UNIVERSITY OF CALIFORNIA

Santa Barbara

From the Monumental to the Mundane:

Defining Early Leadership Strategies at Late Formative Pukara, Peru

A Dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Philosophy

in Anthropology

by

Elizabeth Ana Klarich

Committee in charge:

Professor Mark S. Aldenderfer, Chair

Professor Katharina Schreiber

Professor Stuart T. Smith

Professor Charles S. Stanish

March 2005

The dissertation of Elizabeth Ana Klarich is approved.

_____
Katharina Schreiber

_____
Stuart T. Smith

_____
Charles S. Stanish

_____
Mark S. Aldenderfer, Committee Chair

January 2005

From the Monumental to the Mundane:

Defining Early Leadership Strategies at Late Formative Pukara, Peru

ACKNOWLEDGMENTS

I fear my acknowledgments may be longer than this dissertation! First, I would like to thank my committee. Mark Aldenderfer, my chair, has been a friend and academic advisor since we met in Peru in 1994. During graduate school (and over thousands of pots of coffee), Mark enthusiastically guided me through directed reading courses, grant writing, running a field project, and writing up the dissertation, in spite of the lack of hunter-gatherers involved. At UCSB, we are very fortunate to have two Andean scholars in our department and Kathy Schreiber has encouraged my academic and professional development with sound advice throughout my time in graduate school. Stuart Smith introduced me to the craft production literature in his pottery analysis class, an important element in developing this project. I would also like to thank Michael Jochim, a member of my master's committee and constant mentor. Lastly, I have had the pleasure of working with Charles Stanish since I was an undergraduate. Chip first invited me to participate in field projects in Peru and Bolivia, advised my undergraduate thesis, and has always encouraged me to think about the next step and think big. To you all, mil gracias!

This dissertation project was generously funded by the following sources: a National Science Foundation Dissertation Improvement Grant (# 0115233), a Fulbright-Hays Dissertation Research Fellowship, two travel grants from UCSB Graduate Division, the Albert Spaulding and Elman Service Memorial Fellowship (UCSB Department of Anthropology), a Humanities and Social Sciences Research

Grant (UCSB Graduate Division), and the University of California President's Dissertation Year Fellowship. I would also like to thank Elizabeth Arkush, a fellow archaeologist working in the northern Lake Titicaca Basin, for generously including several of the radiocarbon dates from Pukara in her NSF grant.

The Pukara field project began in 2000 with a geophysical survey and continued in 2001-2002 with excavations and analysis. From 2000, thanks to the techie crew from the survey—the co-director Nathan Craig, Nico Tripcevich, George Herbst, and Arleen Garcia (aka Equipo Fuerza Mortal)—and to Mark Aldenderfer for lending me both the geophysical survey equipment and his excavation crew. Thanks to Christine Hastorf and Matthew Bandy of TAP for letting me use their field forms at Pukara in 2001, to Elias Mujica for providing me with copies of the Kidder field notes and always encouraging the development of this project, and to the staff of the Peabody Museum archives for their assistance in the spring of 2000.

The 2001 field season relied on a large, enthusiastic crew from the towns of Pucará, Puno, and Arequipa, as well as the US, and Britain. The project—known as "Proyecto Mujer"—was co-directed with Leny Pinto Portilla and the excavations were directed by Cecilia Chávez Justo, Carrie Mason, and Sarah Abraham. These mujeres are incredibly skilled and dedicated archaeologists who kept me going through foul weather, car problems, and every other field disaster. Adan Umire and Andy Roddick also joined our excavation crew and made valuable contributions to the project. The maestros of the project were Amadeo Mamani Mamani, my compadre Javier Chalcha Saraza, and Honorato Ttacca Sanga. I would like to

especially thank the Ttacca family, the local land owners, for letting us invade their papa and quinoa fields and annoy their cows. In addition to Honorato, who brought his experience of working with the Copesco project to the 2001 excavations, we were assisted by Heron Ttacca, Ruth Ttacca Apaza, and Juan Ramos Apaza. Our weekend lab crews were directed by Tiburcia Apaza and Luz and Humberto Ttacca. Edwin Castillo, the museum caretaker and his mother, Leonor Huanca Arapa, our project cook, made our stay much more enjoyable. Finally, thanks to the dozens of people from Pucará who participated in our fieldwork rotation and invited us to their homes to see their pottery workshops and discuss local craft production.

The INC (National Institute of Culture) in both Puno and Lima facilitated every step of this project. In Lima, thanks to Charo Moreno, Victor Falcon, and the staff at Pueblo Libre and Museo de la Nación for their patience and assistance with the permitting process. In Puno, the regional INC director Dr. Rolando Paredes has been a constant supporter of the project, introduced us to numerous colleagues, and supervised the 2001 excavations. Chela Fattorini, the director of the restoration project at the Pukara museum, has been an integral part of this project and a wonderful friend. The office staff at the INC-Puno was always available to help with logistics and thanks to Manuel Jara of the INC-Cuzco and Freddy Escobar of the INC-Puno for their assistance in locating maps and paperwork from the Copesco excavations. In Pucará, the project was very fortunate to have access to the Museo Lítico Pukara, the local site museum of the INC, to serve as our home base, lab space, and collections storage.

All of us working in the Puno area are fortunate to have the infrastructure of the Programa Collasuyu, directed by Chip Stanish and Mark Aldenderfer and managed by Karen Doehner and Cecilia Chávez. Karen has also provided translation assistance several times during this project. Many friends and colleagues visited the project in 2001, an important element of staying sane in the field: Mark Aldenderfer, Elizabeth Arkush, Brian Bauer, Robin Beck, Claire Broido, Melissa Chatfield, Brad Jones, Michael Moseley, Elias Mujica, Cheyla Samuelson, Carol Schultze, Chip Stanish, Nico Tripcevich, Alexei Vranich, and Jason Yaeger. The people working in the Titicaca Basin are a close-knit group of colleagues who I would like to thank for the many discussions that influenced this project. Deus pagara to Matt Bandy, Lisa Cipolla, Larry Coben, Amanda Cohen, Nicole Couture, John Janusek, Aimee Plourde, Matt Seddon, Lee Steadman, Bill Whitehead, and a bunch of the folks mentioned above. Lastly, I want to thank Cynthia Herhahn. Participating in her field project in 2000 greatly influenced how I directed the Pukara project and since then she has answered millions of ceramics questions and offered unwaivering support as a long-distance dissertation writing partner.

After fieldwork, I lived in Puno for many months to complete artifact analysis. Special thanks go to Ceci Chávez and Javier Chalcha for their hours of help with ceramic analysis, artifact drawing, and general good cheer for many hours in the freezing lab. The list of friends and colleagues in Puno is very long, but the following people cannot escape mention: Edmundo de la Vega and family, Susana Medina and Rai, Martha Giraldo, Anita Pino and Maurik Bueno de Mesquita, Irini

Scocos and Ollantay, Juan Palao Berastain, and the directors of the local tourism bureau. The most incredible experience of spending a year living in the Titicaca Basin was having the opportunity to dance for the feast of the Virgen of the Candelaria in February. The Centralistas dance troop, especially Enrique Murillo, had the patience to teach this gringa to dance the saya de hombre and welcomed me into a massive network of friends. It was an experience I will never forget. In Lima, I would like to thank the families of Azucena Ugarte and Humberto Cabrera for opening their homes to me on numerous occasions and always making the transition to city life a little easier. In Bolivia, thanks to Lupe Andrade and her family in La Paz for taking very good care of me and my compadres on the Isla del Sol, Santiago and Mercedes Mamani Mendoza for years of friendship and hospitality.

At UCSB, I would like to acknowledge the Andean cohort who have always been willing to talk shop and edit drafts: Valerie Andrushko, Christina Conlee, Justin Jennings, Corina Kellner, James Tate, Jason "Jota" Toohey, Christina Torres-Rouff, Hendrik VanGigseghem, and Kevin Vaughn. Thanks to Lisa Cipolla and Claudia Rumold for their help identifying the groundstone artifacts, to Nico Tripcevich and Nathan Craig for answering millions of GIS questions, and to my undergraduate interns, Jason Campbell, Roberto Garcia and Wesley Bonnheim, for their hours of work on the project database and graphics. I would also like to thank Joan Murdoch for answering any imaginable computer-related question. Outside the gang of Andeanists, there are many other UCSB colleagues to thank: Alison Borek, Michele Buzon, Dave Crawford, Jelmer Eerkens, Hillary Haldane, Karin Klemic, Anastasia

Panagakos, Peter Paige, and Jennifer Perry. Scott Lacy, my other dissertation writing partner, has been a most enthusiastic ally through this process. A trip to present my dissertation research at UCSD, organized by Paul Goldstein and Ulli Green, was also an important step in finishing up this project. Outside archaeology, I would like to thank my pack of cheerleaders: Ilyse Froy, Eileen Junkins, Melissa Hansen, the Miliotises, the Nybos, Laurie Pfeiffer, Cheyla Samuelson, Roberto Sutton, and Salim Virji. I am famous in the department for being a nomad; this would not have been possible without the hospitality of the Aldenderfers, Dave and Debby Bonnheim, Karl Bryant, Sally Holbrook and Russ Schmidt, Joan and Bill Murdoch, and Kathy Schreiber.

Lastly, and most importantly, I want to thank my family. My parents, Dick and Mary Beth, were not particularly thrilled about their favorite child heading off to Peru, Sudan, and other remote places across the globe, but that never stopped them from encouraging me and helping me keep perspective through the eventual completion of the 27th grade. I would also like to thank my brothers Matt and Rich, their wives Heidi and Marisa, and my grandmother Marija for their encouragement and support. Finalmente, pues.

VITA of ELIZABETH ANA KLARICH
January 2005

EDUCATION

Bachelor of Arts, University of Chicago, June 1995 (with honors in Anthropology)
Master of Arts in Anthropology, University of California, Santa Barbara, June 1998
Doctor of Philosophy in Anthropology, University of California, Santa Barbara, March 2005 (expected)

PROFESSIONAL EMPLOYMENT

June 2004-present	GIS technician. Central Coast Information Center, UCSB.
August 2002	Teaching associate, Anthropology 133, Cultural Developments in Mesoamerica, UCSB.
1999-2002	Teaching assistant, Departments of Anthropology and Sociology, UCSB.
January-June 1996	Collections management assistant, Division of Anthropology, Field Museum of Natural History, Chicago, IL.
Fall 1995	Research intern, Crow Canyon Archaeological Research Center, Cortez, CO.
1992-1995	Research assistant, Division of Anthropology, Field Museum of Natural History, Chicago, IL.

PUBLICATIONS

2005 Klarich, Elizabeth A. (editor)
From Subsistence to Social Strategies: New Directions in the Study of Daily Meals and Feasting Events, forthcoming.

2005 Paredes, Rolando, Graciela Fattorini and Elizabeth A. Klarich
Proyecto de Circuito Turístico Pukara, Peru: Perspectives from a Local Site Museum. In *Site Museums in Latin America*, edited by Helaine Silverman. University of Florida Press. In press.

2001 Williams, Sloan R., Kathleen Forgey and Elizabeth Klarich
An Osteological Study of Nasca Trophy Heads Collected by A.L. Kroeber during the Marshall Field Expeditions to Peru. *Fieldiana*,

Anthropology Monograph Series, publication 1516. Field Museum of Natural History, Chicago, IL.

2001 Klarich, Elizabeth A. and Mark S. Aldenderfer
Qawranakasax waljawa: Motivos de camélidos en el espacio y tiempo andino. *Boletín del Museo Chileno de Arte Precolombino* No. 8: 47-58. Santiago de Chile.

AWARDS

2003-2004	University of California President's Dissertation Year Fellowship
2003	Travel Grant, UCSB Graduate Division
2003	Albert Spaulding/ Elman Service Memorial Fellowship, UCSB
2002	Special Graduate Student Travel Grant, UCSB Graduate Division
2001-2002	Fulbright-Hays Dissertation Research Fellowship
2002	Albert Spaulding/ Elman Service Memorial Fellowship, UCSB
2001	Albert Spaulding/ Elman Service Memorial Fellowship, UCSB
2001	National Science Foundation Dissertation Improvement Grant, # 0115233
1999	Humanities and Social Sciences Research Grant, UCSB Graduate Division
1996-1999	Graduate Research Fellowship, National Science Foundation
1995	Richter Grant for Undergraduate Research, University of Chicago
1994	Undergraduate Research Fellowship, Ford Foundation, University of Chicago

ABSTRACT

From the Monumental to the Mundane:

Defining Early Leadership Strategies at Late Formative Pukara, Peru

by

Elizabeth Ana Klarich

The study of alternative leadership strategies has become a major avenue for tracing the development of institutionalized inequality in complex societies across the globe. In the Lake Titicaca Basin of Peru and Bolivia, the Late Formative period (500 B.C. - A.D. 400) is characterized by the development of two regional population centers, Pukara in the northwest and Tiwanaku in the southeast. The site of Pukara, the subject of the present study, is typically identified with the features of the Qalasaya complex, a series of massive terraced platforms with sunken, stone-lined structures, and the presence of sophisticated polychrome pottery and carved monoliths. In this study, the transformation of the site's central ceremonial district during the Late Formative is framed as a reflection of changes in leadership strategies and local responses to those changes. Based on architectural, artifact, and activity area data collected during excavations in 2001, I argue that the changing function of the central pampa, an open area surrounded by the monumental architecture of the Qalasaya complex and several artificial mounds, can be used to trace a shift from inclusive to exclusive leadership strategies at Pukara. The central pampa was originally used as a public space dedicated to the preparation and consumption of suprahousehold-level meals and was an integral element of inclusionary leadership

strategies during the site's early development. Over time, as the monumental architecture of the Qalasaya was reconstructed and ritual activities became more restricted, the central pampa was "cut off" and relegated to the periphery of the ceremonial district. As elite interests shifted, reflecting trends towards exclusionary leadership strategies, commoners reacted by utilizing the central pampa for residential purposes, small-scale ritual, craft production, and other quotidian activities. These occupations are characterized by formal divisions of architectural spaces, increased diversity in activities performed, and differentiation of structure function. The transformation of the central pampa—from the monumental to the mundane—reflects both the motivations of early leaders and the responses of the local population over several centuries of site growth, development, and abandonment.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Chapter 1: The Mundane or the Monumental?

Mention of the *altiplano* region of Peru and Bolivia invokes images of a vast, arid landscape only occasionally interrupted by a view of the distant snow-capped Andean *cordillera.* However, the Lake Titicaca Basin, situated at 3810 meters above sea level (m asl), has drawn human settlement by hunter-gatherers, fisher folks, herders, and agriculturalists, all of whom exploited the riches of the riverine and lacustrine environments of the area for thousands of years (Figure 1). Traveling northwest from Lake Titicaca towards the La Raya Pass and eventually to Cuzco, one follows a series of meandering rivers, *bofedales* (marshes), and the traces of ancient agricultural fields known locally as *camellones* (raised fields) and *qochas* (sunken fields). Approximately 80 kilometers northwest from the lake edge is the impressive prehistoric center of Pukara[1], nestled at the base of a large, pinkish sandstone outcrop called the Peñon and covering at least 1 km^2 (Figure 2).

[1] There are inconsistencies in the spelling of Pukara because of different systems of Quechua orthography used in the Andes. In this study, "Pukara" is used for the prehistoric site and its associated material culture based on the spelling used by the Instituto Nacional de Cultura (INC). Pucará is the modern town near the site and the local river.

Figure 1- Lake Titicaca Basin with Late Formative period sites

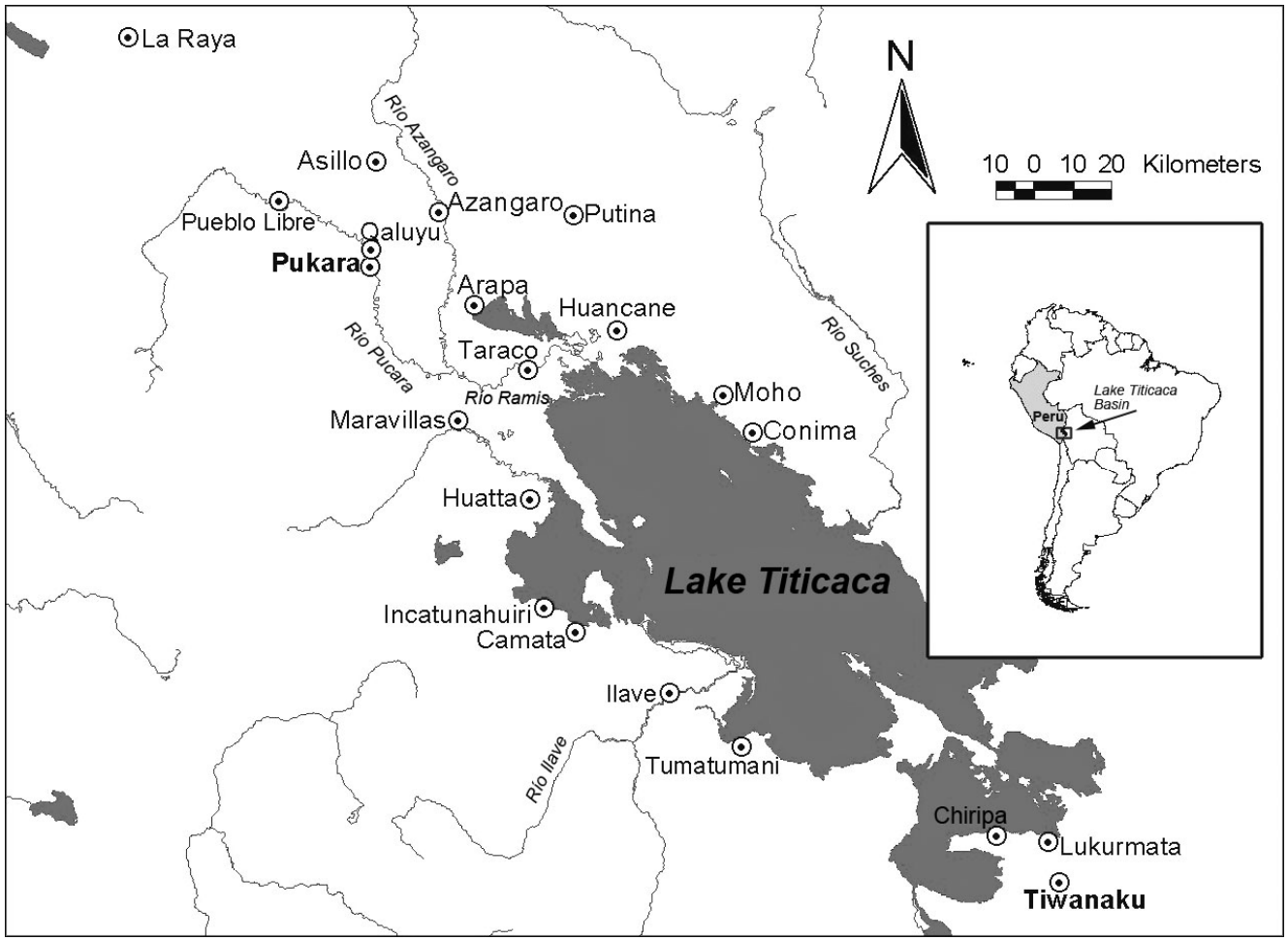


Figure 2- The Peñon of Pukara with the Qalasaya terraces below

During the Late Formative period (500 B.C. – A.D. 400) major transformations took place in the northern Titicaca Basin as Pukara became the center of a regional polity (Figure 3). There are debates as to how to define Pukara—whether it was a booming urban economic hub, a ceremonial site, or an administrative center—but there is general consensus that it represents a major transition in the regional settlement history. There are three models proposed to explain the development and expansion of the Pukara polity during the Late Formative. Within each, there is a focus on elite resource control as a means to determine not only the foundations of institutionalized inequality and early

leadership strategies, but also the nature of Pukara as a center. In the first model, Pukara is characterized as an urban center in which aspiring leaders controlled an economic system focused primarily on long-distance exchange (e.g. Mujica 1985). In the second model, Pukara was a ceremonial center directed by leaders who controlled production of and access to supernatural imagery depicted on material culture as a source of social and economic power (Chávez 1992). In the third model, Pukara is characterized as a regional center, but not planned to the degree of an urban center (Stanish 2003). Early leaders gained and maintained followers through the solidification of reciprocal relationships by hosting public events such as feasts.

These models are based on two major excavation projects at Pukara, material analysis, evidence of Pukara material culture outside of the Titicaca Basin, and regional settlement survey. The first field project, directed by Alfred Kidder II in 1939, exposed a variety of architectural types and activity areas across the site: Areas I, II, and III near the banks of the Río Pucara; Area IV on the central pampa to the east of the monumental architecture; and Areas V and VI on the large northern terrace and main platform of the Qalasaya architectural complex (Figure 4). While the Kidder project is recognized for first defining the sunken court complex (Area VI), a central feature of public architecture in the Titicaca Basin from the Middle Formative (1300-500 B.C.) through the Middle Horizon (A.D. 400-1100), the excavations on the site periphery also uncovered a non-elite residential area and dense middens along the riverbank (Areas I, II and III). In the central area of the site, to the east and north of the Qalasaya, excavations in Areas IV and V exposed large-

scale architectural features of unclear function, but of a clearly different scale and layout than the sunken courts.

Figure 3- Chronology chart (compiled from Janusek 2004, Rowe 1960, and Stanish 2003)

<table>
<tr><th>BC/AD</th><th>Central Andes</th><th>Southern Titicaca Basin</th><th>Northern Titicaca Basin</th></tr>
<tr><td></td><td>Late Horizon</td><td>Inca-Pacajes</td><td>Expansive Inca</td></tr>
<tr><td>1400
1200</td><td rowspan="2">Late Intermediate Period</td><td>Early Pacajes</td><td>Altiplano Period
(A.D. 1100-1450)</td></tr>
<tr><td>1000</td><td>Late Tiwanaku V</td><td rowspan="3">Expansive Tiwanaku
(A.D. 400-1100)</td></tr>
<tr><td>800</td><td rowspan="2">Middle Horizon</td><td>Early Tiwanaku V</td></tr>
<tr><td>600</td><td>Late Tiwanaku IV</td></tr>
<tr><td>400</td><td rowspan="3">Early Intermediate Period</td><td>Early Tiwanaku IV
Late Formative II
Tiwanaku III</td><td rowspan="3">Late/ Upper Formative
(500 B.C.- A.D. 400)</td></tr>
<tr><td>200</td><td>Tiwanaku II/ LF 1B</td></tr>
<tr><td>0
200</td><td>Late Formative I
Tiwanaku I/ LF 1A</td></tr>
<tr><td>400</td><td>Early Horizon</td><td rowspan="2">Late Chiripa 2
Middle Formative
Late Chiripa 1</td><td rowspan="2">Middle Formative
(1300-500 B.C.)</td></tr>
<tr><td>600
800
1000</td><td rowspan="2">Initial Period</td><td rowspan="2">Middle Chiripa
Early Formative
Early Chiripa</td></tr>
<tr><td>1500</td><td rowspan="2">Early Formative
(ca. 2000-1300 B.C.)</td></tr>
<tr><td>2000</td><td colspan="2"></td></tr>
</table>

The second project, conducted from 1975-1980 by Plan Copesco/ UNESCO, conducted its fieldwork exclusively on the Qalasaya complex. In addition to consolidating the stone-lined terraces and other architectural features of the monumental architecture, these excavations exposed the northernmost of the three Pukara period sunken courts, established a pre-Pukara construction under the Late Formative Pukara terraces, and recorded post-Pukara use and reconstruction. In sum, previous archaeological research has documented the site's monumental architectural complex, the scale and general site layout, and the diversity of Pukara iconography and material culture. However, the current state of knowledge remains primarily descriptive, with little known about the causes, nature, and timing of site development during the Late Formative period.

