmedas. Observamos que las dos especies de micromoluscos terrestres identificados, tienen como denominador común un clima húmedo, posiblemente con suelos con hojarasca.

De algunos contextos se pudo aislar e identificar pequeñas vértebras de dos especies muy comunes de los cardúmenes de la fría corriente peruana, se trata de *Engraulis ringens* "anchoveta" y *Sardinops sagax sagax* "sardina". La presencia de ambas especies en el sitio indica contacto con las poblaciones costeras del departamento de Ancash.

Adicionalmente con los restos de fauna, se identificaron algunos restos de pajaritos del orden Passeriformes, huesos de *Cavia porcellus* "cuy" y algunos fragmentos de huesos diagnòsticos asignados a *Lama sp.*

En relación a los restos vegetales, estos han sido posible identificarlos por la presencia de sus semillas, como es el caso de *Opuntia sp.* "tuna", *Chenopodium quinoa* "quinua", *Chenopodium sp.* "quenopodio", *Amaranthus sp.* "amaranto", *Prosopis sp.* "algarrobo", *Trifolium sp.* "trebol", *Medicago sp., Phaseolus vulgaris* "frijol", *Abutilon sp., Linum sp.* "lino", *Dichondra sp., Boehmeria sp., cf. Magnolia sp., Passiflora mollissima* "poroksa" (quechua), *Solanum sp., Asteraceae, Zea mays* "maíz" y *Scirpus sp.* "junco".

De esta relación, las plantas cultivadas son: *Chenopodium quinoa, Phaseolus vulgaris* (que también se identificó en los macrorestos), *Passiflora mollissima* y *Zea mays*. Todos los restos estaban carbonizados, salvo la semilla de *Passiflora mollisima*.

Las demás especies son hierbas que invaden los campos de cultivo como *Chenopodium sp., Amaranthus sp., Trifolium sp., Medicago sp., Abutilon sp., Dichondra sp., Boehmeria sp.* y *Solanum sp.* y deben haber llegado al sitio conjuntamente con las plantas cultivadas, o como un forraje para los camélidos.

Restos de semillas identificadas como *Linum sp.* posiblemente *Linum usitatissimum* "lino" es originario de la región de los ríos Nilo, Éufrates y Tigris. Fue introducido para su cultivo en el resto del mundo, no se precisan fechas, y posiblemente tenga alguna relación con contextos coloniales o contaminados. Curiosamente en el sitio arqueológico de Pomacocha en Ayacucho, excavado por Di Hu (Universidad de California Los Angeles), también reporta semillas de "lino" en sus muestras de flotación, lo cual debe alertar a pensar que podría ser una introducción hispánica, teniendo en cuenta que Pomacocha tienen contextos inca y coloniales, y además en PIARA se ha reportado fauna hispánica.

Finalmente hay semillas de una planta hidrofitica *Scirpus sp.* lo cual implica que la colecta de esta planta se hizo con toda la inflorescencia, la cual posteriormente depositaria sus semillas en el sitio.

Esta es la historia natural del material identificado a partir de las semillas y los restos de fauna aislados de las muestras de flotación, que muestran el acceso y manejo de los pisos ecológicos, la colecta de diversas especies vegetales, posibles cambios en el clima y hábitats que existieron en aquella época del sitio.

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Appendix F.2

Macrobotanical Analysis



ANÁLISIS ARQUEOBOTÁNICO DEL PROYECTO DE INVESTIGACIÓN ARQUEOLÓGICA REGIONAL ANCASH (PIARA)-2015

Por

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- Trujillo, Octubre 2015 -

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1. MÉTODOS DE ESTUDIO

a. ANÁLISIS ARQUEOBOTÁNICO

 Restos Macrobotánicos: Identificación Taxonómica, Cantidad de Restos según Contextos.

Todas las evidencias después de su limpieza y acondicionamiento fueron identificadas taxonómicamente. Los criterios adoptados para la identificación taxonómica de los diversos restos botánicos abarcaron lo siguiente:

- a) la morfología externa: la identificación taxonómica se realizó mediante el microscopio estereoscopio, y se basa en el examen global sobre un conjunto de caracteres de la variabilidad biológica de los restos, estas se fundamentan sobre los principios de la anatomía comparada, es decir, por confrontación de los caracteres morfológicos presentes en ambos lados de las muestras arqueológicas con los de las muestras actuales homólogas y,
- b) la comparación de algunos caracteres morfológicos de los restos, en especial de las semillas. Esta se realiza mediante la forma, reticulación, ubicación del hilum y otras características diagnósticas.

El examen de los restos botánicos a partir de los caracteres morfológicos permitió discernir los rasgos característicos de la familia, género o especie vegetal a que pertenecen.

También se utilizó bibliografía especializada como: Bonavía (1982), Buxo (1997), Esau (1977), Macbride (1943), Mostacero y Mejía (1993), Metcalfe (1960), Pearsall (1989, 1992), Sagástegui (1973), Sagástegui y Leiva (1993), Soukup (1987), Towle (1961), Weberbauer (1945) e Yacovleff y Herrera (1934-35), Ugent y Ochoa (2006).

El material identificado fue cuantificado según elemento anatómico (raíz, tallo, hoja, fruto, semilla, fibra) e impuesto en los respectivos contextos.

ii. Antracología

Para el caso del estudio de los carbones se utilizó microscopio estereoscopio de luz simple. El estudio con esta técnica

microscópica se realizó en el Laboratorio de Bioarqueología de la Universidad Nacional de Trujillo, Los restos de carbón de los diferentes contextos de excavación fueron cuidadosamente limpiados y escogidos aquellos que presentaban buena conservación que permitiera realizar el estudio microscópico de su anatomía interna, mediante seccionamientos transversales. Todos los restos de carbón identificados fueron cuantificados según su contexto, mediante pesaje (gramos).

2. RESULTADOS

Se presenta a continuación los resultados obtenidos después de realizar los análisis arqueobotánicos (macrorestos, semillas, carbones y material asociado a estos) del material recuperado en las excavaciones de PIARA.

a. ARQUEOBOTÁNICA

La sistemática y taxonomía de los restos botánicos que fueron recuperados sigue las pautas establecidas en los trabajos de Mostacero y Mejía (1993), Mostacero et al, (2009) y Towle (1961).

i. SISTEMÁTICA Y TAXONOMÍA

Se han identificado un total de 16 especies de vegetales, los cuales provienen tanto de los macrorestos como de aquellos recuperados de los estudios de antracología.

DIVISIÓN XVII: ANGIOSPERMAE

CLASE I: DICOTYLEDONEAE FAMILIA JUGLANDACEAE

Juglans sp. "nogal"

FAMILIA BETULACEAE

Alnus sp. "aliso"

FAMILIA LEGUMINOSAE

Arachis hypogaea "maní"
Phaseolus vulgaris "frijol"

Phaseolus sp.

Mimosa sp.

FAMILIA SAXIFRAGACEAE

Escallonia sp. "chachacomo"

FAMILIA ROSACEAE

Polylepis sp. "queñoa"

FAMILIA ANACARDIACEAE

Schinus molle "molle"

FAMILIA CONVOLVULACEAE

Ipomoea batatas "camote"

FAMILIA CUCURBITACEAE

Lagenaria siceraria "mate"

FAMILIA SAPOTACEAE

Pouteria sp. "lúcuma"

FAMILIA LOGANIACEAE

Buddleja sp.

FAMILIA ASTERACEAE FAMILIA SOLANACEAE

Solanum tuberosum "papa"

CLASE II: MONOCOTYLEDONEAE

FAMILIA POACEAE

Zea mays "maíz"

ii. MACRÓRESTOS: SEMILLAS Y FRUTOS

Tabla Nº 1. Distribución y cantidades en gramos de restos macrobotánicos de PIARA

| | | | | Ор | 1 | | | | Op 2 | | | Op | 6 | |
|---------------------|------|------|------|------|------|------|-------|-------|---------|---------|--------|--------|--------|--------|
| Taxa | | 2 | | 4 | Ç | 9 | 564 | | 1651 | 1672 | 2: | 29 | 237 | 629 |
| | Bo-1 | Bo-2 | Во-3 | Bo-4 | Во-6 | Bo-7 | Bo-29 | Bo-24 | AE 1799 | AE 2719 | Bo-134 | Bo-145 | Bo-136 | Bo-180 |
| Juglans sp. | | 0,30 | | | 3,18 | 0,15 | | | | | 14,57 | | | |
| Phaseolus vulgaris | | | | | | | | | | 0,16 | 0,07 | | | |
| Arachis hypogaea | | | | | | | | | | | | | | |
| Phaseolus sp. | | | | | | | | | | | | | | |
| Ipomoea batatas | 0,26 | | | | | | | | 0,29 | | | | | |
| Lagenaria siceraria | | | | | | | | 0,12 | | | | | | |
| Schinus molle | | | | | | | | | | | | | | |
| Solanum tuberosum | | | | | | | | | | | | | | |
| Zea mays | | | 0,69 | | | | | | | | 0,51 | 0,05 | 0,06 | 0,04 |
| Semilla n/i | | | | | | | | | | | | | | |
| Herbáceas n/i | | | | 0,05 | | | 0,50 | | | | | | | |
| Vegetal n/i | | | , | | | | | | | | | | | |

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| | | | | | Op 6 | | | | | | Op 7 | |
|---------------------|--------|--------|--------|--------|--------|--------|-------|-------|-------|--------|--------|--------|
| Taxa | 231 | 23 | 37 | 245 | 617 | 620 | 650 | 641 | 649 | | 349 | |
| | Bo-139 | Bo-140 | Bo-184 | Bo-141 | Bo-143 | Bo-185 | Bo-89 | Bo-92 | Bo-93 | Bo-172 | Bo-176 | Bo-177 |
| Juglans sp. | | | | | | | | | | | | |
| Phaseolus vulgaris | | | | | | | 0,25 | 0,09 | | 10,38 | 5,00 | 0,41 |
| Arachis hypogaea | | | | | | | | | | | | |
| Phaseolus sp. | | | | | | | | | 0,04 | | | |
| Ipomoea batatas | | | | | | | | | | | | |
| Lagenaria siceraria | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | |
| Solanum tuberosum | | | | | | | | | | | | |
| Zea mays | 0,08 | 0,06 | 0,05 | 0,05 | | 0,11 | 0,02 | | | | | |
| Semilla n/i | | | | | 0,03 | | | | | | | |
| Herbáceas n/i | | | | | | | | | · | | | |
| Vegetal n/i | | | | | | | | | | | | |

| | | | | | | O | p 7 | | | | | |
|---------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Taxa | 34 | 49 | | 80 |)2 | | | | 82 | 21 | | |
| | Bo-185 | Bo-206 | Bo-178 | Bo-179 | Bo-186 | Bo-215 | Bo-170 | Bo-175 | Bo-189 | Bo-191 | Bo-192 | Bo-195 |
| Juglans sp. | | | | | | | | | | | | |
| Phaseolus vulgaris | 1,47 | 26,00 | 0,57 | 0,93 | 0,43 | 0,98 | | 1,00 | 0,19 | | 0,85 | 35,00 |
| Arachis hypogaea | | | | | | | | | | | | |
| Phaseolus sp. | | | | | | | | | | | | |
| Ipomoea batatas | | | | | | | | | | | | |
| Lagenaria siceraria | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | |
| Solanum tuberosum | | | | | | | | | | | | |
| Zea mays | 0,06 | | | 0,67 | | | 137,00 | | | 1,53 | 0,24 | |
| Semilla n/i | | | | | | | | | | | | |
| Herbáceas n/i | | | | | | | | | | | | |
| Vegetal n/i | | | | | | | | | | | | |

| | | | | | | Op | p 7 | | | | | |
|---------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Taxa | | | 821 | | | 35 | 50 | 819 | | 813 | | 820 |
| | Bo-199 | Bo-207 | Bo-229 | Bo-231 | Bo-233 | Bo-209 | Bo-227 | Bo-217 | Bo-219 | Bo-220 | Bo-223 | Bo-224 |
| Juglans sp. | | | | | | | | | | | | |
| Phaseolus vulgaris | 0,07 | 0,32 | 1,79 | 0,86 | 34,50 | | 8,50 | 2,32 | | 0,70 | | 1,51 |
| Arachis hypogaea | | | | | | | | | | | | |
| Phaseolus sp. | | | | | | | | | | | | |
| Ipomoea batatas | | | | | | | | | | | | |
| Lagenaria siceraria | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | 0,09 | | | |
| Solanum tuberosum | 2,86 | | | | | | | | | | | |
| Zea mays | | 0,44 | 0,12 | | 1,50 | 0,05 | | | | | 0,10 | 0,15 |
| Semilla n/i | | | | | | | | | | | | |
| Herbáceas n/i | | | | | | | | | | | | |
| Vegetal n/i | | | | | | | | | | | | |

| | | | | | | Ор | 7 | | | | | |
|---------------------|--------|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Taxa | | 809 | | | 8 | 10 | | 814 | 824 | 1312 | 13 | 323 |
| | Bo-221 | Bo-226 | AE 1689 | Bo-218 | Bo-228 | Bo-230 | Bo-235 | Bo-225 | Bo-234 | Bo-247 | Bo-251 | Bo-252 |
| Juglans sp. | | | | | | | | | | | | 2,65 |
| Phaseolus vulgaris | | 0,20 | | 1,53 | 0,18 | 0,07 | 15,00 | 0,16 | 1,46 | 3,63 | 92,50 | 5,87 |
| Arachis hypogaea | | | | | | | | | | | | 1,36 |
| Phaseolus sp. | | | | | | | | | | | | |
| Ipomoea batatas | | | | | | | | | | | | |
| Lagenaria siceraria | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | |
| Solanum tuberosum | | | | | | | | | | | | |
| Zea mays | 0,22 | | 16,00 | | | | | | | | 3,50 | 5,25 |
| Semilla n/i | | | | | | | | | | | | |
| Herbáceas n/i | | | | | | | | | | | | |
| Vegetal n/i | | | | | | | | | | | | |

| | | | C | Op 7 | | | Op 12 | Op 13 | | Ор | 22 | |
|---------------------|--------|--------|--------|--------|--------|--------|--------|--------|-------|--------|--------|--------|
| Taxa | 841 | | | 1307 | | | Sup | Bo-316 | Bo-14 | Bo-132 | Bo-137 | Bo-152 |
| | Bo-238 | Bo-246 | Bo-249 | Bo-250 | Bo-253 | Bo-254 | Os-555 | 970 | 1621 | 1613 | 1622 | 1630 |
| Juglans sp. | | | | | | | | 5,13 | 0,21 | | | |
| Phaseolus vulgaris | 9,90 | 2,33 | 24,50 | 9,10 | 165,60 | 130,00 | | | | 0,03 | | |
| Arachis hypogaea | | | | | 111,81 | | | | | | | |
| Phaseolus sp. | | | | | | | | | | | | |
| Ipomoea batatas | | | | | | | | | | | | |
| Lagenaria siceraria | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | |
| Solanum tuberosum | | | | | | | | | | | | |
| Zea mays | | | | | | | 2,50 | | | | 0,03 | 0,13 |
| Semilla n/i | | | | | | | | | | | | |
| Herbáceas n/i | | | | | | | | | | | | |
| Vegetal n/i | | | | | | | | | | | | |

iii. ANTRACOLOGÍA

Los restos de carbones en buen estado de conservación fueron analizados mediante microscopía de luz simple y microscopia electrónica de barrido para su identificación. Los datos de identificación y peso obtenidos, sirven para mostrar otro aspecto del uso de los vegetales por lo pobladores de este sitio.

Tabla Nº 2. Distribución y cantidades en gramos de las especies vegetales identificadas a partir de restos de carbón según contextos

7

| | | | | | | | | Opera | ción 1 | | | | | | | |
|----------------|------|------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|
| Taxa | 46 | | 555 | | 38 | 68 | 30 | 30 | 2 | 24 | 56 | 64 | 17 | 651 | 665 | 673 |
| | Bo-8 | Во-9 | Bo-10 | Bo-35 | Bo-11 | Bo-12 | Bo-27 | Bo-13 | Bo-15 | Bo-21 | Bo-16 | Bo-31 | Bo-17 | Bo-18 | Bo-19 | Bo-20 |
| Juglans sp. | | | | | | | | | | | | | | | | |
| Alnus sp. | | | | 0,25 | | | | | | | | | 0,50 | | | |
| Polylepis sp. | | | | | | | | | | | | | | 3,00 | | |
| Escallonia sp. | | | | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | | | | |
| Budleja sp. | | | | | | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | | | | |
| Carbón n/i | 0,41 | 0,25 | 0,26 | 0,20 | 0,35 | 0,30 | 1,00 | 0,10 | 0,60 | 0,90 | 9,00 | 1,80 | | | 0,40 | 0,25 |

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| | | | | | | | Op | eració | n 1 | | | | | | |
|----------------|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|
| Taxa | 673 | | 666 | | | 559 | | 589 | | 671 | | 56 | 62 | 600 | 54 |
| | Bo-34 | Bo-22 | Bo-23 | Bo-25 | Bo-24 | Bo-44 | Bo-45 | Bo-26 | Bo-28 | Bo-30 | Bo-38 | Bo-32 | Bo-43 | Bo-33 | Bo-36 |
| Juglans sp. | | | | | | | | | | | | | | | |
| Alnus sp. | | | | | | 4,00 | 4,80 | | | | 1,88 | | | | |
| Polylepis sp. | | | | 1,10 | | | | | | | | | | | |
| Escallonia sp. | | 1,10 | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | | | |
| Budleja sp. | | | | | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | | | |
| Carbón n/i | 0,15 | | 1,50 | 1,00 | 3,50 | 7,00 | | 0,30 | 1,50 | 2,00 | 2,00 | 0,90 | 0,10 | 1,10 | 0,53 |

| | | | | | | | 0 | peración | 1 | | | | | |
|----------------|-------|-------|-------|-------|-------|-------|--------|----------|-------|--------|-------|--------|--------|--------|
| Taxa | 558 | 58 | 31 | 566 | 925B | 9 | 07 | 952 | 94 | 45 | 946 | 950 | 7 | 70 |
| | Bo-37 | Bo-39 | Bo-46 | Bo-41 | Bo-95 | Bo-96 | Bo-159 | Bo-97 | Bo-98 | Bo-259 | Bo-99 | Bo-100 | Bo-103 | Bo-119 |
| Juglans sp. | | | | | | | | | | | | | | 2,72 |
| Alnus sp. | | 3,32 | 5,50 | 0,52 | | | | 2,32 | | | | | | |
| Polylepis sp. | | | | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | | | | |
| Schinus molle | 0,96 | | | | | | | | | | | | | |
| Budleja sp. | | | | | 2,60 | | | | | | | | 0,36 | |
| Pouteria sp. | | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | | |
| Carbón n/i | | 1,00 | 5,00 | | | 0,68 | 0,16 | | 1,80 | 0,12 | 1,88 | 0,15 | | |

| | | | | | | 0 | peración | 1 | | | | | |
|----------------|--------|--------|--------|--------|--------|--------|----------|--------|--------|--------|--------|--------|--------|
| Taxa | | | | 770 | | | | | | 7 | 56 | | |
| | Bo-122 | Bo-123 | Bo-125 | Bo-129 | Bo-138 | Bo-142 | Bo-151 | Bo-101 | Bo-102 | Bo-104 | Bo-105 | Bo-106 | Bo-107 |
| Juglans sp. | | | | | | | | | | | | | |
| Alnus sp. | | | | | 0,03 | | 1,15 | | | | | | |
| Polylepis sp. | | | | | | | | | | | | | |
| Escallonia sp. | | | | | | 1,07 | | | | | | | |
| Schinus molle | | | | | | | | | | | | | |
| Budleja sp. | 5,33 | | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | |
| Carbón n/i | | 0,08 | 0,37 | 0,8 | | | | 1,28 | 1,54 | 0,63 | 2,00 | 1,00 | 5,00 |

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| | | | | | | 0 | peración | ı 1 | | | | | |
|----------------|--------|--------|--------|--------|--------|--------|----------|--------|--------|--------|--------|--------|--------|
| Taxa | | 756 | | Clean | | 791 | | | 788 | | 79 | 93 | 771 |
| | Bo-109 | Bo-110 | Bo-111 | Bo-108 | Bo-112 | Bo-136 | Bo-164 | Bo-113 | Bo-130 | Bo-153 | Bo-114 | Bo-116 | Bo-126 |
| Juglans sp. | | | | | | | | 2,33 | | | | | |
| Alnus sp. | | | | | | | | | | | | | |
| Polylepis sp. | | | | | | | | | | 5,20 | | | |
| Escallonia sp. | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | |
| Budleja sp. | | | | | 3,50 | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | |
| Carbón n/i | 0,18 | 0,70 | 0,70 | 6,50 | | 0,30 | 0,37 | | 0,44 | | 2,11 | 0,41 | 0,38 |

| | | | | | | 0 | peración | 1 | | | | | |
|----------------|--------|--------|--------|--------|--------|--------|----------|--------|--------|--------|--------|--------|--------|
| Taxa | | 7 | 71 | | 771B | | 785 | | 78 | 39 | | 783 | |
| | Bo-127 | Bo-132 | Bo-152 | Bo-157 | Bo-115 | Bo-117 | Bo-120 | Bo-141 | Bo-118 | Bo-137 | Bo-121 | Bo-124 | Bo-162 |
| Juglans sp. | | | | | | | | | | | | | |
| Alnus sp. | | | | | | | | | | | | | |
| Polylepis sp. | | | | | | | | | | | 2,35 | | |
| Escallonia sp. | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | |
| Budleja sp. | | | | | 4,00 | | 3,50 | | | | | | |
| Pouteria sp. | | | | | | | | | 5,00 | | | | |
| Mimosa sp. | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | |
| Carbón n/i | 0,69 | 0,52 | 0,10 | 2,23 | 3,00 | 1,16 | | 0,17 | 8,00 | 0,26 | | 0,04 | 7,30 |

| | | | | | | 0 | peración | 1 | | | | | |
|----------------|--------|--------|--------|--------|--------|--------|----------|--------|--------|--------|--------|--------|--------|
| Taxa | | | | 782 | | | | 79 | 99 | 773 | 902 | 90 |)3 |
| | Bo-128 | Bo-131 | Bo-133 | Bo-134 | Bo-135 | Bo-148 | Bo-149 | Bo-139 | Bo-140 | Bo-143 | Bo-144 | Bo-145 | Bo-156 |
| Juglans sp. | | | | | | | | | | | | | |
| Alnus sp. | | | 2,23 | | | | | | | | 1,74 | 0,61 | |
| Polylepis sp. | | | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | |
| Budleja sp. | | | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | |
| Carbón n/i | 0,10 | 0,05 | | 4,16 | 0,14 | | 0,05 | 2,72 | 1,81 | 0,50 | | | 0,44 |

| | | | | | | 0 | peración | 1 | | | | | |
|----------------|--------|--------|--------|--------|--------|--------|----------|--------|--------|--------|--------|--------|--------|
| Taxa | 90 | 03 | 7 | 75 | 800 | 797 | 909 | 904 | 90 |)5 | 796 | 943 | 672 |
| | Bo-160 | Bo-258 | Bo-146 | Bo-257 | Bo-150 | Bo-154 | Bo-155 | Bo-158 | Bo-161 | Bo-261 | Bo-163 | Bo-165 | Bo-166 |
| Juglans sp. | | | | | | | | 1,43 | 4,18 | | | | |
| Alnus sp. | | | | | | | | | | | | | |
| Polylepis sp. | 0,55 | | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | |
| Budleja sp. | | | | | | | | | | | 0,78 | | |
| Pouteria sp. | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | |
| Carbón n/i | | 0,35 | 0,95 | 0,15 | 0,20 | 1,16 | 0,57 | | 2,00 | 1,63 | | 2,37 | 0,12 |

| | | | Opera | ción 1 | | |
|----------------|--------|--------|--------|--------|--------|--------|
| Taxa | 672 | 925 | 9 | 15 | 754 | 923 |
| | Bo-255 | Bo-167 | Bo-168 | Bo-169 | Bo-256 | Bo-260 |
| Juglans sp. | | | | | | |
| Alnus sp. | | | | | | |
| Polylepis sp. | | | | | | |
| Escallonia sp. | | | | | | |
| Schinus molle | | | | | | |
| Budleja sp. | | | | | | |
| Pouteria sp. | | | | | | |
| Mimosa sp. | | | | | | |
| Asteraceae | | | | | | |
| Poaceae | | | | | | |
| Carbón n/i | 1,94 | 5,71 | 0,33 | 0,51 | 0,06 | 0,50 |

.../

| | | | | | | 0 | peración | 2 | | | | | |
|----------------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-------|-------|-------|-------|
| Taxa | 453 | 96 | | | 5 | 59 | | | 52 | 5 | 57 | 6 | 6 |
| | Bo-48 | Bo-48 | Bo-49 | Bo-50 | Bo-54 | Bo-60 | Bo-64 | Bo-65 | Bo-51 | Bo-52 | Bo-53 | Bo-55 | Bo-67 |
| Juglans sp. | | | | | | | | | | | | 11,70 | |
| Alnus sp. | | | 0,22 | | 0,15 | | | | | 0,10 | | | 0,74 |
| Polylepis sp. | | | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | |
| Budleja sp. | | | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | | |
| Mimosa sp. | 0,82 | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | 0,02 | | | | |
| Poaceae | | | | | | | | | | | | | |
| Carbón n/i | | 0,05 | | 1,45 | | 0,08 | 0,02 | 0,51 | | | 0,01 | | |

| | _ | | | | | | | | | | | | |
|----------------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-------|-------|-------|-------|
| | | | | | | 0 | peración | 2 | | | | | |
| Taxa | | | | | 63 | | | | | 96 | 53 | 60 | 55 |
| | Bo-56 | Bo-69 | Bo-71 | Bo-72 | Bo-73 | Bo-75 | Bo-76 | Bo-78 | Bo-80 | Bo-57 | Bo-58 | Bo-59 | Bo-61 |
| Juglans sp. | | | | | | | | | | | | | |
| Alnus sp. | 0,82 | 3,52 | | | | | | | | | | | |
| Polylepis sp. | | | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | |
| Budleja sp. | | | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | |
| Carbón n/i | | | 0,38 | 0,35 | 0,27 | 0,13 | 3,48 | 1,86 | 0,84 | 1,61 | 0,69 | 0,13 | 0,82 |

| | | | | | | 0 | peración | 2 | | | | | |
|----------------|-------|-------|-------|-------|-------|-------|----------|-------|-------|------|------|------|-------|
| Taxa | 55 | | 62 | | | 6 | 7 | | 64 | | 471 | | 462 |
| | Bo-66 | Bo-62 | Bo-63 | Bo-77 | Bo-68 | Bo-70 | Bo-79 | Bo-81 | Bo-74 | Bo-4 | Bo-2 | Bo-3 | Bo-5 |
| Juglans sp. | | | | | | | | | 0,84 | | | | |
| Alnus sp. | | 2,09 | | | 0,34 | 2,68 | | | | 0,71 | | | |
| Polylepis sp. | | | | 0,61 | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | |
| Budleja sp. | | | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | |
| Carbón n/i | 0,30 | | 0,25 | | | | 1,51 | 0,50 | | | 0,08 | 0,32 | 49,00 |

.../

| | | | | | | | Operació | n 2 | | | | | |
|----------------|------|-------|-------|-------|-------|------|----------|-------|-------|-------|-------|-------|-------|
| Taxa | | | 477 | | | 4 | 70 | | 4 | 191 | | 464 | 463 |
| | Bo-7 | Bo-10 | Bo-12 | Bo-23 | Bo-39 | Bo-8 | Bo-9 | Bo-11 | Bo-31 | Bo-47 | Bo-30 | Bo-19 | Bo-20 |
| Juglans sp. | | | | | | | 1,15 | | 2,06 | | | | |
| Alnus sp. | | | | | | | | | | | | | 1,12 |
| Polylepis sp. | | | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | |
| Budleja sp. | | | | | | | | 0,76 | | | | | |
| Pouteria sp. | | | | | | 4,00 | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | |
| Carbón n/i | | 0,21 | 0,18 | 0,27 | 0,04 | 4,00 | | | | 1,06 | 0,08 | 0,64 | |

| | | | | | 0 | peración | 2 | | | | | |
|----------------|-------|-------|---------|-------|-------|----------|-------|-------|-------|-------|-------|-------|
| Taxa | 46 | 33 | Unknown | | 489 | | 493 | 47 | 73 | | 1160 | |
| | Bo-26 | Bo-25 | Bo-21 | Bo-27 | Bo-34 | Bo-29 | Bo-32 | Bo-33 | Bo-28 | Bo-37 | Bo-38 | Bo-40 |
| Juglans sp. | | | | | | | | | | 1,61 | 1,19 | |
| Alnus sp. | | | | | | | | | | | | |
| Polylepis sp. | 3,54 | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | |
| Budleja sp. | | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | |
| Carbón n/i | | 5,01 | 0,11 | 0,37 | 0,35 | 0,53 | 0,46 | 0,07 | 0,07 | | | 0,62 |

| | | | | | | 0 | peración | 2 | | | | | |
|----------------|-------|-------|-------|------|------|-------|----------|-------|-------|-------|-------|-------|-------|
| Taxa | | 1160 | | 420 | 467 | | | 466 | | | 1173 | 476 | 1170 |
| | Bo-44 | Bo-45 | Bo-46 | Bo-1 | Bo-6 | Bo-13 | Bo-14 | Bo-15 | Bo-16 | Bo-17 | Bo-18 | Bo-22 | Bo-35 |
| Juglans sp. | | | | 2,33 | | | | | | | | | |
| Alnus sp. | | | 3,65 | | | | | | | | | | |
| Polylepis sp. | | | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | | | |
| Schinus molle | | 2,92 | | | | | | | | | | | |
| Budleja sp. | | | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | |
| Carbón n/i | 1,46 | | | | | 0,22 | 0,96 | 1,37 | 0,16 | 0,15 | 0,61 | 0,10 | 4,74 |

| | | | | | | О | peración | 2 | | | | | |
|----------------|-------|-------|-------|-------|-------|-------|----------|-------|--------|-------|-------|-------|--------|
| Taxa | 1170 | 1152 | 1181 | | 468 | | 16 | 672 | | | 16 | 67 | |
| | Bo-36 | Bo-41 | Bo-42 | Bo-43 | Bo-47 | Bo-15 | Bo-17 | Bo-24 | Bo-156 | Bo-16 | Bo-21 | Bo-23 | Bo-160 |
| Juglans sp. | | | | | | | | | | | | | |
| Alnus sp. | | | | | | | | | | | | | 1,27 |
| Polylepis sp. | | | | | | | | | | | | | |
| Escallonia sp. | | | | | | | 9,62 | | | | | | |
| Schinus molle | | | | | | | | | | | | | |
| Budleja sp. | | | | | | | | 6,85 | | | | | |
| Pouteria sp. | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | |
| Carbón n/i | | | 1,5 | 2,06 | 0,07 | 1,76 | | | 0,36 | 0,31 | 2,50 | 2,33 | |

| | | | | | | Opera | ación 2 | | | | | | |
|----------------|-------|-------|--------|-------|-------|-------|---------|-------|-------|-------|-------|--------|--------|
| Taxa | | 1669 | | 1666 | 11 | 83 | 1184 | 11 | 82 | 1187 | 1194 | 12 | 200 |
| | Bo-18 | Bo-94 | Bo-118 | Bo-19 | Bo-20 | Bo-22 | Bo-95 | Bo-96 | Bo-97 | Bo-98 | Bo-99 | Bo-100 | Bo-111 |
| Juglans sp. | | | | | | | | | | | | | |
| Alnus sp. | | | 3,80 | | | | 0,94 | 0,98 | | | | 17,00 | 6,06 |
| Polylepis sp. | | | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | |
| Budleja sp. | | 4,36 | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | |
| Carbón n/i | 5,42 | | | 0,44 | 1,11 | 1,08 | | | | | 0,30 | | |

.../

| | | | | 0 | peraciór | າ 2 | | | | | |
|----------------|---------------------|--------|--------|--------|----------|--------|--------|--------|--------|--------|--------|
| Taxa | 1181-1654-1655-1657 | 16 | 555 | 1655 | 1651 | 1660 | | 1653 | | 1198 | 1652 |
| | Bo-101 | Bo-102 | Bo-103 | Bo-105 | Bo-104 | Bo-106 | Bo-107 | Bo-108 | Bo-110 | Bo-109 | Bo-112 |
| Juglans sp. | | | | | | | | | 0,20 | | |
| Alnus sp. | | 4,36 | | 3,24 | | | | | | 0,34 | 2,51 |
| Polylepis sp. | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | |
| Budleja sp. | 2,28 | | 11,60 | | 38,00 | | | 1,10 | | | |
| Pouteria sp. | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | |
| Carbón n/i | | | | | | 0,59 | 0,72 | | | | |

| | | | | | (| Operació | n 2 | | | |
|----------------|--------|--------|--------|--------|--------|----------|----------------|--------|--------|--------|
| Taxa | 1658 | 1661 | 1195 | 1664 | 1662 | 1670 | 1669-1670-1656 | 16 | 75 | 1668 |
| | Bo-113 | Bo-114 | Bo-114 | Bo-115 | Bo-116 | Bo-119 | Bo-157 | Bo-158 | Bo-161 | Bo-159 |
| Juglans sp. | | | | | | | | | | |
| Alnus sp. | | | | | | | | | 1,20 | |
| Polylepis sp. | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | |
| Schinus molle | | | | | | | | | | |
| Budleja sp. | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | |
| Asteraceae | | | | | | | | | | |
| Poaceae | | | | | | | | | | |
| Carbón n/i | 0,07 | 1,19 | 1,24 | 0,49 | 0,94 | 6,44 | 1,02 | 0,61 | 3,15 | 0,47 |

| | | Opera | ción 5 | |
|----------------|--------|--------|--------|--------|
| Taxa | | 158 | | 152 |
| | Bo-130 | Bo-132 | Bo-133 | Bo-131 |
| Juglans sp. | | | | |
| Alnus sp. | | | | |
| Polylepis sp. | | | | |
| Escallonia sp. | | | | |
| Schinus molle | | | | |
| Budleja sp. | | | | |
| Pouteria sp. | | | | |
| Mimosa sp. | | | | |
| Asteraceae | | | | |
| Poaceae | | | | |
| Carbón n/i | 0,22 | 2,85 | 1,67 | 0,74 |

| | | | | | | 0 | peración | 6 | | | | | |
|----------------|--------|--------|--------|--------|--------|--------|----------|--------|--------|--------|--------|--------|--------|
| Taxa | 229 | | | | | 620 | | | | | | 617 | |
| | Bo-134 | Bo-147 | Bo-146 | Bo-155 | Bo-156 | Bo-159 | Bo-171 | Bo-172 | Bo-185 | Bo-187 | Bo-153 | Bo-157 | Bo-158 |
| Juglans sp. | | | | | | | | | | | | | |
| Alnus sp. | | | | | | | | | | | | | |
| Polylepis sp. | | | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | |
| Budleja sp. | | | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | |
| Carbón n/i | 0,06 | 2,00 | | 1,02 | 0,03 | 0,92 | 0,21 | 4,53 | 1,67 | 1,21 | 4,82 | 0,69 | 0,35 |

| | | | | | | 0 | peración | 6 | | | | | |
|----------------|--------|--------|--------|--------|--------|--------|----------|--------|--------|--------|--------|--------|--------|
| Taxa | | 617 | | 206 | 2 | 50 | | 23 | 31 | | | 629 | |
| | Bo-167 | Bo-183 | Bo-209 | Bo-161 | Bo-161 | Bo-204 | Bo-166 | Bo-186 | Bo-205 | Bo-221 | Bo-180 | Bo-200 | Bo-164 |
| Juglans sp. | | | | | | | | | | | | | |
| Alnus sp. | | | | | | | | | | | | | |
| Polylepis sp. | | | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | |
| Budleja sp. | | | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | |
| Carbón n/i | 0,97 | 0,32 | 0,15 | 0,05 | | 0,56 | 1,64 | 1,04 | 0,29 | 0,05 | 0,24 | 0,84 | |

| | | | | | | 0 | peración | 6 | | | | | |
|----------------|--------|--------|--------|--------|--------|--------|----------|--------|--------|--------|--------|--------|--------|
| Taxa | | 62 | 29 | | | 211 | | 601 | 208 | 214 | | 214 | |
| | Bo-165 | Bo-179 | Bo-188 | Bo-194 | Bo-203 | Bo-198 | Bo-199 | Bo-208 | Bo-210 | Bo-216 | Bo-218 | Bo-135 | Bo-152 |
| Juglans sp. | | | | | | | | | | | | | |
| Alnus sp. | | | | | | | | | | | | | |
| Polylepis sp. | | | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | |
| Budleja sp. | | | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | |
| Carbón n/i | 0,12 | 0,51 | 0,52 | 0,04 | | 0,06 | 2,25 | 0,36 | 10,44 | 2,63 | 0,96 | 1,00 | 2,79 |

| | | | | | | 0 | peración | 6 | | | | | |
|----------------|--------|--------|--------|--------|--------|--------|----------|--------|--------|--------|--------|--------|--------|
| Taxa | | | | | | 237 | | | | | | 246 | 614 |
| | Bo-138 | Bo-148 | Bo-160 | Bo-168 | Bo-169 | Bo-170 | Bo-178 | Bo-182 | Bo-184 | Bo-189 | Bo-206 | Bo-151 | Bo-163 |
| Juglans sp. | | | | | | | | | | | | | |
| Alnus sp. | | | | | | | | | | | | | |
| Polylepis sp. | | | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | |
| Budleja sp. | | | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | |
| Carbón n/i | | 0,15 | 0,15 | 2,75 | 0,98 | 0,84 | 4,66 | 0,45 | 0,05 | 0,07 | 2,00 | 0,17 | 2,55 |

| | | | | | | 0 | peración | 6 | | | | | | | 0 | peración | 6 |
|----------------|--------|--------|--------|--------|--------|--------|----------|-------|-------|-------|-------|-------|-------|----------------|-------|----------|-------|
| Taxa | 608 | 628 | 245 | 219 | 2 | 10 | 233 | 1014 | 1001 | 1023 | 1013 | 650 | 641 | Taxa | 64 | 11 | 649 |
| | Bo-174 | Bo-177 | Bo-190 | Bo-193 | Bo-195 | Bo-202 | Bo-214 | Bo-85 | Bo-86 | Bo-87 | Bo-88 | Bo-90 | Bo-91 | | Bo-92 | Bo-94 | Bo-93 |
| Juglans sp. | | | | | | | | | | | | | | Juglans sp. | | | |
| Alnus sp. | | | | | | | | | | | | | | Alnus sp. | | | |
| Polylepis sp. | | | | | | | | | | | | | | Polylepis sp. | | | |
| Escallonia sp. | | | | | | | | | | | | | | Escallonia sp. | | | |
| Schinus molle | | | | | | | | | | | | | | Schinus molle | | | |
| Budleja sp. | | | | | | | | | | | | | | Budleja sp. | | | |
| Pouteria sp. | | | | | | | | | | | | | | Pouteria sp. | | | |
| Mimosa sp. | | | | | | | | | | | | | | Mimosa sp. | | | |
| Asteraceae | | | | | | | | | | | | | | Asteraceae | | | |
| Poaceae | | | | | | | | | | | | | | Poaceae | | | |
| Carbón n/i | 0,10 | 0,03 | 1,96 | 1,97 | 0,44 | 0,37 | 0,63 | 1,00 | 4,04 | 0,21 | 0,09 | 0,45 | 0,30 | Carbón n/i | 0,48 | 0,07 | 0,05 |

| | | | | | | 0 | peración | 7 | | | | | |
|----------------|--------|--------|--------|--------|--------|--------|----------|--------|--------|--------|--------|--------|--------|
| Taxa | | 80 | 02 | | | | | | 822 | | | | |
| | Bo-174 | Bo-187 | Bo-211 | Bo-212 | Bo-180 | Bo-181 | Bo-183 | Bo.184 | Bo-201 | Bo-203 | Bo-204 | Bo-205 | Bo-210 |
| Juglans sp. | | | | | | | | | | | | | |
| Alnus sp. | | | | | | | | | | | | | |
| Polylepis sp. | | | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | |
| Budleja sp. | | | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | |
| Poaceae | | | | 4,77 | | | | | | | | | 4,80 |
| Carbón n/i | 19,00 | 2,75 | 3,42 | | 5,10 | 5,05 | 1,61 | 1,50 | 4,00 | 4,00 | 24,00 | 28,00 | |

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| | | | | | | 0 | peración | 7 | | | | | |
|----------------|--------|--------|--------|--------|--------|--------|----------|--------|--------|--------|--------|--------|--------|
| Taxa | 82 | 29 | | 350 | | | | | 82 | 21 | | | |
| | Bo-182 | Bo-190 | Bo-188 | Bo-209 | Bo-213 | Bo-191 | Bo-193 | Bo-194 | Bo-197 | Bo-199 | Bo-200 | Bo-208 | Bo-231 |
| Juglans sp. | | | | | | | | | | | | | |
| Alnus sp. | | | | | | | | | | | | | |
| Polylepis sp. | | | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | |
| Budleja sp. | | | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | |
| Poaceae | | | | | | | 0,88 | 3,50 | 72,00 | 1,84 | 1,50 | | 0,20 |
| Carbón n/i | 3,93 | 63,00 | 0,40 | 0,70 | 2,35 | 12,20 | | | | | 1,00 | 0,79 | |

| | | | | | | 0 | peración | 7 | | | | | |
|----------------|--------|--------|--------|--------|--------|--------|----------|--------|--------|--------|--------|--------|--------|
| Taxa | | 821 | | 814 | | 8 | 10 | | 349 | 819 | 820 | 813 | 842 |
| | Bo-171 | Bo-173 | Bo-198 | Bo-196 | Bo-202 | Bo-222 | Bo-240 | Bo-242 | Bo-214 | Bo-216 | Bo-224 | Bo-232 | Bo-236 |
| Juglans sp. | | | | | | | | | | | | | |
| Alnus sp. | | | | | | | | | | | | | |
| Polylepis sp. | | | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | |
| Budleja sp. | | | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | |
| Poaceae | 143,00 | 68,00 | 99,00 | 5,00 | 0,30 | | | | | 2,90 | | | |
| Carbón n/i | | | | 5,00 | 3,23 | 0,22 | | | 0,20 | | 0,20 | 3,40 | 1,45 |

| | | | | | 0 | peración | 7 | | | | |
|----------------|--------|--------|--------|--------|--------|----------|--------|--------|--------|--------|--------|
| Taxa | 8 | 12 | 838 | | | 1307 | | | 1312 | 841 | 1323 |
| | Bo-237 | Bo-241 | Bo-239 | Bo-243 | Bo-245 | Bo-248 | Bo-253 | Bo-254 | Bo-247 | Bo-238 | Bo-252 |
| Juglans sp. | | | | | | | | | | | |
| Alnus sp. | | | | | | | | | | | |
| Polylepis sp. | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | |
| Budleja sp. | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | |
| Poaceae | | | | | 8,60 | 0,85 | 3,50 | 29,00 | | | |
| Carbón n/i | 7,00 | 0,12 | 0,60 | 1,60 | | | 30,00 | 12,00 | 5,32 | 10,00 | 67,00 |

| | | | Operad | ción 13 | | |
|----------------|--------|--------|--------|---------|--------|--------|
| Taxa | 952 | 980 | | 964 | | 960 |
| | Bo-317 | Bo-318 | Bo-319 | Bo-320 | Bo-322 | Bo-321 |
| Juglans sp. | | | | | | |
| Alnus sp. | | | | | | |
| Polylepis sp. | | | | | | |
| Escallonia sp. | | | | | | |
| Schinus molle | | | | | | |
| Budleja sp. | | | | | | |
| Pouteria sp. | | | | | | |
| Mimosa sp. | | | | | | |
| Asteraceae | | | | | | |
| Poaceae | | | | | | |
| Carbón n/i | 0,14 | 0,53 | 0,55 | 2,00 | 0,50 | 0,10 |

| | | | | | | Op | peración | 22 | | | | | |
|----------------|-------|-------|-------|-------|--------|--------|----------|--------|--------|--------|--------|--------|--------|
| Taxa | | 1621 | | | | 1625 | | | | | 1610 | | |
| | Bo-11 | Bo-13 | Bo-14 | Bo-12 | Bo-148 | Bo-149 | Bo-153 | Bo-155 | Bo-120 | Bo-121 | Bo-123 | Bo-124 | Bo-125 |
| Juglans sp. | | | 0,21 | | | | | | | | | | |
| Alnus sp. | | 1,20 | | | | | | 0,58 | | | | | 0,39 |
| Polylepis sp. | | | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | |
| Budleja sp. | | | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | |
| Carbón n/i | 0,48 | | | 0,01 | 1,21 | 0,58 | 0,15 | | 0,63 | 0,60 | 0,91 | 0,07 | |

| | | | | | | O | peración | 22 | | | | | |
|----------------|--------|--------|--------|--------|--------|--------|----------|--------|--------|--------|--------|--------|--------|
| Taxa | | | 16 | 310 | | | 1615 | 16 | 13 | 1618 | | 1611 | |
| | Bo-127 | Bo-128 | Bo-130 | Bo-131 | Bo-133 | Bo-134 | Bo-122 | Bo-126 | Bo-132 | Bo-135 | Bo-136 | Bo-142 | Bo-150 |
| Juglans sp. | | | | | | | | | | | | | |
| Alnus sp. | | | 2,42 | | | | 0,45 | | | | | | |
| Polylepis sp. | | | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | 1,77 |
| Budleja sp. | | | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | |
| Carbón n/i | 0,04 | 0,90 | | 0,90 | 0,12 | 0,15 | | 0,25 | 0,40 | | 1,41 | 0,17 | |

| | | | | | | | Operad | ción 22 | | | | | | |
|----------------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|--------|--------|--------|
| Taxa | 1611 | 1622 | | 1612 | | 1624 | 16 | 28 | 1629 | | 1630 | | 1627 | 1614 |
| | Bo-154 | Bo-137 | Bo-138 | Bo-144 | Bo-145 | Bo-139 | Bo-140 | Bo-143 | Bo-141 | Bo-146 | Bo-151 | Bo-152 | Bo-147 | Bo-129 |
| Juglans sp. | | | | | | | | 5,80 | 0,25 | | | | | |
| Alnus sp. | | | | | | 0,08 | | | | | | | | 17,00 |
| Polylepis sp. | | | | | | | | | | | | | | |
| Escallonia sp. | | | | | | | | | | | | | | |
| Schinus molle | | | | | | | | | | | | | | |
| Budleja sp. | | | | | | | | | | | | | | |
| Pouteria sp. | | | | | | | | | | | | | | |
| Mimosa sp. | | | | | | | | | | | | | | |
| Asteraceae | | | | | | | | | | | | | | |
| Poaceae | | | | | | | | | | | | | | |
| Carbón n/i | 0,68 | 0,20 | 0,80 | 0,40 | 0,22 | | 3,21 | | | 1,18 | 1,13 | 0,10 | 0,61 | |

Características Anatómico-Vasculares de los Carbones Identificados

Los restos de carbones en buen estado de conservación y que conservaban las características anatómico-vasculares diagnósticas para una identificación taxonómica segura, fueron analizados mediante microscopía de luz simple (microscopìo estereoscopio hasta 50X) para su identificación. Los datos de identificación y peso obtenidos, sirven para mostrar otro aspecto del uso de los vegetales por lo pobladores de este sitio.

Aquellos carbones (la mayoría) que por su tamaño y conservación no pudieron ser identificados, es porque no presentaban las características diagnósticas para identificar los patrones parenquimáticos y vasculares, que nos permitieran conocer el tipo de árbol o arbusto que sirvió como combustible.

Se presenta a continuación el registro microfotográfico de las secciones transversales de las especies identificadas y sus características anatómico vasculares, basadas en el tipo de parénquima y disposición de los vasos, además de la buena conservación que han tenido estos especímenes.

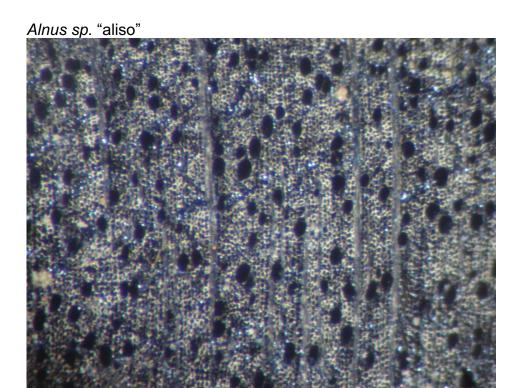


Figura 1.- Sección transversal de un carbón identificado como *Alnus sp.* "aliso" que proviene del contexto 559. Presenta patrón de anillos de crecimiento, poroso difuso, arreglo de los vasos muy pequeños, pero visibles, abundantes. Algunos vasos solitarios, pero la mayoría se forman en grupos alineados. Captura con microscopio óptico estereoscopio a 20X (aumentos)

Schinus molle "molle"

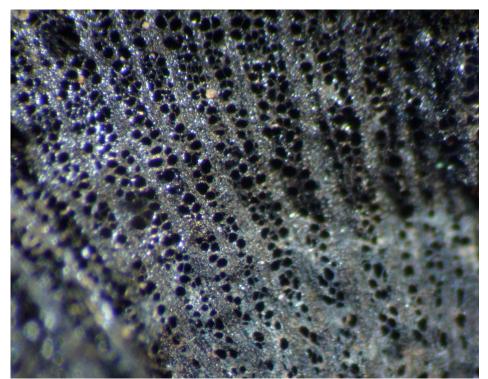


Figura 2.- Sección transversal de un carbón de *Schinus molle* "molle" que proviene del contexto 558. Madera de porosidad difusa, placas de perforación simples, punteaduras radiovasculares en horizontal, escalariformes, y en vertical en palizada, 20 - 40 vasos por milímetro cuadrado, Parénquima axial paratraqueal escaso, 5-8 células por serie de parénquima. Captura con microscopio óptico estereoscopio a 20X (aumentos) *Buddleja sp.*

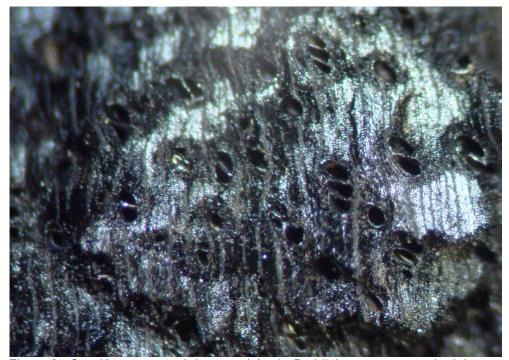


Figura 3.- Sección transversal de un carbón de *Buddleja sp.* que procede del contexto 770, presenta vasos solitarios en patrón diagonal o radial, placas de perforación simples, 40-100

vasos por mm², parénquima escaso paratraqueal y grandes radios seriados de 4 a 10 marginales. Captura con microscopio óptico estereoscopio a 20X (aumentos)

Pouteria sp. "lúcuma"

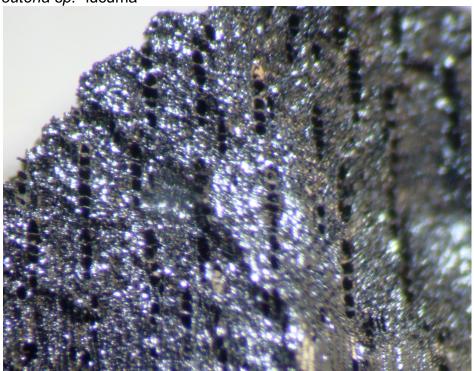


Figura 4.- Sección transversal de un carbón que procede del contexto 789, presenta los vasos múltiples en patrón diagonal o radial, placas de perforación simples, aproximadamente entre 5-20 vasos por mm² y parénquima axial en bandas estrechas y reticulado. Captura con microscopio óptico estereoscopio a 20X (aumentos)

Mimosa sp.

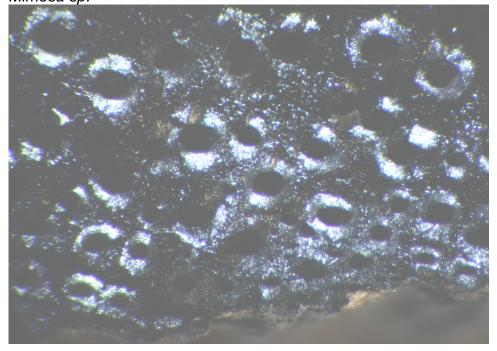


Figura 5. Sección transversal de un carbón de *Mimosa sp.* que procede del contexto 453, madera de porosidad difusa, placas de perforación simples, punteaduras radiovasculares con aréolas distintas; similares a las punteaduras intervasculares en tamaño y forma a lo largo de la célula de radio, 5-20 vasos por milímetro cuadrado parénquima axial vasicéntrico, rombo aliforme, confluente, células del parénquima fusiformes, rayos más grandes comúnmente 4 a 10 seriados. Captura con microscopio óptico estereoscopio a 20X (aumentos)

Restos asociados al material arqueobotánico carbonizado

Dentro del material arqueobotánico carbonizado, llego asociado otros restos, que en su mayoría fueron restos de fauna, tanto invertebrados como vertebrados. A continuación se presenta su identificación y distribución según contextos:

Tabla 3. Cantidades y distribución por contextos de restos de fauna asociados a los restos botánicos

| | | | | Ор | eración ´ | 1 | | | | C | peraciór | n 2 | |
|--------------------|------|-------|-------|-------|-----------|--------|--------|--------|-------|-------|----------|--------|--------|
| Taxa | 9 | 20 | 47 | 26 | 782 | 771 | 915 | 909 | 9 | 16 | 1200 | 1670 | 1174 |
| | Bo-7 | Bo-14 | Bo-40 | Bo-42 | Bo-149 | Bo-152 | Bo-169 | Bo-323 | Bo-48 | Bo-57 | Bo-100 | Bo-119 | AE1764 |
| Bostryx sp. | | | | | | | | | | | | | |
| Systrophia sp. | | | | | | | | | | | | | |
| Bulimulidae | | | | | | 0,20 | 0,10 | | 0,05 | | 0,64 | 2,00 | |
| Pteriidae | | | | | | | | | | | | | |
| Semele solida | | | | | | | | | | | | | |
| Protothaca thaca | | | | | | | | | | | | | |
| Donax obesulus | | | | | | | | | | | | | |
| Molusco n/i | | | | | 0,15 | | | | | | | | |
| Lama sp. | 1,00 | | | | | | | 1,41 | | | | | |
| Mamífero n/i | | | | 1,25 | | | | | | 0,08 | | | |
| Coprolito Lagidium | | | | | | | | | | | | | |
| Coprolito Lama sp. | | | | | | | | | | | | | |
| Carbón de piedra | - | 0,80 | - | | | | | | | | | | |
| Obsidiana | | | | | | | | | | | | | 2,50 |
| Piedra bezoar | | | 2,95 | | | | | | | | | | |

.../

| | 0 | peración | 6 | 0 | peración | 7 | Operación 22 |
|--------------------|--------|----------|--------|--------|----------|--------|--------------|
| Taxa | 250 | 211 | 620 | 813 | 8 | 10 | 1618 |
| | Bo-161 | Bo-203 | Bo-146 | Bo-223 | Bo-240 | Bo-242 | Bo-135 |
| Bostryx sp. | | | | | | | |
| Systrophia sp. | | | | | | | |
| Bulimulidae | | | | | | | |
| Pteriidae | | | | | | | |
| Semele solida | | | | | | | |
| Protothaca thaca | | | | | | | |
| Donax obesulus | | | | | | | |
| Molusco n/i | | | | | | | |
| Lama sp. | | 1,38 | | | | 8,00 | |
| Mamífero n/i | | | 3,33 | | 3,65 | | |
| Coprolito Lagidium | | | | | | | 1,36 |
| Coprolito Lama sp. | | | | 0,15 | | | |
| Carbón de piedra | 11,04 | | | | | | |
| Obsidiana | | | | | | | |
| Piedra bezoar | | | | | | | |

.../

| | Opera | ción 1 | Operación 2 |
|--------------------|---------|---------|-------------|
| Taxa | 799 | 783 | 1653 |
| | AE 1812 | AE 1802 | AE 2706 |
| Bostryx sp. | | | |
| Systrophia sp. | | | |
| Bulimulidae | | | |
| Pteriidae | | | |
| Semele solida | 1 | | |
| Protothaca thaca | | | 1 |
| Donax obesulus | | 1 | |
| Molusco n/i | | | |
| Lama sp. | | | |
| Mamífero n/i | | | |
| Coprolito Lagidium | | | |
| Coprolito Lama sp. | | | |
| Carbón de piedra | | | |
| Obsidiana | | | |
| Piedra bezoar | | | |

3. COMENTARIOS

Se ha identificado un total de 16 especies a partir del material arqueobotánico analizado. De estas 16 especies identificadas, 8 especies son plantas cultivadas:

```
Arachis hypogaea "maní",
Phaseolus vulgaris "frijol",
Ipomoea batatas "camote",
Lagenaria siceraria "mate",
Pouteria sp. "lúcuma",
Solanum tuberosum "papa" y
Zea mays "maíz".
Las restantes 8 especies, son árboles silvestres:
(Juglans sp. "nogal"
Alnus sp. "aliso",
Mimosa sp.,
Escallonia sp. "chachacomo",
Polylepis sp. "queñoa",
Schinus molle "molle" y
Buddleja sp.),
y una leguminosa silvestre (Phaseolus sp.) y
una planta herbácea silvestre (Asteraceae)
```

Arachis hypogaea "maní", planta leguminosa cultivada comúnmente en la costa del Perú, por lo tanto su presencia en los sitios andinos de Ancash, se debe a una introducción desde la costa. Sus restos se han identificado como fragmentos de vainas y semillas carbonizadas en los contextos excavados en Hualcayan. Otras referencias sobre su presencia en los sitios arqueológicos están señaladas únicamente para sitios costeros, desde el período colonial, horizonte tardío (valle de Lurín, Manchán en el valle de Casma y Huaca San Pedro en el valle de

Cañete), luego en el período intermedio tardío, en Ancón, Cerro La Centinela y Cerro Colorado en Chancay, cerca de Huacho.

Para el período intermedio temprano, sus restos se encuentran en el Castillo de Tomaval en el valle de Virú, de los niveles Gallinazo, Cahuachi y Huaca del Loro en el valle de Nasca. En el horizonte temprano, en los niveles Cupisnique de Huaca Prieta en el valle de Chicama, Las Haldas, San Diego, Pampa del Rosario en el valle de Casma. Para el período inicial, en Pampas de las Llamas, Tortugas en el valle de Casma, y en el período Precerámico, en Los Gavilanes del valle de Huarmey, valle de Zaña y Cueva Guitarrero en Ancash (Ugent y Ochoa, 2006).

El "maní" es y fue utilizado como alimento y complemento medicinal, por los aceites esenciales que posee, y las crónicas señalan que su consumo tostado es sabroso y beneficioso para la salud. En la forma carbonizada como se han encontrado sus restos en este sitio, la posibilidad de un consumo tostado resulta una buena alternativa.

Phaseolus vulgaris "frijol", esta leguminosa es una planta herbácea anual con diversas variedades, donde el tipo más utilizado por la población aborigen fue el voluble o de enrame, que hasta la fecha es el compañero natural del maíz en la tecnología agrícola tradicional. Entre las variedades de frijol común, hay una variedad típica del área andina, especialmente de los andes del norte del Perú, conocida como "nunca" (Velasco 1977), el cual es un grano mediano, casi negro, redondo, lustroso y duro. Su único uso es comerlo tostado. Esta característica coincide con los restos de cotiledones reportados para Hualcayan, donde todos los especímenes identificados están carbonizados y tienen la forma redonda y con el hilum en posición central típica para Phaseolus vulgaris y esta variedad.

Esta variedad de *Phaseolus vulgaris* solo es posible cultivarla en climas fríos, por lo que nunca fue reportado para sitios costeros. Su único uso de esta variedad andina es comerlo tostado, aunque también se cita que en la región andina, se usa molido en preparaciones de cataplasmas para inmovilizar fracturas y el cocimiento de este frijol negro se utiliza para restablecer la menstruación (Valdizán 1922).

Ipomoea batatas "camote", es una planta perenne, rastrera, con raíces tuberosas grandes, que contienen mucho almidón. Yacovleff y Herrera (1934) y Macbride (1959) describen 2 cultivos indígenas del camote, cada uno con un número de cultivares con nombre indígenas, como el cultivar dulce que es conocido como camote o apichu, tiene el endosperma suave, amarillo o anaranjado. Este grupo tiene cultivares con piel de varios colores como el yuracapichu (blanco), puca-apichu (rojo) y azul-apichu (azul). También se menciona una forma silvestre conocida como kusi-apichu procedente del Bajo Urubamba.

El segundo grupo, referido en quechua como *cumara*, tiene las raíces más secas, más almidonadas y de color amarillo más pálido que el primer grupo. Este

grupo es muy poco cultivado hoy en día, incluye a los cultivares *yurac-cumara* (blanco), *puca-cumara* (rojizo), *ccompilliclla* (raíces purpurina pequeñas, napiformes), *okkechchuto*, *kusi-cumara* e *incanpa-maccasccan* (endosperma de color púrpura intenso).

Los especímenes arqueológicos de Hualcayan que se ubican en los contextos 2 y 1651, son de forma napiforme, y fueron identificados mediante sus granos de almidón, que se caracterizan por se almidones compuestos, tal como se observa en la siguiente microfotografía.

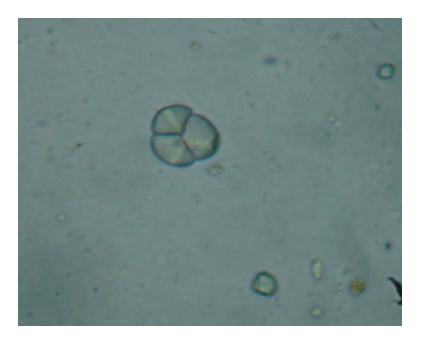


Figura 6.- Grano de almidón de *Ipomoea batatas* "camote" aislado de una raíz napiforme del contexto 2 de Hualcayan

Lagenaria siceraria "mate", esta planta milenaria, es una cucurbitacea de distribución Pantropical y las especies cultivadas han sido colectados en los departamentos de Amazonas, Ayacucho, Cusco y San Martín entre los 0-2000 msnm, por lo que pudo haber sido cultivada en las partes bajas de Hualcayán. Hay un debate en cuanto al origen de la calabaza, porque algunos botánicos señalan a África como el centro de origen de esta especie, mientras otros, argumentan que surgió independientemente de especies silvestres en América del Sur y África.

Los frutos maduros de esta especie se han utilizado comúnmente para la fabricación de varios tipos de envases y utensilios, incluyendo tazones, fuentes, botellas, cucharones y cucharas. Por otro lado, los frutos inmaduros son comestibles, por tanto se puede aprovechar como alimento y como utensilio.

En Hualcayan se han identificado fragmentos de pericarpio (cáscara del fruto seco) en un contexto denominado Back fill clear up South of Kotosh wall, que corresponden a Bot 24, Operación 2. Los fragmentos de pericarpio no están carbonizados y muestran una regular conservación, lo cual permitió su identificación. Son las únicas evidencias de esta cucurbitacea en toda la colección de restos vegetales de este sitio, lo cual podría indicar posiblemente que fue traída de un sitio de menor altitud.

Pouteria sp. "**lúcuma**", este árbol frutal fue extensamente cultivado en tiempos prehispánicos. Las semillas y frutos, son los restos que generalmente aparecen en los sitios arqueológicos costeros y andinos. También hay evidencias del uso de su madera para construir adornos, como es el caso del ídolo de Pachacamac y un artefacto de madera a manera de estandarte que fue tallado en madera de *Pouteria sp.* y que fue recuperado en el complejo arqueológico El Brujo. También hay evidencias de su uso como combustible en diversos sitios formativos de Casma y sitios Chimú, como Chan Chan.

En Hualcayán se ha logrado identificar mediante el estudio de la anatomía vascular de los carbones, el uso de su madera para combustible en los contextos 470 y 789 (ver tablas). Sin embargo, como restos de endocarpio o semillas, que son los otros restos que aparecen en los contextos arqueológicos. Una posibilidad es que se pueden consumir las frutas en el campo y solo traen la madera para combustible, lo cual indica que sería otro producto vegetal traído de partes más bajas (valles interandinos).

Solanum tuberosum "papa", este tubérculo andino tan importante en la economía prehispánica, tiene como evidencia macro, los restos de un tubérculo carbonizado, que aún conserva su forma y detalles morfológicos, y se recuperó del contexto 821. Aunque la carbonización reduce entre 5-10% los restos vegetales, dependiendo de la parte anatómica del vegetal, la morfología del tubérculo indica que se trataría de una variedad antigua de pequeño tamaño, que actualmente son utilizadas para procesar el *chuño*.

En relación a este producto derivado de la "papa", hay evidencias de granos de almidón gelatinizados de este tubérculo, en el contexto C-1672, en un fragmento de cerámica con los siguientes datos: PO-65 AA21, sector S, operación 2, Grid I, sub-operación AA21PO65. En los sedimentos de este fragmento se aislaron granos del almidón de papa gelatinizados (la gelatinización es un proceso que comienza con la introducción de los almidones de papa dentro de agua caliente para su cocción y tiene la característica de agrupar todos los almidones como racimos), los cuales son evidencias de consumo de *chuño*.

Zea mays "maíz", restos de maíz se ha recuperado de los contextos 2, 229, 237, 629, 231, 237, 245, 620, 650, 349, 802, 821, 350, 813, 820, 809, 1323, 1622 y 1630, en la mayoría de ellos son semillas carbonizadas, solo en el contexto 809 se identificaron un fragmento de mazorca con semillas adheridas, completamente carbonizadas. Los análisis de almidón, tanto en los sedimentos de

cerámica y en los líticos, han permitido reconocer dos posibles razas antiguas que fueron utilizadas por los habitantes de Hualcayán, una raza sería aquella de endosperma harinoso (almidones esféricos) y otra raza de endosperma vítreo (almidones poliédricos). En el primer caso se trataría de algún Confite Morocho (raza harinosa) y en el segundo caso un Confite Punteagudo (raza vítrea de tipo reventón). Ambas razas se cultivan actualmente entre 2500 y 3000 msnm.

Por lo tanto y siguiendo estas evidencias, hay dos posibles formas de consumo, una en sopas o posiblemente como *sanco*, el cual es una comida ceremonial, donde al almidón de maíz se le añade sangre y grasa de camélido, y que se sirve en las ceremonias religiosas de los andes. La otra forma de consumo, posiblemente fue como maíz tostado, dentro de vasijas o cocido dentro de los fogones.

Juglans sp. "nogal", este árbol nativo de América, se le denomina togte o nogal, y se cultiva en la región interandina, entre los 1800 a 3000 msnm. Este árbol tiene una utilidad diversa, porque se consume la nuez que esta dentro de la cáscara drupácea del fruto, la madera es fina y sólida, se utiliza para fabricar ornamentos, en construcción y como combustible. Con el cocimiento de sus hojas, se prepara un jarabe reconstituyente de probada eficacia en personas anémicas (Velasco 1977).

Las evidencias de "nogal" en Hualcayan, son a nivel de sus frutos drupáceos, en los contextos 2, 9, 229, 970, 1323 y 1621. Evidencias de carbones y por lo tanto de su uso como combustible es para los contextos 788, 904, 905, 1621, 1628, 1629 y 1653.

Alnus sp. "aliso", este árbol es propio de los valles interandinos del Perú y del Ecuadro. Crece en todo el Perú, cerca de las riberas, arroyos y ríos y no se aparta de ellos sino en climas húmedos. Es muy apreciado por su madera, su corteza es usada para curar el paludismo, se utiliza de igual modo como combustible, en carpintería y en pequeñas construcciones.

Los restos identificados para Hualcayán son fragmentos de carbón que se recuperaron y tuvieron buena conservación en los contextos 17, 57, 59, 62, 63, 66, 67, 463, 471, 555, 559, 566, 581, 770, 782, 902, 903, 1160, 1172, 1184, 1200, 1610, 1614, 1615, 1621, 1624, 1655, 1667, 1669 y 1685. Esta frecuencia indica lo importante de la madera de este árbol para las actividades domésticas de la población local. Detalle de su anatomía vascular de los carbones estudiados se pueden observar en la figura 1.

Mimosa sp., este género de árboles y algunas hierbas, tiene alrededor de 600 especies que viven en las regiones tropicales y subtropicales. En el Perú se conocen 26, de las cuales 8 son endémicas. Las especies que son endémicas del departamento de Ancash, son *Mimosa montana*, que habita alrededor de los 2100 msnm, en ladera abiertas, *Mimosa revoluta* "hualango", frecuente en laderas secas y rocosas, entre los 2000-3350 msnm, su madera es muy dura y es

frecuentemente utilizada como cerco vivo y para la leña, y *Mimosa weberbaueri* "shirac", que frecuenta laderas y riberas de los ríos, alrededor de los 2800 msnm (Mostacero et al. 2009).

Los restos de carbón identificados para Hualcayán corresponde solo al contexto 453, y las características de su anatomía vascular se pueden observar en la figura 5.

Escallonia sp. "chachacomo", este árbol es endémico de los andes y en el Perú esta representado por 17 especies. En las vertientes occidentales y valles interandinos del Perú, crece Escallonia micrantha. Similar distribución tiene Escallonia resinosa, la cual tiene madera muy dura y resistente, por lo que es la mas utilizada, y Escallonia pendula "pauco" cuyo cocimiento sirve como antirreumático (Mostacero y Mejía, 1996).

Los restos de carbón identificados en Hualcayán proceden de los contextos 666, 770 y1672. El material tenía mala conservación, por lo que solo fue posible identificarlo visualmente al microscopio, pero no registrarlo porque no tenía buena resolución.

Polylepis sp. "queñoa", se trata de pequeños arbolitos que crecen en la parte más alta de los andes. Su madera dura, compacta y pesada de color rojizo es incorruptible en el agua y la humedad, y es un excelente combustible. Conjuntamente con otras especies como *Buddleja sp.* forma las comunidades de la puna o jalca denominadas "quinuales o quishuares".

En los contextos 62, 463, 651, 666, 783, 788 y 903, se han identificado mediante el estudio de la anatomía vascular, carbones que fueron el producto de la combustión de la madera de este árbol.

Schinus molle "molle", este árbol se cultiva como ornamental, y en tiempos prehispánicos preparaban los frutos para obtener una bebida fermentada, "la chicha de molle", a la cual atribuyen propiedades medicamentosas. La tintura de los frutos se utiliza en el reumatismo agudo y la oleorresina de su madera para obturar dientes cariados (Mostacero y Mejía, 1993).

En Hualcayán se han identificados sus restos como fruto carbonizado en el contexto 813 y como fragmentos de carbón en los contextos 558, 1160 y 1611. Las características de su anatomía vascular se pueden observar en la figura 2.

Buddleja sp., es otro árbol propio de los andes, que conforma los bosques enanos conjuntamente con *Polylepis*. Su madera es apreciada por su fuerza y durabilidad, aunque también se utiliza extensamente para leña. Los restos de carbón identificados para Hualcayán están en los contextos 491, 770, 771B, 785, 791, 796, 1181, 1651, 1653, 1654, 1655, 1669 y 1672. Las características de su anatomía vascular es posible observar en la figura 3.

Finalmente hubo un material asociado a los restos botánicos, donde se pudo identificar dos especies de caracoles terrestres (*Bostryx sp.* y *Systrophia sp.*), cuatro especies de bivalvos marinos (*Pteriidae, Semele solida, Protothaca thaca* y *Donax obesulus*), de los cuales hubo fragmentos de nacar de las conchas perleras de la familia *Pteriidae* que son muy utilizadas para la fabricación de ornamentos. También se identificaron fragmentos óseos y coprolitos de *Lama sp.*, coprolitos de "vizacacha" *Lagidium*, fragmentos de carbón de piedra, obsidiana y una piedra bezoar en el contexto 47.

Concluyendo se puede observar el uso principal de tres plantas cultivadas en los andes: papa, maíz y frijoles (en este caso ñuñas), complementado con productos como el "camote" y otros importados como el maní. Posiblemente hubo consumo de frutos de lucuma, pero no hay evidencias de esta parte anatómica, pero si de su madera carbonizada. Hay un uso frecuente de madera de *Alnus, Polylepis* y *Juglans*, para combustible, y en menor proporción para *Buddleja, Schinus, Escallonia, Pouteria y Mimosa.*

Todas las plantas identificadas son nativas y endémicas de los andes, a excepción de *Arachis hypogaea* que posiblemente llego de la costa. Hay un uso de dos razas de maíz, lo cual se conoce a partir de la forma de los granos de almidón identificados, también hay evidencias de consumo de masas almidonosas de papa, que posiblemente se tratan de *chuño*.

Para el caso de los restos vegetales, no hay evidencias de intrusiones de plantas hispánicas, todas las que se han identificado son nativas de los andes.

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Appendix F.3

Microbotanical Remains

Table F3.1 Microbotanical remains (phytolith and starch). Analysis by Victor Vásquez Sánchez, Arqueobios Laboratory (Trujillo, Peru). A guide to period designations is available in Appendix F.1.