Project Design

As with all large-scale sites, it is a challenge to select an area for field research that is both logistically feasible and can be used to formulate a coherent connection between methodology and theoretical interpretation. In 2000 to 2001, I directed geophysical survey and excavations within an area designated as the central pampa in Pukara's central ceremonial district (Figure 5). The central pampa abuts the easternmost, lowest level of the imposing Qalasaya complex and expands to cover an area of at least 300 m x 300 m. The multiple tiers of the stone-lined terraces of the Qalasaya rise dramatically above the expanse of this area, creating a formidable obstacle to viewing areas above and to the west (Figure 6).

Figure 4- Kidder's excavation areas (map adapted from Mohr-Chávez 1988 and aerial photo from SAN, Peru). Approximate limits of the central ceremonial district are outlined in white.

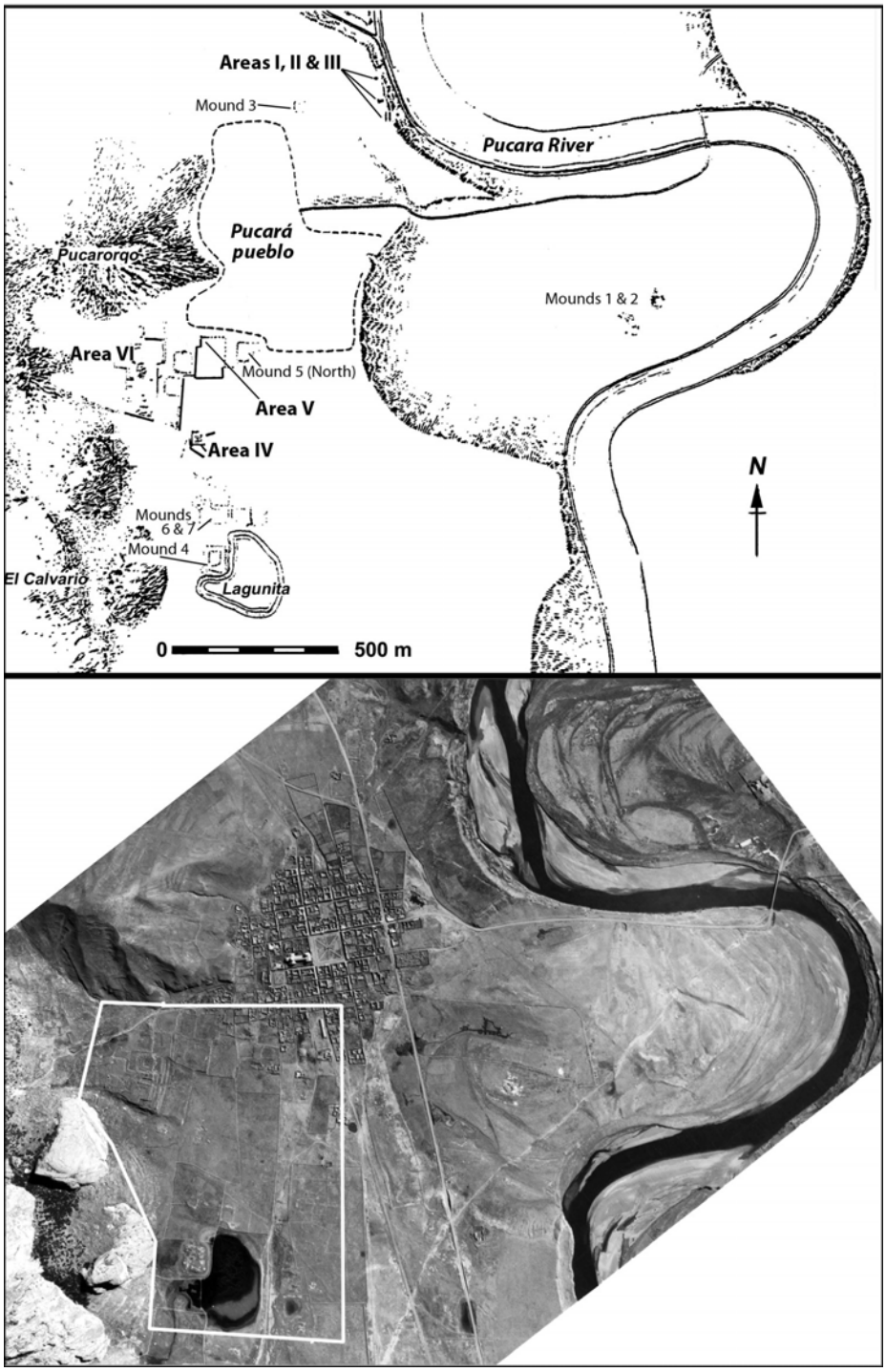
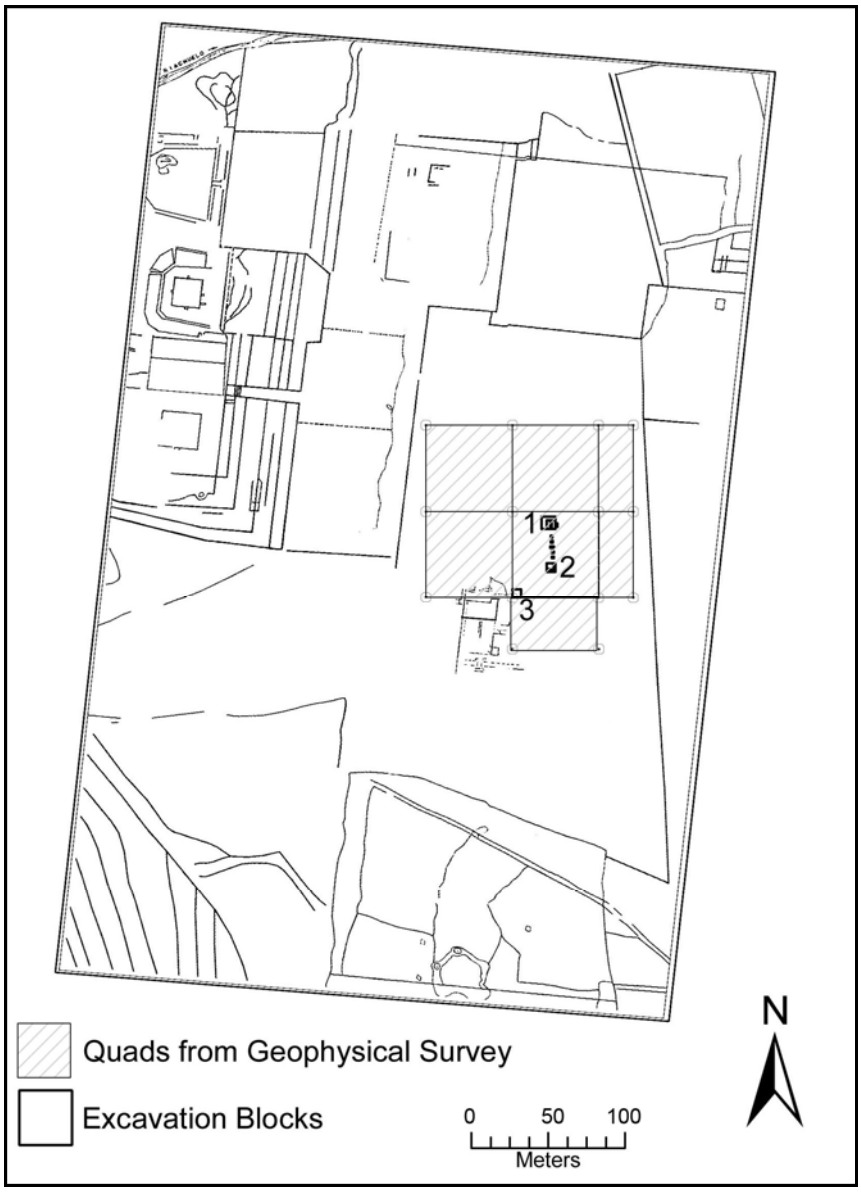


Figure 5- Location of geophysical survey (2000) and excavations (2001) on the central pampa



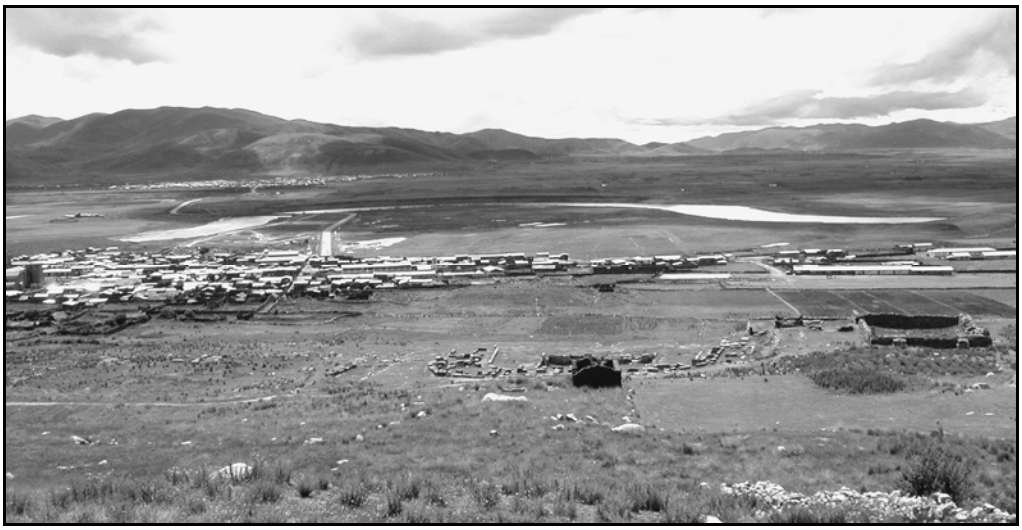
To the north is a large, raised platform where Kidder excavated Area V and a single artificial mound that rises several meters above the pampa to the east of Area V. To the south is the Lagunita Mound, named for its association with a large lagoon that varies seasonally in size and depth. This group of architectural units forms a "U" shape surrounding the pampa to the north, south, and west; the view to the east is

completely unobstructed (Figure 7). From the pampa area, the rolling hills of the Pucara valley are visible beyond the winding oxbows of the Pucara River. To the southeast, the "back" of Cerro Llallahua[2] marks the area where the valley narrows slightly near the river. Just beyond this peak is a massive, well-watered plain covered with the remnants of modern and prehistoric agricultural features, possibly in use since the Late Formative period.

Figure 6- View of Qalasaya terraces from the central pampa (note survey crew for scale)

[2] The set of peaks termed Cerro Llallahua are known locally as the sleeping camelid. There is an Altiplano period site on top of the head (the higher peak) and a Late Formative period site on the lower curve of the neck (the saddle between the two peaks).

Figure 7- View of the Pucara valley from behind the central sunken court (facing East)



The central pampa area was chosen for further investigation for three reasons: its central location within the site; the range of possibilities for pampa function within the central monumental district; and the existence of comparative materials from Kidder's excavations of Area IV. To the modern observer, there are few artifacts or architectural remains visible on the surface of the gently sloping central pampa. Stone walls subdivide modern field boundaries and many clearly have been constructed from large slabs and cut stone blocks removed from the archaeological site. Therefore, one's initial impression is that the area served as a large, open plaza space surrounded by terraced complexes and mounds. However, the pampa was not always, nor an entirely open space. Kidder's excavations of Area IV document the presence of a substantial, complex architectural compound dating to the Late Formative. Cultural deposits underlying this compound indicate that the

function and layout of the pampa were not static over the centuries of use, but the nature and timing of these changes were unclear.

The central pampa was an area of interaction in the central ceremonial district and is used to infer both the motivations of early leaders and the role of the local population in the negotiation of social power. While it is often assumed that the configuration of central, public space is guided by elites, the ability of non-elite residents to manipulate and alter the intended purposes of that space must also be considered (M. Smith 2003b:19).

> Physical space is ordered by and reflects the power structures to which the community is subordinated; the community may contest this subordination through local interpretation and use of space. Examining the origins and use of spatial forms provides insights into the discourse of power relations [Low 1995:748].

Data collected from this area provide both direct evidence of the material processes involved in site development and, more importantly, indirect evidence of the social processes underlying this development. Multiple data sets—architectural remains, associated artifacts, and activity areas—are used to establish the range of activities, which segment of society was sponsoring and/or participating in those activities, and how the use and transformation of central space reflects the nature of early leadership. The excavation data from the central pampa, in combination with data from previous excavations of the Qalasaya complex, are used in tandem to establish the relationship between the areas of the central ceremonial district. Through comparison of their occupation histories and different functions within the site, it is

possible to test competing models for both site development and determine the shifting nature of early leadership at Pukara.

Excavations conducted in 2001 indicate that the central pampa played an integral role in Pukara's growth and development as an early population center in the Lake Titicaca Basin. While superficially the area is unimpressive relative to the architectural grandeur of the surrounding mounds and terraces of the Qalasaya complex, the pampa was a dynamic, bustling area within the central district. Originally used as a public space such as a plaza, the pampa was a vital element of the central ceremonial district during the site's early development. The initial occupations were ephemeral and activities were almost exclusively dedicated to the preparation and consumption of food. There were no formal divisions of space, indicating that access to the area was not limited nor was there spatial separation of different types of activities. This reflects, I argue, inclusionary leadership strategies based on public, large-scale feasting events that complemented the ritual activities taking place on the Qalasaya complex.

Excavation data from the subsequent Late Formative period occupations indicate a major transformation of the central pampa from a public plaza space to a sector sub-divided into private and semi-private spaces. Over time, as the monumental architecture of the Qalasaya was reconstructed and ritual activities became more exclusive, the central pampa was "cut off" and relegated to the periphery of the ceremonial district. As elite interests shifted, reflecting trends towards exclusionary leadership strategies, commoners utilized the central pampa for

residential purposes, small-scale ritual activities, craft production, and other quotidian activities. These occupations are characterized by formal divisions of space through architecture, increased diversity in activities performed, and the differentiation of structures. The transformation of the central pampa—from the monumental to the mundane—reflects both the motivations of early leaders and the responses of the local population over several centuries of site growth, development, and abandonment.

Organization of the Dissertation

Following this introduction, Chapter 2 outlines the major frameworks proposed for Pukara polity organization and contextualizes them within relevant theoretical and methodological literature. The two primary bodies of anthropological literature used to frame Pukara pertain to the nature of early leadership strategies and to the use of monumental spaces as a reflection of social power within centers. Chapter 3 sets the background for this study, including the environmental setting, its place within local chronology, and the history of research both within and beyond the northern Lake Titicaca Basin. In Chapter 4, a series of material expectations are developed in order to connect the use and layout of the pampa to competing frameworks for early leadership strategies. In Chapter 5, project chronology and field methods are summarized.

The second half of the dissertation presents the results of the 2001 excavations and 2002-2003 artifact analyses. Chapter 6 is a summary of the excavation data, organized by block, for all phases of occupation history at the site.

Chapter 7 is artifact description and analysis and is organized by material type. Details of the ceramic analysis and excavated features are included in the appendices. Lastly, Chapter 8 ties together the expectations presented in Chapter 4 with the data sets from Chapters 6 and 7. The spatial and temporal distribution of artifact types and activity areas are used to outline the changing nature of pampa use during the Late Formative period. In Chapter 9, the relevance of these patterns are tied to the theoretical issues outlined in Chapter 2, framing the significance of the new Pukara data sets at a regional and cross-cultural level and proposing future avenues for study.

Chapter 2: Setting the Theoretical Stage

In recent years, the central topics of archaeological "origin" debates have shifted from early agriculture and the rise of the state to focus on the origins of institutionalized inequality in prehistoric societies (Feinman 1995:255). Interest in understanding intermediate-level polities or middle-range societies has driven research in both New and Old World archaeology (Arnold 1996; Blanton et al. 1996; Dietler and Hayden 2001; Earle 1991, 1997; Mills 2000a; Price and Feinman 1995). Within these societies, there are multiple "pathways to power" for aspiring elites (Hayden 1995), which include a number of economic, political, and social strategies outlined in recent archaeological literature. As stated succinctly by Barbara Mills, a central question is, "What do differences in leadership strategies in middle-range societies tell us about the institutionalization of inequality?" (Mills 2000b:3).

The three models outlined in the previous chapter treat determining the nature of elite resource control at Pukara as the key insight to understanding early leadership and the foundations of institutionalized inequality in the Late Formative period (500 B.C. - A.D. 400). In this chapter, these frameworks are briefly presented and contextualized within general theoretical discussions of the development of

socio-political complexity. In the second section, a case is made for treating the central pampa at Pukara as a context in which to test these three models and begin to develop alternative frameworks for understanding early leadership strategies. The final section presents a case study from outside the Andes, the site of Monte Albán in Oaxaca, Mexico, to illustrate the potential substantive and theoretical insights to be gained from using transformations of monumental public space as a reflection of both shifting leadership strategies and local responses to those changes.

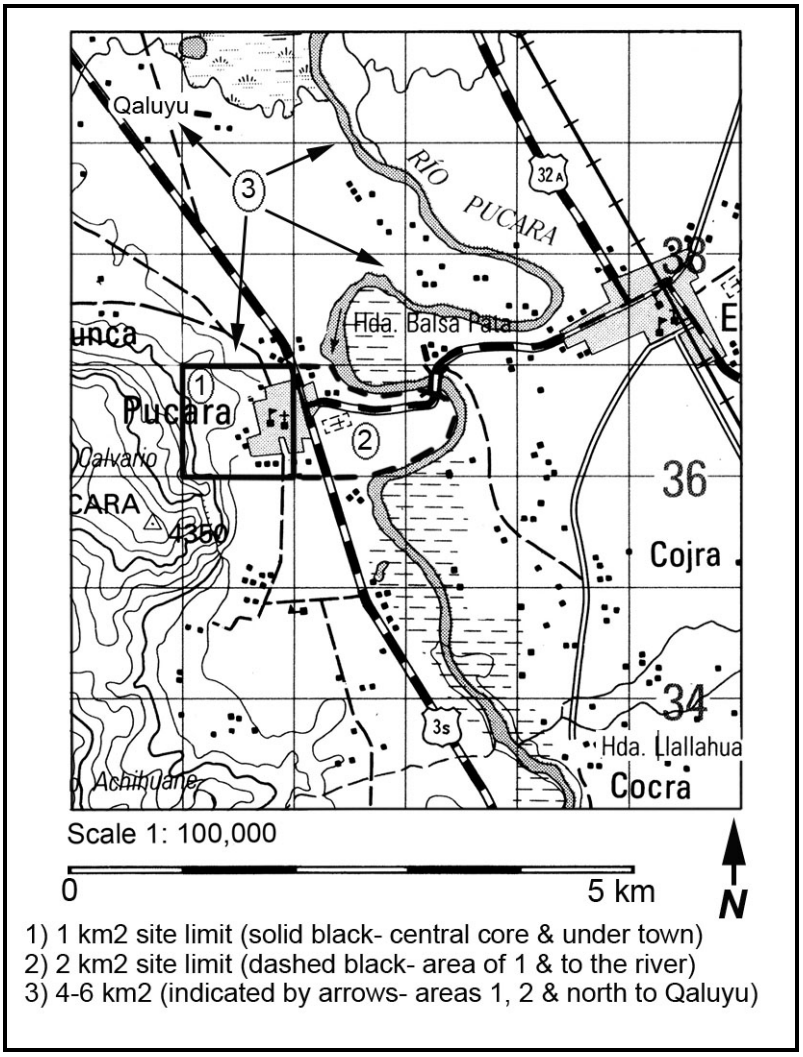
Competing Interpretive Frameworks for the Pukara Polity

While it is not debated that Pukara was one of two major population centers in the Titicaca Basin during the Late Formative period, contemporaneous with early occupations at Tiwanaku in Bolivia, the political and social organization of the site and polity remain unclear. The site of Pukara has been characterized as an early urban center (Kolata 1993; Lanning 1967; Lumbreras 1981; Mujica 1978, 1979, 1988; Rowe 1963), a ceremonial center (Chávez 1992:42), and the center of a complex chiefdom (Mujica 1985, 1991; Stanish et al. 1997; Stanish 2003). While discussions of elite strategies are not always explicit in these characterizations of Pukara, implicit in each is an operating assumption about how the control of resources—economic, ritual, or political—was used by early leaders to gain and maintain followers during the Late Formative.

In the first model, elites developed at Pukara in conjunction with large-scale changes in economic organization (Mujica 1978, 1979, 1985, 1988). Following commercial development/adaptationist/managerial models (Brumfiel and Earle

1987:1-4), early leaders focused on managing redistribution of goods, centralizing production, and sponsoring long-distance trade from Pukara. The site of Pukara was an urban center, based on site size estimates of 4-6 km^2 (Figure 8), social divisions reflected in architectural differences, and the spatial segregation of elite residential areas and peripheral craft production zones (Mujica 1979:185; Rowe 1963).

Figure 8- Pukara site limits from previous research



Beyond the center, the Pukara polity was an extensive economic network with a three-tiered site hierarchy:

> Based on the characteristics and locations of these three settlement types it is not an exaggeration to postulate that the villages were responsible for the extraction of basic materials (clay, minerals, salt, etc.) and for the production of the basic agricultural and pastoral subsistence; that the secondary or intermediate centers functioned as collection and redistribution points for the goods; and finally that the great center of Pucara's purpose was the centralization and transformation of goods into urban resources and their redistribution [Mujica 1985:125].

In this framework (Mujica 1991), the borders of the Pukara polity include the entire western Titicaca Basin, continue north to Cuzco, extend southeast to Tiwanaku, and continue to the southwest to the Azapa valley of northern Chile (Figure 9). The nature of long-distance relationships during the Late Formative was "not through permanent colonies, but through exchange links in which textiles could play an important role" (Mujica 1985:112).

In the second model, Pukara was primarily a ceremonial center and the control of supernatural imagery depicted on material culture was the major source of power for nascent elites (Chávez 1992). "By controlling powerful supernatural images, [these] emerging elite assured themselves access to supernatural, political and economic power, the ability to control labor and have greater access to resources" (Chávez 1992:11). Pukara leaders operated within the Yaya-Mama Religious Tradition, a ceremonial system named after a style of stone sculpture found throughout the region (Chávez and Mohr-Chávez 1975). This tradition is "manifested archaeologically by the following features they shared: temples centers with sunken courts, the earliest public architecture in the Basin; Yaya-Mama and

Pucara style stone sculpture associated with these temples; ritual paraphernalia, including pottery trumpets and ceremonial burners; and supernatural iconography such as heads with rayed appendages" (Burger et al. 2000:311). The limits of the Pukara polity are therefore determined by the distribution of these shared features:

> The Pucara polity unified and controlled most of the northern Titicaca Basin and extended its influence from at least Chumbivilcas in Cuzco (Rowe, 1958; Núñez del Prado, 1972; S. Chávez, 1989) to Tiahuanaco in Bolivia (S. Chávez, 1976). Pucara style materials also indicate contact into the Vilcanota drainage and the Cuzco Basin, to the south and far south coast of Peru (Ica and Moquegua; Conklin, 1985; Feldman, 1989), and possibly northern Chile (Rivera, 1977, pp. 43-46, Plates 1-3), or earlier pre-Pucara Yaya-Mama times (Rivera, 1991, pp. 21-28). [Burger et al. 2000:315].

The Pukara sphere of influence is of the same general scale as that outlined in the first model, but directed by ritual specialists instead of economic managers at the polity center.

The second model can be broadly contextualized within recent studies that treat the materialization of ideology as a source of social power (DeMarrais et al. 1996). In this framework, ceremonial events, symbolic objects and icons, public monuments and landscape, and writing systems all serve to communicate the power of central authority to the broader population. Because "ideology has… both a material and symbolic component," patterning in material culture can be used to "inform archaeologists about unequal access to symbols of status or authority, the efforts of one social segment to promote its ideology over others, and the effects of these strategic activities on the dynamics of social power" (DeMarrais et al. 1996:16). Applying this framework to Pukara, the monumental architecture of the Qalasaya, standardized iconography of decorated ceramic vessels and ritual

paraphernalia, and the ceremonial events presumed to have taken place in these spaces can be viewed as reflections of the degree and nature of social power.

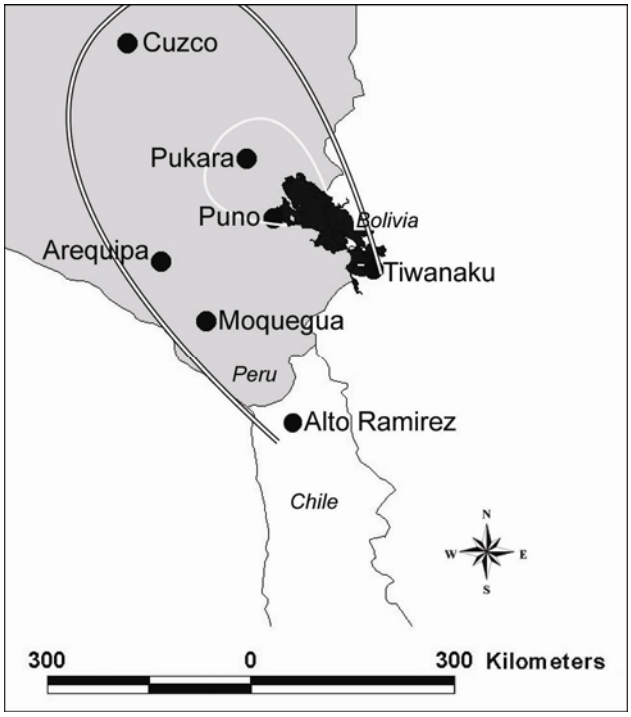
In the third model, early leaders at Pukara gained power through persuasive, not coercive, means and maintained these positions through the solidification of reciprocal relationships with followers (Stanish 2003). Pukara, with multiple sunken courts and highly standardized iconography on fineware ceramics and monoliths, represented the culmination of elite group strategies originally designed to attract commoners and specialists to earlier Middle Formative centers (1300-500 B.C.). In contrast to the previous models, Pukara is contextualized within a dynamic landscape of shifting alliances and constant conflict during the Late Formative, not viewed as a monolithic entity with uninterrupted control of the Titicaca Basin. This model builds upon theories of political economy (Hirth 1996; Muller 1997), factional competition (Brumfiel and Fox 1994), and political approaches to economic organization (Brumfiel and Earle 1987).

The third model is based primarily on the results of regional survey in the Titicaca Basin. From this research, six site types have been identified for the Upper/ Late Formative period: primate regional centers (Tiwanaku and Pukara), primary regional centers, secondary regional centers, large villages, small villages, and hamlets (Stanish 2003:111). The Pukara polity is characterized by a three-tiered site hierarchy with the primate non-urban center of Pukara, smaller secondary centers, and villages and hamlets (Stanish et al. 1997; Stanish 2003:141). In contrast to the first two models, the boundaries of the Pukara polity in the third model reflect the

area under direct political control "in the sense of participating in an integrated political economy headed by a resident elite at the primate center" (Stanish 2003:145). The boundaries are the most conservative of the three; direct control extended from the Suches River in the northeastern Titicaca Basin, past Pukara in the northwest, and down to Incatunahuiri in the southwestern basin (Stanish et al. 1997; Stanish 2003:147).

Within the Titicaca Basin, Stanish argues that there were a number of autonomous polities contemporaneous with Pukara and early Tiwanaku during the Late Formative (Stanish 2003:142). The primary regional centers of the polities include a sunken court, a stone enclosure, and a hill or pyramid-like structure (Stanish 2003:141). Carved stelae of the Yaya-Mama tradition and decorated ceramics from various traditions were also integral features of these centers. In terms of function, "regional centers were the areas of fine-ware pottery production, stone sculpture manufacture, political and ritual feasts, and the organization of regional exchange" (Stanish 2003:141). Stanish emphasizes there were other centers throughout the basin associated with autonomous or semi-autonomous polities, totaling possibly a dozen during the Late Formative period (Stanish 2003:142). In this model, evidence of Pukara material culture beyond the Titicaca Basin resulted from economic exchange, not political control.

Figure 9- Limits of the Pukara polity/ sphere of influence
(white line adapted from Stanish 2003, black line adapted from Chávez 1992 & Mujica 1991)



Leadership Strategies

The three models outlined for Pukara incorporate approaches from a diversity of theoretical backgrounds and serve as a solid foundation for further exploring the complexity and dynamism of leadership in early complex societies. As discussed in a recent volume edited by Barbara Mills (2000a), a number of major changes in archaeological method and theory are reflected by developments in the study of leadership strategies. The first of these is a shift away from neo-evolutionary explanations for change in favor of models "incorporating alternative, multiple trajectories… between and within regions" (Mills 2000b:3; see also Yoffee 1993). The second is a re-evaluation of definitions of inequality, both situational and

institutional forms, and how these may be expressed in the archaeological record (Mills 2000b:4). The third change is interlinked with the second. As definitions of inequality are re-evaluated, this has led to the "unpacking" of the various domains of "economy, kinship, politics, and ritual" through which inequality is manifested (Mills 2000b:4). Lastly, the incorporation of actor-based approaches both complements earlier emphases on regional or microlevel analyses and challenges traditional top-down approaches to social change (Mills 2000b:4). These shifts are exemplified by a number of alternative models to the study of leadership: the dual-processual model (Blanton et al. 1996; Feinman 2000), materialization of ideology (DeMarrais et al. 1996), ritual knowledge as power (Joyce and Winter 1996), heterarchical organization (Crumley 1995), personal aggrandizement (Clark and Blake 1994), communal models (McGuire and Saitta 1996), factional competition (Brumfiel and Fox 1994), and political economy (Hirth 1996; Muller 1997), to name a few.

The first change in approaches to leadership strategies, a shift away from neo-evolutionary explanations for change, is exemplified by the dual-processual model (Blanton et al. 1996; Feinman 2000). Building on elements from adaptationist and political models, the dual-processual model investigates the variety of strategies used by political actors in the development of larger, more complex polities and the corresponding new institutions within those polities (Blanton et al. 1996). The goal is to redirect sociocultural evolutionary theory away from traditional neoevolutionary types and towards one "that is processually grounded in the variant

outcomes of political-economic strategies" (Blanton et al. 1996:14). Within this model, political actors draw from various sources of power, either objective sources such as wealth and factors of production, or symbolic sources such as religion and ritual (Blanton et al. 1996:3).

The two major strategies outlined in the dual-processual model are the exclusionary or network strategy and the corporate or group-oriented strategy. In a network-based mode of political economy, power is gained through an individual's participation in extra-local networks. Exclusive access to exotic goods, marriage alliances, and specialized knowledge are used to emphasize differences between aspiring leaders and the local group. Transformational change involves developing new social structures in order to mobilize labor and manipulating prestige-goods systems in order to exclude competitors.

In the corporate strategy, exclusionary strategies are inhibited and power is "structured, determined, legitimated, and controlled within the limits set by the prevailing corporate cognitive code" (Blanton et al. 1996:2). Interdependence between sub-groups or between leaders and subjects is emphasized within the context of corporate solidarity. Because disparate groups are united under rhetoric of inclusiveness, transformational change is less restricted than that within the network strategy. New groups are incorporated into the "larger society," as are surpluses of their primary production (Blanton et al. 1996:6). The corporate model was developed in order to counteract a "centralization bias in theories of complex society" (Blanton et al. 1996:2) and to move beyond the focus on individualizing strategies to explain

economic and socio-political development. Since its inception, the dual-processual model has been applied to a number of archaeological case studies as a way to rethink traditional evolutionary frameworks (e.g., Mills 2000a; Trubitt 2000), while building from a number of pre-existing political and economic typologies (e.g., D'Altroy and Earle 1985; Renfrew 1974). A key element of the dual-processual model is that "two strategies may coexist in a society and societies may change from one strategy to another over time, or cycle back and forth between corporate and network" (Trubitt 2000:671). In sum, these modes or strategies are not a replacement for evolutionary stages; corporate and network strategies may be present in societies across the sociopolitical spectrum (Blanton et al. 1996).

The second and third major shifts involve refining definitions of situational and institutionalized inequality and "unpacking" its sources within economics, kinship, politics, and ritual contexts (Mills 2000b:6-10). Economic inequality is grounded in control of specialized production and household surplus, or through management of risk in unpredictable environments. Kinship networks can be used to guarantee access to labor for monumental constructions, agricultural production, or to facilitate long-distance exchange. Ritual sources of power have received considerable attention in the Southwestern literature in recent years, based primarily on the work of Burns and Laughlin (1979). In this framework there are three types of social power—constraint, persuasive, and sanctioning— and both persuasive and sanctioning power are indirect forms that can be used by leaders in corporate or collective ritual contexts (Mills 2000b:8-9). Based on cross-cultural ethnographic

and archaeological case studies, these potential sources of power are drawn upon by leaders in a variety of ways and through numerous combinations (Graves and Spielmann 2000; Potter and Perry 2000; VanKeuren 2000). Recognizing the range of variability is essential in the differentiation of the material indicators of these strategies in the archaeological record.

Beyond "unpacking" the sources of inequality, measures of inequality and heterogeneity can be used to determine the nature of social complexity and subsequently to measure or detect changes (Joyce 1997). Inequality, "a measure of status differentiation in society" (Joyce 1997:138), is indicated through patterns of mortuary behavior, variability in household organization, the distribution of prestige goods, and through indirect evidence for increasing differences in power through control of labor. Heterogeneity is defined as increasing differentiation of the administrative, economic, and social roles of both elites and non-elites within a society. For example, the development of craft specialization or full-time military forces is an indicator of increasing heterogeneity among non-elites. For elites, the presence of exclusive roles such as religious specialists is reflected through the monopolization of public spaces and religious paraphernalia and decreased access of these spaces and goods for the remaining population.

Recent comparative approaches to social complexity focus on evaluating complexity in nature and degree (i.e., "how were they complex?") instead of trying to determine which society was "more complex" relative to the other (Nelson 1995: 614). For example, measures of population size, degree of labor investment in

monumental architecture, the extent of the road system, differentiation in mortuary practices, and symbolism in integrative facilities are employed to systematize a comparative study of the political centers of La Quemada, Zacatecas, and Chaco Canyon, New Mexico (Nelson 1995). Based primarily on architectural symbolism (the kiva versus the platform mound) and evidence for the institutionalized use of force at La Quemada, Nelson concludes that Chaco was organized at a larger scale while La Quemada was more hierarchically structured. This case study illustrates that "properties such as inequality, differentiation, scale and integration may vary independently" (Nelson 1995:615) and that neoevolutionary approaches to complexity are inadequate for addressing this variability.

The concept of heterarchy further challenges traditional, relatively static constructs of complexity. In this approach, complexity is not inherently hierarchical; elements within the organizational structure are potentially unranked, can be ranked in a number of ways, and are constantly shifting through a reranking of priorities (Crumley 1995). Heterarchy has been applied to egalitarian, ranked, and highly stratified societies to emphasize the flexibility of scale, power, and values in all social systems. As is the case with the dual-processual model, heterarchy is not a new evolutionary type nor unique to a certain level of sociopolitical organization:

> Heterarchy is probably not any single type of social structure; rather, it is a principle of social organization, like kinship, that is reworked and assumes different roles depending upon its structural context. We probably should not use heterarchy to replace the tribes-chiefdoms-states terminology with which we are familiar; instead we should use heterarchy to look at these constructs differently [Brumfiel 1995:128].

Heterarchical organization opens the possibility for flexibility in the negotiation of power relationships as different sources may be invoked temporarily to resolve particular problems in particular contexts. The scale of decision-making is also considered within heterarchical frameworks, as both individuals and groups may compete over sources of power within society (D'Altroy 2001).

The last major shift is the incorporation of actor-based models that challenge traditional top-down or systems-level approaches to the emergence and transformation of leadership (e.g., Dobres and Robb 2000, editors; Mills 2004b). The application of agency theory and associated practice theories in archaeology are numerous, and often contradictory (Bourdieu 1977; Giddens 1984; Ortner 1984; see Dornan 2002). However, they share a common goal: "to systematically construct and incorporate theories about the ways in which human actions are constrained, enabled, constructed, and manifest within larger social systems" (Dornan 2002:304). Individuals, not "components in a system," are dynamic participants in social change in actor-based models (Joyce 1997:134) and the constant negotiation of power is central to discussions of social change:

> Power within social systems which enjoy some continuity over time and space presumes regularized relations of autonomy and dependence between actors or collectivities in contexts of social interaction. But all forms of dependence offer some resources whereby those who are subordinated can influence the activities of their superiors. This is what I call the *dialectic of control* in social systems [Giddens 1984:16].

While determining the sources of elite resource control provides insight into select elements of economic, ritual, and political organization within a society, actor-based

approaches consider both the roles of leaders and their constituents in the development, maintenance, and transformation of social relationships.

In sum, the three models presented for Pukara and new directions discussed from the archaeological literature illustrate the diversity of theoretical approaches developed within the study of leadership strategies. The next step is to develop methodological approaches that effectively operationalize these new directions. While there are many contexts in which to explore these issues, especially considering the diversity within a large-scale site, the central pampa at Pukara was chosen because of its location within the central ceremonial district and the potential diversity of uses of this highly public space during the Late Formative. Public spaces are areas of significant encounters for all sectors of society; they are arena in which power relationships originally reflected in their construction are reproduced, negotiated, and also challenged. It is these encounters that provide insight into shifting leadership strategies during the Late Formative, while building upon the existing models for Pukara organization.

Theoretical Perspectives on Public Space

Determining the relationship between the use of space and the nature of power relationships in both public and private spheres has been a major goal within anthropological and archaeological discourse during the last few decades (Clark 2004; Couture 2002; DeMarrais et al. 1996; Donley-Reid 1990; A. Joyce 2004; R. Joyce 2004; Low and Lawrence-Zuñiga 2003; Moore 1996a, 1996b; A. Smith 2003; M. Smith 2003a, 2003b; Trigger 1990; Yaeger 2003). In large-scale, highly

differentiated centers such as Pukara, space "ranges from private to public in design and use and is configured by inhabitants at numerous levels" (Smith 2003b:19). The category of public space includes plazas, public buildings, and other areas that can be accessed by large numbers of people. Borrowing from Bruce Trigger's study of monumental architecture, I propose that public space can be differentiated from private space in similar terms: "[i]ts principal defining feature is that its scale and elaboration exceed the requirements of any practical functions that a building is intended to perform" (Trigger 1990:119). Beyond scale, the form and orientation of public spaces can be used to constrain access to and use of areas, as has been documented in numerous spatial analyses of both modern and prehistoric centers (Couture 2002; Moore 1996a, 1996b; Smith 2003a; Yaeger 2003).

In contrast, private or semi-public spaces are "shaped by regular social and economic transactions" (Smith 2003b:19) and include areas such as households, neighborhoods, and production areas such as workshops. It is in these areas where it is possible to record the daily activities of residents and how they reflect status differentiation, the materialization of community and kinship ties, and other basic elements of social and economic relationships. Ideally, data collected from public, semi-public, and private spaces are used in tandem to document the diversity of site organization and power relationships across these spheres.

Jerry Moore's (1996a) analysis of public constructions, *Architecture and Power in the Ancient Andes*, provides an excellent framework for operationalizing the study of public spaces and contextualizing the study of Pukara. The project

begins with a history of the archaeological study of architectural patterns in the Andes. The two major approaches are the "art historical," paralleled by the use of the horizon concept within archaeology, and the "art critical," borrowed from architectural criticism (Moore 1996a:4-8). In response to the limitations of these earlier traditions, a more holistic, anthropological approach is proposed: "I assume that public buildings—whether impermanent ritual structures or massive royal compounds—are evidence of differing public orders and social motives. Public buildings are physical testimonies of the use of power" (Moore 1996a:2). Using the variables of permanence, scale, centrality, uniqueness and visibility, a comparative analysis is conducted of 22 sites across the Peruvian central coast and north and central highlands spanning from 6000 B.C. - A.D. 1470 (Moore 1996a:19, 139). Addressing the major questions of "what could be perceived and from where?" on public constructions, Moore concludes that different modes of communication were used throughout the region, indicating major transformations in the nature of public ritual.

In "*The Archaeology of Plazas and the Proxemics of Ritual,*" Moore (1996b) expands his architectural analyses to include plaza spaces. Plazas are defined as "unroofed, nondomestic areas that are recognizable elements in the built environment" that serve as "places of encounter" (Moore 1996b:789, 798). Archaeological, ethnographic, and ethnohistoric data are used to compare the central plazas of the Inka Empire (A.D. 1430-1530), the enclosed plazas of the Chimu state of the Peruvian North Coast (A.D. 900-1470), and the sunken plazas of the Lake

Titicaca Basin, including those of Chiripa (600-100 B.C.), Pukara (200 B.C. - A.D. 300), and Tiwanaku (A.D. 300-1200). Based on differences in size, layout, and the potential forms of ritual communication that would correspond to each of the three types, Moore concludes that different conceptions of public-ness and rite were reflected through these spaces.

What does this mean for the study of Pukara? In the analysis of Titicaca Basin court complexes, the small, sunken, enclosed plazas prominently located on mounds or platforms were designed for a clearly different type of communication than the massive plazas of the Inca and the Chimu (Moore 1996b:796). Within the courts it would have been possible to see a hand gesture, hear a spoken word, and communicate among a small number of participants[3]. The question remains, "who were those participants within Pukara society?" Can we develop a comprehensive understanding of public ritual through interpretations focused exclusively on the Qalasaya? While the sunken court complexes and monumental terraces of the Qalasaya were clearly the most centrally located and imposing settings for public ceremony at Pukara, there remains the possibility that access to these areas was restricted or that the courts were one of many areas within the central ceremonial district used as public space. Based on the potential insights into social relationships

[3] In 2001, I attended a Catholic mass in the central sunken court of Pukara. It was a highly syncretic ritual presided over by a Catholic priest and a local shaman (*yatiri*) that included the rites of the mass, burned offerings by the *yatiri*, and offerings of crops by local participants. The space held dozens of participants and the service filled the court with impressive amounts of sound.

and leadership strategies to be gained from the study of public spaces, I argue that models for Pukara growth and development are incomplete without consideration of the central pampa as an integral element of the site's ceremonial district.

Insights from Public Space at Monte Albán

Monumental spaces in Mesoamerican centers vary spatially and temporally and there has been heated debate concerning their origins, relative chronologies, functions, and the relationship between public space and early leadership (see Clark 2004; R. Joyce 2004). The site of Monte Albán was chosen as a case study for several reasons: the long history of systematic, well-documented archaeological investigations in the valley of Oaxaca; the variety of theoretical approaches underpinning these investigations; and the development of explanatory frameworks that consider the significance of public space in polity development. While studies have focused on interpolity interaction to explain sociopolitical development in the region (e.g., Marcus and Flannery 1996; see discussion in A. Joyce 2004:192), there has also been a theoretical and methodological shift towards incorporating the role of intrapolity interactions in large-scale change. Instead of focusing primarily on inter-elite conflict beyond the polity boundaries, the latter approach addresses "how the negotiation of power among noble and commoner classes contributed to changes in the scale and complexity of the Monte Albán polity" (A. Joyce 2004:193). From this perspective, shifts in politico-religious power from the Formative through the Classic Period in the valley of Oaxaca are inferred from changes in the architectural layout,

the symbolism of buildings, plazas, and monumental art, and in the access to the Main Plaza area by commoners and elites (A. Joyce 2004).

Based on the interconnectedness of political power and religion in ancient Mesoamerica, Arthur Joyce uses the construction and function of sacred spaces at Monte Albán to study the relationship between constructed landscape and social action (A. Joyce 2004; see also Ashmore and Knapp 1999). Specifically, Joyce investigates monumental spaces such as the Main Plaza as dynamic settings for the "construction and negotiation of politico-religious power" (A. Joyce 2004:194). The Main Plaza at Monte Albán was originally constructed ca. 500 B.C., at the founding of the site, and used for several centuries as a setting for public ritual performances. Monte Albán, like many ceremonial sites across the world, was founded as a cosmogram with the Main Plaza built as an *axis mundi*:

> The religious and political center of the Oaxaca Valley was the Main Plaza at Monte Albán, a huge public plaza surrounded by temples and palaces that housed nobles and ruling institutions. In complex societies, constructed landscapes, especially monumental spaces like Monte's Albán's Main Plaza, are important aspects of structure that shape and are shaped by social action [Joyce 2000:193].

However, the layout and use of the Main Plaza shifted over time, as indicated by architectural, artifactual, and iconographic evidence. Based on continuing spatial segregation of the Plaza, rulers "shifted their focus away from rituals that emphasized communal identity and toward self-aggrandizement" (Joyce 2000:207). By A.D. 200, the Main Plaza was transformed into an elite residential precinct and an area for private ceremonies (A. Joyce 2004:194). Joyce proposes that the disengagement of commoners from state ceremonies, in combination with inter-elite

competition and factionalism, should be considered as contributing factors to the collapse of Monte Albán ca. A.D. 800.

Joyce's work at Monte Albán contributes to the study of social complexity through actor-based theoretical perspectives (Bourdieu 1977; Giddens 1984; Ortner 1984) and also to the operationalization of these approaches at large-scale sites. "Practice theory forces us to consider all people as social agents and to view history as the outcome of struggle, negotiation, competition, and cooperation among actors (elites and commoners alike)" (A. Joyce 2004:212). The study of public spaces provides a context in which transformations of these complex interactions can be traced spatially and temporally in the archaeological record.

Chapter 3: Pukara: Background to Research

The goal of this chapter is to provide a multi-tiered background to frame the study of the Late Formative Pukara polity. First, I briefly outline natural resource zones and cultural modifications of those zones that improve their suitability for agriculture and camelid pastoralism. The second section summarizes relevant previous research, including ethnohistoric, historic, and archaeological investigations of the site of Pukara and the modern town of Pucará. The third section is a discussion of primary data related to site size, layout, and occupation history, including both absolute and relative chronologies for the Late Formative occupation. The last section briefly presents evidence for Pukara presence and/or influence outside of the Titicaca Basin.