Material # Samples

Soil: 96 Ceramic: 38 Lithic: 87 TOTAL: 222

| Period | Op. | Context | Bag / Sample | Material | Taxa Identified | Measurements (L x W) microns | Analysis Results and Observations | Additional Information |
|--------|-----|---------|----------------|----------|-------------------|---------------------------------|---|---------------------------------------|
| 4 | 7 | C-0802 | AE-1690 | Ceramic | Zea mays | 18.2 x 18.2 | Poliédrico | |
| 4 | 7 | C-0802 | AE-1690 | Ceramic | Solanum tuberosum | 23.4 x 18.2 | elíptic dañado | |
| 4 | 7 | C-0802 | AE-1690 | Ceramic | Solanum tuberosum | 20.8 x 15.6 | eliptico | |
| 4 | 2 | C-0477 | AE-1720 | Ceramic | Zea mays | 15.6 x 13 | Almidones de sedimentos de una cuchara que exhibe sedimento | |
| 4 | 2 | C-0477 | AE-1720 | Ceramic | Zea mays | izq.= 15.6 x 13 | amarillo-blanquecino, poliédrico | |
| 4 | 2 | C-0477 | AE-1720 | Ceramic | Zea mays | der.= 13 x 10.4 | poliédrico | |
| 4 | 2 | C-0477 | AE-1720 | Ceramic | Zea mays | 23.4 x 20.8 | esférico, hilum perfrado, huellas de fermentación | |
| 4 | 13 | C-0964 | AE-1764 | Ceramic | Solanum tuberosum | 15.6 x 15.6 | almidón redondeado, cruz polarizacion excentrica= papa | |
| 4 | 13 | C-0970 | AE-1774 | Ceramic | Zea mays | 15.6 x 14.3 | Grano almidón esférico | |
| 4 | 13 | C-0970 | AE-1778 | Ceramic | Solanum tuberosum | 39 x 26 | grano almidón típico | |
| 4 | 13 | C-0970 | AE-1778 | Ceramic | Solanum tuberosum | 23.4 x 20.8 | granos almidón en racimo | |
| 4 | 13 | C-0970 | AE-1778 | Ceramic | Zea mays | 18.2 x 18.2 | poliédrico | |
| 2 | 6 | C-0250 | AE-556 | Ceramic | Zea mays | 18.2 x 16.9 | Poliédrico, sedimento terroso | |
| 2 | 6 | C-0250 | AE-556 | Ceramic | Zea mays | 13 x 10.4 | Grano almidón dañado poliédrico | |
| 2 | 6 | C-0250 | AE-556 | Ceramic | Zea mays | 20.8 x 18.2 | Poliédrico | |
| 2 | 6 | C-0250 | AE-556 | Ceramic | Zea mays | 18.2 x 18.2 | Poliédrico | |
| 2 | 6 | C-0250 | AE-556 | Ceramic | Solanum tuberosum | 20.8 x 15.6 | Grano almidón elíptico | |
| 4 | 6 | C-0221 | AE-0221 A | Ceramic | Zea mays | 23,4 x 20,8 | poliédrico, agujero en hilum | |
| 4 | 6 | C-0221 | AE-0221 A | Ceramic | Zea mays | 19,5 x 13 | poliédrico, agujero en hilum | |
| 4 | 6 | C-0221 | AE-0221 A | Ceramic | Zea mays | 20,8 x 18,2 | poliédrico, provienen base vasija sedimentos con almidones hidrólisis enzimática (agujero en hilum) fermentación?. 03 almidones | |
| 4 | 6 | C-0221 | AE-0221 B (M1) | Ceramic | Zea mays | 20,8 x 15,6 | Poliédrico | |
| 4 | 6 | C-0221 | AE-0221 B (M1) | Ceramic | Zea mays | 20,8 x 18,2 | Poliédrico | |
| 4 | 6 | C-0221 | AE-0221 B (M1) | Ceramic | Zea mays | 18,2 x 18,2 | Esférico - Sedimento marrón claro grasiento (AE221-B). 03 almidones | |
| 4 | 6 | C-0221 | AE-0221 B (M2) | Ceramic | Negativo | | Sedimento negro interior sin almidones (AE221-B) | |
| 4 | 6 | C-0221 | AE-0221 D (M1) | Ceramic | Negativo | | tierra en interior de fragmento, sin almidones (AE221-D) | |
| 4 | 6 | C-0221 | AE-0221 D (M2) | Ceramic | Solanum tuberosum | 33,8 x 26 | ambos típicos, provienen de un sedimento marrón claro grasiento | |
| 4 | 6 | C-0221 | AE-0221 D (M2) | Ceramic | Solanum tuberosum | 23,4 x 18,2 | que esta biuen adherido al interior del fragmento (AE221-D). 02 almidones | |
| 3 | 1 | C-0046 | AE-0430 | Ceramic | Pooideae | 78 por 13 | Negativo para almidones. Fitolito de graminea silvestre | |
| 3 | 1 | C-0562 | AE-0448 | Ceramic | Zea mays | 15,6 x 14,3 | Esférico, sedimento terroso marrón con restos vegetales, escasa presencia de almidones. Cuerpo de vasija. 02 almidones | |
| 3 | 1 | C-0782 | AE-1342 | Ceramic | Zea mays | 15,6 x 13 | Poliédrico | Janabarriu-related doble circle motif |

| 3 | 1 | C-0782 | AE-1342 | Ceramic | Zea mays | 18,2 x 15,6 | Poliédrico, ambos en sedimento marrón grasiento (AE-1342). 02 almidones | Janabarriu-related doble circle motif |
|---|---|------------------|-------------------|-----------|-------------------|-------------|--|---|
| 3 | 1 | C-0791 | AE-1345 (M1) | Ceramic | Zea mays | 22,1 x 20,8 | Poliédrico | |
| 3 | 1 | C-0791 | AE-1345 (M1) | Ceramic | Pooideae | 26 x 7,8 | fitolito de graminea silvestre | |
| 3 | 1 | C-0791 | AE-1345 (M2) | Ceramic | Solanum tuberosum | 20,8 x 18,2 | almidón dañado-M2 cuerpo ceramica. 01 almidón | |
| 3 | 1 | C-0791 | AE-1345 (M3) | Ceramic | Zea mays | 16,9 x 13 | Poliédrico | |
| 3 | 1 | C-0791 | AE-1345 (M3) | Ceramic | Zea mays | 18,2 x 13 | Poliédrico | |
| 3 | 1 | C-0791 | AE-1345 (M3) | Ceramic | Zea mays | 20,8 x 18,2 | Grupos- M3 cuenco Huaraz. 03 almidones | |
| 4 | 7 | C-0346 | AE-1669 | Ceramic | Zea mays | 15,6 x 13 | Poliedrico ambos | Bowl sent with dirt inside |
| 4 | 7 | C-0346 | AE-1669 | Ceramic | Zea mays | 23,4 x 20,8 | Sedimento de cuenco con tierra. 02 almidones | Bowl sent with dirt inside |
| 2 | 1 | C-0771 | AE-1803 | Ceramic | Zea mays | 20,8 x 15,6 | Poliédrico | tube |
| 2 | 1 | C-0771 | AE-1803 | Ceramic | Zea mays | 16,9 x 15,6 | Poliédrico. 02 almidones | tube |
| | | | | Geranne | | | Almidones en sedimento blanquecino bien adherido en tubo ceramio. | |
| 2 | 1 | C-0771 | AE-1803 | Ceramic | Solanum tuberosum | 19,5 x 13 | 01 almidón | tube |
| 3 | 1 | C-0799 | AE-1813 | Ceramic | Zea mays | 15,6 x 15,6 | Esférico | Huarás bowl |
| 3 | 1 | C-0799 C-0799 | | | | | | Huarás bowl |
| 3 | 1 | C-0/99 | AE-1813 | Ceramic | Zea mays | 18,2 x 16,9 | Poliédrico- en sedimento cuenco Huaraz. 02 almidones | Huaras bowi |
| 4 | 7 | C-0822 | AE-2069 (M-5) | Ceramic | Zea mays | 20,8 x 18,2 | Poliédrico digerido-Sedimento marrón grasiento en cuerpo plano. 01 almidón | plain body sherd |
| 4 | 7 | C-0822 | AE-2069 (M1) | Ceramic | Solanum tuberosum | 15,6 x 13 | Digerido | handle and interior face of a Recuay canchero |
| | | | | | | | típico- sedimento en mango canchero como costra compacta. 02 | handle and interior face of a Recuay |
| 4 | 7 | C-0822 | AE-2069 (M1) | Ceramic | Solanum tuberosum | 28,6 x 20,8 | almidones | canchero |
| 4 | 7 | C-0822 | AE-2069 (M2) | Ceramic | Zea mays | 15,6 x 13 | Poliédrico | bowl |
| 4 | 7 | C-0822 | AE-2069 (M2) | Ceramic | Zea mays | 14,3 x 13 | Poliédrico | bowl |
| 4 | 7 | C-0822 | AE-2069 (M2) | Ceramic | Zea mays | 15,6 x 15,6 | Esférico | bowl |
| 4 | 7 | C-0822 | AE-2069 (M2) | Ceramic | Zea mays | 15,6 x 15,6 | Poliédrico-sedimento en cuenco (M-2) grasiento bien adherido. 04 almidones | bowl |
| 4 | 7 | C-0822 | AE-2069 (M3) | Ceramic | Negativo | | Sedimento húmedo mezclado con suelo en cuenco (M3) | bowl |
| 4 | 7 | C-0822 | AE-2069 (M4) | Ceramic | Solanum tuberosum | 20,8 x 18,2 | Típico | jar? |
| | | | · | | | | Esferoide-Jarra con sedimemto compacto color marrón grasiento. 02 | Í |
| 4 | 7 | C-0822 | AE-2069 (M4) | Ceramic | Solanum tuberosum | 23,4 x 23,4 | almidones | jar? |
| 1 | 2 | C-1667 | AE-2716 | Ceramic | Solanum tuberosum | 26 x 20,8 | Típico eliptico | |
| 1 | 2 | C-1667 | AE-2716 | Ceramic | Solanum tuberosum | 31,2 x 23,4 | Típico eliptico-Fragmento con impronta tierra, luego sedimento terroso. 02 almidones | |
| 4 | 7 | C-0303 | AE0-508 | Ceramic | Zea mays | 23,4 x 23,4 | Poliédrico | |
| | | | | | | | Esférico- sedimento con tierra y hollín, por debajo sedimento marrón | |
| 4 | 7 | C-0303 | AE0-508 | Ceramic | Zea mays | 18,2 x 18,2 | grasiento con almidones. 03 almidones | |
| 1 | 2 | C-0471 | CE-0006 | Ceramic | Zea mays | 18,2 x 18,2 | Poliédrico, sedimento con hollín, debajo marrón, almidones dañados. 01 almidon | |
| 4 | 2 | C-0477 | CE-0035 (M1) | Ceramic | Zea mays | 18,2 x 13 | Poliédrico ambos, de jarra pequeña. 02 almidones | Small Jar |
| 4 | 2 | C-0477 | CE-0035 (M1) | Ceramic | Zea mays | 26 x 23,4 | | Small Jar |
| 4 | 2 | C-0477 | CE-0035 (M2) | Ceramic | Zea mays | 20,8 x 18,2 | poliédrico, sedimento grasoso, borde cuenco. 01 almidón | bowl rim |
| 4 | 2 | C-0477 | CE-0035 (M3) | Ceramic | Negativo | , -, | Sedimento con tierra humedecida compacta | |
| 4 | 6 | C-0214 | CE-0498/AE-0210 | | Cucurbita sp. | 39 x 36,4 | fitolitos aislados del mismo fragmento ceramica | Body sherd |
| 4 | 6 | C-0214 | CE-0498/AE-0210 | | Cucurbita sp. | 31,2 x 26 | con sedimento terroso marrón claro bien adherido al interior. 02 fitolitos | Body sherd |
| 4 | 6 | C-0214 | CE-0498/AE-0210 | Ceramic | Pooideae | 31,2 x 10,4 | fitolito de graminea silvestre | Body sherd |
| 4 | 6 | C-0214 | CE-0498/AE-0210 | | Zea mays | 13 x 11,7 | esférico, fragmento de cuerpo. 01 almidón | Body sherd |
| 4 | 6 | C-0641 | CE-0506 | Ceramic | Negativo | • | cuerpo vasija con sedimento muy quemado, sin almidones (CE-506) | Body sherd |
| 4 | 6 | C-0650 | CE-0507 | Ceramic | Negativo | | Cuerpo vasija con sedimento de hollín marcado | Body sherd |
| 1 | 2 | C-0068 | CE-0703 (M1) | Ceramic | Zea mays | 20,8 x 19,5 | Poliédricos ambos, provienen de | |
| 1 | 2 | C-0068 | CE-0703 (M1) | Ceramic | Zea mays | 20,8 x 18,2 | cuerpo de posible olla. 02 almidones | |
| 1 | 2 | C-0068 | CE-0703 (M2) | Ceramic | Zea mays | 15,6 x 15,6 | ambos esféricos, sedimento graso | |
| | | 2 2000 | 1 25 27 23 (1412) | GCTAIIIIC | Lea mays | 10,0 A 10,0 | ambos coloricos, scamiento Braso | ! |

| 4 | | 0.0060 | GE 0500 (MO) | | 7 | 20.0. 20.0 | . 1 | I |
|----|--------|------------------|--------------------|---------|----------------------|-------------|---|--|
| 1 | 2 | C-0068 | CE-0703 (M2) | Ceramic | Zea mays | 20,8 x 20,8 | provienen de jarra borde recto. 02 almidones | |
| 1 | 2 | C-0068 | CE-0703 (M3) | Ceramic | Zea mays | 15,6 x 13 | poliédrico | |
| 1 | 2 | C-0068 | CE-0703 (M3) | Ceramic | Zea mays | 19,5 x 16,9 | esférico, fisura hilum, fragmento olla. 02 almidones | |
| 1 | 2 | C-0068 | CE-0703 (M3) | Ceramic | Pooideae | 101 x 15,6 | fitolito graminea, sedimento terroso con hollín. Fitolito graminea | |
| | | | ` ' | | | | silvestre | |
| 1 | 2 | C-0068 | CE-0703 (M4) | Ceramic | Negativo | | sedimento con tierra sobre hollín-fragmento olla | |
| 1 | 2 | C-0068 | CE-0703 (M5) | Ceramic | Solanum tuberosum | 28,6 x 23,4 | en racimos, gelatinizados | |
| 1 | 2 | C-0068 | CE-0703 (M5) | Ceramic | Solanum tuberosum | 36,4 x 26 | típico, sedimento escaso de tipo arenoso, cuerpo indet. 01 almidon tipico | |
| 1 | 2 | C-0068 | CE-0703 (M6) | Ceramic | Zea mays | 18,2 x 18,2 | Poliédrico- Borde Cuenco | |
| 1 | 2 | C-0068 | CE-0703 (M6) | Ceramic | Zea mays | 20,8 x 18,2 | Esférico - En sedimento terroso-grasiento bien adherido. 02 almidones | |
| 1 | 2 | C-0068 | CE-0703 (M6) | Ceramic | Pooideae | 33,8 x 13 | fitolito de otro tipo de graminea de la subfamilia <i>Pooideae</i> | |
| 1 | 2 | C-0068 | CE-0730 | Ceramic | Solanum tuberosum | 20,8 x 15,6 | dañado, provienen de cuenco u olla cerrado | neck of a closed olla |
| 1 | 2 | C-0068 | CE-0730 | Ceramic | Solanum tuberosum | 18,2 x 16,9 | esférico, sedimento marrón claro aspecto ceroso en interior. 02 almidones | neck of a closed olla |
| 4 | 6 | C-0241 | CE-1190 | Ceramic | Zea mays | 26 x 18,2 | Poliédrico | White residue on bowl interior from tomb |
| 4 | 6 | C-0241 | CE-1190 | Ceramic | Zea mays | 18,2 x 18,2 | Esférico | White residue on bowl interior from tomb |
| 4 | 6 | C-0241 | CE-1190 | Ceramic | Zea mays | 15,6 x 15,6 | grupos dañados esféricos. 03 almidones | White residue on bowl interior from tomb |
| 4 | 6 | C-0241 | CE-1190 | Ceramic | Zea mays | 36,4 x 31,2 | Polen | White residue on bowl interior from tomb |
| 4 | 6 | C-0241 C-0241 | CE-1190 CE-1190 | Ceramic | Zeu muys | 30,4 X 31,2 | fto. Cerámica con sedimento blanco | White residue on bowl interior from tomb |
| 4 | 6 | C-0241 C-0241 | CE-1190 | Ceramic | | | sedimento a 20X (aumentos) | White residue on bowl interior from tomb |
| 4 | 6 | C-0241 C-0641 | CE-1190 CE-510 | Ceramic | Zea mays | 19,5 x 15,6 | Poliédrico | blackened soot on vessel exterior |
| | _ | C-0641 | CE-510 | Ceramic | Zea mays Zea mays | 23,4 x 23,4 | Esférico- con residuo quemado en interior (CE-510). 02 almidones | blackened soot on vessel exterior |
| 4 | 6 2 | | | | | | · | blackened soot on vessel exterior |
| 2 | | C-1672 | PO-0065 | Ceramic | Solanum tuberosum | 23,4 x 18,2 | Racimos almidón mineralizados interfiere con luz polarizada | |
| 2 | 2 | C-1672 | PO-0065 | Ceramic | Solanum tuberosum | 31,2 x 23,4 | Típico-Sedimento grasiento de fragmento cerámica. 02 almidones | G: 1 · · · · · · · |
| 0 | 5 | C-0170 | AE-124 | Lithic | Zea mays | 20,8 x 20,8 | Poliédricos los tres almidones aislados, con fisura en hilum | Circular stone disk |
| 0 | 5 | C-0170 | AE-124 | Lithic | Zea mays | 15,6 x 13 | Disco circular con evidencias de uso para procesar almidon | Circular stone disk |
| 0 | 5 | C-0170 | AE-124 | Lithic | Zea mays | 15,6 x 15,6 | de maíz | Circular stone disk |
| 0 | 5 | C-0170 | AE-124 | Lithic | Pooideae | 54,6 x 13 | Fitolito de gramínea silvestre | Circular stone disk |
| 4 | 6 | C-0639 | AE-1269 | Lithic | Zea mays | 18,2 x 15,6 | Poliédrico, aislado de punta proyecto posible contaminación | Hammerstone fragment |
| 2 | 2 | C-0057 | AE-01 | Lithic | Zea mays | 26 x 20,8 | Poliédrico fisura hilum | Mano |
| 2 | 2 | C-0057 | AE-01 | Lithic | Zea mays | 15,6 x 15,6 | Poliédrico-Lítico forma mortero sedimentos terrosos | Mano |
| 2 | 2 | C-0059 | AE-03 | Lithic | Zea mays | 15,6 x 13 | Poliédrico | Mano |
| 2 | 2 | C-0059 | AE-03 | Lithic | Zea mays | 20,8 x 18,2 | Poliédrico | Mano |
| 2 | 2 | C-0059 | AE-03 | Lithic | Zea mays | 18,2 x 18,2 | Esférico-Mano moler con evidencias molienda maiz (AE-03) | Mano |
| 2 | 2 | C-0059 | AE-06 | Lithic | Solanum tuberosum | 18,2 x 10,4 | Lítico ovoide con aristas, almidones de papa | small spherical mano |
| 2 | 2 | C-0059 | AE-06 | Lithic | Solanum tuberosum | 18,2 x 15,6 | en sedimentos por tanto fue usado en tuberculos (AE-06) | small spherical mano |
| 2 | 2 | C-0059 | AE-06 | Lithic | Solanum tuberosum | 39 x 23,4 | Grano de almidón típico | small spherical mano |
| 2 | 2 | C-0059 | AE-06 | Lithic | Pooideae | 65 x 15,6 | Fitolito de gramínea silvestre | small spherical mano |
| 4 | 5 | C-0152 | AE-101 | Lithic | Zea mays | 20,8 x 15,6 | Poliédrico-Lasca posiblemente contaminada con maíz | fragment of a bifacial tablet |
| 91 | 5 | C-0162 | AE-104 | Lithic | Zea mays | 18,2 x 13 | Poliédrico | Crude batán grindingstone |
| 91 | 5 | C-0162 | AE-104B | Lithic | Zea mays | 15,6 x 15,6 | Poliédrico-Fragmento de batán con depresión central | |
| 91 | 5 | C-0162 | AE-104B | Lithic | Zea mays | | del cual se aislaron los almidones (uso evidente) | |
| 4 | 5 | C-0167 | AE-115 | Lithic | Zea mays | 19,5 x 15,6 | Poliédrico s ambos | Obsidian flake |
| 4 | 5 | C-0167 | AE-115 | Lithic | Zea mays | 18,2 x 15,6 | Ambos aislados de fragmento obsidiana, posible contaminacion | Obsidian flake |
| 0 | 5 | C-0170 | AE-123 | Lithic | Zea mays | 18,2 x 15,6 | Poliédrico | Bifacial point |
| 0 | 5 | C-0170 | AE-123 | Lithic | Zea mays | 15,6 x 15,6 | Esférico bordes dañados | Bifacial point |
| 0 | 5 | C-0170 | AE-123 | Lithic | Zea mays | 14,3 x 13 | Poliédrico | Bifacial point |
| 0 | 5 | C-0170 | AE-123 | Lithic | Zea mays | 16,9 x 15,6 | Poliédrico-Punta proyectil posible despancador maiz | Bifacial point |
| 4 | 6 | C-0639 | AE-1270 | Lithic | Zea mays | 15,6 x 14,3 | Ambos poliédricos hilum perforados y fisuras, aislados de sedimentos de líticos | Oval mano |
| 4 | 6 | C-0639 | AE-1270 | Lithic | Zea mays | 18,2 x 16,9 | con sedimentos terrosos, la herramienta sin zona activa- (AE1270) | Oval mano |
| | | | | | | | | - |

| 4 | 6 | C-1013 | AE-1279 | Lithic | Solanum tuberosum | 15,6 x 13 | típico- aislados de lítico forma ovoide (mano moler) superficie muy porosa | Oval mano |
|---|---|--------|--------------|--------|-------------------|---------------------------------------|---|---|
| 4 | 6 | C-1013 | AE-1279 | Lithic | Solanum tuberosum | 23,4 x 20,8 | con sedimentos terrosos y posiblemente contaminaciones de almidones | Oval mano |
| 4 | 6 | C-1015 | AE-1283 | Lithic | Zea mays | 16,9 x 15,6 | Poliédrico | smoothing stone/hammerstone |
| 4 | 6 | C-1015 | AE-1283 | Lithic | Zea mays | 20,6 x 18,2 | Esférico-Ambos aislado de sedimentos de mano de moler en zona de impacto | smoothing stone/hammerstone |
| 4 | 5 | C-0167 | AE-129 | Lithic | Solanum tuberosum | 31,2 x 26 | Típico-Lasca pequeña, posiblemente contaminada con almidon | crude bifacial point |
| 3 | 1 | C-0791 | AE-1345 (M1) | Lithic | Zea mays | 16,9 x 16,9 | Esférico- M1 fragmento cuerpo desconocido. 02 almidones | |
| 3 | 1 | C-0793 | AE-1347 | Lithic | Zea mays | 7,8 x 5,2 | granos almidón agrupados, tamaños promedio | Quartz fragment with pressure-flaked margin |
| 3 | 1 | C-0793 | AE-1347 | Lithic | Zea mays | 13 x 13 | poliédrico | Quartz fragment with pressure-flaked margin |
| 3 | 1 | C-0793 | AE-1347 | Lithic | Zea mays | 18,2 x 18,2 | fitolito de semilla por chancado de lítico cuarzo | Quartz fragment with pressure-flaked margin |
| 3 | 1 | C-0787 | AE-1349 | Lithic | Zea mays | 20,8 x 18,2 | Poliédrico | Mano |
| 3 | 1 | C-0787 | AE-1349 | Lithic | Zea mays | 20,8 x 18,2 | Poliédrico- Ambos aislados de los sedimentos de mano de moler | Mano |
| 4 | 2 | C-0475 | AE-1591 | Lithic | Negativo | | Lítico en forma raspador con bordes escasos sedimentos, no almidones | Scraper |
| 4 | 2 | C-0480 | AE-1596 | Lithic | Negativo | | Mano grande con superficie lixiviada sin sedimentos | Large Mano |
| 4 | 2 | C-0480 | AE-1597 | Lithic | Zea mays | 18,2 x 15,6 | Dos esféricos y uno hemiesférico, aislados de lítico de forma trapezoidal con | flat stone likely used to prepare food |
| 4 | 2 | C-0480 | AE-1597 | Lithic | Zea mays | 15,6 x 13 | sedimentos de almidón esférico-(AE-1597) | flat stone likely used to prepare food |
| 4 | 2 | C-0480 | AE-1597 | Lithic | Zea mays | 20,8 x 18,2 | | flat stone likely used to prepare food |
| 1 | 2 | C-0068 | AE-16 | Lithic | Zea mays | 13 x 10,4 | agrupados en racimos | large grinding stone |
| 1 | 2 | C-0068 | AE-16 | Lithic | Zea mays | 20,8 x 20,8 | esférico | large grinding stone |
| 1 | 2 | C-0068 | AE-16 | Lithic | Zea mays | 18,2 x 18,2 | esférico-Lítico forma trapezoidal con lado convexo y otro plano del cual se aislaron | large grinding stone |
| 1 | 2 | C-0068 | AE-16 | Lithic | Zea mays | 13 x 10,4 | Almidones en grupos (racimos) la medida es un promedio | large flat lithic with a polygonal shape |
| 1 | 2 | C-0068 | AE-16 | Lithic | Zea mays | 20,8 x 20,8 | Almidón esférico | large flat lithic with a polygonal shape |
| 1 | 2 | C-0068 | AE-16 | Lithic | Zea mays | 18,2 x 18,2 | Almidón esférico, los tres aislados del artefacto lítico plano | large flat lithic with a polygonal shape |
| 4 | 7 | C-0341 | AE-1659 | Lithic | Zea mays | 15,6 x 13 | Políedricos los 4 almidones aislados de un lítico de forma elíptica | Small polishing/hammerstone |
| 4 | 7 | C-0341 | AE-1659 | Lithic | Zea mays | 15,6 x 14,3 | en forma de mano de moler con sedimentos amarillos en superficie | Small polishing/hammerstone |
| 4 | 7 | C-0341 | AE-1659 | Lithic | Zea mays | 23,4 x 18,2 | donde aislaron almidón de maíz | Small polishing/hammerstone |
| 4 | 7 | C-0341 | AE-1659 | Lithic | Zea mays | 13 x 10,4 | | Small polishing/hammerstone |
| 4 | 7 | C-0341 | AE-1660 | Lithic | Negativo | · · · · · · · · · · · · · · · · · · · | Lítico forma rectángular plano ambos lados, no presenta almidones | Black lithic fragment with a worked edge |
| 4 | 7 | C-0344 | AE-1667 | Lithic | Zea mays | 18,2 x 18,2 | Ambos poliédricos aislados de lítico superficie porosa forma irregular | crude hammerstone |
| 4 | 7 | C-0344 | AE-1667 | Lithic | Zea mays | 20,8 x 18,2 | posible fragmento de batán con superficie sedimentos terrosos | crude hammerstone |
| 4 | 7 | C-0346 | AE-1673 | Lithic | Zea mays | 13 x 13 | Ambos poliédricos aislados de lítico forma de lasca con borde afilado | large black flake |
| 4 | 7 | C-0346 | AE-1673 | Lithic | Zea mays | 18,2 x 18,2 | con sedimento amarillo con almidón de maíz | |
| 4 | 7 | C-0809 | AE-1698 | Lithic | Zea mays | 13 x 13 | Poliédrico hilum perforado | spherical mano |
| 4 | 7 | C-0809 | AE-1698 | Lithic | Zea mays | 19,5 x 15,6 | Poliédrico, ambos aislados de lítico en forma mano moler | spherical mano |
| 1 | 2 | C-0463 | AE-1726 | Lithic | Zea mays | 18,2 x 15,6 | Poliédrico | • |
| 1 | 2 | C-0463 | AE-1726 | Lithic | Zea mays | 10,4 x 10,4 | Esférico, aislado de lasca posiblemente utilizada para procesar maíz | |
| 2 | 2 | C-1165 | AE-1737 | Lithic | Solanum tuberosum | 28,6 x 20,8 | almidón grande | Mano |
| 2 | 2 | C-1165 | AE-1737 | Lithic | Solanum tuberosum | 28,6 x 20,8 | típico-ambos aislados de lítico eliptico superficie plana con sedimento crema | Mano |
| 2 | 2 | C-1169 | AE-1738 | Lithic | Solanum tuberosum | 23,4 x 15,6 | vista lateral-ambos aislados de lítico forma cilíndrica con sedimento terroso adherido | Mano |
| 2 | 2 | C-1169 | AE-1738 | Lithic | Solanum tuberosum | 26 x 15,6 | posible función de procesar los tubérculos | Mano |
| 1 | 2 | C-1174 | AE-1766 | Lithic | Zea mays | 18,2 x 15,6 | Poliédrico | Fragment of a well-polished stone |
| 1 | 2 | C-1174 | AE-1766 | Lithic | Zea mays | 23,4 x 20,8 | Poliédrico-Ambos aislados de lítico AE-1766 lítico triangular una cara pulida | Fragment of a well-polished stone |
| 1 | 2 | C-1174 | AE-1768 | Lithic | Solanum tuberosum | 28,6 x 20,8 | Almidones en grupos (medida del inferior) | Fragment of a well-polished stone |
| | | | | | | | | |

| 1 | 2 | C 1174 | AE 1760 | Titaliti. | 7 | 10.2 15.6 | n.1:71 | Programme of a conflict light of the conflic |
|---|---|--------|---------|-----------|--------------------|-------------|---|--|
| 1 | 2 | C-1174 | AE-1768 | Lithic | Zea mays | 18,2 x 15,6 | Poliédrico | Fragment of a well-polished stone |
| 1 | 2 | C-1174 | AE-1768 | Lithic | Zea mays | 15,6 x 15,6 | Esférico-Ambos aislados de lítico AE-1768 forma aplanada superficie irregular | Fragment of a well-polished stone |
| 1 | 2 | C-1191 | AE-1787 | Lithic | Zea mays | 20,8 x 20,8 | Esférico estrías hilum | Batán grindingstone fragment |
| 1 | 2 | C-1191 | AE-1787 | Lithic | Zea mays | 16,9 x 15,6 | Poliédrico-ambos aislados de fragmento de mortero (AE-1787) | Batán grindingstone fragment |
| 1 | 2 | C-1191 | AE-1790 | Lithic | Zea mays | 18,2 x 15,6 | Poliédrico-Aislado de pulidor o mano moler con posibilidad de contaminación (AE-1790) | fragment of a polishing/grindingstone |
| 2 | 1 | C-0771 | AE-1805 | Lithic | Pooideae | 33,8 x 10,4 | Fitolito aislado de lítico plano por ambos lados en forma de tableta | tablet with worked (beveled) edges |
| 2 | 1 | C-0785 | AE-1805 | Lithic | Zea mays | 20,8 x 15,6 | Poliédrico | fragment of a stone tripod vessel |
| 2 | 1 | C-0785 | AE-1805 | Lithic | Zea mays | 15,6 x 15,6 | Esférico | fragment of a stone tripod vessel |
| 2 | 1 | C-0785 | AE-1805 | Lithic | Zea mays | 18,2 x 18,2 | Poliédrico-Aislados de fragmento de mortero | fragment of a stone tripod vessel |
| 4 | 1 | C-0010 | AE-184 | Lithic | Zea mays | 23,9 x 20,8 | Poliédrico dañado | Projectile point (biface) |
| 4 | 1 | C-0010 | AE-184 | Lithic | Zea mays | 20,8 x 15,6 | Rectandular dañado-Posible despancador de maíz | Projectile point (biface) |
| 3 | 1 | C-0905 | AE-1841 | Lithic | Negativo | | Lasca con sedimentos terrosos color ceniza | |
| 2 | 1 | C-0921 | AE-1863 | Lithic | Zea mays | 23,4 x 23,4 | Poliédrico fisura en hilum | Hammerstone |
| 2 | 1 | C-0921 | AE-1863 | Lithic | Zea mays | 23,4 x 18,2 | Poliédrico fisura en Y, aislado de mano moler | Hammerstone |
| 4 | 7 | C-0810 | AE-1962 | Lithic | Negativo | | fragmento de cuarzo cristalino no presentaron almidones | Crystal flake |
| 4 | 7 | C-0822 | AE-2032 | Lithic | Zea mays | 20,8 x 15,6 | Poliédrico | Fragment of a spherical mano |
| 4 | 7 | C-0822 | AE-2032 | Lithic | Zea mays | 18,2 x 13 | Poliédrico | Fragment of a spherical mano |
| 4 | 7 | C-0822 | AE-2032 | Lithic | Zea mays | 20,8 x 16,9 | Poliédrico-Lítico forma ovoide, cara plana con ranuras sedimento amarillo almidones | Fragment of a spherical mano |
| 4 | 7 | C-0831 | AE-2096 | Lithic | Zea mays | 13 x 13 | Almidones poliédricos aisaldo de una mano de moler del área de impacto que tiene | Spherical mano |
| 4 | 7 | C-0831 | AE-2096 | Lithic | Zea mays | 16,9 x 15,6 | desgaste, un sedimento blanquecino, son almidones pequeños poliédricos | Spherical mano |
| 4 | 7 | C-0831 | AE-2096 | Lithic | Zea mays | 15,6 x 13 | cuyos tamaños son parecidos entre ellos y en los cuales no se detecta | Spherical mano |
| 4 | 7 | C-0831 | AE-2096 | Lithic | Zea mays | 13 x 13 | otros almidones similares, por lo tanto puede ser Lítico especial para moler este maiz | Spherical mano |
| 4 | 7 | C-0831 | AE-2096 | Lithic | Zea mays (moderno) | 15,6 x 13 | Almidones modernos de maíz morocho de Cusco | Spherical mano |
| 4 | 6 | C-0212 | AE-218 | Lithic | Dañado N/I | 23,4 x 20,8 | Almidon dañado no permite identificar proviene Lítico forma triangular | • |
| 4 | 6 | C-0221 | AE-222 | Lithic | Solanum tuberosum | 36,4 x 20,8 | dañado | Fragment of a batán grindingstone |
| 4 | 6 | C-0221 | AE-222 | Lithic | Solanum tuberosum | 26 x 15,6 | típicos ambos provienen de un fragmento de batán donde posiblemen- | Fragment of a batán grindingstone |
| 4 | 6 | C-0221 | AE-222 | Lithic | Solanum tuberosum | 46,8 x 28,6 | se te proceso papas y el maiz es contaminante | Fragment of a batán grindingstone |
| 4 | 6 | C-0221 | AE-222 | Lithic | Zea mays | 15,6 x 13 | almidón dañado | Fragment of a batán grindingstone |
| 4 | 7 | C-1306 | AE-2254 | Lithic | Negativo | -, | Lítico forma circular superficie porosa limpia de sedimentos (ver foto) | Spherical mano |
| 4 | 6 | C-0229 | AE-239 | Lithic | Solanum tuberosum | 39 x 28,6 | Almidón aislado de fragmento mano, posible contaminación | Mano fragment |
| 4 | 6 | C-0229 | AE-245 | Lithic | Negativo | | Lítico forma circular con horadación circular no presenta almidón | Porra (club) |
| 4 | 6 | C-0231 | AE-248 | Lithic | Cucurbita sp. | 78 x 65 | Fitolito de Cucurbita sp. en Lítico plano rectangular cortado diagonal | Fragment of a bifacial point |
| 2 | 2 | C-1655 | AE-2708 | Lithic | Zea mays | 18,2 x 18,2 | Almidones poliédricos con hilum con fisuras profundas, aislados de mano de moler | small spherical mano |
| 2 | 2 | C-1655 | AE-2708 | Lithic | Zea mays | | | small spherical mano |
| 1 | 2 | C-1667 | AE-2714 | Lithic | Negativo | | Lítico en forma de hacha no presenta almidones en sus sedimentos | Axe |
| 3 | 2 | C-0097 | AE-40 | Lithic | Zea mays | 18,2 x 13 | Poliédrico-Cuarzo forma punta, contaminado con maíz | crystal point; partially cleaned |
| 4 | 1 | C-0044 | AE-415 | Lithic | Zea mays | 16,9 x 14,3 | Poliédrico | Tablet with filed edges |
| 4 | 1 | C-0044 | AE-415 | Lithic | Solanum tuberosum | 41,6 x 28,6 | Grupo dentro parenquima reserva-Lítico aplanado, del borde | Tablet with filed edges |
| 4 | 1 | C-0044 | AE-415 | Lithic | Solanum tuberosum | , ,,,, | se aislo grupo almidones papa | Tablet with filed edges |
| 3 | 2 | C-0090 | AE-43 | Lithic | Zea mays | 15,6 x 13 | Poliédrico-Lítico pequeño rectangular, contaminado con maíz | small polishing/hammerstone |
| 3 | 1 | C-0581 | AE-482 | Lithic | Zea mays | 13 x 13 | Poliédrico | Biface projectile point fragment |
| 3 | 1 | C-0581 | AE-482 | Lithic | Solanum tuberosum | 23,4 x 20,8 | Grano almidón dañado, aislados de punta de proyectil, contaminación | Biface projectile point fragment |
| 2 | 1 | C-0586 | AE-483 | Lithic | Zea mays | 18,2 x 18,2 | Poliédrico, aislado de Lítico hemiesférico lado plano, sedimento terroso | Mano fragment (tip) |
| 2 | 1 | C-0586 | AE-483 | Lithic | Zea mays | | contaminado y almidones dañados | Mano fragment (tip) |
| - | | | | | | | i | 18 1 1 (11) |

| 2 1 C-0657 AE-500 Lithic Dañado N/I 20,8 x 18,2 Almidones dañados no identificables aislados del sedimento de un lítico en forma 2 1 C-0657 AE-500 Lithic Dañado N/I 20,8 x 18,2 de mano de moler 4 6 C-0237 AE-504 y AE-2279 Lithic Negativo Fragmento cuarzo cristalino sin sedimentos, solo tierra (AE-504) 4 7 C-0303 AE-504 y AE-2279 Lithic Negativo Fragmento mano de moler superficie lixiviada, sin sedimentos 4 7 C-0307 AE-514 Lithic Zea mays 15,6 x 15,6 Esférico 4 7 C-0307 AE-514 Lithic Zea mays 13 x 10,4 Poliédrico 4 7 C-0307 AE-514 Lithic Solanum tuberosum 57,2 x 41,6 Típico. Punta tallada, almidón de maíz y posible contaminación con papa 4 6 C-0237 AE-586 Lithic Solanum tuberosum 33,8 x 20,8 a islaron los almidones 4 6 C-0617 AE-604 Lithic Zea mays 18,2 x 18,2 Grupos, esquina izq. poliédrico 4 6 C-0617 AE-604 Lithic Zea mays 18,2 x 18,2 grupos poliédricos | Spherical hammerstone Spherical hammerstone Quartz bifacial point and spherical mano frag. Quartz bifacial point and spherical mano frag. bifacial point bifacial point bifacial point bifacial point Circular stone disk Circular stone disk Spherical hammerstone Spherical hammerstone Spherical hammerstone |
|--|---|
| 4 6 C-0237 AE-504 y AE-2279 Lithic Negativo Fragmento cuarzo cristalino sin sedimentos, solo tierra (AE-504) 4 7 C-0303 AE-504 y AE-2279 Lithic Negativo Fragmento mano de moler superficie lixiviada, sin sedimentos 4 7 C-0307 AE-514 Lithic Zea mays 15,6 x 15,6 Esférico 4 7 C-0307 AE-514 Lithic Zea mays 13 x 10,4 Poliédrico 4 7 C-0307 AE-514 Lithic Zea mays 13 x 10,4 Poliédrico 4 7 C-0307 AE-514 Lithic Solanum tuberosum 57,2 x 41,6 Típico. Punta tallada, almidón de maíz y posible contaminación con papa 4 6 C-0237 AE-586 Lithic Solanum tuberosum 33,8 x 20,8 aislaron los almidones 4 6 C-0617 AE-604 Lithic Zea mays 18,2 x 18,2 Grupos, esquina izq. poliédrico | Quartz bifacial point and spherical mano frag. Quartz bifacial point and spherical mano frag. bifacial point bifacial point bifacial point bifacial point Circular stone disk Circular stone disk Spherical hammerstone Spherical hammerstone Spherical hammerstone |
| 4 7 C-0303 AE-504 y AE-2279 Lithic Negativo Fragmento mano de moler superficie lixiviada, sin sedimentos 4 7 C-0307 AE-514 Lithic Zea mays 15,6 x 15,6 Esférico 4 7 C-0307 AE-514 Lithic Zea mays 13 x 10,4 Poliédrico 4 7 C-0307 AE-514 Lithic Solanum tuberosum 57,2 x 41,6 Típico. Punta tallada, almidón de maíz y posible contaminación con papa 4 6 C-0237 AE-586 Lithic Solanum tuberosum 20,3 x 18,2 Típicos ambos provienen de un Lítico dorma disco plano del cual se 4 6 C-0237 AE-586 Lithic Solanum tuberosum 33,8 x 20,8 aislaron los almidones 4 6 C-0617 AE-604 Lithic Zea mays 23,4 x 18,2 Poliédrico 4 6 C-0617 AE-604 Lithic Zea mays 18,2 x 18,2 Grupos, esquina izq. poliédrico | frag. Quartz bifacial point and spherical mano frag. bifacial point bifacial point bifacial point bifacial point Circular stone disk Circular stone disk Spherical hammerstone Spherical hammerstone Spherical hammerstone |
| 4 7 C-0307 AE-514 Lithic Cf. Ipomoea batatas 13 x 13 posible almidon de camote 4 7 C-0307 AE-514 Lithic Zea mays 15,6 x 15,6 Esférico 4 7 C-0307 AE-514 Lithic Zea mays 13 x 10,4 Poliédrico 4 7 C-0307 AE-514 Lithic Solanum tuberosum 57,2 x 41,6 Típico. Punta tallada, almidón de maíz y posible contaminación con papa 4 6 C-0237 AE-586 Lithic Solanum tuberosum 20,3 x 18,2 Típicos ambos provienen de un Lítico dorma disco plano del cual se 4 6 C-0237 AE-586 Lithic Solanum tuberosum 33,8 x 20,8 aislaron los almidones 4 6 C-0617 AE-604 Lithic Zea mays 23,4 x 18,2 Poliédrico 4 6 C-0617 AE-604 Lithic Zea mays 18,2 x 18,2 Grupos, esquina izq. poliédrico | frag. bifacial point bifacial point bifacial point bifacial point Circular stone disk Circular stone disk Spherical hammerstone Spherical hammerstone Spherical hammerstone |
| 4 7 C-0307 AE-514 Lithic Zea mays 15,6 x 15,6 Esférico 4 7 C-0307 AE-514 Lithic Zea mays 13 x 10,4 Poliédrico 4 7 C-0307 AE-514 Lithic Solanum tuberosum 57,2 x 41,6 Típico. Punta tallada, almidón de maíz y posible contaminación con papa 4 6 C-0237 AE-586 Lithic Solanum tuberosum 20,3 x 18,2 Típicos ambos provienen de un Lítico dorma disco plano del cual se 4 6 C-0237 AE-586 Lithic Solanum tuberosum 33,8 x 20,8 aislaron los almidones 4 6 C-0617 AE-604 Lithic Zea mays 23,4 x 18,2 Poliédrico 4 6 C-0617 AE-604 Lithic Zea mays 18,2 x 18,2 Grupos, esquina izq. poliédrico | bifacial point bifacial point bifacial point Circular stone disk Circular stone disk Spherical hammerstone Spherical hammerstone Spherical hammerstone |
| 4 7 C-0307 AE-514 Lithic Zea mays 13 x 10,4 Poliédrico 4 7 C-0307 AE-514 Lithic Solanum tuberosum 57,2 x 41,6 Típico. Punta tallada, almidón de maíz y posible contaminación con papa 4 6 C-0237 AE-586 Lithic Solanum tuberosum 20,3 x 18,2 Típicos ambos provienen de un Lítico dorma disco plano del cual se 4 6 C-0237 AE-586 Lithic Solanum tuberosum 33,8 x 20,8 aislaron los almidones 4 6 C-0617 AE-604 Lithic Zea mays 23,4 x 18,2 Poliédrico 4 6 C-0617 AE-604 Lithic Zea mays 18,2 x 18,2 Grupos, esquina izq. poliédrico | bifacial point bifacial point Circular stone disk Circular stone disk Spherical hammerstone Spherical hammerstone Spherical hammerstone |
| 4 7 C-0307 AE-514 Lithic Solanum tuberosum 57,2 x 41,6 Típico. Punta tallada, almidón de maíz y posible contaminación con papa 4 6 C-0237 AE-586 Lithic Solanum tuberosum 20,3 x 18,2 Típicos ambos provienen de un Lítico dorma disco plano del cual se 4 6 C-0237 AE-586 Lithic Solanum tuberosum 33,8 x 20,8 aislaron los almidones 4 6 C-0617 AE-604 Lithic Zea mays 23,4 x 18,2 Poliédrico 4 6 C-0617 AE-604 Lithic Zea mays 18,2 x 18,2 Grupos, esquina izq. poliédrico | bifacial point Circular stone disk Circular stone disk Spherical hammerstone Spherical hammerstone Spherical hammerstone |
| 4 7 C-0307 AE-514 Lithic Solanum tuberosum 57,2 x 41,6 papa 4 6 C-0237 AE-586 Lithic Solanum tuberosum 20,3 x 18,2 Típicos ambos provienen de un Lítico dorma disco plano del cual se 4 6 C-0237 AE-586 Lithic Solanum tuberosum 33,8 x 20,8 aislaron los almidones 4 6 C-0617 AE-604 Lithic Zea mays 23,4 x 18,2 Poliédrico 4 6 C-0617 AE-604 Lithic Zea mays 18,2 x 18,2 Grupos, esquina izq. poliédrico | Circular stone disk Circular stone disk Spherical hammerstone Spherical hammerstone Spherical hammerstone |
| 4 6 C-0237 AE-586 Lithic Solanum tuberosum 33,8 x 20,8 aislaron los almidones 4 6 C-0617 AE-604 Lithic Zea mays 23,4 x 18,2 Poliédrico 4 6 C-0617 AE-604 Lithic Zea mays 18,2 x 18,2 Grupos, esquina izq. poliédrico | Circular stone disk Spherical hammerstone Spherical hammerstone Spherical hammerstone |
| 4 6 C-0617 AE-604 Lithic Zea mays 23,4 x 18,2 Poliédrico 4 6 C-0617 AE-604 Lithic Zea mays 18,2 x 18,2 Grupos, esquina izq. poliédrico | Spherical hammerstone Spherical hammerstone |
| 4 6 C-0617 AE-604 Lithic Zea mays 18,2 x 18,2 Grupos, esquina izq. poliédrico | Spherical hammerstone Spherical hammerstone |
| | Spherical hammerstone |
| 4 6 C-0617 AE-604 Lithic Zea mays 18,2 x 18,2 grupos poliédricos | <u> </u> |
| | 3 Spherical hammerstone |
| 4 6 C-0617 AE-604 Lithic Zea mays 15,6 x 13 Poliédrico, aislados de lítico grande forma circular mano moler, con alta | - phoneural number scone |
| 4 6 C-0617 AE-604 Lithic Zea mays presencia granos de almidón de maíz, aislados y en grupos, evidente herramienta | Spherical hammerstone |
| 3 1 C-0667 AE-715 Lithic Zea mays 15,6 x 13 Poliédrico | Mano |
| 3 1 C-0667 AE-715 Lithic Zea mays 20,8 x 20,8 (paralelepipedo) Esférico, aislados de sedimentos de lítico forma rectangular (paralelepipedo) | Mano |
| 3 1 C-0667 AE-715 Lithic Pooideae 52 x 13 Fitolitos de garmínea silvestre | Mano |
| 3 1 C-0682 AE-740 Lithic Zea mays 20,8 x 15,6 Ambos poliédricos aíslados de sedimentos de lítico aplanado con sedimentos | Fragment of a tablet with rounded corners |
| 3 1 C-0682 AE-740 Lithic Zea mays 15,6 x 15,6 grasientos y bien adheridos a superficie del lítico | Fragment of a tablet with rounded corners |
| 3 1 C-0682 AE-740 Lithic Pooideae 13 x 9,1 fitolitos empaquetados en tejido foliar de gramínea | Fragment of a tablet with rounded corners |
| 4 6 C-0628 AE-760 Lithic Negativo Lítico plano forma cuadrangular, sedimento terroso en zona aguda sin almidones | Fragment of a bifacial point |
| 3 1 C-0680 AE-850 Lithic Zea mays 20,8 x 19,5 Ambos poliédricos aislados de sedimentos de lítico cilíndrico con evidencia de uso | Mano |
| 3 1 C-0680 AE-850 Lithic Zea mays 23,4 x 20,8 procesamiento maíz (AE-850) | Mano |
| 3 1 C-0680 AE-884 Lithic Chenopodium quinoa 6,5 x 5,2 Grupos de almidones | tablet |
| 3 1 C-0680 AE-884 Lithic Solanum tuberosum 23,6 x 20,8 agrupados dentro parénquima reserva en lítico rectangular aplanado ambos lados | tablet |
| 4 7 C-1307 B0-248/250/253 Lithic Zea mays 18,2 x 15,6 Poliédricos, ambos aislados de lítico forma hexagonal bordes activos afilados en los | |
| 4 7 C-1307 BO-248/250/253 Lithic Zea mays 20,8 x 18,2 cuales sedimentos terrosos color naranja conteniendo almidones | |
| 4 22 C-1630 LI-110 Lithic Zea mays 18,2 x 18,2 Almidón esférico, único aislado de bifacial con sedimentos terrosos, podria ser contaminante | Fragment of a large bifacial tool |
| 4 22 C-1621 LI-115 Lithic Negativo Lítico en forma de bifacial no presentaba sedimentos con almidones | fragment of a black bifacial tool |
| 2 2 C-1156 LI-124 (AA29) Lithic <i>Zea mays</i> 13 x 10.4 grano almidón esférico | |
| 93 22 C-1610 LI-157 Lithic Zea mays 20,8 x 18,2 Poliédricos, ambos aislados de lítico bifacial con sedimentos adheridos en superficie | Fragment of a large bifacial tool |
| 93 22 C-1610 LI-157 Lithic Zea mays 15,6 x 13 con almidones típicos de maíz | Fragment of a large bifacial tool |
| 6 22 C-1618 LI-164 Lithic Zea mays 15,6 x 15,6 Los tres almidones poliédricos, aislados de lítico cuadrangular con superficie irregu- | fragment of a large mano |
| 6 22 C-1618 LI-164 Lithic Zea mays 23,4 x 20,8 lar porosa, sedimentos blanquecinos con almidones poliédricos de maíz evidencia | ragment of a large mano |

| 6 | 22 | C-1618 | LI-164 | Lithic | Zea mays | 20,8 x 18,2 | de contacto con las semillas machacadas | fragment of a large mano |
|----|----|------------------|------------------|---------|--------------------|-------------|---|----------------------------|
| 4 | 22 | C-1618 | LI-164 LI-168 | Lithic | Zea mays | 13 x 13 | almidón hemiesférico | bifacial fragment |
| 4 | 22 | C-1628 | LI-168 | | | | | |
| 4 | 22 | C-1628 | LI-108 | Lithic | Zea mays | 18,2 x 15,6 | almidón poliédrico | bifacial fragment |
| 4 | 22 | C-1628 | LI-168 | Lithic | Zea mays | 15,6 x 9,1 | fitolito de maíz-almidones y fitolito aislados de lasca bifacial, del filo aislaron almidón | bifacial fragment |
| 4 | 22 | C-1628 | LI-168 | Lithic | Solanum tuberosum | 31,2 x 18,2 | almidones agrupados gelatinizados, tamaño promedio | bifacial fragment |
| 1 | 2 | C-0063 | LI-188 | Lithic | Solanum tuberosum | 26 x 15,6 | vista lateral, lasca borde interno con sedimento, grupos de | biface |
| 1 | 2 | C-0063 | LI-188 | Lithic | Solanum tuberosum | | almidón con parénquima reserva | biface |
| 4 | 4 | C-0359 | LI-251 | Lithic | Zea mays | 15,6 x 15,6 | Poliédrico (derecha en foto) | bridee |
| 4 | 4 | C-0359 | LI-251 | Lithic | Zea mays | 18,2 x 15,6 | Poliédrico (izquierda en foto) | |
| 4 | 4 | C-0359 | LI-251 | Lithic | Zea mays | 18,2 x 18,2 | Poliédrico (centro en foto) | |
| 4 | 4 | C-0359 | LI-251 | Lithic | Zea mays | 18,2 X 18,2 | | |
| 4 | 4 | C-0359 | LI-251 | Lithic | Zea mays | 18,2 x 15,6 | Poliédrico, aislados de lasca lado aplanado sedimento con almidon en grupos | |
| 4 | 4 | C-0359 | LI-261 | Lithic | Zea mays | 18,2 x 13 | forma irregular | |
| 4 | 4 | C-0359 | LI-261 | Lithic | Zea mays | 18,2 x 15,6 | Poliédrico, provienen de lítico triangular con sedimento terroso | |
| 4 | 4 | C-0370 | LI-278 | Lithic | Solanum tuberosum | 20,8 x 20,8 | Ovoide, aislado de lítico forma lasca con tres aristas, sedimentos terrosos | |
| 4 | 4 | C-0370 | LI-278 | Lithic | Solanum tuberosum | | posiblemente contaminante | |
| -1 | 4 | G-03/0 | L1-4/0 | LIUIIC | Solatium tuberosum | | Ambos poliédricos, aislados de lítico ovoide forma pequeña mano de | |
| 4 | 4 | C-0370 | LI-280 | Lithic | Zea mays | 23,4 x 20,8 | moler | |
| 4 | 4 | C-0370 | LI-280 | Lithic | Zea mays | 20,8 x 18,2 | en sedimentos almidones de maíz, con posible funcion | |
| 4 | 4 | C-0370 | LI-200 | LIUIIC | Zea iliays | 20,0 X 10,2 | procesosamiento | |
| | | 0.0066 | 11.000 | T 1.1 1 | | 160 160 | Esférico ambos almidones, aislados de lítico pequeño en forma de | |
| 4 | 4 | C-0366 | LI-308 | Lithic | Zea mays | 16,9 x 16,9 | punta de | |
| 4 | 4 | C-0366 | LI-308 | Lithic | Zea mays | 15,6 x 15,6 | proyectil, en el lado mas plano sedimentos de donde provienen | |
| 2 | 1 | C-0758 | LI-331 | Lithic | Zea mays | 26,8 x 20,8 | Esférico hilum perforado | unifacial tool |
| 2 | 1 | C-0758 | LI-331 | Lithic | Zea mays | 23,4 x 20,8 | Poliédrico hilum estrías | unifacial tool |
| | | | | | | | Poliédrico- Almidones aislado de lasca con posible función para | |
| 2 | 1 | C-0758 | LI-331 | Lithic | Zea mays | 15,6 x 13 | procesar maíz | unifacial tool |
| 2 | 1 | C-0758 | LI-331 | Lithic | Zea mays | 23,4 x 13 | e incluso contacto posible con pericarpio semillas por presencia fitolito | unifacial tool |
| 4 | 13 | C-0953 | LI-519 y LI-526 | Lithic | Negativo | | Líticos pequeños indefinidos impregnados con tierra y sin almidones | polishing stone with flake |
| 4 | 13 | C-0960 | LI-522 | Lithic | Solanum tuberosum | 18,2 x 15,6 | Lítico forma triangular sedimentos terrosos se aislo un solo almidón=contaminación? | bifacial tool |
| 4 | 13 | C-0964 | LI-542 | Lithic | Negativo | | Ambos líticos no tienen almidones en sedimentos, no tienen forma definida | |
| 4 | 13 | C-0960 | LI-556 | Lithic | Negativo | | | |
| 4 | 13 | C-0970 | LI-560 | Lithic | Almidón N/I | | Almidones muy dañados aislado de lítico pequeño cuadrado y plano | |
| 4 | 13 | C-0963 | LI-561 | Lithic | Solanum tuberosum | 31,2 x 26 | almidón dañado | bifacial tool |
| 4 | 13 | C-0963 | LI-561 | Lithic | Solanum tuberosum | 23,4 x 20,8 | almidón dañado-lítico forma irregular bordes afilados sedimentos | bifacial tool |
| | | 0.0604 | | T 1/1 1 | N .: | | terrosos | |
| 2 | 1 | C-0691 | LI-77 | Lithic | Negativo | | Ausencia de almidones en sedimentos de lascas pequeñas | unifacial tool |
| 2 | 1 | C-0754 | LI-78 | Lithic | Negativo | | Lasca pequeña liegramente curvada, sedimentos color marrónen zona afilada sin | |
| 2 | 1 | C-0754 | LI-78 | Lithic | Negativo | | almidones-(LI-78) | |
| 2 | 1 | C-0754 | LI-79 | Lithic | Solanum tuberosum | 15,6 x 14,3 | Almidones aislados de un lítico biface que posiblemente haya tenido | biface from floor |
| 2 | 1 | C-0754 | LI-79 | Lithic | Solanum tuberosum | 46,8 x 31,2 | contacto por uso con papas | biface from floor |
| 2 | 1 | C-0754 C-0691 | FL-56 | Soil | Bambusoideae | 28,6 x 15,6 | fitolito en forma de mancuerna (dumb-bell) | briace ironi noor |
| | | C-0691 | | | | | | |
| 2 | 1 | | FL-56 | Soil | Bambusoideae | 20,8 x 13 | fitolito regular del complejo dumb-bell | |
| 2 | 1 | C-0691 | FL-56 | Soil | Pooideae | 70,2 x 13 | fitolito elongado, ambos bordes sinuosos | |
| 2 | 1 | C-0691 | FL-56 | Soil | Zea mays | 20,8 x 20,8 | almidón esférico | |
| 3 | 1 | C-0589 | PO-100 | Soil | Zea mays | 13 x 13 | almidón forma esférica | |
| 3 | 1 | C-0589 | PO-100 | Soil | Zea mays | 18,2 x 15,6 | fitolito de maíz, por la forma en cruz procede de la hoja | |

| 3 | 1 | C-0589 | PO-100 | Soil | Pooideae | 70,2 x 18,2 | fitolito elongado, ambos bordes sinuosos |
|----|---|--------|---------------|------|-------------------|------------------|--|
| 2 | 2 | C-0060 | PO-104 (AA18) | Soil | Zea mays | 19.5 x 18.2 | grano almidón poliédrico |
| 2 | 2 | C-0060 | PO-104 (AA18) | Soil | Zea mays | 26 x 23.4 | fitolito de coronta maíz |
| 2 | 2 | C-0060 | PO-104 (AA18) | Soil | Pooideae | 59.8 x 13 | fitolito de graminea silvestre |
| 2 | 2 | C-0062 | PO-105 | Soil | Pooideae | 65 x 13 | fitolito elongado, ambos lados espinoso |
| 2 | 2 | C-0062 | PO-105 | Soil | Pooideae | no medibles | fitolitos elongados sinuosos ambos lados dentro de tejido foliar |
| 2 | 2 | C-0062 | PO-105 | Soil | Pooideae | | fitolitos elongados espinosos ambos lados dentro de tejido foliar |
| 2 | 2 | C-0062 | PO-105 | Soil | Zea mays | 15,6 x 15,6 | almidón esférico |
| 3 | 1 | C-0923 | PO-112 | Soil | Mineral N/I | no medible | tejido con inclusiones minerales |
| 3 | 1 | C-0923 | PO-112 | Soil | Zea mays | 18,2 x 15,6 | fitolito de maíz, por la forma en cruz procede de la hoja |
| 3 | 1 | C-0923 | PO-112 | Soil | Pooideae | 78 x 7,8 | fitolito elongado, ambos bordes sinuosos |
| 2 | 1 | C-0914 | PO-115 | Soil | Pooideae | 72,8 x 20,8 | fitolito elongado, ambos bordes sinuosos |
| 2 | 1 | C-0914 | PO-115 | Soil | Dicotiledoneae | 137,8 x 7,8 | fitolito elongado con bordes espinosos espaciados, tipo esclereida |
| 2 | 1 | C-0914 | PO-115 | Soil | Fitolito N/I | 78 x 13 | fitolito elongado de forma conica y placas perforadas |
| 3 | 1 | C-0915 | PO-131 | Soil | Pooideae | 91 x 13 | fitolito elongado, un borde crenado y el otro liso |
| 3 | 1 | C-0915 | PO-131 | Soil | Pooideae | 18,2 x 15,6 | fitolito elongado, con ambos bordes sinuosos |
| 3 | 1 | C-0915 | PO-131 | Soil | Fitolito N/I | no medibles | fitolitos elongados con bordes aserrados, dentro de tejido |
| 2 | 1 | C-0938 | PO-143 | Soil | Pooideae | 70,2 x 7,8 | fitolito elongado, ambos bordes sinuosos |
| 2 | 1 | C-0938 | PO-143 | Soil | Pooideae | 46,8 x 13 | fitolito elongado, ambos bordes sinuosos |
| 2 | 1 | C-0938 | PO-143 | Soil | Solanum tuberosum | 28,6 x 20,8 | almidón de forma elíptica |
| 2 | 1 | C-0938 | PO-143 | Soil | Zea mays | 18,2 x 15,6 | almidón forma poliédrica |
| 2 | 1 | C-0945 | PO-144 | Soil | Zea mays | 14,3 x 14,3 | almidón forma esférica |
| 2 | 1 | C-0945 | PO-144 | Soil | Pooideae | 39 x 13 | fitolito elongado con ambos bordes sinuosos |
| 2 | 1 | C-0945 | PO-144 | Soil | Panicoideae | 15,6 x 13 | fitolito tipo dumb bell, corto |
| 2 | 1 | C-0945 | PO-144 | Soil | Zea mays | 18,2 x 13 | fitolitos de maíz dentro de tejido foliar posiblemente |
| 3 | 1 | C-0941 | PO-148 | Soil | Pooideae | 26 x 7,8 | fitolitos elongados, bordes sinuosos, dentro de tejido |
| 3 | 1 | C-0941 | PO-148 | Soil | Zea mays | 20,8 x 15,6 | fitolito de maíz, por la forma en cruz procede de la hoja |
| 3 | 1 | C-0941 | PO-148 | Soil | Zea mays | 18,2 x 18,2 | almidón de forma esférica |
| 2 | 1 | C-0944 | PO-149 | Soil | Panicoideae | 52 x 13 | fitolito halteriforme complejo e irregular |
| 2 | 1 | C-0944 | PO-149 | Soil | Pooideae | 46,8 x 7,8 | fitolito rectangular con un borde crenado y el otro liso |
| 2 | 1 | C-0944 | PO-149 | Soil | Pooideae | 62,4 x 15,6 | fitolito rectangular con ambos bordes crenados |
| 2 | 1 | C-0944 | PO-149 | Soil | Pooideae | 91 x 7,8 | fitolito elongado con espinas |
| 2 | 1 | C-0944 | PO-149 | Soil | Zea mays | 18,2 x 15,6 | almidón esferoide |
| 2 | 1 | C-0944 | PO-149 | Soil | Zea mays | 13 x 13 | almidón esférico |
| 2 | 1 | C-0944 | PO-149 | Soil | Zea mays | 18,2 x 18,2 | almidón esférico con fisuras en hilum (milling?) |
| 2 | 1 | C-0944 | PO-149 | Soil | Zea mays | 18,2 x 18,2 | almidón poliédrico |
| 91 | 2 | C-0491 | PO-16 | Soil | Pooideae | 93,6 x 15,6 | fitolito elongado, ambos bordes crenados |
| 91 | 2 | C-0491 | PO-16 | Soil | Zea mays | 15,6 x 15,6 | fitolito de maíz, por la forma en cruz procede de la hoja |
| 4 | 6 | C-0211 | PO-199 | Soil | Bambusoideae | 15,6 x 10,4 | fitolito tipo dumb bell, corto |
| 4 | 6 | C-0211 | PO-199 | Soil | Bambusoideae | 15,6 x 7,8 | fitolito tipo dumb bell, corto |
| 4 | 6 | C-0211 | PO-199 | Soil | Zea mays | 15,6 x 15,16 | almidón esférico |
| 4 | 6 | C-0211 | PO-199 | Soil | Zea mays | 13 x 13 | almidón esférico |
| 4 | 2 | C-0479 | PO-21 | Soil | Pooideae | 44,2 x 7,8 | fitolito elongado bordes lisos |
| 4 | 2 | C-0479 | PO-21 | Soil | Zea mays | 20,8 x 18,2 | almidón poliédrico |
| 4 | 7 | C-0822 | PO-227 | Soil | Zea mays | 18,2 x 18,2 | almidón forma esférica |
| 4 | 7 | C-0822 | PO-227 | Soil | Solanum tuberosum | 15,6 x 15,6 | aldimón forma ovoide |
| 4 | 7 | C-0802 | PO-229 | Soil | Negativo | | Negativo para fitolitos y almidones |
| 4 | 7 | C-0802 | PO-229 | Soil | Roedor | 20,8 diám. fibra | fibra de roedor silvestre |
| 4 | 7 | C-1314 | PO-259 | Soil | Pooideae | 52 x 13 | fitolito elongado, ambos bordes sinuosos |
| 4 | 7 | C-1314 | PO-259 | Soil | Solanum tuberosum | 33,8 x 23,4 | almidón deformado |
| 2 | 1 | C-0951 | PO-267 | Soil | Panicoideae | 18,2 x 13 | fitolito tipo dumb bell, corto |
| 2 | 1 | C-0951 | PO-267 | Soil | Panicoideae | 20,8 x 15,6 | fitolito tipo dumb bell, corto |
| 2 | 1 | C-0951 | PO-267 | Soil | Panicoideae | 28,6 x 13 | fitolito halteriforme complejo e irregular |

| 2 | 1 | C-0925 | PO-272 | Soil | Phaseolus vulgaris | 26 x 18,2 | almidón de frijol | |
|---|----|--------|--------|------|--------------------|--------------|--|--|
| 2 | 1 | C-0925 | PO-272 | Soil | Pooideae | 39 x 15,4 | fitolito elongado, ambos bordes sinuosos | |
| 4 | 7 | C-0812 | PO-283 | Soil | Pooideae | 15,6 x 10,4 | fitolitos elongados dentro de tejido foliar, se observa estomas | |
| 4 | 7 | C-0812 | PO-283 | Soil | Pooideae | 88,4 x 18,2 | fitolito elongado con ambos bordes sinuosos | |
| 4 | 7 | C-0812 | PO-283 | Soil | Zea mays | 15,6 x 15,6 | almidón forma poliédrica, hilum con estrias (milling?) | |
| 4 | 13 | C-0983 | PO-292 | Soil | Pooideae | 70,2 x 18,2 | fitolito elongado con ambos bordes sinuosos | |
| 4 | 13 | C-0976 | PO-293 | Soil | Bambusoideae | 23,4 x 10,4 | fitolito en forma de mancuerna (dumb-bell) | |
| 4 | 13 | C-0976 | PO-293 | Soil | Zea mays | 15,6 x 13 | almidón de forma poliédrica, hilum perforado (hidrólisis) | |
| 4 | 13 | C-0964 | PO-295 | Soil | Solanum tuberosum | 26 x 23,4 | almidones dentro tejido reserva, gelatinizados (hervidos) | |
| 4 | 13 | C-0964 | PO-295 | Soil | Pooideae | 41,6 x 13 | fitolito elongado, ambos bordes sinuosos | |
| 4 | 13 | C-0964 | PO-295 | Soil | Pooideae | 52 x 10,4 | fitolito elongado, ambos bordes sinuosos | |
| 4 | 16 | C-1252 | PO-298 | Soil | Zea mays | 23,4 x 20,8 | almidón dañado | |
| 4 | 16 | C-1252 | PO-298 | Soil | Zea mays | 13 x 13 | almidón forma esférica | |
| 4 | 16 | C-1252 | PO-298 | Soil | Pooideae | 41,6 x 7,8 | fitolito elongado, ambos bordes sinuosos | |
| 4 | 16 | C-1252 | PO-298 | Soil | Bambusoideae | 14,3 x 10,4 | fitolito tipo dumb bell, corto | |
| 2 | 1 | C-0565 | PO-40 | Soil | Pooideae | 109,2 x 13 | fitolito elongado ambos bordes crenados | |
| 2 | 1 | C-0565 | PO-40 | Soil | Pooideae | 111,8 x 20,8 | fitolito elongado, un borde espinoso y el otro sinuoso | |
| 2 | 1 | C-0660 | PO-41 | Soil | Zea mays | 15,6 x 13 | almidón poliédrico | |
| 2 | 1 | C-0660 | PO-41 | Soil | Solanum tuberosum | 18,2 x 13 | almidón forma elíptica aguda | |
| 2 | 1 | C-0660 | PO-41 | Soil | Pooideae | no medibles | fitolitos elongados ambos bordes espinosos, dentro tejido foliar | |
| 2 | 2 | C-1160 | PO-43 | Soil | Solanum tuberosum | 15,6 x 13 | almidón típico forma ovoide, hilum excéntrico con luz polarizada | |
| 2 | 2 | C-1160 | PO-43 | Soil | Pooideae | 59,8 x 15,6 | fitolito elongado con ambos bordes espinoso | |
| 2 | 2 | C-1160 | PO-43 | Soil | Pooideae | 65 x 10,4 | fitolito elongado ambos bordes sinuosos | |
| 3 | 1 | C-0680 | PO-67 | Soil | Panicoideae | 18,2 x 13 | fitolito tipo dumb bell, corto | |
| 3 | 1 | C-0680 | PO-67 | Soil | Zea mays | 15,6 x 13 | almidón poliédrico (vista superior) | |
| 3 | 1 | C-0680 | PO-67 | Soil | Zea mays | 15,6 x 13 | almidón poliédrico (vista inferior) | |
| 2 | 1 | C-0684 | PO-69 | Soil | Pooideae | 44,2 x 7,8 | fitolito elongado, ambos bordes sinuosos | |
| 2 | 1 | C-0684 | PO-69 | Soil | Pooideae | 44,2 x 13 | fitolito elongado, ambos bordes espinoso | |
| 2 | 1 | C-0684 | PO-69 | Soil | Panicoideae | 15,6 x 7,8 | fitolito tipo dumb bell, corto | |
| 3 | 1 | C-0046 | PO-83 | Soil | Zea mays | 20,8 x 15,6 | almidón poliédrico (vista izquierda) | |
| 3 | 1 | C-0046 | PO-83 | Soil | Zea mays | 15,6 x 15,6 | almidón poliédrico (vusta derecha) | |
| 3 | 1 | C-0046 | PO-83 | Soil | Panicoideae | 78 x 10,4 | fitolito halteriforme complejo e irregular | |
| 3 | 1 | C-0564 | PO-87 | Soil | Panicoideae | 44,2 x 10,4 | fitolito halteriforme complejo e irregular | |
| 3 | 1 | C-0564 | PO-87 | Soil | Pooideae | 104 x 10,4 | fitolito elongado, ambos lados sinuoso | |
| 3 | 1 | C-0564 | PO-87 | Soil | Zea mays | 20,8 x 18,2 | almidón poliédrico | |

Appendix G

Faunal Remains

Table G.1 Summary of faunal remains by period and category. Note that faunal remains from flotation were added to understand the diversity of taxa across the site.

| Values are NI | SP | | | | |
|-------------------------|---|-------------------|-------------|-------------|-------|
| Total No. of Samples | Period | NISP Domesticated | NISP Hunted | NISP Marine | TOTAL |
| 1 | 0 Initial Formative (Mito-Kotosh) | 0 | 0 | 0 | 0 |
| 188 | 1 Early-Middle Formative (Mito-Kotosh) | 134 | 125 | 15 | 274 |
| 280 | 2 Late Formative (Chavín) | 331 | 177 | 14 | 522 |
| 230 | 3 Final Formative (Huarás) | 319 | 41 | 3 | 363 |
| 828 | 4 Late Intermediate Period (Recuay) | 1502 | 103 | 1 | 1606 |
| 18 | 5 Middle Horizon (Wari-influence) | 84 | 52 | 0 | 136 |
| 43 | 6 Late Intermediate Period (Akillpo) | 135 | 5 | 0 | 140 |
| | Phases at Hualcayán (combined periods) | | | | |
| 395 | All Perolcoto Phases (Periods 0, 1 and 2) | 465 | 302 | 29 | 796 |
| 982 | All Cayan Phases (Periods 3 and 4) | 1821 | 144 | 4 | 1969 |
| | | | | | |
| | Mixed Contexts | | | | |
| 3 | 90 (Periods 1 and 2 mixed in mound fills) | 5 | 0 | 0 | 5 |
| 44 | 91 (Periods 2, 3, and 4 mixed in mound fills) | 30 | 3 | 0 | 33 |
| 174 | 92 (Periods 4 and 5 mixed in tombs) | 434 | 254 | 2 | 690 |
| 32 | 93 (Periods 4, 5, and 6 mixed in house/patio fills) | 103 | 1 | 0 | 104 |
| 1 | 99 (Unknown Period) | 0 | 1 | 0 | 1 |

| % Domesticated | % Hunted | % Marine |
|----------------|----------|----------|
| 100/ | 100/ | === |
| 49% | 46% | 5% |
| 63% | 34% | 3% |
| 88% | 11% | 1% |
| 94% | 6% | |
| 62% | 38% | |
| 96% | 4% | |
| | | |
| =00/ | 000/ | 40/ |
| 58% | 38% | 4% |
| 92% | 7% | |
| | | |
| | | |
| 100% | | |
| 91% | 9% | |
| 63% | 37% | |
| 99% | 1% | |
| | 100% | |

Table G.2 Summary of faunal remains by period and category. Analysis by Teresa Rosales Tham and Victor Vásquez Sánchez, Arqueobios Laboratory (Trujillo, Peru). (D=Domesticated, H=Hunted, H/N=Hunted or Naturally occurring (e.g., birds in tombs), N=Naturally occurring or intrusive, C=Contemporary or Colonial, UM=Unidentified Mammal, M=Marine, S=LandSnail).

| Values are NISP | | D | D | D | H F | Н | Н | Н | н н | N H/N | H/N | H/N F | I/N H | /N H/ | N H/N | H/N | H/N F | I/N H | N H/N | N/H/N | N | N I | N N | N | 1 | N N | I C | С | С | C | UN | / UN | M | М | M I | M N | <i>I</i> М | 1 M | M | М | M | M M | M | M | S | S | SS | SS | S | S | S | |
|---|-----------|----------|-----------------|----------|-------------------|----------------|-----------|---------------|----------------|--------------|----------------|----------------|---------------|------------------|--------------------|------------|---------------|---------|------------------|----------------|---------------|-------------|-------------|---------|---------------|---------------|---------------|-------------|--------------|---------------|--------------|--------------|------------------|---------------|------------|----------------|--------------------|-------------|-------------------------|-----------------|--------------------|---------------------------------|-------------------|-----------------|-------------|---------------------|-----------------|----------------|------------|------------------|-------------|-------|
| | Total No. | | Cavia porcellus | Lama sp. | Lagidium peruanum | Silvylagus sp. | Felis sp. | Carnívora n/i | Nothoprocta sp | Colaptes sp. | Cyanocorax sp. | cf. Fulica sp. | Buteo sp. | Cairina moschata | Zenaida auriculata | Thraupidae | Passeriforme | Ave n/I | Lonchophylla sp. | Quiróptero n/i | Bufo sp. | Anfibio n/i | Insecto N/I | Muridae | Bothic rothic | Rodentia | Gallus gallus | Bos tarurus | Capra hircus | Ovis aries | Artiodactyla | Mamífero n/i | Chione subrugosa | Semele Solida | Semele sp. | Argopecten sp. | Enoplochiton niger | Molusco n/i | Fusinus dupetitthouarsi | Thais chocolata | Molusco Marino n/i | Donax obesulus Protothaca thaca | Engraulis ringens | Sardinops sagax | Bulimulidae | Epiphragmophora sp. | Thaumasthus sp. | Systrophia sp. | alus maric | Drymaeus sp. | Bostryx sp. | Totai |
| Period 0 Initial Formative (Mito-Kotosh) | Samples | + | \rightarrow | _ | + | + | \vdash | - | + | + | \vdash | \rightarrow | + | + | + | Н | \rightarrow | + | + | + | \dashv | + | + | + | + | + | + | + | \vdash | + | 1 | + | - | \vdash | + | + | + | + | + | \vdash | \rightarrow | + | + | \vdash | \vdash | + | + | + | ₩ | + | - | 1 |
| 1 Early-Middle Formative (Mito-Kotosh) | 188 | \vdash | 5 | 129 | 13 | + | - | 4 1 | ns | + | + | \rightarrow | ٠, | 1 | 1 | | 1 | a | _ | 1 | \rightarrow | | 2 | 22 | _ | \rightarrow | + | + | \vdash | \rightarrow | | 110 | 1 | \vdash | 1 | 1 | 1 | 1 | 1 | \vdash | 1 | 1 | 5 | 3 | 49 | \rightarrow | 1 | 8 | + | + | - , | 534 |
| 2 Late Formative (Chavín) | 280 | | | | 54 1 | 1 0 | | 1 1 | | , | + | \rightarrow | \rightarrow | + | 3 | | 2 | 13 | _ | 7 | \rightarrow | | | 70 | | 1 | + | + | \vdash | \rightarrow | | 4 93 | | \vdash | | 1 | 1 | Η. | +- | \vdash | -+ | т. | 十 | | 153 | \rightarrow | 1 | 8 20 | 17 | | 14 1 | |
| 3 Final Formative (Huarás) | 230 | | 140 | | | 3 | | 1 1 | | | \Box | \rightarrow | 1 | 1 | Ť | | - | - | + | Ť | \rightarrow | -1 | _ | 74 | | 3 | 1 | | \vdash | \rightarrow | 11 | 1 53 | 1 | 1 | | ÷ | _ | 1 | | \vdash | \rightarrow | 1 | + | | 61 | | | 5 13 | | | 11 7 | |
| 4 Late Intermediate Period (Recuay) | 828 | | 397 1 | | | | | 1 6 | 34 | \top | \Box | 1 | 1 . | 1 | 2 | | 6 | 36 6 | 4 | | 1 | 2 3 | 35 3 | 145 | 1 | 3 | 1 | 1 | \Box | \neg | | 8 23 | | | \neg | \neg | \neg | Ť | † | \Box | \neg | Ť | + | | 35 | | | 1 15 | | | 2 3 | |
| 5 Middle Horizon (Wari-influence) | 18 | | | 2 | | 1.0 | m | Ť | | \top | \Box | | | | +- | | 20 | - | | | | 3 | - | 28 | | 6 | | 1 | \Box | \neg | - | 2 | | \Box | \neg | \neg | \neg | \top | † | \Box | \neg | \neg | + | | | \neg | | 1.0 | + | | | 195 |
| 6 Late Intermediate Period (Akillpo) | 43 | | 14 | | 2 | | | 1 | 3 | | \Box | _ | | \perp | | | | 1 | \perp | | \Box | 1 | | | \perp | 1 | 1 | | | _ | 14 | 21 | | | 4 | 1 | \perp | \perp | | | 4 | | 丰 | | | \dashv | | | \Box | 二 | | 176 |
| Phases at Hualcayán (combined periods) | | \vdash | + | _ | + | + | Н | + | + | + | Н | \dashv | + | + | + | \vdash | \dashv | + | + | + | \dashv | + | + | + | + | + | + | + | Н | + | + | + | \vdash | Н | + | + | + | + | \vdash | Н | + | + | + | \vdash | \vdash | + | + | + | \vdash | \vdash | - | |
| All Perolcoto Phases (Periods 0, 1 and 2) | 395 | | 80 : | 385 | 67 1 | 1 9 | \Box | 5 2 | 20 2 | | \Box | \neg | Τ. | 1 | 4 | | 3 | 22 | \top | 8 | \neg | | 7 | 92 | | 1 | \top | \top | \Box | \neg | 17 | 0 20: | 3 | \Box | 1 | 2 | 1 1 | 1 | 1 | \Box | 1 | 1 | 5 | 15 | 202 | \neg | 1 1 | 8 28 | 4 | 1 | 14 1 | 576 |
| All Cayan Phases (Periods 3 and 4) | 982 | | 537 1 | | | 16 | | 2 7 | | \top | | 1 | 1 2 | 2 | 2 | | 6 | 36 6 | 4 | | 1 | 2 3 | 35 3 | 152 | 5 | 6 | - | 1 | \Box | | | 9 28: | | 1 | \neg | | \top | 1 | | \Box | \neg | 1 | | | 96 | | | | | 1 1 | 13 4 | 624 |
| | | | | | | | | | Т | | | \neg | \neg | $\neg \vdash$ | Т | | | | Т | | | | | 1 | Т | | | Т | П | | | 1 | | П | \neg | | \top | | Т | П | | | \top | | | | | | \Box | | 7 | |
| Mixed Contexts | | | | | | \top | П | | 1 | \top | | \neg | \neg | | | | | | | | | | | | | | 1 | | | | T | 1 | | | \neg | | \top | | | | \neg | | \top | | | | | \top | \Box | \Box | 7 | |
| 90 (Periods 1 and 2 mixed in mound fills) | 3 | | 2 | 3 | | | \Box | | Т | | | \neg | \neg | \top | Т | | | | Т | | | | | 1 | Т | | Т | Т | | | 4 | 2 | | | \neg | | Т | Т | П | | | | T | | | | | | \Box | | 7 | 12 |
| 91 (Periods 2, 3, and 4 mixed in mound fills) | 44 | | 4 | 26 | 1 | | \Box | | 2 | | | \neg | \neg | \top | 1 | | | | Т | | | | | 2 | Т | | Т | 1 | | | | 18 | | | \neg | | Т | Т | П | | | | T | | 15 | | | | \Box | | 7 | 83 |
| 92 (Periods 4 and 5 mixed in tombs) | 174 | | 419 | 15 | ### 3 | 8 | 6 | 55 1 | 5 5 | 5 1 | 1 | | | 1 | 1 | 1 | 11 : | 27 | 12 | | | 5 | 1 | 168 | 3 10 | 30 | 8 | 3 | 1 | 5 1 | 3 21 | 1 19 | 7 | | | | | 1 | | 1 | | | 工 | | | 5 | 1 | | | | | 398 |
| 93 (Periods 4, 5, and 6 mixed in house/patio fills) | 32 | | 6 | 97 | 1 | | | | | | | | | | | | | 1 | | | | | | | | | | | | | 9 | 21 | | | | | | | | | | | | | | | | | \Box | | 1 | 135 |
| 99 (Unknown Period) | 1 | | | | | | | 1 | Т | | ΙП | T | | Т | T | | $\neg \top$ | | | | | $\neg \top$ | | Т | Т | | Т | T | | | | Т | | ΙТ | \top | | | T | T | | T | | T | | | | | | | | | 1 |