The Natural Setting: The Lake Titicaca Basin

The Andean Cordillera is 7250 km long (Winterhalder and Thomas 1978:3) and consists of two parallel chains of mountains, converging and diverging as they run the length of South America. The *altiplano*, a wide intermontane basin between the eastern and western flanks of the Andes, covers an area of over 1200 km from north to south and 200 km east to west in parts of modern Peru, Bolivia, Chile and

Argentina (Binford and Kolata 1996:24). Within the *altiplano* are a number of drainage basins, including that surrounding Lake Titicaca, which covers an area of 57,340 km^2.

The geographic massiveness and high elevation of the Andes, interacting with large air masses, are the major variables affecting climate in the Peruvian Andes (Winterhalder and Thomas 1978:12). These factors, coupled with altitude and latitude, interact and form distinct ecological zones starting at the coastal desert plain, rising through the *sierra*, and into the high mountain *puna* region. Human exploitation of these multiple ecological zones is termed 'ecological' or 'zonal complementarity' and Andean studies primarily have focused on comparing the variations between, not within, these zones (Murra 1975).

There are a variety of environmental microzones throughout the Andean highlands and the Lake Titicaca Basin, at an elevation 3810 m asl, is located in the *puna* region. The *puna* is the highest populated ecozone in the Peruvian Andes and its inhabitants practice camelid pastoralism, tuber and grain cultivation, and some agro-pastoralism. The *puna* is characterized as a tropical, high mountain environment with wet and dry seasons, little fluctuation in mean monthly temperatures, but extreme ranges in diurnal temperatures (Troll 1968:19). It is a richly diverse ecozone divided into both vertical and horizontal sub-areas by the native inhabitants and geologists, archaeologists, and ecologists working in the region (McRae 1980; Stanish et al. 1997).

Cultural Modification of the Titicaca Basin Landscape

In general, modern resource zones are the result of thousands of years of human modification of the environment and the Titicaca Basin is no exception. Processes of deforestation, canalization of rivers, construction of agricultural fields, and expansion of marshlands (*bofedales*) have contributed significantly to what is often mistakenly viewed as the "natural land" instead of the anthropogenic landscape. In this section, common land management systems used in the Titicaca Basin are first presented to illustrate the potential for agricultural and pastoral intensification in the region. Secondly, debates concerning the dating of these features are briefly outlined. They are included in this discussion because of their relevance within frameworks for the nature and timing of the development of the Pukara polity.

In the region, human modification of the landscape is evidenced by the expansion of natural *bofedales* and through the construction of artificial *bofedales*, *qocha*s, terrace agriculture, and raised field systems by communities throughout the highlands (Erickson 2000). The *bofedal* is a unique feature of the high *puna*, known as *waylla* or *qocha* in Quechua. It is a natural marsh or lush meadow that occurs most frequently above 4300 m asl and is reliable throughout most of the year. These areas form when standing or running water collects in flat places or depressions in clayey soils. Drainage is poor in these areas and they are fed through run-off from extensive highland snowfields. This creates an area where camelids can graze on high quality grasses during the dry season (Flores Ochoa 1989:66; McRae 1980:21).

The productivity and reliability of *bofedales* are often improved through the construction of small irrigation canals; in some regions these can be used to create *bofedales* where they did not exist naturally (Palacios Rios 1977).

The term *qocha* is used to describe any deposit of water—natural or artificial, of any size, and those that are both permanent and temporary (Flores Ochoa and Paz Flores 1983:127)[4]. In the present context, the term *qocha* is used for anthropogenic depressions in the earth that are used to accumulate rain water. These depressions are typically circular and create artificial ponds that are used both as cultivation areas and to create expanded areas for grazing animals (Flores Ochoa and Paz Flores 1983; Binford and Kolata 1996). While *qocha* are sometimes found in isolation, there are also larger, complex systems of interlocking canals and fields that are included under the term *qocha* (Erickson 2000). Interestingly, the largest well-documented concentration of *qocha* is in the northwestern basin near the site of Pukara, located between the Pucara and Azangaro rivers.

Stone-lined agricultural terraces are also present on hillsides across the basin. As noted by Erickson (2000), terraces actually represent a greater degree of labor investment than other types of agricultural systems discussed, but have received less attention in the regional literature. This is possibly due to their ubiquity throughout the Andes, in contrast to the more "local" nature of *qocha* and raised fields. Terraces,

---

[4] Flores Ochoa and Paz Flores (1983) note that ceremonial vessels are also called *qocha*.

still used in many areas today for both habitation and agriculture, are designed to control soil temperature, decrease erosion, and increase planting space and depth (Treaty and Denevan 1994:93-96 in Erickson 2000).

The most well-documented form of agricultural intensification in the Lake Titicaca Basin are raised field systems (*camellones* in Spanish, *waru warus* in Quechua and *suka kollas* in Aymara). These systems include a series of raised planting surface platforms, often organized in bundles, with canals running between them. Raised fields allow for water management, recycling of nutrient-rich soils, increase soil quality, reduce risk of frost damage, and provide an area for aquaculture. Since the 1980s, heated debate has surrounded the dating, function, and level of socio-political organization necessary to construct and maintain these field systems (e.g., Erickson 2000; Graffam 1992; Kolata 1996; Stanish 1994).

While archaeological and ethnographic data provide insight into *how* the landscape was modified and often for what purpose, it remains unclear as to *when* these changes were originally introduced in the region. As noted by Kolata (1996:18), it is difficult to date agricultural features through ceramic artifacts or direct dating because they are typically constructed of mixed fill contexts and remodeled over time. The earliest direct evidence of stone-lined terrace construction is at Pukara, but in this context they served as retaining walls for the massive platforms of the Qalasaya complex (Erickson 2000). The relationship between architectural and agricultural terraces is only indirect at this point, but this example supports use of the general technology dating back into the Formative. Based on

their density and distribution in the northwestern basin, Flores Ochoa and Paz Flores (1983) propose that *qocha* were used during the Late Formative and, therefore, contributed the agricultural surplus necessary for the development of the Pukara polity. In the southern basin, Binford and Kolata (1996:49) argue that *qocha* use can be dated to the later Tiwanaku period and that they served as intensification devices suited to drought conditions in the post-Tiwanaku period.

Clearly, the timing and intensity of the creation and use of these different systems are key factors to understanding the relationship between intensive agricultural and increasing socio-political complexity in the Titicaca Basin. Further research is necessary to determine if intensive agricultural systems preceded the development of Pukara (Erickson 1988:13), were initially exploited during the Late Formative (Flores Ochoa and Paz Flores 1983; Stanish 2003), or were associated with later Tiwanaku and post-Tiwanaku periods.

The Temporal Setting: A Brief Introduction to Northern Basin Prehistory

A variety of chronological frameworks from both evolutionary and historical perspectives are utilized in studies of Andean prehistory. The most commonly employed framework is the Horizon sequence proposed by Rowe (1960, 1962) and further developed by Menzel, Rowe and Dawson (1964) based on ceramics recovered in the valley of Ica on the Peruvian south coast. In this sequence, horizons are used to describe periods of wide-spread, shared, cultural and art traditions that are assumed to be roughly contemporaneous and are separated by intermediate periods (see Rice 1993 for further discussion). In the Andes, the Early Horizon is

characterized by the influence of Chavín, the Middle Horizon by Wari and Tiwanaku, and the Late Horizon by the Inca. In this framework, Pukara falls into the Early Intermediate Period (200 B.C. - A.D. 600).

In contrast, evolutionary or developmental frameworks "presuppose an evolutionary dynamic inherent in all societies, with a local cultural sequence representing a manifestation of some processes common to all societies" (Stanish 2003:85). These frameworks utilize stage names, such as the Archaic and Formative, to emphasize shared processes, not shared chronology. A key difference is that contemporaneous cultures may be in different stages. In the Andes, the most commonly employed evolutionary framework includes the Lithic, Archaic, Formative, Regional Development, Wari Empire, Regional States, and the Empire of Tawantinsuyu/ Inca periods (Lumbreras 1974).

In the Lake Titicaca Basin, researchers have used the Horizon concept (Burger et al. 2000; Erickson 1988; Steadman 1995), evolutionary frameworks (Lumbreras and Amat 1968), or a combination of both, termed the "dual chronological system" (Stanish 2003:88). The dual system was developed because of the difficulty of adapting the Ica sequence for the Early Horizon and Early Intermediate Period to the Titicaca region. In contrast, the Middle Horizon and Late Horizon roughly correlate with the later Tiwanaku and Inca periods in the area. In a dual chronological system, it is possible to develop local historical chronologies while simultaneously fitting them into a larger, evolutionary framework for the entire region (Stanish 2003:89). Presenting a regional chronology for the Titicaca

Basin is also complicated by the fact that researchers tend to work either in the southern or the northern basin and their use of dates and periods are not always compatible or consistent, especially for the initiation and sub-divisions of the Formative period. Throughout this study, I employ the dual chronological system both because of its flexibility and because the majority of recent research conducted in the western and northern areas of the lake are presented within this framework (e.g., Stanish 2003).

The earliest settlement of the region dates to the Early Archaic period (8000-6000 B.C.) based on research in the Ilave valley in the southwestern basin (Klink and Aldenderfer 2004). During the Late Archaic period (4800-3000 B.C.) the area was inhabited by small populations of semi-sedentary hunter-gatherers and fisherman who participated in early animal domestication. The Terminal Archaic (3000-1500 B.C. in the southwestern basin) was characterized by decreased mobility, resource intensification, and settlement shifts.

The Early Formative period in the northern basin is dated to slightly earlier than in the southern basin (2000-1300 B.C. in Stanish 2003 versus post-1500 B.C. in Klink and Aldenderfer 2004; Janusek 2004). This period is characterized by the first signs of settled villages, specialization, hierarchy and demographic growth (Aldenderfer 1989:133). Based on survey data, villages were small and undifferentiated, without evidence for regional integration (Stanish 2003:99). It is unfortunate that the origins of ceramic production in this region remain unclear, as there have been few Early Formative contexts excavated in the region. The earliest

dates for ceramics are primarily based on collections from early levels at Chiripa (Browman 1980), Qaluyu (Mohr-Chávez 1977), Formative levels at Quelcatani analyzed by Lee Steadman (Aldenderfer, personal communication 2004), and possibly in the earliest constructions at Pukara (Wheeler and Mujica 1981).

The Middle Formative period (1300-500 B.C.) is characterized by the establishment of ranked societies, as evidenced by major changes in material culture and settlement (Stanish et al. 1997; Stanish 2003:109). Settlement patterns shifted as numerous primary regional centers such as Canchacancha-Asiruni, Qaluyu, Pukara, Chiripa, Tiwanaku, and several others grew in size and complexity across the basin (see Figure 1; Stanish 2003:117-120). These sites include the earliest public architecture in the region and highly decorated monoliths and ceramics. Stanish argues that these sites served as "elite civic-ceremonial centers with allied commoner populations" (2003:110) and it has been argued by Sergio Chávez and Karen Mohr-Chávez that they were interconnected through the Yaya-Mama Religious Tradition (Chávez and Mohr-Chávez 1975; Mohr-Chávez 1988). The tradition, starting in the Middle and continuing into the Late Formative period, was originally defined by a style of stone sculpture, but was expanded to include shared architectural traditions and associated ritual paraphernalia (Burger et al. 2000). Stanish emphasizes these shared symbols have significance beyond a religious tradition and "represent[s] the emergence of a new elite ideology associated with a profound change in the sociological and political structure of Titicaca Basin society: the development of social and political ranking" (2003:132).

The Late (or Upper) Formative (500 B.C.- A.D. 400) is characterized by the development of the first markedly ranked societies in the region centered at the sites of Pukara in the northwestern basin and Tiwanaku in the southeastern basin (Stanish et al. 1997; Stanish 2003:137). Stanish defines these polities as complex chiefdoms and, in spite of their scale and influence, argues that many areas of the basin were not under the control of either polity. According to this model for the Late Formative, at least a dozen contemporary regional centers existed at this time and continued with the same political economies as had developed during the Early and Middle Formative (Stanish 2003). Both Pukara and Tiwanaku attracted large numbers of residents, but "the rest of the region's population probably remained largely agricultural, living in hamlets, villages and regional centers" (Stanish 2003: 141).

By A.D. 400, the Pukara polity had collapsed (Wheeler and Mujica 1981) while Tiwanaku continued to grow and reorganize into an urban center, one that developed into the first archaic state of the Titicaca region (Stanish 2003:165). The Middle Horizon, also termed Expansive Tiwanaku period in the south-central Andes (Stanish 2003), is subdivided into four phases that span from A.D. 500-1150 (Janusek 2003:56-57). Extensive excavations have been conducted at the site of Tiwanaku by the Projecto Wila Jawira Research Program (Kolata 2003) and in other contemporaneous Tiwanaku sites in the basin and the periphery (e.g., Bermann 1994; Goldstein 1993; Kaulicke and Isbell 2001; Seddon 1998). It is interesting to note that there are Tiwanaku sites throughout the western Titicaca Basin and as far

north as Maravillas (Stanish 2003:183), located south of Pukara in the northern basin (see Figure 1), but not a single Tiwanaku sherd has been recovered from recent surface collection or excavations at Pukara. Determining the local Middle Horizon occupation in the northern basin is currently being investigated through full-coverage survey and excavations of multi-component sites in the region (Charles Stanish, personal communication 2004).

Previous Research at Pukara: From Ethnohistory to Archaeology

The earliest Colonial historic documents, in conjunction with archaeological research in the area, provide insight into the political situation in the northern basin during the Late Horizon and preceding Altiplano periods. The Altiplano period (A.D. 1000-1450) was a time of regional conflict and the Lake Titicaca Basin was divided by warring polities who lived in a dispersed settlement system with hilltop fortresses (*pukaras*) visible across the region (Hyslop 1976:110; Stanish 2003:206). The largest groups in the western basin were the Colla and the Lupaca, with the former in the northern and the latter in the southern area. In approximately 1450, the Inca formed an alliance with the Lupaca and conquered the Colla. In 1471, the Colla rebelled against the Inca from four major fortified sites at Llallahua, Asillo, Arapa and Pucará[5], all concentrated in the northern basin (Rowe 1942; Spurling 1992). It

[5] The spelling "Pucará" is used in this context because the references are from historical documents that do not distinguish between the prehistoric site (Pukara) and the later town "Pucará".

was a bloody series of battles that is reported to have lasted for three years, resulting in an eventual, but costly victory for the Inca.

There were several repercussions for the Colla after their defeat by the Inca. Pucará, along with several neighboring areas, was incorporated into the private estate of Thupa Inka Yupanki, as was a typical strategy for dealing with areas that had been especially difficult to control (Spurling 1992:86). There was a clear population shift away from the Qalasaya complex, an area of Colla settlement and cemeteries during the Altiplano period, as the Inca moved populations slightly to the north, the location of the modern town of Pucará. Additionally, the Inca moved *mitmaqkuna* into the town of Pucará, possibly to guard over the rebellious Colla population (Spurling 1992:88).

The Formative period occupations and monoliths of Pukara were first mentioned in print by the chronicler Pedro de Cieza de León after a visit in either 1540 or 1550 (Bandelier 1905; Chávez Ballón 1950; Cieza de León 1959 [1553]). Cieza spent a few days in the town of Pucará:

> Following the [Inca] highway, from Ayaviri ones comes to Pucará, which means stronghold and is four leagues from Ayaviri. It is told by these Indians that in olden times there was a large population here in Pucará; now there is hardly a single Indian. I was there one day observing everything. Those living in the vicinity tell that Topa Inca during his reign [AD 1471-93] besieged the Indians for many days, and before he could subdue them, they fought so bravely that they killed many of his men. But as in the end they were defeated, the Inca, to commemorate his victory, ordered great stone statues made. If this was the case, I know it only by what they tell. *What I saw at Pucará were great buildings in ruin and decay and many statues of stone in the shape of human figures and other noteworthy things*" [Cieza de León 1959:277-278 [1553], italics added].

In 1554, not long after Cieza's visit, the rebel army of Francisco Hernández Girón was defeated at Pucará by the Real Audiencia de Lima to put an end to the last civil war following the Spanish conquest (Rowe 1942). In 1618, the Formative period constructions were again mentioned, this time by Antonio Vásquez de Espinosa after a visit to Pucará: "their marvelous works—there were great proud buildings with many stone statues in the likeness of men and other creatures, very neatly worked" (Cieza 1959:238 [1553]).

Between the early 1600's and 1900's, the town of Pucará and the Formative period site of Pukara were not widely referenced in historical accounts of the Titicaca Basin. In an ethnohistorical study of the northern basin, Geoffrey Spurling (1992) documented the location and organization of craft production centers during the Late Horizon and the subsequent Colonial period. He paid special attention to the area of Pucará, located near a variety of excellent clay deposits, because of its position as a modern pottery production center in the region. However, there were not references to the towns of Pucará, Pupuja[6], or Llallahua as pottery producing areas under Inca rule (Spurling 1992:244). It was not until 1680 that Santiago de Pupuja was mentioned in a court case over clay disputes (Spurling 1992:244).

In the late 1800's, a myriad of European and American explorers visited and documented the ruins of Tiwanaku, the Island of the Sun (Bandelier 1910), and Sillustani (Bandelier 1905; Squier 1973 [1877]) in the southern and western Lake

[6] Santiago de Pupuja and Llallahua are both within 10 km of Pucará.

Titicaca Basin. Pukara, in contrast, went relatively unnoticed. Ephraim Squier did document Pukara stone pillars at Hatuncolla, located to the south of Pukara (Squier 1973:385 [1877])[7], but there was nothing equivalent to the detailed documentation of Tiwanaku's Middle Horizon constructions.

In was not until the 1920s that renewed interest was sparked by the impressive stone sculptures and polychrome pottery defined as the Classic Pukara style that were first systematically studied by Julio C. Tello and Luis Valcárcel (1925, 1932, 1935). Valcárcel visited the site in 1925, 1934, and 1935 (Kidder 1942) and Tello is credited with first discovering the expansive middens on the site periphery during a visit in 1937 (Chávez Ballón 1950). According to Rowe and Brandel (1971), on a site visit in 1935 Tello and Valcárcel defined the Pukara pottery style and dated it to the Early Intermediate Period based on similarities to Nasca 1-3 pottery.

Explorations in the western and northern Lake Titicaca Basin by "Project 7" of the Institute of Andean Research program led to a flurry of projects and publications in the 1940s (Kidder 1942, 1943; Rowe 1942; M. Tschopik 1946). From January through June of 1939, Alfred Kidder II of the Peabody Museum at Harvard directed the first and most extensive excavation project at Pukara. The project was conducted in cooperation with the Museo Nacional de Arqueología, Lima, and J.M.

---

[7] The "pillars" drawn in Squier (1973[1877]) are likely those on display in the Museo Nacional de Antropología, Arqueología e Historia in Lima.

Franco Inojosa of the Instituto Arqueológico, Cuzco, worked in the field with Kidder (Inojosa 1940; Kidder 1942). Kidder's first impressions of the site were noted:

> The visible remains of aboriginal populations are not striking at first glance. Although the plain below the hills is gently rolling, with little relief, there are no outstanding structures to meet the eye. Further examination shows that many of the low mounds, covered with grass and occasional stones, are artificial. The most apparent feature is a series of terraces, built with rough stone retaining walls, just southeast[8] of the modern town and almost under the cliff of the great rock. On the top of these terraces are the remains of three large structures, almost entirely buried, and two more on lower terraces of the series. In the modern town, of which a considerable part is abandoned, large dressed blocks indicate the presence of badly ruined structures [Kidder 1942:342].

Kidder excavated in six areas: I, II, and III near the banks of the Río Pucara; IV on the central pampa; and V and VI on the terraces and main platform of Qalasaya (see Figure 4). A final report was not published, but Kidder's notes and drawings are very detailed and much of the text is in manuscript form at the Peabody Museum archive. Additionally, several researchers have published analyses and descriptions of materials from the 1939 excavations (Carlevato 1988; Chávez 1992; Franquemont 1986; Inojosa 1940; M. Kidder 1942[9]; Mohr-Chávez 1988; Mujica 1979, 1988, 1996; Paredes 1985; Wheeler and Mujica 1981). Chávez (1992:48-83) provides a detailed summary of Kidder's fieldwork that serves as the basis for the descriptions of the 1939 excavations detailed below (see also Inojosa 1940; Mujica 1979, 1988).

---

[8] The site is to the southwest of the modern town.

[9] In addition, Mary Kidder's autobiography discusses living and working in Pucará in 1939. It is an interesting account of the excavation project and life in the area.

The importance of Kidder's 1939 field season at Pukara cannot be overstated. The six months of excavations established the scale, layout, architectural components, and variety of material culture types used to define the Pukara culture. It is unfortunate that due to field techniques of the time most areas were excavated in arbitrary levels and that it is not possible to develop a refined ceramic chronology based on the extensive collections (Chávez 1992). Considering the state of knowledge in Titicaca Basin archaeology in 1939 (it was not until the 1950s that the relative chronology of Tiwanaku and Pukara was established, for example), Kidder's excavations had a tremendous impact on the development of regional culture history.

In 1941, John H. Rowe visited several sites around Pukara as part of "Project 7" (Rowe 1942). Rowe had studied the ethnohistoric references to the site and town and was especially interested in understanding the origin of the name Pucará. In Quechua, *pokara* is translated as "*puesto fortificado*," a stronghold or fortress (Rowe 1942). Typically in the Titicaca Basin, these fortresses are located on hilltops and surrounded by large defensive walls (Hyslop 1976; Stanish 2003). The slumping terraces of the Formative period site were not likely candidates for inspiring the name of the town and site. During this visit, Rowe explored beyond the site and discovered Incacancha, a Late Horizon and Late Intermediate Period site located on the crest of the hills above and to the west of the Formative period architecture. The site was apparently destroyed by the Inca after crushing the Colla revolt at Pucará (Rowe 1942). The remains of fortification walls, the location of the site, and

presence of later period pottery styles supported Rowe's assertion that he had located the fortress for which the present day site and town are named.

The investigations of Tello, Kidder, Rowe, and the other members of "Project 7" drew attention from archaeologists working outside the basin. Manuel Chávez Ballón, a major figure in Peruvian archaeology from the Universidad Nacional San Antonio Abad del Cusco, conducted excavations at the site shortly after Kidder.

> En 1943 el Dr. Tello me encomendó efectuar un reconocimiento arqueológico de Pukara y en 1949 realicé excavaciones y trabajos de investigación por encargo del Museo Nacional de Antropología y Arqueología de Lima; los resultados obtenidos fueron muchos miles de fragmentos de alfarería y sólidos conocimientos sobre la Cultura Pukara [Chávez Ballón 1950:42][10].

A final report of these excavations was never published, an unfortunate trend in the archaeological research at Pukara, but local residents have reported that he excavated near the Lagunita Mound on the south end of the central pampa. A subsequent article by Chávez Ballón (1950) presented a general description of the natural resources, site layout, and pottery styles at Pukara. Also in 1949, Chávez Ballón excavated at the site of Qaluyu, 4 km north of Pukara on the Juliaca-Cuzco highway (see Figures 1 and 8). Both Qaluyu and Pukara style ceramics were found in a road cut at the site,

---

[10] "In 1943, Dr. Tello entrusted me to conduct an archaeological survey of Pukara and in 1949 I carried out excavations and investigations for the Museum of Anthropology and Archaeology in Lima; the results obtained were many thousands of ceramic sherds and solid knowledge about the Pukara Culture."