Table G.3 Summary of faunal remains by period and category. Analysis by Teresa Rosales Tham and Victor Vásquez Sánchez, Arqueobios Laboratory (Trujillo, Peru). Period designations described in Table G.1. (D=Domesticated, H=Hunted, H/N=Hunted or Naturally ocurring (e.g., birds in tombs), N=Naturally occurring or intrusive, C=Contemporary or Colonial, UM=Unidentified Mammal, M=Marine, S=LandSnail).

| Valu | es are NISP | | | D D | D | н | н н | Н | н | н | /N H/N | H/N | H/N H | /N H/N | H/N | H/N H | I/N H/I | H/N | H/N H | I/N H | /N N | N | N | N N | I N | N | М | M N | и м | М | UM L | JM I | M M | М | М | M | M M | M | M | M | M N | M M | 1 M | S | S | S S | S | S | SS | |
|--------|--------------|--------------------|----------------------|-------------------------------------|------------|-------------------|---------------------------|-----------|---------------|---------------|--------------|----------------|----------------|-----------|------------------|--------------------|---------------|----------|----------|------------------|----------|----------|----------------|---------------|---------------|----------|---------------|-----------------------------|------------|------------|--------------|---------------|---------------|----------------|----------------|-------------------|-----------------------------------|----------------|-----------------|--------------------|----------------|-------------------|-----------------|----------|----------|-----------------|----------------|--------------------|-----------------------------|---------|
| | | | | | | _ | | | | sn | | | | | | | | | | | | | | | | | | | | | | | | | | E . | | ırsi | | | | | | | .ds | | | - | | |
| Period | | | | Canis familiaris Cavia porcellus | Lama sp. | Lagidium peruanun | Agouti sp. Silvylagus sp. | Felis sp. | Carnívora n/i | | Colaptes sp. | Cyanocorax sp. | cf. Fulica sp. | Strigidae | Cairina moschata | Zenaida auriculata | Ihraupidae | Ave n/i | | Lonchophylla sp. | Bufo sp. | | Reptil n/i | Muridae | Rattus rattus | Rodentia | Gallus gallus | Bos tarurus Capra hircus | Ovis aries | Sus scrofa | Artiodactyla | Mamífero n/i | Semele Solida | Semele sp. | Argopecten sp. | chycardium procer | Enoplochiton niger Molusco n/i | | Thais chocolata | Molusco Marino n/i | Donax obesulus | Engraulis ringens | Sardinops sagax | | ophora | Thaumasthus sp. | Systrophia sp. | Scutalus mariopena | Drymaeus sp. Bostryx sp. | Total |
| Est. | Operation | Context | Sample/ Bag | | | -1 | | | | ŏ | | | | | | | | | | | | | | | | | | | | | | | | | | Ţ. | _ | ã | | - | | | | | ш | 0 | | σ | | |
| 4 | Op 1 | C-0001 | Os-20 | | | | | | \Box | \neg | \perp | П | | \perp | | | \perp | | | 7 | | | | \perp | | | 4 | | \perp | | 1 | 1 | | | \Box | | | \perp | \Box | 4 | \perp | \perp | | | 7 | | | | \blacksquare | 1 |
| 4 | Op 1 Op 1 | C-0001 C-0001 | Os-21 Os-24 | \vdash | 1 | \dashv | + | + | \vdash | \dashv | + | Н | \dashv | + | + | \dashv | + | + | \vdash | + | + | \vdash | + | + | + | Н | \dashv | + | + | + | \vdash | 1 | + | + | \dashv | \dashv | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | + | 1 1 |
| 4 | Op 2 | C-0001 C-0002 | AE-1795 AE-188 | | 1 | \neg | \perp | - | \Box | \dashv | \perp | | \rightarrow | \perp | | \Box | \mp | | \Box | \perp | - | | \blacksquare | \perp | - | \Box | \neg | - | \top | \vdash | \Box | \perp | - | \blacksquare | \dashv | \neg | - | \vdash | \Box | \dashv | \mp | \perp | \perp | П | \dashv | \perp | \blacksquare | \Box | 卫 | 1 |
| 4 | Op 1 | C-0002 | Os-25 | | +'+ | | | | \Box | \pm | | | | \pm | | | \pm | | | \pm | | | | \pm | \pm | | \exists | | \pm | | | 1 | | | | | | \pm | \Box | \pm | \pm | \pm | | | \pm | | | | \pm | 1 |
| 4 | Op 1 | C-0002 | Os-27 | | | - | - | - | \Box | \neg | - | Н | - | - | | \Box | - | - | \Box | \mp | | | \blacksquare | \mp | - | 1 | \dashv | - | \top | \vdash | \Box | 1 | - | | \dashv | - | - | \vdash | \Box | \dashv | \perp | \mp | - | | \mp | | \blacksquare | \Box | \blacksquare | 1 |
| 4 | Op 1 Op 1 | C-0003 | FL45 Os-31 | 1 | + | \dashv | + | + | \vdash | \dashv | + | Н | \dashv | + | + | \dashv | + | + | \vdash | + | + | \vdash | + | + | + | 1 | \dashv | + | + | + | \vdash | + | + | + | \dashv | \dashv | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | + | 1 1 |
| 4 | Op 1 | C-0003 | Os-45 | | 2 | \rightarrow | \perp | | \Box | \Rightarrow | \perp | | _ | \perp | | \blacksquare | \perp | | | 1 | | | | \perp | | | _ | \perp | | | \Box | \Rightarrow | | \blacksquare | _ | \rightarrow | \perp | | \Box | _ | \Rightarrow | | | | 7 | | \blacksquare | \Box | \blacksquare | 2 |
| 4 | | C-0003 C-0004 | Os-47 AE-183 | \vdash | 3 | + | + | + | \vdash | + | + | Н | + | + | + | \dashv | + | + | \vdash | + | + | + | + | + | + | Н | + | + | + | + | \vdash | + | + | + | \dashv | \rightarrow | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | + | 3 |
| 4 | Op 1 | C-0004 | Os-1 | | 1 | | | | \Box | \perp | | | | | | | | | | 士 | | | | 士 | | | 士 | | 土 | | | 士 | | | 士 | | | I | | 士 | | 土 | | | 士 | | | | | 1 |
| 4 | Op 1 Op 1 | C-0004 C-0004 | Os-10 Os-11 | H | 3 | + | + | + | \vdash | + | + | \vdash | - | + | 1 | \dashv | + | + | + | + | + | \vdash | H | + | + | \vdash | + | + | + | + | 11 | + | + | + | + | + | + | + | + | + | + | + | + | \vdash | + | + | + | H | 47 | 11 |
| 4 | Op 1 | C-0004 | Os-12 | | 1 | | | | | | | | | | | | | | | | | | | \pm | | | | | | | | 1 | | | 士 | | | | | | \perp | | | | | | | | \Box | 3 2 |
| 4 | Op 1 | C-0004 | Os-13 | \vdash | $+$ \top | - | + | + | \vdash | + | + | H | - | + | | \vdash | + | \vdash | \vdash | + | + | 1 | \vdash | + | + | \vdash | _ | + | + | + | 2 | + | + | + | | - | + | + | + | | + | + | + | \vdash | + | + | + | \vdash | 47 | 2 |
| 4 | | C-0004 C-0004 | Os-15 Os-16 | 1 | 2 | + | + | + | \vdash | + | + | Н | + | + | + | + | + | + | \vdash | + | + | + | + | + | + | Н | + | + | + | + | 3 | + | + | + | \dashv | + | + | + | + | + | + | + | + | \vdash | + | + | + | \vdash | + | 3 |
| 4 | Op 1 | C-0004 | Os-19 | | | | # | | \Box | 1 | \perp | | | # | | | # | | | # | | | | # | \perp | | | | 1 | | | \Rightarrow | | | コ | | | | \Box | \Rightarrow | \perp | | | | | | | | \Box | 1 |
| 4 | Op 1 Op 1 | C-0004 C-0004 | Os-2 Os-212 | \vdash | 4 | + | + | +- | \vdash | 1 | + | Н | - | + | \vdash | \dashv | + | + | \vdash | + | + | \vdash | + | + | + | Н | \dashv | - | + | + | 2 | + | - | + | - | \rightarrow | - | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | 4 | 3 |
| 4 | | C-0004 | Os-212 | | 1 | \dashv | + | + | \vdash | - | + | Н | - | + | + | \vdash | + | | | + | + | + | \vdash | + | | Н | \dashv | + | + | + | - | + | | + | \dashv | \rightarrow | + | + | \vdash | \dashv | + | + | + | | \dashv | | | | + | 1 |
| 4 | Op 1 | C-0004 | Os-235 | | | \Rightarrow | \perp | \perp | \Box | 2 | \perp | | _ | \bot | | | \perp | | | 1 | \perp | | | \perp | | | _ | \perp | | | 3 | \Rightarrow | | \Box | _ | \Rightarrow | \perp | \perp | \Box | 4 | \Rightarrow | \perp | | | 4 | \blacksquare | \blacksquare | \Box | \Rightarrow | 5 |
| 4 | | C-0004 C-0004 | Os-239 Os-250 | \vdash | 3 | + | + | + | \vdash | + | + | Н | + | + | + | \dashv | + | + | \vdash | + | + | + | + | + | + | Н | + | + | + | + | 1 | 1 | + | + | \dashv | \rightarrow | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | + | 1 |
| 4 | Op 1 | C-0004 | Os-230 | \vdash | 1 | \top | + | + | \vdash | \dashv | + | Н | \neg | + | + | \dashv | + | | \vdash | + | + | + | \vdash | + | | Н | \dashv | \top | + | + | H | + | \top | + | \dashv | \rightarrow | \top | + | \vdash | \dashv | + | $^{+}$ | + | \vdash | \dashv | + | \top | \vdash | + | 1 |
| 4 | | C-0004 | Os-4 | | | \neg | \perp | \perp | П | \neg | \perp | П | \neg | \perp | | \Box | \perp | 1 | | \perp | \perp | | | \perp | 1 | | \Box | \perp | \perp | - | 3 | \bot | \perp | \blacksquare | \Box | \neg | \perp | \blacksquare | П | \neg | \perp | \perp | \perp | | \neg | | \blacksquare | | 卫 | 3 |
| 4 | | C-0004 C-0004 | Os-5 Os-6 | \vdash | 2 | \dashv | + | + | \vdash | \dashv | + | Н | \dashv | + | + | \dashv | + | + | \vdash | + | + | \vdash | + | + | + | Н | + | + | + | + | \vdash | 1 | + | + | \dashv | \dashv | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | + | 5 |
| 4 | Op 1 | C-0004 | Os-618 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | 4 | | | | | | | | | | | | | | | | | | \Box | 5 |
| 4 | | C-0004 C-0004 | Os-626 Os-664 | \vdash | 1 | + | + | +- | \vdash | + | + | Н | - | + | \vdash | \dashv | + | + | \vdash | + | + | \vdash | + | + | + | Н | + | - | + | + | 1 4 | + | - | + | \dashv | \rightarrow | - | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | 4 | 1 - |
| 4 | Op 1 | C-0004 | Os-671 | | + '+ | \dashv | + | + | \vdash | 2 | + | Н | - | + | + | \vdash | + | | | + | + | + | \vdash | + | | Н | \dashv | + | + | + | 1 | + | | + | \dashv | \rightarrow | + | + | \vdash | \dashv | + | + | + | | \dashv | | | | + | 5 |
| 4 | Op 1 | C-0004 | Os-673 | | 1 | | | | \Box | \neg | | | | \perp | | | \perp | | | \blacksquare | | | | \perp | | | \Box | | | | \Box | \perp | | | \Box | | | \perp | \Box | 7 | \perp | \perp | | | \Box | | | \Box | \Box | 1 |
| 4 | Op 1 Op 1 | C-0004 C-0004 | Os-7 Os-8 | | + | + | + | + | Н | 5 | + | Н | - | + | \vdash | + | + | + | \vdash | + | + | ╁ | \vdash | + | + | Н | \dashv | + | + | + | 1 | 1 | + | + | \dashv | - | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | + | 6 |
| 4 | Op 1 | C-0004 | Os-9 | | 7 | | | | \Box | Ť | | | | | | | 士 | | | 士 | | | | 土 | | | 二 | | | | | 士 | | | | | | | \Box | 士 | 士 | | | | | | | | 世 | 7 |
| 2 | Op 1 Op 1 | C-0004 C-0005 | Os-9 AE-154 | \vdash | 1 | \rightarrow | + | + | \vdash | \dashv | + | Н | _ | + | ₩ | \vdash | + | 1 | \vdash | + | + | ⊬ | \vdash | + | + | Н | - | \perp | + | + | \vdash | + | \perp | \vdash | - | \rightarrow | \perp | + | \vdash | + | + | + | + | \vdash | + | \perp | \vdash | \vdash | \dashv | 1 |
| 2 | | C-0005 | AE-154 AE-155 | | 1 | \dashv | + | + | \vdash | \dashv | + | Н | - | + | + | \vdash | + | | | + | + | + | \vdash | + | | Н | \dashv | + | + | + | \vdash | + | | + | \dashv | \rightarrow | + | + | \vdash | \dashv | + | + | + | | \dashv | | | | + | 1 |
| 2 | Op 1 | C-0006 | Os-17 | | 3 | 3 | | | \Box | \neg | | | | \perp | | | \perp | | | \blacksquare | | | | \perp | | | \Box | | | | \Box | 1 | | | \Box | | | \perp | \Box | 7 | \perp | \perp | | | \Box | | | \Box | \Box | 7 |
| 2 | | C-0006 C-0006 | Os-18 Os-5 | \vdash | 1 1 | | + | + | \vdash | + | + | Н | + | + | \vdash | + | + | + | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | + | \dashv | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | $\dashv \dashv$ | 1 |
| 99 | Op 1 | C-0007 | Os-142 | | | _ | | | 1 | # | \perp | | \rightarrow | \perp | | \Box | \perp | | \Box | # | | | \Box | \perp | \perp | | \Rightarrow | \perp | | | \Box | \Rightarrow | \perp | \Box | # | | \perp | \perp | \Box | \Rightarrow | \bot | \perp | | | # | | | \Box | = | 1 |
| 4 | Op 1 Op 1 | C-0009 C-0010 | Bo-7 AE-1324 | \vdash | 1 | + | + | + | \vdash | + | + | Н | \dashv | + | \vdash | \vdash | + | + | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | + | \dashv | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | $\dashv \dashv$ | 1 |
| 4 | Op 1 | C-0010 | AE-1329a | | | 1 | 1 | | \Box | 1 | \perp | | | 1 | | \Box | # | | | # | 1 | | | # | \perp | П | # | | \mp | | \Box | # | | \Box | # | _ | | 1 | Ħ | # | # | 1 | | | 4 | | | | \dashv | 1 |
| 4 | Op 1 Op 1 | C-0010 C-0010 | AE-1329b AE-1329c | 1 | | + | + | + | \vdash | + | + | Н | + | + | \vdash | + | + | + | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | + | \dashv | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | $\dashv \dashv$ | 1 |
| 4 | Op 1 | C-0010 | AE-189 | | 1 | # | # | 1 | П | # | \perp | П | \neg | 1 | | | 丰 | | \Box | # | Ŧ | | \Box | 丰 | I | П | # | 1 | \perp | | \Box | \Rightarrow | 1 | \Box | ゴ | # | 1 | 1 | П | \Rightarrow | # | 1 | 1 | П | # | # | | \Box | \dashv | 1 |
| 4 | Op 1 Op 1 | C-0010 C-0010 | AE-191 Os-23 | 1 | 3 | + | + | + | \vdash | + | + | \vdash | \dashv | + | \vdash | \vdash | + | + | + | + | + | \vdash | + | 1 | + | \vdash | \dashv | + | + | + | \vdash | + | + | + | \dashv | \dashv | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | $\dashv \dashv$ | 4 |
| 4 | Op 1 | C-0010 | Os-26 | | 1 | | 二 | | \Box | _ | \perp | | | $^{\pm}$ | | \Box | \Rightarrow | | | \Rightarrow | | | | \Rightarrow | \perp | | | \perp | | | \Box | | | \Box | 耳 | | \perp | | \Box | \Rightarrow | \bot | \perp | | | _ | | | | 世 | 1 |
| 4 | Op 1 | C-0010 C-0010/2 | Os-30 Os-32 | \vdash | + | + | + | + | \vdash | + | + | Н | + | + | \vdash | + | + | + | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | + | 1 | 1 | + | + | \dashv | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | $\dashv \dashv$ | 1 |
| 4 | Op 1 | C-0010/2 | Os-35 | | | | | | \Box | | \perp | | _ | \perp | | \Box | \perp | | | \Rightarrow | | | \Box | \pm | \perp | | \Rightarrow | | | | | 4 | | | \Box | | | | \Box | \Rightarrow | \perp | \perp | | | \perp | | | \Box | 世 | 4 |
| 4 | Op 1 Op 1 | C-0015 C-0015 | AE-410 Os-127 | | 1 | + | 1 | + | \vdash | + | + | Н | + | + | + | + | + | + | + | + | + | + | + | + | + | Н | + | + | + | + | 2 | + | + | + | \dashv | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | + | 1 13 |
| 4 | Op 1 | C-0015 | Os-242 | 1 | | _ | T | | \Box | # | \perp | | \rightarrow | $^{\pm}$ | | \Box | \bot | | | # | | | | # | \perp | | \Rightarrow | \perp | | | | \Rightarrow | | \Box | _ | | \perp | | \Box | \Rightarrow | \bot | \perp | | | # | | | | \Rightarrow | 13 1 |
| 4 | Op 1 Op 1 | C-0015 C-0015 | Os-38 Os-41 | 1 | 6 | + | + | + | \vdash | 1 | + | Н | + | + | \vdash | + | + | + | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | + | \vdash | 2 | + | + | \dashv | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | $\dashv \dashv$ | 8 2 |
| 4 | Op 1 | C-0015 | Os-51 | | | | | | | \Rightarrow | | | | | | | | | | \perp | | | | \pm | | | | | | | 1 | _ | | | | | | | | \Rightarrow | | | | | | | | | \Box | 1 |
| 3 | Op 1 Op 1 | C-0015 C-0016 | Os-690 Os-37 | 2 | + | + | + | + | \vdash | + | + | \vdash | - | + | - | \dashv | + | + | + | + | + | - | + | + | + | \vdash | \dashv | + | + | + | 1 | 4 | + | + | - | - | + | + | \vdash | + | + | + | + | \vdash | + | + | + | H | \dashv | 6 |
| 4 | Op 1 | C-0017 | Os-29 | Ľ | | _ | \pm | | \Box | | \perp | | | | | \Box | \pm | | | # | \perp | | | \pm | | | _ | | # | | 2 | # | | | \exists | _ | | | \Box | # | # | 1 | | | # | | | | \Rightarrow | 2 |
| 4 | | C-0017 C-0017 | Os-34 Os-36 | \vdash | + | + | + | + | \vdash | + | + | \vdash | + | + | \vdash | \vdash | + | + | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | + | 1 4 | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | $\dashv\dashv$ | 1 4 |
| 4 | Op 1 | C-0017 | Os-44 | | 1 | | | | | | | | | | | | | | | | | | | \pm | | | | | | | | \pm | | | 士 | | | | | | \perp | | | | | | | | \Box | 1 |
| 4 | Op 1 Op 1 | C-0017 C-0019 | Os-46 Os-28 | \vdash | 1 | + | + | + | \vdash | + | + | H | - | + | \vdash | \vdash | + | \vdash | +F | + | + | + | + | + | + | H | | + | + | + | 1 | + | + | $+$ \top | - | + | + | + | +I | 4 | + | + | + | H | + | + | + | H | # | 1 2 |
| 1_4 | Op i | C-0019 | US-20 | | | | | | | | | | _ | | _ | _ | | _ | | | | _ | _ | _ | | | | | _ | _ | | _ | | | _ | _ | | | | _ | | | | | _ | _ | | _ | | |

| Values are NISP | | D C |) D | Н | н | н | н | н | H/N I | 1/N H/I | N H/N | H/N F | I/N H/ | N H/N | H/N F | I/N H | N H/N | N H/N | H/N | N N | N N | N | N | N N | М | М | M N | 1 M | UM L | JM M | М | M I | м м | М | М | M M | M | М | M | M N | M S | S | S | S S | S | S S | 3 | \neg |
|--|--------------------------------|------------------|----------|-------------------|------------|----------------|---------------|------------------------|-----------------|-----------------------------|----------------|---------------------|-------------------------------|---------|------------|--------------|---------------|----------------|----------------|----------|------------|----------------|---------------|---------------------------|---------------|-------------|--------------|----------------|--------------|-------------------------------|---------------|---------------|--|--------------------|----------|----------------------|--------------------|----------------|---------------------|-------------------|-------------|--------------------|-----------------|--------------------------------------|--------------------|---------------|---------------|---------|
| | | | | 1_ | | | | 2 | | | | | | | | | | | | | | | | | | П | | | | | | | E | | | ısı | | | | | | sp. | | | | | | |
| Si Operation Co | Sample/ Context Bag | Canis familiaris | Lama sp. | Lagidium peruanum | Agouti sp. | Silvylagus sp. | Carnívora n/i | Odocoileus virginianus | Nothoprocta sp. | Colaptes sp. Cyanocorax sp. | cf. Fulica sp. | Buteo sp. | Strigidae Cairina moschata | auricul | Thraupidae | Passeriforme | Didelphis sp. | | Quiróptero n/i | Bufo sp. | Reptil n/i | Insecto N/I | Muridae | Rattus rattus Rodentia | Gallus gallus | Bos tarurus | Capra hircus | Sus scrofa | Artiodactyla | Mamifero n/i Chione subrugosa | Semele Solida | Semele sp. | Argopecten sp. Trachycardium procen | Enoplochiton niger | | Fusinus dupetitthoua | Molusco Marino n/i | Donax obesulus | Protothaca thaca | Engraulis ringens | Sulimulidae | Epiphragmophora sp | Thaumasthus sp. | Drepanostomella sp Systrophia sp. | Scutalus mariopena | Drymaeus sp. | DOSUY v op. | Total |
| 3 Op 1 C | C-0020 Os-140 | | | | | | | \Box | | | | | 士 | | | | | | | | | | 士 | | | ш | | | 1 | | | 士 | | | | | | | 二 | 士 | | \Box | | | | 士 | 土 | 1 |
| 3 Op 1 C | C-0020 Os-141 | + | T, | + | H | $\perp T$ | + | \Box | H | $-\Gamma$ | \Box | 7 | \perp | + | H | Ŧ | F | \perp | H | Ŧ | £ | + | Ţ | _ | 1 | H | \perp | \Box | 1 | $-\Gamma$ | \Box | Ţ | _ | + | H | $-\Gamma$ | \Box | H | Ţ | \perp | + | \Box | H | _ | H | T | | 1 |
| 1 3 1 On 1 1 C | C-0020 Os-143 C-0020 Os-145 | 1 1 | 1 | 1 | \vdash | \vdash | + | \vdash | \vdash | + | + | \dashv | + | + | \vdash | + | + | + | \vdash | + | + | + | 1 | + | + | \vdash | + | + | \vdash | _ | + | \dashv | _ | + | \vdash | + | + | \vdash | \dashv | + | + | \vdash | | + | \vdash | + | + | 2 |
| 3 Op 1 C | C-0020 Os-50 | | 1 4 | | | | | | | | | | | | \Box | | | | | | | | | | | \Box | | | | | | | | | | | | | | | | | | | | | 工 | 8 |
| 3 Op 1 C 3 Op 1 C | C-0020 Os-628 C-0020 Os-665 | + | 1 | + | \vdash | \vdash | + | \vdash | \vdash | + | + | \dashv | + | + | \vdash | + | + | + | \vdash | + | + | + | \dashv | + | + | \vdash | + | + | 3 | _ | \vdash | + | _ | + | \vdash | + | + | \vdash | \rightarrow | + | + | \vdash | \vdash | - | \vdash | + | + | 4 |
| 3 Op 1 C 3 Op 1 C | C-0020 Os-689 C-0021 Os-610 | | | | | | | \Box | | | | | 士 | | | | | | | | | | 士 | | | \Box | | | 2 | | | 士 | | | | | | | 二 | 士 | | \Box | | | | 士 | | 2 |
| | 0000/750 | 1 | | + | \vdash | 1 | + | \vdash | \vdash | + | + | \dashv | + | + | \vdash | + | + | + | \vdash | + | + | + | + | + | \vdash | \vdash | - | + | \dashv | - | \vdash | + | + | +- | \vdash | + | + | \vdash | + | + | + | \vdash | \vdash | + | \vdash | + | $\overline{}$ | 2 |
| int | nterface AL-1550 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| 3 Op 1 C 3 Op 1 C | C-0024 AE-455 C-0024 FL7 | \vdash | 1 | \perp | | - | \perp | \square | \Box | \perp | | - | \perp | \perp | \vdash | \perp | \perp | \perp | \Box | \perp | \perp | \Box | 1 | \perp | \vdash | \Box | \perp | \blacksquare | \Box | \perp | | \rightarrow | _ | - | \vdash | \perp | \Box | \Box | \rightarrow | \perp | \perp | \square | | \perp | \Box | \perp | \mp | 1 |
| | C-0024 PL7 C-0024 Os-134 | | 1 | + | | \vdash | + | \vdash | \vdash | + | | \dashv | + | + | \vdash | + | + | + | | + | + | + | 1 | + | + | \vdash | + | + | \vdash | | | \dashv | | | \vdash | + | + | | \dashv | + | + | + | | + | | \dashv | | 2 |
| 3 Op 1 C | C-0024 Os-138 | | | | | | \perp | \Box | | \perp | | \neg | \perp | | \Box | | \perp | | | | \perp | | 4 | \perp | | \Box | | \blacksquare | 1 | | | \dashv | | | | \perp | | | 7 | \perp | | \Box | | \perp | | \dashv | \mp | 1 |
| 3 Op 1 C 3 Op 1 C | C-0024 Os-213 C-0024 Os-213 | 1 1 | 3 | + | | \vdash | + | \vdash | \vdash | + | + | \dashv | + | + | \vdash | + | + | + | | + | + | + | + | + | + | \vdash | + | + | 1 | + | \vdash | \dashv | _ | + | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | \vdash | + | + | 1 |
| 3 Op 1 C | C-0024 Os-226 | | 2 | | | | | \Box | \Box | \perp | \Box | \Rightarrow | \bot | | \Box | \perp | \perp | \perp | \Box | \perp | \perp | \Box | \Rightarrow | \perp | | \Box | \perp | | | \perp | | _ | \perp | | \Box | \Rightarrow | \Box | \Box | \rightrightarrows | \Rightarrow | | \square | \Box | \perp | | \perp | 丰 | 2 |
| 1 3 1 On 1 1 C | C-0024 Os-233 C-0024 Os-240 | + | 1 | + | \vdash | \vdash | + | \vdash | \vdash | + | \vdash | + | + | + | \vdash | + | + | + | + | + | + | + | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | + | + | + | \vdash | + | + | + | H | \vdash | + | \vdash | + | + | 3 |
| 3 Op1 C 3 Op1 C | C-0024 Os-39 | | 1 | Т | | | | | | | | | 土 | | | 1 | \pm | | | 1 | \perp | | 2 | | | | 土 | | | 2 | | | | | | | | | \exists | 土 | | | | | | | \pm | 5 |
| 3 Op 1 C 3 Op 1 C 3 Op 1 C 3 Op 1 C | C-0024 Os-627 C-0024 Os-649 | $+\top$ | 1 | + | H | H | + | H | H | 一厂 | H | Ŧ | Ŧ | + | H | Ŧ | F | + | H | Ŧ | £ | + | Ŧ | + | H | H | Ŧ | + | 1 | - | H | Ŧ | - | + | H | 一厂 | + | H | Ŧ | + | + | H | H | | H | Ŧ | + | 1 |
| 3 Op 1 C 3 Op 1 C | C-0024 Os-654 | | | + | | | | \Box | | | | | \pm | | | \pm | \pm | | | \pm | | | 1 | | | \Box | | | 1 | | | \pm | | | | | \Box | | | \pm | | \Box | | | | \pm | | 2 |
| 3 Op 1 C | C-0024 Os-667 | \vdash | 1 | \perp | | - | \perp | \square | \Box | \perp | | \rightarrow | \perp | \perp | \vdash | \perp | \perp | \perp | \Box | \perp | \perp | \Box | \perp | \perp | \vdash | \Box | \perp | \blacksquare | \Box | | | \rightarrow | _ | - | \vdash | \perp | \Box | \Box | \rightarrow | \perp | \perp | \square | | \perp | \Box | \perp | | 1 |
| 4 Op 1 C 4 Op 1 C | C-0026 Bo-42 C-0026 Os-40 | ++ | 7 | + | \vdash | + | + | \vdash | \dashv | + | + | \dashv | + | + | \vdash | + | + | + | \vdash | + | + | + | + | + | + | \vdash | + | + | \dashv | 1 | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | + | + | \vdash | + | \vdash | + | + | 7 |
| 4 On 1 C | C-0026 Os-42 | | 2 | | | | | | | | | _ | \perp | | | | | | | | | | _ | | | \Box | | | | | | \Rightarrow | | | | | | | | | | \Box | | | | \Rightarrow | | 2 |
| 4 Op 1 C 3 Op 1 C | C-0027 Os-43 C-0028 Os-132 | 1 1 | 1 | + | \vdash | + | + | \vdash | + | + | \vdash | \dashv | + | + | \vdash | + | + | + | \vdash | + | + | + | + | + | + | \vdash | + | + | \dashv | + | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | + | + | \vdash | + | \vdash | + | | 1 |
| 3 Op 1 C | C-0030 Os-126 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | 2 |
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| 3 Op 1 C 3 Op 1 C 3 Op 1 C | C-0030 Os-146 C-0030 Os-147 | +++ | 4 | + | \Box | \vdash | + | \vdash | \vdash | + | | \dashv | + | + | \vdash | + | + | + | \Box | + | + | + | 1 | + | + | \vdash | \top | \top | 3 | • | \Box | \dashv | | + | \Box | + | + | \vdash | \dashv | + | + | \vdash | | + | \Box | + | + | 22 4 |
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| 4 Op 1 C | C-0034 Os-632 C-0035 Os-125 | | + | + | | \vdash | + | \vdash | \vdash | + | | \dashv | + | + | \vdash | + | + | + | | + | + | + | \dashv | + | + | \vdash | + | + | 3 | | | \dashv | | | \vdash | + | + | | \dashv | + | + | + | | + | | \dashv | + | 3 |
| 4 Op 1 C 4 Op 1 C | C-0035 Os-49 | | \perp | | | | \perp | \Box | | \perp | | \neg | \perp | | \Box | | \perp | | | | \perp | | 4 | \perp | | \Box | \perp | \blacksquare | | 1 | | \dashv | | | | \perp | | | \Box | \perp | | \Box | | \perp | | \dashv | | 3 |
| 4 Op 1 C 4 Op 1 C 2 Op 1 C 3 Op 1 C | C-0036 Os-48 C-0037 Os-131 | ++ | 2 | + | | \vdash | 1 | \vdash | \vdash | + | + | \dashv | 1 | + | \vdash | + | + | + | | + | + | + | + | + | + | \vdash | + | + | 1 | + | \vdash | \dashv | _ | + | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | \vdash | + | + | 5 |
| 3 On 1 C | C-0037 Os-688 | | | | | | | | | | | _ | \perp | | | | | | | | | | _ | | | \Box | | | 2 | | | \Rightarrow | | | | | | | | | | \Box | | | | \Rightarrow | | 2 |
| 4 Op 1 C | C-0038 Os-128 C-0038 Os-130 | 1 1 | 1 | 1 | \vdash | + | + | \vdash | + | + | \vdash | \dashv | + | + | \vdash | + | + | + | \vdash | + | + | + | + | + | + | \vdash | + | + | 3 | + | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | + | + | \vdash | + | \vdash | + | + | 5 |
| 3 On 1 C | C-0039 Os-144 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | 2 |
| 3 Op 1 C 3 Op 1 C | C-0039 Os-243 C-0039 Os-247 | | 2 | + | \vdash | \vdash | + | \vdash | \dashv | + | \vdash | \dashv | + | + | \vdash | + | + | + | \vdash | + | + | + | + | + | ₩ | \vdash | + | + | 3 | 1 | \vdash | + | + | + | \vdash | + | + | \vdash | - | + | + | \vdash | \vdash | + | \vdash | + | + | 5 |
| 3 Op1 C | C-0039 Os-631 | Ш. | 2 | | | | | \Box | | | | | \pm | | | \pm | \pm | | | \pm | | | 3 | | | \Box | | | 2 | _ | | \pm | | | | | \Box | | | \pm | | \Box | | | | \pm | 士 | 7 |
| 4 Op 1 C 3 Op 1 C | C-0041 Os-139 | \vdash | \perp | \perp | | - | \perp | \square | \Box | \perp | | \rightarrow | 1 | \perp | \vdash | \perp | \perp | \perp | \Box | \perp | \perp | \square | \perp | \perp | \vdash | \Box | \perp | \blacksquare | 1 3 | \perp | | \rightarrow | _ | - | \vdash | \perp | \Box | \Box | \rightarrow | \perp | \perp | \square | | \perp | \Box | \perp | | 3 |
| 4 Op 1 C | C-0043 Os-136 C-0044 AE-412 | | 1 | \pm | H | | \pm | | \vdash | | \perp | | _ | \pm | H | _ | \pm | \pm | | _ | _ | | _ | | | H | _ | \perp | | | | | | \pm | | | $\pm \pm$ | \vdash | _ | _ | | ╁┤ | \vdash | | | _ | | 1 |
| 4 Op 1 C | C-0044 AE-413 | | 1 | Ŧ | П | | Ŧ | П | \Box | \perp | F | \dashv | \mp | Ŧ | \Box | 7 | Ŧ | F | | 7 | Ŧ | \Box | \dashv | Ŧ | Е | П | 7 | \Box | | \top | П | 7 | \top | \blacksquare | \Box | 7 | \Box | H | \dashv | 7 | Ŧ | П | \Box | Ŧ | П | \mp | | 1 |
| 4 Op 1 C | C-0045 Os-606 C-0046 AE-436 | + | + | + | \vdash | 1 | + | 1 | \vdash | + | \vdash | + | + | + | \vdash | + | + | + | + | + | + | + | + | + | + | \vdash | + | + | 1 | + | + | + | + | + | + | + | + | \vdash | + | + | + | H | + | + | \vdash | + | | 1 |
| 3 Op 1 C | C-0046 AE-439 | | 1 | | Ħ | | | | \Box | \Rightarrow | \blacksquare | \Rightarrow | # | | \Box | # | 1 | | | # | 1 | \Box | \Rightarrow | \perp | | Ħ | # | \Box | \Box | 1 | \Box | # | | | \Box | \Rightarrow | \Box | | \Rightarrow | \Rightarrow | 1 | \Box | \Box | \perp | | \Rightarrow | | 1 |
| 3 Op 1 C | C-0046 Os-203 C-0046 Os-204 | + | 1 5 | | \vdash | \vdash | + | \vdash | \vdash | + | \vdash | + | + | + | \vdash | + | + | + | + | + | + | + | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | + | + | + | \vdash | + | + | + | H | \vdash | + | \vdash | + | + | 5 |
| 3 Op 1 C | C-0046 Os-246 | | Ť | | | | | \Box | \Box | 士 | \vdash | \Rightarrow | \perp | | \Box | | \pm | | | | \perp | | \Rightarrow | | | | | | 2 | | | | | | ш | \perp | | | \Rightarrow | \perp | | | \Box | | | | | 2 |
| 3 Op 1 C | C-0046 Os-614 C-0047 AE-418 | + | + | + | H | \vdash | + | + | H | + | + | \dashv | + | + | H | + | + | + | \vdash | + | + | + | 1 | + | + | H | + | + | 5 | 1 | \vdash | + | + | + | \vdash | + | + | H | + | + | + | + | \vdash | + | + | + | | 1 |
| 4 Op 1 C | C-0047 AE-420 | | 1 | \pm | | | \pm | | \exists | 士 | | _ | \pm | | | \pm | 士 | 土 | | \pm | \pm | | \pm | 土 | | | 士 | | | | | \pm | | | | 土 | | | \pm | \pm | \pm | | | 土 | | \pm | | 1 |
| 4 On 1 C | C-0047 Os-619 | $+\top$ | 1 | | H | 1 | + | \Box | H | $-\Gamma$ | \Box | 7 | \perp | + | H | Ŧ | F | \perp | H | Ŧ | £ | + | Ŧ | _ | 1 | H | $-\Gamma$ | \Box | 7 | $-\Gamma$ | \Box | Ŧ | _ | + | H | $-\Gamma$ | \Box | H | Ŧ | \perp | + | \Box | H | _ | H | \perp | | 9 |
| 13 Op 1 C | C-0047 Os-621 C-0049 Os-137 | + | 2 | | \vdash | \vdash | + | \vdash | \vdash | + | \vdash | + | + | + | \vdash | + | + | + | + | + | + | + | + | + | + | \vdash | + | + | + | + | + | + | + | + | + | + | + | \vdash | + | + | + | H | + | + | \vdash | + | + | 2 |
| 3 Op 1 C | C-0049 Os-245 | | | | | | | | \Box | \neg | | \Rightarrow | \bot | | \Box | 1 | \perp | | | 1 | \perp | \Box | \Rightarrow | | | | # | \Box | 2 | | | # | | | H | \Rightarrow | | | \rightrightarrows | \Rightarrow | | | \Box | | | \perp | 工 | 2 2 2 |
| 2 On 1 C | C-0049 Os-248 C-0050 Os-679 | ++ | 1 | | \vdash | \vdash | + | \vdash | \dashv | + | \vdash | \dashv | + | + | \vdash | + | + | + | \vdash | + | + | + | + | + | \vdash | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | \dashv | + | \vdash | + | + | 1 |
| 4 Op 2 C | C-0051 Os-51 | | 1 | | | | | \Box | \Box | \perp | \vdash | \Rightarrow | \perp | | \Box | | \bot | \perp | | | | \Box | \Rightarrow | \perp | | \Box | | | \Box | \perp | | | \perp | | \Box | \perp | \Box | | \Rightarrow | \Rightarrow | | \Box | \Box | \perp | | \perp | | 1 |
| 4 Op 2 C | C-0052 Os-371 C-0052 Os-52 | ++ | + | + | H | \vdash | + | \vdash | \dashv | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | + | + | + | + | + | \vdash | \vdash | + | + | | 2 | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | \vdash | + | \vdash | + | | 1 |
| 4 Op 2 C | C-0052 Os-52 C-0052 Os-53 | | \pm | | | | 土 | | | \pm | | | 士 | | | | 土 | 土 | | | | | \exists | 士 | | | \perp | | | 1 | | \pm | | | | 士 | | | \exists | \pm | | | | 土 | | \pm | 士 | 1 |
| 4 Op 2 C | C-0052 Os-54 | \Box | F | F | H | \Box | F | \Box | H | T | | \dashv | Ŧ | F | H | Ŧ | F | F | \Box | Ŧ | Ŧ | \Box | Ŧ | T | F | H | \perp | \Box | | 1 | | 7 | \perp | F | H | T | \Box | H | Ŧ | Ŧ | F | \Box | H | T | H | Ŧ | | 1 |
| 14 On 2 C | C-0052 Os-55 C-0052 Os-56 | + | 6 | + | \vdash | \vdash | + | \vdash | \dashv | + | | \dashv | + | + | \vdash | + | + | + | \vdash | + | + | + | + | + | \vdash | \vdash | + | + | \vdash | 1 | | + | + | + | \vdash | + | + | \vdash | + | + | + | + | \vdash | + | \vdash | + | + | 6 |
| 4 Op 2 C | C-0052 Os-57 | | 7 | | | | Ŧ | \Box | \Box | \perp | | \dashv | \perp | | \Box | 1 | T | \blacksquare | \Box | 1 | Ŧ | \Box | \perp | Ŧ | | \Box | 7 | \blacksquare | \Box | | \Box | \neg | Ŧ | \blacksquare | \Box | \perp | \Box | | \dashv | \perp | \top | \Box | | Ŧ | \Box | \perp | Ŧ | 7 |
| 4 Op 2 C | C-0052 Os-58 C-0052 Os-59 | + | 1 7 | | \vdash | \vdash | + | \vdash | \vdash | + | + | + | + | + | \vdash | + | + | + | \vdash | + | + | + | + | + | \vdash | \vdash | + | + | \vdash | 3 | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | + | + | \vdash | + | \vdash | + | | 7 |
| 4 On 2 C | C-0052 Os-60 | | 2 | | | | | | \Box | \perp | | \rightrightarrows | \Rightarrow | | | \perp | \perp | \perp | | \perp | | \Box | \Rightarrow | | | \Box | \perp | | \Box | | | \Rightarrow | | | \Box | \perp | | | \rightrightarrows | \perp | | \Box | | | | \Rightarrow | | 2 |
| 4 Op 2 C 4 Op 2 C 4 Op 2 C | C-0052 Os-61 C-0053 FL50 | ++ | 6 | 11 | \vdash | \vdash | + | \vdash | \dashv | + | + | + | + | + | \vdash | + | + | + | \vdash | + | + | + | 1 | + | \vdash | \vdash | + | + | + | 2 | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | 4 | \vdash | \vdash | + | \vdash | + | + | 7 |
| 4 Op 2 C | C-0053 Os-62 | 11 | 1 | \top | \Box | \vdash | \top | 1 | \vdash | \top | \top | \dashv | \top | 1 | \vdash | \dashv | \top | | \vdash | \dashv | \top | \top | _ | \top | 1 | 1 | \neg | \top | | Ť | 1 | \dashv | \top | 1 | \vdash | \top | + | \vdash | \rightarrow | \pm | + | 1 | \vdash | \top | \Box | \top | + | 1 |

| Values are NISP | | D C | οΙο | Тн | н | н | н | нТв | H H/N | H/N I | | N H/N | H/N H | /N H/N | H/N | H/N F | I/N H | N H/N | H/N | N | N I | N N | N | N | N N | и м | М | М | M U | M UN | M | и м | М | М | м | и м | М | M | м | и м | М | S | S | s s | S | S | s s | $\overline{}$ |
|---|-------------------|------------------|----------|-------------------|------------|----------------|---------------|---------------|-----------------|--------------|----------------|----------|----------------|--------------------|------------|---------------|---------|------------------|----------------|-----------|----------------|---------|----------|---------------|---------------------------|-------------|----------------|------------|---------------|--------------|------------------|--------------|----------------|---------------------|--------------------|---------------------------------------|-----------------|--------------------|----------------|-------------------|-----------------|-------------|---------------------|--------------------------------------|----------------|----------|-----------------------------|---------------|
| | | | | | | | | | 20 | | | | | | | | | | | | | | | | | | | | | | | | | Ę | | is | | | | | | | 2 | | | _ | | |
| Operation Context | Sample/ | Canis familiaris | Lama sp. | Lagidium peruanum | Agouti sp. | Silvylagus sp. | Felis sp. | Carnivora n/i | Nothoprocta sp. | Colaptes sp. | Cyanocorax sp. | | Strigidae | Zenaida auriculata | Thraupidae | Passeriforme | Ave n/i | Lonchophylla sp. | Quiróptero n/i | Bufo sp. | Anfibio n/i | | Muridae | Rattus rattus | Rodentia Gallus gallus | Bos tarurus | Capra hircus | Ovis aries | Sus scrofa | Mamífero n/i | Chione subrugosa | Semele sonda | Argopecten sp. | rachycardium procer | Enoplochiton niger | Molusco IVI Fusinus dupetitthouars | Thais chocolata | Molusco Marino n/i | Donax obesulus | Engraulis ringens | Sardinops sagax | Bulimulidae | Epiphragmophora sp. | Thaumasthus sp. Drepanostomella sp. | m | s maric | Drymaeus sp. Bostryx sp. | Total |
| й Operation Context 4 Op 2 C-0053 4 Op 2 C-0053 | Bag Os-63 | | 2 | + | | \Box | \pm | \pm | | | | \pm | \forall | \pm | Н | \pm | \pm | \pm | | \Box | \pm | \pm | | | \pm | \pm | Н | \Box | 1 | 1 | | \pm | | - | | ╫ | \pm | \pm | \pm | \pm | \vdash | | \pm | \pm | | Н | | 3 |
| 4 Op 2 C-0053 4 Op 2 C-0054 | Os-64 FL51 | | 1 | | | | \mp | \mp | \perp | П | - | | \Box | + | \Box | \dashv | \perp | + | | \Box | \blacksquare | - | | Н | \mp | \perp | \blacksquare | \Box | - | 2 | \Box | \perp | | | \Box | + | | \blacksquare | \perp | - | \vdash | | \blacksquare | - | \blacksquare | | - | 1 2 |
| 4 On 2 C-0054 | Os-65 | | 5 | | | | \pm | \pm | | | \pm | | | | | \pm | \pm | \pm | | | \pm | | | | \pm | | | | \pm | 12 | | | | | | \pm | | \pm | \pm | | | | \pm | \pm | | | | 5 |
| 2 Op 2 C-0055 2 Op 2 C-0055 | Os-66 Os-67 | 1 | 1 1 | | \vdash | \vdash | + | + | 2 | H | + | \vdash | \vdash | + | \vdash | \dashv | + | + | \vdash | Н | + | + | \vdash | \vdash | + | + | Н | Н | + | + | + | + | + | H | \vdash | + | \vdash | + | + | + | \vdash | H | + | + | + | \vdash | + | 7 |
| 2 Op 2 C-0055 | Os-67 | | | | | | \Rightarrow | Τ. | 1 | | | | | | | | # | \perp | | | # | | | \Box | \bot | | | | | $^{+}$ | | | | | \Box | | | # | 1 | | | | # | | | | | 1 |
| 2 Op 2 C-0055 2 Op 2 C-0055 | Os-68 Os-69 | 1 | 1 | 1 | Н | \vdash | + | - | 6 | Н | + | + | H | + | Н | \dashv | + | + | Н | \vdash | + | + | \vdash | \vdash | + | + | Н | \vdash | + | + | + | + | + | | \vdash | + | + | + | + | + | \vdash | Н | + | + | + | H | + | 1 8 |
| 2 Op 2 C-0055 | Os-70 Os-71 | | 1 | | | \Box | \dashv | 7 | | П | | | \Box | \perp | \Box | \neg | - | \vdash | | \Box | 7 | - | | | \mp | \perp | \Box | \Box | - | 2 | | \perp | | | \Box | + | | \dashv | - | - | \vdash | \Box | - | | | | | 1 |
| 2 Op 2 C-0055 | Os-72 | | | | | | \pm | | | | | | | | | | | | | | | | | | \pm | | | | | 1 | | | | | | | | | | | | | | | | | | 1 |
| 2 Op 2 C-0055 2 Op 2 C-0057 | Os-74 Os-73 | ++ | 3 | + | \vdash | \vdash | + | + | + | H | + | + | \vdash | + | \vdash | \dashv | 1 | + | \vdash | \vdash | + | + | \vdash | \vdash | + | + | Н | \vdash | + | + | \vdash | + | + | Н | \vdash | + | + | + | + | + | \vdash | \vdash | + | + | + | \vdash | + | 3 |
| 2 Op 2 C-0057 | Os-75 | | | | | | \Rightarrow | \perp | | | | | | \perp | | | | \perp | | \Box | # | | 1 | | \bot | | | \Box | | 1 | | | | | \Box | \perp | | \dashv | | | \vdash | | \dashv | | | | | 1 |
| 2 Op 2 C-0057 2 Op 2 C-0057 | Os-76 Os-77 | | 5 | 1 | | | \pm | \pm | | | \pm | | | | | \pm | \pm | \pm | | | \pm | | Ľ | | \pm | | | | \pm | \pm | | | | | | \pm | | \pm | \pm | | | | \pm | \pm | | | | 6 |
| 2 Op 2 C-0057 2 Op 2 C-0057 | Os-78 Os-79 | H | 1 5 | | \vdash | H | + | + | + | H | + | + | H | + | H | + | 1 | + | \vdash | H | + | + | + | H | + | + | H | H | + | + | + | + | + | H | H | + | + | + | + | + | + | H | + | + | + | H | + | 5 |
| 2 Op 2 C-0058 | FL57 | \Box | Ť | | | | \Rightarrow | \Rightarrow | \perp | \Box | # | | \Box | \bot | \Box | \Rightarrow | \perp | \perp | | \Box | \Rightarrow | \perp | | \Box | \Rightarrow | \perp | \Box | \Box | \Rightarrow | 1 | \Box | \perp | | | \Box | \perp | | \dashv | \perp | \perp | \vdash | 2 | \dashv | \perp | \Box | \Box | | 2 |
| 2 Op 2 C-0058 2 Op 2 C-0058 | Os-312 Os-82 | $\pm \pm$ | \pm | \pm | | | \pm | 1 | 2 | | \pm | \pm | \exists | \pm | | _ | \pm | \pm | | \exists | \pm | \pm | \perp | | \pm | \pm | | \exists | \pm | 1 | | \pm | \pm | | \vdash | \pm | \pm | \pm | \pm | \pm | \pm | | \pm | \pm | | | \pm | 1 2 |
| 2 Op 2 C-0058 2 Op 2 C-0059 | Os-83 Os-314 | F | F | 1 | П | H | Ŧ | 1 | | H | Ŧ | H | H | Ŧ | П | \mp | Ŧ | F | П | H | \mp | F | F | H | Ŧ | F | П | H | Ŧ | 1 | \Box | Ŧ | F | H | H | Ŧ | H | \mp | Ŧ | Ŧ | F | П | \mp | Ŧ | H | H | \pm | 3 |
| 2 Op 2 C-0059 | Os-373 | | | | | | \Rightarrow | | | | | | | | | | 2 | \pm | | | | | | | \pm | | | | | 1 | | | | | | | | | | | | | | | | | | 3 |
| 2 Op 2 C-0059 2 Op 2 C-0059 | Os-374 Os-375 | | 2 | + | Н | \vdash | + | + | 1 | Н | + | + | H | + | Н | \dashv | + | + | Н | \vdash | + | + | \vdash | \vdash | + | + | Н | \vdash | + | + | + | + | + | | \vdash | + | + | + | + | + | \vdash | Н | + | + | + | H | + | 1 2 |
| 2 Op 2 C-0059 | Os-378 Os-80 | | 2 | 1 | | | \perp | \perp | | | | | | | | | 1 | \perp | | \Box | 1 | | | \Box | \perp | | | \Box | _ | 1 | \Box | | | | \Box | \perp | | _ | 1 | | | | _ | | \blacksquare | | | 2 |
| 2 Op 2 C-0059 | Os-81 | | 4 | ť | | | \pm | 1 2 | 2 | | | | | \pm | \Box | \exists | \pm | \pm | | | \pm | | | | \pm | | | | | 2 | | | | | | \pm | | \pm | \pm | | | | \pm | | | | | 8 |
| 2 Op 2 C-0059 2 Op 2 C-0059 | Os-83 Os-84 | \vdash | 3 | 1 | \vdash | \vdash | + | Η. | 1 | \vdash | - | \vdash | \vdash | + | \vdash | \dashv | + | + | \vdash | \vdash | + | + | \vdash | \Box | + | + | \vdash | \vdash | - | 1 | $\overline{}$ | + | + | | \vdash | + | \vdash | + | + | + | \vdash | \vdash | + | + | - | | - | 4 |
| 2 Op 2 C-0059 | Os-85 | | 7 | Т | | | \Rightarrow | # | | | | | \Box | \Rightarrow | | | # | \perp | | \Box | # | | | \Box | $^{+}$ | | | \Box | \perp | 1 | \Box | | | | \Box | | | _ | | | | | _ | | | | | 8 1 |
| 2 Op 2 C-0059 2 Op 2 C-0059 | Os-86 Os-87 | | 1 | 1 | Н | \vdash | + | - | 8 | Н | + | + | H | + | Н | \dashv | 1 | + | Н | \vdash | + | + | \vdash | \vdash | + | + | Н | \vdash | + | + | + | + | + | | \vdash | + | + | + | + | + | \vdash | Н | + | + | + | H | + | 10 |
| 2 Op 2 C-0059 2 Op 2 C-0059 | Os-87 Os-88 | | - | | | | \mp | \mp | \perp | П | - | | \Box | + | \Box | \neg | 1 | \top | | \Box | \blacksquare | - | | Н | \mp | \perp | \blacksquare | \Box | - | 2 | \Box | \perp | | | \Box | + | | \blacksquare | \perp | - | \vdash | | \blacksquare | - | \blacksquare | | - | 1 2 |
| 2 Op 2 C-0059 | Os-89 | | | | | | # | 1 | 7 | | | | | | | # | | \pm | | | # | | | | # | | | | | | | | | | | | | 1 | | | | | 1 | | | | | 7 |
| 2 Op 2 C-0059 2 Op 2 C-0059 | Os-90 Os-91 | ++ | + | + | \vdash | \vdash | + | + | 3 | H | + | + | \vdash | + | Н | \dashv | + | + | \vdash | \vdash | + | + | 1 | \vdash | + | + | Н | \vdash | + | 5 | | + | + | Н | \vdash | + | + | + | + | + | \vdash | \vdash | + | + | + | \vdash | + | 9 |
| 2 Op 2 C-0059 | Os-92 | | 1 | | | | \perp | 7 | | | | | \blacksquare | \perp | \Box | \neg | 1 | \perp | | \Box | 7 | \perp | | | 7 | \perp | | \Box | | \perp | | \perp | | | \Box | \perp | | 4 | 1 | \perp | | | 4 | | | | | 1 |
| 2 Op 2 C-0059 2 Op 2 C-0059 | Os-93 Os-94 | | | | | | \pm | - 1 | 3 | | | | | | | | | \pm | | | \pm | | | | \pm | | | | | \pm | | | | | | | | | | | | | | | | | | 3 |
| 2 Op 2 C-0059 2 Op 2 C-0059 | Os-95 Os-96 | ++ | 1 4 | + | Н | \vdash | + | 2 | 2 | Н | + | + | H | + | Н | \dashv | + | + | Н | \vdash | + | + | ╁ | \vdash | + | + | Н | \vdash | + | + | + | + | + | | \vdash | + | + | + | + | + | \vdash | Н | + | + | + | \vdash | + | 3 4 |
| 2 Op 2 C-0059 | Os-97 | | | | | | # | | 1 | | | | | \perp | | | 1 | + | | \Box | # | | | | # | | | \Box | | \perp | | | | | | \perp | | _ | 1 | | | | _ | | | | | 11 |
| 2 Op 2 C-0059 2 Op 2 C-0060 | Os-98 AE-1445 | | | | | | \pm | 1 | 6 | | | | | \pm | \Box | \exists | 1 | \pm | | | \pm | | | | \pm | | | | | \pm | | | | | | \pm | | \pm | \pm | | | | \pm | | | | | 6 |
| 2 Op 2 C-0060 2 Op 2 C-0060 | FL53 Os-99 | ++ | + | 5 | Н | \vdash | + | - | 4 | Н | + | + | H | + | Н | \dashv | + | + | Н | \vdash | + | + | ╁ | \vdash | + | + | Н | \vdash | + | + | + | + | + | | \vdash | + | + | + | + | + | \vdash | 2 | + | 1 | 3 | \vdash | + | 9 |
| 2 Op 2 C-0061 | Os-100 | | | Ť | | | \Rightarrow | | 2 | | | | | \perp | | | | \perp | | \Box | # | | | | \bot | | | \Box | | 3 | | | | | \Box | \perp | | \dashv | | | \vdash | | \dashv | | | | | 2 |
| 2 Op 2 C-0061 2 Op 2 C-0061 | Os-301 Os-315 | | | | | | \pm | - | 3 | | | | | + | Н | \dashv | \pm | + | | \Box | \pm | | | | \pm | + | | \Box | \pm | | | | | | | \pm | | \dashv | | | | | \dashv | | | | | 3 3 3 |
| 2 Op 2 C-0061 2 Op 2 C-0062 | Os-319 Os-302 | + | + | + | H | H | + | + | 5 | H | + | + | H | + | + | + | + | + | H | H | + | + | + | H | + | + | H | H | + | 3 | + | + | + | H | H | + | + | + | + | + | \vdash | H | + | + | + | H | + | 5 |
| 2 Op 2 C-0062 | Os-303 | \Box | \perp | | | H | # | - 2 | 2 | \Box | | | Ħ | \mp | \Box | \Rightarrow | 1 | \perp | | H | # | \perp | | H | # | \perp | \Box | H | # | \mp | \Box | \perp | | | Ħ | + | | # | \perp | 1 | \vdash | \Box | # | \perp | \Box | Ħ | | 2 |
| 2 Op 2 C-0062 2 Op 2 C-0062 | Os-304 Os-305 | | 2 | | | | \pm | | 5 | | \pm | | \exists | | | | \pm | | | \exists | \pm | | | | \pm | | | \exists | \pm | | | | | | | | | | | | | | | | | \Box | | 5 2 7 |
| 2 Op 2 C-0062 2 Op 2 C-0062 | Os-306 Os-307 | ++ | 4 | + | H | H | + | - 1 | 7 | H | + | + | H | + | \vdash | - | + | + | \vdash | \vdash | + | + | 1 | \vdash | + | + | \vdash | \vdash | + | + | + | + | + | H | H | + | + | - | + | + | \vdash | \vdash | - | + | + | H | + | 7 |
| 2 Op 2 C-0062 | Os-308 | | 2 | | | | # | | | | | | | \perp | | | 1 | + | | \Box | # | | | | # | | | \Box | | 1 | | | | | | | | _ | 1 | | | | _ | | | | | 3 |
| 2 Op 2 C-0062 2 Op 2 C-0062 | Os-309 Os-310 | | + | + | \vdash | \vdash | + | - 5 | | \vdash | + | + | \vdash | + | \vdash | \dashv | + | + | \vdash | \vdash | + | + | \vdash | \vdash | + | + | \vdash | \vdash | + | + | + | + | + | | \vdash | + | + | + | + | + | + | \vdash | + | + | + | \vdash | + | 5 7 |
| 2 Op 2 C-0062 2 Op 2 C-0062 | Os-313 Os-316 | H | 2 | | H | П | Ŧ | | 1 | | \top | H | \Box | Ŧ | П | \neg | \mp | \blacksquare | П | \Box | \mp | \perp | | | Ŧ | \perp | П | \Box | Ŧ | 2 | H | \top | | | \Box | \mp | H | \neg | \top | \mp | \vdash | П | \neg | \top | \blacksquare | П | - | 7 |
| 2 Op 2 C-0062 | Os-317 | \Box | <u> </u> | | | | \Rightarrow | 1 | 4 | \Box | | | \Box | \pm | \Box | \Rightarrow | \pm | \pm | | 口 | # | $^{+}$ | | \Box | \pm | $^{+}$ | | 口 | \pm | | \Box | \perp | | | \Box | \pm | | \Rightarrow | \perp | $^{\pm}$ | \vdash | | \Rightarrow | \perp | | \Box | | 4 |
| 2 Op 2 C-0062 2 Op 2 C-0062 | Os-320 Os-321 | ++1 | 1 2 | + | \vdash | \vdash | + | + | + | \vdash | + | + | \vdash | + | \vdash | + | + | + | \vdash | \vdash | + | + | \vdash | \vdash | + | + | \vdash | \vdash | + | 1 | + | + | + | \vdash | \vdash | + | + | + | + | + | \vdash | \vdash | + | + | + | \vdash | + | 2 2 |
| 1 Op 2 C-0063 | Os-318 | \Box | 2 | | | H | \mp | \mp | \perp | \Box | \perp | | H | + | | \dashv | \mp | + | | H | \dashv | + | | \Box | \mp | + | П | H | \mp | 4 | \Box | + | | | \dashv | + | | \dashv | \perp | + | \vdash | П | \dashv | \perp | \blacksquare | H | \perp | 2 |
| 1 Op 2 C-0063 | Os-327 Os-329 | \perp | 2 | | | \Box | # | 1 | | | \pm | | \Box | \pm | \Box | | \pm | \pm | | \Box | \pm | | | \Box | \pm | \pm | | \Box | \pm | | | \perp | | | \Box | \pm | | \pm | \perp | \pm | \vdash | | \pm | | \forall | \Box | | 3 |
| 1 Op 2 C-0063 1 Op 2 C-0063 | Os-335 Os-366 | + | + | + | H | H | + | + | + | H | + | + | H | + | + | + | + | + | H | H | + | + | + | H | + | + | H | H | + | 1 | + | + | + | H | H | + | + | + | + | + | \vdash | H | + | + | + | H | + | 1 1 |
| 1 Op 2 C-0063 | Os-367 | \Box | 1 | | | Ħ | \Rightarrow | \mp | \perp | \Box | | | Ħ | \mp | | \Rightarrow | \perp | + | | \Box | \mp | | | \Box | \mp | + | | \Box | \mp | 1 | | \perp | | | \Box | \perp | | \Rightarrow | \perp | \perp | \vdash | | \Rightarrow | | \Box | \Box | | 1 |
| 1 Op 2 C-0063 | Os-370 Os-372 | $\pm \pm$ | 2 | \pm | | | \pm | \pm | \pm | | | \pm | \exists | \pm | | _ | \pm | \pm | | \exists | \pm | \pm | \perp | | \pm | \pm | | \exists | \pm | 1 | | \pm | \pm | | \vdash | \pm | \pm | \pm | \pm | \pm | \pm | | \pm | \pm | | | \pm | 1 |
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| 3 Op 2 C- 1 Op 2 C- | -0098 Os-481 -0099 Os-479 | ++ | 4 | \vdash | + | + | \vdash | + | + | + | + | + | \vdash | \vdash | + | + | \vdash | \dashv | + | + | \vdash | + | + | \vdash | + | + | + | + | 3 | + | + | + | \vdash | + | + | Н | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | 3 |
| 1 Op 2 C | -0099 Os-480 | | 6 | 口 | \Rightarrow | | | | | | \Rightarrow | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | \Rightarrow | | 口 | | | 1 | 6 |
| 1 Op 2 C | -0099 Os-486 | $+$ Γ | $+\Box$ | H | Ŧ | - | \Box | \mp | - | + | \perp | + | 1 | H | + | 2 | H | \dashv | Ŧ | + | H | \pm | + | H | Ŧ | \perp | + | H | 5 | | \pm | + | \vdash | Ŧ | + | H | H | + | + | H | Ŧ | + | H | F | + | 7 | 7 |
| 1 Op 2 C- 1 Op 2 C- | -0100 Os-470 -0100 Os-472 | ++ | 2 | \vdash | + | + | \vdash | + | + | + | + | + | + | \vdash | + | + | \vdash | \dashv | + | + | \vdash | + | + | \vdash | + | + | + | + | 1 | + | + | + | \vdash | + | + | Н | \vdash | + | + | \vdash | + | + | \vdash | + | + | \dashv | 1 2 |
| 92 Op 3 C- | -0101 Os-102 | 7 | | | \Rightarrow | | | \Rightarrow | 1 | \Box | \Rightarrow | \perp | | | \perp | \perp | \Box | \Rightarrow | \rightarrow | \perp | | \Box | | | \Rightarrow | \Rightarrow | | \Box | | | \Rightarrow | \perp | | \Rightarrow | | | | \perp | | | \Rightarrow | | H | \neg | | \rightrightarrows | 8 |
| | -0101 Os-110 -0101 Os-111 | ++ | + | \vdash | + | + | \vdash | + | + | + | + | + | \vdash | \vdash | + | + | + | \dashv | + | + | \vdash | + | + | \vdash | + | + | + | + | 20 | + | + | + | \vdash | + | + | Н | \vdash | + | \vdash | \vdash | + | + | \vdash | + | + | + | 20 1 |
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| Values are NISP | | Г | D D | D I | н | н | н | Н | H/N H | /N H/N | H/N F | I/N H/ | N H/N | H/N H | /N H/ | N H/N | H/N | H/N | H/N | N N | N | N | N N | N | М | М | м м | M | UM U | JM M | М | M M | I M | М | M M | 1 M | M | M N | 1 M | М | S | S S | SS | S | S | s s | т— |
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| Doeration | | nple/ | Canis familiaris Cavia porcellus | Lama sp. | Agouti sp. | Silvylagus sp. | Felis sp. Carnívora n/i | Odocoile us virginia nus | Nothoprocta sp. | Cyanocorax sp. | cf. Fulica sp. | Buteo sp. | Cairina moschata | Zenaida auriculata | Inraupidae | Ave n/i | Didelphis sp. | Lonchophylla sp. | | Anfibio n/i | Reptil n/i | Insecto N/I | Muridae Rattus rattus | Rodentia | Gallus gallus | Bos tarurus | Capra hircus Ovis aries | Sus scrofa | Artiodactyla | Chione subrugosa | Semele Solida | Semele sp. | | Enoplochiton niger | Molusco n/i Fusinus dupetitthouar | Thais chocolata | Molusco Marino n/i | Donax obesulus Protothaca thaca | Engraulis ringens | Sardinops sagax | Bulimulidae | Epiphragmophora sp Thaumasthus sp. | Drepanostomella sp. | Systrophia sp. | | Drymaeus sp. Bostryx sp. | Total |
| <mark>Ш Operation</mark> 92 Op 3 | | Bag -133 | + | \vdash | + | ++ | + | Ť | \vdash | + | \vdash | + | + | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | Н | + | + | + | + | 1 | \vdash | + | F | Н | - " | + | \vdash | + | + | + | \dashv | + | + | + | + | + | 1 |
| 92 Op 3 | C-0101 Os- | -698 | | | | | | | | | | | 土 | | 士 | | | 士 | | | | | | | | 士 | | \Box | | 2 | | | | | | | | | | | | | | | \perp | | 2 |
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| 92 Op 3 92 Op 3 | C-0102 Os- | -106 | | | | | | | | | | | 土 | | 士 | | | 士 | | | | | | | | 士 | | \Box | | 2 | | | | | | | | | | | | | | | \perp | | 2 |
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| 92 Op 3 92 Op 3 | C-0107 Os- | -614 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | | Ë | | | | | | | | | | | 2 |
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| 92 On 3 | C-0145 Os- | -112 | 27 | 1 2 | 4 | \Box | 1 | 1 | | \perp | | 1 | 1 | | 1 | \perp | П | 4 | 7 | 1 | \perp | | 1 | H | H | 7 | 1 | \Box | | 2 | П | 1 | \vdash | П | \Rightarrow | \perp | \Box | 1 | 1 | | \Box | \Rightarrow | \perp | H | 7 | 7 | 47 |
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| 92 Op 3 | C-0146 Os- C-0147 Os- | -700 -497 | 2 | $\overline{}$ | + | + | + | + | \vdash | - | \vdash | - | + | | + | + | \vdash | \dashv | - | + | - | \vdash | _ | \vdash | \Box | \dashv | + | $\overline{}$ | - | 1 | \vdash | _ | _ | \vdash | - | + | \vdash | + | + | \vdash | \dashv | - | + | \vdash | \dashv | + | 1 1 |
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| 4 Op 1 | C-0151 Os- | -624 | 1 | | | | | 3 | | | | | 土 | | 士 | | | 士 | | | | | | | | 士 | | \Box | 3 | 3 | | | | | | | | | | | | | | | \perp | | 5 7 |
| 4 Op 3 4 Op 5 | C-0152 Os- C-0152 Os- | -115 -605 | + | + | + | + | + | + | \vdash | + | \vdash | + | + | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \vdash | + | + | + | 1 | 2 | \vdash | + | + | Н | + | + | \vdash | + | + | + | \dashv | + | + | + | \dashv | + | 1 |
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| 91 Op 5 91 Op 5 | | -600 -601 | + | + | + | + | + | + | \vdash | + | \vdash | + | + | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | Н | + | + | | 1 | + | \vdash | + | + | Н | + | + | \vdash | + | + | + | \dashv | + | + | + | + | + | 1 |
| 4 Op 5 | C-0167 Os- | -596 | \perp | | | \Rightarrow | \perp | \perp | | \perp | | | | | $^{+}$ | \perp | | | | | | | \perp | | | # | \perp | | 1 | | | | | | \perp | \perp | \Box | | | | | \perp | | | \Rightarrow | \Rightarrow | 1 |
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| 4 On 5 | C-0167 Os- | -602 | \perp | | \perp | \Box | \perp | | | | | | \perp | | \perp | | \Box | | | | | | | | | 4 | \perp | | 4 | | | | | | | | П | \perp | \perp | | \Box | | | | \neg | \perp | 4 |
| 4 Op 5 2 Op 5 4 Op 6 | C-0167 Os- C-0169 Os- | -603 -597 | + | 1 | + | + | + | + | \vdash | + | \vdash | + | + | \vdash | + | + | \vdash | \dashv | \dashv | + | + | \vdash | + | + | Н | \dashv | + | + | 1 | + | \vdash | + | + | \vdash | + | + | + | + | + | + | \dashv | + | + | + | \dashv | + | 1 |
| 4 Op 6 4 Op 2 | C-0201 Os- C-0202 Os- | -701 -353 | \perp | | \perp | \Box | \perp | \perp | П | \perp | | \perp | \blacksquare | | \perp | \blacksquare | \Box | \Box | \perp | \perp | \blacksquare | | \perp | | П | \Box | \perp | \Box | 1 | | | | | П | \perp | \blacksquare | П | \perp | \perp | | \Box | \perp | \perp | | \neg | \perp | 1 |
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| 4 Op 6 | | -255 | | 4 | | \Box | | | | | | | | | | | \Box | | | | | | 1 | | | | | \Box | 1 | | | | | | | | П | | | | | | | | \Box | \perp | 6 |
| 4 Op 6 4 Op 6 | C-0202 Os- C-0202 Os- | -259 -260 | + | 1 | + | + | + | + | \vdash | + | | + | + | | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \vdash | + | + | + | + | + | \vdash | + | + | Н | + | + | \vdash | + | + | + | \dashv | + | + | + | \dashv | + | 1 |
| 4 Op 6 | C-0202 Os- | -261 | 1 | | \perp | \Box | 1 | 1 | \Box | \perp | | 1 | | \Box | \perp | \perp | \Box | | _ | | | | 1 | | | 1 | 1 | \Box | 1 | | \Box | | \perp | | 1 | \perp | \Box | 1 | | \blacksquare | \Box | 1 | | \blacksquare | \rightarrow | # | 1 |
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| 4 Op 6 | C-0202 Os- | -707 | \perp | 1 | Ŧ | \Box | \mp | 1 | | Ŧ | | Ŧ | \top | | Ŧ | F | П | \neg | 7 | Ŧ | \vdash | | \mp | F | H | 7 | \mp | | 1 | \perp | \Box | \mp | | П | | F | \sqcap | Ŧ | Ŧ | | \Box | | Ŧ | \Box | \dashv | Ŧ | 1 2 |
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| 4 On 6 | C-0203 Os- | -296 | \perp | 1 | \pm | \Box | 士 | | \Box | \perp | | \pm | | | 士 | \pm | П | | \pm | 1 | | | | | | \Rightarrow | 士 | | | | | | | | \perp | \pm | \Box | \perp | 1 | | | \perp | \pm | | \Rightarrow | \pm | 1 |
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| 4 Op 6 | | -254 -258 | + | 3 | + | ++ | + | + | \vdash | + | \vdash | + | + | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \vdash | + | + | + | 1 | + | \vdash | + | + | \vdash | + | + | + | + | + | + | \vdash | + | + | + | + | + | 3 |
| 4 On 6 | C-0204 Os- | -263 | \perp | | \pm | \Box | \perp | | \Box | | | \perp | | \Box | \downarrow | + | Ħ | | \Rightarrow | \perp | \perp | | | | | \Rightarrow | \perp | \Box | 1 | | | \perp | | | \perp | + | \Box | \perp | \perp | | \Box | \perp | \perp | | \Rightarrow | $^{\pm}$ | 3 |
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| 4 Op 6 | C-0204-209 Os- | -193 | \perp | 5 | 1 | 1 | 1 | 1 | \Box | \perp | | 1 | 1 | | # | I | П | _ | # | 1 | \perp | | 1 | \blacksquare | | # | 1 | \Box | # | | | 1 | | | \perp | I | \Box | 1 | 1 | | | \perp | Ŧ | \Box | # | # | 6 |
| 4 Op 6 4 Op 6 | | -179 -183 | + | 1 | + | ++ | + | + | \vdash | + | \vdash | + | + | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \vdash | + | + | + | 3 | + | \vdash | + | + | \vdash | + | + | + | + | + | + | \dashv | + | + | + | \dashv | + | 3 |
| 4 Op 6 | C-0206 Os- | -186 | 1 | | \mp | \Box | \perp | | \Box | \perp | | \bot | | П | \downarrow | \perp | \Box | \Rightarrow | \Rightarrow | \perp | \perp | | | | | \dashv | \perp | | 4 | | | \perp | | | 1 | \perp | \Box | \perp | \perp | \Box | \Box | 1 | \perp | | \dashv | ightharpoons | 4 |
| 4 Op 6 | C-0206 Os- C-0206 Os- | -190 -198 | + | 1 | + | ++ | + | + | \vdash | + | \vdash | + | + | \vdash | + | + | \forall | \dashv | + | + | + | \vdash | + | + | H | + | + | + | 2 | + | \vdash | + | + | Н | + | + | + | + | + | + | \dashv | + | + | + | + | + | 2 |
| 4 Op 6 | C-0206 Os- | -517 | \Rightarrow | \Box | \perp | \dashv | \perp | | \Box | | | 7 | | | 1 | \perp | H | \Rightarrow | 7 | | | | \perp | | | 7 | \perp | Т | 4 | \perp | \Box | \perp | | П | \dashv | \perp | H | \perp | | \blacksquare | \Box | \dashv | | \Box | 4 | \perp | 4 |
| 4 Op 6 4 Op 6 | | -527 -536 | \exists | | \pm | $\pm +$ | \pm | \pm | | \pm | | _ | \pm | | ᅪ | \pm | H | _ | _ | \pm | \pm | | _ | \pm | H | _+ | \pm | | 1 | \pm | H | \pm | \pm | Н | _ | \pm | | _ | \pm | | \vdash | _ | \pm | | _ | ᅪ | |
| 4 Op 6 | C-0207 Os- | -272 | \bot | \Box | Ŧ | | Ŧ | Ŧ | | Ŧ | | 7 | Ŧ | \Box | Ŧ | F | П | \neg | 7 | Ŧ | Ι. | | 1 | F | П | 7 | Ŧ | \Box | 1 | \perp | П | 7 | \blacksquare | П | \neg | F | \sqcap | 7 | Ŧ | | \Box | \neg | Ŧ | П | 7 | Ŧ | 1 2 |
| 4 Op 6 4 Op 6 | C-0208 Os- C-0208 Os- | -288 -589 | + | 1 | + | 3 | + | + | \vdash | + | \vdash | + | + | \vdash | + | + | \forall | \dashv | + | + | 1 | \vdash | + | + | H | + | + | + | + | + | \vdash | + | + | Н | + | + | + | + | + | + | \dashv | + | + | + | + | + | 4 |
| 4 Op 6 | | -268 | \neg | | \neg | | \neg | | | | | | 1 | Πİ | \neg | | T | \neg | \neg | | | | | 1 | П | \neg | \neg | \Box | 1 | | | | | П | | | | \neg | 1 | \Box | Πİ | | | \Box | | \neg | 1 |