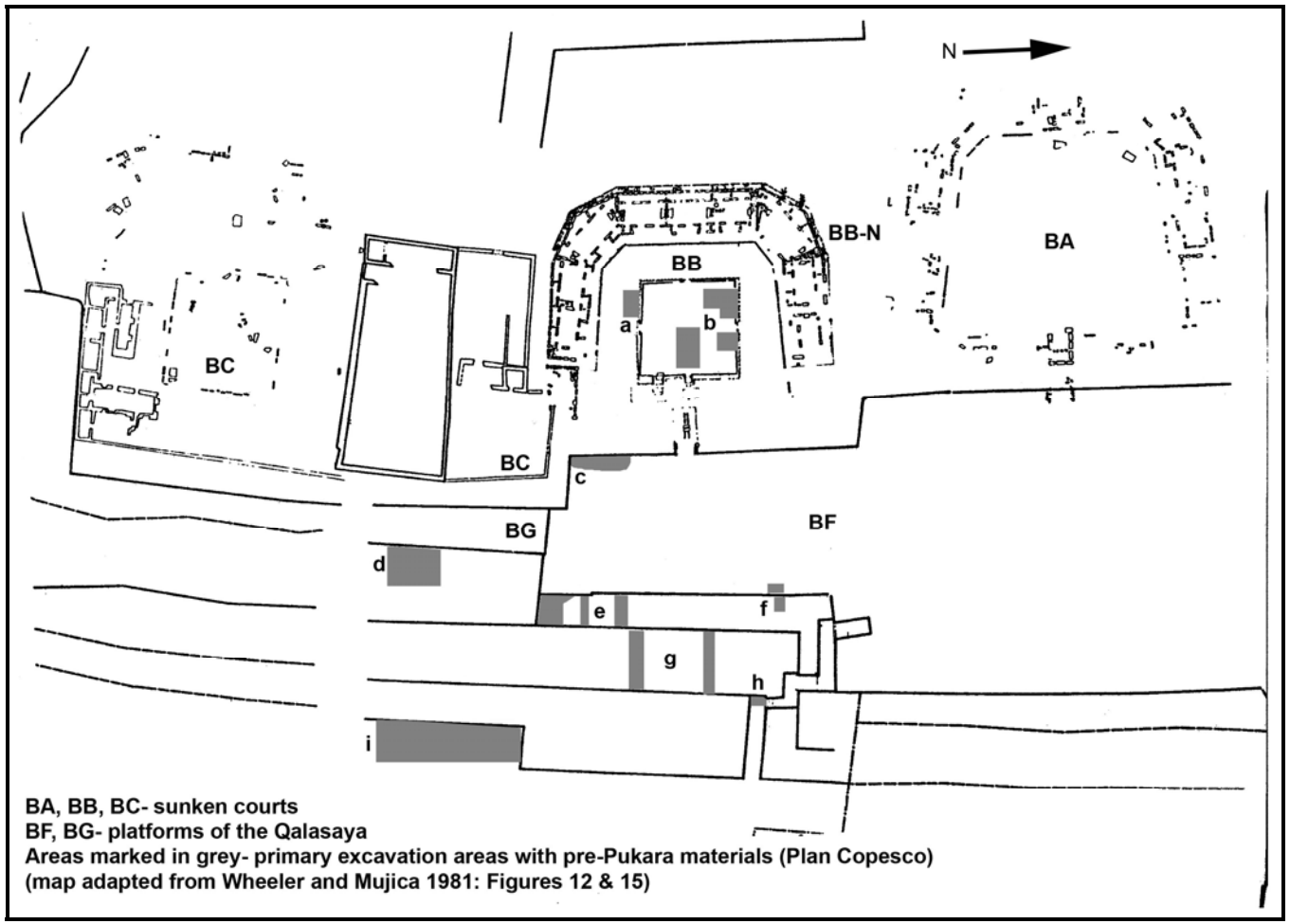
with the former being recovered from midden deposits 2 m below the latter and separated by alluvium (Chávez Ballón 1950:43). Chávez Ballón's research at Qaluyu was an important contribution to the regional chronology. He concluded that Pukara was possibly pre-Tiwanaku and definitely post-Qaluyu, and also noted similarities between Pukara pottery and that of Chavín in the central highlands and Chanapata in Cuzco.

In 1955, Kidder returned to Pukara with Manuel Chávez Ballón to collect samples for radiocarbon dating (Kidder 1956a, Kidder 1956b; Lumbreras and Amat 1968). They recovered the samples from a stratified midden with exposed Classic Pukara decorated sherds. The midden area, Huayapata, is located near the Juliaca-Cuzco highway and was not associated with the 1939 Kidder excavations. In 1964, Máximo Neira Avedaño and Jorge Flores Ochoa conducted a limited testing project in the Huayapata midden area from which Kidder and Chávez Ballón collected the radiocarbon samples. Unfortunately, the recovered ceramic materials have not been published, nor have details of the contexts dated by Kidder.

The second large-scale excavation project was conducted from 1975-1980. Beginning in 1975, the Primer Curso de Métodos y Técnicas en Arqueología Andina, directed by Luis Lumbreras, was conducted in the central ceremonial complex of Pukara with the participation of archaeologists from across the Andes and the sponsorship of UNESCO (United Nations Educational, Scientific and Cultural Organization), the OAS (Organization of American States), and the Peruvian INC (Instituto Nacional de Culture). Plan Copesco (Comisión especial para

coordinar y supervigilar el plan turístico y cultural Perú-Unesco) continued for over four years at Pukara (Paredes 1985; Wheeler and Mujica 1981). Elias Mujica and Ernesto Nakandakari directed the project from 1975-1978 and Jorge Ismodes, Percy Paz, and Percy Bonnett from 1979-1980 (Wheeler and Mujica 1981). The project included extensive horizontal and vertical excavations of the sunken court area and reconstruction of the terraces and stairways of the Qalasaya. A National Science Foundation report by Jane Wheeler and Elias Mujica (1981) provides a summary of the architectural features, Qalasaya construction history, range of pottery types, and faunal data from each of the occupations (Figure 10). Excavations exposed the northern sunken court complex (BA), the areas between the central and northern courts (BB-N), areas of Altiplano/Late Intermediate Period and Late Horizon occupation on the upper platform, and evidence of Middle Formative (pre-Pukara) constructions in the lower platforms of the terraces (BG) (Wheeler and Mujica 1981). Due to political unrest in the region, the Copesco project was halted in the early 1980s and archaeological research at the site ceased until the UC-Santa Barbara geophysical survey and surface collections in 2000 and our excavations of 2001.

Figure 10- Qalasaya complex, central area, with areas of Copesco excavations



Pukara: What We Know

This section is a brief summary of data collected by the projects outlined above that pertain to delimiting the size of Pukara, determining area layout, and developing absolute and relative chronologies.

Site Size

Researchers have reported the size of Pukara ranging from 150 ha (Chávez 1992) to 6 km^2 (Mujica 1991) based on both differences in site recording methodology and the lack of excavations in peripheral areas (see Figure 8). Smaller size estimates limit the site to the central core of monumental architecture and the surrounding area of habitation, excluding areas with Pukara artifacts that are not continuous (Stanish 2003). Estimates of 4 km^2 include the central core area as well as associated mounds reported on the alluvial plain near the river (Erickson 1988). The 6 km^2 estimates encompass the aforementioned areas, in addition to the zone between the town of Pucará and the Qaluyu River to the north (Wheeler and Mujica 1981: Figure 10; Mujica 1991). Because this entire area has been heavily modified through agricultural practices, grazing, and river meanderings, additional excavations are needed in peripheral areas in order to support site size estimates beyond conservative boundaries of 1-2 km^2.

Diversity of Site Use and Layout

There are a number of distinct areas at Pukara, as illustrated through the overall site layout, diversity of architectural types, scale of different zones, and

associated artifacts reported from previous excavations (Chávez 1992; Franquemont 1986; Inojosa 1940; Kidder 1942; Mujica 1991). Based on the Kidder and Copesco excavations, I divide the site into two general areas: 1) the central, monumental district that includes the Qalasaya complex, the surrounding artificial mounds, and the central pampa; and 2) the site periphery near the river that includes evidence of commoner residences and dense midden areas. These areas and their various components are described in detail in order to contextualize the central pampa within the site as a whole.

The Qalasaya complex consists of a series of stone-lined terraces and platforms rising steeply 32 m over the central pampa. The complex is in the form of a truncated step-pyramid with both straight and curved walls, a series of variously sized platforms, and a variety of interesting architectural features, many of which are only partially exposed. On the uppermost platform is a series of three sunken courts running north-south that vary slightly in form, orientation, and scale. The Copesco excavations fully exposed the terrace walls and platforms that measure 315 m north-south and 300 m east-west and reconstructed the main central staircase (Wheeler and Mujica 1981).

In 1939, Kidder completely exposed Enclosure 2[11], the central sunken court and its surrounding structures, in an area measuring 1800 m^2 (Chávez 1992). The

[11] Enclosure 2 is also referred to as the red and white temple by Kidder and as BB by Copesco.

central court measures 15 m x 16 m and is 2.2 m deep (BB on Figure 10)[12]. The walls of the court were constructed of vertically placed worked stone. The entrance is off-center on the eastern side of the structure and each of the walls has a central stone-lined burial chamber (Mohr-Chávez 1988). The upper structures were constructed of large, worked stone slabs arranged in rooms on three sides of the court forming a U-shape. Recovered materials from Kidder's excavations include burials from the four chambers in the court walls and carved stone bowls, pestles, and other "religious materials associated with temple activities" (Chávez 1992:83). Later excavations by Copesco uncovered evidence of stone-lined canals in various areas of the Qalasaya, including in the sub-floor deposit of the central sunken court (Wheeler and Mujica 1981). While the tradition of subterranean structures in the Lake Titicaca Basin predates the Late Formative (Mohr-Chávez 1988; Hastorf 1999), it was Kidder's excavations at Pukara that first fully exposed and defined the sunken court complex.

A second type of architectural feature was excavated in the monumental core of the site by Kidder, but it is poorly understood because only a small area was exposed (Chávez 1992:74-78). Area V (Enclosure 4 for Kidder) is located on a massive, lower terrace of the Qalasaya to the north-east of the sunken courts, above the central pampa, and just west of the northernmost mound. Kidder selected this area because of surface evidence of architecture and through excavations he outlined

[12] Unless otherwise noted, descriptions from the Kidder 1939 excavations are from Chávez 1992.

the general layout of a structure measuring approximately 73 m x 65 m. Of the small section excavated, it is clear that the construction was monumental; the walls were constructed of dressed, sandstone blocks and large slabs were used both for paving and to subdivide the area. The excavation contexts were initially divided into three areas and then two of these were further subdivided into upper and lower levels, however the contexts are mixed (Chávez 1992:78). Kidder designated this structure as the largest temple at the site, arguing for the presence of a sunken court within it, but due to the small percentage exposed this area clearly merits further attention.

In addition to platform structures, there are two artificial mounds, the northern mound and the Lagunita Mound, that serve to mark the boundaries of the central ceremonial site core. The Lagunita Mound is so named for the presence of a lagoon directly to the south that may represent a borrow pit from mound construction. These mounds have not been systematically excavated, but they clearly qualify as a third type of architectural unit and are dated to the Pukara occupation of the site based on location and surface pottery. Kidder reportedly trenched the Lagunita Mound, but there are no published data on the results. The northern mound has not been excavated, but recent plowing has exposed stone blocks, a possible entrance from the west, and Formative period pottery. It is hypothesized that there were structures, possibly sunken courts, constructed on the upper surfaces of these mounds (Stanish 2003), but this remains to be tested.

The last type of architectural unit was a large compound excavated on the southern edge of the central pampa (Area IV), located just to the west of the 2001

excavations (see Figure 5). There were not many surface indications of the buried architecture, but Kidder chose to excavate Area IV because a monolith was reported to have been encountered there (Kidder 1942). Excavation trenches exposed an area of 1245.5 m^2 and uncovered the walls of a large enclosure, sub-divided into rooms and open areas, measuring 35 m on a side (Chávez 1992). The uppermost surfaces of the large foundation walls were found very close to the modern ground surface, approximately 20-30 cm in some areas, and excavations in most areas were only 50 cm deep (some as deep as 1.4-1.9 m). Materials collected from Area IV include Pukara decorated and plainware sherds, charred animal bones, and other domestic refuse. Features include a three meter long baked clay hearth, a possible storeroom, a human burial, and a concentration of approximately 100 cranial fragments encountered near a large slab in the central area of the enclosure.

On the site periphery, to the east of the town of Pucará, Kidder excavated a series of test pits in Areas I, II, and III (Chávez 1992). Kidder chose this area because of high densities of surface artifacts and midden eroding from the riverbank. Area I was located high above the river and extended over an area of 10 m x 6 m. It consisted of four rubbish pits dug into sterile and several interesting features, including a dog burial and secondary human burial. Area II was 6 m x 2.5 m wide and over 2 m deep. In this area there was a large midden-filled pit containing charcoal, ash, obsidian, polished stone artifacts, worked antler, and pottery. Area III

covered an area of over 135 m^2 and was chosen because Pukara polychrome pottery was found on the surface[13]. There were dense middens (but not from pits like in Areas I and II) and a structure that Kidder defined as non-elite domestic architecture. The structure was rectangular (2.4 m long and 1.4 m wide on the interior), constructed of adobe and a single row of river cobbles, and opened onto a pavement layer of small rocks. Artifacts and features included two broken mortars, a possible exterior hearth, and abundant ceramics. Unfortunately, the foundations of the structure were encountered three meters below the ground surface and the major excavation unit in this area collapsed and trapped two of the workers. They survived with a few broken ribs, but excavations were halted immediately for obvious reasons (M. Kidder 1942). While this area has promising potential for future fieldwork, the logistics of excavating near the river are complicated by the depth and instability of the alluvial deposits.

Based on previous field research, published observations, aerial photos, geophysical survey, and recent surface observations, there are a number of areas remaining to be investigated at Pukara. As noted above, no systematic excavations have been conducted on the smaller northern and Lagunita mound complexes of the central ceremonial district. Kidder also noted seven mounds on the pampa (Chávez

---

[13] Chávez (1992) notes that a stone bowl fragment recovered in Area III was refitted with a fragment recovered from Area VI, the central sunken court. This evidence, in combination with the dense concentration of polychrome pottery recovered from Area III, supports that parts of the riverbank were used as a dumping area for activities from the central ceremonial district.

1992:49), but these have yet to be definitively located and investigated in detail. There are also numerous buried architectural features that cross the pampa in unclear patterns visible on aerial photos and through surface observations (see Figure 4). On the upper hills of Pucaorqo (red hill), the hill located to the north of the site, Rowe (1942) first documented the presence of a Formative period site with a monolith on the surface. This area continues to be used today as a pilgrimage location and there are burned offerings covering the Pukara monolith. No testing of the surrounding architecture has been completed. Dense deposits of Pukara middens and stone sculpture have been encountered across the plains to the east of the site and under the modern town of Pucará. As is clear from these descriptions, we are in the initial stages of outlining the diversity of architectural types present at Pukara and have little information as to whether the variability was based on differences in function, change over time, or use by different sectors of society.

Site Chronology

There are a limited number of radiocarbon dates available from Late Formative period contexts at Pukara or from Pukara occupations at other sites (Appendix 1). As mentioned above, Kidder collected samples for dating from a midden area called Huayapata located between the town and the central area of the site (Ralph 1959). The dates have been published in a variety of contexts as the temporal limits of the Classic Pukara (200 B.C. - A.D. 200) culture for their association with highly decorated, polychrome, incised ceramics (Franquemont

1986; Lumbreras and Amat 1968; Paredes 1985; Steadman 1995; Wheeler and Mujica 1981). A single date has been published from excavations at Qaluyu: "Our own date for the Pucara occupation at Qaluyu, also in the first century B.C. (Lawn 1971, P-1581), conforms well to those of Kidder obtained at Pucara itself" (Chávez 1992:45). Moving to the south, a number of dates from the Formative period were recovered from the multi-component site of Camata (Steadman 1995:541-543).

The Copesco excavations of the monumental terraces and below the central sunken court exposed a series of construction phases within the Qalasaya complex (Wheeler and Mujica 1981). Ceramics recovered in these excavations were compared to diagnostic sherds from dated contexts at other sites in the region to create a relative ceramic chronology for Pukara. Finally, the architectural sequences, coupled with ceramic cross-dating, were used to develop an overall occupation history that included at least two major constructions of the Qalasaya complex. The proposed "epochs" outlined by the Copesco project are presented, but with some discussion of their limitations and subsequent data to consider.

Epoch 1, the initial pre-Pukara occupation, is dated to pre-1400 B.C. based on the presence of Qaluyu style pottery in the overlying deposits (Wheeler and Mujica 1981). Considering Qaluyu pottery ranges from 1400-850 B.C. (Mohr-Chávez 1977), this occupation could be significantly later than 1400 B.C., but little has been published on Early and Middle Formative ceramics from the northern basin to refine this chronology. From the excavations, diagnostic ceramics were encountered in several areas of the Qalasaya: excavations 2.8 m below the surface of

the central sunken court (BB, levels I and J); on bedrock below the west end of the first flight of the Inca staircase; on Platform 3 of Sector BG; and on the southwest corner of Platform 4 in Sector BF (see Figure 10). Unfortunately, detailed descriptions or drawings of the diagnostic ceramics have not been published.

Epoch 2, the middle pre-Pukara occupation, is dated to 1400-850 B.C. based on the presence of Qaluyu and Chiripa ceramics superimposed on Epoch 1 levels under the central sunken court (BB, levels F, G and H) (Wheeler and Mujica 1981). Additionally, a local style defined as Zeta was recovered from these early contexts. Considering new developments in southern basin research concerning the timing, scale, and organization of the Chiripa polity (Bandy 2001; Beck 2004; Hastorf 1999; summarized in Janusek 2004), a re-evaluation of the pottery from these levels at Pukara is essential for dating the construction of the Qalasaya and determining the degree of intraregional interaction in the Titicaca Basin during the Middle Formative period.

Epoch 3, the pre-Pukara to Pukara transition, is dated to 850-200 B.C. based on ceramic cross-dating (Wheeler and Mujica 1981). Materials from this period were encountered in three distinct levels overlying the Epoch 2 levels under the central sunken court (BB, levels C, D, E), on Platforms 2, 3, and 4 of Sector BF, and on the atrium of Sector BG. Diagnostic pottery from these levels includes Initial Pukara pottery (originally termed Río Pucará, Franquemont 1986), Cusipata pottery (Franquemont 1986; Mujica 1987), and a presumably non-local type designated as Ramis (Wheeler and Mujica 1981).

The most significant aspect of Epoch 3 is evidence for large-scale architecture pre-dating the construction of the sunken court complexes and stone-lined platforms of the Qalasaya visible today (Figure 11). Architectural remains are described as representing a five-level truncated step-pyramid with retaining walls oriented on a south-southwest to north-northeast axis (Mujica 1987; Wheeler and Mujica 1981). Within these earlier constructions is a small, rectangular, stone-walled structure with a doorway on the east wall and niches on the west. Within the niches were two painted stone sculptures, one of a human body and the other a human head[14], presumably placed when the building was abandoned and sealed (Lynch 1981; Wheeler and Mujica 1981). The small structure is significant for both its timing and unique form: "[i]n form and content this structure is clearly ancestral to the more elaborate *plaza hundida* ceremonial center of the succeeding classic Pukara period" (Wheeler and Mujica 1981:29).

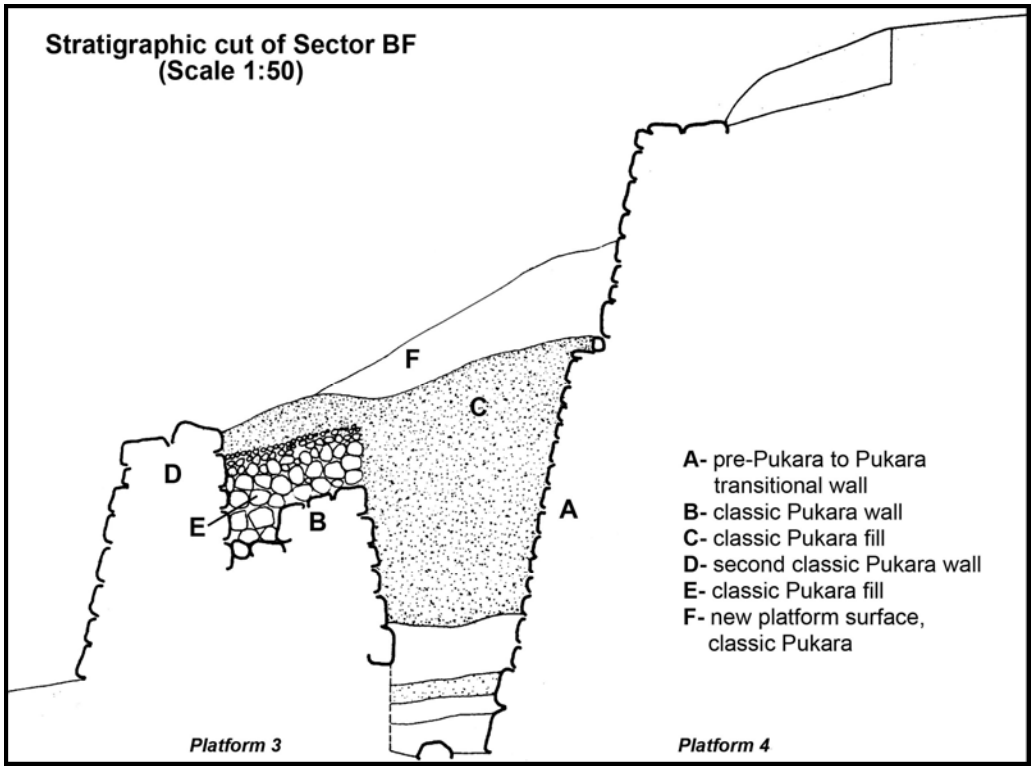
While these elements of the Epoch 3 occupation clearly precede the construction of the sunken court and terraces, it is important to detail briefly the evidence used to establish the dating of these events. For example, the most commonly referenced date for the Epoch 3 construction is from a Current Research report in *American Antiquity*: "The Kalasaya Pyramid (about 200 B.C. to A.D. 200), belonging to the Classic epoch, was built upon an Initial epoch pyramid dating

---

[14] These monoliths are on display at the Pukara site museum.

perhaps to 800-200 B.C." (Lynch 1981:204). These dates are not from directly dated contexts, but inferred from the relative ceramic chronology outlined above. In spite of these issues, the overall construction sequence is significant: "The most important finding is that continuity existed between the two cultural stages. Before the Kalasaya pyramid was erected, the Initial epoch pyramid was carefully sealed and red, black, and yellow-painted Pukara carvings were included as offerings" (Lynch 1981:204). Based on the construction sequence, method of sealing the earlier structure, and continuity in elements of local ceramic styles it is argued that the Qalasaya was continuously occupied from pre-Pukara times and experienced a major rebuilding episode during the Classic Pukara period (see Wheeler and Mujica 1981).

Figure 11- Cross-section of Qalasaya platforms illustrating multiple construction episodes (adapted from Wheeler and Mujica 1981: Figure 26)



Epoch 4, the Classic Pukara phase, is dated from 200 B.C. - A.D. 100 (Wheeler and Mujica 1981). The excavations in these levels of the central sunken court did not produce much cultural material because of Kidder's earlier excavations, but Classic Pukara ceramics have been described in numerous publications (see Chapter 7). It is presumed that during this time the site of Pukara reached its greatest extent.

Epoch 5, the Decadent Pukara occupation and abandonment of the site, is dated to ca. A.D. 100 based on the latest of Kidder's 1955 dates (Wheeler and Mujica 1981). Excavations to the north of the central sunken court (BB-N) are used as indicators of a rapid and peaceful abandonment of the site at this time. The pottery recovered from the area of BB-N is described as very similar to Classic Pukara polychromes, but slightly less elaborate. As noted by Wheeler and Mujica (1981), the stylistic variation in pottery could have resulted from differences in function instead of chronology. Overall, little is known about the timing, causes, or processes of site abandonment during the Late Formative period and there is no evidence of site use during the subsequent Middle Horizon.

Epoch 6 is the reoccupation of Pukara by the Colla during the Late Intermediate/Altiplano Period, dated to ca. A.D. 1250 (Wheeler and Mujica 1981). Use of Pukara by the Colla was first documented by Marion Tschopik (1946) based on the presence of Collao plainware and black on red pottery across the site. As indicated by the Copesco excavations, the Colla reoccupied several areas of Pukara, utilizing the terraces above the site for occupation and the platforms of the Qalasaya

to bury the dead. The majority of their occupation was on the terraces and slopes at the foot of the Calvario hill and Peñon. Excavations on the Platform 4 terrace (BF) established the use of this area as a Colla cemetery.

Lastly, the Copesco project documented Inca and colonial modifications of the Qalasaya. The Inca remodeled areas of the Qalasaya by blocking off the central stairway and moving the Late Horizon entrance to the northern end of the terraces, marked by a few Inca cut-stone blocks (Hyslop 1990; Wheeler and Mujica 1981). At the top of the former main entrance, the Inca constructed a series of trapezoidal niches just below a long, rectangular building that sits between the central and southern sunken courts. The structure, called the *Quinta*, has been dated to post-contact period and was reportedly used as a church (Wheeler and Mujica 1981:58). Ceramics recovered from this period include Cusco Polychrome, Saxamar/ Pacajes, Sillustani wares, and a local Collao-Inka ware (Carlevato 1988; Tschopik 1946).

Based on the work of Kidder and Plan Copesco, there exists a general guide to Formative period site construction and subsequent site re-use. However, due to a lack of internal subdivisions based on absolute dates or on more tightly controlled relative dates, I argue for "lumping" the Copesco epochs in the manner proposed by Elias Mujica (1988). In this framework (Table 1), the Pukara period is divided into Initial Pukara (500-200 B.C.), Middle Pukara (200 B.C. - A.D.100) and Late Pukara (A.D. 100-300). Therefore, the earliest occupation evidence from the Qalasaya complex is dated to the pre-Pukara and Initial Pukara periods, with the construction of the "Classic" Pukara terraces and sunken courts dated to the Middle Pukara

period. These dates are relatively consistent with Lee Steadman's (1995) divisions of Initial Pucara (400-300 B.C.), Pucara 1 (300-100 B.C.), Pucara 2 (100 B.C. - A.D. 100), and Late Pucara (A.D. 100-350) from her excavations at Camata. Radiocarbon dates recovered from the 2001 excavations are from the same general date range, but due to statistical overlap cannot be used to further subdivide the Pukara period (see Chapter 8).

Table 1- Pukara occupation phases

Phase	**Mujica (1988)**	**Steadman (1995)**
Initial Pukara	500-200 B.C	400-300 B.C
Middle/ Classic Pukara	200 B.C.- A.D.100	300-100 B.C. (Pucara 1) & 100 B.C.- A.D. 100 (Pucara 2)
Late Pukara	A.D. 100-300	A.D. 100-350

Interregional Interaction: Evidence of Pukara outside the Titicaca Basin

Material evidence of Pukara's presence or influence outside of the Titicaca Basin is broad in scale—artifacts are found throughout the south-central Andes—but the occurrences are limited in number, often not presented in detail, and difficult to locate in the regional literature. For these reasons, I present brief summaries of published Pukara or Pukara-style artifacts found outside of the basin (see Figure 9).

In the Department of Cuzco, approximately 200 km to the northwest of Pukara, Titicaca Basin lithic and ceramic materials serve as evidence for interaction between the two areas during the Early Intermediate Period/ Late Formative (Bauer 1999:123). Incised Pukara ceramics occur in the upper Vilcanota and Apurimac drainages (Bauer 1999), monoliths with Pukara iconography have been recovered from the province of Chumbivilcas located 75 km south of Cuzco (Chávez 1988),

and stylistic connections between Cuzco and early Tiwanaku have been proposed based on the presence of stamped and incised incense burners recovered in Cuzco (Mohr-Chávez 1985). Excavations at Batan Orco in the Valley of Huaro "have provided clear examples of Pucara ceramics" (Zapata, personal communication 1994, in Bauer 1999:123), but these results have yet to be fully published. Further work in this region is necessary to establish the nature, scale, and timing of interaction between the areas.

In the valley of Arequipa there are examples of possible imported Pukara and Pukara-style ceramics found in association with local Late Formative period contexts. At the site of Sonqonata, district of Mollebaya, a Classic Pukara feline pottery fragment was excavated from a context associated with the local Formative style termed Socabaya (Cardona 2002:61). Additionally, Sonqonata is reported to have a substantial Tiwanaku component. Lastly, Augusto Cardona (2002) reports evidence of Qeya-style pottery from the southern basin Late Formative at the site of Tasata in Arequipa, further indicating ties between the region and the Titicaca Basin.

Evidence of interaction between the Late Formative populations of Moquegua and the Titicaca Basin was first defined as the Trapiche phase by Robert Feldman (1989:213). In this framework, evidence of Pukara-style pottery from Cerro Trapiche (M7) was argued to represent an *altiplano* colony in Moquegua, similar to those investigated from the subsequent Tiwanaku period (Feldman 1989). Paul Goldstein's (2000) full-coverage survey and collections within the Middle Moquegua valley provide refined data sets from Pukara-style contexts in the area

and new insights into the significance of those finds outside of the Titicaca Basin. In contrast to Feldman's framework, Goldstein (2000:Figure 8, 347) finds that there were no Pukara residential occupations in the area, no Pukara plainware encountered, and Pukara-style sherds and textiles were encountered at only nine sites, seven of which had local Huaracane assemblages. Pukara polychrome sherds were found predominantly in association with local offerings within Huaracane boot tomb burials that appear after 170 B.C. in the area. More specifically, Pukara sherds were recovered in association with a boot tomb from Cerro Trapiche (M7C), from a significantly later context dated to A.D. 5-340 (Goldstein 2000: Tables 2 and 3 and Figure 8). An *altiplano*-style textile was also partially reconstructed from a looted boot tomb at the Omo M10Y cemetery (Goldstein 2000: Figure 16).

In addition to clarifying the contexts of Pukara-style goods in Moquegua, Goldstein's (2000) field research recovered evidence of associations between Pukara materials and both ceramics and textiles from the south coast Nasca culture. A Nasca 5 bowl was recovered from the elite habitation site of Montalvo and fragments of an Early Nasca embroidered tab textile were recovered from the same burial context as the altiplano-style textile mentioned above from Omo M10Y[15]. As noted by Goldstein (2000:347), this is the only case in which Pukara and Nasca pottery have been associated in the same site and they are both at the limits of their long-distance

[15] It is interesting to note the broad time range represented in the artifacts from the south coast in Moquegua. The Paracas or Early Nasca textile (from 300/150 B.C. into early Nasca) and Nasca 5 bowl may reflect a long history of interaction or the curation of textiles and/or ceramics.

exchange networks. Goldstein (2000:356) concludes that "the small number, specific context, and, above all, the eclecticism of the exotica found in Huaracane suggest that their significance was not to unite peer elites across geographic space, but to separate elites from commoners across local space." This is one of the few archaeological cases outside of the Titicaca Basin with sufficient contextual information to evaluate the role of Pukara goods in peripheral areas.

In sum, there remain a number of unresolved issues regarding Pukara influence both in and beyond the Titicaca Basin. Based on Pukara materials recovered in other regions, long-distance exchange of rare ritual items such as feline *incensarios* was a principal means of contact between lower elevation valleys and the altiplano during the Late Formative. Considering the central role of prestige goods exchange in all three models for early leadership strategies, further research at Pukara, contemporaneous sites in the Titicaca Basin, and outside the region is necessary to document the scale, timing, and organization of exchange during the Late Formative.

Chapter 4: Developing Material Expectations for Leadership

Determining the nature of early leadership involves the incorporation of multiple data sets from architectural, artifact, and activity area analysis. In this chapter, material expectations for alternative leadership strategies are utilized as a framework for guiding the interpretation of excavation data collected from Pukara. The chapter is organized in three sections. The first briefly reviews the material expectations developed within the dual-processual model. In the second section, the discussion shifts to developing expectations for Pukara and contextualizing the existing data sets from the site. The last section is a synthesis of relevant case studies from Formative period and Middle Horizon contexts in the Lake Titicaca Basin. These case studies are used to further refine the material expectations for the 2001 excavations and to develop a regional context for the Pukara data.

Material Expectations from the Dual-Processual Model

To briefly reiterate, in inclusionary strategies such as the corporate mode, there is an emphasis on "staple food production, communal ritual, public construction, large cooperative labor tasks, social segments that are woven together through broad integrative ritual and ideological means, and suppressed economic

differentiation" (Feinman 2000:213-214). In this strategy, leaders are relatively "faceless" and typically not commemorated as individuals in images on material culture (Feinman 2000). In contrast, exclusionary strategies such as those in network modes, place "greatest significance on personal prestige, wealth exchange, individualized power accumulation, elite aggrandizement, lineal patterns of inheritance and descent (e.g., patriarchy), particularizing ideologies, personal networks, princely burials, and the specialized (frequently attached) manufacture of status-related goods" (Feinman 2000:214).

Table 2- Tendencies of Corporate/Network modes (Feinman et al. 2000: Table 1)

Network	Corporate
Concentrated wealth	More even wealth distribution
Individual power	Shared power arrangements
Ostentatious consumption	More balanced accumulation
Prestige goods	Control of knowledge
Patron/client factions	Corporate labor systems
Attached specialization	Emphasis on food production
Wealth finance	Staple finance
Princely burials	Monumental ritual spaces
Lineal kinship systems	Segmental organization
Power inherited through personal glorification	Power embedded in group association/ affiliation
Ostentatious elite adornment	Symbols of office
Personal glorification	Broad concerns with fertility, rain

In order to develop a set of systematic material expectations for each of these strategies, I propose using evidence from three categories of data in tandem: intrasite spatial organization, food-related activities, and craft production. The use of space, specifically the presence of monumental ritual spaces, is an indicator of the corporate mode of leadership. These spaces are public, in the sense of being open to common

view or use (Clark 2004:48), and typically serve as plazas for gatherings of large numbers of people. In contrast, ritual spaces with evidence of restricted access are indicators of network, exclusionary strategies.

The second category of data pertains to whether food and beverage-related activities were organized at household (i.e. daily meals) and/or suprahousehold levels (i.e., feasts). Specifically, the role of feasting in the construction of political power is a defining element used in both corporate and network based models of political economy, as evidenced by a myriad of recent ethnographic and archaeological case studies (e.g., Blitz 1993; Bray 2003a; Dietler and Hayden 2001; Junker 1999, 2001; Le Count 2001; Mills 2004; Pauketat et al. 2001). Typologies have been developed to systematize both the recording of feasting behavior in the archaeological record and the interpretations of the significance of these events in political and social action (e.g., Dietler 1996; Hayden 2001). In Michael Dietler's framework, feasts are categorized as "diacritical", "patron-role", or "entrepreneurial" (Dietler 1996). Diacritical feasts are exclusionary events, hosted by and limited to attendance by the elite, and feature special foods, elaborate serving vessels, and are held in ritualized locations (Dietler 1996:98, 2001). In this context, feasts serve to naturalize social status and are highly visible in the archaeological record. In contrast, patron-role feasts and entrepreneurial feasts are inclusionary events in which "hosts attempt to promote solidarity and equality by widely casting invitations to community members and supporters" (LeCount 2001:935). While they may be large in scale and held in public places, inclusionary feasts can be difficult to identify

in the archaeological record because the food and beverages served do not vary significantly from daily cuisine and the style of consumption does not change. While the dichotomy of inclusionary and exclusionary feasts may not capture the subtleties of ancient feasting, it does "allow archaeologists to explore the commingled and not necessarily linear relationships among feasting patterns, social status, and political ritual" (LeCount 2001:935).

The third category of data reflects the organization of craft production. The craft production literature is extensive, utilizing both archaeological and ethnographic case studies to develop material expectations for differentiating between types of organization and contextualizing production within larger economic and social relationships (Brumfiel and Earle 1987; Clark and Parry 1990; Costin 1991; Costin and Hagstrum 1995; Feinman 1999; Hagstrum 1999; Janusek 1999). In the context of early leadership strategies, the presence of attached specialists and the control of prestige goods by leaders are indicators of network modes.

Material Expectations for Pukara

Based on previous research at Pukara, the initial impression was that early leaders at the site were utilizing a mixture of strategies, as is often the case. For example, corporate strategies are indicated by a lack of individual leaders being depicted in iconography on ceramics and monoliths. Exclusionary strategies are indicated by the use of prestige goods in long-distance exchange networks. Additionally, based on previous analyses, production of highly decorated ceramics

was standardized and has been interpreted as evidence for attached craft specialists controlled by local elites (Chávez 1992, 2002). It is also possible that shifting strategies were employed, but this is difficult to establish without diachronic data from the site.

There are a number of possible avenues to pursue in order to build upon and expand the existing data sets. A key area for further study is the central ceremonial district of the site; additional data related to the use of this space and activities performed within it are integral to discussions of leadership. While the sunken courts of the Qalasaya complex were presumably the setting of ritual activities at the site, their function, intended audiences, and relationship to the other areas of the central ceremonial district remain ambiguous. If these spaces were accessible, they would be interpreted as indicators of public ritual space and corporate strategies. However, if access to these spaces was limited to only a segment of the population, a distinct possibility considering the limited nature of access patterns, the courts would be treated as indicators of network or exclusionary strategies. Therefore, it is necessary to move beyond monumental constructions of the Qalasaya complex as a setting for public ritual and to incorporate other areas of the central ceremonial district into discussions of site organization and Pukara leadership. The central pampa was selected due to its location within the site core, the comparative data sets from the Kidder excavations, and the potential for testing models of Pukara organization in this large and diverse space. In the following section, the material indicators of spatial organization, food-related activities, and craft production are presented in

detail and related to expectations developed for alternative leadership strategies (Table 3).

Spatial Organization and Leadership

The central pampa likely functioned in a number of ways during the occupation history of Pukara and the major question related to the study of leadership is whether it served as a public or private space within the central ceremonial district. If public, the presence of a monumental space associated with the Qalasaya complex would signal the inclusion of large numbers of participants in the ritual activities of the site core, indicating the utilization of corporate leadership strategies at Pukara. In contrast, if the central pampa was used as a private space, likely for elite residential activities or centralized craft production, this would support use of exclusionary, network strategies that limited access to the area and the goods produced within.

Food-related Activities and Leadership

The goal of studying the organization of food-related activities is to determine if preparation and consumption were organized at the household level, in the context of private daily meals, or if there is evidence for suprahousehold organization related to public feasting events. If there was feasting, it is then possible to differentiate among types of feasts and relate these events to either corporate or network modes of leadership. The methodological framework for approaching Pukara food and beverage preparation is adapted from Tamara Bray's study of Inca

cuisine (Bray 2003b). Studies of cuisine use historic, ethnographic, and archaeological data to determine the following: 1) the major types of food in the diet; 2) methods of preparation; 3) modes of serving and eating; and 4) storage practices (Bray 2003a:6; see also Crown 2000; Weismantel 1988). These data sets are used to create a baseline by which to establish what constituted daily, household level activities; consequently, the presence of special or unusual elements then serve as evidence for the presence of differentiated cuisine (Goody 1982:98). These variations are then used to determine if the presence of differentiated cuisine was the result of feasting behavior or numerous other factors (see Crown 2000). Overall, while Bray's focus is Late Horizon ceramic assemblages, her discussion is holistic in its methodological approach and broadly applicable to the study of prehistoric Andean lifeways.

Following Bray, the major types of food in the Inca diet included maize (especially at lower elevations), potatoes and other root crops, *quinoa*, beans, peppers, salt, meat (hunted and domesticated), and a variety of miscellaneous wild foods (Bray 2003b). Based on research in the southern Titicaca Basin, the local dietary focus was on tubers, other root crops, *quinoa* and *cañihua*, with peppers, maize, and other lower elevation resources gained through exchange with lower elevations. Meat resources would have included domesticated camelids (*llamas* and *alpacas*), possibly wild camelids (*guanaco* and *vicuña*), guinea pig, deer (*taruca*), and a variety of fish and bird species from the nearby riverine and lacustrine areas (Moore et al. 1999; Webster and Janusek 2003; Wheeler and Mujica 1981).

Types of beverages present and their role in both daily meals and special events are unclear at this point for the Late Formative period. Beer (*chicha*), which can be made from corn, quinoa, and a variety of other grains, may have been produced and consumed during Pukara times. During the Tiwanaku period, evidence for the production and consumption of fermented beverages has been established by distinctive, decorated cups (*keros*) and the prevalence of fermentation vessels in the ceramic assemblage (Couture 2002; Janusek 2003a; Goldstein 1993, 2003). However, there is not evidence for *chicha* production from Pukara excavation contexts nor have *kero*-style serving vessels been identified in the Pukara ceramic assemblage[16]. There are highly decorated bowls, but the prevalence of beveled rims would not have been ideal for the consumption of beverages. Goldstein argues that *chicha* was first used during the Middle Horizon as a major element of Tiwanaku diet and political economy (Goldstein 2003); however, its presence in Pukara cuisine, as part of daily consumption or feasting events, must also be considered as a possibility.

There are a variety of vessel forms and sizes that would be necessary for the time consuming tasks of "drying, soaking, rinsing, mixing, parching, or boiling, and reheating" included in food preparation (Bray 2003b:103). Ceramic vessels are used from the initial stages of food processing, as evidenced by grinding or pounding

[16] Moore (1989) details the archaeological indicators of *chicha* production from a coastal Peruvian context and Sillars (2000) provides details from ethnographic research in the northern Titicaca Basin.

marks on the bases of bowls or plates, through cooking and storing. A number of vessel types are also used in the fermentation process for beer, as illustrated in ethnographic accounts from the region (Sillar 2000). Expectations for form, composition, and other attributes for utilitarian pottery were developed through three main bodies of data: 1) studies of pottery as culinary equipment or "pots as tools" (Braun 1983); 2) comparative studies of other plainware assemblages from the Titicaca Basin (Bermann 1994; Janusek 1994, 2003a; Steadman 1995); and 3) ethnographic analogy with modern ceramic assemblages from the region (Mohr-Chávez 1987; Sillar 2000; Tschopik 1950; Vokral 1991).

Lithics for food processing, including both groundstone and chipped stone artifacts, are also expected to be abundant and differentiated in the Pukara excavations. Large grinding stones (*batanes*) were described by Bandelier (1914: 156 in Couture and Sampeck 2003:234) as the most common domestic tool for the Aymara residents of the Titicaca Basin at the beginning of the twentieth century. They were, and continue to be, used as netherstones to grind maize, chili peppers, dried meat (*charki*), and quinoa. Smaller groundstone objects for grinding peppers and other spices have also been documented. Chipped stone tools are expected to represent various stages of food preparation, especially cutting and scraping activities, and likely be produced of obsidian.

In terms of food preparation techniques, the two most common culinary practices recorded are boiling and roasting. Meat and fowl were cooked directly on coals during the Late Horizon (Bray 2003b). Depictions of these techniques from the

chronicles are complemented by ethnographic and archaeological data collected from cooking features in the region (Sillar 2000; Tschopik 1946; Vokral 1991). Excavations at Lukurmata (Bermann 1994, 2003) and Tiwanaku (Couture 2002; Janusek 1994, 2003b) provide comparative data for hearth construction techniques, size, and distribution in both domestic and non-domestic contexts. Kidder's excavations by the riverbanks and in Area IV also unearthed at least two types of thermal features of different constructions and sizes (Chávez 1992; Inojosa 1940). In addition to hearths, there is a cooking technique recorded ethnographically (and still used today in Pucará) that should also be considered. The *watiya*, an igloo-shaped earth oven constructed of clods of dirt or fist-sized stones, is used during work parties to roast tubers to serve large groups of people in the fields and on site peripheries (Sillar 2000; Vokral 1991). If encountered archaeologically, this type of roasting facility could be used to infer both the scale and method of prehistoric food preparation.

Serving and eating may be accomplished with a limited number of multi-purpose vessels, but in more specialized assemblages such as those of the Inca (Bray 2003b) or Tiwanaku (Janusek 2003a) there are clearly defined categories of utilitarian and decorated wares. Pukara-style serving vessels, specifically bowls, have been identified and described in detail in previous publications (Chávez 1992; Franquemont 1986; Rowe and Brandel 1971). There are both highly decorated bowl styles with incision, polychrome paint, and Pukara iconography and presumably "everyday" bowls that are typically burnished and red slipped. As mentioned above,

cups have not yet been identified in the Pukara assemblage beyond a few possible examples of "tumblers" or proto-keros.

The last element of cuisine, the nature of storage practices, varies for liquids and dry goods and includes structures, pits, and ceramic vessels. For example, Kidder excavated a number of small structures in Area IV that may have served as storage rooms, but little information is available to firmly support that designation. Large ceramic vessels are also typically used for both types of storage, but with slightly different morphologies based on ease of access and other factors. Lastly, throughout the region there are archaeological and ethnographic examples of storage pits dug into patio surfaces and structure floors. They are used for the storage of dry goods like dehydrated potatoes (*chuño*) and grains (Janusek 1994; Klarich and Seddon 1997; Sillar 2000). Unfortunately, in archaeological examples the pits have frequently been transformed into middens and their function is therefore unclear.

Craft production and Leadership

The goals of studying craft production are two-fold. The first is to document the organization of craft activities at Pukara, there have been no production zones uncovered in previous excavations, and the second is to use the organization of production to infer modes of early leadership. Specifically, the presence of attached craft specialists and their participation in prestige goods production would serve as indicators of network models. Direct evidence for prehistoric ceramic production in the region has been recovered exclusively from the Ch'iji Jawira sector at Tiwanaku,

dated to the Tiwanaku IV and Tiwanaku V phases (Franke 1995; Rivera 1994, 2003). Four areas were identified that represent the entire production process: 1) a clay source and procurement area; 2) floor surfaces for the preparation of production materials and vessel shaping; 3) ceramic firing zones; and 4) refuse areas (Rivera 2003:306). Associated tools used in the processes of forming, treating the surface (smoothing, wiping, burnishing), trimming, and decorating were also found in the area (Rivera 2003:297, 309). In the northern basin, tools have been identified from Spurling's research at Milliraya, such as smoothers used during the leather-hard stage of vessel production and scrapers for the final stages of forming (Spurling 1992:274, 276-279). Outside of the Basin, tools used in ceramic production have been identified from Arequipa (Cardona 2002: 132), the upper Mantaro valley (Costin 1986), northwestern Argentina (Lorandi 1984:311-313) and other areas of the Andes (Shimada 1994, editor).