| Values an | e NISP | D | D | D H | Н | н | н | Н | H/N | H/N H/I | N H/N | H/N F | I/N H/I | N H/N F | I/N H/ | N H/N | I H/N I | I/N H | I/N N | N | N | N N | N | N | м м | I M | М | M UN | UM | М | M M | М | М | M | м м | M | M M | I M | М | М | S | s s | S | S | S S | S | |
|---------------------|--|------------------|-----------------|----------------------------|------------|------------|-----------|------------------------|-----------------|---------------|------------|---------------|----------------------------|----------------|-----------|---------|----------------|---------------|------------------------|-------------|------------|------------------------|----------------|---------------|------------------------------|----------|------------|----------------------------|--------------|----------------|-----------------|------------|-----------------|---------------|--------------------------|---------|-----------|---------|----------|-----------------|---------------|----------------|------------|------------|------------------|-------------|-------------|
| | | | | | | П | Ť | | П | | | T | T | | | T | П | Ī | T | | П | T | П | | T | | П | | П | | | | E | | ırsi | | | T | | | \neg | ġ. | ١. | | _ | T | |
| | | liaris | sillas | nanun | á | sb. | , | Odocoileus virginianus | a sp. | sp. | sb. | ď. | e chata | culata | ae | | .ds | la sp. | <u>.</u> | ij/c | ı, | 5 | tus | | snu | sno | se | yla yla | i/u | ugosa | Solida e sp. | . sp. | procer | niger | n/i tthoua | olata | ino n/i | thaca | dens | Sardinops sagax | lidae | s b. | nella sp | .ds | lopena | j. | |
| | | Canis familiaris | Cavia porcellus | Lama sp. agidium peruan | Agouti sp. | Silvylagus | Felis sp. | s virg | Nothoprocta sp. | Colaptes sp. | lica | Buteo sp. | Strigidae Cairina mosch | auri | Thraupida | Ave n/i | phis | nchophylla | Quiróptero Bufo sp. | Anfibio n/i | Reptil n/i | Insecto N/I Muridae | Rattus rattu | Rodentia | Gailus gailus Bos tarurus | a hire | Ovis aries | Sus scrofa Artiodactyla | Mamífero n/i | | | Argopecten | chycardium proc | hitor | olusco n/i dupetittho | choc | Mar | aca | is | s sdo | 3 | S S | 11 5 | Systrophia | Scutalus mariope | Bostryx sp. | Total |
| io B | | sine . | avia . | Lama dium p | Ago | ly l | Fel Fel | ilen | thop | Colay | cf. Fulica | But | Stri | aida | Thra | Æ | Didelphis | မ္မ မ | uiropte | Anfi | Rep | Inse Mu | Sattu | % | Bos 1 | Capre | Š | Sus | Mami | one : | Semele S | gob | card | ploc | Molu nus du | rhais c | usco | toth | ngraul | rdino | Bulim | auma | anos | ystro | utalus | | - |
| F. Pe | Sample/ | ö | ő | Lagi | 1 | S | ٦ | docc | ž | 0 | " | | Cai | Zen | " | | " | ' ا دَ | ٥ | | | | " | - ` | - ا " | ľ | | ` | - | G. | ν | Ā | achy | Eno | usin | Ė | Molu | , la | E G | Sal | - | Epiphr Thau | Drepanosto | S | Scut | ` _ | |
| у Оре 4 С 4 С | eration Context Bag | ++ | \perp | + | + | \vdash | + | P | Н | + | + | \dashv | + | + | \perp | + | \vdash | \perp | + | + | \vdash | 1 | + | \dashv | + | \perp | Н | \vdash | 2 | \perp | 4 | \perp | Ĕ | + | <u> </u> | Ш | \vdash | + | \perp | Н | \dashv | | F | \vdash | \perp | + | |
| 4 C | Op 6 C-0209 Os-571 Op 6 C-0210 FL212 | | | | | | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | 1 | | | 3 |
| 4 C | Op 6 C-0210 Os-266 Op 6 C-0210 Os-269 | ++ | + | + | + | \vdash | + | + | Н | + | + | \dashv | + | + | + | + | + | + | + | + | \vdash | + | + | + | + | + | Н | 1 | | + | + | + | \vdash | + | + | Н | \vdash | + | + | Н | \dashv | + | + | \vdash | + | + | 1 |
| 4 C | Op 6 C-0210 Os-278 | \Box | 7 | 1 | | | 1 | \perp | П | \perp | | \Box | \perp | \Box | \perp | \perp | \Box | 7 | \perp | | \Box | | \Box | \dashv | \top | \vdash | П | 4 | П | \Box | - | \vdash | | 7 | | \Box | | \perp | \vdash | \Box | \dashv | \perp | | \Box | 7 | \perp | 1 |
| 1 4 I C | Op 6 C-0210 Os-404 | | 工 | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | 2 |
| 4 C | Op 6 C-0211 Bo-203 Op 6 C-0211 FL216 | ++ | 1 | 1 | + | \vdash | + | + | Н | + | + | \dashv | + | + | + | + | + | + | + | + | \vdash | + | + | + | + | + | Н | \vdash | Н | \dashv | + | + | \vdash | + | + | Н | \vdash | + | + | Н | \dashv | + | + | \vdash | + | + | 1 |
| 4 C | Op 6 C-0211 FL217 | \blacksquare | \dashv | 1 | | | - | - | П | | | \Box | - | \blacksquare | \perp | + | | \dashv | \perp | | 10 | 3 | | \dashv | \mp | \vdash | \Box | | \Box | \Box | | \vdash | | \dashv | | \Box | | + | \vdash | \Box | \dashv | | | \Box | - | + | 4 10 |
| 1 4 I C | Op 6 C-0211 Os-286 | | # | 1 | | | # | | | | | \equiv | # | | | | | # | # | | 10 | | | # | # | | | | | | | | | # | | | | | | | \Rightarrow | | | | # | \pm | 1 |
| 4 C | Op 6 C-0211 Os-289 Op 6 C-0211 Os-290 | ++ | 2 | 1 | + | \vdash | + | + | Н | + | + | \dashv | + | + | + | + | + | + | + | + | 1 | + | + | + | + | + | Н | 7 | \vdash | + | + | + | \vdash | + | + | Н | \vdash | + | + | \vdash | \dashv | + | + | \vdash | + | + | 12 |
| 4 C | Op 6 C-0211 Os-295 Op 6 C-0211 Os-576 | \blacksquare | | 1 | | | - | - | П | | | \Box | - | \blacksquare | \perp | + | | \dashv | \perp | | \Box | | | \dashv | \mp | \vdash | \Box | | \Box | \Box | | \vdash | | \dashv | | \Box | | + | \vdash | \Box | \dashv | | | \Box | - | + | 1 |
| 14 I C | Op 6 C-0212 Os-189 | | \Rightarrow | _ | | | | | | | | \Rightarrow | | | | \pm | \Box | \Rightarrow | \Rightarrow | | | | | \Rightarrow | \pm | | | 2 | | | | | | \Rightarrow | | | | | | | \Rightarrow | | | | | $^{+}$ | 2 |
| 4 C | Op 6 C-0212 Os-199 Op 6 C-0212 Os-265 | ++ | + | 2 | + | \vdash | + | + | Н | + | + | \dashv | + | + | + | + | + | + | + | + | H | + | + | + | + | + | Н | 1 | Н | + | + | + | \vdash | + | | Н | H | + | + | \vdash | \dashv | + | + | H | + | + | 1 2 |
| 4 C | Op 6 C-0212 Os-270 | \mathbf{H} | | 2 | | \Box | \perp | - | Н | - | | \dashv | \perp | \mathbf{H} | \perp | \top | \blacksquare | \dashv | + | | \Box | - | \blacksquare | \dashv | \mp | \vdash | | 1 | \Box | \Box | - | \vdash | | \dashv | | \Box | \Box | + | \vdash | | \dashv | - | | \Box | \perp | \top | 2 2 1 |
| 4 C | Op 6 C-0212 Os-285 | \pm | 2 | | | | | | | | | \equiv | | | | | | # | \pm | | \exists | | | # | # | | | | | | | | | \Rightarrow | | | | | | | \Rightarrow | | | | | \pm | 2 |
| 4 0 | Op 6 C-0212 Os-542 Op 6 C-0212 Os-703 | ++ | + | + | + | \vdash | + | 1 | Н | + | + | \dashv | + | + | + | + | + | + | + | + | \vdash | + | + | + | + | + | Н | 1 | \vdash | + | + | + | \vdash | + | + | Н | \vdash | + | + | \vdash | \dashv | + | + | \vdash | + | + | 1 |
| 4 C | Op 6 C-0213 Os-159 | \blacksquare | \dashv | 1 | | \Box | \perp | - | Н | - | | \dashv | \perp | \mathbf{H} | \perp | \top | \blacksquare | \dashv | + | | \Box | - | \blacksquare | \dashv | \mp | \vdash | | - | \Box | \Box | - | \vdash | | \dashv | | \Box | \Box | + | \vdash | | \dashv | - | | \Box | \perp | + | 1 |
| 4 C | Op 6 C-0213 Os-280 Op 6 C-0213 Os-424 | | 1 | | | | | | | | | \Rightarrow | | | | | | # | \Rightarrow | | | | | \Rightarrow | \pm | | | | | | | | | \Rightarrow | | | | | | | \Rightarrow | | | | | \pm | 3 |
| 4 C | Op 6 C-0213 Os-435 Op 6 C-0213 Os-438 | ++ | + | 1 | + | \vdash | + | + | Н | + | + | \dashv | + | + | + | + | 1 | + | + | + | \vdash | + | + | + | + | + | Н | \vdash | Н | + | + | + | \vdash | + | + | Н | \vdash | + | + | \vdash | \dashv | + | + | \vdash | + | + | 1 2 |
| 4 C | Op 6 C-0213 Os-442 | \Box | 2 | | | | 1 | 1 | П | \perp | | \Box | - | \Box | \perp | \perp | \Box | 7 | \perp | | \Box | | \Box | \dashv | \top | \vdash | П | | 4 | \Box | - | \vdash | | 7 | | \Box | | \perp | \vdash | \Box | \dashv | \perp | | \Box | 7 | \perp | 12 4 |
| 4 C | Op 6 C-0214 Os-582 | | | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | | 3 | | | | | | | | | | | | | | | | | | | 5 |
| 4 C | Op 6 C-0215 FL214 Op 6 C-0215 Os-291 | ++ | + | 2 | + | \vdash | + | + | Н | + | + | \dashv | + | + | + | + | + | + | + | + | 3 | + | + | + | + | + | Н | 1 | Н | + | + | + | \vdash | + | + | Н | \vdash | + | + | Н | \dashv | + | + | \vdash | + | + | 3 |
| 4 C | Op 6 C-0216 Os-171 | \blacksquare | | 6 | | | - | - | П | | | \Box | - | \blacksquare | \perp | + | | \dashv | \perp | | 1 | | | \dashv | \mp | \vdash | \Box | 3 | | \Box | | \vdash | | 7 | | \Box | | + | \vdash | \Box | \dashv | | | \Box | - | \vdash | 9 |
| 4 C | Op 6 C-0217 Os-705 | | # | | | | | | | | | \Rightarrow | | | | | | # | \Rightarrow | | \Box | | | \Rightarrow | \pm | | | 4 | | | | | | \Rightarrow | | | | | | | \Rightarrow | | | | | \pm | 4 |
| 4 C | Op 6 C-0218 Os-271 Op 6 C-0218 Os-541 | ++ | + | + | + | \vdash | + | + | Н | + | + | \dashv | + | + | + | 2 | + | + | + | + | 1 | 12 | | + | + | + | Н | 3 | Н | + | + | + | \vdash | + | + | Н | \vdash | + | + | \vdash | \dashv | + | + | \vdash | + | + | 18 |
| 4 C | Op 6 C-0218 NE Os-285 Op 6 C-0219 Os-283 | | 2 | - | | 1 | \mp | | Н | - | | \dashv | \mp | 2 | - 2 | | \blacksquare | \perp | + | 2 | \Box | | \blacksquare | \dashv | + | \vdash | | \blacksquare | Н | \blacksquare | \perp | \vdash | | \dashv | | \Box | | + | \vdash | П | \dashv | | | \Box | \mp | + | 5 |
| 4 C | Op 6 C-0220 Os-155 | | | \perp | | | | | | | | \Rightarrow | | | ļ | | \Box | \Rightarrow | \Rightarrow | Ĺ | | | | \Rightarrow | \pm | | | 1 | | | | | | \Rightarrow | | | | | | | \Rightarrow | | | | | $^{+}$ | 1 |
| 1 1 0 | Op 6 C-0220 Os-273 Op 6 C-0222 Os-406 | | 1 | 10 | | | \pm | | Н | \pm | | \exists | | | | \pm | 62 | \pm | \pm | | | 1 | | \pm | \pm | | | 1 | | | | | | \pm | | | | \pm | | | \dashv | \pm | | | \pm | + | 74 |
| 4 C | Op 6 C-0223 Os-166 Op 6 C-0223 Os-274 | + | + | 5 | + | | + | + | Н | + | \vdash | \dashv | + | \vdash | + | + | \vdash | + | + | + | H | 1 | \vdash | \dashv | + | \vdash | Н | 1 | \Box | \vdash | + | \vdash | | \dashv | | Н | \vdash | + | \vdash | \vdash | \dashv | + | + | \vdash | + | + | 6 |
| 4 C | Op 6 C-0224 AE-223 | \bot | # | Ť | | \Box | 1 | | П | \Rightarrow | | \equiv | | \Box | 1 | 1 | \Box | # | # | | \Box | | \Box | # | # | | | | | | | | \Box | # | | | | | | | # | \perp | | | 1 | # | 1 |
| 4 C | Op 6 C-0224 Os-157 Op 6 C-0227 Os-275 | | \pm | 1 | | | \pm | | Н | \pm | | \exists | | | | \pm | | \pm | \pm | | | | | \pm | \pm | | | 1 | | | | | | \pm | | | | \pm | | | \dashv | \pm | | | \pm | + | 1 |
| 4 C | Op 6 C-0227 NW Os-281 Op 6 C-0229 Os-170 | ++ | + | 4 | + | 1 | + | + | Н | + | + | \dashv | + | ++ | + | + | ++ | + | + | + | \vdash | 1 | | + | + | + | Н | 1 | \vdash | + | + | + | \vdash | + | - | Н | \vdash | + | + | \vdash | \dashv | + | + | \vdash | + | + | 3 6 |
| 4 C | Op 6 C-0229 Os-177 | \Box | | | | | | | | 1 | | \Box | | \Box | 1 | \perp | \Box | 7 | \perp | | \Box | | \blacksquare | \dashv | \perp | | | 3 | | | | | \Box | 1 | | \Box | | \perp | | | \dashv | 1 | | | 1 | \perp | 3 |
| 4 0 | Op 6 C-0229 Os-421 Op 6 C-0229 Os-537 | $\pm \pm$ | 2 | | | | \pm | | Н | | | \exists | \pm | | \pm | \pm | | # | \pm | | \exists | 1 | | \pm | \pm | | Н | 4 | Н | | | | | \pm | | Н | | | | | \pm | | | | \pm | \pm | 6 7 |
| 4 C | Op 6 C-0229 Os-559 Op 6 C-0229 Os-587 | ++ | + | 1 | + | 1 | + | + | Н | + | + | \dashv | + | + | + | + | + | + | + | + | \vdash | + | + | + | + | + | Н | \vdash | Н | + | + | + | \vdash | + | + | Н | \vdash | + | + | \vdash | \dashv | + | + | \vdash | + | + | 5 1 |
| 4 C | Op 6 C-0230 NE Os-194 | \Box | 1 | 1 | | \Box | | | | 1 | 1 | \Box | | \Box | 1 | \perp | \Box | 7 | \perp | | \Box | | \blacksquare | \dashv | \perp | | | | 1 | | | | \Box | 1 | | \Box | | \perp | | | \dashv | 1 | | | 1 | \perp | 3 |
| 4 0 | Op 6 C-0230 NE Os-414 Op 6 C-0230 NW Os-429 | | \pm | | | | | | | | 1 | \exists | | | | 1 | \pm | \pm | | | | ² | | \pm | \pm | | | 1 | | | | | | \pm | | | | | | | \pm | | | | | \pm | 1 |
| 4 C | Op 6 C-0230 SE Os-287 Op 6 C-0230 SE Os-408 | ++ | 3 | + | + | \vdash | + | + | Н | + | + | \dashv | + | + | + | + | + | + | + | + | \vdash | + | + | + | + | + | Н | \vdash | 1 | + | + | + | \vdash | + | + | Н | \vdash | + | + | \vdash | \dashv | + | + | \vdash | + | + | 3 1 |
| 4 C | Op 6 C-0230 SE Os-437 | \Box | 3 | \perp | | | # | | | | | \Box | | | | \perp | \Box | # | \perp | | \Box | | | \Rightarrow | \mp | | | | | | | | | # | | | | \perp | | | \Rightarrow | | | | # | + | 3 |
| 4 C | Op 6 C-0230 SE Os-572 Op 6 C-0231 AE-585 | | | 1 | | | \pm | | \Box | \pm | | | \pm | | \pm | \pm | | \pm | \pm | | \exists | \pm | \Box | \pm | \pm | | | 3 | | | | | | \pm | | | | \pm | | | | | | | \pm | \pm | 3 1 |
| 4 C | Op 6 C-0231 FL233 Op 6 C-0231 Os-162 | Π | 2 | Ŧ | \Box | H | Ŧ | F | H | - | \Box | \Box | Ŧ | + | Ŧ | F | H | Ŧ | Ŧ | \Box | H | \pm | \Box | Ŧ | Ŧ | F | H | | 1 | H | Ŧ | F | \Box | \mp | | H | | F | F | H | \dashv | Ŧ | \Box | H | Ŧ | F | 1 |
| 4 C | Op 6 C-0231 Os-415 | \Box | # | 1 | | | \mp | | H | \perp | | \Box | \downarrow | \Box | \perp | + | \Box | # | \mp | | \Box | \perp | Ħ | \Rightarrow | \downarrow | | \Box | 1 | | \Box | 1 | | | \Rightarrow | | | \vdash | + | | | \dashv | \Rightarrow | | \Box | # | + | 1 |
| 4 C | Op 6 C-0231 Os-419 Op 6 C-0231 Os-514 | | | 5 | | | \pm | | | | | | \pm | | \pm | \pm | | \pm | \pm | | | \pm | | \pm | \pm | | | 3 | | | | | | \pm | | | | \pm | | | | | | | \pm | \pm | 3 5 |
| 4 0 | Op 6 C-0231 Os-568 Op 6 C-0231 Os-568 | $+\top$ | 1 | | + | H | + | + | H | + | + | H | F | $+\top$ | F | + | 1 | Ŧ | F | + | H | F | H | Ŧ | F | + | H | \vdash | \Box | H | + | + | $\vdash \vdash$ | Ŧ | + | H | \vdash | + | + | H | \dashv | $-\Gamma$ | + | H | Ŧ | + | 3 |
| 4 C | Op 6 C-0231 Os-708 | \Box | \downarrow | 2 | | \Box | \pm | + | Ħ | \Rightarrow | | \Rightarrow | \pm | \Box | \mp | \pm | \Box | \downarrow | \mp | | | # | Ħ | \Rightarrow | \mp | + | | | \Box | \Rightarrow | \perp | + | \Box | \Rightarrow | | \Box | \vdash | + | + | Ħ | \Rightarrow | \Rightarrow | | | \Rightarrow | + | 2 |
| 4 C | Op 6 C-0231 Os-708 Op 6 C-0232 Os-593 | | \pm | \pm | \pm | H | \pm | \pm | | \pm | \pm | \exists | \pm | ₩ | \pm | \pm | $\pm \pm$ | \pm | \pm | \pm | H | \pm | \pm | \pm | \pm | \pm | | 1 | | \exists | \pm | \pm | | \pm | \pm | Н | $\pm \pm$ | \pm | \pm | H | _ | \pm | \pm | H | \pm | \pm | 1 |
| 4 C | Op 6 C-0232 NE Os-430 Op 6 C-0232 NW Os-195 | $+\top$ | Ŧ | 1 | + | H | + | + | H | + | + | H | F | $+\top$ | F | + | + | Ŧ | F | + | H | F | H | Ŧ | F | + | H | 1 | \Box | H | + | + | \vdash | Ŧ | + | H | \vdash | + | + | H | \dashv | $-\Gamma$ | + | H | Ŧ | + | 1 |
| 4 C | Op 6 C-0232 SE Os-405 | \Box | \Rightarrow | \Rightarrow | | Ħ | \mp | \perp | | 1 | | \Box | \bot | \Box | \perp | + | \Box | \Rightarrow | # | | \Box | 1 | Ħ | \Rightarrow | # | \vdash | | 2 | 2 | \Box | \perp | \vdash | | # | | | \Box | 1 | \vdash | Ħ | # | \Rightarrow | | \Box | # | + | 4 |
| 4 C | Op 6 C-0232 SE Os-592 Op 6 C-0232 W Os-543 | | 1 | \pm | \pm | H | \pm | \pm | | \pm | \pm | \exists | \pm | ₩ | \pm | \pm | $\pm \pm$ | \pm | \pm | \pm | H | \pm | \pm | \pm | \pm | \pm | | 1 | | \exists | \pm | \pm | | \pm | \pm | Н | $\pm \pm$ | \pm | \pm | H | _ | \pm | \pm | H | \pm | \pm | 1 |
| 4 C | Op 6 C-0235 Os-570 Op 6 C-0235 NE Os-518 | + | 2 | F | F | H | Ŧ | F | П | \mp | F | \top | Ŧ | \Box | Ŧ | F | F | Ŧ | Ŧ | F | H | 1 | H | Ŧ | Ŧ | F | П | 7 | П | Ŧ | Ŧ | F | П | \mp | \blacksquare | H | \Box | F | F | H | \exists | \mp | F | H | Ŧ | F | 2 8 |
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| Values are NISP | D E | D I | D H | Н | н | н | н | H H/N | N H/N | H/N I | I/N H/ | N H/N | H/N | H/N H | /N H/ | N H/N | N H/N | H/N | H/N | N N | I N | N | N | N I | N N | и м | М | М | M UI | M UN | 1 M | M I | и м | М | М | М | M N | 1 M | м | M | М | M S | SS | S | S | s s | S | S | |
|---|------------------|-----------------|-------------------------------|------------|----------------|-----------|---------------|---|--------------|----------------|-----------------------------|-----------|------------------|--------------------|--------------|----------|----------------|------------------|----------------|-------------------------|------------|----------------|-----------|---------------|---------------|-------------|--------------|-----------------|------------|--------------|------------------|---------------|----------------|----------|--------------------|----------|---|--------------------|----------------|------------------|-------------------|-----------------|----------|-------------|--------------------|----------------|--------------|-------------|--------------|
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| Policion Sample/ | Canis familiaris | Cavia porcellus | Lama sp. Lagidium peruanun | Agouti sp. | Silvylagus sp. | Felis sp. | Carnívora n/i | Odocoileus virginianus Nothoprocta sp. | Colaptes sp. | Cyanocorax sp. | cf. Fulica sp. Buteo sp. | Strigidae | Cairina moschata | Zenaida auriculata | Passeriforme | Ave n/i | Didelphis sp. | Lonchophylla sp. | Quiróptero n/i | Buto sp. Anfibio n/i | Reptil n/i | Insecto N/I | Muridae | Rattus rattus | Gallus gallus | Bos tarurus | Capra hircus | Ovis aries | Sus scrofa | Mamífero n/i | Chione subrugosa | | Argopecten sp. | | Enoplochiton niger | | Fusinus dupetitthoua Thais chocolata | Molusco Marino n/i | Donax obesulus | Protothaca thaca | Engraulis ringens | Sardinops sagax | ophora | masthus sp. | Drepanostomella sp | Systrophia sp. | Drymaeus sp. | Bostryx sp. | Total |
| Operation Context Bag | ++ | + | + | + | Н | \vdash | — ' | <u> </u> | + | \dashv | + | + | <u> </u> | \vdash | + | + | \vdash | | \vdash | + | + | \vdash | 1 | \dashv | + | + | \vdash | Ш | + | + | \vdash | + | + | Ĕ | ┢ | Н | <u> </u> | + | Ш | - | \dashv | + | + | - | \vdash | + | + | | 1 |
| 4 Op 6 C-0235 NW Os-197 4 Op 6 C-0235 W Os-185 | | | | | | | | | | | | | | | \pm | | | | | | | | Ï | | | | | | 3 | 3 | | | | | | | | | | | | | | | | | | | 3 |
| 4 Op 6 C-0235 W Os-188 4 Op 6 C-0237 AE-587 | ++ | + | 1 | + | \vdash | \vdash | + | + | + | \dashv | + | + | ⊢ | \vdash | 1 | + | + | | + | + | + | \vdash | Н | \dashv | + | + | \vdash | Н | + | + | + | + | + | + | ⊬ | \vdash | + | + | Н | \dashv | \dashv | + | + | + | \vdash | + | + | Н | 1 |
| 4 Op 6 C-0237 FL243 | | \perp | | \perp | | | | \perp | | \Box | | | | | \bot | \perp | | | | | | | 1 | \rightarrow | | \perp | | | | 2 | \Box | \Rightarrow | \perp | | | | | | | | \Box | \Rightarrow | | \perp | | | | | 3 |
| 4 Op 6 C-0237 Os-172 | ++ | + | 2 | + | \vdash | \vdash | + | + | + | \dashv | + | + | \vdash | \vdash | + | + | + | | + | + | + | + | Н | + | + | + | \vdash | Н | 1 | + | + | + | + | + | \vdash | \vdash | + | + | Н | \dashv | + | + | + | + | \vdash | + | + | Н | 2 |
| 4 Op 6 C-0237 Os-300 | | | 1 3 | \vdash | \Box | \Box | 4 | \perp | | \blacksquare | \mp | | | | \mp | + | \blacksquare | | \blacksquare | \mp | + | | \Box | | + | \vdash | | \Box | | + | \Box | 7 | + | | | \Box | | + | \Box | \exists | \dashv | 7 | + | \perp | | \mp | \vdash | | 1 |
| 4 Op 6 C-0237 Os-408 | | | 1 | | | | | | | | | | | | \pm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 1 |
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| 4 Op 6 C-0237 Os-417 4 Op 6 C-0237 Os-418 4 Op 6 C-0237 Os-422 | ++ | + | 1 | + | \vdash | \vdash | + | + | + | \dashv | + | + | \vdash | \vdash | + | + | + | | + | + | + | + | Н | + | + | + | \vdash | Н | 1 | + | + | + | + | + | \vdash | \vdash | + | + | Н | \dashv | + | + | + | + | \vdash | + | + | Н | 1 |
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| 4 Op 7 C-0342 AE-1676 4 Op 7 C-0342 Os-395 4 Op 7 C-0342 Os-421 | \blacksquare | 1 | 1 | \blacksquare | \Box | \perp | \blacksquare | \blacksquare | | \perp | - | П | \dashv | \neg | \perp | \perp | \Box | = | \neg | \perp | \perp | \Box | 2 | \perp | \vdash | Н | \Box | \dashv | _ | \Box | \dashv | \perp | - | | \dashv | - | \blacksquare | \Box | \neg | \perp | \perp | \blacksquare | \vdash | \Box | \perp | \top | \blacksquare | \dashv | 1 |
| 4 Op 7 C-0342 Os-421 4 Op 7 C-0342 Os-431 | ++ | + | + | + | \vdash | + | + | + | | + | | \vdash | \dashv | \dashv | + | + | + | \dashv | \dashv | + | + | + | - | + | + | Н | \vdash | + | | 1 | \dashv | | + | | \dashv | | + | + | \dashv | + | + | + | \vdash | \vdash | + | + | \vdash | \dashv | 1 |
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| 4 Op 7 C-0342 Os-601 4 Op 7 C-0344 Os-387 4 Op 7 C-0344 Os-414 4 Op 7 C-0348 Os-414 4 Op 7 C-0348 Os-427 | ++ | + | 1 | + | \vdash | + | + | + | | + | + | \vdash | \dashv | \rightarrow | + | + | + | \neg | \dashv | + | + | + | \dashv | + | + | Н | \vdash | + | + | 1 | \dashv | _ | + | | \dashv | _ | + | + | + | + | + | + | + | \vdash | + | + | \vdash | + | 1 1 |
| 4 Op 7 C-0348 Os-414 4 Op 7 C-0348 Os-427 4 Op 7 C-0349 Os-430 4 Op 7 C-0349 Os-442 | \blacksquare | \bot | \perp | - | П | \perp | 1 | - | | \perp | 1 | \Box | | \neg | \perp | \perp | \Box | = | \perp | \perp | \perp | П | \neg | \perp | \blacksquare | | | \perp | _ | | \neg | | | | \neg | \perp | \perp | П | \neg | \perp | \perp | \perp | | П | \perp | \perp | \Box | \dashv | 1 |
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| 4 Op 7 C-0349 Os-442 | \perp | \bot | | | | \perp | \perp | | | | | | | \Rightarrow | 1 | | \Box | = | _ | | | | | \perp | | | | \Rightarrow | | 1 | \Rightarrow | | | | 4 | | | \Box | \Rightarrow | | \bot | | | \Box | _ | \bot | \Box | \Rightarrow | 1 |
| 4 Op / C-0349 Os-483 | ++ | + | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | + | + | 4 | \vdash | \dashv | + | + | + | | 121 | + | + | \vdash | + | + | + | 2 | + | + | + | \vdash | + | + | + | + | + | + | + | + | \vdash | \vdash | + | + | \vdash | + | 127 1 |
| 4 Op 7 C-0350 FL166 4 Op 7 C-0350 Os-393 4 Op 7 C-0350 Os-402 4 Op 7 C-0350 Os-405 | \perp | \Rightarrow | \perp | | \Box | \Rightarrow | \perp | | | \perp | \perp | \Box | | | \perp | | \square | | \Rightarrow | \perp | \perp | I | 45 | | \perp | \Box | \Box | # | \perp | 1 | _ | | \perp | | \Rightarrow | \perp | | \Box | # | \perp | \perp | | | \Box | \perp | \perp | Ħ | \Rightarrow | 46 |
| 4 Op 7 C-0350 Os-402 4 Op 7 C-0350 Os-405 4 Op 7 C-0350 Os-465 | ++ | + | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | + | + | 1 | H | \dashv | + | + | + | + | 1 46 | + | + | \vdash | \vdash | + | + | 1 | + | + | + | \vdash | + | + | + | + | + | + | + | + | + | \vdash | + | + | \vdash | + | 2 47 |
| 4 Op / C-0350 Os-465 | | \pm | | | | \perp | | | | | \pm | | | | \perp | Ť | | | \Rightarrow | | \perp | | 13 | 士 | | | | | | \Box | | | | | \Rightarrow | | | 口 | | | \pm | | | \Box | | \perp | \Box | \Rightarrow | 13 |
| 4 Op 7 C-0350 Os-487 | ++ | + | + | + | H | + | + | + | \Box | + | + | \vdash | - | + | + | 7 | \vdash | \dashv | + | + | + | + | 20 32 | + | + | \vdash | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | + | + | + | + | + | + | + | $\vdash \vdash$ | + | + | \vdash | + | 20 39 |
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| 91 Op 10 C-0401 Os-728 91 Op 10 C-0405 Os-726 91 Op 9 C-0405 AE-1198 | ++ | + | 1 | + | \vdash | + | + | + | | + | | \vdash | \dashv | \dashv | + | + | + | \dashv | \dashv | + | + | + | \dashv | + | + | Н | \vdash | + | +- | \vdash | \dashv | | + | | \dashv | | + | + | \dashv | + | + | + | \vdash | \vdash | + | + | \vdash | \dashv | |
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| 91 Op 9 C-0405 Os-730 91 Op 10 C-0406 Os-725 | ++ | + | 1 | + | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | + | + | + | + | \exists | \dashv | + | + | + | \dashv | + | + | Н | \vdash | + | 1 | \vdash | \dashv | + | + | \vdash | \dashv | + | + | + | + | + | + | + | + | \vdash | + | + | \vdash | + | 1 |
| 91 Op 9 C-0409 Os-729 | Η. | 1 ' | | - | П | \perp | \perp | - | | \perp | 1 | \Box | | \neg | \perp | \perp | \Box | = | \perp | \perp | \perp | П | \neg | \perp | \blacksquare | | | \perp | Ι. | \Box | \neg | | | | \neg | \perp | \perp | П | \neg | \perp | \perp | \perp | | П | \perp | \perp | \Box | \dashv | 2 |
| 91 Op 10 C-0410 Os-727 3 Op 2 C-0451 Os-473 1 Op 2 C-0452 Os-493 1 Op 2 C-0453 Os-452 | ++: | 2 . | | + | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | \dashv | + | + | + | \neg | \dashv | + | + | + | 4 | + | + | Н | \vdash | + | 1 | \vdash | \dashv | + | + | \vdash | \dashv | + | + | + | + | + | + | + | \vdash | \vdash | + | + | \vdash | + | 7 |
| 1 Op 2 C-0452 Os-493 | | Т | \neg | | | \perp | \perp | | | \perp | | | | | \perp | \vdash | \Box | | \neg | \perp | \perp | \Box | 4 | \perp | \perp | П | | 7 | 1 | | \neg | | | | 4 | | \perp | \Box | 7 | \perp | \perp | \perp | | | | \perp | | \dashv | 1 |
| 1 On 2 C-0453 Os-458 | ++ | + | 4 | + | \vdash | + | 1 | + | \vdash | + | + | \vdash | \dashv | + | + | + | + | \exists | \dashv | + | + | + | \dashv | + | + | Н | \vdash | + | + | \vdash | \dashv | + | + | \vdash | \dashv | + | + | + | + | + | + | + | + | \vdash | + | + | \vdash | + | 1 |
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| 1 Op 2 C-0456 Os-461 | | - 6 | 6 | | | | | | | | | | | | \perp | | | | \Rightarrow | | | \Box | _ | | | | | # | | | \Rightarrow | | | | # | | | | # | | | | | | | | | \Rightarrow | 6 |
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| 1 Op 2 C-0457 AE-50 | | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | \Rightarrow | 1 |
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| 1 On 2 C-0457 Oc-456 - B | | \pm | | | | | | | | | | | | | | Ė | | | \Rightarrow | | | \Box | | | | | | | | 1 | | | | | | | | \Box | | | | | | | | | | \Rightarrow | 1 7 |
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| 1 Op 2 C-0458 AE-1437 1 Op 2 C-0458 FL62 | 廿 | _ | # | \pm | | \pm | \pm | \pm | | | \pm | | | | | \pm | | | \pm | | \pm | | | | \pm | | | | 士 | | | | \pm | | | | \pm | 世 | \pm | | \pm | 5 | | | | \pm | | \pm | 5 |
| 1 On 2 C-0458 Os-464 | + | Ŧ | - | F | \Box | Ŧ | F | F | \Box | Ŧ | F | П | \exists | Ŧ | Ŧ | F | П | \exists | Ŧ | Ŧ | F | \Box | Ţ | \perp | F | П | Ŧ | Ŧ | - | 5 4 | \exists | Ŧ | F | | \exists | Ŧ | F | \Box | Ŧ | Ŧ | F | F | F | \Box | Ŧ | F | П | Ţ | 5 4 |
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| 1 Op 2 C-0459 Os-453 | \Box | 7 | | | \Box | 7 | \perp | | | 1 | + | П | \dashv | \rightarrow | 1 | + | H | = | 7 | 1 | 1 | \Box | \dashv | \neg | \perp | H | | 1 | \perp | 1 | 7 | 1 | \blacksquare | | 7 | 1 | | \Box | 7 | 1 | \mp | | \vdash | \Box | 7 | + | H | \dashv | 7 |
| 1 Op 2 C-0459 Os-462 1 Op 2 C-0459 Os-463 | | _ | 2 | \pm | | | \pm | \pm | | _ | \pm | \vdash | | | | \pm | \vdash | \exists | _+ | _ | \pm | $\pm \pm$ | _ | \exists | \pm | \Box | | | \pm | 7 | _ | | \pm | | _+ | | \pm | | _ | _ | \pm | \pm | \pm | | | \pm | | _ | 1 9 |
| 1 On 2 C-0450 Oc-485 | \Box | 1 | 2 | | \Box | \perp | T | | | \bot | T | | | | T | \top | \Box | \Box | \neg | \bot | T | \Box | \neg | \perp | \top | \Box | | \bot | \top | \Box | \dashv | | \perp | | \dashv | \perp | \blacksquare | \Box | \Box | \bot | T | \blacksquare | | \Box | \perp | T | \Box | \dashv | 2 |
| 1 Op 2 C-0459 Os-491 2 Op 2 C-0459/465 Os-455 | ++ | 1 | 1 10 1 | + | \vdash | + | 3 | + | \vdash | + | + | Н | \dashv | + | + | + | H | \dashv | + | + | + | + | + | + | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | + | + | + | + | + | + | + | + | + | \vdash | + | + | \vdash | + | 14 |
| 1 Op 2 C-0459 Os-491 2 Op 2 C-0459/465 Os-455 1 Op 2 C-0459/465 Os-65 1 Op 2 C-0463 Os-16 1 Op 2 C-0463 Os-168 | \perp | Ï | Ť | | \Box | \Rightarrow | Ť | | | \perp | \perp | \Box | | | \perp | | \square | | \Rightarrow | \perp | \perp | \Box | \Rightarrow | \perp | \perp | \Box | \Box | # | \perp | 3 | _ | | \perp | | \Rightarrow | \perp | | \Box | # | \perp | | | | \Box | \perp | | Ħ | \Rightarrow | 3 |
| 1 Up 2 C-0463 FL33 | ++ | + | + | + | \vdash | + | 2 | + | \vdash | + | + | \vdash | \dashv | + | + | 1 | | \dashv | + | + | + | + | + | + | + | Н | \vdash | + | + | 1 | + | + | + | \vdash | + | + | + | + | + | +1 | 1 1 | 4 | + | \vdash | - 2 | + | \vdash | + | 9 |
| 1 Op 2 C-0463 Os-168 | \pm | \Rightarrow | \perp | | | \Rightarrow | Ļ | | | | $^{\pm}$ | \Box | | | \perp | Ė | \Box | | \Rightarrow | | | \Box | \Rightarrow | \perp | | \Box | | | 1 | | \Rightarrow | | $^{\pm}$ | | \Rightarrow | | | \Box | \perp | | \pm | | | \Box | | \pm | \Box | \Rightarrow | 1 |
| 1 Op 2 C-0463 Os-173 1 Op 2 C-0463 Os-183 | ++ | + | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | - | + | + | 1 | \vdash | \dashv | + | + | + | + | \dashv | + | + | \vdash | \vdash | + | + | 2 | + | + | + | \vdash | + | + | + | \vdash | + | + | + | + | \vdash | \vdash | + | + | \vdash | + | 3 |
| 1 Op 2 C-0463 Os-184 | | 1 | 1 | | | \pm | | | | | \pm | | | | | Ľ | | | \Rightarrow | | | | | | | | | | | | | | \pm | | | | | | | | | | | | | | | \Rightarrow | 1 |
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| 1 Op 2 C-0464 Os-192 | | | \top | | | | T | | | | | | | \neg | Т | \top | | | | | T | | | | T | | | | 2 | | | | \Box | | | | | | | | T | | | | | T | | \neg | 2 |

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| Period | anis siy | בן | di Ç | Age | 1 | 윤 | E | Odocoileus | Colapt | and | # 6 | Bute | Cairina | aids | 퇸 | ass | ide , | 1 5 | nin | ŭ j | R 8 | luse | ž | Saftu - | 윤 룷 | Bos | ap | 8 | Artic | Nam | Chione | eme Sen | doß. | carc | old | Moli | Thais | Molusco | ž į | tot ran | Sardin | Buli. | m ag | ano | Systro | Drym | | _ |
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| 1 Op 2 C-0464 Os-27 1 Op 2 C-0465 Os-165 | | \perp | \perp | \blacksquare | - | П | \neg | | - | \Box | \neg | \perp | - | - | \Box | \perp | \perp | | П | \neg | \perp | - | 1 | \dashv | - | \blacksquare | \dashv | \rightarrow | _ | \blacksquare | \Box | = | - | | \Box | - | - | \Box | \rightarrow | \perp | \blacksquare | \Box | - | - | \Box | \Box | 工 | 1 |
| 1 Op 2 C-0465 Os-165 1 Op 2 C-0465 Os-169 | | + | + | + | + | \vdash | \dashv | 6 | + | Н | + | + | + | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | \dashv | + | + | 1 | \vdash | + | + | | \vdash | + | + | + | + | + | + | \dashv | + | + | | ++ | | 1 |
| 1 Op 2 C-0465 Os-172 | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| 1 Op 2 C-0465 Os-185 1 Op 2 C-0465 Os-579 | ++ | 1 | | + | + | \vdash | \rightarrow | + | + | \vdash | + | + | + | \vdash | \vdash | - | + | - | \vdash | + | + | + | \vdash | \rightarrow | + | + | \rightarrow | - | - | + | \vdash | + | + | \vdash | \vdash | - | + | \vdash | - | + | + | \dashv | - | + | \vdash | + | | 1 |
| 1 Op 2 C-0465 Os-579 1 Op 2 C-0466 FL34 | | + | + | + | | \vdash | \dashv | \dashv | + | \Box | \dashv | + | + | + | \vdash | _ | + | 1 | \vdash | \dashv | _ | + | 1 | \dashv | + | + | \dashv | _ | _ | + | \vdash | + | + | | | _ | + | \Box | \dashv | + | + | 2 | _ | + | | | | 3 |
| 1 Op 2 C-0466 Os-287 | | \perp | Τ. | \blacksquare | 1 | П | \neg | 5 | - | \Box | \neg | \perp | - | - | \Box | \rightarrow | \perp | | П | \neg | \perp | - | | \dashv | - | \blacksquare | \dashv | \rightarrow | _ | 6 | \Box | = | - | | \Box | - | - | \Box | \rightarrow | \perp | \blacksquare | \Box | - | - | \Box | \Box | 平 | 11 |
| 1 Op 2 C-0466 Os-293 1 Op 2 C-0466 Os-294 | + | 3 | 1 | + | + | \vdash | \rightarrow | 6 | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | \dashv | + | + | 1 | \vdash | + | + | \vdash | \vdash | + | + | + | \dashv | + | + | \vdash | + | + | | + | | 4 |
| 1 Op 2 C-0466 Os-295 | | Ť | 工 | | | | | 9 | | | 士 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 9 |
| 1 Op 2 C-0466 Os-297 4 Op 2 C-0467 AE-1568 | ++ | + | + | + | \vdash | \vdash | - | 1 | + | \vdash | + | + | + | ₩ | \vdash | Н, | | - | \vdash | + | + | + | \square | \rightarrow | + | \vdash | \rightarrow | + | + | + | \vdash | + | + | Ш | \vdash | + | + | \vdash | \rightarrow | + | \vdash | \vdash | + | + | \vdash | + | | 1 |
| 4 Op 2 C-0467 AE-1568 4 Op 2 C-0467 FL6 | | + | + | + | + | \vdash | \dashv | + | + | \vdash | \dashv | + | + | + | \vdash | + | 1 | + | H | + | + | + | \vdash | \dashv | + | + | \dashv | - | + | + | \vdash | + | + | \vdash | | + | + | \vdash | \dashv | + | + | 1 | + | + | | ++ | | 1 |
| 4 Op 2 C-0467 Os-10 | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| 4 Op 2 C-0467 Os-12 4 Op 2 C-0467 Os-13 | ++ | 10 | + | + | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | \vdash | \vdash | + | + | + | \vdash | + | + | + | + | + | 4 | + | \vdash | + | + | \vdash | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | ++ | + | 10 |
| 4 Op 2 C-0467 Os-14 | | 7 | | \pm | \pm | | | _ | \pm | H | _ | ᆂ | \pm | | \vdash | _ | \pm | | | _ | | | H | _† | ╧ | | _† | _ | | 1 | | _ | \pm | | | | \pm | | _+ | _ | | \vdash | | \pm | | | | 8 |
| 4 Op 2 C-0467 Os-18 | | 11 | 1 | \perp | | \Box | \Rightarrow | \blacksquare | \perp | | 4 | | | | \Box | 1 | \perp | | | 4 | | | | \Rightarrow | \perp | \Box | \Rightarrow | 4 | \perp | | | 1 | \perp | | | \perp | \perp | \Box | _ | \perp | \blacksquare | \Box | \perp | | | | | 11 |
| 4 Op 2 C-0467 Os-24 4 Op 2 C-0467 Os-4 | ++ | + | + | + | + | \vdash | \dashv | + | + | \vdash | + | + | + | + | \vdash | + | + | \vdash | \vdash | + | + | + | \vdash | + | + | + | + | + | + | 1 | \vdash | + | + | \vdash | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | ++ | | 1 |
| 4 Op 2 C-0467 Os-7 | | | | | | \Box | | \pm | | | | | | | | \pm | | | | \pm | | | | | \perp | | | \pm | | 1 | | \pm | | | | | | | | \perp | | | | | | | | 1 |
| 4 Op 2 C-0467 Os-8 4 Op 2 C-0467 Os-9 | $+\top$ | 5 | + | \perp | | H | Ţ | Ŧ | + | Н | \perp | | 1 | 1 | H | \perp | - | 1 | П | \perp | - | + | П | Ţ | - | \Box | Ţ | \perp | $-\Gamma$ | 1 | H | \perp | +- | \Box | H | $-\Gamma$ | 1 | \Box | \perp | \perp | \Box | II. | - | 1 | $\perp T$ | +T | | 5 |
| 4 Op 2 C-0467 Os-9 4 Op 2 C-0468 Os-171 | ++ | | 3 | + | + | \vdash | \dashv | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | + | + | + | + | + | + | + | \vdash | + | + | \vdash | \vdash | + | + | + | \dashv | + | + | + | + | + | \vdash | ++ | | 8 |
| 4 Op 2 C-0469 Os-163 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | 2 |
| 4 Op 2 C-0469 Os-182 1 Op 2 C-0470 AE-1588 | ++ | 1 | 1 | + | + | \vdash | \dashv | + | + | \vdash | + | + | + | \vdash | \vdash | - | + | - | \vdash | + | + | + | \vdash | \rightarrow | + | + | \rightarrow | - | - | 1 | \vdash | + | + | \vdash | \vdash | - | + | \vdash | - | + | + | \dashv | - | + | \vdash | + | | 2 |
| 1 Op 2 C-0470 AE-1588 1 Op 2 C-0470 FL10 | | +1 | + | + | + | \vdash | \dashv | + | + | \vdash | \dashv | + | + | + | \vdash | _ | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | \dashv | - | + | + | \vdash | + | + | \vdash | | + | + | \vdash | \dashv | 1 | + | \vdash | + | + | | ++ | + | 1 |
| 1 Op 2 C-0470 Os-25 | | | | | | | | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 4 |
| 1 Op 2 C-0470 Os-25 1 Op 2 C-0470 Os-39 | + | + | + | + | + | \vdash | \rightarrow | 4 | + | \vdash | + | + | + | \vdash | \vdash | - 1 | 1 | \vdash | \vdash | + | + | + | \vdash | \rightarrow | + | + | \rightarrow | + | + | + | \vdash | + | + | \vdash | \vdash | + | + | + | + | + | + | \dashv | + | + | \vdash | + | | 4 |
| 1 Op 2 C-0470 Os-39 1 Op 2 C-0470 Os-43 | | + | + | + | | \vdash | \dashv | - | + | \Box | \dashv | + | + | + | \vdash | ٠, | 1 | 1 | \vdash | \dashv | _ | + | \Box | \dashv | + | + | \dashv | _ | _ | + | \vdash | + | + | | | _ | + | \Box | \dashv | + | + | \vdash | _ | + | | | | 1 |
| 1 Op 2 C-0471 FL4 | | \perp | \perp | \perp | | | \neg | \perp | \perp | | \neg | | \perp | | \Box | \perp | \perp | | | \perp | | | | \neg | \perp | | \neg | \neg | \perp | \blacksquare | \Box | \perp | \perp | | \Box | \perp | \perp | \Box | \Box | \perp | | 2 | \perp | | | \perp | | 2 |
| 1 Op 2 C-0471 Os-14 1 Op 2 C-0471 Os-26 | + | 3 | + | + | + | \vdash | \rightarrow | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | \dashv | + | + | 1 | \vdash | + | + | \vdash | \vdash | + | + | + | \dashv | + | + | \dashv | + | + | | + | + | 1 |
| 1 Op 2 C-0471 Os-5 | | 1 | $^{+}$ | \top | | \Box | | \dashv | \top | П | \dashv | \top | 1 | 1 | \vdash | \neg | \top | 1 | \Box | \neg | \top | | П | \dashv | \top | \Box | \dashv | \neg | | + | \Box | \top | 1 | | | _ | \top | \Box | | \top | \top | \vdash | | | | | | 1 |
| 4 Op 2 C-0472 AE-1570 | 1 | 1 | \perp | \perp | | \Box | - | \perp | \perp | | \perp | \perp | | - | \Box | \perp | \perp | | \Box | \perp | \perp | _ | | \rightarrow | \perp | | \rightarrow | \perp | | | \Box | \perp | \perp | | \Box | \perp | \perp | \Box | \perp | \perp | | \Box | \perp | | | \perp | | 1 |
| 4 Op 2 C-0472 AE-1575 4 Op 2 C-0472 Os-22 | +++ | + | + | + | + | \vdash | \dashv | + | + | \vdash | + | + | + | + | \vdash | - | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | \dashv | - | - | 1 1 | \vdash | + | + | \vdash | \vdash | - | + | \vdash | \dashv | + | + | \vdash | + | + | \vdash | + | | 1 |
| 4 Op 2 C-0472 Os-28 | | 3 | 1 | + | | \vdash | \dashv | \dashv | + | \Box | \dashv | + | + | + | \vdash | _ | + | 1 | \vdash | \dashv | _ | + | | \dashv | + | + | \dashv | _ | _ | + | \vdash | + | + | | | _ | + | \Box | \dashv | + | + | \vdash | _ | + | | | | 4 |
| 4 Op 2 C-0472 Os-29 | | 3 | | | | | | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 11 |
| 4 Op 2 C-0472 Os-45 4 Op 2 C-0472 Os-603 | ++ | + | + | + | + | \vdash | \rightarrow | + | + | \vdash | + | + | + | \vdash | \vdash | - | + | - | \vdash | + | + | + | \vdash | \rightarrow | + | + | \rightarrow | - | - | 1 | \vdash | + | + | \vdash | \vdash | - | + | \vdash | - | + | + | \dashv | - | + | \vdash | + | | 1 |
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| 4 Op 2 C-0473 Os-195 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | | | | \Box | | | | | | | | | | 2 |
| 4 Op 2 C-0473 Os-198 | | 2 | \perp | \perp | | \Box | \neg | | \perp | | _ | \perp | _ | - | \Box | \perp | | _ | \Box | _ | \perp | | | \rightarrow | \perp | \blacksquare | \rightarrow | _ | | \blacksquare | \Box | _ | _ | | \Box | \perp | \perp | \Box | _ | \perp | \blacksquare | \Box | \perp | | | \perp | | 2 |
| 4 Op 2 C-0473 Os-202 4 Op 2 C-0473 Os-21 | 1 1 | + | + | + | + | \vdash | \dashv | 8 | + | \vdash | + | + | + | + | \vdash | - | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | \dashv | - | - | 1 | \vdash | + | + | \vdash | \vdash | - | + | \vdash | \dashv | + | + | + | + | + | \vdash | + | | 10 |
| 4 Op 2 C-0473 Os-258 | | 1 | + | + | | \vdash | \dashv | \dashv | + | \Box | \dashv | + | + | + | \vdash | _ | + | 1 | \vdash | \dashv | _ | + | | \dashv | + | + | \dashv | _ | _ | + | \vdash | + | + | | | _ | + | \Box | \dashv | + | + | \vdash | _ | + | | | | 1 |
| 4 Op 2 C-0473 Os-266 | | \perp | 1 | | | \Box | \rightrightarrows | \Rightarrow | | | \Rightarrow | \perp | | | \Box | \perp | \perp | | | ightharpoons | | | | \rightrightarrows | \Rightarrow | | \rightrightarrows | ightharpoons | | 4 | | ightharpoons | | | | \perp | \perp | \Box | \Box | \Rightarrow | | \Box | | | | \Box | | 5 |
| 4 Op 2 C-0473 Os-270 4 Op 2 C-0473 Os-285 | ₩. | 1 6 | + | + | \vdash | \vdash | \dashv | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | \vdash | \vdash | + | + | + | \vdash | + | + | + | + | + | + | 2 | \vdash | + | + | \vdash | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | ++ | | 7 |
| 4 Op 2 C-0473 Os-285 4 Op 2 C-0473 Os-285 | ++ | +° | + | + | + | \vdash | \dashv | + | + | \vdash | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | + | + | + | + | + | 1 | + | \vdash | + | + | \vdash | \vdash | + | + | + | + | + | + | + | + | + | \vdash | ++ | | 1 |
| 4 Op 2 C-0473 Os-37 | 1 | 1 1 | İ | İ | | | ゴ | ゴ | 土 | | | | | | | | 土 | | | | | | | | 工 | | | | | | | | 上 | | | | 土 | | | 工 | | | 工 | | | | | 2 |
| 4 Op 2 C-0473 Os-587 | \perp | \perp | Ţ. | \perp | | П | | \perp | 1 | П | \perp | | 1 | \perp | \Box | \perp | | | П | \perp | - | | Щ | Ţ | \perp | \Box | Ţ | T | 1 | \Box | П | \perp | 1 | \Box | \Box | \perp | 1 | \Box | \perp | \perp | \Box | J | \perp | | $\perp T$ | + | | 1 |
| 1 Op 2 C-0474 FL3 1 Op 2 C-0474 Os-11 | ++ | + | 1 | + | + | \vdash | \dashv | + | + | \vdash | + | + | + | + | \vdash | + | + | \vdash | \vdash | + | + | + | \vdash | \dashv | + | + | \dashv | + | + | + | \vdash | + | + | \vdash | \vdash | + | + | + | + | + | + | 2 | + | + | \vdash | ++ | | 1 |
| 1 Op 2 C-0474 Os-23 | + | \top | + | \top | | \vdash | \dashv | \top | \top | \Box | \top | + | + | + | \vdash | \top | \top | | \vdash | \top | | | \Box | \dashv | \top | + | \dashv | \perp | \top | 1 | \vdash | + | \top | \Box | \vdash | \top | + | + | \neg | \top | \top | \vdash | \top | | \vdash | + | | 1 |
| 1 Op 2 C-0474 Os-6 | | \perp | \perp | | | \Box | \rightrightarrows | 1 | | | \Rightarrow | \perp | | | \Box | \perp | \perp | | | ightharpoons | | | | \rightrightarrows | \Rightarrow | | \rightrightarrows | \rightrightarrows | | | | ightharpoons | | | | \perp | \perp | \Box | \Box | \Rightarrow | | \Box | | | | \Box | _ | 1 |
| 4 Op 2 C-0475 AE-1574 4 Op 2 C-0475 FL12 | , | 1 | + | + | + | \vdash | \dashv | + | + | \vdash | + | + | + | \vdash | $\vdash \vdash$ | + | + | \vdash | \vdash | + | + | + | \vdash | + | + | + | + | + | + | + | \vdash | + | + | \vdash | \vdash | + | + | \vdash | + | + | + | $\vdash \vdash$ | + | + | \vdash | ++ | | 7 |
| 4 Op 2 C-0475 FL12 4 Op 2 C-0475 Os-161 | ++' | 2 | + | + | + | \vdash | \dashv | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | + | + | + | + | + | + | + | \vdash | + | + | \vdash | \vdash | + | + | + | \dashv | + | + | + | + | + | \vdash | ++ | | 2 |
| 4 Op 2 C-0475 Os-20 | | | | | | | | | | | | | | | | 土 | | | | 土 | | | | | \perp | | | 土 | | 1 | | 土 | | | | | | | | | | | | | | | | 1 |
| 4 Op 2 C-0475 Os-273 | $+\top$ | 5 | | + | 1 | H | 7 | T | 1 | П | Ţ | \perp | 1 | | H | Ţ | \perp | 1 | П | Ţ | Γ | + | П | Ţ | 二 | \Box | Ţ | Ţ | $-\Gamma$ | \Box | H | \perp | 1 | \Box | H | \perp | 1 | \Box | Ţ | \perp | \Box | H. | - | 1 | H | +T | | 5 |
| 4 Op 2 C-0475 Os-30 4 Op 2 C-0475 Os-31 | ++ | 1 | | + | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | + | \vdash | + | + | + | + | + | + | + | \vdash | + | + | \vdash | \vdash | + | + | \vdash | + | + | + | + | + | + | \vdash | ++ | | 1 |
| 4 Op 2 C-0475 Os-33 | | 5 | | + | + | \vdash | \dashv | + | + | \vdash | + | + | $^{+}$ | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | \dashv | + | \top | + | \vdash | + | + | ш | \vdash | \top | + | 1 1 | \dashv | + | + | \vdash | \top | | | + | | 5 |
| 4 Op 2 C-0475 Os-34 | | | T | | | \Box | \rightrightarrows | \Rightarrow | \perp | | \Rightarrow | | \perp | | \Box | \perp | | | | \Rightarrow | \perp | | | \Rightarrow | \Rightarrow | | \Rightarrow | \perp | | 1 | | \perp | | | | | | \Box | | ightharpoons | | \Box | | | | \perp | | 1 |
| 4 Op 2 C-0475 Os-35 | + | 5 | | + | | \vdash | 1 | \perp | + | \sqcup | 4 | _ | + | 1 | \Box | \perp | + | 1 | Щ | 4 | - | _ | \sqcup | _ | \perp | + | _ | - | \perp | + | HГ | 4 | \perp | \square | \vdash | \perp | + | +1 | \perp | \perp | \Box | \Box | _ | 1 | \vdash | + | | 5 |
| 4 Op 2 C-0475 Os-36 4 Op 2 C-0475 Os-38 | ++1 | 1 4 | | + | + | \vdash | \dashv | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | \vdash | \vdash | + | + | + | \vdash | + | + | + | + | + | + | + | \vdash | + | + | \vdash | \vdash | + | + | \vdash | + | + | + | + | + | + | \vdash | ++ | | 5 |
| 4 Op 2 C-0475 Os-38 4 Op 2 C-0475 Os-40 | | +* | + | + | + | \vdash | \dashv | + | + | \vdash | + | + | $^{+}$ | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | \dashv | + | \top | 1 | \vdash | + | + | ш | \vdash | \top | + | 1 1 | \dashv | + | + | \vdash | \top | | | + | | 1 |
| 4 Op 2 C-0475 Os-41 | | 1 | | | | | | | | | | | | | | 土 | | | | 土 | | | | | \perp | | | 土 | | | | 土 | | | | | | | | | | | | | | | | 1 |
| 4 Op 2 C-0475 Os-42 | 1 7 | 1 7 | 1 | \perp | | П | | \perp | 1 | П | \perp | | 1 | \perp | \Box | \perp | _ | | П | \perp | - | | Щ | Ţ | \perp | \Box | Ţ | T | \Box | 2 | П | \perp | 1 | | \Box | \perp | 1 | \Box | \perp | \perp | \Box | \Box | \perp | | $\perp T$ | + | 4 | 10 |
| 4 Op 2 C-0475 Os-44 4 Op 2 C-0475 Os-585 | + | + | + | + | + | \vdash | + | + | + | \vdash | + | + | + | + | \vdash | + | + | \vdash | \vdash | + | + | - | \vdash | + | + | + | + | + | + | 1 | \vdash | + | + | \vdash | \vdash | + | + | + | + | + | + | \vdash | + | + | \vdash | ++ | | 1 |
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| Values are NISP | | | D D | D | н | н н | Н | н | H H/ | N H/N | H/N H | N H/N | H/N H | /N H/ | N H/N | H/N F | I/N H | /N H/N | N H/N | N | N N | N N | N | N N | N M | М | M I | м м | UM | UM N | и м | M | M I | и м | M | M M | M | М | M | M N | / S | S | S | S S | S | S S | S | \neg |
|----------------------------|------------------|------------------------|----------------------------------|-----------|-------------------|---------------------------|----------------|---------------|---|--------------|----------------|----------------|-----------------|--------------------|------------|---------------|---------------|------------------|----------------|----------|-------------|-------------|----------------|---------------|---------------|----------------|---------------|--------------------------|--------------|----------------|---------------|------------|----------------|--------------------|-------------|----------------------|--------------------|----------------|---------------------|---------------|-------------|-----------------|---|---------------------------------------|--------------------|--------------|-----|---------|
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| 0 Operation 4 Op 2 4 Op 2 | Context | Sample/ Bag FL13 | Canis familiaris Cavia porcellus | Lama sp. | Lagidium peruanum | Agouti sp. Silvylagus sp. | Felis sp. | Carnívora n/i | Odocoileus virginianus Nothoprocta sp. | Colaptes sp. | Cyanocorax sp. | | Strigidae | Zenaida auriculata | Thraupidae | Passeriforme | | Lonchophylla sp. | Quiróptero n/i | Bufo sp. | Anfibio n/i | Insecto N/I | Muridae | Rattus rattus | Gallus gallus | Bos tarurus | Capra hircus | Ovis aries Sus scrofa | Artiodactyla | Mamífero n/i | Semele Solida | Semele sp. | Argopecten sp. | Enoplochiton niger | Molusco n/i | Fusinus dupetitthoua | Molusco Marino n/i | Donax obesulus | Protothaca thaca | llis r | Bulimulidae | Epiphragmophora | Thaumasthus sp. | Urepanostomella sp. Systrophia sp. | Scutalus mariopena | Drymaeus sp. | Ros | Total |
| 4 Op 2 | C-0477 C-0477 | FL13 | 4 | + | \vdash | + | + | \vdash | + | + | + | _ | \vdash | + | + | \dashv | + | + | + | \vdash | + | + | \vdash | \vdash | + | + | + | + | \vdash | 1 | + | \vdash | \vdash | - | \vdash | + | + | \vdash | \rightarrow | + | 4 | + | \vdash | + | \vdash | + | | 4 |
| 4 Op 2 4 Op 2 | C-0477 | FL8 | ⊢+" | + | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \dashv | + | + | \vdash | \vdash | + | + | \vdash | \vdash | + | \vdash | \dashv | + | + | 3 | + | \vdash | \vdash | + | + | \dashv | + | \vdash | \dashv | \dashv | + | \vdash | \vdash | + | + | \dashv | | 3 |
| 4 Op 2 | C-0477 | Os-164 | | 25 | 1 | | | | | | | | | | | | 土 | | | | | | 7 | | 土 | | | | | | | | | | | | | | ユ | | | | | | | | - : | 33 |
| 4 Op 2 | C-0477 | Os-170 | \vdash | 15 | - | \perp | \perp | \Box | \perp | | \perp | \perp | \Box | \perp | \vdash | \rightarrow | \perp | \perp | \blacksquare | \Box | \perp | \perp | - | - | \perp | - | \rightarrow | \perp | \vdash | \perp | \perp | \vdash | | \perp | \square | - | | \Box | \dashv | \perp | \perp | \blacksquare | - | \perp | \vdash | - | | 15 |
| 4 Op 2 4 Op 2 | C-0477 C-0477 | Os-174 Os-187 | | 3 | + | + | + | \vdash | 3 | + | + | + | \vdash | + | + | \dashv | + | + | + | \vdash | + | + | + | - | + | + | + | + | + | - | + | \vdash | \vdash | - | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \dashv | + | 3 |
| 4 Op 2 | C-0477 | Os-268 | | + | + | + | + | H | Ť | + | + | + | \vdash | + | \top | \dashv | + | + | \vdash | \vdash | + | + | \Box | \vdash | + | \Box | \dashv | + | 3 | \top | \top | \vdash | \vdash | \top | \vdash | \neg | | \vdash | \dashv | \top | + | \vdash | \vdash | + | + | \neg | + | 3 |
| 4 Op 2 | C-0477 | Os-32 | | 1 | \Box | \perp | \blacksquare | \Box | \perp | | \perp | \blacksquare | | \perp | | \Box | \perp | \perp | \Box | \Box | \perp | \perp | \Box | | \perp | \blacksquare | \neg | \perp | | \perp | \perp | | | \perp | \Box | \perp | | П | \dashv | \perp | \perp | \Box | | \perp | | \perp | | 1 |
| 4 Op 2 4 Op 2 | C-0477 C-0479 | Os-586 FL32 | \vdash | + | + | + | + | \vdash | + | + | + | + | \vdash | + | + | \dashv | 1 | + | \vdash | \dashv | + | + | \vdash | + | + | + | + | + | \vdash | 1 | + | \vdash | \vdash | + | \vdash | + | + | \vdash | \dashv | + | + | \vdash | \vdash | + | \vdash | + | | 1 |
| 4 Op 2 | C-0479 | Os-162 | | 1 | \vdash | + | + | \vdash | \vdash | | + | | \vdash | + | + | \dashv | + | + | \vdash | \dashv | + | + | \vdash | \vdash | + | \vdash | \dashv | + | + | + | | \vdash | | | + | - | | \vdash | \dashv | + | + | \vdash | \vdash | + | + | \perp | | 1 |
| 4 Op 2 | C-0479 | Os-47 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| 4 Op 2 | C-0479 | Os-48 | \vdash | 4 | \vdash | + | + | \vdash | - | + | + | _ | \vdash | + | \vdash | \rightarrow | + | + | \vdash | \vdash | + | + | \vdash | \vdash | + | \vdash | \rightarrow | + | \vdash | _ | + | \vdash | \vdash | + | \vdash | - | \perp | \vdash | - | + | + | \vdash | \vdash | + | \vdash | + | + | 4 |
| 4 Op 2 4 Op 2 4 Op 2 | C-0479 C-0480 | Os-50 AE-1592 | \vdash | 1 | \vdash | + | + | \vdash | + | + | + | + | \vdash | + | + | + | + | + | \vdash | \dashv | + | + | \vdash | \vdash | + | \vdash | + | + | + | + | + | \vdash | \vdash | + | + | + | | \vdash | \dashv | + | + | \vdash | \vdash | + | + | + | | 1 |
| 4 Op 2 4 Op 2 | C-0480 | Os-280 | 1 | 3 | | \perp | | | | | \perp | | | \pm | | | 士 | | | | 土 | | | | \pm | | | | | 士 | | | | | | | | | \exists | | | | | | | | | 4 |
| 4 Op 2 | C-0480 | Os-288 | $+\Gamma$ | 1.7 | H | F | + | H | 2 | $+\Box$ | Ŧ | - | H | F | \Box | 7 | Ŧ | \perp | H | H | Ŧ | + | H | \perp | F | H | T | \perp | + | \perp | + | F | $\perp \Gamma$ | $-\Gamma$ | \Box | \perp | | H | 7 | \perp | \perp | H | $\vdash \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \!$ | _ | + | Ŧ | + | 2 |
| 4 Op 2 4 Op 2 | C-0480 C-0480 | Os-46 Os-49 | \vdash | 3 | \vdash | + | + | \vdash | + | + | + | + | \vdash | + | + | + | + | + | + | \vdash | + | + | \vdash | \vdash | + | + | + | + | + | + | + | \vdash | \vdash | + | + | + | | \vdash | \dashv | + | + | + | \vdash | + | + | + | + | 3 |
| 4 Op 2 | C-0481 | Os-160 | | | | | | | | | | | | | | | 土 | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | 1 |
| 4 Op 2 | C-0481 | Os-180 | | 1 | \Box | \perp | \perp | \Box | \perp | | \perp | | | \perp | \perp | \perp | \perp | \perp | \Box | | \perp | \perp | \Box | | \perp | \Box | \perp | \perp | \Box | | \perp | \Box | | \perp | \Box | | | Ш | _ | \perp | \perp | \Box | | \perp | \Box | \perp | | 1 |
| 2 Op 2 2 Op 2 | C-0482 C-0482 | AE-1729 Os-200 | | + | + | + | + | \vdash | + | + | + | + | \vdash | + | + | \dashv | + | + | + | \vdash | + | + | + | - | + | + | + | + | + | 1 | + | \vdash | 1 | - | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \dashv | | 1 |
| 2 Op 2 2 Op 2 | C-0482 | Os-271 | | 1 | 2 | + | + | H | \dashv | + | \dashv | _ | \vdash | + | + | \dashv | + | + | + | \vdash | + | + | \Box | | + | \Box | \dashv | + | + | 1 | + | | \vdash | _ | \Box | \dashv | | \vdash | \dashv | + | + | + | \vdash | + | + | \dashv | | 3 |
| 2 On 2 | C-0482 | Os-286 | 1 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 6 |
| 2 Op 2 2 Op 2 | C-0482 | Os-291 | \vdash | 7 | _ | + | + | \vdash | - | + | + | _ | \vdash | + | \vdash | \rightarrow | + | + | \vdash | \vdash | + | + | \vdash | \vdash | + | \vdash | \rightarrow | + | \vdash | _ | + | \vdash | \vdash | + | \vdash | - | \perp | \vdash | - | + | + | \vdash | \vdash | + | \vdash | + | | 7 |
| 2 Op 2 4 Op 2 | C-0483 C-0486 | Os-281 Os-176 | | 1 | + | + | + | H | + | + | + | + | \vdash | + | + | \dashv | 1 | + | + | \vdash | + | + | + | - | + | + | \dashv | + | + | _ | + | \vdash | \vdash | + | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \dashv | + | 1 |
| 4 Op 2 | C-0486 | Os-194 | | 9 | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | \Box | | | | | | | | | | | | 1 | 10 |
| 91 Op 2 | C-0488 | Os-177 | | 1 | \Box | \perp | \perp | \Box | \perp | | \perp | | | \perp | \perp | \perp | \perp | \perp | \Box | | \perp | \perp | \Box | | \perp | \Box | \perp | \perp | \Box | | \perp | \Box | | \perp | \Box | | | Ш | _ | \perp | \perp | \Box | | \perp | \Box | \perp | | 1 |
| 91 Op 2 91 Op 2 | C-0488 C-0488 | Os-179 Os-262 | | 2 | + | + | + | \vdash | + | + | + | + | \vdash | + | + | \dashv | + | + | + | \vdash | + | + | + | \vdash | + | + | + | + | + | 1 | + | \vdash | \vdash | - | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \dashv | + | 2 |
| 91 Op 2 | C-0489 | Os-178 | | 1 | + | + | + | H | \top | \top | + | + | \vdash | + | \top | \dashv | + | + | \vdash | \vdash | + | + | \Box | \vdash | + | \Box | \dashv | + | + | 2 | \top | \vdash | \vdash | \top | \vdash | \neg | | \vdash | \dashv | \top | + | \vdash | \vdash | + | + | \neg | | 2 |
| 91 Op 1 | C-0491 | Os-588 | | \Box | | | | | \Rightarrow | | | | | | | _ | \Rightarrow | \perp | \Box | | | | | | | | \Rightarrow | | 1 | | | | | | \Box | \Rightarrow | | | \Rightarrow | \Rightarrow | \perp | \Box | | | | | | 1 |
| 91 Op 2 2 Op 2 | C-0491 C-0492 | Os-196 FL16/FL37 | | 8 | \vdash | + | + | \vdash | + | + | + | _ | \vdash | + | + | \dashv | + | + | + | \vdash | + | + | \vdash | - | | + | + | + | \vdash | - | + | \vdash | \vdash | - | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | \vdash | + | | 1 |
| 2 Op 2 | C-0492 | FL23 | 2 | + | \vdash | + | + | H | + | + | + | + | \vdash | + | + | \dashv | + | + | + | \vdash | + | + | + | | + | + | \dashv | + | + | _ | + | \vdash | \vdash | + | \vdash | + | + | \vdash | \dashv | + | 1 | + | \vdash | + | + | \dashv | + | 3 |
| 4 Op 2 | C-0495 | FL25 | | | | | | | | | | | | | | | 土 | | | | | | 1 | | 土 | | | | | | | | | | | | | | ユ | | | | | | | | | 1 |
| 2 Op 2 2 Op 2 | C-0496 | Os-278 | | 1 | 1 | _ | \perp | Ш | _ | \perp | _ | _ | \vdash | _ | \perp | - | _ | _ | \vdash | \Box | _ | _ | 1.1 | \perp | \perp | \vdash | \rightarrow | _ | \vdash | _ | _ | \vdash | \perp | _ | \vdash | \rightarrow | \perp | Ш | _ | \rightarrow | _ | \vdash | \vdash | _ | \vdash | _ | | 2 |
| 2 Op 2 2 Op 2 | C-0496 C-0497 | Os-289 Os-175 | | 1 | \vdash | + | + | H | + | + | + | + | \vdash | + | + | \dashv | + | + | + | \vdash | + | + | 1 | - | + | + | \dashv | + | + | _ | + | \vdash | \vdash | + | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \dashv | | 1 |
| 2 Op 2 | C-0497 | Os-186 | | 1 | \vdash | \top | + | \Box | | | \top | | \vdash | \top | | | \top | \top | \vdash | \Box | \neg | \top | \Box | | + | \Box | \neg | \top | | \top | | \vdash | | | + | \neg | | \vdash | \dashv | \neg | \top | \vdash | | \top | | | | 1 |
| 4 Op 2 | C-0498 | Os-191 | | 6 | \Box | \perp | \blacksquare | \Box | \perp | | \perp | | | \perp | | \Box | \perp | \perp | | | \perp | \perp | \blacksquare | | \perp | \blacksquare | \Box | \perp | | | \perp | | | \perp | \Box | | | | \Box | \perp | \perp | | | \perp | | \perp | | 6 |
| 4 Op 2 4 Op 2 | C-0498 C-0499 | Os-274 FL21 | | + | \vdash | + | + | \vdash | + | + | + | + | \vdash | + | + | \dashv | + | + | + | \vdash | + | + | + | \vdash | + | + | + | + | + | 3 | + | \vdash | \vdash | - | \vdash | + | + | \vdash | \dashv | + | 10 | + | \vdash | + | + | \dashv | | 3 10 |
| 4 Op 2 | C-0499 | Os-166 | \vdash | + | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \dashv | + | + | \vdash | \vdash | + | + | \vdash | \vdash | + | \vdash | \dashv | + | + | 2 | + | Н | \vdash | + | + | + | | \vdash | \dashv | + | +" | \vdash | \vdash | + | + | + | | 2 |
| 4 Op 2 | C-0499 | Os-189 | | \Box | | \perp | \blacksquare | | | \Box | \Box | \perp | | \perp | | \Rightarrow | \perp | \perp | \Box | | | \perp | \Box | | \perp | \Box | \Box | \perp | 1 | | | | | | \Box | | | | \rightrightarrows | \Box | \perp | \Box | | \perp | | | | 1 |
| 4 Op 1 4 Op 1 | C-0551 C-0553 | Os-608 Os-135 | \vdash | + | \vdash | + | + | \vdash | 1 | + | + | + | \vdash | + | + | \dashv | + | + | \vdash | \vdash | + | + | 1 | \vdash | + | \vdash | + | + | 2 | + | + | \vdash | \vdash | + | \vdash | + | + | \vdash | \dashv | + | + | \vdash | \vdash | + | \vdash | + | | 3 |
| 4 Op 1 | C-0553 | Os-135 Os-207 | \vdash | 5 | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \dashv | + | + | \vdash | \vdash | + | + | ۲ | \vdash | + | \vdash | \dashv | + | - | + | + | Н | \vdash | + | + | + | | \vdash | \dashv | + | + | \vdash | \vdash | + | + | + | + | 5 |
| 4 Op 1 | C-0553 | Os-217 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | \equiv | | | | | | | | | 1 |
| 4 Op 1 4 Op 1 | C-0553 | Os-607 | H. | \Box | H | $-\Gamma$ | \perp | П | \perp | \Box | \perp | | H | F | \Box | Ţ | T | | \Box | H | \perp | 1 | \Box | H | + | \Box | Ŧ | \perp | 3 | \perp | \perp | | $\perp \Gamma$ | $-\Gamma$ | \Box | \perp | | П | 7 | \perp | | \Box | H | | \Box | \perp | | 3 |
| 4 Op 1 4 Op 1 | C-0553 C-0553 | Os-609 Os-613 | 7 | 1 | \vdash | + | + | \vdash | + | + | + | + | \vdash | + | + | + | + | + | + | \vdash | + | + | + | \vdash | + | + | + | + | 2 | + | + | \vdash | \vdash | + | + | + | | \vdash | \dashv | + | + | + | \vdash | + | + | + | + | 9 |
| 4 Op 1 | C-0553 | Os-672 | | 1 | | ╛ | | | | 1 | _ | | | ╧ | | | _ | | \perp | | | | \Box | | | Ħ | | | | | | | | | | | | | _† | | | \perp | | | | | | 1 |
| 4 Op 1 | C-0555 | FL42 | | П | | \perp | \blacksquare | | | \Box | \perp | T | | T | | \dashv | \perp | Ŧ | \Box | | 1 | Ŧ | 1 | | T | П | \neg | Ŧ | | \blacksquare | Ŧ | | | \top | \Box | | | | \dashv | \perp | Ŧ | \Box | 1 | 12 | | 7 | | 14 |
| 4 Op 1 4 Op 1 | C-0555 C-0555 | Os-205 Os-611 | 6 | 2 5 | \vdash | + | + | \vdash | + | + | + | + | \vdash | + | + | + | + | + | \vdash | \vdash | + | + | \vdash | \vdash | + | + | + | + | 1 | + | + | \vdash | \vdash | + | \vdash | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | + | | 7 27 |
| 4 Op 1 | C-0555 | Os-625 | 2 | 6 | 1 | + | + | \vdash | + | + | + | + | \vdash | + | + | + | + | + | \vdash | \dashv | + | 1 | \vdash | \vdash | + | \vdash | + | + | + | 1 | + | \vdash | \vdash | + | + | + | | \vdash | \dashv | + | + | \vdash | \vdash | + | + | + | +- | 11 |
| 4 Op 1 | C-0555 | Os-648 | | \Box | | | \blacksquare | | | | | | | 工 | | | \perp | \perp | | | | | | | \perp | | ightharpoons | | 1 | \Box | | | | | | | | | \rightrightarrows | | \perp | | | | | | | 1 |
| 4 Op 1 | C-0556 | AE-452 | H_ | + | \vdash | \perp | + | H | 1 | + | + | + | $\vdash \vdash$ | 4 | \Box | _ | 4 | + | + | \sqcup | + | + | 1 | \vdash | + | + | - | + | 1 | \perp | + | H | \vdash | \perp | \sqcup | - | + | \sqcup | 4 | - | + | + | | + | + | + | | 1 |
| 4 Op 1 4 Op 1 | C-0556 C-0556 | Os-202 Os-211 | 3 | 4 | \vdash | + | + | \vdash | + | + | + | + | \vdash | + | + | + | + | + | + | \vdash | + | + | ++ | \vdash | + | + | + | + | 2 | + | + | \vdash | \vdash | + | + | + | | \vdash | \dashv | + | + | + | \vdash | + | + | + | | 5 |
| 4 Op 1 | C-0556 | Os-225 | | \Box | | ╛ | | | | 1 | _ | | | ╧ | | | _ | | \perp | | | | \Box | | | Ħ | | | | 3 | | | | | | | | | _† | | | \perp | | | | | | 3 |
| 4 Op 1 | C-0556 | Os-237 | 1 | \Box | | T | \Box | | | \Box | \neg | T | | T | | \dashv | \bot | Ŧ | \Box | \Box | 1 | Ŧ | | | T | | \Box | Ŧ | 2 | \Box | Ŧ | | | \top | \Box | \perp | | | \dashv | \Box | Ŧ | \Box | | T | \Box | 7 | | 3 |
| 4 Op 1 4 Op 1 | C-0556 C-0556 | Os-244 Os-616 | \vdash | + | \vdash | + | + | \vdash | + | + | + | + | $\vdash \vdash$ | + | + | + | + | + | \vdash | \dashv | + | + | \vdash | \vdash | + | + | + | + | 1 | + | + | \vdash | \vdash | + | \vdash | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | + | | 1 |
| 4 Op 1 4 Op 1 | C-0556 | Os-666 | \vdash | 1 | \vdash | + | + | \vdash | + | + | + | + | \vdash | + | + | + | + | + | \vdash | \dashv | + | + | \vdash | \vdash | + | \vdash | + | + | +++ | + | + | \vdash | \vdash | + | + | + | | \vdash | \dashv | + | + | \vdash | \vdash | + | + | + | | 1 |
| 3 Op 1 | C-0558 | Os-106 | | | | | | | | | | | | | | | 土 | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | 2 |
| 3 Op 1 | C-0558 | Os-223 | 1 | \Box | \Box | Ţ | | П | T | \Box | T | F | П | Ţ | \Box | \neg | Ŧ | T | \Box | I | Ŧ | F | \Box | H | T | П | \neg | T | | 7 | F | | | T | \Box | T | | П | \neg | T | T | \Box | \Box | T | \Box | 7 | | 1 |
| 3 Op 1 3 Op 1 | C-0558 C-0558 | Os-238 Os-668 | \vdash | + | \vdash | + | + | \vdash | + | + | + | + | \vdash | + | + | + | + | + | \vdash | \dashv | + | + | \vdash | \vdash | + | + | + | + | 2 | + | + | \vdash | \vdash | + | \vdash | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | + | + | 1 |
| 3 Op 1 | C-0558 | Os-678 | | $\pm \pm$ | | ╛ | | | | 1 | _ | | | ╧ | | | _ | | \perp | | | | \Box | | | Ħ | | | 1 | | | | | | | | | | _† | | | \perp | | | | | | 1 |
| 3 Op 1 | C-0559 | Os-149 | 13 | 10 | | | | | \Box | | | | | \perp | | | Т | | | | | | 2 | | T | | | T | 1 | | | | | | | | | | | | | | | | | | | 26 |

| Part | Values are NISP | | | D D | D | н | н | Н | н | н н | /N H/N | H/N | H/N H/I | N H/N | H/N | H/N H | N H/N | l H/N | H/N H | I/N H | /N N | N | N | N N | N | N | M N | M N | и м | MU | JM U | M M | М | м м | М | М | M N | M N | M | M I | M N | M M | S | S | S | s s | S | S | S | $\overline{}$ |
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| Pe | | Sample/ | ပြိ ပြိ | 5 | agi | | σ | ľ | | ž | ا آ ا | ં ે | 1 | | Ca | Zen | 1" | | 151 | ١٥ | ٥l | | | | Ι, | - | ١ | - | ĭ | | ` | - | 흥 | σ | Ā | chy | Eno | - 14 | Fusinus | Molu | å | P | E | Sa | Epiphr | Ĕ | rep | S S | | - | |
| Operation 4 Op 6 | Context | Bag Os-509 | | | | | | | ŏ | | | | | | | | | | | | | | | | | | | | | | | | | | | Tra | | d | 2 | | | | | | | | - | | | | |
| 4 Op 6 | C-0608 | | | 2 | | | | | \perp | | | \perp | | П | | \neg | \perp | | \Box | \Box | | | | | \Box | \perp | | П | | | 1 | | П | \neg | | | | \Box | | | | \Box | \neg | \perp | \perp | | | \Box | | | 3 |
| 4 Op 6 4 Op 6 | C-0608 C-0610 | Os-578 Os-165 | \vdash | 1 | | \vdash | \vdash | + | + | + | \vdash | + | + | \vdash | - | \rightarrow | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | - | + | \vdash | \rightarrow | + | + | \vdash | + | + | + | \vdash | \dashv | \rightarrow | + | + | \vdash | \vdash | + | + | + | 1 |
| 4 Op 6 | C-0612 | AE-562 | | 1 | | \vdash | \vdash | + | + | + | \vdash | + | + | \vdash | \neg | \dashv | + | + | + | \dashv | \dashv | + | + | \vdash | \dashv | + | + | \vdash | \vdash | \dashv | _ | + | \vdash | \dashv | + | + | \vdash | + | + | + | \vdash | \rightarrow | \dashv | + | + | \vdash | \vdash | + | + | + | 1 |
| 4 Op 6 | C-0612 | Os-580 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| 4 Op 6 | C-0614 C-0614 | FL175 Os-403 | \vdash | + | + | \vdash | \vdash | + | + | + | \vdash | + | + | Н | _ | \rightarrow | + | + | \vdash | _ | + | + | + | | 2 | + | + | Н | \dashv | 4 | + | - | \vdash | \rightarrow | + | ₩ | Ш | + | + | + | \vdash | \dashv | \rightarrow | + | + | \vdash | \vdash | + | + | + | 2 |
| 4 Op 6 4 Op 6 | C-0614 | Os-403 Os-432 | \vdash | 3 | 3 | \vdash | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | \dashv | + | + | + | \dashv | + | + | + | \vdash | 1 | + | + | \vdash | \dashv | + | - | + | \vdash | \dashv | + | + | \vdash | + | + | + | \vdash | \dashv | \dashv | + | + | + | \vdash | + | + | + | 1 3 |
| 4 Op 6 | C-0615 | FL188 | | T | | | | | | | | | | | | | | | | | | | | 2 | | | | | | | | | \Box | | | | | | | | | | | | | | | | | | 3 2 |
| 4 Op 6 | C-0615 | Os-427 | | 2 | 2 | \Box | | \perp | \perp | | \Box | \perp | \perp | | \Box | | \perp | \perp | \Box | \Box | \perp | \perp | | \Box | \perp | \perp | \perp | | \Box | \perp | | | \Box | | \perp | \perp | | \perp | \perp | \perp | | \Box | \rightarrow | \perp | \perp | | | \perp | \perp | \perp | 7 |
| 4 Op 6 4 Op 6 | C-0615 C-0616 | Os-439 Os-423 | 1 | 1 5 | - | \vdash | \vdash | + | 3 | + | \vdash | + | + | Н | \dashv | + | + | + | + | \dashv | \dashv | + | + | \vdash | + | + | + | Н | + | + | 1 | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | \dashv | \dashv | + | + | + | \vdash | + | + | + | 4 |
| 4 Op 6 | C-0616 | Os-579 | | $^{+}$ | + | \Box | \vdash | _ | ۲ | + | \vdash | + | + | Н | | \dashv | + | + | \Box | \dashv | \dashv | + | + | \vdash | \dashv | + | + | Н | \vdash | _ | + | 1 | \vdash | \dashv | + | + | H | \dashv | + | + | \Box | \dashv | \dashv | + | $^{+}$ | \Box | \vdash | \dashv | + | + | 1 |
| 4 Op 6 | C-0617 | AE-599 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | 1 |
| 4 Op 6 4 Op 6 | C-0617 C-0617 | AE-601 AE-605 | \vdash | 1 | | \vdash | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | - | + | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | \vdash | \vdash | + | + | + | \vdash | + | + | + | \vdash | - | + | + | + | \vdash | \vdash | + | + | + | 1 |
| 4 Op 6 4 Op 6 | C-0617 C-0617 | AE-605 AE-607 | \vdash | 1 | | \vdash | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | + | + | + | + | \dashv | + | + | + | \vdash | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | + | \vdash | \vdash | + | + | + | 1 |
| 4 Op 6 | C-0617 | AE-622 | | 1 | 1 | | | | I | | | 士 | 工 | | | 二 | 士 | | | | | | I | | \perp | 上 | I | | \Box | \pm | | | | 二 | | L | | 士 | ᆂ | | | J | 寸 | \pm | \perp | | \Box | 士 | | I | 1 |
| 4 Op 6 | C-0617 | AE-623 | | 1 | | П | | \perp | T | \blacksquare | \Box | T | T | П | \Box | T | T | F | П | コ | T | T | Г | \Box | T | \perp | Γ | П | I | T | \perp | | П | T | T | | П | T | T | \perp | П | \exists | I | T | F | \Box | I | T | T | Γ | 1 |
| 4 Op 6 4 Op 6 | C-0617 C-0617 | AE-661 FL111 | Н, | 1 | + | \vdash | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | + | + | + | + | \dashv | + | + | + | \vdash | 4 | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | + | \vdash | \dashv | + | + | + | 7 |
| 4 Op 6 | C-0617 | FL128 | H | + | + | \vdash | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | \dashv | + | 1 | + | \dashv | \dashv | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | | \vdash | \dashv | + | + | \vdash | + | + | + | \vdash | \dashv | \dashv | + | + | \vdash | \vdash | + | + | + | 1 |
| 4 Op 6 | C-0617 | FL184 | | 土 | | | | | | | | | | | | | | | | | | | | | \perp | | | | | | | | \Box | | | | | | | | | | | | | | 1 | | | | 1 |
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| 4 Op 6 4 Op 6 | C-0617 C-0617 | FL224 FL228 | \vdash | + | + | \vdash | \vdash | + | + | + | \vdash | + | + | \vdash | - | \rightarrow | 2 | + | \vdash | \dashv | + | + | + | 1 | 2 | + | + | \vdash | \dashv | + | - | + | \vdash | \rightarrow | + | + | \vdash | + | + | + | \vdash | \dashv | \rightarrow | + | + | \vdash | \vdash | + | + | + | 1 |
| 4 Op 6 | C-0617 | FL230 | | + | + | \vdash | \vdash | + | + | + | \vdash | + | + | \vdash | \neg | \dashv | + | + | + | \dashv | \dashv | + | + | | \dashv | + | + | \vdash | \vdash | \dashv | _ | + | \vdash | \dashv | + | + | H | + | + | + | | \rightarrow | \dashv | + | + | \vdash | \vdash | +: | 2 | + | 2 |
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| 4 Op 6 | C-0617 C-0617 | Os-154 Os-164 | Н. | 2 | 2 | \vdash | \vdash | _ | _ | _ | \vdash | \perp | _ | Ш | _ | \rightarrow | _ | + | \vdash | _ | _ | _ | _ | \vdash | \dashv | + | \perp | Ш | \vdash | _ | _ | - | Н | \rightarrow | _ | - | Ш | _ | _ | + | Ш | _ | \rightarrow | + | + | \vdash | \perp | _ | _ | \perp | 2 |
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| 4 Op 6 | C-0617 | Os-178 | | Τ. | + | \Box | \vdash | \top | + | | \vdash | \dashv | \top | \Box | \neg | \neg | + | + | \Box | \dashv | \neg | \top | + | | 52 | \top | + | \Box | \vdash | \neg | | | \vdash | \neg | \top | + | \Box | \top | \top | + | | \neg | \dashv | \dashv | $^{+}$ | \vdash | \vdash | \top | \top | + | 52 |
| 4 Op 6 | C-0617 | Os-391 | | T | \perp | | | | \perp | | | \blacksquare | | | \Box | | \perp | \perp | \Box | \Box | | \perp | | | \neg | \perp | | | | 4 | 1 | | \Box | | \perp | | | \blacksquare | | | | \Box | | \perp | \perp | | | \blacksquare | \perp | | 1 |
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| 4 Op 6 | C-0617 | Os-506 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | ш | | | | | | | | | | | | | | | | | | 1 |
| 4 Op 6 4 Op 6 | C-0617 C-0617 | Os-507 Os-529 | \vdash | 1 | + | \vdash | \vdash | + | + | - | \vdash | + | + | \vdash | _ | \rightarrow | + | + | \vdash | - | + | + | + | \vdash | \dashv | + | + | \vdash | \vdash | + | 1 | \vdash | \vdash | \rightarrow | + | - | Ш | + | + | + | \vdash | - | \rightarrow | + | + | \vdash | \vdash | + | + | + | 1 |
| 4 Op 6 4 Op 6 | C-0617 | Os-544 | 1 | | + | \vdash | \vdash | + | + | + | \vdash | + | + | \vdash | \neg | \dashv | + | + | + | \dashv | \dashv | + | + | \vdash | \dashv | + | + | \vdash | \dashv | \dashv | _ | + | \vdash | \dashv | + | + | \vdash | + | + | + | \vdash | \rightarrow | \dashv | + | + | \vdash | \vdash | + | + | + | 1 |
| 4 Op 6 | C-0617 | Os-560 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | \Box | | | | | | | | | | | | | | | | | | 2 |
| 4 Op 6 | C-0617 C-0618 | Os-561 Os-530 | \vdash | +. | | \vdash | \vdash | + | + | - | \vdash | + | + | \vdash | _ | \rightarrow | + | + | \vdash | - | + | + | + | \vdash | \dashv | + | + | \vdash | \vdash | + | 1 | \vdash | \vdash | \rightarrow | + | - | Ш | + | + | + | \vdash | - | \rightarrow | + | + | \vdash | \vdash | + | + | + | 1 |
| 4 Op 6 4 Op 6 | C-0619 | AE-625 | \vdash | 1 | | \vdash | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | \dashv | + | + | + | \dashv | + | + | + | \vdash | \dashv | + | + | \vdash | \dashv | + | - | + | \vdash | \dashv | + | + | \vdash | + | + | + | \vdash | \dashv | \dashv | + | + | + | \vdash | + | + | + | 1 |
| 4 Op 6 | C-0619 | FL176 | | Τ. | + | \Box | \vdash | \top | + | | \vdash | \dashv | \top | \Box | \neg | \neg | + | + | \Box | \dashv | \neg | \top | + | \vdash | \dashv | + | + | \Box | \vdash | \neg | | | \vdash | \neg | \top | + | \Box | \top | \top | + | | \neg | \dashv | \dashv | $^{+}$ | \vdash | 2 | 1 | \top | + | 3 |
| 4 Op 6 | C-0619 | Os-504 | | 1 | _ | \Box | | \perp | \perp | | \Box | \perp | \perp | | \Box | | \perp | \perp | \Box | \Box | _ | \perp | | \Box | \perp | \perp | \perp | | \Box | \perp | | | \Box | | \perp | \perp | | \perp | \perp | \perp | | \Box | \rightarrow | \perp | \perp | | \Box | \perp | \perp | \perp | 1 |
| 4 Op 6 4 Op 6 | C-0620 | AE-633 | \vdash | 1 | | \vdash | \vdash | + | + | + | \vdash | + | + | \vdash | - | \rightarrow | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | - | + | \vdash | \rightarrow | + | + | \vdash | + | + | + | \vdash | \dashv | \rightarrow | + | + | \vdash | \vdash | + | + | + | 1 |
| 4 Op 6 | C-0620 C-0620 | AE-642a AE-642b | \vdash | 1 | | Н | \vdash | + | + | + | \vdash | + | + | Н | \dashv | \dashv | + | + | + | \dashv | + | + | + | \vdash | + | + | + | Н | \vdash | + | + | + | \vdash | \dashv | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | + | + | \dashv | + | + | + | 1 |
| 4 Op 6 | C-0620 | Bo-146 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 土 | | 1 | | | | | | 土 | | | | | | | | | | 土 | | | 1 |
| 4 Op 6 | C-0620 | FL182 | HT | \Box | | H | H | - | 1 | + | H | T | 1 | \Box | \Box | T | 1 | 1 | \Box | | T | \perp | + | H | Ţ | 二 | 1 | \Box | H. | Ţ | $-\Gamma$ | 3 | H | T | \perp | 1 | П | Ţ | Ţ | 1 | П | | Ţ | \perp | \perp | \Box | П | Ţ | \perp | 1 | 3 |
| 4 Op 6 4 Op 6 | C-0620 C-0620 | Os-156 Os-182 | \vdash | 1 | + | \vdash | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | + | + | + | + | \dashv | + | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | 1 | \vdash | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | + | + | \vdash | + | + | + | 1 |
| 4 Op 6 | C-0620 | Os-446 | 1 | 1 ' | + | Н | \vdash | \top | + | \top | \vdash | + | + | Н | \neg | + | + | \top | \forall | \dashv | + | + | + | \vdash | + | + | + | Н | \dashv | + | 1 | + | \vdash | + | + | + | H | + | + | + | \forall | \dashv | \dashv | + | + | \Box | \dashv | + | + | + | |
| 4 Op 6 | C-0620 | Os-448 | | | | | 1 | | \perp | | | # | | | | | \perp | \perp | | | | \perp | | | # | \perp | | | | # | 1 | | | | \perp | | | # | \perp | | | \Box | \Rightarrow | \perp | | | | # | \perp | | 2 |
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| 4 Op 6 | C-0620 | Os-512 | | 2 | 2 | | | | 土 | I | | | 土 | | | | 士 | I | | | | 士 | t | | Ì | \perp | İ | | | \pm | \perp | | | | 士 | | | \perp | | | | | ゴ | \perp | İ | | | \perp | 士 | İ | 2 |
| 4 Op 6 | C-0620 | Os-524 | 1 | 1 | \perp | П | \Box | \perp | T | | | T | \perp | П | \Box | \top | T | \Box | \Box | | \perp | T | | | T | T | \blacksquare | П | | T | 2 | | \Box | \top | T | | | T | \top | | | \Box | \Box | T | T | \Box | | T | T | \blacksquare | 3 |
| 4 Op 6 4 Op 6 | C-0620 C-0620 | Os-528 Os-532 | \vdash | + | + | \vdash | \vdash | + | + | + | \vdash | + | + | \vdash | - | + | + | + | + | \dashv | + | + | + | \vdash | + | + | + | \vdash | \vdash | + | 1 | + | \vdash | + | + | +- | \vdash | + | + | + | \vdash | \dashv | + | + | + | \vdash | \vdash | + | + | + | 1 |
| 4 Op 6 | C-0620 | Os-532 | \vdash | 1 | | \vdash | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | \dashv | + | + | + | \dashv | \dashv | + | + | \vdash | + | + | + | \vdash | \vdash | + | 1 | | \vdash | \dashv | + | + | \vdash | + | + | + | \vdash | \dashv | \dashv | + | + | \vdash | \vdash | + | + | + | 2 |
| 4 Op 6 | C-0620 | Os-551 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
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| 4 Op 6 | C-0622 | Os-531 | \vdash | 1 | | \vdash | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | \dashv | + | + | + | \dashv | + | + | + | \vdash | + | + | + | \vdash | \vdash | + | 2 | + | \vdash | \dashv | + | + | \vdash | + | + | + | \vdash | \dashv | \dashv | + | $^{+}$ | + | \vdash | + | + | + | 3 |
| 4 Op 6 | C-0623 | Os-187 | | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | | | | | | | | | | | | | | | | | | | | 2 |
| 4 Op 6 | C-0626 | Os-152 | H | 1 | | H | H | - | + | + | H | \perp | | H | 4 | Ŧ | F | \perp | \Box | 7 | \perp | - | 1 | H | \perp | - | + | H | II. | \perp | $-\Gamma$ | | H | Ŧ | - | _ | П | \perp | | +- | Н | 7 | Ţ | \perp | F | \Box | H | \perp | - | + | 1 |
| 4 Op 6 4 Op 6 | C-0626 C-0626 | Os-175 Os-298 | \vdash | 1: | 2 | \vdash | \vdash | 1 | + | + | \vdash | + | + | \vdash | \dashv | + | + | + | + | \dashv | + | + | + | \vdash | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | + | \vdash | \dashv | + | + | + | 13 |
| 4 Op 6 | C-0626 | Os-256 Os-443 | \vdash | 3 | | Н | \vdash | + | + | + | \vdash | + | + | Н | \dashv | \dashv | + | + | + | \dashv | + | + | + | \vdash | + | + | + | Н | \vdash | + | + | + | \vdash | \dashv | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | + | + | \dashv | + | + | + | 2 |
| 4 Op 6 | C-0626 | Os-447 | | 1 | | | | | | | | | | | | | | | | | | | | | | \perp | | | | ユ | | | | | | | | ightharpoons | | | | 二 | \Box | | | | 耳 | ightharpoons | | | 1 |
| 4 Op 6 | C-0628 | FL190 | l I | | | | | | | | 1 | | | 1 1 | | | | | 1 | | | | | 1 | 2 | | | 1 1 | 1 1 | | | 1 | 1 | | | 1 | ıl | | | | 1 | | - 1 | | | 1 1 | 1 | - 1 | 1 | | 3 |

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|------------------------------------|--------------------|-------------------------------------|----|-------------------|------------|-----------|---------------|---|--------------|-----------------|-----------------------------|-----------|------------------|----------------------------------|--------------|-----------|---------------------------|----------------|----------------|-------------|---------------|------------------------|---------------|----------|-------------|----------------|------------|-----------------|--------------|------------------|-----------------------------|----------------|----------------------|--------------------|--------------------------------------|-----------------|--------------------|---------------------------------|-------------------|-----------------|-------------|---------------------|---------------------|----------------|--------------------|--------------------------|----------|---------|
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| ☐ Operation Context | Sample/ Bag Os-299 | Canis familiaris Cavia porcellus | | Lagidium peruanum | Agouti sp. | Felis sp. | Carnívora n/i | Odocoileus virginianus Nothoprocta sp. | Colaptes sp. | | cr. Fulica sp. Buteo sp. | Strigidae | Cairina moschata | Zenaida auriculata Thraupidae | Passeriforme | Ave n/i | Didelphis sp. | Quiróptero n/i | | Anfibio n/i | Reptil n/i | Insecto N/I Muridae | Rattus rattus | Rodentia | Bos tarurus | Capra hircus | Ovis aries | Sus scrofa | Mamífero n/i | Chione subrugosa | Semele Solida Semele sp. | Argopecten sp. | Trachycardium procer | Enoplochiton niger | Molusco n/i Fusinus dupetitthoual | Thais chocolata | Molusco Marino n/i | Donax obesulus Protothaca thaca | Engraulis ringens | Sardinops sagax | Bulimulidae | Epiphragmophora sp. | Drepanostomella sp. | Systrophia sp. | Scutalus mariopena | Drymaeus sp. Bostryx sp. | Total | |
| 4 Op 6 C-0628 C | Os-299 | 3 | 3 | \Box | \Box | | | | \perp | \Box | | П | \Box | | | | | \perp | | | | \perp | \Box | \Box | | | | | | \Box | | \perp | | | | | | | | П | \Box | | | | \Box | 工 | | 6 |
| | Os-557 Os-575 | - | 4 | | - | | \vdash | _ | + | \vdash | _ | \vdash | - | - | + | Н | \vdash | + | + | \vdash | + | _ | + | + | + | + | \vdash | \vdash | + | + | + | + | \vdash | \rightarrow | - | + | \vdash | + | + | \vdash | - | + | + | \vdash | \rightarrow | + | | 4 |
| | Os-575 | \vdash | 10 | + | + | 1 | \vdash | _ | + | \vdash | _ | \vdash | \dashv | - | + | Н | | + | + | \vdash | + | _ | + | + | + | + | | - | _ | + | - | + | \vdash | \dashv | + | + | \vdash | + | + | \vdash | \dashv | + | + | \vdash | \dashv | + | | 11 2 |
| 4 Op 6 C-0629 A | AE-656 | \vdash | 1 | + | \top | \top | \Box | | + | \vdash | \top | \vdash | \dashv | | + | Н | \vdash | + | \top | \Box | \neg | \top | | \dashv | \top | | | Η. | | + | \top | + | \vdash | \neg | \top | + | \vdash | \top | + | \vdash | \dashv | \neg | + | \vdash | \dashv | + | | 1 |
| 4 Op 6 C-0629 A | AE-763 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | \perp | | 1 |
| 4 Op 6 C-0629 A | AE-765 | \perp | 1 | \vdash | \perp | _ | \sqcup | _ | \perp | \sqcup | | \vdash | _ | \perp | \perp | ш | | \perp | _ | \sqcup | _ | _ | \vdash | \perp | \perp | \perp | | Ш. | \perp | \vdash | \perp | \perp | \sqcup | _ | _ | \perp | \vdash | \perp | \perp | \sqcup | _ | \perp | \perp | \sqcup | \rightarrow | + | <u></u> | 1 |
| | Os-153 Os-158 | | 2 | + | + | + | \vdash | - | + | \vdash | - | \vdash | \dashv | - | + | Н | \vdash | + | + | \vdash | \dashv | + | + | + | + | + | | 2 | 2 | + | + | + | \vdash | \dashv | + | + | \vdash | - | + | \vdash | \dashv | + | + | \vdash | \dashv | + | | 2 |
| 4 Op 6 C-0629 C | Os-191 | \vdash | 1 | | + | + | \vdash | | + | \vdash | + | \vdash | \dashv | - | + | Н | \vdash | + | + | \vdash | \dashv | + | + | + | + | + | | \vdash | + | + | + | + | \vdash | \dashv | + | + | \vdash | + | + | \vdash | \dashv | \dashv | + | + | \dashv | + | | 1 |
| 4 Op 6 C-0629 C | Os-192 | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | \equiv | \pm | | 3 |
| 4 Op 6 C-0629 C | Os-424 | \perp | 2 | \vdash | \perp | _ | \sqcup | _ | \perp | \sqcup | | \vdash | _ | \perp | \perp | ш | | \perp | _ | \sqcup | _ | _ | \vdash | \perp | \perp | \perp | | \vdash | \perp | \vdash | \perp | \perp | \sqcup | _ | _ | \perp | \vdash | \perp | \perp | \sqcup | _ | \perp | \perp | \sqcup | \rightarrow | + | | 2 |
| | Os-444 Os-449 | - | + | \vdash | + | + | \vdash | 1 | + | \vdash | _ | \vdash | \dashv | - | + | Н | \vdash | + | + | \vdash | + | - | + | + | + | + | | Н, | 1 | + | + | + | \vdash | + | - | + | \vdash | + | + | \vdash | \dashv | + | + | \vdash | \rightarrow | + | +-1 | 4 |
| 4 Op 6 C-0629 C | Os-525 | \vdash | + | + | + | + | \Box | | | \vdash | | \vdash | \neg | | + | Н | \vdash | + | + | \vdash | \neg | | + | $^+$ | + | \top | | | 1 | + | \neg | | \vdash | \neg | + | + | \vdash | \top | + | \vdash | \neg | \neg | + | \vdash | \dashv | + | + 7 | 1 |
| 4 Op 6 C-0629 C | Os-545 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 4 | 1 | | | | | | | | | | | | | | | | | \perp | 5 | 5 |
| | Os-556 | \perp | + | + | + | _ | \vdash | + | + | щ | _ | + | | \perp | + | \vdash | $\mathbb{H}^{\mathbb{I}}$ | + | + | \vdash | + | - | + | + | + | 1 | \vdash | \Box | 4 | + | - | + | \vdash | - | + | 1 | \Box | \perp | + | \vdash | | - | + | + | | + | | 4 |
| 4 Op 6 C-0632 F 4 Op 6 C-0632 C | FL197 Os-565 | \vdash | 3 | + | + | + | \vdash | + | + | \vdash | + | \vdash | \dashv | + | + | \vdash | \vdash | + | + | \vdash | + | 3 | ++ | + | + | + | \vdash | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | + | + | + | \dashv | + | +-3 | 3 |
| 4 Op 6 C-0633 C | Os-598 | | 2 | | | 土 | | \pm | \pm | \Box | | | | | | | | \pm | | | | | 世 | \pm | | | | | 土 | | | \pm | | | | | | | | | | \perp | | | \Rightarrow | 士 | 2 | 2 |
| 4 Op 6 C-0635 A | AE-1292 | | 1 | | T | \perp | \Box | T | \perp | \Box | \perp | \Box | \Box | \perp | | \Box | \Box | T | T | \Box | T | \perp | \Box | T | T | | \Box | | \perp | \Box | T | \perp | | \mp | \perp | | \Box | \perp | I | \Box | \Box | T | T | \Box | 丁 | 工 | 1 | 1 |
| 4 Op 6 C-0635 C | Os-360 Os-307 | - | 2 | | + | + | \vdash | - | + | \vdash | - | \vdash | - | _ | + | Н | \vdash | + | + | \vdash | + | + | + | + | + | + | | \vdash | + | + | + | + | \vdash | - | + | + | \vdash | - | + | \vdash | - | + | + | \vdash | \dashv | + | | 2 |
| | Os-310 | \vdash | 1 | | + | + | \vdash | | + | \vdash | + | \vdash | \dashv | - | + | Н | \vdash | + | + | \vdash | \dashv | + | + | + | + | + | | \vdash | + | + | + | + | \vdash | \dashv | + | + | \vdash | + | + | \vdash | \dashv | \dashv | + | + | \dashv | + | | 1 |
| 4 Op 6 C-0638 C | Os-312 | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 2 | | | | | | | | | | | | | | | | | 士 | 2 | 2 |
| | Os-313 | | 1 | | \perp | | \Box | | | \Box | | \Box | | | | \Box | | | \perp | Ш | _ | | \Box | \perp | | | | | \perp | \Box | | | | _ | | | | \perp | | \Box | | | | \Box | \Box | \perp | | 1 |
| | Os-316 Os-319 | | 1 | | + | + | \vdash | - | + | \vdash | - | \vdash | \dashv | - | + | Н | \vdash | + | + | \vdash | \dashv | + | + | + | + | + | | \vdash | + | + | + | + | \vdash | \dashv | + | + | \vdash | - | + | \vdash | \dashv | + | + | \vdash | \dashv | + | | 1 |
| 4 Op 6 C-0638 C | Os-328 | | +÷ | | + | + | \vdash | | + | \vdash | _ | \vdash | \dashv | _ | + | Н | \vdash | + | + | \Box | \dashv | + | 1 | + | _ | + | | 1 | 1 | 11 | \dashv | + | \vdash | \dashv | + | + | \vdash | _ | + | \vdash | \dashv | \dashv | + | \Box | \dashv | + | | 1 |
| 4 Op 6 C-0638 C | Os-349 | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | \perp | 3 | 3 |
| | Os-359 Os-596 | - | 1 | | + | + | \vdash | _ | + | $\vdash \vdash$ | + | \vdash | - | _ | + | Ш | \vdash | + | +- | \vdash | + | + | + | + | + | - | \vdash | \vdash | + | + | + | + | \vdash | \rightarrow | + | + | \vdash | + | + | \vdash | - | - | + | \vdash | \rightarrow | + | | 1 |
| 4 Op 6 C-0638 C | Os-390 Os-311 | | 1 | | + | + | \vdash | _ | + | \vdash | + | \vdash | \dashv | _ | + | Н | \vdash | + | + | \vdash | \dashv | + | + | + | + | + | | \vdash | + | + | + | + | \vdash | \dashv | + | + | \vdash | + | + | \vdash | \dashv | + | + | \vdash | \dashv | + | | 1 |
| 4 Op 6 C-0639 C | Os-317 | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | | | | | | | | | | | | | | | | | 士 | 1 | 1 |
| | Os-324 | | 2 | \Box | _ | | | \perp | \perp | \Box | | \Box | \Box | | | | \perp | \perp | \perp | \Box | \rightarrow | | \perp | \perp | \perp | _ | | | \perp | \Box | \perp | \perp | | _ | | \perp | | \perp | \perp | | \Box | _ | \perp | \Box | \rightarrow | 工 | | 2 |
| | Os-595 Os-595 | \vdash | 3 | | + | + | \vdash | - | + | \vdash | + | \vdash | \dashv | - | + | Н | + | + | + | \vdash | + | + | + | + | + | + | \vdash | \vdash | + | + | + | + | \vdash | \dashv | + | + | \vdash | + | + | \vdash | \dashv | + | + | + | \dashv | + | + | 3 1 |
| 4 Op 6 C-0641 C | Os-298 | \vdash | 1 | | 1 | 1 | \Box | 3 | + | \vdash | \top | \vdash | \dashv | | + | Н | \vdash | + | \top | \Box | \neg | \top | | \dashv | \top | | | \vdash | \top | + | \top | + | \vdash | \neg | \top | + | \vdash | \top | + | \vdash | \dashv | \neg | + | \vdash | \dashv | + | 5 | 5 |
| | Os-301 | | 2 | | \perp | | | | \perp | \Box | \perp | | \Box | | | | \Box | \perp | \blacksquare | \Box | \Box | | | \perp | | | | | \perp | \Box | \perp | \perp | | \Box | \perp | | | \perp | \blacksquare | | \Box | \perp | \perp | \Box | \neg | 工 | 7 | 2 |
| 4 Op 6 C-0641 C | Os-326 Os-346 | - | 1 | + | + | + | \vdash | - | + | \vdash | + | \vdash | \dashv | - | + | Н | + | + | + | \vdash | + | + | + | + | + | + | \vdash | 2 | 2 | + | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | + | + | \vdash | \dashv | + | | 2 1 |
| 4 Op 6 C-0641 C | Os-361 | 1 | 2 | | + | + | \vdash | | + | \vdash | _ | \vdash | \dashv | _ | + | Н | \vdash | + | + | \Box | \dashv | + | 1 | + | _ | + | | 4 | 1 | 11 | \dashv | + | \vdash | \dashv | + | + | \vdash | _ | + | \vdash | \dashv | \dashv | + | \Box | \dashv | + | 7 | 7 |
| 4 Op 6 C-0641 C | Os-369 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 4 | 1 | | | | | | | | | | | | | | | | | \perp | | 5 5 |
| | Os-370 Os-380 | 1 | 4 | \vdash | + | + | \vdash | _ | + | $\vdash \vdash$ | + | \vdash | - | _ | + | Ш | \vdash | + | +- | \vdash | + | + | + | + | + | - | \vdash | Н, | 3 | + | + | + | \vdash | \rightarrow | + | + | \vdash | + | + | \vdash | - | - | + | \vdash | \rightarrow | + | | 5 |
| 4 Op 6 C-0641 C | Os-340 | 2 | + | | + | + | \vdash | | + | \vdash | + | \vdash | \dashv | | + | Н | \vdash | + | + | \vdash | \dashv | + | + | + | + | + | | | 3 | + | + | + | \vdash | \dashv | + | + | \vdash | + | + | \vdash | \dashv | \dashv | + | + | \dashv | + | + | 3 5 |
| 4 Op 6 C-0644 C | Os-327 | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 士 | | 3 5 |
| 4 Op 6 C-0645 C | Os-318 Os-320 | \vdash | 1 | + | + | \perp | \vdash | \dashv | + | \vdash | \perp | \Box | | \perp | + | \square | \vdash | + | + | \vdash | 4 | 4 | + | + | + | + | H | \vdash | 1 | $+$ \bot | \perp | + | \vdash | $-\Gamma$ | + | 1 | \vdash | \perp | + | \vdash | | - | + | +1 | $-\Gamma$ | + | <u> </u> | 5 4 |
| 4 Op 6 C-0645 C | Os-320 Os-379 | + | +3 | + | + | + | \vdash | + | + | \vdash | + | \vdash | \dashv | + | + | \vdash | + | + | + | \vdash | + | + | + | + | + | + | | Η, | 1 1 | + | + | + | \vdash | \dashv | + | + | \vdash | + | + | \vdash | \dashv | + | + | \vdash | + | + | | 1 |
| 4 Op 6 C-0646 C | Os-309 | | I | 口 | 士 | 上 | | 士 | 工 | ㅂ | 上 | | | 土 | I | | | 士 | | | \exists | ᆂ | 口 | 士 | \perp | | | | 1 | Ħ | 土 | 工 | | | ᆂ | | | 丁 | I | | | 士 | I | | \Box | 丁 | 1 | 1 |
| 4 Op 6 C-0647 C | Os-315 | \vdash | 1 | H | \perp | - | H | T | + | H | $-\Gamma$ | H | 7 | \perp | \perp | H | H | F | F | H | Ţ | - | + | Ŧ | F | + | H | H | . — | $+\Box$ | \perp | + | \Box | - T | _ | + | H | | F | H | 7 | \perp | F | \Box | 7 | \bot | +-1 | 1 |
| | Os-299 Os-314 | \vdash | + | + | + | + | \vdash | + | + | \vdash | + | \vdash | \dashv | + | + | \vdash | \vdash | + | + | \vdash | + | + | ++ | + | + | + | \vdash | | 1 | + | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | + | + | + | \dashv | + | | 1 |
| 4 Op 6 C-0648 C | Os-321 | 2 | 3 | | _ | | | _ | _ | \vdash | | H | _ | | \pm | Н | | | \pm | | _ | | 1 | _ | | | Н | | | | | _ | | _+ | | \pm | | | \pm | | _ | | \pm | | _+ | \pm | | 5 |
| 4 Op 6 C-0648 C | Os-325 | | 1 | | \perp | T | | | T | \Box | \top | | | | \Box | | | T | \perp | | \Box | T | \Box | \perp | T | | | | 1 | \Box | \perp | T | | \Box | T | | | \perp | \perp | | | | T | | \Box | 工 | 2 | 2 |
| 4 Op 6 C-0648 C | Os-329 Os-330 | \vdash | 1 | + | + | + | \vdash | + | + | \vdash | + | Н | - | + | + | Н | \vdash | + | + | \vdash | + | + | + | + | + | + | \vdash | ⊣. | + | + | + | + | $\vdash \vdash$ | + | + | + | \vdash | + | + | \vdash | - | + | + | \vdash | + | + | | 1 |
| 4 Op 6 C-0648 C | Os-335 | \vdash | 8 | + | + | + | \vdash | + | + | \vdash | + | Н | \dashv | + | + | Н | \vdash | + | + | \vdash | + | + | ++ | + | + | + | Н | | 1 | + | + | + | \vdash | \dashv | + | + | \vdash | + | + | \vdash | \dashv | \dashv | + | + | \dashv | + | | 12 |
| 4 Op 6 C-0649 C | Os-322 | | 2 | | 工 | | | \Box | | 口 | | | | | | | | 工 | | | \Box | | \Box | \perp | | | | | | \Box | | | | | | | | | | | | | | | \Box | 工 | 2 | 2 |
| | Os-367 Os-304 | 186 | 6 | ++ | + | + | \vdash | + | + | \vdash | + | \vdash | \dashv | + | + | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | | Η. | + | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | + | + | \vdash | \dashv | + | | 86 1 |
| | Os-304 Os-366 | \vdash | 1 | + | + | + | \vdash | + | + | \vdash | + | Н | \dashv | + | + | Н | \vdash | + | + | \vdash | + | + | ++ | + | + | + | \vdash | | 3 | + | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | + | + | \vdash | + | + | | 4 |
| 3 Op 1 C-0651 C | Os-651 | 1 | 2 | | 1 | 1 | | \pm | \pm | Ħ | | | | | \pm | | | 士 | \pm | | \pm | | 世 | 士 | \pm | | | | | | | \pm | | \exists | \pm | | | 士 | \pm | | | | \pm | | 士 | \bot | 4 | 4 |
| 3 Op 1 C-0653 | FL10 | | Г | \Box | T | \perp | П | \perp | | П | \perp | П | 耳 | | Г | П | \Box | Ţ | F | П | Ţ | \perp | \Box | 1 | T | \blacksquare | П | | | П | \perp | | | T | \perp | | | \perp | F | П | 耳 | \perp | T | \Box | T | 工 | 1 | 1 |
| 3 Op 1 C-0653 C 2 Op 1 C-0654 A | Os-615 AE-708 | \vdash | + | 1 | + | + | \vdash | + | + | \vdash | + | \vdash | - | + | + | \vdash | \vdash | + | + | \vdash | + | + | ++ | + | + | + | \vdash | - -1 | 1 | + | + | + | $\vdash \vdash$ | + | + | + | \vdash | + | + | \vdash | - | + | + | \vdash | + | + | | 1 |
| 2 Op 1 C-0654 A | AE-706 AE-727 | \vdash | + | +++ | + | + | \vdash | + | + | \vdash | + | Н | \dashv | + | + | Н | \vdash | + | + | \vdash | + | + | ++ | + | + | + | Н | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | \dashv | + | \vdash | \dashv | + | - 0 | |
| 2 Op 1 C-0657 A | AE-702 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | \perp | 1 | 1 |
| 2 Op 1 C-0657 A | AE-703 AE-704 | \vdash | 1 | 1 | + | + | +I | + | + | Н | + | \vdash | | + | + | \vdash | \vdash | + | + | \vdash | + | + | + | + | + | + | \vdash | H | + | + | + | + | H | + | + | + | H | + | + | \vdash | | + | + | \vdash | | + | +- | 1 |
| 2 Op 1 C-0657 A | AE-704 AE-705 | + | 1 | | + | + | \vdash | + | + | \vdash | + | Н | \dashv | + | + | Н | + | + | + | \vdash | + | + | + | + | + | + | Н | \vdash | + | + | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | + | + | \vdash | \dashv | + | | 1 |
| 2 Op 1 C-0657 C | Os-652 | | Ė | | 1 | 1 | | | | 口 | | | | | | | | \perp | | | \Rightarrow | | | \perp | | | | | | | | | | | | | | | | | | | | | \Rightarrow | \perp | 1 | 1 |
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| | | Canis familiaris | Cavia porcellus | Lama sp. Lagidium peruanu | sp. | Silvylagus sp | Ġ. | Carnívora n/i | ocolleus virginia | comoprocta s Colaptes sp. | Cyanocorax sp. | a sp. | sp. | Strigidae | rici la | Thraupidae | Passeriforme | i/u | is sb. | | | Anfibio n/i | Reptil n/i | Insecto N/I | Muridae Rattus rattu | Rodentia | Gallus gallus | Bos tarurus | Capra hircus | Ovis aries | Sus scrofa Artiodactyla | Mamífero n/i | ne subrugo | Solida | Semele sp. | chycardium proc | l e | o n/i | dupetitthor | Marin | esn | a th | ring | Sardinops sagax Bulimulidae | ophora | haumasthus sp. | le le | Scutalus mariope | aeus sp. | Bostryx sp. | - |
| 1_ | | la l | <u>a</u> | Lama sp. dium peru | Agouti sp. | lagı | Felis sp. | ١٤٥ | N S | pro apte | 1000 |) H | Buteosp. | rigic | | dne. | serif | Ave n/i | ilphi | ncnopnylla | Bufo | fibic | ptil | ecto | Muridae attus rattu | der | l s | ţ a | a l | isa | s sc oda | ig i | lns e | | nele pect | . <u>.</u> | l ig | usc | lupeti | ≥ 0 | Š | hac | is | 틸 | agmo | nast | osto | S B | naeı | stry | Total |
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| 2 Op 1 C | C-0660 AE-707 | | \top | 1 | \top | | П | \neg | \neg | \top | 1 | П | \neg | \neg | \top | 1 | | | \vdash | \top | | \top | П | \neg | \top | \top | 1 | ш | | _ | \top | \top | \Box | \dashv | \top | | П | \neg | \top | \top | П | | | \top | | | _ | \top | П | | 1 |
| 2 Op 1 C | C-0660 AE-737 | | \perp | 1 | \perp | | | \neg | \neg | \perp | \perp | | \Box | \perp | \perp | \perp | | | | \perp | | - | | \neg | | \perp | | \Box | \neg | \perp | \perp | \perp | \Box | \neg | \perp | - | \Box | \Box | \perp | \perp | | \neg | _ | | \vdash | | \perp | \perp | \blacksquare | \Box | 1 |
| 2 Op 1 C | C-0660 FL14 C-0660 Os-642 | + | + | + | + | \vdash | Н | \dashv | + | + | + | Н | \dashv | + | + | + | ⊢ | Н | + | + | + | + | Н | + | 1 | + | + | Н | \dashv | + | 1 | + | + | \dashv | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \vdash | \dashv | 1 |
| 2 Op 1 C | C-0660 Os-653 | | $^{+}$ | 1 | + | 2 | | \rightarrow | $^+$ | + | + | Н | \dashv | + | + | + | \vdash | Н | \vdash | $^{+}$ | + | + | | $^{+}$ | + | + | + | \vdash | \dashv | \top | Η, | + | \Box | \dashv | + | + | т | \dashv | + | + | \Box | \dashv | \neg | + | + | \Box | \top | + | \vdash | \neg | 3 |
| 2 Op 1 C | C-0660 Os-656 | \perp | \perp | \perp | \blacksquare | | | \Box | \Box | \perp | \perp | | \Box | \perp | \perp | \perp | | | \Box | \perp | \perp | | | \Box | \perp | \blacksquare | | | \Box | \perp | 1 | \perp | \Box | \neg | \perp | \blacksquare | \Box | \Box | \perp | \perp | | \Box | \perp | \perp | \vdash | | \perp | \perp | | \Box | 1 |
| 2 Op 1 C | C-0660 Os-674 C-0661 AE-701 | + | + | 1 | + | 1 | \vdash | \rightarrow | 1 | + | + | \vdash | \dashv | + | + | + | ⊢ | Н | + | + | + | + | \vdash | \rightarrow | + | + | - | \vdash | \dashv | + | + | + | + | \dashv | + | + | \vdash | \dashv | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \vdash | \dashv | 1 |
| | C-0666 Os-617 | | $^{+}$ | Ť | + | \vdash | \Box | \rightarrow | \dashv | + | + | | \dashv | + | $^{+}$ | + | \vdash | | \vdash | + | + | + | \Box | \dashv | + | + | 1 | \vdash | \dashv | _ | 1 | + | \Box | \dashv | + | + | \Box | \dashv | + | + | \Box | \dashv | _ | _ | + | | _ | + | \vdash | \dashv | 1 |
| 3 Op 1 C | C-0666 Os-639 | | 1 | | | | | | | | | | | | | | | | | \perp | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | 3 |
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| 3 Op 1 C | C-0666 Os-670 | ++ | 1 | 2 | + | + | \vdash | \dashv | + | + | + | \vdash | \dashv | + | + | + | + | Н | + | + | + | + | \vdash | \dashv | + | + | \vdash | \vdash | \dashv | + | + | + | + | \dashv | + | + | \vdash | \dashv | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \vdash | \dashv | 3 |
| 3 Op 1 C | C-0666 Os-675 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | _ | | | | | | | | | | | | | | | | | | | 3 |
| 3 Op 1 C | C-0667 Os-657 | + | 4 | \perp | + | \vdash | H | 4 | + | + | + | Н | _[| + | + | + | H | \vdash | \vdash | + | + | + | H | - | + | + | \vdash | \sqcup | 4 | 4 | 1 | | +1 | 4 | \perp | 1 | \vdash | 4 | | + | \vdash | _[| - | + | + | \vdash | + | + | \vdash | 4 | 2 |
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| 3 Op 1 C | C-0671 FL26 | $\perp \perp$ | 士 | 土 | I | | | ゴ | \perp | 士 | | | J | 士 | | | | | | 士 | \perp | | | 二 | ᆂ | I | | | \exists | \pm | 土 | I | | \Box | ᆂ | 上 | | \Box | 士 | | | J | | \perp | \perp | | 1 1 | 1 | | Ì | 2 |
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| 3 Op 1 C | C-0671 FL28 C-0671 FL30 | + | + | - | + | \vdash | \vdash | \rightarrow | + | + | + | \vdash | \dashv | + | + | + | \vdash | \vdash | \vdash | + | + | + | \vdash | + | + | + | + | \vdash | \dashv | + | + | + | + | \dashv | + | + | \vdash | \dashv | + | + | \vdash | \dashv | - | 4 | | | 1 | + | \vdash | \dashv | 2 5 |
| 3 Op 1 C | C-0672 AE-1879 | | $^{+}$ | 1 | + | \vdash | \Box | \rightarrow | \dashv | + | + | | \dashv | + | $^{+}$ | + | \vdash | | \vdash | + | + | + | \Box | \dashv | + | + | 1 | \vdash | \dashv | _ | + | + | \Box | \dashv | + | + | \Box | \dashv | + | + | \Box | \dashv | _ | + | + | | | + | \vdash | \dashv | 1 |
| 3 Op 1 C | C-0672 AE-1880 | | 土 | | | | | | | 土 | | | | | | | | | | 土 | | | | | | | | | | 工 | 1 | 土 | | | | | | 1 | | | | 1 | | | 工 | | | | | | 1 |
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| 3 Op 1 C | C-0672 Os-246 C-0672 Os-646 | | 1 | 2 | + | \vdash | \vdash | \rightarrow | \dashv | + | + | \vdash | \dashv | + | + | + | \vdash | Н | + | + | + | + | \vdash | \dashv | + | + | + | \vdash | \dashv | + | 1 | + | + | \dashv | + | + | \vdash | \dashv | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \vdash | \dashv | 3 |
| 2 Op 1 C | C-0673 Os-635 | | \top | | + | \vdash | | \neg | \dashv | + | \top | \Box | \dashv | \dashv | $^{+}$ | \top | \vdash | | \vdash | \top | | + | 5 | 1 | 7 | + | - | \vdash | \neg | \neg | + | 2 | + | \dashv | + | + | \Box | \dashv | \top | + | | \neg | \neg | \top | + | | \top | + | \vdash | \dashv | 14 |
| 2 Op 1 C | C-0673 Os-658 | | | 2 | \perp | \Box | | \neg | \perp | \perp | | | \Box | \perp | \perp | | | | \Box | \perp | \perp | \perp | | | \perp | \perp | | \Box | \perp | _ | \perp | \perp | \Box | \rightarrow | \perp | \perp | \Box | \perp | \perp | \perp | | \Box | \perp | \perp | \perp | | \perp | | \Box | _ | 2 |
| 2 Op 1 C | C-0673 Os-662 C-0674 Os-54 | ++ | 1 | 1 | + | \vdash | Н | \dashv | + | + | + | \vdash | \dashv | + | + | + | \vdash | Н | + | + | + | + | Н | + | + | + | + | \vdash | \dashv | + | 2 | - | + | \dashv | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \vdash | \dashv | 3 1 |
| 2 Op 1 C | C-0678 Os-201 | | | 1 | + | \vdash | | \neg | \dashv | + | \top | \Box | \dashv | \dashv | $^{+}$ | \top | \vdash | | \vdash | \top | | + | | \dashv | \top | + | - | \vdash | \neg | \neg | \top | + | + | \dashv | + | + | \Box | \dashv | \top | + | | \neg | \neg | \top | + | | \top | + | \vdash | \dashv | 1 |
| 2 Op 1 C | C-0678 Os-638 | | | | | | | | | | | | | | | | | | | \perp | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | | | 2 |
| | C-0680 AE-1326 C-0680 AE-813 | + | | 1 | + | \vdash | \vdash | \rightarrow | + | + | + | \vdash | \dashv | + | + | + | ⊢ | Н | + | + | + | + | \vdash | \rightarrow | + | + | - | \vdash | \dashv | + | + | + | + | \dashv | + | + | \vdash | \dashv | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \vdash | \dashv | 1 |
| 3 Op 1 C | C-0680 AE-817 | | + | 1 | + | \vdash | H | \dashv | \dashv | + | + | Н | \dashv | + | + | + | \vdash | | \vdash | + | | + | H | \dashv | + | + | + | \vdash | \dashv | \dashv | + | + | + | \dashv | + | + | \Box | \dashv | + | + | | \dashv | | | + | | + | + | \vdash | \dashv | 1 |
| 3 Op 1 C | C-0680 AE-818 | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| 3 Op 1 C | C-0680 AE-820 C-0680 AE-823a | + | 4 | _ | + | \vdash | \vdash | \rightarrow | \rightarrow | + | + | \square | - | + | + | + | ⊢ | | \vdash | + | + | + | \vdash | | 1 | + | - | \vdash | \rightarrow | + | + | + | \vdash | \rightarrow | + | + | \vdash | \dashv | + | + | \vdash | - | + | + | + | \vdash | + | + | \vdash | - | 1 |
| 3 Op 1 C | C-0680 AE-823b | ++- | 1 | _ | + | \vdash | \vdash | \rightarrow | + | + | + | \vdash | \dashv | + | + | + | \vdash | Н | \vdash | + | + | + | \vdash | \dashv | + | + | + | \vdash | \dashv | \dashv | + | + | + | \dashv | + | + | \vdash | \dashv | + | + | \vdash | \dashv | _ | + | + | \vdash | \dashv | + | \vdash | \dashv | 1 |
| 3 Op 1 C | C-0680 AE-825 | | 1 | | | | | | | 土 | | | | | | | | | | 土 | | | | | | | | | | 工 | | 土 | | | | | | 1 | | | | 1 | | | 工 | | | | | | 1 |
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| 3 Op 1 C | C-0680 AE-832b | T = T | 1 | | | | | | _† | ╁ | | | | | | | | | | | \pm | 1 | | | ╧ | | | | _ | _ | ⇉ | ╧ | | | \exists | 1 | H | _† | | 1 | | _ | | | \pm | | | | Н | | 1 |
| 3 Op 1 C | C-0680 AE-835a | | 1 | | T | | | \neg | 7 | T | Ŧ | | \dashv | 1 | Ŧ | Ŧ | | | | 1 | T | | | | T | T | | | \dashv | 7 | \perp | T | \Box | \dashv | \top | \blacksquare | | \neg | \perp | \perp | | \neg | 7 | T | \blacksquare | | 7 | T | | \Box | 1 |
| | C-0680 AE-835b C-0680 AE-838 | ++ | 1 | + | + | \vdash | \vdash | + | + | + | + | \vdash | \dashv | + | + | + | \vdash | \vdash | \vdash | + | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | + | 1 | + | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \vdash | \dashv | 1 |
| 3 Op 1 C | C-0680 AE-840 | ++ | + | 1 | \top | Н | Н | \dashv | + | + | \top | Н | \dashv | + | + | \top | \vdash | Н | \vdash | + | + | \top | Н | + | + | \top | + | Н | \dashv | + | + | + | + | \dashv | + | + | Н | \dashv | + | + | \forall | \dashv | + | + | + | \vdash | + | + | Н | \dashv | 1 |
| 3 Op 1 C | C-0680 AE-843a | | 1 | \perp | \perp | | | | _ | \perp | \perp | | _ | \rightarrow | \perp | \perp | | | | 1 | | | | \Rightarrow | \perp | \perp | | | _ | 4 | \perp | \bot | \Box | \Rightarrow | \perp | | \Box | _ | \blacksquare | \perp | | \Rightarrow | \rightarrow | \perp | \perp | | \perp | \perp | \Box | | 1 |
| | C-0680 AE-843b C-0680 AE-843c | | 1 | + | + | \vdash | \vdash | \dashv | + | + | + | \vdash | \dashv | + | + | + | \vdash | Н | \vdash | + | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | + | + | + | \dashv | + | + | \vdash | \dashv | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \vdash | \dashv | 1 |
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| 3 Op 1 C | C-0680 AE-844e | | 1 | | 士 | | | J | \Box | 士 | | | | | İ | | | | | 士 | | | | | 士 | 士 | | | | \pm | | 土 | | 士 | | | | J | | | | | | | 士 | | 士 | | | | 1 |
| 3 Op 1 C | C-0680 AE-845 | | | 1 | F | П | П | Ţ | T | Ţ | \perp | П | 耳 | T | T | \perp | | П | \Box | Ŧ | T | \vdash | П | T | T | F | | П | Ţ | Ţ | \perp | T | \Box | Ţ | T | \blacksquare | П | Ţ | \perp | F | П | コ | T | T | \vdash | П | Ŧ | T | П | \Box | 1 |
| | C-0680 AE-849 C-0680 AE-853a | ++: | 1 | + | + | \vdash | \vdash | + | + | + | + | \vdash | \dashv | + | + | + | \vdash | \vdash | \vdash | + | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | + | + | + | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \vdash | \dashv | 1 |
| 3 Op 1 C | C-0680 AE-853b | | 1 | | \pm | | H | | _† | | | H | | | ᆂ | | | | | _ | \pm | $^{\pm}$ | H | | ╧ | \pm | | \Box | | _ | ⇉ | \pm | $\pm \pm$ | _+ | \exists | 1 | H | _† | | \pm | H | _ | | | \pm | | | | H | _ | 1 |
| 3 Op 1 C | C-0680 AE-857 | | 1 | \top | | | | | T | T | | | \Box | T | T | | | | \Box | T | \top | | | \top | T | | | | \Box | T | T | T | \Box | \Box | T | | П | 7 | T | | | \Box | \top | T | | | \top | \perp | \Box | | 1 |
| | C-0680 AE-858 C-0680 AE-861 | ++ | 1 | + | + | \vdash | \vdash | \dashv | + | + | + | \vdash | \dashv | + | + | + | \vdash | Н | \vdash | + | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | + | 1 | + | \dashv | + | + | \vdash | \dashv | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \vdash | \dashv | 1 |
| 3 Op 1 C | C-0680 AE-863a | | 1 | + | + | \vdash | \vdash | \dashv | + | + | + | \vdash | \dashv | + | + | + | \vdash | Н | \vdash | + | + | + | \vdash | \dashv | + | + | \vdash | H | \dashv | + | + | + | + | \dashv | + | + | Н | \dashv | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | Н | \dashv | 1 |
| 3 Op 1 C | C-0680 AE-863b | | | | | | | 二 | | | | | 1 | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | 1 |
| | C-0680 AE-864 | $+\top$ | | 1 | F | | H | 7 | Ŧ | F | + | П | 7 | Ŧ | £ | + | F | H | $\perp \Gamma$ | Ŧ | F | \vdash | H | \perp | F | F | 1 | П | 7 | Ŧ | $-\Gamma$ | + | + | Ţ | F | +- | H | Ţ | \perp | + | H | 7 | Ŧ | F | + | H | \perp | + | H | 7 | 1 |
| | C-0680 AE-871a C-0680 AE-871b | | 1 | + | + | \vdash | \vdash | + | + | + | + | \vdash | \dashv | + | + | + | \vdash | Н | \vdash | + | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | + | + | + | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | Н | \dashv | 1 |
| 3 Op 1 C | C-0680 AE-877 | \pm | _ | 1 | İ | | | J | \pm | 士 | | | J | 士 | \pm | | | | | \pm | \pm | İ | | | ᆂ | İ | | | \exists | \pm | | \pm | | 士 | ᆂ | \pm | | \exists | \pm | \pm | | J | 士 | \pm | \pm | | 士 | \pm | | | 1 |
| 3 Op 1 C | C-0680 FL12 | II | Ţ | | F | П | П | 耳 | T | Ţ | F | П | コ | T | T | F | | | \Box | T | T | Г | П | | 10 | F | Г | П | T | T | \perp | T | \Box | T | Ţ | \perp | П | T | \perp | \perp | П | \exists | T | T | \vdash | П | T | | П | 耳 | 10 |
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| 92 Op 11 | C-0701 | Os-256 | 4 | 1 | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 19 | |
| 92 Op 11 | C-0703 C-0703 | Os-101 Os-102 | Н. | _ | _ | \square | \vdash | _ | + | \vdash | _ | +- | Ш | _ | + | \vdash | - | - | + | +- | \vdash | - | + | 1 | \vdash | - | _ | +- | \vdash | \vdash | 2 | + | _ | _ | \vdash | - | _ | ш | \vdash | _ | _ | + | Ш | _ | + | + | \vdash | _ | 3 | _ |
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| 92 Op 11 | C-0703 | Os-113 | 3 | 3 | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 4 | |
| 92 Op 11 | C-0703 C-0703 | Os-114 Os-115 | 2 | | \perp | | \Box | \perp | | | | _ | \Box | | \perp | | \Box | _ | \perp | _ | | \dashv | \perp | | \Box | _ : | 2 | _ | | | \perp | | _ | | | \rightarrow | | | \Box | \perp | | | \Box | _ | \perp | | | \perp | 4 | |
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| 92 Op 11 | C-0704 | Os-130 | ++* | + | + | Н | \vdash | \top | + | \forall | + | \top | \vdash | + | + | \forall | \dashv | + | + | \top | \vdash | + | + | + | 1 | + | 1 | \top | Н | \vdash | + | + | + | + | \Box | + | + | Н | \vdash | + | + | \Box | \vdash | + | + | \Box | \vdash | + | 1 | 7 |
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| 92 Op 11 | C-0709 | Os-147 | $+$ \top | | +- | П | \Box | F | + | H | \perp | + | H | F | + | H | 7 | Ţ | \perp | + | H | Ţ | F | 1 | | Ţ | £ | + | H | H | 5 | \Box | \perp | - | \Box | Ţ | _ | | H | F | F | \Box | П | \perp | \perp | \Box | H | F | 6 | |
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| 92 Op 11 | C-0709 | Os-251 | 3 | | _ | H | $\vdash \vdash$ | | \pm | | | | | | \pm | | | ÷ | \pm | | | _ | \exists | 1,3 | | _ | | | H | | 3 | | | _ | | _ | | | | ᆂ | \pm | | \Box | _ | \pm | | | ᆂ | 32 6 | |
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| 2 Op 1 | C-0756 | Os-61 | | 4 | | | | | \perp | | | | | | | | \rightrightarrows | ightharpoons | | | | \rightrightarrows | \Rightarrow | 1 | \Box | ightharpoons | | | | | | | | | | \rightrightarrows | | | | \perp | | | | \Rightarrow | | | | \perp | 6 | |
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| 8 | | | Canis familiaris | Lama sp. | Ę | Agouti sp. | Silvylagus sp. Felis sp. | Carnívora n/i | colleus virginia | Colaptes sp. | Cyanocorax sp. | cf. Fulica s | Strigidae | na m | aida a | Passerifon | Ave n/i | Didelphis | chophylla | Quiróptero Bufo so | Anfibio n/i | Reptil n/i | Insecto N/I Muridae | Rattus rattu | Rodentia | Gallus gallus | Bos tarurus | Ovis aries | Sus scrofa | Artiodactyla | Mamifero n/i | Semele | Semele | Argopecten ycardium p | loch | | | 300 | axo | otha | Engraulis ringens Sardinops sagax | Bullim | agm | mas | spanostomella Svstrophia sp. | ns n | /mae | Bostryx sp. | Total |
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| 2 Op 1 | C-0771 | Bo-152 | | | \Box | | | | | | \Box | | \perp | | | | | \Box | \Rightarrow | \Rightarrow | | | \rightarrow | | | \Rightarrow | | | \Box | | | | \Rightarrow | | | | \perp | | | | | 1 | | | \perp | | | 丰 | 4 |
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| 3 Op 1 3 Op 1 | C-0787 C-0787 | Os-72 Os-81 | 1 | 1 | \vdash | + | + | \vdash | $\vdash\vdash$ | + | + | + | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | 1 | + | \vdash | + | + | + | ++ | + | + | \vdash | + | + | \vdash | \vdash | + | + | \vdash | + | + | + | + | $\vdash \vdash$ | + | + | \vdash | + | 1 |
| 3 Op 1 | C-0787 | Os-93 | | \pm | 坩 | \pm | | | | \pm | | \pm | | | | | | | | \pm | \pm | | | \pm | | \exists | \pm | \pm | | 2 | | | | \pm | | | | | H | | | \pm | | | _ | \pm | | \pm | 2 |
| 3 Op 1 | C-0787 C-0788 | Os-97 FL84 | | 2 | \Box | Ŧ | T | | H | F | \Box | | Ŧ | F | \Box | Ŧ | F | H | 7 | Ŧ | F | П | Ŧ | F | П | 4 | Ŧ | Ŧ | \Box | Ŧ | T | \Box | \perp | \perp | П | H | T | A | H | 7 | Ŧ | 6 | | H | Ŧ | \blacksquare | H | Ŧ | 7 |
| 2 Op 1 2 Op 1 | C-0789 | FL73 | Н, | + | + | + | + | Н | \vdash | + | + | + | + | + | \vdash | + | + | \vdash | \dashv | + | + | \vdash | + | + | \vdash | + | + | + | + | + | + | + | + | + | \vdash | \vdash | + | + | \vdash | + | + | 1 | | \vdash | + | + | \vdash | + | 1 |
| 2 Op 1 | C-0789 | Os-211 | | 2 | 1 | \rightrightarrows | | | | \perp | \Box | \Rightarrow | \perp | | | \perp | | П | \Rightarrow | \bot | | 口 | \perp | | | # | 1 | | \Box | \rightrightarrows | | | \dashv | | | | \perp | | \Box | | | \perp | | | \perp | | | 工 | 3 |
| 2 Op 1 2 Op 1 2 Op 1 2 Op 1 2 Op 1 3 Op 1 | C-0789 C-0789 | Os-214 Os-86 | 1 , | 1 | 2 | + | + | 1 | \vdash | + | + | + | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | + | ++ | + | 4 | Н | + | + | \vdash | \vdash | + | + | \vdash | + | + | + | + | \vdash | + | + | \vdash | + | 7 |
| 2 Op 1 | C-0789 | Os-89 | 1 | 1 | \Box | \Rightarrow | | | | \perp | \Box | \Rightarrow | | | | | | | | \perp | | 口 | | | | \exists | | | \Box | \Rightarrow | | | | | | | | | \Box | | | | | \Box | \perp | | \Box | 工 | 2 |
| 3 Op 1 3 Op 1 | C-0791 C-0793 | Os-71 FL71 | 1 | 4 | \vdash | + | + | \vdash | \vdash | + | + | + | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | 2 | | \vdash | + | + | + | ++ | + | + | \vdash | + | + | \vdash | \vdash | + | + | \vdash | + | + | 6 | + | \vdash | 1 | + | \vdash | 2 | 7 |
| 3 Op 1 | C-0793 | Os-70 | | 1 | 坩 | \pm | | | 1 | \pm | | \pm | | | | | | | | \pm | \pm | | | \pm | | \exists | \pm | \pm | | \pm | | | | \pm | | | | | H | | | | | | _ | \pm | | | 2 |
| 2 Op 1 | C-0796 C-0796 | FL85 Os-207 | 1 | | H | Ŧ | - | П | | F | П | Ŧ | Ŧ | F | H | Ŧ | F | П | Ŧ | Ŧ | F | П | \perp | F | П | Ŧ | Ŧ | Ŧ | \Box | Ŧ | 4 | П | Ŧ | | F | H | Ŧ | F | H | Ŧ | Ŧ | 8 | F | H | Ŧ | F | H | 2 | 11 |
| 2 Op 1 2 Op 1 | C-0796 | Os-207 Os-90 | 1 2 | 1 | 2 | + | + | Н | \vdash | + | \forall | + | + | + | \vdash | + | + | \forall | + | + | + | H | + | + | \vdash | + | + | + | ++ | + | 4 | Н | + | + | \vdash | \vdash | + | + | \vdash | + | + | + | + | \vdash | + | + | \vdash | + | 5 |
| 2 Op 1 | C-0797 | FL86 | | Ŧ | Ħ | # | \perp | П | | Ŧ | \Box | # | 1 | | \Box | 1 | | П | # | # | T | Ħ | \Rightarrow | 1 | | # | 1 | \perp | \Box | # | 1 | П | # | | \Box | | 1 | \blacksquare | \Box | # | 1 | 2 | | \Box | 2 | \perp | \Box | \mp | 4 |
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| 4 Op 1 | C-0800 | FL81 | | | П | # | | | | \perp | | # | \perp | | | \perp | | | \Rightarrow | # | | | 1 | | | 7 | 1 | | \Box | # | | | 1 | | | | \perp | | \Box | | | 1 | | | \perp | | | 工 | 2 |
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| Sample/ Operation Context Bag 4 Op 1 C-0800 Os-531 | Canis familiaris Cavia porcellus | Lama sp. | Lagidium peruanum | Agouti sp. | Silvylagus sp. | relis sp. Carnívora n/i | Odocoileus virginianus | Nothoprocta sp. | Colaptes sp. Cyanocorax sp. | cf. Fulica sp. | Buteo sp. | Strigidae Cairina moschata | 131 | Thraupidae | Passeriforme | Didelphis sp. | Lonchophylla sp. | Quiróptero n/i | Buro sp. Anfibio n/i | Reptil n/i | Insecto N/I Muridae | Rattus rattus | Rodentia | Bos tarurus | Capra hircus | Ovis aries | Sus scrofa Artiodactyla | Mamífero n/i | Chione subrugosa | Semele solida Semele sp. | Argopecten sp. | Trachycardium proceru | Molusco n/i | Fusinus dupetitthouar | o Mari | Donax obesulus | Protothaca thaca | Engraulis ringens | Bulimulidae | Epiphragmophora sp. | Thaumasthus sp. | Drepanostomella sp. Systrophia sp. | Scutalus mariopenal | Drymaeus sp. | Bostryx sp. | |
| 4 Op 1 C-0800 Os-531 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | 2 | |
| 4 Op 7 C-0801 Os-438 4 Op 7 C-0801 Os-472 | + | + | +1 | \vdash | H | + | + | \vdash | + | + | H | + | +1 | + | _ 1 | 1 | H | + | + | +1 | 1 | + | + | + | +1 | + | + | 1 | - | + | \vdash | + | + | H | + | + | _ | + | + | +1 | \vdash | + | +1 | + | 1 2 | |
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| 4 Op 7 C-0802 Os-399 | | | | | | | | | | | \Box | | | 一 | | | | \dashv | | \Box | 1 | | \dashv | | | \dashv | | | | | | | | | | | | \perp | | | | | | | 1 | |
| 4 Op 7 C-0802 Os-415 4 Op 7 C-0802 Os-417 | 3 | \perp | | | | \perp | \perp | | \perp | \perp | Ш | \perp | | \rightarrow | \perp | \perp | | \perp | \perp | \Box | 22 | | \perp | \perp | | \perp | \perp | 2 | | \perp | \Box | \perp | \perp | | \perp | | \Box | \perp | \perp | \Box | | \perp | \Box | \perp | 27 4 | |
| 4 Op 7 C-0802 Os-417 4 Op 7 C-0802 Os-420 | + | + | + | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | \rightarrow | + | + | \vdash | + | + | + | 4 | + | \dashv | + | + | \dashv | - | 2 | \rightarrow | + | \vdash | + | + | | + | \vdash | \dashv | + | + | + | \vdash | + | + | + | 2 | |
| 4 Op 7 C-0802 Os-423 | | + | \top | Н | \vdash | + | + | \Box | + | + | \vdash | + | \top | \dashv | + | + | Н | \dashv | + | \vdash | 14 | | \dashv | \top | \Box | \dashv | | 1 | $^{+}$ | + | \vdash | \top | + | | \top | \Box | \dashv | \top | + | \vdash | \vdash | \top | \Box | \top | 14 | |
| 4 Op 7 C-0802 Os-424 | | | | | | | | | | | | | | | | | | | | | 7 | | | | | | | | | | П | | | | | | | | | | | | | | 7 | |
| 4 Op 7 C-0802 Os-425 4 Op 7 C-0802 Os-432 | + | + | + | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | \rightarrow | + | + | \vdash | + | + | + | 1 | | \dashv | + | + | \dashv | - | \vdash | \rightarrow | + | \vdash | + | + | | + | \vdash | \dashv | + | + | + | \vdash | + | + | + | 3 | |
| 4 Op 7 C-0802 Os-433 | | + | + | Н | \vdash | + | + | | + | | \vdash | + | | \dashv | + | + | Н | \dashv | + | 7 | 30 | | \dashv | + | | \dashv | | | \dashv | + | \vdash | \vdash | + | | + | | \dashv | + | + | \vdash | \vdash | | + | + | 37 | - |
| 4 Op 7 C-0802 Os-435 | | 1 | | | | | | | \Rightarrow | | | | | _ | 1 | | | | | \Box | | | \Rightarrow | | | \Rightarrow | | | _ | | П | \Rightarrow | | | | | | \Rightarrow | \perp | \Box | | | | | 1 | |
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| 4 Op 7 C-0802 Os-475 | | + | + | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | \vdash | + | + | + | 34 | + | + | + | + | + | + | 1 | + | + | \vdash | + | + | \vdash | + | + | \dashv | + | + | + | \vdash | + | + | + | 1 | \dashv |
| 4 Op 7 C-0802 Os-477 | | | | | | | | | \perp | | | \perp | | \Box | \bot | | | # | | 1 | 1 | | \Rightarrow | | | \Rightarrow | | 1 | | | П | | | | | | \Box | \Rightarrow | | | | | | \Box | 3 | |
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| 4 Op 7 C-0809 Os-392 | | Τ | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | コ | | | | | | | | 1 | |
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| 4 Op 7 C-0809 Os-452 | | \top | \top | П | | \top | \top | \Box | \neg | | \Box | \top | \top | \neg | 2 | : | | \dashv | \top | \Box | T | 11 | \dashv | _ | \Box | \dashv | | \Box | \neg | \top | \Box | \neg | \top | | 1 | \Box | | \top | \top | \Box | \vdash | | \Box | \neg | 2 | |
| 4 Op 7 C-0809 Os-456 | | \perp | | | | \perp | - | | \perp | - | П | \perp | \blacksquare | \neg | \perp | \perp | | \perp | \perp | \Box | | \Box | \neg | \perp | \blacksquare | \neg | | 1 | \neg | \perp | П | \perp | \perp | | \perp | | \neg | \perp | \perp | \blacksquare | | \perp | \Box | \perp | 1 | |
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| 4 Op 7 C-0809 Os-467 | | ۳ | \top | Н | \vdash | + | + | \Box | + | + | \vdash | + | \top | \dashv | + | + | Н | \dashv | + | \vdash | 5 | + | \dashv | \top | \Box | \dashv | | 1 | $^{+}$ | + | \vdash | \top | + | | \top | \Box | \dashv | \top | + | \vdash | \vdash | \top | \Box | \top | 6 | |
| 4 Op 7 C-0809 Os-468 | | \perp | \blacksquare | | | \perp | \blacksquare | \Box | \perp | \perp | П | \perp | \Box | \neg | \perp | \perp | | \neg | \perp | \Box | 10 | | \neg | \perp | \Box | \neg | | | \Box | \perp | \Box | \perp | \blacksquare | | \perp | | \Box | \perp | \perp | \Box | | \perp | \Box | \perp | 10 | \equiv |
| 4 Op 7 C-0809 Os-476 4 Op 7 C-0810 Bo-240 | + | + | + | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | \rightarrow | + | + | Н | + | + | \vdash | - | + | + | + | + | + | + | 1 | + | + | \vdash | + | + | \vdash | + | \vdash | \dashv | + | + | \vdash | \vdash | + | + | + | 3 | |
| 4 Op 7 C-0810 Bo-242 | | 1 | \top | Н | \vdash | + | + | \Box | + | + | \vdash | + | \top | \dashv | + | + | Н | \dashv | + | \vdash | | + | \dashv | \top | \Box | \dashv | | ╁ | $^{+}$ | + | \vdash | \top | + | | \top | \Box | \dashv | \top | + | \vdash | \vdash | \top | \Box | \top | 1 | - |
| 4 Op 7 C-0810 Os-428 | | | | | | | | | | | | | | | | | | | | | 26 | | | | | | | | | | | | | | | | | | | | | | | | 26 | |
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| 4 Op 7 C-0810 Os-462 | | | | | | | | | | | | | | | | | | | | | 56 | 3 | | | | | | 1 | | | | | | | | | | | | | | | | | 57 | • |
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| 4 Op 7 C-0810 Os-489 4 Op 7 C-0812 AE-2025a | | 1 | + | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | \dashv | ۲, | + | Н | \dashv | + | + | 51 | + | + | + | + | + | + | \vdash | + | + | + | + | + | | + | \vdash | \dashv | + | + | + | \vdash | + | + | + | 1 | |
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| 4 Op 7 C-0812 FL219 | | | | | | | | | 土 | | | | | | 土 | | | | | | 20 | | | | | | | | | | | | | | | | | \perp | 3 | | | | | | 23 | : |
| 4 Op 7 C-0812 Os-505 4 Op 7 C-0812 Os-601 | 1 | + | \Box | П | \perp | _ | + | H | $-\Gamma$ | + | H | \perp | \Box | Ţ | \perp | + | | \perp | _ | \Box | 10 | \Box | Ŧ | F | + | Ŧ | \perp | H | \perp | _ | \Box | $-\Gamma$ | F | H | + | \Box | 7 | \perp | \perp | H | \perp | $-\Gamma$ | + | $-\Gamma$ | 1 104 | |
| 4 Op 7 C-0812 Os-601 4 Op 7 C-0813 Os-461 | ++ | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | + | + | + | \vdash | + | + | \vdash | 110 | + | + | + | + | + | + | 2 | + | + | + | + | + | \vdash | + | + | \dashv | + | + | \vdash | + | + | + | + | 104 | |
| 4 Op 7 C-0813 Os-466 | | 3 | | | | | | | \perp | | | 土 | | | 土 | | | \pm | | | 8 | | | | | | | 2 | | | \Box | | | \Box | | | | \perp | \pm | | | | | 士 | 13 | 1 |
| 4 Op 7 C-0813 Os-470 | $+\Gamma$ | 1 | \Box | П | H | | 1 | H | \perp | 1 | П | \perp | \Box | Ţ | | | | \perp | | \Box | 5 | | \perp | - | \Box | \perp | | 1 | Ŧ | | H | \perp | 1 | H | \perp | \Box | 7 | T | | \Box | H | $-\Gamma$ | \Box | \perp | 6 | |
| 4 Op 7 C-0813 Os-480 4 Op 7 C-0814 Os-493 | ++ | + | + | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | 2 | + | \vdash | + | + | 1 | 22 | 8 | + | + | + | + | + | 1 | + | + | \vdash | + | + | \vdash | + | \vdash | \dashv | + | + | \vdash | \vdash | + | + | + | 232 | <u>-</u> |
| 4 Op 7 C-0819 Os-391 | | 土 | | | | 土 | 1 | | | | | 士 | | ゴ | | | | 士 | 土 | | | | \perp | | | \perp | 1 | | | 土 | 口 | | I | | | | | 士 | | | | | 口 | 士 | 5 2 | |
| 4 Op 7 C-0819 Os-481 | | Ţ, | \Box | П | \Box | T | \vdash | П | T | | П | T | \Box | 7 | 1 | I | | 7 | T | \Box | 1 | \Box | 7 | Ŧ | \Box | 7 | T | 1 | T | T | H | T | \perp | П | F | \Box | \Box | T | T | \Box | \Box | T | \Box | 7 | 3 | |
| 4 Op 7 C-0819 Os-589 4 Op 7 C-0821 AE-2058 | ++ | 1 | | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | \vdash | + | + | ++ | + | + | + | + | + | + | + | \vdash | + | + | + | + | + | \vdash | + | + | \dashv | + | + | \vdash | \vdash | + | + | + | 1 | |
| 4 Op 7 C-0821 Os-419 | | 3 | | | | \pm | 1 | | | 1 | | _ | | _† | _ | \pm | | | \pm | | | 1 | | | | | | | | \pm | | | | \vdash | | | _ | | \pm | \perp | | | | | 3 | |
| 4 Op 7 C-0821 Os-429 | | T | \Box | | | T | | \Box | \perp | | | \perp | \Box | \dashv | \perp | T | | \neg | T | \Box | 89 | | \neg | Ŧ | \Box | \neg | T | | | T | \Box | \neg | \blacksquare | | T | | \Box | \neg | T | \Box | | \top | \Box | 7 | 89 | , |
| 4 Op 7 C-0821 Os-449 4 Op 7 C-0821 Os-451 | ++ | + | + | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | \vdash | + | + | \vdash | 1 | | + | + | + | + | 2 | 2 | + | + | + | + | + | \vdash | + | + | \dashv | + | + | \vdash | \vdash | + | + | + | 3 | - |
| 4 Op 7 C-0821 Os-463 | | \pm | $\pm \Box$ | H | | \pm | \pm | | _ | \pm | | _ | $\pm \Box$ | _+ | _ | \pm | \vdash | | \pm | \perp | # | 1 | | | | | 1 | 1 | | \pm | | | \pm | | | | _ | _ | \pm | $\pm \pm$ | | | $\pm \pm$ | _ | 3 3 2 | \dashv |
| 4 Op 7 C-0821 Os-482 | | T | \Box | | | T | | | \perp | | | \perp | \Box | \supset | \perp | \perp | | \perp | T | \Box | \perp | \Box | \neg | \perp | | \neg | T | 2 | \blacksquare | T | \Box | \perp | \perp | | \perp | | \Box | \perp | T | \Box | | \top | \Box | \perp | 2 | |
| 4 Op 7 C-0821 Os-491 4 Op 7 C-0821 Os-502 | ++ | 2 | + | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | \vdash | + | + | \vdash | + | + | + | + | + | + | + | 3 | \dashv | + | \vdash | + | + | \vdash | + | \vdash | - | + | + | \vdash | \vdash | + | + | + | 3 2 | _ |
| 4 Op 7 C-0821 Os-502 4 Op 7 C-0821 Os-591 | | +- | \Box | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | Н | + | + | + | + | + | + | + | + | + | + | 3 | \dashv | + | + | \dashv | + | \vdash | + | \vdash | \dashv | + | + | + | \vdash | + | + | + | 3 | |
| 4 Op 7 C-0821 Os-602 | | | | | | | | | | | | | | \Box | 工 | | | | | | | | \Box | | | \Box | | 1 | | | П | | | | | | 二 | ightharpoons | | | | | | | 1 | |
| 4 Op 7 C-0822 AE-2039 4 Op 7 C-0822 AE-2039 | ++ | 1 | + | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | \vdash | + | + | \vdash | 2 | + | + | + | + | + | + | \vdash | \dashv | + | \vdash | + | + | \vdash | + | \vdash | \dashv | + | + | \vdash | \vdash | + | + | + | 1 | \dashv |
| 4 Op 7 C-0822 AE-2039 4 Op 7 C-0822 FL145 | | + | + | Н | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | Н | + | + | 2 | + | + | + | + | + | + | + | + | + | + | + | + | + | \vdash | + | \vdash | \dashv | + | + | + | \vdash | + | + | + | 2 | |
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| Values are NISP | | D [| D D | Н | н | н н | Н | н | H/N H/ | N H/N | H/N F | I/N H/ | N H/N | H/N F | I/N H/ | N H/N | H/N | H/N | H/N | N N | N | N N | N N | N | М | M N | 1 M | M L | JM UI | M M | M I | и м | М | М | M M | M | M | M M | M | М | S | S S | SS | S | S S | SS | T |
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| | Sample/ Bag FL174 | Canis familiaris | Lama sp. | Lagidium peruanum | Agouti sp. | Silvylagus sp. Felis sp. | Carnívora n/i | Odocoileus virginianus | Nothoprocta sp. | Cyanocorax sp. | cf. Fulica sp. | Buteo sp. | Cairina moschata | Zenaida auriculata | Thraupidae | Ave n/i | Didelphis sp. | Lonchophylla sp. | Quiróptero n/i | Anfibio n/i | Reptil n/i | Insecto N/I | ~ | Rodentia | Gallus gallus | Bos tarurus Capra hircus | Ovis aries | Sus scrofa | Artiodactyla Mamífero n/i | Chione subrugosa | Semele Solida | Argopecten sp. | Trachycardium procer | Enoplochiton niger | Molusco n/i Fusinus dupetitthoua | Thais chocolata | Molusco Marino n/i | Donax obesulus Protothaca thaca | Engraulis ringens | Sardinops sagax | Bulimulidae | Epiphragmophora sp. | Drepanostomella sp. | Systrophia sp. | Scutalus mariopena | Bostryx sp. | Total |
| 4 Op 7 C-0822 4 Op 7 C-0822 | FL174 FL191 | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | _ | + | + | \vdash | | 1 | Н | - | + | + | \vdash | + | + | + | + | \vdash | $\vdash \vdash$ | + | + | \vdash | + | + | \vdash | Ш | + | + | \vdash | + | + | 1 |
| 4 Op 7 C-0822 4 Op 7 C-0822 | Os-386 | | 2 | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \dashv | + | + | Н | 9 | 2 | \vdash | + | + | + | + | + | + | + | + | | \vdash | + | + | \vdash | + | + | \vdash | \vdash | + | + | \vdash | + | + | 11 |
| 4 Op 7 C-0822 | Os-396 | | 3 | | П | | \top | | \top | 1 | \vdash | \top | 1 | | \top | \top | \Box | | | \top | П | | | П | \neg | _ | 1 | | \top | \top | \dashv | \top | | \Box | \top | 1 | | _ | 1 | \Box | П | \neg | 1 | П | | | 3 |
| 4 Op 7 C-0822 | Os-403 | | 2 | | \Box | | | | \perp | \perp | | \perp | | | | \blacksquare | \blacksquare | \Box | \Box | \perp | | | | \Box | \neg | \perp | \perp | | | | \Box | | | \Box | \perp | | | \perp | \perp | | \Box | \perp | \perp | \Box | \Box | | 2 |
| 4 Op 7 C-0822 4 Op 7 C-0822 | Os-445 Os-445 | ++ | 3 | | \vdash | - | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \dashv | + | + | \vdash | \vdash | + | \vdash | \dashv | + | + | \vdash | + | + | + | + | \vdash | \vdash | + | + | \vdash | + | + | \vdash | Н | + | + | \vdash | + | + | 3 |
| 4 Op 7 C-0822 | Os-443 | | 5 | \vdash | \vdash | | + | | + | + | \vdash | + | + | | + | + | \vdash | \dashv | \dashv | + | \vdash | \vdash | + | \vdash | \dashv | + | + | | + | + | \dashv | + | | \vdash | + | + | | + | + | | Н | \dashv | + | \vdash | \dashv | + | 5 |
| 4 Op 7 C-0822 | Os-469 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | ш | | | 1 |
| 4 Op 7 C-0822 4 Op 7 C-0822 | Os-471 | \vdash | 1 | - | \vdash | _ | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | - | + | + | \vdash | 1 | 1 | $\vdash \vdash$ | \rightarrow | + | + | \vdash | 1 | + | + | + | \vdash | $\vdash \vdash$ | + | - | \vdash | + | +- | \vdash | Ш | - | + | \vdash | + | + | 11 |
| 4 Op 7 C-0822 4 Op 7 C-0822 | Os-474 Os-494 | | 3 | | H | _ | + | | + | + | \vdash | + | + | | + | + | + | \dashv | - | + | \vdash | \vdash | + | \vdash | \dashv | + | + | + | + | + | \dashv | + | | \vdash | + | + | | + | + | + | Н | + | + | \vdash | - | + | 3 |
| 4 Op 7 C-0822 | Os-495 | | 2 | | | | | | | | | | | | | | | | | | | | | | 工 | | | | | | | | | | | | | | | | | | | | | | 2 |
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| 4 Op 7 C-0822 | Os-499 | | 2 | | | | | | | | | | | | | | | | | | | | | | o | | | | | | | | | | | | | | | | | | | | | | 2 |
| 4 Op 7 C-0822 | Os-503 | | 5 | | \Box | | | \Box | \perp | | \Box | _ | | \Box | \perp | \perp | \perp | \Box | | \perp | \Box | \Box | | \Box | \perp | \perp | \perp | \Box | | | _ | | | \Box | \perp | | \Box | \perp | \perp | | \Box | _ | \perp | \Box | | | 5 |
| 4 Op 7 C-0822 4 Op 7 C-0829 | Os-504 Os-389 | + + - | 3 6 | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \dashv | + | + | \vdash | \vdash | + | \vdash | + | + | + | + | 2 | + | + | + | | \vdash | + | + | \vdash | + | + | + | $\vdash\vdash$ | + | + | + | + | + | 9 |
| 4 Op 7 C-0829 | Os-409 | Ш, | | | | | | | | | | _ | \pm | | ⇟ | \pm | Ħ | | | \pm | Н | _ 1 | 1 | H | | | | | ⇟ | | | | | | ⇉ | | | | | | | | | | | \pm | 11 |
| 4 Op 7 C-0829 | Os-473 | | 3 | | | | | | | \top | | \perp | T | | \perp | T | \Box | | | T | | | T | | \Box | \perp | \perp | \Box | \perp | \Box | \Box | \perp | | | | | | \perp | \perp | | | | \perp | \Box | | T | 3 |
| 4 Op 7 C-0829 4 Op 7 C-0831 | Os-500 | ++ | 2 | - | \vdash | - | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \dashv | + | + | \vdash | | 1 | \vdash | \dashv | + | + | \vdash | 1 | | + | + | \vdash | \vdash | + | + | \vdash | + | + | \vdash | Н | + | + | \vdash | + | + | 6 |
| 4 Op 7 C-0831 4 Op 7 C-0831 | FL189 Os-400 | | + | + | \vdash | - | + | | + | + | \vdash | + | + | | + | + | \vdash | \dashv | \dashv | + | \vdash | - | 5 | \vdash | \dashv | + | + | | | + | \dashv | + | | \vdash | + | + | | + | + | | Н | \dashv | + | \vdash | \dashv | + | 6 |
| 4 Op 7 C-0831 | Os-404 | 1 | 1 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 4 |
| 4 Op 7 C-0831 | Os-408 | | 1 | | \Box | \perp | \perp | \Box | \perp | \perp | \Box | \perp | \perp | \Box | \perp | \perp | - | \dashv | \perp | \perp | \blacksquare | 8 | В | \Box | \rightarrow | \perp | \perp | \vdash | 2 | | \perp | \perp | | \Box | \perp | - | \vdash | \perp | _ | | \Box | \perp | \perp | \Box | \perp | \perp | 10 |
| 4 Op 7 C-0831 4 Op 7 C-0831 | Os-506 Os-507 | | 18 | | \vdash | - | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \dashv | - | + | \vdash | \vdash | + | \vdash | \rightarrow | - | + | + | + | + | + | + | | \vdash | + | + | | - | + | \vdash | \vdash | + | + | \vdash | - | + | 5 18 |
| 4 Op 7 C-0831 4 Op 7 C-0831 | Os-510 | | 9 | | H | _ | + | | + | + | \vdash | + | + | | + | + | \Box | \dashv | _ | + | \vdash | \vdash | + | \vdash | \rightarrow | _ | + | | + | + | \dashv | + | | \vdash | + | + | | _ | + | \vdash | Н | \dashv | + | \vdash | _ | + | 9 |
| 4 Op / C-0838 | Os-418 | | 1 2 | | | | | | | | | | | | | | | | | | | | | | _ | | | | | | | | | | | | | | | | | | | | | | 3 |
| 4 Op 7 C-0838 4 Op 7 C-0841 | Os-439 Os-410 | 1 | 1 3 | | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \dashv | + | + | \vdash | \vdash | + | \vdash | - | + | + | \vdash | + | + | + | + | \vdash | \vdash | + | + | \vdash | + | + | \vdash | Н | + | + | \vdash | + | + | 2 |
| 4 Op 7 C-0842 | FL143 | | ť | | \vdash | | + | \vdash | + | | \vdash | + | | \vdash | | + | \vdash | \dashv | | + | \vdash | \vdash | + | \vdash | \dashv | + | + | | | | + | + | | \vdash | + | | \vdash | + | + | | 4 | \vdash | | \vdash | | | 4 |
| 4 Op 7 C-0842 | Os-406 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | ш | | | 1 |
| 4 Op 7 C-0842 | Os-407 | ++ | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | - | + | + | \vdash | \vdash | + | \vdash | + | + | + | \vdash | 1 | + | + | + | \vdash | \vdash | + | + | \vdash | + | + | \vdash | Н | + | + | \vdash | + | + | 1 |
| 4 Op 7 C-0848 (storage) | Os-511 | | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 4 |
| 4 Op 7 C-0849 | FL134 | | \perp | \Box | ш | | \perp | | \perp | | | \Box | | | | \perp | П | \Box | | \perp | П | | | \Box | \neg | | | | | | | \perp | | \Box | | | | | | | | | 1 | П | | 1 | 2 |
| 3 Op 1 C-0901 3 Op 1 C-0902 | Os-212 FL75 | ++ | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \dashv | + | + | \vdash | \vdash | + | \vdash | - | + | + | \vdash | 3 | + | + | + | \vdash | $\vdash \vdash$ | + | + | \vdash | + | + | \vdash | Н | + | 1 | 1 | + | + | 3 2 |
| 3 Op 1 C-0903 | FL92 | | + | + | H | _ | + | | + | + | \vdash | + | + | | + | + | \Box | \dashv | _ | + | \vdash | <u> </u> | 1 | \vdash | \dashv | _ | + | | + | + | \dashv | + | | \vdash | + | + | | _ | + | \vdash | Н | \dashv | 1 | +'+ | _ | + | 2 |
| 3 Op 1 C-0903 | Os-204 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 4 | | | | | | | | | | | | | | | | | | 2 |
| 3 Op 1 C-0903 3 Op 1 C-0903 | Os-213 | 1 | 1 | - | \vdash | _ | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | - | + | + | \vdash | \vdash | + | $\vdash \vdash$ | \rightarrow | + | + | \vdash | 1 1 | + | + | + | \vdash | $\vdash \vdash$ | + | - | \vdash | + | +- | \vdash | Ш | - | + | \vdash | + | + | 2 |
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| 3 Op 1 C-0903 | Os-520 | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | 4 | | | | | | | | | | | | | | | \Box | | | 6 |
| 3 Op 1 C-0903 | Os-521 | 2 | 2 1 | | H | T | F | \Box | T | | П | Ŧ | F | \Box | Ŧ | F | A | 4 | 7 | F | П | \Box | \perp | П | 7 | Ŧ | F | \Box | 1 | \Box | 7 | F | | H | T | F | H | Ŧ | F | | П | \top | Ŧ | H | 7 | F | 6 |
| 3 Op 1 C-0903 2 Op 1 C-0904 | Os-522 FL77 | + | 4 | ++ | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \dashv | + | + | Н | \vdash | + | \vdash | + | + | + | + | + | + | + | + | | \vdash | + | + | \vdash | + | + | + | 6 | + | + | 1 | + | + | 7 |
| 2 Op 1 C-0904 | Os-215 | | | | | | | | 土 | | | 士 | | | 土 | | | | | | | | | | \exists | | | | 4 | | | | | | | | | | | | | | | | | | 4 |
| 3 Op 1 C-0905 | FL82 | \vdash | + | \vdash | H | \perp | + | \vdash | \perp | + | $\vdash \vdash$ | + | + | \vdash | + | + | + | 4 | 4 | + | H | \vdash | \perp | Щ | 4 | + | + | \vdash | 1 | + | | + | | \sqcup | \perp | + | $\vdash \vdash$ | + | + | \vdash | 5 | - | + | $+$ \top | 4 | + | 5 |
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| 3 Op 1 C-0905 | Os-529 | | 1 | 2 | | 土 | | | 土 | \perp | | 士 | \pm | | ᆂ | 士 | | | | | | - 2 | 2 | ㅂ | \exists | 丁 | | | ľ | 山 | 士 | | | | 土 | | | 丁 | | | | 士 | | Ш | | \perp | 8 |
| 3 Op 1 C-0907 | AE-1840 | | 1 | \Box | | \perp | | | T | | | T | F | | T | F | П | П | T | T | П | \Box | \perp | | Ţ | T | \blacksquare | \Box | T | | \neg | T | | | \top | | | T | \blacksquare | | | \top | \perp | \Box | T | T | 1 |
| 3 Op 1 C-0907 3 Op 1 C-0907 | Os-153 Os-527 | ++ | 1 | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \dashv | + | + | \vdash | \vdash | + | \vdash | + | + | + | + | 2 | + | + | + | | \vdash | + | + | \vdash | + | + | + | $\vdash\vdash$ | + | + | + | + | + | 1 |
| 3 Op 1 C-0907 | Os-527 | 1 1 | 1 2 | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \dashv | + | + | Н | \vdash | + | \vdash | + | + | + | + | + | + | + | + | | \vdash | + | + | \vdash | + | + | \vdash | \vdash | \dashv | + | \vdash | + | + | 3 |
| 3 Op 1 C-0909 | Bo-323 | | 1 | | | | | | \Rightarrow | | | ightharpoons | \perp | | \perp | \perp | \Box | | | \perp | | | | \Box | \rightrightarrows | \perp | \perp | \Box | \perp | | \Rightarrow | | | \Box | \perp | | | \perp | | | | | \perp | \Box | | \perp | 1 |
| 3 Op 1 C-0909 3 Op 1 C-0910 | FL80 | ++ | 1 | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | \dashv | + | + | \vdash | \vdash | + | \vdash | + | + | + | \vdash | + | + | + | + | | \vdash | + | + | \vdash | + | + | \vdash | 5 | + | + | \vdash | + | + | 5 |
| 3 Op 1 C-0910 2 Op 1 C-0914 | Os-232 AE-1842 | | 3 | | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \dashv | + | + | Н | \vdash | + | \vdash | + | + | + | + | + | + | + | + | | \vdash | + | + | \vdash | + | + | \vdash | \vdash | + | + | \vdash | + | + | 3 |
| 2 Op 1 C-0914 | FL121 | | | | | | | | | | | 土 | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | 6 | | 1 | | | 2 | 9 |
| 2 Op 1 C-0914 | Os-229 | 2 | 2 1 | \Box | П | T | | H | T | \perp | П | T | F | H | T | F | П | \Box | \bot | T | П | I | T | П | 7 | T | \perp | П | 4 | | | | | \Box | T | | П | T | \perp | \Box | П | T | F | H | \bot | T | 7 |
| 2 Op 1 C-0914 2 Op 1 C-0914 | Os-230 Os-239 | $++^2$ | 2 1 | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \dashv | + | + | Н | \vdash | + | \vdash | + | + | + | + | 2 | + | + | + | | $\vdash \vdash$ | + | + | \vdash | + | + | \vdash | $\vdash\vdash$ | + | + | \vdash | + | + | 1 |
| 2 Op 1 C-0914 | Os-239 Os-242 | | 1 | | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | \forall | \dashv | + | + | Н | \vdash | + | \vdash | \dashv | + | + | + | + | + | \dashv | + | | \vdash | + | + | \vdash | + | + | \vdash | \vdash | + | + | + | + | + | 1 |
| 2 Op 1 C-0914 | Os-250 | | 1 | | 1 | | | | | | | | | | | | | | | | | | | | \Box | | | | | | | | | | | | | | | | | | | | | | 2 |
| 3 Op 1 C-0915 | Bo-169 | $+$ \top | Ŧ. | \Box | H | \perp | + | \sqcap | $-\Gamma$ | - | H | \perp | + | \sqcap | F | + | H | 7 | Ŧ | \perp | H | $\perp \Gamma$ | - | П | Ŧ | $-\Gamma$ | + | $+$ \top | F | \Box | $-\Gamma$ | + | | H | $-\Gamma$ | + | H | $-\Gamma$ | F | \Box | 1 | $-\Gamma$ | + | \Box | Ŧ | 1 | 1 |
| 3 Op 1 C-0915 3 Op 1 C-0915 | FL47 Os-234 | + | 1 | | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \dashv | + | + | Н | \vdash | + | \vdash | + | + | + | + | + | + | + | + | | \vdash | + | + | \vdash | + | + | + | 6 | + | + | \vdash | + | 2 | 9 |
| 3 Op 1 C-0915 | Os-235 | 1 | ı İ | | | | | | 土 | | | 士 | \pm | | 土 | \pm | | | | | | | | | \exists | | | | 土 | | 士 | | | | 土 | | 口 | | | | | | | \Box | | \pm | 1 |
| 2 Op 1 C-0916 | FL49 | | T | | Д | T | | \Box | T | | П | T | | \Box | Ŧ | | П | \Box | T | T | \Box | \Box | | П | I | T | | \Box | T | | \perp | | | П | T | | П | T | | | 8 | T | T | \Box | T | T | 8 |
| 2 Op 1 C-0916 | Os-245 | | 2 | ! 1 | Ш | | | | | | | | | | | | | | | | | | 3 | | | | \perp | | 2 | | | | | | | | | | | \perp | | | | | | | 8 |