Typically, the most difficult step of the ceramic production process to identify is where and how the pottery was fired. Due to the smoke and odor, this area is often located downwind from site centers and in areas beyond habitation zones. Fortunately, in the case of small-scale production, the firing area may be located more centrally, such as within a habitation zone. The Ch'iji Jawira area at Tiwanaku has clear evidence of the use of open-pit fire technology:

> This evidence consists of a circle 1 meter in diameter defined internally by three rings of burned earth: a black external ring measuring approximately 5 centimeters in width; a second 10-cm ring of bright orange earth, indicating intense exposure to heat; and a white 85 centimeter ring in the center showing the area of greatest heat concentration. Similar patterns of burn marks are left by open-pit firing activities in modern-day potters'

> communities in several parts of the Andes (William Sillar, personal communication 1991). [Rivera 2003:304].

The fact that large-scale firing areas have not been encountered in the region could be due either to a lack of these facilities in areas chosen for surface collection and excavation, or due to the organization of prehistoric ceramic production. It is possible, as is the case in Oaxaca, Mexico, that specialized pottery production took place within domestic contexts and that separate workshop areas will not be encountered in the region (Feinman 1999:97).

The last stage of ceramic production is disposing of refuse. Fortunately for archaeologists, ceramic production is messy and leaves a number of characteristic material indicators that can be readily identified. Wasters, or misfired fragments of pottery (Spurling 1992:280), are the most recognizable remains of pottery production and are frequently concentrated in refuse areas associated with this activity. At Tiwanaku, the production debris at Ch'iji Jawira included "misfired and overfired sherds, wasters, figurines, amorphous clay lumps, and specialized production tools" (Rivera 2003:297).

Ethnoarchaeological studies in the region provide insights into the physical process of producing pottery, the considerations potters make in order to balance a variety of economic activities throughout the year, how pottery can be used to maintain economic and social relationships, and a myriad of other factors that may have affected the remains encountered in the archaeological record (Mohr-Chávez 1987; Sillar 2000; Tschopik 1950). Ethnoarchaeological studies in the region

highlight a number of elements missed from prehistoric cases, but it is important to consider the impacts of European contact on modern ceramic production. For example, the town of Pucará is one of the few places in the Titicaca Basin where the wheel has been adopted, in addition to more common changes such as the introduction of lead glaze and the use of electric kilns when available.

Ceramic traditions involve a combination of relatively static and highly dynamic elements. For example, in Harry Tschopik's ethnographic study of Aymara pottery production in the town of Chucuito, located in the southwestern Lake Titicaca Basin, he noted that "striking stylistic continuity appears evident: techniques of grinding clay, kneading it, "souring" the paste, and methods of construction seem to have changed little, if at all; many vessel shapes have persisted; present-day paste, paints, and slips, as well as some design motifs, represent an unbroken continuity from the past" (Tschopik 1950:216). However, he also emphasized that there was little differentiation between "ceremonial" and "utilitarian" wares in Aymara household ceramic assemblages, a striking contrast to the Pukara assemblage in which decorated and utilitarian wares are clearly differentiated by degree of decoration, form, and the composition of the pastes used. While this level of differentiation was characteristic of the Pukara assemblage, the later Collao assemblages would be categorized in a manner similar to that of modern Aymara communities. Thus, while the stages of production may remain stable over hundreds of years, the composition of the assemblage may shift at a variety of levels.

A number of other craft goods have been identified from previous excavations or in collections, but to date production loci at Pukara have not been identified. For textile production, the stages of processing include cleaning, spinning, and weaving the wool, presumably on a loom. Many of these steps would be invisible in the archaeological record because of preservation, but weaving tools are frequently preserved (Bermann 1994:222; Janusek 1994: Figures 8.4 and 10.15; Rose 2001:128, 239). Ceramic spindle whorls are generally constructed in two ways: they are either hand modeled specifically to serve as whorls, such as those recovered from Ch'iji Jawira at Tiwanaku (Rivera 2003:310); or by drilling a hole through a broken pot sherd and shaping its edges into a circle through grinding. There are also a number of bone tools that typically preserve, the most commonly identified being a weaving tool called the *wichuña* (Moore 1999; Vidal de Milla 2000).

Expectations for lithic production, maintenance, and disposal events are based on archaeological case studies in the Titicaca Basin. Lithic data collected from Tiwanaku (Giesso 2003), the Formative sites of Tumatumani (Seddon in Stanish and Steadman 1994) and Camata (Steadman 1995), and from previously excavated contexts at Pukara (Burger et al. 2000) provide comparative assemblages from in the region. Hammerstones, expended cores, and debitage serve as evidence of generalized lithic production (Janusek 2003b:283) and worked bifaces, unifaces and projectile points treated as evidence of area function when found *in situ*. *Batanes*, the local term for large netherstones, are multi-purpose tools for grinding subsistence and craft-related items such as pigments. Stone grinders (*moleadores, urqos*) are the

handstones used in conjunction with *batanes* (Janusek 2003b:275). Crushers are rounded, pestle-like tools likely used for smaller food items, but these could also be used in the production of craft-related goods. Expectations for the production and maintenance of agricultural implements, including hoes, adzes, and discoids, are based on studies from Camata (Steadman 1995) and Tumatumani (Stanish and Steadman 1994) Lastly, it is interesting to note that in spite of the importance of carved monoliths from the Formative period in the Titicaca Basin, there has been little discussion of either raw material procurement or the processes of monolith production. Lastly, there are other categories of craft goods that may have been produced and/ or consumed at Pukara, including beads, pendants, sumptuary goods such as snuff kits, metals, and hides; these are also considered in the interpretation of activity areas.

Table 3- Summary of expectations for central pampa use at Pukara

	Inclusionary/ Corporate Modes	Exclusionary/ Network Modes
Spatial organization	Public space (e.g., plaza)	Private space or semi-private (e.g., residences)
Food-related activities	Patron-role or entrepreneurial feasting	Diacritical feasting
Craft-related activities	Small-scale production and consumption	Workshop production/ attached specialization

In sum, determining the subtle variations within leadership strategies necessitates the consideration of a number of complementary data sets. The first of these, spatial organization, provides insight into area use and, most importantly, the nature of access to the central ceremonial district. The second, organization of food-

related activities, is used to establish a baseline of expectations for the material patterning of daily cuisine and, as a result, changes to these patterns serve as indicators of special events such as feasts. Within the category of feasts, determining the type of feast is a key indicator of network or corporate strategies. Lastly, the organization of craft production, whether organized at the household level or carried out by specialists, provides insight into the nature of economic and social relationships within the site and can be used to build upon the models for Pukara organization developed in Chapter 2.

Regional Perspectives on Late Formative Architecture and Activities

As noted in a recent publication by John Janusek (2004), the southern basin has been home to a flurry of archaeological activity in recent years; in contrast, researchers in the northern basin are just beginning to establish the very basics of chronology, settlement patterns, and architectural canons within this vast area. Therefore, I rely on excavation data collected primarily in the southern basin to synthesize the range of documented architectural units and their variation based on chronology, site type, and function. Data from patio groups, residential compounds, small-scale public spaces (relative to the large-scale architecture of pyramid complexes or sunken courts), and workshop areas are described from the sites of Tiwanaku (Couture 2002, 2003; Janusek 1994, 1999, 2003b; Rivera 2003) and Chiripa (Hastorf 1999; Roddick 2002). These data sets are presented in order to further refine the range of material expectations for the 2001 excavations and to develop a regional context for the Pukara data.

Chiripa: Sunken Courts and Off-mound Enclosures

The site of Chiripa, located on the Taraco Peninsula in the southeastern Titicaca Basin, has been the focus of both sporadic and intensive research attention since the 1920s (Bandy 1999). Initial excavations were focused on the mound (or Montículo) and exposed at least three levels of building dated from 1500 B.C. to the Middle Horizon (Hastorf 1999). An initial focus on the central mound of the site was later complemented through off-mound excavations by the Taraco Archaeological Project (TAP) directed by Christine Hastorf (Bandy 2001; Hastorf 1999, 2003; Roddick 2002). In spite of moving excavations to areas off-mound, there have not been clearly domestic contexts exposed on the site, a perplexing problem for a project attempting to address the daily life of Chiripeños (Hastorf 1999:2). However, a series of enclosures have been encountered across the site that provide insight into early ceremonial life in the region, the nature of Chiripa site use, and change over time[17]. The earliest of these enclosures, Choquehuanca, was located in the Santiago area approximately 80 meters northwest of the mound. This stone enclosure measured 14 meters on a side and special labor investments are reflected in the presence of plastered walls and floors. It is has been hypothesized that there was a sunken court in the central area, but this has not been confirmed through excavation. The initial use of Choquehuanca, dated to the Early Chiripa Period (1500-1000 B.C),

[17] These data are detailed in Hastorf 1999 (editor) and summarized in Roddick 2002.

represents the earliest example of corporate architecture in the Titicaca Basin (Bandy 2001; Dean and Kojan 2001; Hastorf 1999). The Llusco structure, dated to the early Late Chiripa period (Late Chiripa 800-100 B.C.), was a semi-sunken walled courtyard plaza located 200 meters south of the mound (Hastorf 1999). This was constructed of alluvial cobbles set in mud with a white clay floor. Limited testing at the Alejo enclosure, located 200 meters to the east of the mound, recovered evidence of a canal. The last enclosure, Quispe, was located to the north and east of the mound and included occupation surface remains utilized in a number of material analyses (e.g., Roddick 2002).

A recent study conducted by Andrew Roddick (2002) used ceramic materials to determine the function of the mound and enclosure structures. The goal was to differentiate between domestic and ritual uses of structures, primarily through comparing ratios of cooking, storage, and serving vessels. He notes the challenges of differentiating between ritual structures, elite households, and structures with domestic and ritual functions (e.g., the Putuni complex at Tiwanaku) and presents a series of expectations based on cross-cultural ethnographic and archaeological case studies (Roddick 2002:Tables 2 and 3). Based on the high ratios of serving to cooking vessels, Roddick (2002:38) concludes that both the mound and Quispe structures fit the expectations for ceramic use in ritual spaces, not domestic areas. A number of complementary lines of evidence, including fauna, paleoethnobotanical remains, and microstratigraphy were also analyzed by the TAP team and further

support the designation of these structures as spaces in which ritual activities occurred (Hastorf 1999).

The general similarities between the artifactual and architectural remains at Chiripa and Pukara have been noted over the years and were first outlined in detail by Karen Mohr-Chávez (1988) [18]. These connections are attributed to the unification of diverse groups in the area through the Yaya-Mama Religious Tradition, a ceremonial system named after a style of stone sculpture found throughout the region (Chávez and Mohr-Chávez 1975). The Yaya-Mama tradition is:

> …manifested archaeologically by the following features they shared: temples centers with sunken courts, the earliest public architecture in the Basin; Yaya-Mama and Pucara style stone sculpture associated with these temples; ritual paraphernalia, including pottery trumpets and ceremonial burners; and supernatural iconography such as heads with rayed appendages [Burger et al. 2000:311].

Mohr-Chávez (1988) proposed that Chiripa served as a model for the Pukara polity.

While the shared characteristics of Pukara, Chiripa, and other sites in the region are essential to understanding intersite and inter-polity interactions during the Formative, in the present context it is the intrasite diversity of architectural remains at Chiripa that is most germane. The Chiripa sunken court complex and Upper Houses have clear analogs with the Qalasaya constructions (Mohr-Chávez 1988). The Lower Houses, excavated in the 1950s (Bandy 1999), share characteristics with two, mirrored enclosures from a mound excavated at the nearby Middle Formative

[18] Alfred Kidder II excavated at both Pukara (1939, 1955) and Chiripa (1955), but final reports were not published.

site of Kala Kala by Robin Beck (2004). Beck argues that the scale, construction techniques, and processes of abandonment of the Middle Formative enclosures on the Taraco Peninsula are comparable with the pre-Pukara structure excavated by Copesco on the Qalasaya. At Chiripa, most striking is the diversity of architectural types encountered off-mound in the enclosures briefly outlined above. The combined efforts of TAP have emphasized the challenges of determining structure function when the dichotomous "domestic" versus "ceremonial" designations do not neatly fit the data sets (Dean and Kojan 2001; Hastorf 1999; Roddick 2002).

Tiwanaku: House Compounds, Barrios, and Public spaces

Following recently revised chronologies, the earliest occupations of Tiwanaku are dated to approximately 200 B.C. (Tiwanaku I or Late Formative 1) and by A.D. 500 (Tiwanaku III or Late Formative 2) the site had grown to cover 1 km^2 (Janusek 2003b:268). Janusek's excavations focused on exposing residential sectors from the subsequent Tiwanaku IV and V phases in the central area of the site. Broad, horizontal excavations were concentrated in Akapana East 1, located near the edge of the settlement core, and Akapana East 2, an area 120 meters to the east and outside the moat dividing off the central site core (Janusek 2003b:269). Using the Akapana East excavations, combined with comparative data from other areas of the site such as the centrally located Putuni Complex (Couture 2002; Couture and Sampeck 2003) and Ch'iji Jawira on the site's eastern edge (Rivera 2003), Janusek compared residential patterns across the site and over time (Janusek 2003:269).

In the Tiwanaku IV and V residential sectors in Akapana East 1, "[m]inimal households, each represented by dwellings associated with patios, middens, and ancillary buildings, were incorporated into large, architecturally bounded compounds" (Janusek 2003b:276). These compounds were impressive in scale and surrounded by massive stone and adobe exterior walls. Individual structures were characterized as kitchens or living rooms (*salas*) based on the distribution of activity areas and associated artifacts. Outdoor patio areas were used extensively; one area in Akapana East 1 Mound had ten superimposed use surfaces. Based on the distribution of activity areas, artifact types, and disposal areas, patio areas were the loci of domestic activities such as cooking, butchering, storage, and craft activities, in addition to social activities (Janusek 2003b:274). Human burials, animal offerings, ceramic *sahumadores* (ceremonial burners), elaborate serving vessels, and other artifact classes "not restricted to the material reproduction of the household" (Janusek 2003b:275) were also common in all residential areas excavated. Additionally, the city grew through planned constructions of repeated architectural elements; these general architectural patterns also apply to the Mollo Kuntu, La Karaña, Putuni, and Ch'iji Jawira areas of the site, in spite of some variability in activity areas and associated artifacts (Janusek 2003b:278).

Changes to the areas during Tiwanaku V "involved an interesting mosaic of continuity and change" (Janusek 2003b:284). In terms of continuity, the compound of Akapana East 1 remained standardized in its spatial orientation, but "domestic life was not ordered as repetitive clusters of similarly structured dwellings and activity

areas" (Janusek 2003b:287). Major changes took place in the locations and scale of numerous activities. In the south compound, for example, Structure 5 measured 8.4 m x 8.6 m, contained a well, refuse pits, and twelve hearths (Janusek 2003b:285). There were thousands of cooking vessel sherds and animal bones from food preparation, in addition to weaving and spinning tools, within the structure. The bordering exterior zone also had a wide range of activities and artifact classes represented, including a variety of sumptuary goods. There was also a new level of differentiation of structure types in Akapana East 1. A large building measuring 30 m x 20 m in the north compound was focused around a sunken courtyard and had prepared floors, well-constructed walls, and exotic and sumptuary goods indicating special purpose functions. Janusek (2003b:288) proposes that this was the "setting for social gatherings, feasts, or ceremonies that involved Tiwanaku elite." It is interesting to note that 30 m farther to the north of this special structure was another structure similar to that described for the south compound. In terms of area layout, it appears that the special-function building of the north compound was surrounded by "more vernacular, residential compounds and middens" (Janusek 2003b:288). In contrast to major changes in Akapana East 1 and the Putuni complex, the residential patterns of Akapana East 2 and Ch'iji Jawira remained relatively continuous through Tiwanaku V.

Tiwanaku: The Dual Residential and Ceremonial Functions of the Putuni

The Putuni complex is located within Tiwanaku's moated core and features a series of occupations from Late Formative 2- Early Tiwanaku IV, late Tiwanaku IV, and Tiwanaku V periods (Couture and Sampeck 2003; Couture 2002; Janusek 2003b; Kolata 1993), providing one of the most complete occupation records for any section of Tiwanaku (Couture and Sampeck 2003:226). This is an interesting and relevant space to include in the discussion for a number of reasons: the area's central location, the variability of its architectural and artifactual remains, and its use and transformation before and after the urban expansion of the site. "Over the course of more than six centuries of occupation, this area of the site underwent multiple cycles of construction, destruction, and reorganization of both residential and ceremonial space, culminating with the establishment and, eventually, final destruction of the elite Putuni platform and palace complex" (Couture and Sampeck 2003:228).

It was during Late Formative 2 (A.D. 300-500) that the Kalasasaya platform and Semi-Subterranean temple, the first monumental structures at Tiwanaku, were constructed. The earliest occupations of the Putuni area are dated to the Late Formative 2-Early Tiwanaku IV and included a rich deposit of early ceramic vessels (Feature 134), a red clay platform structure, and exposure of an outdoor surface (Couture and Sampeck 2003:229). The combination of high percentages of utilitarian vessels along with fine wares, in combination with the architectural investment in this area, are used to argue that this area was occupied by people of elevated status and served a mixture of residential and ceremonial functions.

Major transformations of the Putuni occurred during the Late Tiwanaku IV phase. A single level of occupation was exposed in which the area was divided into a series of residential compounds, not unlike those of Akapana East, Ch'iji Jawira, and Mollo Kontu in general layout. The north compound was comprised of a three room kitchen complex and the south compound of at least two residential structures and an elite mortuary complex (Couture and Sampeck 2003:233-245). These areas have been described in detail, but a few points should be emphasized. In the north compound, the three partially excavated residential structures were constructed with cobblestone foundations. In the southern compound, there is an elite residential structure with cut stone foundations adjacent to the mortuary complex and an additional structure with cobblestone foundations in the same compound. As emphasized by Couture and Sampeck (2003:244), "The coexistence of both styles of domestic architecture in the Putuni area at this time is important in that it suggests the presence of significant social differences between households within a single compound and between households from neighboring compounds." Also, located just west of the Putuni is the Kheri Kala, a contemporaneous Late Tiwanaku IV elite residential sector. This is further evidence of the dense and diverse occupation of the central area of the site during this time.

A massive razing event marked the transition from the Tiwanaku IV to Tiwanaku V "urban renewal" of the Putuni area[19]. This event included a number of human and camelid sacrifices, the burning of roofs, and destruction of habitation walls before the construction of the Putuni Platform and Palace Complex (Couture and Sampeck 2003:245). These massive constructions were built over a uniform layer of gravel covered with a compact red clay surface, indicating a highly planned restructuring of the areas described above. The Platform was a stone-faced, elevated structure that measured 50 m x 70 m and was composed of massive, worked andesite blocks surrounding a central courtyard. The Palace Complex included at least four structures surrounding a large, paved courtyard during Tiwanaku V (Couture and Sampeck 2003:251-259). Two of these structures have been excavated, the Palace of the Multi-Colored Rooms and the West Palace, and include some of the most elaborate construction techniques, associated sacrifices, and high value artifacts from dedicatory burials within the site[20]. However, in spite of the massive changes, there is still continuity expressed through residential use of space at the site. As emphasized by Couture and Sampeck (2003:251), "overall, the organization of space in the palace area is similar to that encountered in residential areas outside of the monumental district, but executed on a significantly larger and more elaborate scale."

---

[19] Major "urban renewal" during Tiwanaku V is discussed by Couture and Sampeck (2003:261) for the Putuni, by Janusek (1994, 2003b) for Akapana East, and by Kolata (1993).
[20] for further details see also Kolata 1993.

While most would agree that there are no analogs to the Tiwanaku V Putuni complex in any of the known contexts from Pukara, these data support two key points: 1) the integrated nature of domestic and ceremonial spaces in even the most elite contexts at Tiwanaku; and 2) the shifting scale, location, and exclusivity of ritual architecture and activities at the site. For example, Kolata (1993:149) hypothesizes that the Putuni served as the residence and court of a royal dynastic lineage and was the most exclusive residential area at the site by Tiwanaku V. Excavations of the Palace of Multi-Colored Rooms exposed a number of features related to the preparation of food and beverages in the palaces, including an interior hearth, several storage or midden pits, domestic refuse, and high percentages of utilitarian ceramics (Couture and Sampeck 2003; Couture 2002). Concurrently, the Putuni was a major locus of ceremonial activity in the monumental district (Couture and Sampeck 2003:262) as the focus shifted away from the Akapana during Tiwanaku V (Alconini 1995). This shift from the open spaces of highly visible and widely attended ritual events on the Kalasasaya and Akapana to the more intimate and exclusive spaces of the Putuni complex likely represent "a major transformation in the nature of elite power at Tiwanaku" (Couture and Sampeck 2003:261-262). The construction and manipulation of space in the central ceremonial district guaranteed that potential participants would not be able to witness the activities of the Putuni Palace's central courtyard unless invited to do so.

Tiwanaku: Ch'iji Jawira and Specialized Craft Production

Moving out of the monumental core and to the eastern site periphery, the Ch'iji Jawira sector provides an example of the range of architectural types and activities at the site during Late Formative 2, Tiwanaku IV, and V (Alconini 1995; Franke 1995; Janusek 2003; Rivera 1994, 2003). The area includes a low mound (two meters high) with two elevated areas, a canal, and an area of dense material scatters (Rivera 2003). There are general similarities between this area and other residential zones from the site, but with differences in labor investment and/or materials available to area residents. Overall, in terms of architecture, structure foundations were made of *tapia* or adobe instead of the cobble or worked stone foundations in other areas. Floors were fragmentary and superimposed and associated with a number of pit features, midden areas, and burials. The most notable difference in the Ch'iji Jawira sector is the presence of debris related to production of certain types of ceramics, including "misfired and overfired sherds, wasters, figurines, amorphous clay lumps, and specialized production tools" (Rivera 2003:297). Because this is the only area at the site from which these materials have been recovered, it is argued that it represents an area of specialized ceramic production.

Four areas were excavated in the sector to sample the mound, areas off the mound, and an area with a channel (Rivera 2003:297, Figure 11.1)[21]. The largest area of excavations, the north area, exposed a series of superimposed occupations dated to the Late Tiwanaku IV and Tiwanaku V phases. The occupation included the typical remains of a residential compound, in addition to the remains of ceramic production activities on the occupation surfaces and in associated middens. The floor contexts included ceramic production tools, clay coils, pigments, and figurines. In nearby trash pits were the following:

> …flat, baked clay discs with hand and finger impressions, pieces of burned clay mixed with ash and earth, and burned llama dung. Sulfur, bits of red, yellow, and green pigments, ground stone mortars and pestles, ceramics sherds, animal bone, vegetable remains, and some fragmented copper objects were also recovered [Rivera 2003:298].