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| | | lia lia | sb. | . Bull | S. | ls sr | Carnívora n/i | irgi | othoprocta s Colaptes sp. | ax a | a sp. | ae | sch | iricu | Passeriforme | چ | s sp. | | | Anfibio n/i | i/u | Insecto N/I Muridae | Rattus rattu | ıtia | Gallus gallus | | ries | Sus scrofa | Arriodactyla Mamífero n/i | ne subrugo | Solida | | l pr | 8 | dusco n/i | | arin | esul | in g | saç | ulidae | ophora | nus | ias | ario | rymaeus sp. Bostryx sp. | / = |
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| 2 Op 1 | C-0917 AE-1874b | | 1 | | \Box | \perp | | \Box | | | \blacksquare | \perp | | | \perp | | | \Box | | | | \perp | | | | | | | \perp | \blacksquare | \Box | | | \Box | | | \Box | \blacksquare | \perp | | | | | | | 丰 | 1 |
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| 2 Op 1 | C-0917 Os-233 | 1 | 4 | | | \pm | | | | | 士 | | | | | | \Box | 士 | | | | \perp | | | | | | | | | | | | | | | \Box | \perp | | | | | | | | 土 | 5 |
| 2 Op 1 2 Op 1 | C-0917 Os-237 C-0917 Os-238 | 1 | 1 | + | \dashv | + | \vdash | \vdash | - | Н | + | + | | + | + | + | \vdash | + | - | + | \vdash | + | + | \vdash | + | + | +- | \vdash | + | + | \vdash | - | + | \vdash | - | + | + | + | + | + | Н | \vdash | - | \vdash | \vdash | + | 1 |
| 2 Op 1 | C-0917 Os-240 | | 4 | | | | | | | | | | | | | | | \exists | | | | | | | | \pm | | | | | | | | | | | | | | | | | | | | \pm | 4 |
| 2 Op 1 2 Op 1 2 Op 1 | C-0917 Os-248 C-0917 Os-528 | \perp | \perp | \vdash | _ | \perp | \vdash | \Box | _ | Н | \perp | _ | | \Box | 1 | | \Box | 4 | \perp | \perp | \Box | 10 | | \Box | _ | \perp | \perp | \vdash | _ | \perp | \Box | \perp | \vdash | \Box | \perp | \perp | \vdash | \perp | \perp | \perp | | \Box | \perp | \vdash | \Box | 丰 | 10 |
| 2 Op 1 | C-0917 Os-528 | ++ | 2 | + | \dashv | + | + | \vdash | + | \vdash | + | + | Н | + | + | + | \vdash | + | + | + | \vdash | - | + | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | + | Н | \vdash | + | + | \vdash | + | 2 |
| 2 Op 1 | C-0918 Os-236 | | 4 | | | 1 | | | | | \perp | | | | | | \Box | _ | | | | ightharpoonup | | | | | | | | | | | | | | | \Box | \Rightarrow | | | | | | | | 工 | 4 |
| 3 Op 1 2 Op 1 | C-0919 FL48 C-0921 Os-231 | 1 | 1 | + | \dashv | + | + | \vdash | - | Н | + | + | | + | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | H | + | + | + | + | + | + | 4 | \vdash | 1 | + | \vdash | + | 7 |
| 2 Op 1 | C-0922 AE-1871a | | 2 | | 寸 | \pm | | | | | \perp | | | | 土 | 土 | | ⇉ | | | | | | | 1 | 土 | 土 | | 士 | | | | | | 士 | 土 | | \perp | 土 | | | | | | | \pm | 2 |
| 2 Op 1 | C-0922 AE-1871b C-0922 Os-533 | HT. | 1 | | \dashv | \perp | F | H | - | П | Ŧ | F | П | \perp | Ŧ | F | П | \mp | Ŧ | F | H | \perp | F | T | Ŧ | Ŧ | F | H | Ŧ | \blacksquare | H | Ŧ | | H | Ŧ | F | \Box | Ŧ | Ŧ | F | П | Ŧ | Ŧ | F | T | 丰 | 1 3 |
| 2 Op 1 2 Op 1 | C-0922 Os-533 C-0925 FL115 | ++ | 2 | + | \dashv | + | + | \vdash | + | Н | + | + | \vdash | \vdash | + | + | \vdash | \dashv | + | + | \vdash | + | + | \dashv | + | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | + | 3 | + | + | + | \dashv | + | 3 |
| 2 Op 1 | C-0929 Os-249 | | 5 | \Box | _ | \Rightarrow | | \Box | | \Box | \Rightarrow | \perp | | | | | \Box | 4 | \perp | \perp | \Box | \Rightarrow | | | | \perp | \perp | | \perp | \perp | \Box | \perp | | \Box | _ | \perp | \Box | \Rightarrow | | \perp | | | | | | 丰 | 5 |
| 2 Op 1 2 Op 1 | C-0930 FL118 C-0936 FL100 | ++ | + | + | + | + | + | \vdash | + | \vdash | + | + | \vdash | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | \dashv | + | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | + | 5 | + | + | + | \dashv | 1 | 5 3 |
| 2 Op 1 | C-0938 Os-243 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | 士 | 1 |
| 2 | C-0943 FL94 C-0943 Os-156 | ++ | + | + | + | + | + | \vdash | + | Н | + | + | Н | + | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | 1 | + | \vdash | + | \vdash | Н | + | + | + | + | + | + | 4 | + | 1 | + | \vdash | + | 5 |
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| 2 Op 1 | C-0944 Os-244 | 1 | \perp | | 4 | \perp | | \Box | | \Box | \neg | \perp | | \Box | \perp | | | 7 | | | | | | | 7 | \perp | | | 1 | | | | | \Box | | | \Box | \neg | \perp | | | | | | | 丰 | 2 |
| 2 Op 1 2 Op 1 | C-0945 FL117 C-0945 Os-155 | ++ | + | + | \dashv | + | + | \vdash | + | \vdash | + | + | Н | + | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | + | Н, | 2 | + | \vdash | + | + | \vdash | + | + | + | + | + | + | 2 | \vdash | + | + | \vdash | + | 2 |
| 2 Op 1 | C-0945 Os-984 | | 2 | | \Rightarrow | \Rightarrow | | | | | \Rightarrow | | | | | | \Box | # | | | | \Rightarrow | | | | $^{\pm}$ | | | | | | | | | | | \Box | \Rightarrow | | | | | | | | 士 | 2 2 |
| 2 Op 1 2 Op 1 | C-0950 FL98 C-0950 Os-532 | ++ | + | + | + | + | \vdash | \vdash | - | \vdash | + | + | Н | + | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | + | Н. | 5 | + | \vdash | + | + | \vdash | + | + | + | + | + | + | 2 | \vdash | + | \vdash | \vdash | + | 5 |
| 2 Op 1 | C-0951 FL97 | | 士 | | \exists | \pm | | | | Ш | \pm | | | | | | \Box | 1 | | | | | | | | 土 | | | | | | | | | | | \pm | \pm | | | 2 | | | | | 土 | 2 |
| 2 Op 1 | C-0952 Os-524 | + | + | \square | \dashv | \perp | \vdash | \vdash | | Н | \perp | + | | - | + | \vdash | \Box | \dashv | \perp | + | \Box | \perp | | \Box | \perp | + | + | | 1 1 | | \Box | \perp | | \Box | - | + | \vdash | \perp | + | \perp | Н | - | | \vdash | \Box | \perp | 1 |
| 4 Op 13 4 Op 13 | C-0953 Os-572 C-0960 Os-563 | ++ | 1 | + | \dashv | + | + | \vdash | + | \vdash | + | + | Н | + | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | + | Н | \vdash | + | + | \vdash | + | 1 |
| 4 Op 13 | C-0960 Os-567 | | \perp | | \Box | \perp | | \Box | | | \blacksquare | \perp | | | \perp | | | \Box | | | | \blacksquare | | | | | | | 2 | | \Box | | | \Box | | | \Box | \blacksquare | \perp | | | | | | | 丰 | 2 |
| 4 Op 13 4 Op 13 | C-0960 Os-570 C-0964 Os-556 | ++ | 1 | + | \dashv | + | + | \vdash | + | \vdash | + | + | Н | + | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | + | Н | \vdash | + | + | \vdash | + | 1 |
| 4 Op 13 | C-0964 Os-560 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | \perp | 1 |
| 4 Op 13 4 Op 13 | C-0964 Os-564 C-0964 Os-566 | + | + | + | \dashv | + | \vdash | 1 | - | Н | + | + | | + | + | + | \vdash | + | - | + | \vdash | + | + | \vdash | + | + | +- | \vdash | 2 | - | \vdash | - | + | \vdash | - | + | + | + | + | + | Н | \vdash | - | \vdash | \vdash | + | 1 |
| 4 Op 13 | C-0964 Os-573 | | \pm | | | | | | | | | | | | | | | \exists | | | | | | | | \pm | | | 1 | | | | | | | | | | | | | | | | | \pm | 1 |
| 4 Op 13 4 Op 13 | C-0964 Os-574 | \perp | 1 | \vdash | _ | \perp | \vdash | \Box | _ | Н | \perp | _ | | \Box | \perp | | \Box | 4 | \perp | \perp | \Box | \perp | | \Box | _ | \perp | \perp | \vdash | | | \Box | \perp | \vdash | \Box | \perp | \perp | \vdash | \perp | \perp | \perp | | \Box | \perp | \vdash | \Box | 丰 | 1 |
| 4 Op 13 4 Op 13 | C-0964 Os-575 C-0970 Os-159 | ++ | 2 | + | \dashv | + | + | \vdash | + | \vdash | + | + | Н | + | + | + | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | 3 | + | \vdash | + | + | \vdash | + | + | + | + | + | + | Н | \vdash | + | + | \vdash | + | 3 2 |
| 4 Op 13 | C-0970 Os-557 | | 2 | | | 1 | | | | \Box | \perp | | | | | | \Box | _ | | | | ightharpoonup | | | | | | | | | | | | | | | \Box | \Rightarrow | | | | | | | | 工 | 2 |
| 4 Op 13 4 Op 13 | C-0970 Os-558 C-0970 Os-559 | ++ | 2 | | \dashv | + | + | \vdash | + | \vdash | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | \vdash | + | + | \dashv | + | + | + | \vdash | 1 | + | \vdash | + | + | \vdash | + | + | + | + | + | + | \vdash | + | + | + | \dashv | + | 3 |
| 4 Op 13 | C-0970 Os-562 | | 1 | | | | | | | | | | | | | | | | | | | | | 世 | | \pm | | | Ť | | | | | | | | | | | | | | | | 世 | 士 | 1 |
| 4 Op 13 4 Op 13 | C-0970 Os-565 C-0970 Os-569 | ++ | 3 | + | + | + | + | H | + | \vdash | + | + | \vdash | \vdash | + | + | \vdash | + | + | + | Н | _ | + | H | + | + | + | H | 1 | | H | + | \vdash | H | + | + | + | + | + | + | \vdash | \dashv | + | + | H | + | 3 |
| 4 Op 13 | C-0970 Os-571 | 1 | | | | | | | | | \pm | | | | | \pm | ⇈ | | | \perp | Ħ | | \pm | | | | \pm | | # | | \Box | | | | \pm | | 世 | | | | | \Box | | | | \pm | 1 |
| 4 Op 13 | C-0977 Os-158 | $+$ \mp | Ţ, | | Ţ | \perp | F | H | - | П | Ŧ | F | П | \Box T | T | F | П | \exists | Ŧ | F | П | \perp | F | I | Ŧ | T | F | H | 1 | \Box | I | Ŧ | \vdash | H | Ŧ | F | \Box | Ŧ | T | F | П | I | Ŧ | F | I | 丰 | 1 |
| 4 Op 13 4 Op 13 | C-0980 Os-561 C-0980 Os-568 | ++ | 1 | +1 | + | + | + | \vdash | + | Н | + | + | Н | \vdash | + | + | \forall | + | + | + | \vdash | + | + | \dashv | + | + | + | + | 1 | + | \vdash | + | | \vdash | + | + | + | + | + | + | Н | + | + | + | \dashv | + | 1 |
| 4 Op 6 | C-1001 Os-344 | | 2 | | \Rightarrow | \Rightarrow | \Box | \Box | | | \Rightarrow | \perp | | | \perp | \perp | \Box | # | \perp | \perp | Ħ | \Rightarrow | \Box | \Box | \perp | \perp | \perp | | | \blacksquare | \Box | \perp | | \Box | \perp | \perp | \Box | \perp | \perp | | | \Box | | \Box | \Box | 工 | 2 |
| 4 Op 6 4 Op 6 | C-1004 Os-597 C-1005 AE-1274 | ++ | 1 | + | + | + | + | \vdash | + | \vdash | + | + | \vdash | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | \dashv | + | + | + | 1 | 1 | + | \vdash | + | + | \vdash | + | + | + | + | + | + | Н | + | + | + | \dashv | + | 1 |
| 4 Op 6 | C-1005 Os-300 | | 1 | | 寸 | \pm | | | | | \perp | | | | 土 | 土 | | ⇉ | | | | | | | 1 | 土 | 土 | | 士 | | | | | | 士 | 土 | | \perp | 土 | | | | | | | \pm | 1 |
| 4 Op 6 4 Op 6 | C-1005 Os-305 C-1005 Os-306 | $+ \mp$ | 1 | $+$ \Box | Ŧ | | + | H | + | H | T | + | H | H | F | + | H | Ŧ | F | + | H | $-\Gamma$ | + | H | Ŧ | + | + | | 1 4 | + | H | F | + | H | Ŧ | + | + | Ŧ | F | + | H | H | F | + | H | # | 2 |
| 4 Op 6 | C-1005 Os-323 | ++ | 2 | + | \dashv | + | + | \vdash | + | Н | + | + | \vdash | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | \dashv | + | + | + | | 1 | + | \vdash | + | + | \vdash | + | + | + | + | + | + | Н | + | + | + | \dashv | + | 3 |
| 4 Op 6 | C-1005 Os-331 | | 1 | | \dashv | \dashv | | \Box | | | \Rightarrow | | | \Box | \perp | | | 7 | \perp | | | \Rightarrow | \blacksquare | \Box | \perp | \perp | | | \bot | \blacksquare | \Box | \perp | | \Box | \bot | | \Box | \perp | \perp | | | \Box | \perp | | \Box | 工 | 1 |
| 4 Op 6 4 Op 6 | C-1005 Os-332 C-1005 Os-339 | + + 2 | 3 | | + | + | + | \vdash | + | \vdash | + | + | \vdash | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | \dashv | + | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | + | Н | + | + | + | \dashv | + | 3 3 |
| 4 Op 6 | C-1005 Os-342 | | 3 | | \Rightarrow | \perp | | \Box | | | \Rightarrow | † | | | 1 | | 口 | \Rightarrow | \perp | \pm | Ħ | \perp | \pm | \Box | \perp | \pm | $^{\pm}$ | 口 | 士 | | \Box | \perp | | | \pm | 1 | \Box | \perp | 1 | | | \Box | | | \Box | 士 | 3 |
| 4 Op 6 4 Op 6 | C-1005 Os-352 C-1005 Os-364 | ++ | 2 | | + | + | + | H | + | \vdash | + | + | \vdash | \vdash | + | + | \vdash | + | + | + | Н | _ | + | H | + | + | + | H | + | + | H | + | \vdash | H | + | + | + | + | + | + | \vdash | \dashv | + | + | H | + | 2 |
| 4 Op 6 | C-1005 Os-368 | $\pm \pm$ | 3 | 1 | _ | _ | \perp | \vdash | | Н | _ | \pm | | | | \pm | | _ | _ | | | | \pm | \vdash | | \pm | \pm | | Ⅎ | | \vdash | _ | | \vdash | \pm | | | _ | | \pm | Н | \vdash | _ | \perp | \vdash | + | 3 |
| 4 Op 6 | C-1005 Os-374 | | 1 | | \neg | \perp | \blacksquare | \Box | \perp | П | \perp | \top | | | Ŧ | \perp | П | 7 | \perp | \top | П | \perp | \blacksquare | | \perp | Ŧ | T | | T | \blacksquare | | \perp | | | \bot | Ŧ | \Box | \bot | Ŧ | T | П | | 7 | \blacksquare | | 工 | 1 |
| 4 Op 6 4 Op 6 | C-1006 Os-302 C-1006 Os-358 | ++ | 3 | | + | + | + | \vdash | + | \vdash | + | + | \vdash | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | \dashv | + | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | + | Н | + | + | + | \dashv | + | 1 3 |
| 4 Op 6 | C-1007 Os-338 | | 4 | | \Rightarrow | ightharpoons | | | | | ightharpoons | | | | | | | ユ | | | | | | | | # | | | 士 | | | | | | | | \Box | | | | | | | | | 工 | 4 |
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| 4 Op 6 4 Op 6 | C-1014 C-1014 | Os-355 Os-375 | + | 5 | \vdash | \dashv | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | + | + | \vdash | \dashv | + | + | + | + | + | + | + | \vdash | 3 | + | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | \vdash | + | + | + | 5 |
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| 4 Op 6 | C-1015 | Os-347 | | 2 | | T | | \Box | I | T | \perp | П | T | T | \blacksquare | П | T | T | \perp | Г | П | I | T | F | П | T | T | T | T | \Box | T | | I | T | \perp | | П | | T | П | 耳 | Ţ | T | F | \Box | I | T | T | T | 2 |
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| 4 Op 6 | C-1015 | Os-383 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | 1 |
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| 4 Op 6 | C-1017 | Os-345 | | 1 | | \dashv | | \top | \Box | \top | \top | \Box | \neg | \top | 1 | П | \neg | \top | | \top | П | | \top | \top | \Box | | \top | \top | \top | \Box | 1 | | П | \top | | 1 | П | | \top | ш | \neg | \neg | \top | \top | \Box | П | \dashv | \top | 1 | 1 11 |
| 4 Op 6 | C-1020 | Os-337 | | 11 | | \Box | | | \Box | \perp | \perp | | \neg | | | | \neg | \perp | \perp | | | \neg | \perp | | \Box | \Box | \perp | \perp | \perp | | \neg | | | \perp | | | \Box | \perp | \perp | | \Box | \Box | | T | | \Box | \neg | \perp | \perp | 11 |
| 4 Op 6 4 Op 6 | C-1022 C-1022 | Os-350 Os-365 | 1 | 9 | | \dashv | - | + | 1 | + | + | \vdash | - | + | + | \vdash | \dashv | + | + | + | \vdash | \rightarrow | + | 2 | + | \dashv | + | + | + | \vdash | 1 | - | \vdash | + | + | + | \vdash | - | + | \vdash | \dashv | \dashv | + | + | + | Н | + | + | + | 15 |
| 4 Op 6 | C-1022 | Os-378 | Н. | 2 | | \dashv | \top | + | \vdash | + | + | \vdash | $^{+}$ | + | + | \Box | \dashv | + | \top | + | \Box | \neg | + | + | \Box | \dashv | + | + | + | \Box | | \top | \Box | + | + | + | \Box | \top | + | \vdash | \dashv | \dashv | + | + | \Box | \vdash | \dashv | + | + | 4 2 |
| 4 Op 6 | C-1022 | Os-381 | | 1 | | \Box | | | | \Box | | П | | | | | \Box | \Box | | | | \Box | \Box | \perp | \Box | | \perp | | \perp | П | \Box | | | \Box | | | | | \perp | | \Box | \Box | | \perp | | П | \Box | \perp | \perp | 1 |
| 4 Op 6 4 Op 6 | C-1023 C-1025 | Os-343 Os-373 | 1 | 6 | \vdash | \dashv | - | \vdash | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | + | + | \vdash | \rightarrow | + | + | \vdash | \dashv | + | + | + | \vdash | + | - | \vdash | + | + | \vdash | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | \vdash | \dashv | + | + | 7 |
| 4 Op 6 | C-1027 | AE-1286 | | 1 | | \dashv | \top | + | \vdash | + | + | \vdash | $^{+}$ | + | + | \Box | \dashv | + | \top | + | \Box | \neg | + | + | \Box | \dashv | + | + | + | \Box | \dashv | \top | \Box | + | + | + | \Box | \top | + | \vdash | \dashv | \dashv | + | + | \Box | \vdash | \dashv | + | + | 1 |
| 4 Op 6 | C-1027 | Os-351 | 21 | 1 26 | | | | | | | | | 1 | | | | | | | | | | | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | 54 3 6 |
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| Op 2 | C-1118 | Os-583 | Н. | + 3 | \vdash | \dashv | | + | \vdash | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | + | | \rightarrow | + | + | + | \dashv | + | + | + | | 1 | | \vdash | + | + | + | \vdash | + | + | \vdash | \dashv | \dashv | + | + | \vdash | \vdash | \dashv | + | + | 1 |
| 4 Op 2 | C-1152 | Os-199 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | 1 |
| 4 Op 2 4 Op 2 | C-1152 C-1152 | Os-279 Os-290 | 3 | 3 | 1 | \rightarrow | _ | \vdash | \vdash | + | + | \vdash | + | + | - | \vdash | \dashv | + | + | + | \vdash | \rightarrow | + | + | \vdash | \rightarrow | + | + | + | \vdash | - | 3 | \vdash | + | - | ₩ | \vdash | + | + | \vdash | - | + | + | + | \vdash | \vdash | \dashv | + | + | 7 |
| 4 Op 2 | C-1152 | Os-290 Os-581 | H | + | +++ | \dashv | _ | + | \vdash | + | + | \vdash | - | + | + | \vdash | \dashv | + | + | + | \vdash | \rightarrow | + | + | + | \dashv | + | + | + | + | | 2 | \vdash | + | + | + | \vdash | _ | + | \vdash | \dashv | \dashv | + | + | + | H | \dashv | + | + | 2 |
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| 2 Op 2 | C-1162 | Os-269 | | 1 | \Box | \Box | | | | \perp | T | | \supset | T | | | \Box | \perp | T | | | \Box | \perp | \perp | \Box | \Box | | \perp | \perp | \Box | \Box | \top | | \perp | \perp | | | | \perp | | \supset | \Box | | \top | | | \Box | \perp | T | 2 |
| 2 Op 2 2 Op 2 | C-1162 C-1168 | Os-282 Os-259 | \vdash | 1 | \vdash | \dashv | + | \vdash | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | + | + | \vdash | \dashv | + | + | \vdash | \dashv | + | + | + | \vdash | + | + | \vdash | + | + | \vdash | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | \vdash | + | + | + | 1 |
| 2 Op 2 | C-1168 C-1169 | US-259 FL124 | 1 | | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | + | \forall | + | + | + | + | \vdash | \dashv | + | + | + | + | + | + | + | ++ | + | + | \vdash | + | + | \vdash | \vdash | + | + | Н | \dashv | + | + | + | + | \vdash | + | 1 | 2 | |
| 2 Op 2 | C-1169 | Os-267 | 4 | | | | | | | 土 | | | 土 | | | | | 土 | | | | | 土 | | | | | 1 | | | | 1 | | 土 | | | | | | | | | | | | | | 土 | Ţ | 5 |
| 1 Op 2 | C-1173 | Os-193 | \vdash | 2 | +1 | | \perp | \vdash | \vdash | + | + | \vdash | + | + | + | \vdash | | + | \perp | + | \vdash | 4 | + | - | +1 | | + | + | + | \vdash | - | - | \vdash | + | + | 1 | | \perp | + | \Box | | 4 | - | + | \vdash | $\vdash \vdash$ | - | + | + | 2 |
| 1 Op 2 1 Op 2 | C-1174 C-1174 | AE-1763 Os-69 | \vdash | 12 | 1 | + | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | + | + | \vdash | \dashv | + | + | + | \dashv | + | + | + | \vdash | + | + | \vdash | + | + | \vdash | 1 | + | + | \vdash | \dashv | + | + | + | \vdash | \vdash | + | + | + | 13 |
| 1 Op 2 | C-1174 | Os-69 - A | | Ľ | | | | | | \pm | 土 | | \pm | \pm | | | _ | \pm | | | | ⇉ | \pm | | | J | | \pm | | | 1 | | | \pm | 土 | | | | | | | \exists | | | | | \pm | 士 | \pm | 1 |
| 1 Op 2 | C-1174 | Os-69 - B | | 1 | 1 | Ţ | $-\Gamma$ | | ĻΤ | \perp | | H | Ţ | Γ | + | П | Ţ | Ţ | - | 1 | П | | \perp | | \Box | Ţ | T | T | 1 | \Box | Ţ | | Щ | \perp | 1 | | H | \perp | 1 | П | 7 | Ţ | | \perp | \Box | П | Ţ | T | | 1 |
| 1 Op 2 1 Op 2 | C-1174 C-1176 | Os-72 Os-73 | \vdash | + | \vdash | + | + | + | 9 | + | + | \vdash | + | + | + | \vdash | + | + | + | + | \vdash | + | + | 2 | + | + | + | + | + | \vdash | 4 | + | \vdash | + | + | \vdash | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | \vdash | + | + | + | 15 1 |
| 90 Op 2 | C-1176 | Os-73 Os-65 | \vdash | + | + | + | + | + | H | + | + | \vdash | + | + | + | \vdash | + | + | + | + | \vdash | \dashv | + | 1 | + | \dashv | + | + | + | 1 | 1 : | 2 | \vdash | + | + | | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | \vdash | + | + | + | 4 |
| 90 Op 2 | C-1177 | Os-68 | 2 | | | | | | | 工 | | | ユ | | | | \Box | \perp | | | | \sqsupset | 工 | | | \Box | | | | | 3 | | | 工 | | | | | | | コ | \Box | | | | | \Box | \perp | | 5 |
| 90 Op 2 | C-1177 | Os-70 | \vdash | 3 | \vdash | \dashv | + | + | H | + | + | H | + | + | + | \vdash | + | + | + | 1 2 | H | 4 | + | - | +1 | \dashv | + | + | + | \vdash | 12 | + | H | + | + | - | \vdash | + | + | $\vdash \vdash$ | | + | + | + | +1 | H | + | + | + | 3 17 |
| 2 Op 2 1 Op 2 | C-1181 C-1182 | Os-191 Os-197 | \vdash | + | \vdash | + | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | + | 2 | \vdash | + | + | 3 | + | + | + | + | + | ++ | 12 | 4 | \vdash | + | + | \vdash | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | \vdash | + | + | + | 1/ |
| 1 Op 2 | C-1182 | Os-66 | | İ | | \exists | | | 5 | \pm | \pm | | \pm | \pm | | Ħ | \exists | 士 | | İ | | \exists | \pm | \pm | | \exists | \perp | ᆂ | \pm | | | | 世 | \pm | \pm | | 世 | | \pm | | J | \pm | 士 | \pm | | H | 士 | 士 | \pm | 4 5 |
| 1 Op 2 | C-1182 | Os-67 | | F | П | T | | \Box | 3 | T | \perp | П | T | T | \blacksquare | П | T | T | \perp | Г | П | I | T | T | П | T | T | T | T | \Box | T | | I | T | \perp | | П | | T | П | 耳 | Ţ | T | F | \Box | I | T | T | T | 3 |
| 1 Op 2 | C-1183 | AE-2713 | 1 1 | | 1 | | | 1 | 1 1 | | | ı I | | - 1 | 1 | 1 | - 1 | - 1 | - 1 | 1 | 1 1 | - 1 | - 1 | | 1 1 | - 1 | - 1 | - 1 | - 1 | 1 1 | | - 1 | 1 1 | | | 1 | 1 1 | 1 | - 1 | 1 1 | - 1 | - 1 | | - 1 | 1 1 | 1 1 | | | - 1 | 1 |

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| t. Period | | Sample/ | Canis familiaris | Lama sp. | Lagidium peruanun | Agouti sp. | Silvylagus sp. Felis sp. | Carnívora n/i | Odocoileus virginianus | Colaptes sp. | Cyanocorax sp. | Buteosp. | Strigidae | Zenaida auriculata | Thraupidae | Passeritorme Ave n/i | Didelphis sp. | | Quiróptero n/i Bufo sp. | Anfibio n/i | Reptil n/i | Insecto N/I Muridae | Rattus rattus | Rodentia | Bos tarurus | Capra hircus | Ovis aries | Sus scrota Artiodactyla | Mamífero n/i | Semele Solida | Semele sp. | Argopecten sp. | Enoplochiton niger | Molusco n/i | Fusinus dupetitthoua Thais chocolata | Molusco Marino n/i | Donax obesulus | Protothaca thaca | Engraulis ringens Sardinops sagax | Bulimulidae | Epiphragmophora s | Thaumasthus sp. | Systrophia sp. | Scutalus mariopena | Drymaeus sp. | Total |
| Operation | Context | Bag | \vdash | + | \vdash | + | _ | \vdash | - | + | \perp | + | \vdash | + | + | + | \vdash | \dashv | + | \vdash | \vdash | + | + | + | + | \vdash | + | \perp | \vdash | _ | \vdash | F | : | \vdash | - | + | \vdash | \dashv | 1 | + | \vdash | \vdash | + | \vdash | \perp | 1 |
| 1 Op 2 1 Op 2 | C-1183 C-1183 | FL10 Os-171 | | + | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | + | \dashv | + | + | \vdash | + | + | + | + | \vdash | + | 2 | \vdash | + | \vdash | - | + | \vdash | + | + | \vdash | \dashv | 1 | + | + | \vdash | + | \vdash | + | 2 |
| 1 Op 2 | C-1183 | Os-179 | | | | | | | | | | | | | | | | 二 | | | | | | | | | | 2 | | | | | | | | | | 二 | | | | | | | | 2 |
| 1 Op 2 | C-1184 C-1187 | Os-71 AE-1782 | \vdash | 4 | \vdash | \rightarrow | + | \vdash | + | + | + | + | \vdash | + | \rightarrow | + | \vdash | - | + | \vdash | \vdash | + | + | + | + | \vdash | + | \perp | | + | \vdash | - | + | \vdash | + | + | \vdash | - | + | + | \vdash | \vdash | + | \vdash | + | 4 |
| 1 Op 2 1 Op 2 | C-1187 C-1188 | AE-1782 AE-1783 | | 1 | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | + | \dashv | + | + | \vdash | + | + | + | + | \vdash | + | + | 1 | + | \vdash | - | + | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | \vdash | + | 1 |
| 1 Op 2 | C-1188 | AE-1786 | | 1 | | \neg | | \Box | \top | | | + | \vdash | \top | \neg | \top | + | \neg | \top | + | \vdash | \top | + | | \top | \Box | \top | | | | \Box | | | \Box | \top | + | \vdash | \neg | | + | \Box | | | | | 1 |
| 1 Op 2 | C-1188 | AE-1789 | | | \Box | | | \Box | 1 | \Box | | | | | | | \Box | \Box | \perp | | | \perp | | | \perp | \Box | \blacksquare | | | | | | | \Box | \perp | \Box | \Box | \Box | | | | | | | | 1 |
| 1 Op 2 1 Op 2 | C-1188 C-1188 | FL16 Os-181 | \vdash | + | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | ++ | \dashv | + | + | \vdash | + | + | + | + | \vdash | + | 1 | \vdash | + | \vdash | + | + | \vdash | + | + | \vdash | \dashv | + | 3 | + | \vdash | + | \vdash | + | 3 |
| 1 Op 2 | C-1188 | Os-183 | \vdash | 1 | + | $^+$ | \top | \vdash | + | + | \top | + | + | + | $^+$ | + | + | \neg | + | + | \vdash | + | + | + | + | \vdash | + | 5 | \vdash | + | \Box | \neg | \top | \vdash | + | + | \vdash | \neg | \top | + | \Box | \vdash | + | \Box | + | 6 |
| 1 Op 2 | C-1189 | AE-1785 | | 1 | \Box | \neg | | | | \Box | | | \Box | | \neg | | П | \Box | \perp | | \Box | | \Box | \perp | \perp | П | | | | | | | | П | | \Box | П | \Box | | | П | | \perp | \Box | | 1 |
| 1 Op 2 1 Op 2 | C-1189 C-1191 | Os-182 Os-184 | \vdash | + | + | + | + | \vdash | + | + | + | + | + | + | + | + | ++ | \dashv | + | \vdash | \dashv | + | ++ | + | + | \vdash | + | 3 | 1 | + | \vdash | + | + | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | \vdash | + | 3 4 |
| 1 Op 2 | C-1192 | AE-1794 | | + | 1 | \dashv | _ | \Box | | + | _ | + | \vdash | + | \dashv | + | + | _ | + | + | \vdash | + | + | + | + | \vdash | \dashv | + | H | + | 1 | \dashv | + | \vdash | \dashv | + | \vdash | _ | _ | + | \Box | \vdash | + | | _ | 1 |
| 1 Op 2 1 Op 2 | C-1194 | FL18 | | | \Box | | | | | \Box | | \blacksquare | | | | \perp | \Box | \rightrightarrows | \Rightarrow | | | 1 | \Box | | \perp | \Box | \Box | \blacksquare | | \perp | \square | | \perp | \Box | | \Box | | \rightrightarrows | | 1 | | | \perp | \Box | | 2 |
| 1 Op 2 1 Op 2 | C-1195 C-1195 | AE-2702 Os-199 | $\vdash\vdash$ | + | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | + | \dashv | + | \vdash | \vdash | + | ++ | + | + | \vdash | + | 3 | $\vdash \vdash$ | + | \vdash | + | + | \vdash | + | + | \vdash | \dashv | + | 1 | + | \vdash | + | \vdash | + | 3 |
| 1 Op 2 | C-1195 C-1196 | AE-2709 | \vdash | + | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | + | \dashv | + | + | + | + | + | + | + | \vdash | + | + | \vdash | + | \vdash | 1 | + | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | ++ | + | 1 |
| 1 Op 2 | C-1196 | AE-2710 | | | \Box | # | | \Box | 1 | | | | | | # | \perp | \Box | \rightrightarrows | \perp | | \Box | \perp | \Box | | \perp | \Box | \Rightarrow | \perp | | | \Box | \Rightarrow | | \Box | \Rightarrow | \Box | \Box | \rightrightarrows | | | | | | | | 1 |
| 1 Op 2 | C-1198 | FL38 | \vdash | 4 | + | + | + | +1 | \perp | + | + | + | \Box | + | + | + | + | 4 | + | \vdash | \dashv | 1 | + | + | + | \vdash | \perp | + | \vdash | + | \sqcup | + | + | \vdash | \perp | +1 | H | 4 | \perp | 4 | \vdash | \vdash | _ | + | + | 4 |
| 1 Op 2 2 Op 2 | C-1198 C-1200 | Os-195 AE-1796 | | 1 | | + | + | \vdash | + | + | + | + | \vdash | + | + | + | + | \dashv | + | + | \vdash | + | + | + | + | \vdash | + | + | \vdash | + | \vdash | + | + | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | \vdash | + | 1 |
| 2 Op 2 | C-1200 | Bo-100 | | | | | | | | | | | | | | | \Box | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | 1 |
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| 2 Op 2 2 Op 2 | C-1200 C-1200 | Os-187 Os-193 | 2 | + | + | + | + | \vdash | + | + | + | + | + | + | + | + | ++ | \dashv | + | + | + | 1 3 | | + | + | \vdash | + | 2 | 2 | + | \vdash | + | + | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | \vdash | + | 5 |
| 4 Op 16 | C-1252 | Os-576 | 1 | + | + | \neg | | \Box | \top | | | + | \vdash | \top | \neg | \top | + | \neg | \top | + | \vdash | Ť | + | | \top | \Box | \top | | 1 | | \Box | | | \Box | \top | + | \vdash | \neg | | + | \Box | | | | | 2 |
| 4 Op 16 | C-1253 | Os-157 | | | \Box | \neg | | | | \Box | | | \Box | | \neg | | П | \Box | \perp | | \Box | | \Box | \perp | \perp | П | | 1 | | | | | | П | | \Box | П | \Box | | | П | | \perp | \Box | | 1 |
| 4 Op 17 4 Op 7 | C-1261 C-1307 | Os-577 Os-515 | \vdash | + | + | + | _ | \vdash | - | + | + | + | \vdash | + | + | + | ++ | \rightarrow | + | \vdash | \vdash | + | + | + | + | \vdash | + | 2 | \vdash | + | \vdash | - | + | \vdash | + | + | \vdash | \rightarrow | - | + | + | \vdash | + | + | + | 2 |
| 4 Op 7 | C-1307 | Os-518 | | 1 | + | \dashv | | \vdash | + | | + | + | \vdash | + | \dashv | + | + | \dashv | + | + | \vdash | + | + | + | + | \vdash | + | | \vdash | | \vdash | | | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | | | 1 |
| 4 Op 7 | C-1313 | Os-514 | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | 1 |
| 4 Op 7 | C-1313 C-1324 | Os-590 Os-508 | \vdash | 10 | + | \rightarrow | | \vdash | _ | + | + | + | \vdash | + | \rightarrow | + | \vdash | \rightarrow | + | \vdash | \vdash | + | + | + | + | \vdash | + | \perp | 2 | + | \vdash | _ | + | \vdash | + | + | \vdash | \rightarrow | _ | + | \vdash | \vdash | + | \vdash | + | 2 |
| 4 Op 7 4 Op 7 | C-1324 C-1324 | Os-508 Os-517 | | 10 | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | + | \dashv | + | + | \vdash | + | + | + | + | \vdash | + | 1 | \vdash | + | \vdash | + | + | \vdash | + | + | \vdash | \dashv | + | + | + | \vdash | + | \vdash | + | 10 |
| 92 Op 20 | C-1401 | Os-62 | | | | | | | | | | | | | | | | 二 | | | | | | | | | | | 29 | | | | | | | | | 二 | | | | | | | | 29 |
| 92 Op 20 | C-1401 | Os-63 | \vdash | + | \vdash | \rightarrow | + | \vdash | + | + | + | + | \vdash | + | \rightarrow | + | \vdash | - | + | \vdash | \vdash | + | + | + | + | \vdash | + | \perp | 10 | + | \vdash | - | + | \vdash | + | + | \vdash | - | + | + | \vdash | \vdash | + | \vdash | + | 10 |
| 92 Op 20 92 Op 21 | C-1401 C-1451 | Os-64 AE-2508 | \vdash | 1 | | + | _ | \vdash | _ | + | \dashv | + | \vdash | + | + | + | + | \rightarrow | + | + | \vdash | + | + | + | + | \vdash | + | + | \vdash | + | \vdash | \dashv | + | \vdash | + | + | \vdash | \rightarrow | _ | + | + | \vdash | + | + | + | 1 |
| 92 Op 21 | C-1451 | AE-2509 | | 1 | | | | \Box | | | | | | | | | \Box | | | | | | | | | \Box | | | | | \Box | | | \Box | | | \Box | | | | | | | | | 1 |
| 92 Op 21 | C-1451 | Os-10 | | \perp | \vdash | \perp | \perp | \square | \perp | \perp | \perp | \perp | - | - | \perp | \perp | \Box | \dashv | \perp | \vdash | \Box | \perp | 1 | \perp | \perp | \Box | \perp | 5 | \vdash | \perp | \Box | - | \perp | \Box | \perp | \Box | \Box | \dashv | _ | \perp | - | - | \perp | \Box | \perp | 6 |
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| 92 Op 21 | C-1451 | Os-13 | | | | | | | | | | | | | | | \Box | | | | | | 2 | | | | 1 | 7 | | | | | | | | | | | | | | | | | | 9 |
| 92 Op 21 | C-1451 | Os-14 | | \perp | \Box | \perp | | \Box | | \Box | \perp | | \Box | \perp | \perp | \perp | \Box | \neg | \perp | \perp | \Box | \perp | \Box | \perp | \perp | \Box | \perp | 1 | | | \Box | | \perp | \Box | \perp | \Box | Ш | \neg | | \perp | \Box | | \perp | | | 1 |
| 92 Op 21 92 Op 21 | C-1451 C-1451 | Os-15 Os-16 | 8 | 5 | + | + | _ | \vdash | 1 3 | | - | + | + | + | + | + | ++ | \rightarrow | + | + | \vdash | + | 25 | + | + | \vdash | + | + | \vdash | + | \vdash | - | + | \vdash | + | + | \vdash | \rightarrow | - | + | + | \vdash | + | + | + | 41 |
| 92 Op 21 | C-1451 | Os-10 | Ш° | Ť | | \perp | | | 1 | | \perp | | | | \perp | | 世 | J | \pm | | | \pm | 120 | \perp | \pm | | \pm | \pm | | | H | \pm | | | \pm | 士 | \Box | J | | I | | | | | | 0 |
| 92 Op 21 | C-1451 | Os-18 | H | | \Box | 7 | Ŧ | 5 | 7 | \Box | Ŧ | | \Box | \Box | 7 | T | \Box | 7 | T | | \Box | T | 3 | Ŧ | T | H | Ţ | F | H | \perp | П | T | T | \Box | T | \Box | П | 7 | T | \perp | П | \Box | T | \Box | T | 8 |
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| 92 Op 21 | C-1451 | Os-20 | 1 | | 口 | \perp | | 2 | 1 | | 士 | I | | 山 | \perp | 土 | Ħ | \exists | ᆂ | | | ᆂ | 2 | 士 | 1 | Ħ | | | 1 | 土 | | 士 | 土 | Ħ | 士 | 力 | \Box | \exists | 丁 | İ | | | | | | 8 |
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| 92 Op 21 | C-1451 | Os-26 | Ľť | | 1 | | | | | | | | | $\pm \pm$ | | | $\pm \pm$ | _ | \exists | | | ╧ | 52 | | | | | | | | \Box | | | | | 1 | | _ | | | \Box | | | | | 52 |
| 92 Op 21 | C-1451 | Os-27 | | \perp | \Box | 1 | \top | | \blacksquare | \Box | 7 | \blacksquare | | \Box | 7 | T | \Box | \dashv | \top | | \Box | \top | \Box | 1 | T | \Box | 1 | T | | \top | П | \perp | \top | \Box | \perp | \Box | | \dashv | \perp | T | П | | T | \Box | 1 | 1 |
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| 92 Op 21 | C-1451 | Os-29 Os-3 | | \pm | | | | 1 | 3 | | | \pm | | $\pm \pm$ | _† | | $\pm \pm$ | _ | | \pm | \vdash | | 4 | | \pm | | _ | 10 | | _ | H | _ | | | _ | 1 | | _ | | \pm | \Box | | \pm | | | 18 |
| 92 Op 21 | C-1451 | Os-30 | | I | \Box | \Box | \top | | \Box | \Box | 7 | \Box | | \Box | \Box | T | \Box | \neg | T | | | \bot | 4 | 7 | T | \Box | \neg | \top | | T | \Box | \Box | T | \Box | \perp | \Box | | \neg | | T | П | | T | \Box | \perp | 4 |
| 92 Op 21 92 Op 21 | C-1451 C-1451 | Os-31 Os-32 | 3 | + | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | + | + | + | + | \vdash | + | 3 43 | + | + | \vdash | + | + | \vdash | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | \vdash | + | \vdash | + | 3 46 |
| 92 Op 21 | C-1451 | Os-32 Os-33 | H | + | ++ | 2 | + | \vdash | + | + | + | + | \vdash | + | + | + | + | \dashv | + | + | \vdash | + | 19 | + | + | \vdash | + | + | 2 | + | Н | + | \top | \forall | + | + | \vdash | \dashv | + | \top | \forall | \vdash | + | 1 | + | 23 |
| 92 Op 21 | C-1451 | Os-34 | | | | # | | | \perp | | \perp | | | | # | | \Box | \sqsupset | \perp | | | \perp | 3 | # | | | \Rightarrow | \blacksquare | | | | \Rightarrow | | | \perp | \Box | | \sqsupset | | | | | | | | 3 |
| 92 Op 21 | C-1451 C-1451 | Os-35 | \vdash | + | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | + | 4 | + | \vdash | \vdash | + | 29 | + | + | \vdash | + | + | \vdash | + | \vdash | + | + | \vdash | + | + | H | 4 | + | + | + | \vdash | + | + | + | 29 |
| 92 Op 21 92 Op 21 | C-1451 C-1451 | Os-36 Os-37 | \vdash | + | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | + | + | + | + | \vdash | + | 7 | + | + | \vdash | + | + | \vdash | + | \vdash | + | + | + | + | + | \vdash | + | + | + | + | \vdash | + | 1 | + | 7 |
| 92 Op 21 | C-1451 | Os-38 | 2 | | | | | | | | | | | | | | \Box | 士 | | 5 | | | 130 | | | | \Rightarrow | | 4 | | | | | | | | 口 | 士 | | | | | | | | 141 |
| 92 Op 21 | C-1451 | Os-39 | \vdash | + | + | + | + | \vdash | + | + | + | + | \vdash | + | + | + | + | 4 | + | + | \vdash | \perp | 46 | + | + | \vdash | 1 | - | \vdash | + | \vdash | + | + | \vdash | + | +1 | H | 4 | + | + | + | \vdash | + | + | + | 46 |
| 92 Op 21 92 Op 21 | C-1451 C-1451 | Os-40 Os-41 | \vdash | + | + | 1 | + | \vdash | + | + | + | + | \vdash | + | + | + | + | \dashv | + | + | + | + | 1 6 | + | + | \vdash | + | 2 1 | 4 | + | \forall | + | + | \vdash | + | + | \vdash | \dashv | + | + | \vdash | \vdash | + | ++ | + | 3 12 |
| 92 Op 21 | C-1451 | Os-42 | | \perp | \Box | 1 | | 1 | \Rightarrow | \Box | | \blacksquare | | \Box | 1 | \perp | \Box | \Rightarrow | \Rightarrow | | \Box | \Rightarrow | 22 | | \perp | \Box | \Rightarrow | \blacksquare | 1 | | \square | \Box | | \Box | ightharpoons | \Box | | \Rightarrow | | | \Box | | | \Box | | 24 |
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| , , Op 2. | 101 | | | _ | | _ | _ | | | | | | | _ | | | | | | _ | | | | | | | _ | | | _ | _ | _ | _ | _ | | | | | | _ | _ | | _ | | | |

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| Operation Context Sample/ | Canis familiaris Cavia porcellus | Lama sp. | Lagidium peruanum | Agouti sp. | Silvylagus sp. | Carnívora n/i | Odocoileus virginianus | Nothoprocta sp. | Colaptes sp. Cyanocorax sp. | cf. Fulica sp. | Buteo sp. | Strigidae Cairina moschata | auricul | Thraupidae | Passeriforme Ave n/i | Didelphis sp. | Lonchophylla sp. | Quiróptero n/i | Anfibio n/i | Reptil n/i | Insecto N/I | Rattus rattus | Rodentia | Gallus gallus | Capra hircus | Ovis aries | Sus scrofa | Artiodactyla Mamífero n/i | Chione subrugosa | Semele Solida | | Trachycardium proceru | Enoplochiton niger | Fusinus dupetitthouar | ais c | Molusco Marino n/i Donax obesulus | Protothaca thaca | | Sardinops sagax Bulimulidae | Ιĕ | asthus sp. | Drepanostomella sp. | Scutalus mariopenai | Drymaeus sp. | Total | |
| 1 92 1 On 21 1 C-1451 1 Os-45 | | \perp | \blacksquare | \neg | | | \Box | \Box | \perp | | \Box | | \Box | \Box | | \perp | | | \perp | \Box | \perp | 15 | \neg | \perp | | | | \perp | \Box | | | \Box | \perp | | \Box | | | \Box | \perp | \perp | \Box | \perp | \Box | | 15 | |
| 92 Op 21 C-1451 Os-46 92 Op 21 C-1451 Os-47 | ++ | + | + | \dashv | + | 1 | \vdash | \vdash | + | + | \vdash | + | + | + | + | + | \vdash | \vdash | + | \vdash | + | 1 28 | + | + | + | + | \vdash | 1 2 | | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | + | 31 | |
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| 92 Op 21 C-1451 Os-49 | | | | | | | | | | | | | | | | | 1 | | | | | 16 | | | | | <u> </u> | 1 4 | | | | | | | | | | | | | | | | | 22 | 2 |
| 92 Op 21 C-1451 Os-5 | | | | | | 6 | | | | | | | | | | | | | | | | 11 | | | | | | 8 1 | | | | | | | | | | | | | | | | | 26 | <i>i</i> |
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| 92 Op 21 C-1451 Os-54 | | | | | | 1 | 1 | | | | | | | | | | | | | | | 12 | | | | | | 5 | | | | | | | | | | | | | | | | | 19 | |
| 92 Op 21 C-1451 Os-55 | \perp | \perp | \perp | _ | \perp | _ | \sqcup | \sqcup | _ | \vdash | \perp | \perp | \perp | _ | \perp | \perp | Ш | \perp | \perp | \sqcup | _ | \bot | \rightarrow | \perp | \perp | \vdash | | 1 | \vdash | \perp | \perp | \Box | \perp | \perp | \perp | _ | \perp | \vdash | \perp | \perp | \vdash | \perp | \perp | \perp | 1 | |
| 92 Op 21 C-1451 Os-56 92 Op 21 C-1451 Os-57 | + | + | + | 3 | + | + | \vdash | \vdash | + | + | \vdash | + | + | + | + | + | Н | + | + | \vdash | + | 8 | \rightarrow | + | + | + | Η. | 2 | + | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | + | 10 | _ |
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| 92 Op 21 C-1451 Os-59 | | | | 6 | | 1 | | | | | | | | | | | | | | \Box | | 76 | | | | | | | \Box | | | | | | | | | | | | \Box | | | | 83 | 3 |
| 92 Op 21 C-1451 Os-6 | | | \Box | \Box | T | 6 | | \Box | T | | \Box | T | \Box | 7 | T | | Щ | \Box | | \Box | T | 1 | 耳 | T | T | | Щ | 1 | \Box | T | | | T | | | T | | П | T | \perp | \Box | T | \Box | T | 9 | |
| 92 Op 21 C-1451 Os-60 92 Op 21 C-1451 Os-8 | 7 | | + | 5 | + | 1 | 1 | $\vdash \vdash$ | + | + | \vdash | + | + | + | 1 | + | \vdash | \vdash | + | \vdash | + | 130 | \dashv | + | + | + | \vdash | + | + | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | + | 145 | |
| 92 Op 21 C-1451 Os-8 92 Op 21 C-1451 Os-9 | ++ | + | + | + | + | 5 | + | \vdash | + | + | \vdash | + | + | + | + | + | Н | \vdash | + | + | + | 14 | + | + | + | + | 1 | 16 4 | + | + | + | \vdash | + | + | + | + | + | \vdash | + | + | + | + | + | + | 39 | |
| 92 Op 21 C-1452 Os-21 | | | | | | Ť | | | | | | | 1 | 二十 | | | П | | | | | 2 | _† | | | | Lt. | | | | | | | | | | | | | | | | | | 2 | |
| 92 Op 21 C-1453 Os-22 | | | \Box | | \Box | \perp | \Box | \Box | | | | | \Box | 4 | | \perp | | | \perp | \Box | \Box | 2 | \Rightarrow | | \perp | | : | 3 | \Box | | \blacksquare | | | \blacksquare | | | | | | \perp | \Box | \Box | \Box | \Box | 5 | |
| 92 Op 21 C-1454 Os-23 | + | + | + | \rightarrow | \rightarrow | _ | \vdash | \vdash | - | \vdash | \vdash | + | + | + | + | + | Ш | \vdash | + | \vdash | - | 1 | \rightarrow | + | + | \vdash | \vdash | + | + | \rightarrow | \perp | \vdash | + | \perp | \vdash | _ | + | \vdash | + | - | + | + | + | \rightarrow | 1 | |
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| 6 Op 22 C-1603 Os-80 | | 1 | \top | \rightarrow | \neg | Ť | \vdash | \vdash | + | \vdash | \vdash | \top | + | \neg | \top | + | ш | \vdash | + | \vdash | \neg | + | \dashv | $^+$ | + | \vdash | \vdash | + | + | \neg | \top | \Box | \top | \top | \vdash | | + | + | + | \top | + | \neg | + | \neg | 1 | |
| 6 Op 22 C-1603 Os-84 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | 2 | |
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| 6 Op 22 C-1603 Os-95 6 Op 22 C-1604 Os-75 | + | 2 | + | \rightarrow | + | + | \vdash | \vdash | + | \vdash | \vdash | + | + | + | + | + | \vdash | \vdash | + | \vdash | + | + | \rightarrow | + | + | \vdash | Н. | 1 | + | + | - | \vdash | + | - | \vdash | - | + | \vdash | + | + | + | + | + | + | 1 | |
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| 6 Op 22 C-1605 Os-111 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
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| 6 Op 22 C-1605 Os-87 | | | | | | | \Box | | | | | | | 士 | | | | | | \Box | 士 | \perp | 士 | | | | | 2 | \pm | | | | | | | | | | 士 | | \pm | | | | 2 | |
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| 6 Op 22 C-1605 Os-97 6 Op 22 C-1606 FL20 | ++- | 3 | + | \rightarrow | - | + | \vdash | \vdash | + | + | \vdash | + | + | \dashv | + | + | Н | + | + | \vdash | + | + | 1 | + | + | + | \vdash | + | + | + | + | \vdash | + | + | \vdash | + | + | + | + | + | + | + | + | - | 3 1 | \dashv |
| 6 Op 22 C-1606 Os-104 | | 1 | | | | | | | | | | | | | | | | | | \Box | | | | | | | | 2 | \Box | | | | | | | | | | | | \Box | | | | 3 | |
| 6 Op 22 C-1606 Os-126 | | 7 | | \rightarrow | _ | | \Box | \Box | - | _ | \Box | _ | \Box | \rightarrow | _ | \perp | | - | \perp | \Box | - | \Box | \rightarrow | \perp | \perp | _ | \vdash | \perp | \Box | - | - | \Box | _ | - | \Box | - | - | \vdash | \perp | \perp | \Box | \perp | \Box | _ | 7 | |
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| 6 Op 22 C-1607 Os-79 | | 12 | 2 | | | | | | | | | | | | | | | | | \Box | | | | | | | | | \Box | | | | | | | | | | | | \Box | | | | 12 | <u>. </u> |
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| 6 Op 22 C-1608 Os-81 | | 2 | | | \Rightarrow | \perp | \Box | \Box | 二 | | | | \Box | | | \perp | | | \perp | \Box | \Rightarrow | \Box | \Rightarrow | | \perp | | \Box | 二 | \Box | | \pm | | | \pm | | | | | 二 | | \Box | \Rightarrow | \Box | \Rightarrow | 2 | |
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| 93 Op 22 C-1610 Os-102 | | 5 | \Box | | | | | | | | | | 1 | 二十 | | | П | | | | | 17 | _† | | | | | | | | | | | | | | | | | | | | | | 5 | |
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| 93 Op 22 C-1610 Os-121 | 1 | 1 | 1 | _† | | | | | | | | | | 二十 | | | П | | | | | 1 | _† | | | | | 2 | | | | | | | | | | | | ╧ | | | 1 | | 7 | \Box |
| 93 Op 22 C-1610 Os-122 | | 2 | | \neg | \neg | T | \Box | \Box | \perp | | \Box | \perp | \Box | \neg | \perp | \top | | | T | \Box | \neg | \Box | \neg | \perp | T | | \Box | 丁 | \Box | \perp | \blacksquare | | \perp | \blacksquare | | \perp | | \Box | \perp | T | \Box | \perp | \Box | \neg | 2 | |
| 93 Op 22 C-1610 Os-123 93 Op 22 C-1610 Os-124 | ++- | 4 | | + | + | + | + | \vdash | + | + | \vdash | + | + | + | + | + | Н | \vdash | + | \vdash | + | + | + | + | + | + | \vdash | + | + | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | + | 4 | \dashv |
| 93 Op 22 C-1610 Os-125 | | 8 | | \dashv | + | + | + | \vdash | + | | \vdash | \perp | + | + | \perp | + | Н | \vdash | + | \vdash | + | + | \dashv | + | + | | | + | + | \perp | + | \vdash | | + | \vdash | + | | \vdash | + | + | + | + | + | + | 8 | \dashv |
| 93 Op 22 C-1610 Os-127 | | 2 | 1 1 | \Box | \Box | \top | \Box | | | | | | \Box | 4 | | \perp | | | T | \Box | | \Box | \neg | \perp | T | | | 丁 | \Box | | \blacksquare | | | \blacksquare | | | | | \Box | \perp | \Box | | \Box | \Box | 2 | |
| 93 Op 22 C-1610 Os-130 93 Op 22 C-1610 Os-132 | + | 3 | | \dashv | + | + | \vdash | \vdash | + | + | \vdash | + | + | + | + | + | \vdash | \vdash | + | \vdash | + | + | \dashv | + | + | + | \vdash | 5 | + | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | + | 8 2 | \dashv |
| 93 Op 22 C-1610 Os-132 93 Op 22 C-1610 Os-89 | 3 | | + | \dashv | + | + | + | \vdash | + | | \vdash | + | + | + | + | + | Н | \vdash | + | \vdash | + | + | + | + | + | | \vdash | 3 | + | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | + | 6 | \dashv |
| 93 Op 22 C-1610 Os-90 | | | \Box | | | | | \Box | | | | | | _ | | | | | | \Box | \Rightarrow | | \Rightarrow | 1 | | | | 4 | | | \blacksquare | | | \blacksquare | | | | | | | | \perp | \Box | | 4 | |
| 93 Op 22 C-1610 Os-91 93 Op 22 C-1610 Os-91 | + | + | + | \dashv | + | + | \vdash | $\vdash \vdash$ | + | + | \vdash | + | + | + | + | + | \vdash | \vdash | + | \vdash | + | + | \dashv | + | + | + | 1 | 1 | + | + | + | $\vdash \vdash$ | + | + | \vdash | + | + | \vdash | + | + | + | + | + | + | 1 | |
| 93 Op 22 C-1610 Os-91 93 Op 22 C-1610 Os-93 | ++ | 6 | + | + | + | + | + | \vdash | + | + | \vdash | + | + | + | + | + | Н | \vdash | + | + | + | + | + | + | + | + | Н. | 1 1 | + | + | + | \vdash | + | + | + | + | + | \vdash | + | + | + | + | + | + | 7 | |
| 93 Op 22 C-1610 Os-96 | | 2 | | | | | | 世 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | |
| 4 Op 22 C-1611 Os-137 4 Op 22 C-1611 Os-145 | + | 5 | + | - | + | + | \vdash | $\vdash \vdash$ | + | + | \vdash | + | + | + | + | + | \vdash | \vdash | + | \vdash | + | + | \dashv | + | + | + | 1 | 3 | + | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | + | 3 5 | _ |
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| Do Sample/ | Cavia porcellus | cavia porceilus | Lama sp. Lagidium peruanun | Agouti sp. | Silvylagus sp. | Carnívora n/i | Odocoileus virginianus | Nothoprocta sp. | Colaptes sp. | cf. Fulica sp. | Buteosp. | Strigidae Cairina moschata | Zenaida auriculata | Thraupidae | Passeriforme | Ave n/I Didelphis sp. | | Quiróptero n/i | Bufo sp. | Antibio n/I Reptil n/i | Insecto N/I | Muridae | Rattus rattus | Gallus gallus | Bos tarurus | Capra hircus | Ovis aries | Artiodactyla | Mamífero n/i | Chione subrugosa Semele Solida | | Argopecten sp. | achycardium procer | Enoplochiton niger | Fusinus dupetitthoua | ais c | Molusco Marino n/i Donax obesulus | Protothaca thaca | Engraulis ringens | 9 | Bullmulidae | masthus sp. | Drepanostomella sp | Systrophia sp. | Drymaeus sp. | Bostryx sp. | Total |
| | ++ | + | 6 | \vdash | \vdash | + | ř | \vdash | + | + | Н | + | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | \vdash | + | 1 | \vdash | + | + | 2 | + | + | \vdash | F | + | +-+ | + | + | + | + | + | + | + | \vdash | + | + | Н | 9 |
| 4 Op 22 C-1611 Os-153 | 1 1 | 1 | 6 | | | | | | | \pm | H | | \pm | | | ╧ | | \Box | _ | ⇟ | | | | | Τ' | | | \pm | 4 | | \pm | | | | 1 | _ | | \pm | \perp | | | \pm | | | \pm | | 11 |
| 4 Op 22 C-1611 Os-154 | \Box | | 5 | | | \perp | | | \perp | \blacksquare | П | \perp | \perp | | \Box | \perp | \blacksquare | П | \blacksquare | \perp | \blacksquare | \Box | | Ŧ | | | | \perp | | \perp | \blacksquare | | \Box | \perp | П | \blacksquare | \perp | \perp | \Box | \neg | \perp | \perp | \Box | \perp | \perp | П | 5 |
| 4 Op 22 C-1611 Os-162 4 Op 22 C-1612 Os-139 | 1 | 1 : | 7 | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | 1 | + | \vdash | + | + | + | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | \rightarrow | + | + | + | + | + | + | \dashv | + | + | \vdash | + | + | Н | 7 |
| 4 Op 22 C-1612 Os-140 | TT | Т | | | | | | | | | | | | | | | | | | | | | | | | | | 7 | | | | | | | | | | | | | 1 | | | | | | 7 |
| 4 Op 22 C-1612 Os-155 4 Op 22 C-1612 Os-156 | + + 3 | 3 | 7 | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | + | + | \vdash | + | + | \vdash | + | + | 2 | + | + | \vdash | \rightarrow | + | + | + | + | + | + | \dashv | + | + | \vdash | + | + | Н | 12 5 |
| 6 Op 22 C-1613 Os-103 | \bot | # | | | | | | | \rightarrow | \perp | | # | \perp | | # | # | | \Box | \Rightarrow | # | | \Box | | \perp | | | # | | 5 | | + | | | | \Box | \Rightarrow | | | \Box | \Rightarrow | # | | \Box | \perp | | | 5 |
| 6 Op 22 C-1613 Os-115 6 Op 22 C-1613 Os-128 | ++ | + | + | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | + | + | \vdash | + | + | \vdash | + | + | 3 | + | + | \vdash | \rightarrow | + | + | + | + | + | + | \dashv | + | + | \vdash | + | + | Н | 3 |
| 4 Op 22 C-1614 Os-116 | 3 | 3 | \perp | | | | | \Box | \Rightarrow | | | \perp | \perp | \Box | 4 | 1 | | \Box | 4 | | | \Box | | \bot | | \Box | _ | | 2 | _ | | \Box | \Rightarrow | \perp | \Box | 4 | \perp | \perp | \Box | \Rightarrow | 1 | \perp | \Box | \perp | \perp | | 3 5 |
| 6 Op 22 C-1615 Os-114 6 Op 22 C-1615 Os-117 | ++ | | 2 | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | \vdash | - | + | \vdash | + | + | + | - | + | + | + | + | + | + | \dashv | + | + | + | + | + | H | 2 |
| 6 Op 22 C-1615 Os-118 | \bot | | | | | | 3 | \Box | \Rightarrow | | | \perp | \perp | \Box | 4 | \perp | | \Box | 4 | | | \Box | | \bot | | \Box | _ | | \Box | _ | | \Box | \Rightarrow | \perp | \Box | 4 | \perp | \perp | \Box | \Rightarrow | 1 | \perp | \Box | \perp | \perp | | 3 |
| 6 Op 22 C-1615 Os-120 6 Op 22 C-1615 Os-129 | ++ | | 6 4 | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | \dashv | + | + | + | + | + | + | \dashv | + | + | \vdash | + | + | Н | 6 4 1 |
| 6 Op 22 C-1615 Os-129 | Н. | | | | | | | | \perp | | | 1 | \perp | | 7 | | | \Box | _ | | | \Box | | | | \Box | 1 | 1 | | _ | | \Box | \rightarrow | | \Box | _ | | | \Box | \Rightarrow | 1 | \perp | \Box | # | | | 1 |
| 6 Op 22 C-1615 Os-131 6 Op 22 C-1615 Os-134 | | 8 : | - | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | + | + | \vdash | + | + | \vdash | + | 2 | \vdash | + | + | \vdash | \dashv | + | + | + | + | + | + | \dashv | + | + | \vdash | + | + | Н | 13 3 |
| 6 Op 22 C-1615 Os-94 | 1 | 1 | | \blacksquare | \Box | - | | \Box | \mp | - | \Box | \perp | \perp | \Box | \dashv | \perp | \perp | \Box | \dashv | \perp | \perp | \Box | \Box | \perp | - | \Box | \perp | 1 | \Box | - | - | \blacksquare | \neg | - | \Box | \dashv | \perp | \vdash | \Box | \dashv | \perp | \perp | \Box | \perp | - | | 2 |
| 6 Op 22 C-1615 Os-98 93 Op 22 C-1617 Os-135 | | | 2 1 | | | | | | | | | | | | | \pm | | \Box | | | | | | | | | | 2 | | | | | | | | | | | | \rightarrow | \pm | | | | | | 2 |
| 6 Op 22 C-1618 Os-133 | 1 | 1 1 | 4 | \blacksquare | \Box | - | | \Box | \mp | - | \Box | \perp | \perp | \Box | \dashv | \perp | \perp | \Box | \dashv | \perp | \perp | \Box | \Box | \perp | - | \Box | \perp | - | \Box | - | - | \blacksquare | \neg | - | \Box | \dashv | \perp | \vdash | \Box | \dashv | \perp | \perp | \Box | 1 | - | | 15 1 |
| 4 Op 22 C-1621 Os-165 | 1 2 | 2 | 7 | | | | | | \pm | \pm | Н | \pm | \pm | | \pm | \pm | | \Box | \pm | \pm | | 1 | | \pm | | | | | 1 | | \pm | | | | | \pm | | \pm | \Box | \pm | \pm | | \Box | + | | | 11 |
| 4 Op 22 C-1621 Os-166 4 Op 22 C-1622 FL27 | + | - | 4 | \vdash | \vdash | + | \vdash | \vdash | + | - | \vdash | + | + | \vdash | \dashv | + | + | \vdash | \dashv | + | + | \square | - | + | + | \vdash | - | - | 1 | - | + | \vdash | - | - | \vdash | \dashv | _ | + | \vdash | \dashv | 2 | + | \vdash | + | + | \Box | 5 2 |
| 4 Op 22 C-1622 Os-151 | 1 3 | 3 | 6 | \vdash | \vdash | + | + | | + | + | \vdash | + | + | | + | + | + | \vdash | \dashv | + | + | \vdash | \vdash | + | + | \vdash | _ | 1 | \vdash | + | + | \vdash | _ | _ | + | \dashv | _ | + | + | \dashv | - | + | + | + | + | H | 10 |
| 4 Op 22 C-1624 Os-144 | \Box | | 2 | | | | | | \perp | | | \perp | | | 7 | \perp | \perp | \Box | 4 | 1 | \perp | \Box | | \bot | | | | | 4 | | | | | | \Box | 4 | | \perp | \Box | \neg | 7 | \perp | \Box | \perp | | | 6 |
| 93 Op 22 C-1625 Os-142 93 Op 22 C-1625 Os-149 | ++ | + | 6 | \vdash | \vdash | + | \vdash | \vdash | + | + | Н | + | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | \vdash | + | + | 1 | + | + | \vdash | \rightarrow | + | + | + | + | + | + | + | + | + | \vdash | + | + | Н | 6 |
| 93 Op 22 C-1625 Os-157 | | | 9 | | | | | | | | | | | | | | | \Box | | | | | | | | | | | | | | | | | \Box | | | | | | | | | | | | 9 |
| 93 Op 22 C-1625 Os-158 93 Op 22 C-1625 Os-159 | ++ | + | 3 | \vdash | \vdash | + | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | 1 | + | \vdash | + | + | + | \vdash | \vdash | + | + | \vdash | + | +- | \vdash | - | + | \vdash | \rightarrow | - | \vdash | + | + | + | + | \dashv | + | + | \vdash | + | +- | H | 3 4 |
| 93 Op 22 C-1625 Os-163 | | Т | | | | | | | | | | | | | | | | | \Rightarrow | | | | | \pm | | | | 1 | | | | | | | | \Rightarrow | | | | | | | | | | | 1 |
| 93 Op 22 C-1625 Os-164 93 Op 22 C-1625 Os-170 | ++ | - | 7 | \vdash | \vdash | + | ₩ | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | \rightarrow | + | + | + | + | + | + | \dashv | + | + | \vdash | + | + | Н | 7 |
| 4 Op 22 C-1627 Os-138 | | | 3 | | | | | | | | | | | | | | | \Box | | | | | | | | | | | | | | | | | \Box | | | | | | | | | | | | 3 |
| 4 Op 22 C-1627 Os-141 4 Op 22 C-1628 Os-150 | ++ | + | 7 | \vdash | \vdash | + | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | + | 1 | \vdash | + | + | \vdash | - | + | 1 | + | + | + | - | + | + | + | + | + | + | + | + | + | \vdash | + | + | H | 9 |
| 4 Op 22 C-1628 Os-152 | 1 2 | 2 | | | | | | | \Rightarrow | | | | | | # | | | \Box | # | | | | | \perp | | | | | 3 | | | | | | | # | | | | \Rightarrow | # | | | | | | 11 |
| 4 Op 22 C-1629 FL29 4 Op 22 C-1629 Os-148 | ++ | + | 5 | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | \vdash | + | + | + | 1 | \vdash | + | + | \vdash | + | 4 | \vdash | + | + | \vdash | \rightarrow | + | + | + | + | + | + | \dashv | + | + | \vdash | + | + | Н | 9 |
| 4 Op 22 C-1630 Os-143 | | 1 : | 3 | | | | | | \perp | | | 1 | \perp | | 7 | | | \Box | _ | | | \Box | | | | \Box | 1 | | | | | \Box | \rightarrow | | \Box | _ | | | \Box | \Rightarrow | 1 | \perp | \Box | # | | | 4 |
| 4 Op 22 C-1630 Os-160 4 Op 22 C-1630 Os-161 | +++1 | 1 | 1 | \vdash | \vdash | + | \vdash | \vdash | + | + | Н | + | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | \rightarrow | + | + | + | + | + | + | \dashv | + | + | \vdash | + | + | H | 6 1 |
| 4 Op 22 C-1632 Os-167 | \Box | 7 | 1 | | | | | | \perp | | | \perp | | | 7 | \perp | \perp | \Box | 4 | 1 | \perp | \Box | | \bot | | | | | | | | | | | \Box | 4 | | \perp | \Box | \neg | 7 | \perp | \Box | \perp | | | 1 |
| 2 Op 2 C-1651 AE-1800 2 Op 2 C-1651 AE-2703 2 Op 2 C-1651 FL37 2 Op 2 C-1651 Os-185 2 Op 2 C-1651 Os-185 | ++ | + | + | \vdash | \vdash | + | + | | + | + | \vdash | + | + | | + | + | + | \vdash | \dashv | + | + | \vdash | \vdash | + | + | \vdash | _ | + | 1 | \pm | + | \vdash | _ | _ | + | \dashv | _ | + | + | \dashv | + | + | + | + | + | H | 1 |
| 2 Op 2 C-1651 FL37 | Η, | 7 | - | | \Box | - | \vdash | Н | \perp | \vdash | П | \mp | \vdash | Н | 4 | \mp | - | \Box | \dashv | \mp | - | 3 | \Box | + | \vdash | \Box | - | - | 2 | - | + | \blacksquare | \neg | - | \Box | \dashv | - | \vdash | \blacksquare | \dashv | 5 | - | \Box | \perp | - | Н | 5 |
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| 1 Op 2 C-1653 AE-2705 1 Op 2 C-1653 AE-2707 | + | Ŧ | 1 | | H | Ŧ | F | H | Ŧ | F | H | Ŧ | F | H | Ŧ | Ŧ | F | H | Ŧ | Ŧ | F | \Box | + | Ŧ | F | H | Ŧ | F | H | \pm | F | \Box | - | \pm | \Box | Ŧ | Ŧ | F | \Box | 7 | 1 | F | H | Ŧ | | H | 1 |
| 1 Op 2 C-1653 Os-194 | 11 | 1 | 1 | | 世 | 3 | | | \pm | | | \pm | | | | \pm | | | | | | | | \pm | | | | 6 | \Box | \pm | | \Box | \Rightarrow | \pm | \Box | | | | \Box | \Rightarrow | 1 | \pm | \Box | \pm | | | 11 |
| 1 Op 2 C-1653 Os-197 1 Op 2 C-1653 Os-198 | ++ | + | 1 | \vdash | \vdash | + | \vdash | \vdash | + | + | $\vdash \vdash$ | + | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | \vdash | + | 2 | 1 | + | + | \vdash | \dashv | + | + | + | + | + | + | \dashv | + | + | \vdash | + | + | \vdash | 2 |
| 2 Op 2 C-1654/1655 Os-186 | \pm | \pm | \perp | | \Box | | | П | \pm | | | \pm | | П | # | 士 | | П | \Rightarrow | \downarrow | | 1 | | # | | Ħ | # | 1 | | \pm | \pm | Ħ | \exists | | \Box | \Rightarrow | \perp | | \Box | \Rightarrow | \perp | | Ħ | \pm | $^{\pm}$ | | 2 |
| 2 Op 2 C-1655 Os-188 | + | 4 | 4 6 | \vdash | \vdash | + | - | H | + | + | Н | + | + | H | + | + | + | H | + | + | + | 2 | \vdash | + | + | \vdash | + | 2 | H | + | + | H | + | + | + | + | + | + | \dashv | + | + | + | H | + | + | H | 12 3 |
| 2 On 2 C-1655 Os-190 | 1 : | 5 | ; | | | | | | _ | \pm | H | \pm | \pm | | | Ⅎ | \pm | 3 | _ | _ | \pm | 3 | | | \pm | | | 6 | | \pm | \pm | | _ | _ | | _ | | \pm | oxdot | | _ | \pm | ╁┤ | | \pm | H | 17 |
| 2 Op 2 C-1656 FL8 | \Box | | \perp | | | Ŧ | | \Box | \top | \blacksquare | | \perp | T | \Box | \neg | T | \top | П | \neg | \perp | \top | 3 | | Ŧ | \blacksquare | П | \bot | \perp | | 7 | T | \Box | \neg | 7 | \Box | \neg | T | \top | \Box | \Box | 5 | T | П | 1 | T | | 9 |
| 2 Op 2 C-1656 Os-192 1 Op 2 C-1658 Os-200 | ++ | + | 4 | \vdash | 3 | + | \vdash | \vdash | + | + | H | + | 12 | \vdash | + | 6 | + | \vdash | + | + | + | 5 | \vdash | + | + | \vdash | + | 1 | 1 | + | + | \vdash | \dashv | + | + | + | + | + | + | \dashv | + | + | \vdash | + | + | \vdash | 20 |
| 1 Op 2 C-1660 FL41 | \Box | # | | | | | | | \perp | | | \mp | | | \perp | \perp | | \Box | \dashv | \perp | | | | \perp | | | \perp | 5 | \Box | # | \perp | \Box | 7 | \perp | \Box | \dashv | | | \Box | \dashv | 2 | | \Box | \perp | | | 2 5 |
| 1 Op 2 C-1660 Os-196 1 Op 2 C-1661 Os-177 | $\pm \pm$ | \pm | | | | | | | _ | \pm | H | \pm | \pm | | | Ⅎ | \pm | | _ | _ | \pm | | | | \pm | | | 2 | | \pm | \pm | | _ | _ | | _ | | \pm | oxdot | | _ | \pm | \Box | | \pm | H | 2 |
| 1 Op 2 C-1662 FL6 1 Op 2 C-1662 Os-176 | \Box | 7 | 2 | Е | | Ŧ | | \Box | \mp | \vdash | H | \mp | F | \Box | 7 | Ŧ | \top | П | \mp | \mp | \top | П | | Ŧ | F | H | 7 | | | 7 | F | \Box | 7 | 7 | \Box | \mp | Ŧ | F | 1 | \dashv | 7 | \top | П | \mp | Ŧ | H | 3 |
| 1 Op 2 C-1662 Os-176 1 Op 2 C-1663 Os-211 1 Op 2 C-1664 FL40 | | | 2 | | \Box | \pm | | | \pm | \pm | | \pm | \pm | | \pm | \pm | \pm | | \pm | \pm | \pm | | | \pm | \pm | | | 1 | | \pm | \pm | | | | | \pm | \pm | \pm | | | \pm | \pm | | \pm | \pm | | 1 |
| | + | Ŧ | F | П | H | F | | H | Ŧ | F | П | 1 | F | H | Ŧ | Ŧ | F | A | Ŧ | 1 | F | П | \perp | Ŧ | F | П | Ŧ | - | H | Ŧ | F | П | Ŧ | Ŧ | \Box | Ŧ | Ŧ | F | П | \mp | Ŧ | \perp | П | Ŧ | F | П | 1 7 |
| 1 Op 2 C-1667 AE-1715 | $\pm \pm$ | \pm | | | | \pm | | | \pm | \pm | | _ | \pm | | \pm | \pm | \pm | 1 | \pm | | \pm | | | \pm | \pm | H | \pm | 5 | | \pm | \pm | | \pm | 1 | | \pm | | \pm | | | \pm | \pm | \Box | \pm | \pm | \Box | 7 |
| 1 Op 2 C-1667 AE-2723a | + | Ŧ | T | П | II | \perp | 1 | П | Ŧ | F | П | Ŧ | F | П | T | Ŧ | F | П | Ŧ | T | F | П | \Box | Ŧ | F | П | Ŧ | \perp | H | Ŧ | F | П | Ŧ | Ŧ | \Box | Ŧ | T | F | П | \exists | Ŧ | \perp | П | T | F | П | 1 |
| 1 Op 2 C-1667 AE-2723b 1 Op 2 C-1667 AE-2724 | ++ | + | + | | \vdash | + | 1 | \vdash | + | + | H | + | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | \vdash | + | + | \vdash | + | + | \vdash | + | + | + | + | + | + | \forall | \dashv | + | + | \vdash | + | + | \vdash | 1 |
| 1 Op 2 C-1667 AE-2725 | \Box | \bot | | | | | 2 | | \bot | | | \bot | | | \dashv | \bot | | \Box | \dashv | \perp | | | | \perp | | | \perp | | \Box | \bot | \perp | \Box | # | \perp | \Box | \dashv | | | \Box | \dashv | \perp | | H | \Rightarrow | | | 2 |
| 1 Op 2 C-1667 AE-2726 | | | | 1 | \perp | | 1 | \perp | | | \perp | | | \perp | | _1_ | | \perp | | | | | $\perp \perp$ | | | | | | \perp | | | | | | | | | | | | | | | | | ш | 1 |

| Val | ues are | NISP | | | D | D | D | н н | н | н | н | н | I/N H | /N H/I | N H/N | H/N | H/N H | /N H/ | N H/N | H/N | H/N | H/N H | I/N H | /N N | N | N | N | N N | l N | М | М | М | M | M UM | 1 UM | M | M I | и м | М | М | M | M N | I M | М | M | M I | M S | S | S | S | S S | S | S | |
|---|---------|------------|----------------------------|------------------------|------------------|-----------------|----------|---------------------------------|----------------|-----------|---------------|------------------------|-----------------|-----------------------------|----------------|----------|---------------|--------------|------------|--------------|-----------------|---------------|------------------|----------|----------|------------|---------------|--------------------------|--------------|---------------|-------------|--------------|------------|----------------------------|--------------|------------------|---------------|----------------|----------------------|--------------------|----------|-----------------------|---------|----------------|------------------|-------------------|--------------------------------|---------------------|-------------|---------------------|-----------------------------------|----------------|-------------|---------|
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Ę | | | ·s | | | | | | | | | | | \Box | |
| Est. Period | Oper | ration | Context | Sample/ Bag FL46 | Canis familiaris | Cavia porcellus | Lama sp. | Lagidium peruanum Adouti sp. | Silvylagus sp. | Felis sp. | Carnívora n/i | Odocoileus virginianus | Nothoprocta sp. | Colaptes sp. Cyanocorax sp. | cf. Fulica sp. | Buteosp. | Strigidae | | Thraupidae | Passeriforme | Ave n/i | | Lonchophylla sp. | Bufo sp. | | Reptil n/i | Insecto N/I | Muridae Raffus raffus | Rodentia | Gallus gallus | Bos tarurus | Capra hircus | Ovis aries | Sus scrofa Artiodactyla | Mamífero n/i | Chione subrugosa | Semele Solida | Argopecten sp. | Trachycardium procen | Enoplochiton niger | | Fusinus dupetitthouar | | Donax obesulus | Protothaca thaca | Engraulis ringens | Sardinops sagax Bulimulidae | Epiphragmophora sp. | masthus sp. | Drepanostomella sp. | Systrophia sp. Scutalus mariopena | Drymaeus sp. | Bostryx sp. | Total |
| 1 | 0 | p 2 | C-1667 | | | | | | | | | | | | | | | | | 1 | | | \Box | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| 1 | 1 0 | p 2 | C-1668 | FL42 | + | - | 1 | + | + | + | \vdash | \vdash | + | + | + | Н | + | + | + | \vdash | $\vdash \vdash$ | + | + | + | + | \vdash | + | + | + | + | \vdash | \vdash | + | + | \vdash | \vdash | + | + | + | \vdash | \vdash | + | + | \vdash | - | + | 2 | ! | + | \vdash | + | + | \vdash | 2 |
| 1 2 | 0 | p 2 | C-1668 C-1669 | Os-212 FL39 | _ | + | | + | + | + | \vdash | \vdash | + | + | + | Н | \dashv | + | + | Н | Н | \dashv | + | + | + | \vdash | - | 2 | + | + | \vdash | \vdash | + | _ | + | \vdash | \dashv | + | + | | \vdash | + | + | \vdash | \dashv | \dashv | 4 | | | \vdash | + | + | Н | 6 |
| 2 | 0 | n 2 | C-1669 | Os-173 | | | | 3 | | | | | | | | | | | | | | | | 2 | | | | 4 | | | | | 士 | 1 | | \Box | | | | | | | | | | | Τ. | | | | | | | 10 |
| 2 | 0 | p 2 | C-1669 | Os-210 | | | 1 | \perp | 1 | | | \Box | \perp | | | | \dashv | \perp | \perp | | | \perp | \blacksquare | \perp | | | \neg | \perp | \perp | | | \Box | \neg | | 1 | \Box | \dashv | \perp | | | \Box | \perp | \perp | | \Box | \dashv | \perp | \perp | | | \perp | \blacksquare | \Box | 3 |
| 2 | 0 | p 2 | C-1670 C-1672 | Bo-119 AE-2720 | _ | + | 1 | + | + | + | \vdash | \vdash | + | + | + | Н | + | + | + | Н | \vdash | + | + | + | + | \vdash | \rightarrow | + | + | + | \vdash | \vdash | + | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | \vdash | \dashv | + | 1 | + | + | \vdash | + | + | \vdash | 1 |
| 2 | 1 0 | p 2 | C-1672 | FL45 | | - | H | \top | + | + | \vdash | \vdash | \neg | + | + | Н | \dashv | + | \top | т | Н | \neg | + | + | \top | \Box | \neg | 2 | + | + | \vdash | \vdash | \dashv | + | | \vdash | \dashv | + | | | \vdash | + | \top | Н | \neg | \dashv | 5 | | | \vdash | + | + | \vdash | 7 |
| 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 0 | p 2 | C-1672 | Os-172 | | | | | | | | | | | | | | | | | | | \Box | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | 1 |
| 2 | 10 | p 2 | C-1672 | Os-174 | - | \vdash | \vdash | - | + | + | \vdash | \vdash | - | + | + | Н | + | + | + | \vdash | \vdash | - | + | + | + | \vdash | - | + | + | + | \vdash | \vdash | + | 1 | + | \vdash | + | + | + | | \vdash | + | + | \vdash | \dashv | + | + | + | + | \vdash | + | + | \vdash | 3 |
| 2 | 0 | p 2 p 2 | C-1672 C-1675 | Os-175 AE-2722 | + | + | 1 | + | + | + | \vdash | \vdash | + | + | + | Н | + | + | + | \vdash | Н | \dashv | + | + | + | \vdash | \rightarrow | + | + | + | \vdash | \vdash | + | ++ | + | \vdash | + | + | + | \vdash | \vdash | + | + | \vdash | \rightarrow | + | + | + | + | \vdash | + | + | \vdash | 1 |
| 2 | | p 2 | C-1675 | FL43 | | | | | | | | | | | | | 士 | | | | | | 土 | | | | | 土 | | | | | 士 | | | \Box | 士 | | | | | 土 | | | | 士 | 4 | | | | | | | 4 |
| 2 | 0 | p 2 | C-1675 | Os-213 | + | ₩ | \vdash | + | + | - | \vdash | \vdash | + | + | - | Ш | \dashv | + | + | ш | \sqcup | \rightarrow | + | + | - | \vdash | \rightarrow | + | + | + | \vdash | \vdash | \dashv | 1 | _ | \vdash | \dashv | + | + | \vdash | \vdash | + | + | \square | \dashv | \dashv | + | + | \vdash | \vdash | + | + | ш | 1 |
| 91 | - | p 1 | C-Op1 CleanUp | Os-221 | | | Ш | \perp | \perp | | Ш | Ш | \perp | \perp | | Ш | | \perp | \perp | Ш | Ш | \perp | 4 | \perp | \perp | | 4 | \perp | \perp | ╙ | | Ш | _ | 3 | - | Ш | | \perp | | Ш | \Box | \perp | \perp | Ш | 4 | | \perp | \perp | | \Box | \perp | | Ш | 4 |
| 91 | - | p 1 | C-Op1 CleanUp | Os-56 | | | Ш | \perp | \perp | | Ш | Ш | \perp | \perp | | Ш | | \perp | \perp | Ш | Ш | \perp | 4 | \perp | \perp | | 4 | 2 | \perp | ╙ | | Ш | _ | | 1 | Ш | | \perp | | Ш | \Box | \perp | \perp | Ш | 4 | | \perp | \perp | | \Box | \perp | | Ш | 3 |
| 91 | 0 | p 1 | C-Op1 CleanUp | Os-58 | | | Ш | \perp | \perp | \perp | Ш | Щ | \perp | \perp | \perp | Ш | _ | 1 | \perp | | Ш | \perp | 4 | \perp | \perp | Ш | 4 | \perp | \perp | L | 1 | Щ | \perp | \perp | \perp | Ш | _ | \perp | | Ш | \Box | \perp | \perp | Ш | 4 | | \perp | | | \Box | \perp | | Ш | 1 |
| 91 | 0 | p 1 | C-Op1 CleanUp | Os-60 | | | 1 | 1 | \perp | \perp | Ш | Щ | \perp | \perp | \perp | Ш | | 1 | \perp | | Ш | \perp | 4 | \perp | \perp | Ш | 4 | \perp | \perp | L | Ш | Щ | \perp | \perp | \perp | Ш | | \perp | | Ш | \Box | \perp | \perp | Ш | 4 | | \perp | | | \Box | \perp | \perp | Ш | 2 |
| 91 | 0 | p 1 | C-Op1 CleanUp | Os-612 | _ | | Щ | 4 | _ | \perp | Ш | Н | \perp | \perp | \perp | Ш | 4 | \downarrow | \perp | | Ш | 4 | 4 | \perp | 1 | Ш | 4 | 4 | _ | ┡ | | Н | 4 | 1 | _ | Ш | 4 | \perp | _ | Ш | \perp | 4 | \perp | | 4 | 4 | \perp | \perp | | \perp | 4 | 1 | Ш | 1 |
| 91 | 0 | p 1 | C-Op1 CleanUp | Os-66 | | | Ш | \perp | \perp | | Ш | Ш | \perp | \perp | | Ш | | 1 | \perp | Ш | Ш | \perp | 4 | \perp | \perp | | 4 | \perp | \perp | ╙ | | Ш | _ | | \perp | Ш | | \perp | | Ш | \Box | \perp | \perp | Ш | 4 | | \perp | \perp | | \Box | \perp | | Ш | 1 |
| 91 | - | p 1 | C-Op1 Sin contexto | Os-52 | | 1 | Щ | \perp | _ | | Ш | Щ | \perp | \perp | | Ш | | \perp | \perp | | Ш | 4 | 4 | \perp | | | 4 | \perp | \perp | L | | Щ | 4 | | _ | Ш | | \perp | | Ш | \Box | \perp | \perp | | 4 | | \perp | \perp | | | \perp | | \sqcup | 1 |
| 91 | O | P 1 | C-Op1 Sin contexto | Os-53 | | 1 | Ш | | \perp | | Ш | Ш | \perp | | | | | \perp | | | Ш | \perp | | \perp | | | _ | \perp | | | | Ш | \perp | | 1 | Ш | | | | | | \perp | | | | | \perp | | | | \perp | | Ш | 2 |
| 91 | 0 | рі | C-Op1 Sin contexto | Os-535 | | | Ш | | \perp | | Ш | Ш | \perp | | | Ш | | \perp | | | Ш | \perp | | \perp | | | \perp | \perp | | L | | Ш | | | 1 | Ш | | \perp | | | | \perp | | | | | \perp | | | | \perp | | Ш | 1 |
| 91 | 0 | P 1 | C-Op1 Sin contexto | Os-536 | | | 1 | | \perp | | Ш | Ш | \perp | | | Ш | | \perp | | | Ш | \perp | | \perp | | | \perp | \perp | | L | | Ш | | | | Ш | | \perp | | | | \perp | | | | | \perp | | | | \perp | | Ш | 1 |
| 91 | 0 | p i | C-Op1 Sin contexto | Os-537 | | | Ш | | \perp | | Ш | Ш | \perp | | | Ш | | \perp | | | Ш | \perp | | \perp | | | \perp | \perp | | L | | Ш | | 2 | | Ш | | \perp | | | | \perp | | | | | \perp | | | | \perp | | Ш | 2 |
| 91 | O | p 1 | C-Op1 Sin contexto | Os-55 | | | 2 | | \perp | | Ш | Ш | \perp | | | | | \perp | | | Ш | \perp | | \perp | | | _ | \perp | | | | Ш | \perp | | | Ш | | | | | | \perp | | | | | \perp | | | | \perp | | Ш | 2 |
| 91 | | p 1 | C-Op1 Superficie | Os-33 | | | 1 | | \perp | | Ш | Ш | \perp | | | | | \perp | | | Ш | \perp | | \perp | | | _ | \perp | | | | Ш | \perp | | | Ш | | | | | | \perp | | | | | \perp | | | | \perp | | Ш | 1 |
| 5 5 | | 12 | C-Op12 Sup | Os-538 | _ | 2 | \vdash | + | + | + | \vdash | \vdash | + | + | + | Н | + | + | + | \vdash | \vdash | + | + | + | + | \vdash | \rightarrow | + | + | + | \vdash | \vdash | + | - | + | \vdash | + | + | + | | \vdash | + | + | \vdash | \dashv | + | + | + | - | \vdash | + | + | \vdash | 3 |
| 5 | Op | 12 | C-Op12 Sup C-Op12 Sup | Os-539 Os-540 | | 15 | | 21 | + | + | \vdash | 2 | \top | + | + | Н | \dashv | + | \top | т | Н | \neg | + | + | \top | \Box | \neg | + | + | + | \vdash | \vdash | \dashv | + | | \vdash | \dashv | + | | | \vdash | + | \top | Н | \neg | \dashv | + | + | | \vdash | + | + | \vdash | 38 |
| 5 | Op | 12 | C-Op12 Sup | Os-541 | | 18 | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | \Box | 18 |
| 5 5 | | 12 | C-Op12 Sup C-Op12 Sup | Os-542 Os-543 | _ | 19 | | 3 | + | + | \vdash | \vdash | + | + | + | Н | + | + | + | 20 | \vdash | + | + | + | 1 | \vdash | \rightarrow | + | + | + | \vdash | \vdash | + | - | + | \vdash | + | + | + | | \vdash | + | + | \vdash | \dashv | + | + | + | - | \vdash | + | + | \vdash | 22 |
| 5 | | | C-Op12 Sup | | _ | 2 | | - | + | + | \vdash | \vdash | \dashv | + | + | Н | \dashv | + | + | | Н | \dashv | + | + | +: | \Box | _ | + | + | + | | \vdash | \dashv | + | | \vdash | \dashv | + | + | | \vdash | + | + | | \dashv | \dashv | + | + | + | \vdash | + | + | \vdash | 23 |
| 5 | Op | 12 | C-Op12 Sup | Os-545 | \perp | | 1 | \perp | \perp | | \Box | | Ţ | \top | | | \neg | Ţ | | | П | \neg | T | T | \vdash | | \Box | T | T | \vdash | | | T | \perp | | \Box | \neg | T | \blacksquare | | | \perp | | | \Box | \neg | T | F | \Box | | T | \blacksquare | \Box | 1 |
| 5 5 | | 12 | C-Op12 Sup C-Op12 Sup | Os-546 Os-547 | + | + | 1 | 2 | + | + | \vdash | \vdash | + | + | + | Н | + | + | + | \vdash | \vdash | + | + | + | + | \vdash | | 26 | + | + | \vdash | \vdash | + | + | + | \vdash | + | + | + | \vdash | \vdash | + | + | \vdash | \dashv | + | + | + | + | \vdash | + | + | \vdash | 1 28 |
| 5 | Op | 12 | C-Op12 Sup | Os-548 | \perp | 9 | | 士 | \pm | | | | \pm | | | | \pm | \pm | | | | | | | 1 | | | | | | | | | 土 | | | \pm | | | | | 士 | | | | \pm | \pm | | | | 土 | | | 10 |
| 5 | Op | 12 | C-Op12 Sup | Os-549 | $-\Gamma$ | 11 | | . [| + | 1 | \Box | H | \perp | - | 1 | П | Ŧ | F | + | H | П | \perp | Ŧ | \perp | 1 | Н | \perp | \perp | 1 | \perp | H | H | \perp | _ | | H | Ŧ | - | +- | \Box | H | \perp | + | П | 7 | Ŧ | $-\Gamma$ | F | \Box | H | | + | H | 11 |
| 5 5 | On | 12 | C-Op12 Sup C-Op12 Sup | Os-550 Os-551 | + | 3 | | 1 | + | + | \vdash | \vdash | + | + | + | Н | + | + | + | \vdash | \vdash | + | + | + | + | \vdash | \dashv | + | + | + | \vdash | \vdash | + | + | + | \vdash | + | + | + | \vdash | + | + | + | \vdash | \dashv | + | + | + | + | \vdash | + | + | \vdash | 3 |
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| 5 91 | 0 | p2 (| C-Op2 Clean | Os-1 | | | | | | | | | 土 | | | | | | | | | | | | | | | 1 | | | | | | | 1 | | | | | | | 土 | | | | | | | | | | | | 29 1 |
| 91 | 0 | p2 (| C-Op2 Clean | Os-190 | $-\Gamma$ | 1 | \sqcap | - F | + | \vdash | H | H | Ţ | - | \vdash | H | Ţ | F | + | | П | - T | Ŧ | F | + | H | 7 | \perp | F | \perp | F | H | Ŧ | _ | 1 | H | Ţ | F | +- | H | H | \perp | + | П | 7 | Ţ | F | F | \Box | H | F | F | H | 1 |
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| 91 | 1 0 | p 2 1 | C-Op2 Clean | Os-3 | \perp | | 3 | \perp | \perp | | | | \Rightarrow | | | | \Rightarrow | \pm | \perp | | | \Rightarrow | \perp | \perp | | | | | \pm | | | | | \perp | | \Box | \Rightarrow | | | | | 二 | \perp | | | \Rightarrow | \Rightarrow | \perp | | | \Rightarrow | | \Box | 3 |
| 91 | | p 2 | C-Op2 East Wall | Os-490 | | | Ш | | | L | | Ш | | | L | | | | | | \square | | | | | \square | | | | L | | Ш | | | 1 | Ш | | | | | | | | \square | | | | | | | | | \Box | 1 |
| 91 | O | p z | C-Op2 East Wall | Os-494 | | | 1 | | | L | | | | | L | | | ╧ | | | | | | Ţ | \perp | | | | | | | | | | L | | | | | | | | | | | | ╧ | | | | | \perp | LŢ | 1 |
| 91 | O | P 2 | C-Op2 East Wall | Os-733 | | | | $oxed{oxed}$ | | | | | I | | | | | I | | | | | I | Ι | | | | I | $oxed{\Box}$ | | | | I | | 1 | | | I | | | | | | | J | | Ι | I | | | | | | 1 |
| 91 | O | p 2 | C-Op2 Sin contexto | Os-167 | | | | | | Γ | | | \Box | \perp | Γ | | | I | | | | | $oxed{T}$ | Ι | Γ | | | \perp | $oxed{\Box}$ | | | | \Box | | 4 | | | Ι | | | | | | | | | I | Γ | | | \perp | Γ | | 4 |
| 91 | O | p 2 | C-Op2 Sin contexto | Os-17 | | | | | Т | | | 1 | T | T | | П | | T | | П | П | \top | T | T | | П | | T | | | | | T | | | П | | | | П | | \top | | П | \exists | | T | T | | | | Г | П | 1 |
| 91 | O | p 2 | C-Op2 Sin contexto | Os-363 | | | | | | | П | | | | | П | T | | T | | П | T | | T | | | T | \top | | | | | | | 2 | П | T | | | | | | T | | | T | | | | | | | П | 2 |
| 91 | O | p 2 | C-Op2 Sin contexto | Os-377 | | | | I | | | | | I | | | | | Ι | | | | | I | Ι | | | | I | $oxed{\Box}$ | | | | I | | 1 | | | I | | | | | | | | | Ι | I | | | | \prod | | 1 |
| 93 | Op | 22 | C-Op22 Clean E | Os-168 | | 1 | 3 | | | | | | | | | | | | | | Π | | | | | | | | | | | | | | | ΙĪ | | | | | | | | | I | | | | | | | |] | 4 |

| Valu | es are NIS | P | | D | D | D I | 4 H | Н | Н | Н | H H | /N H/ | N H/N | H/N | H/N | H/N | I/N | I/N H | /N H/ | N H/I | N H/N | H/N | H/N | N | 1 N | N N | N N | N | N | M | M | M I | M I | M U | M UN | M | M | M | M | M I | M I | M N | M N | M | М | M | M | M | S | S | S | S | S S | S | S | | |
|-------------|------------|-----------------------|----------------|------------------|-----------------|----------|---------|----------------|-----------|----|------------------------|--------------|----------------|----------------|----------|----------|------------------|--------------------|--------------|--------|---------------|------------------|----------------|----------|-------------|-------------|---------|---------------|----------|---------------|-------------|--------------|--------|----------|--------------|------------------|---------------|------------|----------------|------------------------|--------------------|-------------|-----------------|--------------------|----------------|------------------|-------------------|-----------------|-------------|---------------------|---------------|---------------------|----------------|--------------|-----|---|-------|
| Est. Period | Operation | n Context | Sample/ Bag | Canis familiaris | Cavia porcellus | Lama sp. | Agoutis | Silvylagus sp. | Felis sp. | | Odocoileus virginianus | Colaptes sp. | Cyanocorax sp. | cf. Fulica sp. | Buteosp. | gig | Cairina moschata | Zenaida auriculata | Passeriforme | 1 8 | Didelphis sp. | Lonchophylla sp. | Quiróptero n/i | Bufo sp. | Anfibio n/i | Insecto N/I | Muridae | Raftus rattus | Rodentia | Gallus gallus | Bos tarurus | Capra hircus | | ga Scr | Mamífero n/i | Chione subrugosa | Semele Solida | Semele sp. | Argopecten sp. | Trachycardium procerum | Enoplochiton niger | Molusco n/i | Thais chocolata | Molusco Marino n/i | Donax obesulus | Protothaca thaca | Engraulis ringens | Sardinops sagax | Bulimulidae | Epiphragmophora sp. | haumasthus sp | Drepanostomella sp. | Systrophia sp. | Drymaeus sp. | yxs | | Total |
| 93 | Op 22 | C-Op22 Clean E | Os-169 | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| 92 | Op 3 | C-Op3 Room 2 | Os-500 | | 1 | | | | | | | | Τ | | | | | | | | | | | | | Τ | \top | | | | | | | | | | | | | | | | Τ | | | | | | | T | | T | | | Τ | Π | 1 |
| 4 | Op 6 | C-Op6 Sin contexto | Os-371 | П | | 5 | | | | | | | | | | | | | | Т | | | П | | | | Т | | | | | | | | | | | | | | | | | | | | | | | П | | T | | | Т | | 5 |
| 4 | Op 6 | C-Op6 Sin contexto | Os-372 | П | T | 5 | \top | | П | T | | | T | | П | | T | \top | | | T | | П | | | T | T | T | П | | T | \top | | 2 | 2 | | | | | T | T | \top | Τ | T | | | | | | 1 | T | 1 | | T | T | Т | 7 |
| 4 | Op 6 | C-Op6 Sin | Os-384 | П | 1 | 2 | \top | | П | T | | | T | | П | | T | \top | | | T | | П | | | T | T | T | П | | T | \top | | | 1 | | | | | T | T | \top | Τ | T | | | | | | 1 | T | 1 | | T | T | Т | 4 |
| 4 | Op 6 | C-Op6 Sin | Os-523 | П | T | T | \top | | П | | 1 | | T | | | | T | | | | | | П | | | | T | | | | T | | | | Т | Т | | | | T | T | T | | | | | П | | | T | | 1 | | | T | | 1 |
| 4 | Op 6 | C-Op6 Sup | Os-303 | \Box | | 1 | | | М | | \neg | | | | | \neg | \neg | | | \top | | | \Box | \neg | \neg | \neg | | | | \neg | \neg | | | | | | | \neg | \neg | \neg | \neg | \neg | | | | | | \neg | \neg | | \neg | \neg | \neg | \top | | | 1 |
| 4 | Op 7 | C-Op7 Clean | Os-426 | | | 1 | | | | | \neg | | | | | \neg | \neg | | | | | | | \neg | | | | | | | | | | | | | | \neg | | \neg | \neg | | | | | | | | | | | | \neg | | | | 1 |
| 4 | Op 7 | C-Op7 Clean | Os-479 | \Box | \neg | 2 | \neg | 1 | \Box | | \neg | \top | 1 | 1 | П | \dashv | \neg | \neg | \top | 1 | 1 | | \vdash | \neg | \neg | \neg | \neg | 1 | П | \neg | \neg | \neg | \neg | \neg | \neg | 1 | ш | \dashv | \neg | \neg | \neg | \neg | 1 | 1 | T | | ш | \neg | \neg | \dashv | \neg | \neg | \neg | \neg | 1 | 1 | 2 |
| 4 | Op 7 | C-Op7 Clean | Os-516 | | | 1 | | | | | \neg | | | | | \neg | \neg | | | | | | | | | | | | | | | | \neg | | | | | | \neg | | \neg | | | | | | | | | \neg | | | | | | | 1 |
| 92 | Op 8 | C-Op8 Sin Contexto | Os-725 | | | 2 | 1 | | | | | | | | | | | | | | | | | | | | 14 | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | 36 |
| 91 | Op 9 | C-Op9 Sin Contexto | Os-731 | | | | | | | | | | Τ | | | | | | | | | | | | | Τ | | | | | | | | 1 | | | | | | Т | | | Τ | | | | | | | T | | | | | Τ | Π | 1 |
| | TOTAL | | | 2 | 1144 | 1931 | 39 | 25 | 7 | 63 | 319 | | - | - | - | 6 | - | ∞ - | - 04 | 98 | 64 | 12 | | - : | 9 5 | ئ د | 1816 | 1036 | 8 | 8 | ٠. | - " | 2 | 13 | 747 | - | - | - | 7 | - [| - (| | - | - | - | - | 2 | 15 | 313 | 2 | 28 | 37 | g 6 | , - | 27 | 9 | 200 |



ANÁLISIS ARQUEOZOOLOGICO DEL PROYECTO DE INVESTIGACIÓN ARQUEOLÓGICA REGIONAL ANCASH (PIARA)-2015

Por

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1. MÉTODOS DE ESTUDIO

ANÁLISIS ARQUEOZOOLÓGICO

Identificación Taxonómica:

Vertebrados

Las identificaciones taxonómicas de los restos de anfibios, aves y mamíferos fueron llevadas a cabo utilizando las colecciones comparativas del Laboratorio del Centro de Investigaciones Arqueobiológicas y Paleoecológicas Andinas "ARQUEOBIOS".

En la identificación de los restos de aves se procedió a reconocer el resto óseo a que parte del esqueleto de un ave tipo pertenecía, siguiendo los criterios diagnósticos de Olsen (1979) y Gilbert *et al,* (1981). También se utilizaron los trabajos de Driesch (1976), Koepcke (1970) y uso de la osteometría y bioinformática.

La identificación taxonómica de los restos de mamíferos se realizó tomando los mismos criterios que para los restos de aves y el método comparativo con muestras del Centro de Investigaciones Arqueobiológicas y Paleoecológicas Andinas "ARQUEOBIOS"

También se utilizaron trabajos especializados como: Ziswiler (1980), Olsen (1968, 1982), Driesch (1976), Pacheco et al, (1979), Boessneck (1982), Emmons (1990), Flower (1876), Gardner y Romo (1993), Gilbert (1990), Glass (1965), Hesse y Wapnish (1985), Hillson (1992), Lawlor (1979), Myers et al, (1990), Pasquini y Spurgeon (1989), Rosi (1988), Sisson y Grossman (1990), Wheeler (1982), Puig y Monge (1983) y Davis (1989).

La utilización de la bioinformática mediante la consulta con los bancos de datos de Animal Diversity (http://www.animaldiversity.ummz.umich.edu), FAO (http://www.fao.org), ITIS (http://www.fao.org), entre otras, permitió acceder a las muestras de esqueletos craneales y post-craneales de fauna Neotropical, para su comparación respectiva en cuanto a datos morfológicos y osteométricos.

Abundancia Taxonómica mediante NISP

Vertebrados

En los grupos zoológicos que conforman los vertebrados, el indicador de abundancia taxonómica utilizado fue el NISP. Para el caso de las aves y mamíferos, la muestra estaba fragmentada, por lo cual y teniendo en cuenta esta naturaleza, se procedió a calcular la abundancia taxonómica utilizando el NISP.

La cuantificación por NISP se realizó reuniendo la cantidad total de especimenes identificados de cada contexto, operación, sub-operación y OS, de todos los sitios excavados.

Osteometria de Camélidos

La identificación de los restos de camélidos al nivel específico se efectuó utilizando un método cuantitativo basado en la osteometría según las variables sugeridas por Kent (1982), luego se procedió con un análisis discriminante (Kent 1982).

Con respecto a la osteometría utilizada para Camelidae, se estudiaron diversas muestras de primeras falanges delanteras y traseras que provienen del sitio. Está técnica se basa en la utilización de medidas univariadas para cada elemento óseo y la asociación de técnicas estadísticas, como las variables discriminantes y coeficientes de clasificación.

Las medidas se efectuaron con un vernier de ± 0,05 mm de precisión, realizando tres veces las medidas para las cinco variables y sacando un promedio aproximado para cada una de ellas para luego identificar a que resto de camélidos pertenece. Las fórmulas del análisis discriminante fueron puestas en una hoja de cálculo Excel y los datos osteométricos fueron ingresados a ella y graficados en un diagrama bivariado, empleando para esta discriminación P1V2 (ancho proximal latero medial) y P1V3 (ancho proximal antero posterior). La finalidad de este diagrama es notar como se separan mediante estas medidas, el grupo grande (guanaco y llama) y el grupo pequeño (alpaca y vicuña).

También se realizaron análisis cluster jerárquico, para obtener dendrogramas como estrategia para analizar en que grupo de

la base moderna de datos de los camélidos sudamericanos, se agrupan las primeras falanges arqueológicas. Este método se utilizó mediante el paquete estadístico IBM SPSS Statistics 22.0 - Agosto 2013, un software que se emplea en estudios de Ciencias Sociales, tanto para variables cualitativas y cuantitativas.

Las interpretaciones se hicieron en base a los antecedentes filogenéticos de la familia *Camelidae* y como grupo externo para consolidar la interpretación se introdujeron medidas de un herbívoro de otra familia como es el caso de *Capra hircus* "cabra" que es de la familia *Bovidae*, para otorgar sentido filogenético al dendrograma.

Estructuras de Edad

Las estructuras de edad están básicamente relacionadas al estudio del desgaste dentario de los maxilares superiores e inferiores y algunos dientes sueltos (Wheeler 1982), para el caso de los incisivos se procedió a estimar la edad según el trabajo de Puig y Monge (1983). La aplicación de estos dos métodos sin embargo puede tener un efecto diferencial por estar realizados el primero sobre mandíbulas (Wheeler 1982) y sobre incisivos de camélidos chilenos en el otro caso (Puig y Monge 1983).

Tafonomía

Como parte de los aspectos tafonómicos de la muestra ósea estudiada, hemos enfatizado nuestro estudio sobre algunos utensilios óseos recuperados nuevamente en esta temporada de las excavaciones. Al carecer de una base de datos de esta especialidad se ha procedido a realizar un estudio preliminar dividiéndolo en categorías y realizando una clasificación de éstas.

Para la clasificación se ha tenido en cuenta la morfología de estas evidencias incidiendo en la observación de la parte activa, notándose las siguientes clases: a) instrumentos con la parte activa puntiaguda, b) instrumentos con la parte activa roma, c) instrumentos con la parte activa plana, d) instrumentos macizos, e) instrumentos huecos, f) objetos escultóricos, g) piezas seccionadas, y h) piezas indefinidas.

Luego se trató de identificar taxonómicamente a nivel de familia, género o especie, para lo cual se utilizo material óseo comparativo sin alteraciones antrópicas, de la colección del Centro de Investigaciones Arqueobiológicas y Paleoecológicas Andinas-"ARQUEOBIOS". También se cuantificó la cantidad de elementos óseos de camélidos con huellas de cortes. La información se presenta en cuadros de distribución según los contextos estudiados.

2.- RESULTADOS

Se presenta a continuación los resultados obtenidos de los análisis del material arqueozoológico de los contextos excavados en PIARA.

Sistemática y Taxonomía

La sistemática y taxonomía de los restos de anfibios, aves y mamíferos identificados para PIARA, sigue las pautas establecidas en la base de datos de Animal Diversity (www.animaldiversity.edu)

PHYLLUM CHORDATA

Clase Amphibia

Familia Bufonidae

Bufo sp. "sapo"

Clase Reptilia

Clase Aves

Familia Tinamidae

Nothoprocta sp. "perdiz andina"

Familia Rallidae

cf. Fulica sp. "gallineta"

Familia Accipitridae

Buteo sp. "aguilucho"

Familia Strigidae (lechuzas)

Familia Picidae

Colaptes sp. "carpintero andino"

Familia Anatidae

Anas sp. "pato silvestre"

Familia Columbidae

Zenaida auriculata "paloma" "columbina sp. "tortolita"

Familia Phasianidae

Gallus gallus "gallina"

Familia Corvidae

Cyanocorax sp. "inca jay"

Familia Thraupidae (tángaras)

Clase Mammalia

Familia Didelphidae

Didelphis sp. "muca" "zarigüeya"

Familia Phyllostomatidae

Lonchophylla sp. "murciélago"

Familia Muridae (ratones de campo y ratas)

Rattus rattus "rata"

Familia Caviidae

Cavia porcellus "cuy"

Familia Chinchillidae

Lagidium peruanum "vizcacha"

Familia Dasyproctidae

Agouti sp. "aguti"

Familia Leporidae

Sylvilagus sp. "conejo silvestre"

Familia Canidae

Canis familiaris "perro doméstico"

Familia Felidae

Felis sp. "gato silvestre"

Familia Cervidae

Odocoileus virginianus "venado de cola blanca"

Familia Camelidae

Lama sp. "camélido"

Familia Bovidae

Bos Taurus "vaca"
Capra hircus "cabra"
Ovis aries "oveja"

Familia Suidae

Sus scrofa domestica "cerdo"

Osteometría de Camélidos

El estudio arqueozoológico realizó una análisis de osteometría de 11 primeras falanges de camélidos, con la finalidad de conocer la identidad de las especies de camélidos que estaban utilizando en este sitio. Mediante un análisis discriminante señalado en la metodología y una análisis jerárquico obtenido mediante el programa SPSS, pudimos identificar que en este sitio por lo menos había dos especies de camélidos domésticos: *Lama glama* "llama" y *Vicugna pacos* "vicuña"

Tabla 1.- Datos osteométricos y coeficientes de clasificación de 11 primeras falanges de camélidos de PIARA

| | | PRIMERAS FALANGES DELANTERAS | | | | | | | | |
|---|----------------------------|------------------------------|-------|-------|-------|-----------|-----------|-----------|-----------|-------------------|
| Procedencia | P1V1 | P1V2 | P1V3 | P1V4 | P1V5 | CCG | CCL | CCA | CCV | Taxa Identificado |
| 105 HU01, Sector A Perolcoto Contexto 581 | 60,81 | 20,44 | 17,62 | 17,35 | 15,38 | 199,13121 | 233,78957 | 234,1637 | 217,7309 | Alpaca |
| 257 HU01, Sector A Perolcoto Contexto 1015 | 60,93 | 18,37 | 17,72 | 15,81 | 15,18 | 169,62265 | 202,14087 | 211,36835 | 201,35944 | Alpaca |
| 526 HU01, Sector A Perolcoto, Contexto 229 | 55,41 | 18,14 | 16,82 | 15,08 | 15,26 | 122,63505 | 165,24245 | 180,14347 | 165,09879 | Alpaca |
| 540 HU01, Sector A Perolcoto, Contexto 204-209 | 69,55 | 20,91 | 19,8 | 16,9 | 17,7 | 265,27255 | 278,49977 | 276,05154 | 268,18079 | Llama |
| 720 PIBRA 2013, Sector B, Pachocucho, Contexto 1610 | 57,16 | 18,13 | 16,4 | 15,47 | 13,65 | 157,86487 | 192,21902 | 201,80504 | 191,90412 | Alpaca |
| 932 PIARA 2012, Sector A Perolcoto, Contexto 756 | 56,01 | 19,24 | 16,58 | 15,81 | 15,01 | 151,8201 | 191,23353 | 200,11728 | 183,97667 | Alpaca |
| 1133 PIARA 2011, Hualcayan, Sector A, Contexto 57 | 61,23 | 19,01 | 17,54 | 15,87 | 13,37 | 219,34612 | 238,99561 | 240,94871 | 236,37959 | Alpaca |
| 1355 PIARA 2012, Hualcaya, Sector A Perolcoto, Contexto 471 | 68,69 | 21,04 | 19,78 | 17,97 | 17,08 | 252,32267 | 274,77521 | 270,44588 | 258,31486 | Llama |
| 1446 PIARA 2013, Sector A Perolcoto, Contexto 1326 | 65,87 | 20,34 | 19,96 | 16,92 | 16,2 | 237,89269 | 258,66643 | 257,79861 | 248,28979 | Llama |
| 1616 PIARA 2012, Sector A Perolcoto, Contexto 1005 | 58,52 | 19,3 | 18,1 | 16,49 | 14,56 | 172,45912 | 209,14632 | 214,48501 | 200,17757 | Alpaca |
| | PRIMERAS FALANGES TRASERAS | | | | | | | | | |
| Procedencia | P1V1 | P1V2 | P1V3 | P1V4 | P1V5 | CCG | CCL | CCA | CCV | Taxa Identificado |
| 279 HU01, Sector A Perolcoto, Contexto 638 | 51,85 | 17,94 | 15,92 | 14,34 | 13,26 | 270,09177 | 284,71756 | 290,42491 | 278,03923 | Alpaca |

Figura 1.- Diagrama bivariado que muestra la separación del grupo de grandes camélidos ("guanaco" y "llama") de los pequeños camélidos ("alpaca" y "vicuña") cuando se confrontan P1V2 vs P!V·ç3

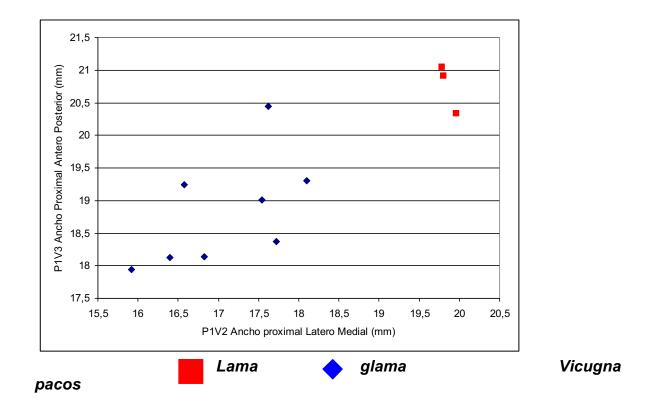
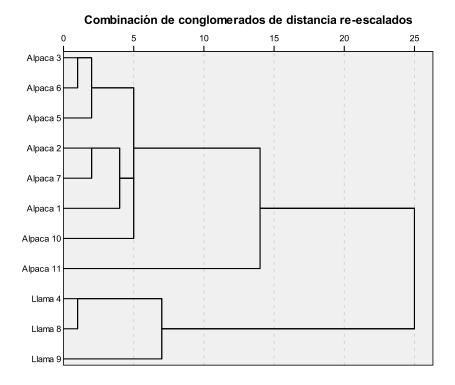


Figura 2.- Dendrograma que utiliza el método del vecino más próximo para clasificar las 11 primeras falanges de camélidos identificadas mediante osteometría

Dendrograma que utiliza una vinculación única



3.- COMENTARIOS

De la muestra ósea de la fauna recuperada de las excavaciones de PIARA y posteriormente analizada, se han identificado un anfibio (*Bufo sp.*), un reptil no identificado, 11 taxones de aves, de los cuales tres están en nivel específico (*Cairina moschata, Zenaida auriculata* y *Gallus gallus*), cinco a nivel de género (*Nothoprocta, Colaptes, Cyanocorax, Fulica* y *Buteo*), uno a nivel de familia (*Thraupidae*) y uno a nivel de orden (*Passeriformes*).

En relación a restos de mamíferos se han identificado 9 taxones a nivel específico (Cavia porcellus, Rattus rattus, Lagidium peruanum, Canis familiaris, Odocoileus virginianus, Bos taurus, Capra hircus, Ovis aries y Sus scrofa). De estas 9 especies, solo Cavia porcellus, Lagidium peruanum, Canis familiaris y Odocoileus virginianus, constituyen fauna nativa, los demás son fauna hispánica, y por lo tanto sirven como indicadores de intrusiones o contextos no prehispánicos.

A nivel de género se han identificado 5 taxones: *Didelphis sp., Lonchophylla sp., Agouti sp., Sylvilagus sp.* y *Felis sp.,* excluimos *Lama sp.* aunque sus restos predominan, porque mediante la osteometría se ha determinado que existían las dos especies de camélidos domésticos: *Lama glama* y *Vicugna pacos*, aunque no se conoce con exactitud cuantos restos

del total de la muestra corresponden a cada uno de ellos por estar la mayor parte de ellos fragmentados y solo en el caso de las primeras falanges, tenemos la certeza de poder conocer cuantas especies hay entre sus restos.

Otros restos óseos de mamíferos fueron identificados en nivel familia como los ratones de campo *Muridae*, y también a nivel de orden como es el caso de restos óseos de *Quiroptera* (murciélagos) y *Carnivora*, que por estar fragmentados, no ofrecieron características diagnósticas para su identificación en un nivel mas específico.

En relación a las aves, se identificaron restos óseos de húmeros y esternón de *Nothoprocta sp.* "perdiz andina", posiblemente *N. pentlandii* la cual esta ampliamente distribuida y, con frecuencia, bastante común en la vertiente occidental de los andes y en valles intermontanos, entre 2000-3600 msnm, donde se le encuentra en matorral montano, incluyendo bordes de *Polylepis* y pastizales. Tiene entre 25,5 y 30 cm de tamaño y no hay datos etnozoológicos de su consumo.

Otros restos de aves identificadas es el "carpintero andino" *Colaptes sp.* posiblemente *C. rupicola* que es la que se adecua a la distribución geográfica del sitio arqueológico. Esta ave es bastante común en pastizales de puna y páramo, entre 2700-4500 msnm, a menudo se lo encuentra en lugares donde no hay árboles, aunque puede entrar en arboledas de *Eucalyptus* o en bordes de bosques húmedos. Particularmente común cerca de salientes rocosos, aunque cuando se alimenta pùede ocurrir en zonas muy abiertas. Sus restos pudieron ser identificados a partir de un fragmento de cráneo y pico.

La siguiente ave identificada es cf. *Fulica sp.* un ave que habita ambientes acuáticos como lagunas y orilla de ríos. Sus restos en mínimas cantidades son partes de huesos como el coracoides y húmero. Tenemos también restos óseos de aves como "lechuzas" *Strigidae*, que habitan los matorrales y bordes montanos de los ríos. De este taxón hemos identificado coracoides, carpometacarpo y tibiotarso.

Resto óseos como un tibiotarso y un carpometacarpo, fueron identificados como *Buteo sp.*, un gavilán o aguilucho que vive en los montes cordilleranos, posiblemente *B. polyosoma*, porque es la especie que coincide con la distribución geográfica del sitio arqueológico. Es común en las vertientes occidentales y en los valles intermontanos. Es obvio que fue capturado, pero desconocemos su utilidad.

Dentro del registro óseo de aves, se ha identificado una fúrcula de un pato *Cairina moschata*. Este pato es originario de América tropical y su área de distribución actual abarca desde México hasta el centro de Argentina y Uruguay, en zonas de clima tropical y subtropical y entre

altitudes que van desde el nivel del mar hasta los 1000 msnm. Posiblemente haya sido importado al sitio o la forma silvestre llego a algún ambiente dulceacuícola del entorno del sitio arqueológico, donde posteriormente sería capturado.

Hay diversos huesos como, coracoides, húmero, ulnas, fémur, de dos especies de palomas de campo, una de mayor tamaño como es *Zenaida auriculata* "paloma de campo" y otra de menor tamaño *Columbina sp.* "tórtola". Ambas habitan en los matorrales, montes ribereños y campos de cultivo. En ambos casos, hay evidencias modernas de consumo de estas palomas silvestres.

Dentro de la colección ósea de aves, se pudo identificar huesos que pertenecían a *Gallus gallus domestica* "gallina". La peculiaridad de los restos óseos de esta ave doméstica, es que los huesos identificados: tibiotarso, fémur, húmero, son de menor tamaño que las formas domesticas actuales. Estas evidencias concuerdan con las pequeñas gallinas que crían actualmente en los andes, y constituyen una raza particular en esta ecología.

Para terminar el registro óseo de las aves, se han identificado elementos óseos como un premaxilar de Cyanocorax sp. un paseriforme que habita entre los 1100 – 2400 msnm de los bosques montanos húmedos en la vertiente este de los Andes, por lo que posiblemente fue importado al sitio. Luego tenemos elementos óseos de otro paseriforme de la familia Thraupidae tales como tarsometatarso, fémur, tibiotarso, que son pájaros que se reconocen por tener plumaje brillante y pico grueso, pero no cónico, y por ser de hábitos insectívoros o frugívoros. Se considera que la familia de 400 especies. 100 géneros (variando contiene alrededor en dependiendo de la clasificación considerada). Las especies de esta familia son todas habitantes de las zonas intertropicales.

En relación a los mamíferos se han identificado silvestres y domésticos, además de prehispánicos y hispánicos. En relación a los silvestres tenemos un marsupial *Didelphis sp.* "muca" "zarigüeya", del cual se reportan: húmero, cráneo, fémur, omóplato, tibia, peroné. Este marsupial vive desde México a Bolivia, desde el nivel del mar hasta los 2500 msnm. Según Emmons (1990) es cazado por su carne cuando hay escasez de otros recursos.

Restos de quirópteros han sido identificados para el sitio, se trata de huesos como la mandíbula y sus dientes, y huesos de las extremidades anteriores. Por medio de la mandíbula se pudo identificar que pertenecía a Lonchophylla sp. un murciélago que se alimenta de néctar de flores, insectos y polen. Se caracteriza por tener un pronunciado rostro (ver foto de mandíbula) y su rango de distribución geográfica indica que habita desde Nicaragua hasta Bolivia. Las especies que habitan en Perú, una es

de la costa *L. hesperia* y la otra que habita en bosques lluviosos es *L. handleyi*.

Numerosos restos óseos y algunos especímenes deshidratados conteniendo aún fibra y restos de músculo, fueron identificados como *Lagidium peruanum* "vizcacha", un roedor grande que habita en los matorrales de las áreas secas de los cerros en los andes. Hay restos que indican la captura de diversas edades, incluso individuos tiernos. Por las evidencias que hay en el sitio, la posibilidad de su consumo es alta.

También se reporta para el sitio, un omóplato de un roedor identificado como *Agouti sp.* "aguti", el cual habita entre los 2000-3000 msnm, siendo nocturnos, terrestres, solitarios, consumen frutos caídos y algunos tubérculos. La especie *Agouti paca*, vive cerca de las riberas de los ríos, aunque a veces son encontrados en los bosques abiertos.

Restos de omóplato, radio, fémur, calcáneo, húmero, pelvis, tibia y atlas, se identificaron para otro taxón de lagomorfo silvestre, como es el caso de *Sylvilagus sp.* "conejo silvestre". Estos conejos son nocturnos, terrestres, solitarios, se alimentan de gramíneas silvestres, y habitan los bosques abiertos, tierras bajas de los valles secos interandinos y se indica que son atraídos por la sal y la orina humana (Emmons, 1990).

El último taxón de mamíferos silvestres es un felino, *Felis sp.* del cual se han identificado maxilares y falanges. Las únicas especies que habitan en esta ecología son el *Felis colocolo, Felis yagouaroundi* y *Felis concolor* "puma". Por el tamaño de los huesos, es posible que tenga más afinidad con *Felis colocolo*. El "gato de los pajonales o gato montés" es un pequeño felino rayado nativo de la zona occidental central de América del Sur, que se extiende desde Colombia, Ecuador, Bolivia, Perú, Brasil, Paraguay, Uruguay, Chile y a través de la Cordillera de los Andes en Argentina.

Los taxones de mamíferos domésticos, se dividen en dos partes: los prehispánicos donde están *Cavia porcellus* "cuy" del cual se han identificado la mayoría de sus partes esqueléticas, *Canis lupus familiaris* "perro", y restos de camélidos domésticos, de los cuales trataremos en detalle su importancia para el sitio.

En relación a los mamíferos hispánicos, hay una buena cantidad de restos óseos de *Sus scrofa domestica* "cerdo", que incluyen en su mayoría huesos post-craneales, donde predominan las falanges. Una de las características observadas, es que la mayoría de estos elementos óseos no tenían fusionadas sus epífisis, lo que implica que estaban consumiendo individuos tiernos y muy jóvenes.

Mezclados con los restos de camélidos pudimos identificar restos óseos de tres especies de bóvidos como: Bos Taurus "vaca", Capra hircus "cabra" y Ovis aries "oveja", lo que indica que se trataría contextos con intrusión de fauna hispánica, cuya cantidad indica que son momentos eventuales, aislados.

Los restos de camélidos son los más numerosos en la muestra zooarqueológica de PIARA. Mediante la osteometría, se ha identificado que los habitantes del sitio estaban criando *Lama glama* "llama" y *Vicugna pacos* "alpaca". Resulta lógico en sitios andinos la crianza de ambas especies domésticas, porque mientras la "llama" es un elemento importante para cargar mercancías, la "alpaca" proporciona la fibra y su carne.

Los datos osteometricos y los coeficientes de clasificación, están clasificando bien las primeras falanges medidas. Las variables obtenidas fueron sometidas a un análisis jerárquico mediante un análisis del vecino más próximo, y el dendrograma obtenido además de tener sentido filogenético, separa bien ambos grupos en dos clados diferentes y bien diferenciados (figura 2). Por lo tanto las posibilidades de la existencia de ambas especies domésticas en el sitio tienen buen argumento en estos dos métodos empleados.

Por otro lado los perfiles etarios obtenidos de algunos elementos de los maxilares, nos indican un perfil etario de tipo *atricional*, el cual siempre esta conformado por individuos de diversas edades, tal como se aprecia en la siguiente tabla:

| | ESTRUCTURAS DE EDAD: PIARA 20 | 15 | |
|---------------|--|---------------------|--------------|
| PROCEDENCIA | DESCRIPCION | EDAD | TAXA |
| | ELEMENTO OSEO | ESTIMADA | IDENTIFICADO |
| Operación 1 | 01 fragmento derecho de maxilar superior, presenta | 6 años | Lama sp. |
| Contexto 4 | M1 roto, M2 y M3 con mucho desgaste oclusal. | | |
| Os-673 | | | |
| Operación 2 | 01 incisivo 1, esmalte en ambos lados. | 9 meses | Lama glama |
| Contexto 90 | | | |
| Os-398 | | | |
| Operación 6 | 01 fragmento de mandíbula izquierda, presenta: | 3 años 3 meses | Lama sp. |
| Contexto 213 | Pd3, Pd4 y M1. | | |
| Os-424 | | | |
| Operación 6 | 01 incisivo 2, esmalte en ambos lados. | 2 años 9 meses | Lama glama |
| Contexto 229 | | | |
| Os-170 | | | |
| Operación 7 | 01 incisivo 1 derecho, 01 incisivo 1 izquierdo | 4 años 6 meses | Lama glama |
| Contexto 829 | 01 incisivo 2 derecho, 01 incisivo 2 izquierdo | (Puig y Monge 1983) | |
| Os-389 | 01 incisivo 3 derecho, 01 incisivo 3 izquierdo | | |
| | Todos con esmalte en ambos lados. | | |
| Operación 7 | 01 mandíbula izquierda incompleta, presenta: Pd3, | 1 año 3 meses | Lama sp. |
| Contexto 831 | Pd4, M1 y M2 por erupcionar. | | |
| Os-506 | | | |
| Operación 8 | 01 mandíbula derecha, presenta: Pd3 y Pd4. | 1 mes | Lama sp. |
| Contexto 255 | | | |
| Os-253 | | | |
| Operación 22 | 01 mandíbula, presenta los siguientes dientes: | 1 mes | Lama sp. |
| Contexto 1607 | Pd3, Pd4, I1, I2, I3. | | |
| Os-79 | | | |
| Operación 22 | 01 incisivo 1, esmalte en ambos lados. | 8 años | Lama glama |
| Contexto 1610 | | | |
| Os-100 | | | |
| Operación 22 | 01 mandíbula derecha, presenta: Pd3, Pd4 y M1 que | 6 meses | Lama sp. |
| Contexto 1618 | está erupcionando. | | |
| Os-133 | | | |

Aquí se observa que hay individuos tiernos (1 mes a 9 meses), individuos juveniles (1 año 3 meses y 2 años 9 meses) e individuos adultos (4 años 6 meses a 8 años). Este perfil etario indica crianza local y por lo tanto los camélidos serían los mamíferos más importantes de su economía.

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| Elementos óseos | | | TAFONO | MÍA: HU | ESOS DE | CAMELI | IDAE QUI | EMADOS | | |
|---------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|-------------|
| Lama sp. | | ZON | | | | ZON | ZONA C | | | |
| | Unidad 3 | Unidad 4 | Unidad 7 | Unidad 8 | Unidad 1 | Unidad 5 | Unidad 6 | Unidad 10 | Unidad 2 | Unidad 9 |
| Cráneo | | | | | | | | | | |
| Hioides | | | | | | | | | | |
| Maxilar superior | | | | | | | | | | |
| Mandibula | | | | | | | | | | |
| Dientes | | | | | | | | | | |
| V. Cervicales | | 1 | | | | 8 | | 1 | | |
| V. Toraxica | | | | | | 1 | | | 2 | |
| V. Lumbares | | | | | | 3 | | | | |
| V. Coxígeas | | | | | | | | | | |
| Sacro | | | | | | | | | | |
| Costillas | | | | | | 18 | 4 | 1 | 4 | |
| Esternebras | | | | | | 1 | | | | |
| Omóplato | | | | | | | | | | |
| Húmero | | | | | | 1 | | | | |
| Radiocúbito | | | | | | 1 | | 2 | 2 | |
| Metacarpiano | 1 | 1 | 1 | | | | | | 3 | |
| Carpianos | | | | | | 1 | | | | |
| Pelvis | | | | | | 3 | | | | |
| Fémur | | | | | | 1 | | | | |
| Tibia | | | | | | 1 | | 1 | 1 | |
| Rótula | | | | | | 2 | | | | 1 |
| Metatarsiano | | | | | | | | | | |
| Metapodio | | | | | | 3 | 1 | | | |
| Tarsianos | | | | | | | | | | |
| Calcáneo | | | | | | 1 | 2 | | | |
| Astragalo | | | | | | | | | | |
| 1º Falange | | 1 | 1 | | | 5 | 2 | 1 | 3 | |
| 2º Falange | | | | | | | | | | |
| 3º Falange | | | | | | | | | | |
| Total | | | | | | | | | | |
| | 1 | 3 | 2 | | | 50 | 9 | 6 | 15 | 1 |

| | | TAFONOMÍA: HUESOS DE CAMELIDAE CON HUELLAS DE ROEDURAS | | | | | | | | | | | | | |
|--------------------|------------|--|------------|-------------|------------|------------|-------------|------------|------------|------------|--------------|------------|-----------|------------|------------|
| Elementos óseos | | Operación 1 | | Operación 2 | | | Operación 6 | | | | Operación 22 | | | | |
| Lama sp. | 556 | 581 | 582 | 782 | 907 | 4 | 77 | 1653 | 231 | 1013 | 1015 | 1027 | 1605 | 1610 | 1630 |
| | Os- 666 | Os- 210 | Os- 241 | Os- 82 | Os- 527 | Os- 174 | Os- 164 | Os- 194 | Os- 415 | Os- 348 | Os- 377 | Os- 351 | Os- 97 | Os- 127 | Os- 143 |
| Cráneo | | | | | | | | | | | | | | | |
| Hioides | | | | | | | | | | | | | | | |
| Maxilar superior | | | | | | | | | | | | | | | |
| Mandibula | | | | | | | | | | | | | | | |
| Dientes | | | | | | | | | | | | | | | |

| i | Ī | ı | 1 | i | 1 | 1 | ı | i | i | İ | İ | İ | İ | ı | ı |
|---------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V. Cervicales | | | | | | | | | | | | | | | |
| V. Toraxica | | | | | | | | | | | | | | | |
| V. Lumbares | | | | | | | | | | | | | | | |
| V. Coxígeas | | | | | | | | | | | | | | | |
| Sacro | | | | | | | | | | | | | | | |
| Costillas | | | | 1 | | | | 1 | | | | | | | |
| Esternebras | | | | | | | | | | | | | | | |
| Omóplato | | | | | | | | | | | | | | | |
| Húmero | | | | | | | | | | | | | | | |
| Radiocúbito | | | | | | 1 | | | | | | | | | |
| Metacarpiano | | | | | | | | | | | | | | | |
| Carpianos | 1 | | 3 | | | | | | | | | | | | |
| Pelvis | | | | | | | | | | | | | | | |
| Fémur | | | | | | | | | | | | | | | 1 |
| Tibia | | | | | | | | | | | | | | | |
| Rótula | | | | | | | 1 | | | | | | | 1 | |
| Metatarsiano | | | | | | | | | | | | | | | |
| Metapodio | | | | | | | | | | | | 1 | | | |
| Tarsianos | | | | | | | | | | | | | | | |
| Calcáneo | | | | | | | | | | | | | | | |
| Astragalo | | | | | 1 | | 1 | | | | | | | | |
| 1º Falange | | | | | | | | | 1 | | 1 | 1 | | | |
| 2º Falange | | 3 | 1 | | | | 2 | | | 1 | | | 1 | | |
| 3º Falange | | | | | | | 1 | | | | | | | | |
| Total | | | | | | | | | | | | | | | |

AE = Artefactos Especiales **OM** = Otros Materiales

| | | TAFON | IOMÍA: Operación 1 |
|--|--------|----------|---|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN |
| Operación 1 Contexto 5 | AE-154 | Lama sp. | Costilla: 01 fragmento de costilla, presenta parte del extremo vertebral y parte del cuerpo. En el lado proximal presenta fractura de característica antigua y en esta parte la superficie externa presenta huellas de cortes realizadas posiblemente en actividades de carnicería. Los cortes van en dirección transversal, así también se aprecia en el cuerpo de la superficie externa cierto pulimento asociado a presencia de estrías. |
| | AE-155 | Lama sp. | Pelvis: 01 porción de acetábulo fusionado con fragmento de isquion. Se observa que el perímetro del acetábulo presenta huellas de cortes realizadas por actividades de carnicería. |
| Operación 1 Contexto 4 | AE-183 | Lama sp. | Costilla: 01 extremo vertebral fusionado, la superficie se presenta muy erosionada y la fractura es de carácter antiguo. No se observan huellas tafonómicas. |
| Operación 1 Contexto 10 Contexto 2 | AE-188 | Lama sp. | Industria ósea: 01 fragmento de útil óseo, pertenece al cuerpo de un posible punzón. El extremo de la parte proximal se encuentra con acabado y el extremo de la parte distal se encuentra incompleto con fractura antigua. El cuerpo es alargado, de sección circular, con pulimento desarrollado por toda su superficie que le otorga cierto brillo. Conservación: buena Medidas: L= 94.50 mm Dp= 5.11 mm Dd= 3.79 mm Peso: 2.66 g |
| Operación 1 Contexto 10 | AE-189 | Lama sp. | Rótula: 01 izquierda, en un extremo de la cara articular presenta huellas de roeduras causadas por roedor pequeño, estas se distribuyen también para la otra cara en este mismo extremo. |
| Operación 1 Contexto 15 (perfil) | AE-410 | Lama sp. | Fémur: 01 distal izquierdo fusionado totalmente, se aprecia en la cara posterior por debajo de la fosa plantar huellas de cortes horizontales producto de agentes antrópicos y por encima de estos huellas de haber recepcionado golpes por percusión. La fractura es de tipo antigua. La superficie de los cóndilos muestra erosión. |

| | | TAFONOMÍA: Op | peración 1 |
|-----------------------------|--------|------------------------|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN |
| Operación 1 Contexto 44 | AE-412 | Lama sp. | Radiocúbito: 01 distal derecho s/f, con su superficie articular más diáfisis. El extremo de la diáfisis presenta fractura antigua. En la cara caudal se observa en la diáfisis distal huellas por agentes biológicos: roeduras (roedor pequeño). En la otra cara no se observan huellas. |
| | AE-413 | Lama sp. | Radiocúbito: 01 distal derecho s/f, ausente la superficie articular. En ambas caras en la parte de la diáfisis presenta múltiples huellas por agentes biológicos: roeduras (roedor pequeño). La fractura de la diáfisis es de caracter antiguo. |
| Operación 1 Contexto 46 | AE-436 | Odocoileus virginianus | <u>1ra falange</u> : 01 fusionada, en su diáfisis de la cara posterior se observa un pequeño abultamiento. |
| | AE-439 | Mamífero n/i | Costilla: 01 fragmento de cuerpo, los extremos presentan fractura de caracter antiguo. En un extremo de la cara posterior presenta huellas de cortes. |
| Operación 1 | AE-420 | Lama sp. | Molar: 01 fragmento. |
| Contexto 47 | | Concresiones de sales | 02 |
| Operación 1 Contexto 556 | AE-452 | Odocoileus virginianus | Mandíbula: 01 fragmento con sus dientes. |
| Operación 1 Contexto 24 | AE-455 | Lama sp. | Industria ósea: 01 útil apuntado, tipo punzón, subtipo de base articular. Este útil se presenta completo y bien conservado. La matriz corresponde a un fragmento de metatarsiano proximal. La cara interna deja apreciar las trabéculas propias de este elemento óseo. La parte activa se presenta apuntada con sección circular, se observa múltiples estrías que van en sentido horizontal. Así también se aprecia un ligero desconchado con características de er sntiguo. Medidas: L= 122 mm Ap= 20.71 mm Ad= 3.65 mm Am= 9 mm G= 6.06 mm Peso: 9.10 g |

| | | TAFONO | MÍA: Operación 1 |
|-----------------------------|------------------|---------------------|---|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN |
| Operación1 Contexto 589 | AE-466 | Lama sp. | Industria ósea: 01 útil apuntado, tipo punzón, subtipo de base articular. La matriz corresponde a un fragmento de epífisis distal de metapodio s/f (el cóndilo se encuentra ausente), se ha trabajado la parte de la diáfisis en forma apuntada. Medidas: L= 83 mm Ap= 16 mm Ad= 4.50 mm Am= 8 mm Peso: 6.45 g |
| Operación 1 Contexto 566 | AE-485 AE-486 | Caolín Homo sapiens | 01 borde de olla. 01 fragmento de diente. |
| Operación 1 Contexto 592 | AE-490 | sapiens Lama sp. | Industria ósea: 01 ornamento: tupu. Se encuentra en buen estado de conservación. Este es un alfiler grande que fue usado por las mujeres en épocas prehispánicas para sostener la prenda que llevaban sobre sus hombros. La matriz de este ornamento pertenece a un fragmento de diáfisis de hueso largo de <i>Lama sp</i> . En la zona proximal se muestra un diseño decorativo de sección cuadrada (L=10.66mm A= 9.83 mm) con el lado superior con tenues incisiones en dirección vertical distantes uno de otro. En la parte central de este diseño se tiene una perforación circular (D= 3.54 mm) que está situada concéntricamente y es de tipo bicónica para ambos lados, lo cual demuestra la tecnología para realizar la perforación (acción oblícua para la acción de perforar). Por debajo de esta parte se tiene el cuerpo alargado con un ancho inicial de 6.74 mm y grososr 33.46 mm, su sección es plana desde su inicio siguiendo por la zona mesial hasta la zona distal que termina en punta. Toda la pieza muestra pulimento asociado a brillo. El estudio traceológico indica la presencia de estrías producto de la tecnología en la elaboración de este ornamento, estas se ubican en la zona proximal de ambas caras (en el diseño cuadrado) corren en |

| | | TAFONO | MÍA: Operación 1 |
|-----------------------------|--------|----------------------|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN |
| / | | | sentido longitudinal. En la zona del cuerpo alargado de la parte proximal y mesial se presentan estrías longitudinales largas y cortas, son finas y se ubican en ambas caras, también son producto de la tecnología. En la zona distal disminuyen estando localizadas en asociación a la parte activa, estas son cortas y finas en dirección caótica. Las huellas derivadas del uso son escasas. |
| Operación 1 Contexto 661 | AE-701 | Lama sp. | Sacro: 01 porción que incluye la 1ra y 2da vértebra en proceso de fusión, está ausente el disco vertebrasl de la 2da y 3ra vértebra. No presenta huellas antrópicas. |
| Operación 1 Contexto 657 | AE-702 | Lama sp. | <u>Vértebra toraxica</u> : 01 completa s/f, ausente los discos vertebrales, no presenta huellas antrópicas. |
| | AE-703 | Lama sp. | <u>Costilla</u> : 01 porción pequeña de cuerpo que presenta huellas de cortes. |
| | AE-704 | Lagidium peruanum | <u>Fémur</u> : 01 derecho s/f, no presenta las superficies articulaes. No posee huellas antrópicas. |
| | AE-705 | OLama sp. | Mandíbula: 01 derecha, presenta Pd4, M1 y M2, ausente M3 por la fractura. Edad: 3 años Dientes: 03 fragmentos desiduales. |
| Operación 1 | AE-706 | Lama sp. | <u>3ra falange</u> : 01 sin huellas tafonómicas. |
| Contexto 660 | AE-707 | Lama sp. | Vértebra toraxica: 01 apófisis espinosa. Vértebra lumbar: 01 fragmento. |
| | AE-737 | Lama sp. | <u>Vértebra lumbar</u> : 01 fragmento de apófisis toraxica (se une con AE-707 y conforman un elemento). La fractura es de tipo antiguo. |
| Operación 1 Contexto 654 | AE-708 | Lagidium peruanum | <u>Fémur</u> : 01 proximal. |
| Operación 1 Contexto 667 | AE-727 | Lama sp. | <u>Fémur</u> : 01 fragmento proximal fusionado (porción del trocanter mayor). |
| Operación 1 Contexto 683 | AE-801 | Lama sp. | Industria ósea: 01 preforma elaborada de un fragmento de diáfisis de radiocúbito. |

| | | TAFONO | OMÍA: Operación 1 |
|--------------|------------------|-------------------------|---|
| OPERACIÓN | | | |
| y | A.E. | TAXA | DESCRIPCIÓN |
| CONTEXTO | AE | IAXA | DESCRIPCION |
| , | | | 7. 11. 7. 62.20 |
| / | | | Medidas: L= 63.20 mm A= 7.48 mm |
| | | | G= 5.14 mm |
| | | | Peso: 3.49 g |
| | | | Las fracturas que se observan son de carácter |
| Operación1 | AE-804 | Lama sp. | antiguo. Industria ósea: 01 útil apuntado, tipo punzón, |
| Contexto 669 | AL-804 | Lama sp. | subtipo de base articular. |
| Contexto 00) | | | Siendo la matriz un fragmento de ángulo posterior |
| | | | con fragmento de borde de omóplato se ha |
| | | | elaborado este útil que se encuentra en estado de |
| | | | conservación regular. La parte activa se ubica en el |
| | | | extremo distal y se ha seccionado transversalmente. |
| | | | La superficie de la parte activa muestra desgaste |
| | | | con presencia de estrías asociado a pulimento. |
| | | | Medidas: L= 127.47 mm |
| | | | Am= 24.13 mm |
| | | | Grosor= 8.04 mm |
| | | | Peso: 13.26 g |
| Operación 1 | AE-813 | Lama sp. | <u>1ra falange</u> : 01 con la epífisis proximal terminando |
| Contexto 680 | | | de fusionar, presenta en el extremo izquierdo |
| | | | proximal (visto desde la cara posterior) huellas de |
| | AE 017 | T : 1: | agente biológico: mordido por carnívoro. |
| | AE-817 | Lagidium | <u>Húmero</u> : 01 (con mala conservación en la parte proximal). |
| | AE-818 | <i>peruanum</i> Muridae | 1 / |
| | AE-818 AE-820 | Muridae | Omóplato: 01 izquierdo Cráneo: 01 con maxilar superior con dientes (mal |
| | AL-620 | Mulidac | conservado). |
| | AE-823 | Muridae | Húmero: 01 |
| | 71E 023 | Cavia | Radio: 01 fragmento |
| | | porcellus | <u></u> |
| | AE-825 | Cavia | Ulna:01 |
| | | porcellus | |
| | AE-828 | Cavia | Maxilar superior: 01 fragmento con dos molares |
| | | porcellus | |
| | AE-830 | Lama sp. | <u>1ra falange</u> : 01 con la epífisis proximal terminando |
| | | | de fusionar. Presenta huellas de agente biológico: |
| | | | mordido por carnívoro en la parte proximal y distal. |
| | AE-832 | Cavia | Pelvis: 01 |
| | 17000 | porcellus | Fémur: 01 diáfisis |
| | AE-835 | Cavia | Maxilar superior: 01 fragmento con molar. |
| | | porcellus | <u>Diáfisis</u> : 01 fragmento de hueso largo. |

| | | TAFONOMÍA: Op | eración 1 | | | | |
|-----------------------------|------------------|------------------------|--|--|--|--|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN | | | | |
| Operación 1 Contexto 680 | AE-838 AE-840 | Mamífero n/i Lama sp. | <u>Diáfisis</u> : 01 (tipo tubo). Vértebra: 01 disco vertebral. | | | | |
| Contexto 000 | AE-843 | Cavia porcellus | Mandíbula: 01 izquierda con dientes. 01 fragmento (porción pequeña) Pelvis: 01 fragmento. | | | | |
| | AE-844 | Cavia porcellus | Mandíbula: 01 izquierda con dientes. 01 fragmento con incisivo. Húmero: 01 distal. Fémur: 02 izquierdos. Pelvis: 01 fragmento. Diáfisis: 01 fragmento. | | | | |
| | AE-845 | Lama sp. | Costilla: 01 fragmento de cuerpo. | | | | |
| | AE-849 | Cavia porcellus | Costilla: 01 | | | | |
| | AE-853 | Cavia porcellus | <u>Tibia</u> :01 <u>Cráneo</u> : 01 fragmento. | | | | |
| | AE-857 | Cavia porcellus | Mandíbula: 01 izquierda, dientes ausentes. | | | | |
| | AE-858 | Mamífero n/i | Costilla: 01 fragmento. | | | | |
| | AE-861 | Cavia porcellus | Maxilar superior: 01 fragmento derecho, sólo alveolos. | | | | |
| | AE-863 | Cavia porcellus | Maxilar superior: 01 fragmento izquierdo con molar. | | | | |
| | | Mamífero n/i | <u>Costilla</u> : 01 fragmento de cuerpo (conservación deficiente). | | | | |
| | AE-864 | Lama sp. | 3ra falange: 01 | | | | |
| | AE-871 | Cavia porcellus | Maxilar superior: 01 fragmento, presenta sólo alveolos. Diáfisis: 01 | | | | |
| | AE-877 | Lama sp. | <u>Tibia</u> : 01 superficie articular proximal. | | | | |
| | AE-1326 | Lama sp. | Costilla: 01 fragmento de cuerpo (poroso). | | | | |
| Operación 1 Contexto 952 | AE-2203 | Homo sapiens sapiens | Fragmento óseo deteriorado. | | | | |
| Operación 1 Contexto 10 | AE-191 | Muridae | <u>Incisivo</u> : 01 | | | | |
| Operación 1 | AE-1324 | Lama sp. | Molar: 01 | | | | |
| Contexto 756 | AE-1325 | Homo sapiens sapiens | Fragmento óseo. | | | | |
| | AE-1329 | Lagidium peruanum | <u>Tibia</u> : 01 diáfisis, el extremo distal se encuentra parcialmente seccionado. Medidas: L= 69.49 mm Peso: 2.96 g | | | | |
| | | Cavia porcellus | Molar: 01 <u>Diáfisis</u> : 01 | | | | |

| | | TAFONOMÍA | A: Operación 1 |
|---|---------|-----------|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN |
| Operación 1 Contexto 756/23 Interface | AE-1330 | Lama sp. | Costilla: 01 fragmento de cuerpo con huellas de cortes, fracturas de tipo antiguo en ambos extremos. |
| Operación 1 Contexto 770 | AE-1336 | Lama sp. | Costilla: 01 fragmento de cuerpo con huellas de cortes en un extremo a lado de la fractura esternal, parte externa. |
| Operación 1 Contexto 782 | AE-1340 | Lama sp. | Industria ósea: 01 útil apuntado, tipo punzón. Este se ha elaborado a partir de un fragmento de epífisis proximal de metapodio. Medidas: L= 56.88 mm Ap= 18.15 mm Ad= 5.61 mm Peso: 5.35 g |
| Operación 1 Contexto 785 | AE-1811 | Lama sp. | Vértebra cervical: 01 faceta articular. |
| Operación 1 Contexto 907 | AE-1840 | Lama sp. | <u>Húmero</u> : 01 fragmento de diáfisis (individuo adulto). |
| Operación 1 Contexto 914 | AE-1842 | Lama sp. | Mandíbula: 01 completa, presenta en ambos lados los siguientes dientes: I1: derecho e izquierdo I2: derecho e izquierdo I3: derecho e izquierdo C: derecho e izquierdo P4: derecho e izquierdo M1: derecho e izquierdo M2: derecho e izquierdo M3: derecho e izquierdo Edad estimada: 09 años |
| Operación 1 Contexto 922 | AE-1871 | Lama sp. | Vértebra lumbar: 02, de las cuales una presenta huellas de cortes en la apófisis toraxica. Pelvis: 01 fragmento. |
| Operación 1 Contexto 917 | AE-1873 | Lama sp. | Industria ósea: 01 útil con un extremo apuntado y el otro extremo romo. La matriz corresponde a un fragmento de diáfisis de hueso largo de <i>Lama sp.</i> , el acabado es bueno por la presencia de pulimento en toda la superficie. La traceología deja observar las huellas tecnológicas que se ubican en la parte medial mientras en las partes activas se han desaparecido para dar paso a las huellas de uso que marcan actividad en ambos extremos. Medidas: L= 96.61 mm Ap= 13.34 mm |

| | | TAFONOMÍA: Op | peración 1 |
|-----------------------------|---------|----------------------|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN |
| / | | | Am= 12.25 mm Ad= 4.41 mm G= 2.56 mm Peso: 4.26 g Esta pieza estuvo fraccionada en dos partes y la fractura posee características de ser antigua. |
| Operación 1 Contexto 917 | AE-1874 | Lama sp. | Omóplato: 01 con la tuberosidad en proceso de fusión. Se presenta en fragmentos. <u>Tibia</u> : 01 fragmento de diáfisis proximal fusionado. |
| Operación 1 Contexto 672 | AE-1879 | Lama sp. | Industria ósea: 01 útil apuntado tipo punzón. La pieza se muestra incompleta, toda la superficie se presenta con pulimento y la matriz corresponde a un fragmento de cuerpo de omóplato. Medidas: L= 46.29 mm Ap= 12.08 mm Ad= 2.05 mm G= 1.97 mm Peso: 1.11 g |
| | AE-1880 | Artiodactyla | 01 fragmento de diáfisis, en un extremo presenta huellas de agente antrópico: percusión. |
| Operación 1 Contexto 925 | AE-1886 | Homo sapiens sapiens | Fragmento óseo. |
| Operación 1 Contexto 47 | AE-418 | Chione subrugosa | 01 fragmento charnelar |

| TAFONOMÍA: Operación 2 | | | |
|------------------------------|---------|----------------------|---|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN |
| Operación 2 Contexto 462 | AE-1551 | Homo sapiens sapiens | 01 diente. |
| Operación 2 Contexto 467 | AE-1568 | Ave n/i | Industria ósea: 01 ornamento tipo cuenta tubular. Este ha sido elaborado de un fragmento de diáfisis de hueso largo de ave n/i, los extremos presentan huellas de seccionamiento. Medidas: L= 30.94 mm D= 8.83 mm Peso: 1.79 g |
| Operación 2 Contexto 472 | AE-1570 | Cavia porcellus | <u>Húmero</u> : 01 distal. |
| Operación 2 Contexto 475 | AE-1574 | Lama sp. | Diáfisis: 01 fragmento. |
| Operación 2 Contexto 472 | AE-1575 | Mamífero n/i | 04 fragmentos óseos indeterminados (astillas). |
| Operación 2 Contexto 477 | AE-1582 | Lama sp. | <u>Tibia</u> : 03 fragmentos de diáfisis quemadas (mala conservación). |
| Operación 2 Contexto 470 | AE-1588 | Lama sp. | Industria ósea: 01 útil apuntado tipo punzón. La evidencia muestra sólo un fragmento de este útil y al parecer la matriz corresponde a un fragmento de diáfisis de hueso largo de <i>Lama sp</i> . Se observa un intenso desgaste en la parte activa y en el otro extremo la fractura es de origen antiguo. Medidas: L= 36.79 mm Ap= 6.98 mm Ad= 2.93 mm G= 4.70 mm Peso: 1.42 g |
| Operación 2 Contexto 480 | AE-1592 | Lama sp. | Mandíbula: 01 derecha con porción de izquierda, presenta: I1 : derecho e izquierdo I2: derecho e izquierdo I3: 01 izquierdo C: derecho e izquierdo P4, M1, M2, M3. Edad estimada: 09 años. |
| Operación 2 Contexto 1159 | AE-1762 | Lama sp. | Sacro: 01 porción con las dos primeras vértebras fusionadas. Esta presenta huellas de cortes cerca a la superficie articular de la primera vértebra. |
| Operación 2 Contexto 75 | AE-25 | Mamífero n/i | La fracción es muy pequeña, su morfología muestra un borde con una pequeña perforación circular. Peso: 0.53 g |

| | TAFONOMÍA : Operación 2 | | | |
|-----------------------------|-------------------------|-------------------------|---|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN | |
| Operación 2 Contexto 90 | AE-42 | Homo sapiens sapiens | Mandíbula: 01 fragmento. | |
| Operación 2 Contexto 457 | AE-50 | Lama sp. | Industria ósea: la pieza no se encuentra completa y está ausente la parte activa. Lo que se tiene pertenece a un extremo de un útil. Este luce con un buen acabado, la superficie externa con decoración incisa y orificios sin perforación completa a excepción de dos orificios, uno se encuentra completo y con perforación total de forma circular, el otro orificio por la fractura está incompleto. El cuerpo es plano y la sección ligeramente curvada. La cara interna no presenta decoración pero ha sido rebajada por la tecnología. La matriz corresponde a un fragmento de diáfisis de <i>Lama sp</i> . Medidas: L= 44.22 mm A= 20.48 mm G= 3.07 mm | |
| Operación 2 Contexto 458 | AE-1437 | Lama sp. | Peso: 2.98 g Industria ósea: 01 fragmento de útil que ha sido elaborado de un fragmento de diáfisis de <i>Lama sp.</i> , este posee forma trapezoidal, cuerpo plano y se encuentra quemado. Toda la superficie presenta pulimento y un extremo luce seccionamiento mientras el otro presenta fractura antigua. Medidas: L= 11.51 mm A= 9.30 mm G= 3.88 mm Peso: 0.7 g | |
| Operación 2 Contexto 60 | AE-1445 | Ave n/i | Industria ósea: 01 ornamento tipo cuenta tubular. Ha sido elaborado tomando un fragmento de diáfisis de ave n/i, seccionando ambos extremos cuidadosamente. Medidas: L= 12.67 mm D= 5.64 mm Peso: 0.23 g | |
| Operación 2 Contexto 66 | AE-1447 | Lama sp. | Industria ósea: 01 fragmento de útil apuntado, posiblemente pertenece a una aguja, de sección circular y fractura antigua en el lado proximal. Medidas: L= 26.38 mm D= 2.96 mm Peso: 0.26 g | |

| TAFONOMÍA : Operación 2 | | | | |
|------------------------------|---------|------------------------|--|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN | |
| Operación 2 Contexto 1174 | AE-1763 | Molusco n/i | Industria de concha: 01 ornamento: cuenta tipo disco circular. Medidas: D= 5.33 mm G= 1.71 mm Peso: 0.10 g | |
| Operación 2 Contexto 1187 | AE-1782 | Mamífero n/i | Industria ósea: 01 fragmento óseo pequeño trabajado, presenta pulimento en ambas caras y los bordes con fracturas antiguas. Medidas: L= 20 mm Peso: 0.50 g | |
| Operación 2 Contexto 1188 | AE-1783 | Lama sp. | <u>Fémur</u> : 01 fragmento proximal fusionado, presenta huellas de cortes en el cuello y cabeza. | |
| Operación 2 | AE-1784 | Homo sapiens sapiens | Fragmento óseo. | |
| Contexto 1189 | AE-1785 | Lama sp. | <u>Diáfisis</u> : 01 fragmento trabajado, presenta pulimento en la parte externa, en un extremo huellas de seccionamiento y en el otro extremo fractura antigua. Medidas: L= 28 mm Peso: 2.89 g | |
| Operación 2 Contexto 1188 | AE-1786 | Lama sp. | Industria ósea: 01 útil romo tipo paleta. La pieza se encuentra incompleta, luce la parte activa que tiene cuerpo de sección plana, bordes romos y de forma algo rectangular. Posee un mango alargado de donde se coge. La matriz corresponde a un fragmento de diáfisis de <i>Lama sp.</i> , quemado. Toda la superficie se encuentra con pulimento y una de las caras de la parte activa presenta múltiples estrías finas que van en dirección horizontal. Medidas: L.38.31 mm Ap= 4.06 mm Ad= 9.49 mm G= 3.24 mm Peso: 1.45 g | |
| | AE-1789 | Odocoileus virginianus | <u>3ra falange</u> : 01 | |
| Operación 2 Contexto 1 | AE-1795 | Lama sp. | <u>Fémur</u> : 01 distal fusionado (la parte distal se muestra incompleta, ausente los epicóndilos laterales. Fractura de carácter antiguo para el extremo de la diáfisis). | |

| TAFONOMÍA: Operación 2 | | | |
|------------------------------|---------|---------------------------|---|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN |
| Operación 2 Contexto 1200 | AE-1796 | Lama sp. | Rótula: 01 |
| Operación 2 | AE-1800 | Mamífero n/i | 01 fragmento óseo indeterminado. |
| Contexto 1651 | AE-2703 | Mamífero n/i | Costilla: 01 extremo vertebral, fractura antigua para el extremo esternal. |
| Operación 2 Contexto 1653 | AE-2705 | Lama sp. | Industria ósea: 01 pieza tecnológica conformada por un fragmento de diáfisis de fémur que presenta seccionamiento en ambos extremos. Medidas: L= 35.43 mm Peso: 5.76 g |
| Operación 2 Contexto 1196 | AE-2710 | Odocoileus virginianus | Industria ósea: 01 fragmento de asta modificado en sus extremos, éste útil se encuentra incompleto. Se caracteriza por tener aspecto macizo. Medidas: L= 46.65mm A= 15.50 mm D= 10.40 mm Peso: 4.42 g |
| Operación 2 Contexto 1672 | AE-2720 | Lama sp. | Industria ósea: 01 útil romo tipo espátula. La matriz corresponde a un fragmento de diáfisis de tibia proximal derecha de <i>Lama sp.</i> , se ha diagnosticado por las características morfológicas y la ubicación del agujero nutricio. Esta espátula lleva en su parte proximal un agujero o perforación circular que se encuentra incompleta. La sección de este útil es plana, presenta buena conservación y se observa presencia de múltiples estrías horizontales y transversales desde la parte medial hasta la parte activa. Estas son más abundantes en la cara externa y disminuyen notoriamente en su otra cara. La fractura de la perforación es de carácter antiguo. Medidas: L= 83.41 mm Ap= 12.15 mm Am= 16.68 mm Ad= 19.37 mm Gm= 4.28 mm Peso: 8.74 g |
| Operación 2 Contexto 1675 | AE-2722 | Lama sp. | <u>Fémur</u> : 01 cabeza s/f, presenta huellas de agente biológico : mordedura de carnívoro. |

| | | TAFONOMÍA: Oper | ración 2 |
|------------------------------|---------|----------------------------|---|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN |
| Operación 2 Contexto 1667 | AE-2723 | Odocoileus virginianus | <u>Cráneo</u> : 01, se encuentra desecho y sus dientes sueltos. <u>Asta</u> : 02 fragmentos. |
| | AE-2724 | Odocoileus virginianus | Industria ósea: 01 ornamento que ha sido elaborado a partir de un fragmento de diáfisis de hueso largo y al parecer la tecnología no ha concluído. Este representa el perfil de un ave y en un extremo presenta fractura. Peso: 3.16 g |
| | AE-2725 | Odocoileus virginianus | Astas: 02 candiles (puntas con fractura antigua). |
| | AE-2726 | Odocoileus virginianus | Omóplato: 01 derecho (completo pero se encuentra fraccionado). |
| | AE-1715 | Enoplochiton niger | 01 placa. |
| Operación 2 Contexto 1192 | AE-1794 | Semele sp. | 01 fragmento de valva. |
| Operación 2 Contexto 1195 | AE-2702 | Bulimulidae | 01 individuo fragmentado. |
| Operación 2 Contexto 1653 | AE-2707 | Bulimulidae | 01 individuo fragmentado (mala conservación, idem a : AE-2702). |
| Operación 2 Contexto 2709 | AE-2709 | Argopecten sp. | Industria de concha: 01 fragmento de valva semicircular, recortada y pulida. La pieza no se presenta completa, su periostraco ha sido pulido a tal punto que ha eliminado las estrías naturales. Medidas: D= 39.16 mm G= 2.21 mm Peso: 3.88 g |
| Operación 2 Contexto 1183 | AE-2713 | Fusinus dupetitthouarsi | 01 fragmento que corresponde a parte del canal sifonal. |
| Operación 2 Contexto 67 | OM-55 | Thaumasthus sp. | 01 individuo fragmentado. |
| Operación 2 Contexto 88 | OM-60 | Lama sp. | 01 fragmento de diente desidual. |
| Operación 2 Contexto 482 | AE-1729 | Argopecten sp. | 01 fragmento de valva. |

| | | TAFONOMÍA: Oper | ración 3 |
|-----------------------------|--------|----------------------|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN |
| Operación 3 Superficie | AE-63 | Homo sapiens sapiens | 01 dedo con uña. |
| Operación 3 Contexto 103 | AE-83 | Thais chocolata | NMI: 01 (individuo fragmentado) |
| Operación 3 Contexto 519 | AE-87 | Lama sp. | Industria ósea: 01 útil romo tipo paleta. Se presenta completo pero con fractura antigua en su parte activa, sin embargo deja ver su morfología para tipificarlo como una pequeña paleta. La matriz corresponde a un fragmento de diáfisis de fémur de <i>Lama sp</i> . El mango es plano con sección curva. La parte activa se encuentra erosionada en su superficie lo que dificulta para ver las huellas de uso. El mango deja aún ver estrías transversales producto de la tecnología para elaborar este útil. Medidas: L= 80.61 mm Ap= 2.69 mm Ad= 9.96 mm G= 2.38 mm Peso: 2.48 g |
| Operación 3 Contexto 145 | AE-98 | Lama sp. | Industria ósea: 01 útil apuntado, tipo aguja curva. La matriz corresponde a un fragmento de diáfisis de fémur de Lama sp. El cuerpo presenta sección curva y el ojo tiene forma lenticular y aún se aprecia la tecnología para realizar el agujero. Medidas del cuerpo: L= 65.22 mm Ap= 5.73 mm Ad=2.78 mm G= 3.20 mm Medidas del ojo: L= 5.64 mm A= 1.10 mm Peso: 1.19 g |
| Operación 3 Contexto 101 | AE-288 | Homo sapiens sapiens | Fragmento de piel deshidratada con presencia de tendones y huesos carpianos articulados. |
| Operación 3 Contexto 145 | OM-85 | Muridae | Incisivos: 02 |
| Operación 3 Contexto 145 | OM-116 | Molusco n/i | 01 fragmento de gasterópodo (parte columelar). |

| | | TAFONOMÍ | A: Operación 6 |
|------------------------------|---------|---------------|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN |
| Operación 6 Contexto 1009 | AE-1276 | Lama sp. | Maxilar superior: 01 fragmento con molar. |
| Operación 6 Contexto 1005 | AE-1274 | Vicugna pacos | Ira falange: 01 delantera fusionada, presenta una perforación que es bicónica en la cara anterior y en la cara posterior la perforación es ovalada y está asociada a huellas de percusión. Peso: 10.73 g Fue sometida a osteometría, tenemos: P1V1= 58.52 mm P2V2= 19.30 mm P3V3= 18.10 mm P4V4= 16.49 mm P5V5= 14.56 mm Promedios: CCG: 172.45912 CCL: 209.14632 CCA: 214.48501 CCV: 200.17757 Taxa identificado: Vicugna pacos |
| Operación 6 Contexto 1013 | AE-1284 | Lama sp. | 01 diente desidual. |
| Operación 6 Contexto 1027 | AE-1286 | Lama sp. | Industria ósea: Se tiene un fragmento de útil que no muestra la parte activa pero sí la zona proximal que pertenece a una aguja por el detalle morfológico del diseño del ojo. La parte distal muestra fractura antigua, quizás en el momento de su uso se quebró dejando en abandono la pieza. Medidas: L= 18.62 mm Ap= 5.88 mm Ad= 3.85 mm G= 2.50 mm Peso: 0.29 g |
| Operación 6 Contexto 635 | AE-1292 | Lama sp. | Industria ósea: 01 disco plano con perforación circular central. Su conservación es irregular, la cara externa es lisa mientras que la cara interna muestra las trabéculas óseas lo que permite identificar que la matriz corresponde a un fragmento de hueso plano de <i>Lama sp</i> . Medidas: D= 27.55mm Dperforación= 2.82mm Peso: 2.09 g |

| | | TAFONOMÍA: Op | peración 6 |
|------------------------------|---------|----------------------|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN |
| Operación 6 Contexto 1030 | AE-1293 | Caolín | 01 fragmento de cerámica (cuchara ?) |
| Operación 6 Contexto 1013 | AE-1297 | Lama sp. | Omóplato: 01 izquierdo s/f, la parte proximal está incompleta, con fracturas antiguas yla parte distal erosionada. No presenta huellas antrópicas. |
| Operación 6 Contexto 224 | AE-223 | Felis sp. | Industria ósea: 01 instrumento musical de viento: flauta. Se ha tomado una diáfisis derecha de ulna para fabricar un instrumento musical. Esta pieza al parecer se encuentra en proceso de fabricación y no se ha concluído. Los extremos de las epífisis se encuentran fracturados sin forma definida por su mala conservación. Partiendo de la diáfisis proximal, cara posterior donde se ubica el agujero nutricio se ha realizado la primera perforación de la flauta. Esta tiene un diámetro de 2.53 mm. Por debajo de esta primera perforación a 18.71 mm se ha realizado la segunda perforación de la flauta, esta posee un diámetro de 2.55 mm y por debajo de esta a una distancia de 12 mm existe una perforación no acabada, motivo por lo cual se piensa que se encuentra en proceso de fabricación. Estado de conservación: regular. Medidas: L= 97.14 mm Ap= 9.34 mm Ad= 7.32 mm |
| Operación 6 Contexto 223 | AE-225 | Homo sapiens sapiens | 5to metatarsiano: 01 derecho |
| Operación 6 Contexto 227 | AE-243 | Homo sapiens sapiens | Fragmento óseo desecho. |
| Operación 6 Contexto 612 | AE-562 | Lama sp. | Industria ósea: 01 útil romo tipo espátula. La pieza se encuentra incompleta, en la parte proximal presenta fractura antigua. Su cuerpo tiene sección plana, posee un buen acabado con pulimento en ambas caras y huellas de uso en la parte activa con embotamiento y brillo. |

| | | TAFONO | MÍA: Operación 6 |
|-----------------------------|--------|--------------|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN |
| / | | | Medidas: L= 85.33mm Ap= 7.68 mm |
| | | | Ad= 11.06 mm G= 2.54 mm Peso: 3.49 g |
| Operación 6 Contexto 231 | AE-585 | Lama sp. | Costilla: 01 extremo vertebral s/f. |
| Operación 6 Contexto 237 | AE-587 | Lama sp. | <u>1ra falange</u> : 01 s/f (ausente la superficie articular proximal, individuo tierno). |
| Operación 6 | AE-599 | Mamífero n/i | 01 fragmento óseo n/i |
| Contexto 617 | AE-601 | Lama sp. | Omóplato: 01 izquierdo fusionado, se encuentra fraccionada. |
| | AE-605 | Lama sp. | <u>Tibia</u> : 01 izquierda fusionada totalmente en ambas epífisis, se observa en la epífisis proximal en la superficie de la cresta que ha recibido un golpe de percusión causando una fractura en esta parte y en la parte lateral del cóndilo. |
| | AE-607 | Lama sp. | Metatarsiano: 01 izquierdo fusionado. |
| | AE-622 | Lama sp. | Radiocúbito: 01 derecho fusionado. |
| | AE-623 | Lama sp. | Metapodio: 01 fragmento de diáfisis. |
| | AE-661 | Lama sp. | Metacarpiano: 01 derecho fusionado, se encuentra desecho en la parte distal. |
| Operación 6 Contexto 620 | AE-633 | Lama sp. | Industria ósea: 01 fragmento óseo trabajado, la porción no permite clasificarlo, presenta huellas de perforación que se muestra incompleta. Toda la superficie presenta pulimento. Medidas: L= 22.35 mm Ap= 5.15 mm Ad= 6.34 mm G= 2.95 mm Peso: 0.55 g |
| | AE-642 | Lama sp. | <u>Tibia</u> : 01 distal derecho s/f, ausente la superficie articular y fractura antigua en el extremo de la diáfisis. <u>Húmero</u> : 01 distal izquierdo fusionado, fractura antigua en la diáfisis. |
| Operación 6 Contexto 629 | AE-656 | Lama sp. | Radiocúbito: 01 proximal izquierdo fusionado, el extremo de la diáfisis presenta fractura reciente y la parte proximal sobre la escotadura se encuentra con la superficie regularizada. |

| | | TAFONO | OMÍA: Operación 6 |
|-----------------------------|-------------------|----------|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN |
| Operación 6 Contexto 629 | AE-763 AE- 765 | Lama sp. | Fémur: 01 distal derecho fusionado, presenta fractura antigua en el extgremo de la diáfisis. Industria ósea: 01 recipiente. Ha sido elaborado de un fragmento de cráneo que comprende parte del parietal derecho e izquierdo, parte del frontal derecho e izquierdo, todos articulados. Se aprecia que los bordes externos presentan acabado romo. Por la sección del hueso craneal debió de servir como un recipiente. Peso: 37 g |
| Operación 6 Contexto 608 | AE-667 | Lama sp. | Industria ósea: 01 preforma, posee forma trapezoidal, sus extremos muestran huellas de seccionamiento. Medidas: L= 30.52mm Ap= 5.17 mm Ad= 8.70 mm G= 4.12 mm Peso: 1.27 g |
| | AE1483 | Lama sp. | Industria ósea: 01 fragmento indeterminado, trabajado. Presenta pulimento por toda su superficie, el hueso se encuentra quemado y un extrewmo está con seccionamiento mientras que los otros tres extremos presentan fractura antigua. Medidas: L= 10.49 mm A= 7.21 mm G= 3.09 mm Peso: 0.24 g |
| Operación 6 Contexto 619 | AE-625 | Lama sp. | Industria ósea: 01 instrumento musical de viento: flauta. Este se ha elaborado utilizando la diáfisis de un radiocúbito derecho de <i>Lama sp</i> . En la norma caudal de la epífisis proximal se ha diseñado la boquilla. En la parte medial se distribuyen tres agujeros circulares (diámetro: 5.20 mm) equidistantes uno del otro en sentido vertical. Toda su superfície presenta pulimento y en la epífisis distal se ubica dos orificios propios de este instrumento musical. En la norma craneal se muestra un orificio circular pequeñito que no ha culminado en perforación. Toda la superfície muestra pulimento y aún se puede observar las huellas tecnológicas. Medidas: L= 133.76 mm Ap= 19.87 mm Ad= 27.89 mm Am= 20.85 mm G= 11 mm Peso: 39 g |

| TAFONOMÍA: Operación 6 | | | | | | |
|-----------------------------|--------|------------------------|------------------------|--|--|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN | | | |
| Operación 6 Contexto 250 | OM-160 | Trachycardium procerum | 01 fragmento de valva. | | | |

| TAFONOMÍA: Operación 7 | | | | |
|-----------------------------|---------|----------------------|--|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN | |
| Operación 7 Contexto 303 | AE-503 | Homo sapiens sapiens | Fragmento óseo. | |
| Operación 7 Contexto 342 | AE-1676 | Lama sp. | 01 fragmento de diáfisis. | |
| Operación 7 Contexto 812 | AE-2025 | Lama sp. | Fémur: 01 distal derecho fusionado, muy erosionado. Húmero: 01 distal derecho fusionado, muy erosionado. | |
| Operación 7 Contexto 821 | AE-2058 | Lama sp. | Industria ósea: 01 fragmento de diáfisis de hueso largo, presenta un extremo con huellas de seccionamiento, los otros extremos con fractura antigua. Peso: 4.78 g | |
| Operación 7 Contexto 822 | AE-2039 | Muridae Lama sp. | Omóplato: 02 cuerpos con espina Industria ósea: 01 útil apuntado, tipo punzón. La evidencia se presenta en fragmentos que al tratar de armarlo hay partes que están ausentes. Tenemos: 01 fragmento de cuerpo (se unieron 3 partes), peso: 1.70 g 01 fragmento de cuerpo, peso: 0.74 g 01 fragmento de cuerpo, peso: 0.34 g éste presenta huellas de perforación en un extremo. 01 fragmento de la parte activa (punta) se presenta quemado, peso: 0.30 g Peso total: 3.08 g | |

| TAFONOMÍA: Operación 8 | | | | |
|----------------------------|--------|---------------------|----------------------------|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN | |
| Operación 8 | OM-194 | Thaumasthus sp. | 01 individuo completo | |
| Contexto 252 | | Epiphragmophora sp. | 03 individuos completos | |
| | | | 02 individuos fragmentados | |
| | | | Foto: DSC 7592 | |

| TAFONOMÍA: Operación 9 | | | | |
|-----------------------------|---------|----------|--|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN | |
| Operación 9 Contexto 405 | AE-1198 | Lama sp. | <u>Diáfisis</u> : 01 fragmento de diáfisis de hueso largo quemado. | |

| TAFONOMÍA: Operación 11 | | | | |
|------------------------------|---------|----------------------|---|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN | |
| Operación 11 Contexto 701 | AE-1603 | Homo sapiens sapiens | Huesos articulados y con piel: <u>Ulna</u> : 01 <u>Radio</u> : 01 <u>Carpianos</u> : 06 <u>Metacarpianos</u> : 05 <u>1ra falange</u> : 05 <u>2da falange</u> : 05 <u>3ra falange</u> : 05 | |

| | | TAFONOMÍA: Ope | eración 21 |
|---------------|-----------|--|--|
| OPERACIÓN | | | |
| | | m. *** | p p g gp yp gy ó y |
| y CONTEXTO | AE | TAXA | DESCRIPCIÓN |
| CONTENTO | | | |
| Operación 21 | AE-2433 | Homo sapiens sapiens | Clavícula: 01 |
| Contexto 1451 | AE-2475 | Madera n/i | 01 útil apuntado tipo aguja. La matriz |
| | | | corresponde a madera n/i. Este se |
| | | | encuentra completo pero fraccionado, |
| | | | por su morfología se trata de una aguja |
| | | | recta de sección circular, al parecer la |
| | | | tecnología no se ha concluído ya que se |
| | | | observa en proceso de trabajo el agujero de la aguja para ambos extremos. La |
| | | | perforación del ojo no se ha concluido. |
| | | | Medidas: L= 87.43 mm aproximad. |
| | | | D= 2.32 mm |
| | | | Peso: 0.34 g |
| | AE-2508 | Lama sp. | Industria ósea: 01 útil apuntado tipo |
| | | 1 | aguja recta. La matriz corresponde a un |
| | | | ragmento de diáfisis de hueso largo. Su |
| | | | forma es recta, sección circular, se |
| | | | presenta muy maciza y fuerte. La parte |
| | | | activa muestra embotamiento como |
| | | | huellas de uso. |
| | | | Se aprecia pulimento por toda la |
| | | | superficie de la pieza. |
| | | | Medidas: L= 112.60 mm |
| | | | Dp= 4.71 mm Dm= 4.30 mm Dd= 3.53 mm |
| | | | Peso: 3 g |
| | AE-2509 | Lama sp. | Industria ósea: 01 útil romo tipo |
| | 7 HL 2307 | Ейта эр. | espátula. Se ha elaborado a partir de un |
| | | | fragmento de diáfisis de hueso largo, su |
| | | | sección es plana y posee una perforación |
| | | | en la parte proximal. Esta es circular, |
| | | | con un diámetro de 2.40 mm. Toda su |
| | | | superficie muestra pulimento mostrando |
| | | | las estrías tecnológicas y la parte activa |
| | | | presenta embotamiento por su uso |
| | | | contínuo así como estrías longitudinales. |
| | | | Medidas: L= 108.29 mm |
| | | | Ap= 10.63 mm Am= 15.32 mm |
| | | | Ad= 15.41 mm Gm= 3.35 mm |
| | OM 4 | Indiana and a set of the set of t | Peso: 6.64 g |
| | OM-4 | Iphragmophora sp.E | 01 individuo completo. |

Elementos:

Strigidae: coracoide carpometacarpo, tibiotarso.

Sylvilagus: omóplato, radio, fémur, calcáneo, húmero, pelvis, tibia, atlas,

Quiróptero: radio, ulna

Didelphis: húmero, cráneo, fémur, omóplato, tibia, peroné

Zenaida: húmero, ulna

Capra: mandíbula, maxilar superior

Sus: tibia, falanges, vértebras, atlas, húmero, ulna, fragmentos de cráneo

Passeriforme: tarsometatarso, fémur, tibiotarso

Ovis: mandíbula, astrágalo, húmero

Felis: maxilar, falanges,

Bos: atlas, vértebra cervical,

Colaptes: cráneo+pico,

Lonchophylla: mandíbula y huesos largos,

Cyanocorax: premaxila

Gallus: tibiotarso, fémur, húmero

Notoproctha: húmero, esternón

Cairina: fúrcula,

Agouti: omóplato

Huesos trabajados que se evidenciaron con la fauna

| | TAFONOMÍA: Operación 1 | | | |
|-----------------------------|------------------------|--------------|--|--|
| OPERACIÓN y CONTEXTO | Os | TAXA | DESCRIPCIÓN | |
| Operación 1 Contexto 4 | Os-9 | Ave n/i | Industria ósea: 01 fragmento de diáfisis, presenta huellas de seccionamiento en un extremo. Medidas: L= 34.96 mm G= 2.01 mm Peso: 1 g | |
| Operación 1 Contexto 24 | Os-213 | Artiodactyla | Industria ósea: 01 fragmento de útil óseo, no se puede definir su tipología por estar incompleto. La matriz corresponde a un fragmento de diáfisis de hueso largo de Artiodactyla. Su forma es alargada, sección circular, extremos con fractura de carácter antiguo. Superficie con acabado por el pulimento asociado a brillo. Medidas: L= 34.55 mm Peso: 1.13 g | |
| Operación 1 Contexto 783 | Os-88 | Artiodactyla | Industria ósea: 01 útil apuntado tipo punzón. Se trata de un fragmento de punzón que corresponde a la parte activa, éste ha sido elaborado a partir de un fragmento de diáfisis de hueso largo de Artiodactyla. Toda su superficie se presenta con pulimento con brillo mate. En la parte activa presenta estrías en dirección diagonal. La parte proximal se encuentra en mal estado de conservación con fractura de carácter antiguo. Medidas: L= 45.06 mm | |

| | | TAFONOMÍA: C | Operación 2 |
|----------------------------|--------|-----------------------|--|
| OPERACIÓN y CONTEXTO | Os | TAXA | DESCRIPCIÓN |
| Operación 2 Contexto 55 | Os-67 | Nothoprocta sp. | Industria ósea: 01 ornamento, tipo cuenta tubular. La matriz corresponde a un fragmento de diáfisis izquierda de húmero. Esta presenta los extremos con huellas de seccionamiento, especialmente en el extremo distal donde se observa líneas finas, ténues asociado al proceso de seccionamiento. La superficie se encuentra con pulimento asociado a brillo. Medidas: L= 28.17 mm D= 5.11 mm Peso: 0.56 g |
| Operación 2 Contexto 58 | Os-312 | Mamífero n/i | Industria ósea: 01 fragmento de cuerpo de útil, posiblemente de punzón. La matriz corresponde a un fragmento de diáfisis quemada. La superficie se encuentra con pulimento y la fractura se localiza en ambos extremos. Medidas: L= 23.81 mm A= 7.32 mm G= 3.95 mm Peso: 1.01 g |
| Operación 2 Contexto 59 | Os-87 | Ave n/i | Industria ósea: 01 fragmento de diáfisis que presenta un extremo seccionado y el otro con fractura antigua. Medidas: L= 39.15 mm D= 4.18 mm Peso: 0.54 g |
| Operación 2 Contexto 67 | Os-330 | Mamífero n/i | Industria ósea: 03 fragmentos de cuerpo de omóplato, su forma es semicircular y presentan acabado en sus bordes. De estos 02 fragmentos se unieron. Peso:1.92 g Peso: 1.97 g |
| Operación 2 Contexto 75 | Os-355 | Molusco marino n/i | Industria de concha: se presenta un fragmento de molusco marino trabajado, la sección es plana, sus bordes poseen fractura a excepción de un extremo que está pulido y posee forma circular. Una de sus caras no posee diseño pero la otra presenta diseños incisos en círculos. Peso: 0.83 g |

| | | TAFONOMÍA: (| Operación 2 |
|-----------------------------|--------|--------------|---|
| OPERACIÓN y CONTEXTO | Os | TAXA | DESCRIPCIÓN |
| Operación 2 Contexto 457 | Os-456 | Ave n/i | Industria ósea: 01 fragmento de diáfisis, posee un extremo con huellas de seccionamiento y la superficie externa presenta pulimento, mientras que la superficie interna muestra acabado que suaviza los canales internos. Medidas: L= 30.75mm A= 5.27 mm G= 1.04 mm Peso: 0.27 g |
| | | Mamífero n/i | Industria ósea: 01 fragmento de cuenta tubular. Medidas: L= 10.69 mm A= 5.80 mm Peso: 0.22 g |
| Operación 2 Contexto 463 | Os-168 | Artiodactyla | Industria ósea: 01 útil apuntado tipo puncón. Se ha elaborado a partir de un fragmento de diáfisis, éste no se encuentra completo. La parte activa presenta desgaste y el acabado de la pieza es simple. La fractura de la zona proximal es de carácter antiguo. Medidas: L= 46.30 mm Ap= 9.02 mm Ad= 2.06 mm G= 2.63 mm Peso: 1.15 g |
| Operación 2 Contexto 470 | Os-25 | Ave n/i | Industria ósea: 01 fragmento de diáfisis con huellas de seccionamiento en los extremos. Medidas: L= 28.62 mm Peso: 0.53 g |
| Operación 2 Contexto 473 | Os-587 | Artiodactyla | Industria ósea: 01 fragmento trabajado, su forma no es definida, presenta acabado en sus bordes, pulimento por toda su superficie. Peso: 0.92 g |
| Operación 2 Contexto 473 | Os-285 | Artiodactyla | Industria ósea: 01 fragmento trabajado, no se puede determinar su tipo por estar incompleto. Toda la superficie presenta pulimento y brillo. Los bordes presentan fractura antigua. Medidas: L= 31.76 mm Peso: 1.22 g |

| TAFONOMÍA: Operación 2 | | | |
|------------------------------|-------|----------------------|--|
| OPERACIÓN y CONTEXTO | Os | TAXA | DESCRIPCIÓN |
| Operación 2 Contexto 1174 | Os-69 | Artiodactyla | Industria ósea: 01 útil apuntado tipo punzón. Este ha sido elaborado de un fragmento de diáfisis de hueso largo. La pieza se ecidencia incompleta mostrando en un extremo la parte activa y en el otro extremo fractura de tipo antiguo. Medidas: L=59.70 mm Ap= 10.86 mm Ad= 2.52 mm G= 2.49 mm Peso: 1.43 g |
| | | Lagidium peruanum | Industria ósea: 01 pieza tecnológica que se identifica como una epífisis proximal de fémur izquierdo de <i>Lagidium peruanum</i> , el que presenta la diáfisis con huella de seccionamiento. Esta pieza ha quedado como residuo después de seccionar la diáfisis. Medidas: L= 15 mm Peso: 1.60 g |
| Operación 2 Contexto 296 | Clean | Mamífero n/i | Industria ósea: 01 fragmento de diáfisis que presenta un extremo con huellas de seccionamiento. Medidas: L= 33.25 mm Peso: 1.23 g |
| Operación 2 Contexto 296 | Clean | Ave n/i | Industria ósea: 01 útil apuntado tipo aguja. Aprovechando un fragmento de diáfisis de ave n/i se ha trabajado un útil apuntado, este se presenta con el cuerpo de forma triangular no uniforme, presenta una perforación circular en la parte superior y la parte activa es apuntada. Por estas caracgterísticas se trata de una aguja, siendo su morfología poco común. La superficie externa presenta pulimento mientras que la superficie interna deja ver las trabéculas que han sido rebajadas por la tecnología. La sección no es totalmente plana, para la parte activa se aprecia la curvatura de la diáfisis del hueso largo. Los extremos presentan desgaste por la tecnología en la fabricación del útil mientras la parte |

| | | TAFONOMÍA: C | Operación 2 |
|----------------------------|----|--------------|---|
| OPERACIÓN y CONTEXTO | Os | TAXA | DESCRIPCIÓN |
| / | | | activa presenta fractura intencional de característica antigua provocada posiblemente por su uso contínuo. Medidas: L= 38.58 mm Ap= 9.05 mm Ad= 2.95 mm G= 1.14 mm Peso: 0.43 g |

| | TAFONOMÍA: Operación 3 | | | | |
|-----------------------------|------------------------|--------------|---|--|--|
| OPERACIÓN y CONTEXTO | Os | TAXA | DESCRIPCIÓN | | |
| Operación 3 Contexto 145 | Os-108 | Artiodactyla | Industria ósea: 01 fragmento de útil apuntado, se presenta únicamente la parte activa apuntada, la matriz corresponde a un fragmento de diáfisis de hueso largo quemado. Posee sección circular y la fractura es de carácter antiguo. Medidas: L= 20.12 mm A= 3.67 mm Peso: 0.22 g | | |

| | TAFONOMÍA: Operación 4 | | | | | |
|-----------------------------|------------------------|--------------|---|--|--|--|
| OPERACIÓN y CONTEXTO | Os | TAXA | DESCRIPCIÓN | | | |
| Operación 4 Contexto 359 | Os-152 | Artiodactyla | Industria ósea: 01 fragmento óseo trabajado. La matriz es posible corresponda a un fragmento de diáfisis de hueso largo o parte de huesos planos. La forma es trapezoidal, dos extremos presentan acabado y los otros extremos lucen erosionados. La sección del cuerpo es plano. No se puede determinar su tipología, sin embargo podría tratarse de un fragmento de placa. Medidas: L= 18.69 mm A= 18.14 mm G= 2.02 mm Peso: 2 g | | | |

| | TAFONOMÍA: Operación 6 | | | | | |
|-----------------------------|------------------------|---------------------------|---|--|--|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN | | | |
| Operación 6 Contexto231 | Os- 568 | Didelphis sp. | Industria ósea: 01 húmero proximal con la diáfisis con huella de seccionamiento. Foto: 7028 Medidas: L= 22 mm Peso: 1.2 g | | | |
| | Os-708 | Artiodactyla | Industria ósea: 01 fragmento trabajado, no se puede definir su tipología por estar incompleta. Ambas superfícies presentan acabado con pulimento. La fractura es de carácter antiguo. Medidas: L= 27.58 mm G= 2.08 mm Peso: 0.43 g | | | |
| Operación 6 Contexto 603 | Os-585 | Artiodactyla | Industria ósea: 01 útil apuntado tipo punzón, la evidencia muestra solo la parte activa. Medidas: L= 29.09 mm A= 4.42 mm Peso: 0.67 g | | | |
| Operación 6 Contexto 629 | Os-444 | Odocoileus virginianus | Industria ósea: 01 fragmento de omóplato trabajado, la porción corresponde a un fragmento de espina de omóplato derecho que ha sido seccionado a la altura del borde posterior y borde anterior del acromión, el seccionamiento es transversal. Se puede apreciar claramente el borde anterior de la porción posee desgaste con brillo. También se observa que han cortado una parte de la fosa infraespinosa y han llegado al borde posterior el cual lo han modelado en forma ondular hasta cerca del acromión en donde ha terminado en un corte transversal. Medidas: L= 90.92 mm A= 30.21 mm G= 9.16 mm Peso: 14.11 g | | | |
| Operación 6 Contexto 639 | Os-595 | Lama sp. | Industria ósea: 01 fragmento de diáfisis de forma trapezoidal que presenta un extremo con huellas de seccionamiento bien definido, los otros extremos también presentan huellas de seccionamiento pero no tan delineado. Ambas superficies presentan pulimento. Medidas: L=38 mm A= 22 mm Peso= 4.94 g | | | |

| | TAFONOMÍA: Operación 6 | | | | | |
|------------------------------|------------------------|--------------|---|--|--|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN | | | |
| Operación 6 Contexto 1013 | Os-336 | Lama sp. | Industria ósea: 01 útil tipo receptor. Tomando un fragmento de cráneo de <i>Lama sp.</i> , se ha elaborado un útil óseo. Este posee forma trapezoidal y su sección es hendida. El fragmento óseo comprende parte de los parietales derecho e izquierdo y parte anexa a la sutura intercraneal que separa los parietales del frontal. Su perímetro posee acabado en ambas caras. Medidas: L>= 63.60 mm L<= 32.73 mm Acentral= 50-92 mm G>= 5.22 mm G<= 2.02 mm Peso: 11.09 g | | | |
| Operación 6 Contexto 1013 | Os-353 | Artiodactyla | Industria ósea: 01 fragmento de diáfisis que presenta pulimento por toda su superficie. Extremos con fractura antigua. Medidas: L= 37.44 mm A= 7.54 mm G= 2.60 mm Peso: 0.91 g | | | |

| | TAFONOMÍA: Operación 7 | | | | |
|-----------------------------|------------------------|----------|---|--|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN | | |
| Operación 7 Contexto 822 | Os-445 | Lama sp. | Industria ósea: 01 útil apuntado tipo punzón. La evidencia se ha elaborado de una diáfisis de hueso largo, esta se encuentra fragmentada y sus fracturas son de carácter antiguo. Se unieron los fragmentos pero faltó una parte para completar la pieza. Esta presenta cierto acabado sobre su superficie y la cara anterior deja ver una serie de estrías transversales, así también la aparte activa que está fragmentada y quemada presenta pulimento y huellas de uso. Medidas: L= 198.36 mm aproximad. Ap= 8.15 mm Ad= 3.47 mm G= 4 mm Peso: 6.75 g | | |

| | TAFONOMÍA: Operación 17 | | | | |
|-------------------------------|-------------------------|--------------|---|--|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN | | |
| Operación 17 Contexto 1261 | Os-577 | Artiodactyla | Industria ósea: 01 fragmento óseo trabajado, la matriz puede corresponder a un fragmento de diáfisis, su forma es trapezoidal, sección plana, este se encuentra quemado, con pulimento por todo su cuerpo. No posee partes diagnósticas para determinar su tipo, por lo que posiblemente quedó como residuo de fragmento trabajado. Medidas: L= 14.42 mm A= 11.88 mm G= 2.07 mm Peso: 2 g | | |

| | TAFONOMÍA: Operación 22 | | | | |
|-------------------------------|-------------------------|--------------|--|--|--|
| OPERACIÓN y CONTEXTO | AE | TAXA | DESCRIPCIÓN | | |
| Operación 22 Contexto 1610 | Os-91 | Artiodactyla | Industria ósea: 01 fragmento de útil óseo, presenta un extremo con acabado y su superficie con pulimento. Medidas: L= 34.31 mm A= 12.35 mm Peso: 3.02 g | | |
| Operación 22 Contexto 1615 | Os-129 | Artiodactyla | Industria ósea: 01 fragmento de diáfisis que presenta un extremo acabado. Medidas: L= 37.57 mm A= 13.26 mm Peso: 1.76 g | | |

Appendix H

Human Skeletal Remains

Compiled by Emily A. Sharp

The data presented in this appendix represent preliminary analyses of the human skeletal remains excavated at Hualcayán. The following collaborators helped lead efforts to clean and inventory the remains: Amy Anderson, Sara Becker, Elizabeth DiGangi, Ann Laffey, Julie Lesnik, Shaina Molano, Christine Pink, Emily Sharp, Nicole Thiemann, and Rachel Witt. This work also benefited from the help of numerous PIARA field school students.

The minimum number of individuals (MNI) are presented for each operation that contained human remains. Over 10,200 bones and fragments have been inventoried, with a total site MNI of 129. For these MNI estimates, relative completeness of each bone was considered. Only bones 75% complete or more were included. These preliminary analyses indicate that individuals of all ages were interred at the site, and we encountered commingling in all operations. At least one primary internment was recovered from Operation 1.

Sex and age-at-death estimation occurred following standards outlined in Buikstra and Ubelaker (1994). For this report, two age categories are considered—juvenile and adult. Sex estimation was based on cranial morphology and results are reported for adult crania as either male, female, or indeterminate sex. I examined 97 crania across 9 operations.

Future research will assess any discrepancies in element representation. With more detailed analyses, we hope to 1) refine the juvenile and adult MNI across more age categories, 2) incorporate evidence related to pathological lesions, 3) perform a more thorough accounting of dental elements, 4) take measurements, and 5) assess potential pair-matches.

For Operations 3, 6, 7, 8, 11, 12, 19, and 21, I include summary tables of inventories with only the postcranial bones that are considered in MNI calculations. For Operations 1 and 2, I include a table with more detailed descriptions of all analyzed bones, and the information is reported with respect to special artifact number (AE) and context.

Summary Information of Site MNI

| Operation | MNI |
|-----------|-----|
| OP. 1 | 3 |
| OP. 2 | 2 |
| OP. 3 | 39 |
| OP. 6 | 9 |
| OP. 7 | 3 |
| OP. 8 | 14 |
| OP. 11 | 14 |
| OP. 12 | 25 |
| OP. 19 | 5 |
| OP. 21 | 15 |

Inventory of Complete Crania

| Operation | Juvenile | Adult Male | Adult Probable Male | Adult Female | Adult Probable Female | Adult Indeterminate Sex |
|-----------|----------|---------------|---------------------------|-----------------|-----------------------------|-------------------------------|
| OP. 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| OP. 3 | 0 | 10 | 5 | 6 | 4 | 1 |
| OP. 6 | 5 | 2 | 1 | 0 | 0 | 1 |
| OP. 7 | 1 | 1 | 0 | 0 | 0 | 0 |
| OP. 8 | 4 | 5 | 1 | 3 | 1 | 0 |
| OP. 11 | 1 | 7 | 1 | 2 | 0 | 0 |
| OP. 12 | 3 | 10 | 0 | 11 | 1 | 0 |
| OP. 19 | 2 | 0 | 0 | 0 | 1 | 0 |
| OP. 21 | 1 | 0 | 1 | 3 | 0 | 1 |
| TOTALS | 18 | 35 | 9 | 25 | 7 | 3 |

Summary Tables of Bone Inventories

OPERATION 1

Over 115 bones were recovered from Operation 1, with an MNI of 3. Bones were recovered from the following contexts: 4, 566, 660, 952, UE 3.12B, and 3.10B.

| e thoracic |
|----------------|
| me individual, |
| |
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| |
| s) |
| m |

OPERATION 2

Approximately 6 bones were recovered form Operation 2, with an MNI of 2. Bones were recovered from the following contexts: 90, 462, 1182, and 1189.

| AE# | Context | Bone Description |
|------|---------|---|
| 42 | 90 | Left half of a mandible from an infant |
| 1551 | 462 | Maxillary, right third premolar (adult) |
| 1772 | 1182 | Assorted cranial fragments and teeth |
| 1784 | 1189 | Possible occipital fragment |

Over 2,800 bones were inventoried from Operation 3, with an MNI of 39 based on the left femur. Bones were recovered from the following contexts: 101, 113, 145, and 146.

| Element | Juvenile | Adult | Total estimate |
|------------|----------|-------|-----------------------|
| Cranium | 0 | 26 | 26 |
| L Clavicle | 10 | 14 | 24 |
| R Clavicle | 10 | 14 | 24 |
| L Humerus | 5 | 25 | 30 |
| R Humerus | 1 | 23 | 24 |
| L Radius | 6 | 22 | 28 |
| R Radius | 0 | 20 | 20 |
| L Ulna | 4 | 20 | 24 |
| R Ulna | 1 | 23 | 24 |
| L Femur | 11 | 28 | 39 |
| R Femur | 9 | 28 | 37 |
| L Tibia | 11 | 18 | 29 |
| R Tibia | 12 | 23 | 35 |
| L Fibula | 2 | 16 | 18 |
| R Fibula | 1 | 15 | 16 |

OPERATION 6

Over 900 bones were inventoried from Operation 6, with an MNI of 9 based on the left femur and cranium. Bones were recovered from the following contexts: 207, 208, 218, 219, 220, 223, 224, 226, 227, 230, 232, 234, 235, 236, 238, and 240.

| Element | Juvenile | Adult | Total estimate |
|------------|----------|-------|-----------------------|
| Cranium | 5 | 4 | 9 |
| L Clavicle | 1 | 3 | 4 |
| R Clavicle | 2 | 3 | 5 |
| L Humerus | 1 | 4 | 5 |
| R Humerus | 1 | 3 | 4 |
| L Radius | 1 | 5 | 6 |
| R Radius | 2 | 4 | 6 |
| L Ulna | 1 | 4 | 5 |
| R Ulna | 0 | 3 | 3 |
| L Femur | 4 | 5 | 9 |
| R Femur | 1 | 5 | 6 |
| L Tibia | 1 | 3 | 4 |
| R Tibia | 3 | 4 | 7 |
| L Fibula | 1 | 2 | 3 |
| R Fibula | 0 | 4 | 4 |

Over 90 bones were inventoried from Operation 7, with an MNI of 3 based on the right femur and right tibia. Bones were recovered from the following contexts: 340, 811, 812, 1313, and 1318.

| Element | Juvenile | Adult | Total estimate |
|------------|----------|-------|-----------------------|
| Cranium | 1 | 1 | 2 |
| L Clavicle | 1 | 1 | 2 |
| R Clavicle | 1 | 1 | 2 |
| L Humerus | 1 | 0 | 1 |
| R Humerus | 1 | 1 | 2 |
| L Radius | 1 | 1 | 2 |
| R Radius | 1 | 0 | 1 |
| L Ulna | 1 | 1 | 2 |
| R Ulna | 1 | 0 | 1 |
| L Femur | 1 | 1 | 2 |
| R Femur | 1 | 2 | 3 |
| L Tibia | 1 | 0 | 1 |
| R Tibia | 1 | 2 | 3 |
| L Fibula | 0 | 0 | 0 |
| R Fibula | 1 | 0 | 1 |

OPERATION 8

Over 600 bones were inventoried from Operation 8, with an MNI of 14 based on the cranium and right tibia. Bones were recovered from context 255.

| Element | Juvenile | Adult | Total estimate |
|------------|----------|-------|-----------------------|
| Cranium | 4 | 10 | 14 |
| L Clavicle | 0 | 2 | 2 |
| R Clavicle | 1 | 0 | 1 |
| L Humerus | 3 | 9 | 12 |
| R Humerus | 2 | 7 | 9 |
| L Radius | 5 | 6 | 11 |
| R Radius | 5 | 4 | 9 |
| L Ulna | 1 | 3 | 4 |
| R Ulna | 0 | 6 | 6 |
| L Femur | 4 | 8 | 12 |
| R Femur | 2 | 10 | 12 |
| L Tibia | 5 | 6 | 11 |
| R Tibia | 5 | 9 | 14 |
| L Fibula | 0 | 7 | 7 |
| R Fibula | 0 | 4 | 4 |

Over 1,300 bones were inventoried from Operation 11, with an MNI of 14 based on the left femur. Bones were recovered from the following contexts: 701, 702, 703, 704, and 709.

| Element | Juvenile | Adult | Total estimate |
|------------|----------|-------|-----------------------|
| Cranium | 1 | 10 | 11 |
| L Clavicle | 3 | 5 | 8 |
| R Clavicle | 1 | 6 | 7 |
| L Humerus | 0 | 8 | 8 |
| R Humerus | 1 | 8 | 9 |
| L Radius | 2 | 6 | 8 |
| R Radius | 1 | 5 | 6 |
| L Ulna | 2 | 5 | 7 |
| R Ulna | 0 | 4 | 4 |
| L Femur | 4 | 10 | 14 |
| R Femur | 2 | 6 | 8 |
| L Tibia | 2 | 6 | 8 |
| R Tibia | 1 | 10 | 11 |
| L Fibula | 0 | 8 | 8 |
| R Fibula | 0 | 4 | 4 |

OPERATION 12

Over 1,700 bones were inventoried from Operation 12, with an MNI of 25 based on the left tibia and cranium. Bones were recovered from the following contexts: 1, 2, and 3.

| Element | Juvenile | Adult | Total estimate |
|------------|----------|-------|-----------------------|
| Cranium | 3 | 22 | 25 |
| L Clavicle | 0 | 10 | 10 |
| R Clavicle | 2 | 7 | 9 |
| L Humerus | 2 | 20 | 22 |
| R Humerus | 5 | 16 | 21 |
| L Radius | 0 | 15 | 15 |
| R Radius | 3 | 10 | 13 |
| L Ulna | 4 | 10 | 14 |
| R Ulna | 6 | 16 | 22 |
| L Femur | 3 | 18 | 21 |
| R Femur | 3 | 18 | 21 |
| L Tibia | 6 | 19 | 25 |
| R Tibia | 4 | 17 | 21 |
| L Fibula | 3 | 8 | 11 |
| R Fibula | 4 | 11 | 15 |

Over 470 bones were inventoried from Operation 19, with an MNI of 5 based on the left clavicle. Bones were recovered from contexts 1351.

| Element | Juvenile | Adult | Total estimate |
|------------|----------|-------|-----------------------|
| Cranium | 2 | 1 | 3 |
| L Clavicle | 3 | 2 | 5 |
| R Clavicle | 0 | 2 | 2 |
| L Humerus | 2 | 1 | 3 |
| R Humerus | 3 | 0 | 3 |
| L Radius | 0 | 0 | 0 |
| R Radius | 0 | 0 | 0 |
| L Ulna | 1 | 0 | 1 |
| R Ulna | 1 | 0 | 1 |
| L Femur | 2 | 1 | 3 |
| R Femur | 0 | 1 | 1 |
| L Tibia | 1 | 1 | 2 |
| R Tibia | 0 | 3 | 3 |
| L Fibula | 0 | 0 | 0 |
| R Fibula | 1 | 0 | 1 |

OPERATION 21

Over 2,400 bones were inventoried from Operation 21, with an MNI of 15 based on the left clavicle. Bones were recovered from contexts 1451 and 1457.

| Element | Juvenile | Adult | Total estimate |
|------------|----------|-------|-----------------------|
| Cranium | 1 | 5 | 6 |
| L Clavicle | 3 | 12 | 15 |
| R Clavicle | 5 | 7 | 12 |
| L Humerus | 3 | 10 | 3 |
| R Humerus | 4 | 5 | 9 |
| L Radius | 4 | 5 | 9 |
| R Radius | 7 | 4 | 11 |
| L Ulna | 4 | 6 | 10 |
| R Ulna | 4 | 6 | 10 |
| L Femur | 3 | 3 | 6 |
| R Femur | 4 | 2 | 6 |
| L Tibia | 5 | 4 | 9 |
| R Tibia | 4 | 5 | 9 |
| L Fibula | 1 | 1 | 2 |
| R Fibula | 0 | 2 | 2 |

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