Burials, offerings of ceramics, and other features were also encountered in the north area.

Further excavations exposed the channel area and an irregular, stone wall that separated Ch'iji Jawira from the rest of the site to the west. As in other areas of the site, it is argued that this was either a *barrio* or compound wall and it is dated to the Tiwanaku V urban renewal episode by its construction over earlier midden contexts. In the northeast area, located 50 m north of the mound, two occupations were excavated with further evidence of ceramic production. The most notable was an open-pit firing area measuring one meter across. The south area, located 40 m south

[21] Unless otherwise noted, descriptions of Ch'iji Jawira are from Rivera 2003.

of the north area and at the edge of the mound, exposed several superimposed ashy middens related to ceramic production. These were overlying an occupation zone with domestic remains recovered from a shallow ash pit.

The Ch'iji Jawira data illustrate a number of important points about the use of space at Tiwanaku. First, the function of Ch'iji Jawira changed over time, as did its relationship to the core of Tiwanaku. Evidence of use during the Late Formative 2 is limited to two burials in the north area with Qeya ceramics. It is possible that this area served a mortuary function, along with the Markapata sector to the west (excavated by Martin Giesso), and may have been outside the limits of the site during this time (Rivera 2003:305). The changes that took place across the site during Tiwanaku IV and V (A.D. 700-800)—both spatial and functional—are also evident in the transformations of Ch'iji Jawira. The large, stone compound wall was constructed during the urban height of Tiwanaku and this area was used as a "discrete locus of specialized ceramic production" (Rivera 2003:306). Second, these data challenge a fundamental assumption common in studies of household archaeology that intrasite variability is primarily related to differences in wealth. "As noted by Janusek (1994, 1999) and Rivera (1994) differences between residential compounds at Tiwanaku (and also Lukurmata) are not simply a product and expression of class or social status, but are often intimately tied to occupational specialization" (Couture and Sampeck 2003:244). The use of space, investment in various attributes of that space, and artifact assemblages recovered from midden contexts must be considered in terms of both wealth and occupation (which are, of

course, typically related). The third point to emphasize is the intersection between the "domestic" and crafting activities within the residential compounds at Ch'iji Jawira.

In sum, the goal of the first half of the dissertation has been to synthesize background information pertaining to Pukara at the site and polity level, present the range of models that have been developed, and refine the material expectations for interpreting architecture, artifacts, and activity areas on the central pampa in order to evaluate these models. There are three major data sets that directly relate to determining leadership strategies: intrasite spatial organization, the organization of craft production, and the scale and nature of food-related activities. Utilizing these data sets, the role of prestige goods, feasting events, long-distance exchange, control of ritual knowledge, and other indicators of inclusionary and exclusionary leadership strategies can be evaluated. The second half of the dissertation outlines the specifics of the 2000 and 2001 field projects, presents relevant data sets in detail, and concludes with a discussion of the relationship of these new data sets to the expectations developed for determining Pukara leadership strategies.

Chapter 5: Research Project Chronology and Methods

The four major phases of the Pukara project included archival research, geophysical survey and surface collection, excavation, and analysis. In 1999 and 2000, archival research was conducted in order to gather unpublished information from the 1939 excavations. As mentioned above, Kidder did not publish a final report, but there are copies of a nearly completed manuscript in the possession of Elias Mujica, a co-director of the Copesco project, and at the Peabody Museum at Harvard University. Mujica has a complete copy of the text of the manuscript, but few photos or maps. In 1999, he generously provided me with a copy to use as a reference for project development. In April of 2000, I visited the Peabody Museum's photo and document archives and was able to check the manuscript details and copy artifact drawings and a limited number of site photos from 1939. I did not examine the collection of artifacts from the 1939 excavations housed at the museum because they have been published in a number of contexts (Chávez 1992; Carlevato 1988; Franquemont 1986). The only discrepancy in the archives was the lack of excavation photos. While they are referenced throughout the manuscript, there were only a few that we were able to locate in the photo archive. It is unclear if the remaining photos were never acquisitioned by the museum or if they had been temporarily

miscataloged. In the document archives there were basically the same elements of the manuscript in the possession of Mujica, but with several additional reports from other researchers working on material analyses. The manuscript was summarized by Chávez (1992) in his dissertation and is referenced as such unless otherwise noted.

In September of 2000, the first field season included a geophysical survey and systematic surface collection in the central pampa. Walking over the modern ground surface one is struck by the lack of surface artifacts and the absence of variations in topography. There are the occasional eroded Collao sherds, but more prevalent are the remains of modern trash deposits from a town that continues to produce massive quantities of ceramics for regional trade, including the famous *toros de Pucará*. The lack of surface remains can be attributed to at least three processes: the ancient meanderings of the Pucara River; the perishable nature of prehistoric building materials such as adobe; and generations of archaeology students and tourists collecting Pukara and Inca polychrome sherds from the surface. Kidder mentioned that he would not have excavated in the central pampa area if local informants had not reported finding a monolith there (Chávez 1992:59). The results of the Area IV excavations established that the pampa merited further attention, but developing an excavation strategy in this large, undifferentiated area necessitated the use of subsurface survey techniques.

Excavations based on the geophysical survey data were conducted from mid-June through November of 2001. Following excavations, all artifacts were inventoried and ceramic analyses were conducted until June of 2002 in Peru. The

majority of the artifacts are housed at the Instituto Nacional de Cultura (INC) site museum in Pucará where they are separated by material type and excavation area. Those remaining are temporally stored at the project house of the Programa Collasuyu in Puno, but will be permanently housed in Pucará after analyses are completed. Lastly, radiocarbon dating and data analysis were completed during 2002-2003 in the United States.

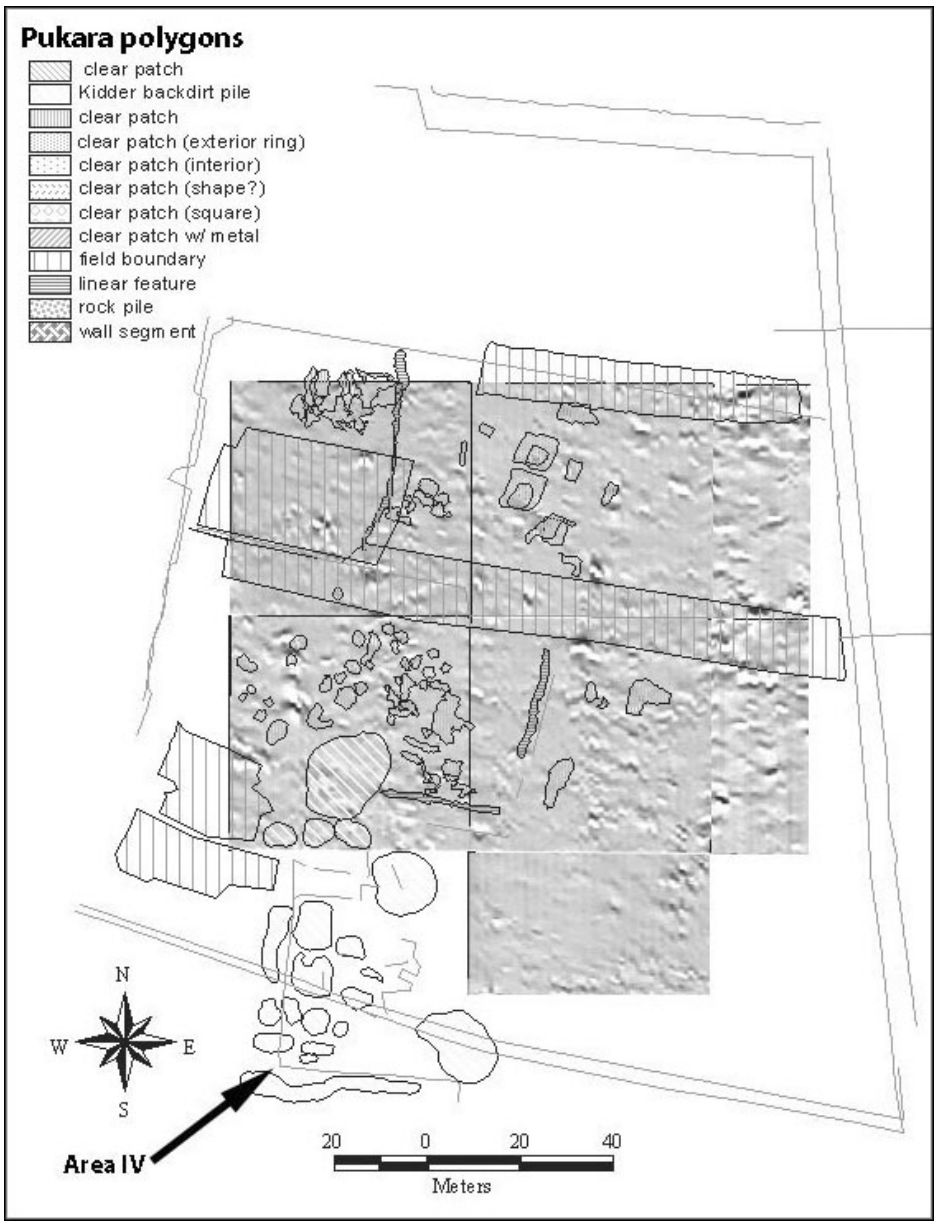
Project Methods

Geophysical Survey

In order to determine if additional prehistoric occupations were located in the central pampa area, a geophysical survey was co-directed with Nathan Craig of the University of California, Santa Barbara during September of 2000 (Klarich and Craig 2001). Two complementary geophysical survey devices were utilized—a cesium magnetometer (Geometrics 858a) and a ground penetrating radar (GPR; Geophysical Survey Systems International (GSSI) SIR-2000 with a 400 megahertz antenna). A Leica TCR1105 Total Station and Trimble Geoexplorer II GPS receiver were used to map the central area of the site, to create a formal site grid for the project, and record surface features such as modern agricultural fields, stone field boundaries, and back dirt piles from previous excavations (Figure 12). Because Kidder's Area IV was never backfilled, it was also possible to record the orientation of the exposed walls and integrate these data into the GIS. Output from each of these four data sources was reassembled in a common map projection and coordinate

system using ArcView 3.2 GIS software from Environmental Systems Research Institute (ESRI) by Craig. The GIS served as a project database in which to organize all spatial data collected from both the 2000 survey and the 2001 excavations.

Figure 12- Magnetometer survey and GPS data collected from the central pampa (2000). Note Kidder's Area IV in the southwest corner.

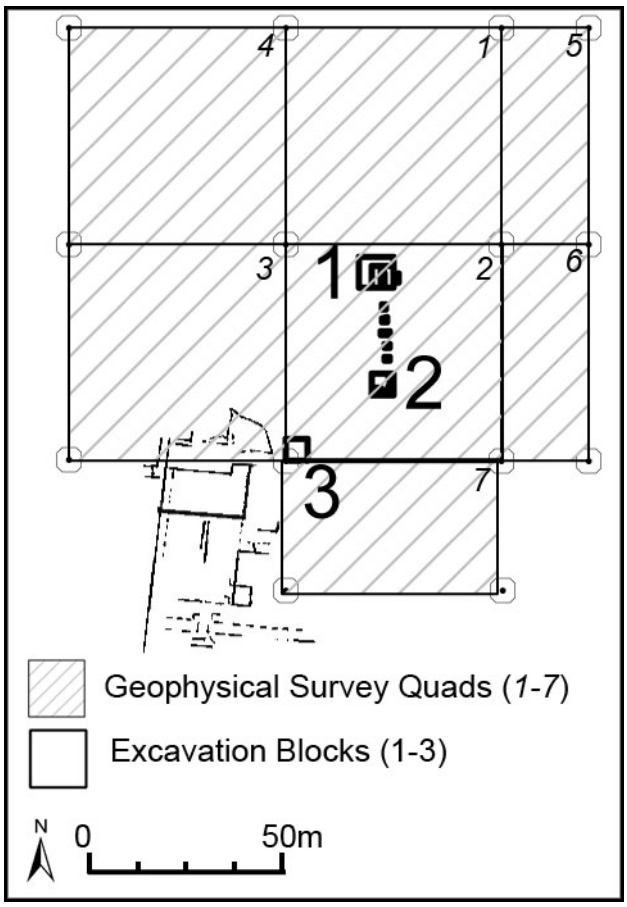


A site datum at 352585.6E/ 8336069.9N (Zone 19) was set using the Leica Total Station and GPS receiver and a site grid was set across the pampa. A stake was also set for controlling elevation and given the arbitrary measure of 100 m. Using the total station, a series of four 50-m-x-50-m grids, designated as Quads 1-4, were surveyed with both the magnetometer and GPR in one meter intervals. The area was expanded for the magnetometer survey with two 20-m-x-50-m blocks to the east and a 30-m-x-50-m block to the south of the original survey area, Quads 5-7, but time did not permit the survey of these additional blocks with the GPR (Figure 13). The surveys located linear anomalies and anomalies of limited lateral extent, also called globular anomalies (Desvignes 1999:86) throughout the Quads. These are interpreted to represent both architectural remains and areas with thermal activities, such as hearths. Anomalies found simultaneously in both surveys were mapped onto the Quads to guide the placement of the excavation blocks (Klarich and Craig 2001), but further analysis of the GPR data indicated that there were problems with collection techniques in the field. Therefore, interpretations based on the geophysical survey data are limited to the magnetometer results and future field projects will include the re-mapping the pampa with the GPR.

The geophysical survey was followed by a systematic surface collection in multiple 5-m-x-5-m blocks, but due to agricultural practices and site formation processes the collections were very limited and mostly included Altiplano period Collao sherds. The ceramics were drawn, analyzed, and catalogued for the Preliminary Report (2000) to the National Institute of Culture, Peru. Few artifacts

collected could be attributed to the Formative period, thus supporting the difficulty of interpreting surface artifacts as representative of sub-surface contexts in sites that have been highly impacted by modern processes.

Figure 13- Location of survey and excavation areas on central pampa (southwest corner of Block 3 is located at 5050N 5050E on the site grid)



The ultimate goal of the geophysical survey was to develop an excavation strategy for the large area of the pampa, measuring at least 300 m x 300 m. Excavation blocks were limited to Quad 2 and selected based on the following factors: density of anomalies (both linear and non-linear), presence of both "busy"

and “open” spaces (Aldenderfer 1991; Klarich and Craig 2001), proximity to Kidder’s Area IV, and congruity between subsurface data and the limited surface remains. Based on the survey data, three 5-m-x-5-m excavation blocks (sub-divided into 1-m-x-1-m units) were chosen in areas with anomalies in both surveys: one “open” area, one “busy” area, and one block at an intersection of an “open” and “busy” area. Due to the requests of local landowners, two of the three blocks were moved within the same Quad to zones with similar geophysical results. The excavation blocks were designated by the coordinates of their southwest corner: Block 1 at 4990N 5070E; Block 2 at 4965N 5070E; Block 3 at 4950N 5050E. These blocks were expanded as necessary during the field project and additional test units were placed between Block 1 and Block 2 to follow the presence of a large north-south wall located in both blocks.

Excavations

In 2001, excavations were conducted from mid-June through mid-November with a three week laboratory break during September. The excavation staff included both a permanent crew of archaeologists, students, and *maestros* (supervisors), and a rotating weekly field crew drawn from a community work rotation system. Each block had a full-time director responsible for field supervision and documentation. A full-time excavation supervisor and assistant *maestro* assisted with artifact organization and field documentation. The weekly rotating crew included at least one person to screen and separate excavated materials and one or two additional

workers to assist with excavations. Near the end of the project weekly crew was expanded from four to eight to increase the number of excavators and screeners.

Once selected and placed on the site grid using a Topcon total station, the excavation blocks were divided into 1-m-x-1-m units designated by their southwest corners. This enabled the excavators to maintain horizontal control of artifact recovery and documentation of activity areas within the block. We used the locus system to record field contexts with the goal of associating loci both within and between blocks for comparative spatial and temporal analyses organized into a Harris Matrix. The two-page locus form included detailed categories of information in both check-list and essay formats and an area to inventory associated photographs, drawings, and all artifacts collected from the context. Both general collections and *in situ* specimen collections were recorded on the locus form and the master bag list for the project. A unique list of both loci numbers and bag numbers were distributed to each block director in order to prevent overlap in the cataloguing system.

Units were excavated following natural stratigraphy with the addition of arbitrary subdivisions when natural levels exceeded 10 cm. Initially, units were limited to the 1-m-x-1-m areas of the block grid, but once activity areas and context changes could be distinguished the loci often crossed unit limits and were recorded accordingly. The excavations were expanded using the *decapage* method in order to expose large areas and determine the contemporaneity of architecture, features, and activity areas (Aldenderfer 1998:75-77). In general, this was possible and multiple, superimposed occupation sequences were recorded in each block during excavations.

All excavated materials were passed through a 1/4" screen and below the plow zone every 10th bucket was passed through 1/16" screen. The materials were separated by screen size and material type (ceramics, lithics, bone, and other) and a preliminary artifact count was conducted in the field. Soil was measured volumetrically during excavations in order to compare artifact density between deposits (Hastorf and Bandy 1999). Following a "blanket sampling strategy" (Pearsall 2000), eight liters of soil were recovered as float samples from each excavated context below the plow zone for paleoethnobotanical analysis.

Features such as house floors, hearths, storage pits, and burials were documented using a standard locus form (or multiple locus forms if necessary) and received a unique feature number. Features were drawn and photographed in plan view and cross section, flotation samples were collected, and the remaining contents of the feature were screened through both 1/4" and 1/16" screen (Bermann 1994). *In situ* artifacts associated with the feature were given specimen numbers and recorded on the locus form. Architectural features, including walls and wall fragments, were given individual ASD numbers (architectural subdivision). Documentation of architecture included plan and profile drawings, photographs, and detailed descriptions on the locus form.

A primary aim of the excavations was to distinguish between primary and secondary contexts (Janusek 1994). Artifacts from primary contexts, including occupation surfaces (OS), occupation zones (OZ), and associated features were piece plotted on the locus form map, photographed, and given separate specimen numbers

on the locus form. Occupation surfaces include both formally prepared floors and informal compact use surfaces (*apisonados*) that often include smaller artifacts pressed into place through trampling. In contrast, occupation zones are characterized by "thicker strata consisting of microstratigraphy, which represent the gradual accumulation of refuse from residential activities" (Janusek 1994:82). Occupation zones were distinguished from fill episodes by the orientation of the artifacts encountered (typically lying flat in the former) and the presence of features such as hearths, pits, or other activity areas. Artifacts collected from both types of primary contexts are used to determine area function and refine ceramic chronology.

Secondary residential contexts such as outdoor dumps, midden, refuse pits, and primary contexts that were converted over time into refuse deposits were excavated with special attention to their relationship to primary contexts in the area. Pits, a typical feature within highland compounds for both storage and disposal, were bisected for excavation, profiled, and soil samples were collected (following South 1977 and Wilson 1985 in Schiffer 1987:220). Pit function will be clarified through paleoethnobotanical studies of the contents from the matrices within, below and above the feature (Lennstrom and Hastorf 1995).

The division between interior and exterior space is often difficult to determine because of a variety of factors, but is essential to understanding the utilization of the pampa area. As noted in previous publications from the region (Janusek 1994; Bermann 2003), excavating residential architecture in the altiplano is complicated by the nature of adobe building materials that erode quickly and are

often reused by later inhabitants. Therefore, it is often difficult to locate walls, differentiate intentional fill from eroded or slumped adobe, and separate *in situ* artifacts from those that may have filtered down from construction episodes. Fortunately, adobe superstructures were and continue today to be placed atop a line of at least one course of stones that serve as a wall base, occasionally located in a shallow trench for support (Klarich and Seddon 1997). The combination of wall bases, occupation surfaces and zones, and features serves to differentiate between interior and exterior areas.

Excavations were generally conducted until sterile soil was reached, but due to the high water table this was impossible in some areas. For example, areas of Block 3 began to fill with water less than one meter below the modern ground surface and excavations had to be delayed until the area dried out. Due to time constraints, in some blocks sterile soil was only reached in a limited area. However, in these cases the block wall profiles were used to relate the unexcavated areas to the area where sterile was reached.

Excavated contexts were documented with written notes and locus forms and also through photos, drawings, and maps. Each locus had a standard two-page form and each block director was responsible for keeping a notebook journal that synthesized information and re-evaluated previous judgments about excavated contexts. Digital and print photos were taken at the base of each locus and numerous photos were taken of features and artifacts *in situ*. Once large areas were exposed,

digital photos were taken of each 1-m-x-1-m to create a compilation photo of the horizontal distribution of activity areas.

At the end of the field season all wall profiles were drawn, profiles were photographed, and the laser transit was used to create a final map of excavated areas. The edges of the blocks were remapped, in addition to the major architectural features such as walls, and the both the bases of the units and the remaining areas of the central pampa were recorded in order to create a series of topographic maps. The maps, along with the geophysical data and aerial photos, were added into the project GIS for data organization and display.

Laboratory Procedures

During the field project, weekend crews worked in the laboratory at the Pukara museum washing and sorting artifacts from the week's excavation. At the completion of the excavations, a general inventory of all excavated artifacts, soil samples, and carbon samples was compiled based on the bag lists maintained in the field during excavations and then checked with the actual artifact bags. This inventory consisted of recounting bags of artifacts, weighing all objects, and doing a preliminary sort of artifact categories.

During the field season, the ceramic collections were soaked, cleaned, and inventoried each weekend. Ceramics with clear evidence of charred residues were separated in the field and not washed. Upon completion of the excavations, all recovered sherds were weighed, counted, separated into non-diagnostic and

diagnostic groups, and then a preliminary sort was conducted to categorize the sherds by time period. Diagnostic sherds, including rims, bases, decorated body sherds, ceramic tools, and some handles were given inventory specimen numbers and labeled individually. For example, the second rim inventoried from bag 412 would be 412/02 to facilitate analysis, database management, drawing, and photographing of diagnostics. Sherds from the same vessel were glued together for analysis, but multiple specimen numbers were maintained if the fragments were recovered from different loci. The specimens were drawn in profile and in plan view, weighed, and the size and percentage of diameter present were recorded.

Lithic materials were sorted into general categories of groundstone and chipped stone, material types were recorded, and complete and partial tools were weighed, described, and drawn. In order to facilitate future functional studies, groundstone materials were not washed. For faunal remains, preservation was exceptional and all materials were counted, weighed and sorted into burned and unburned categories. Unfortunately, human bone does not preserve well in these contexts and the two sub-adult burials from Block 3 were fragmentary. The botanical samples remain to be analyzed by a regional specialist. Finally, other categories of materials, including pigment, metal artifacts, and a variety of tools were counted, weighed, and included in preliminary conclusions concerning area function.

Chapter 6: Excavation Data

This chapter presents a detailed summary of the excavation results from the 2001 field season. In the first section, the stratigraphy (Appendix 2), features (Appendix 3), and architectural remains (Appendix 4) are described in each of the blocks. The location of the block and the criteria for its selection are first detailed, followed by a simplified Harris matrix that summarizes the occupational history for that block, and the section concludes with descriptions organized by time period. In the second section, the occupations are compared between blocks and summarized across the central pampa.

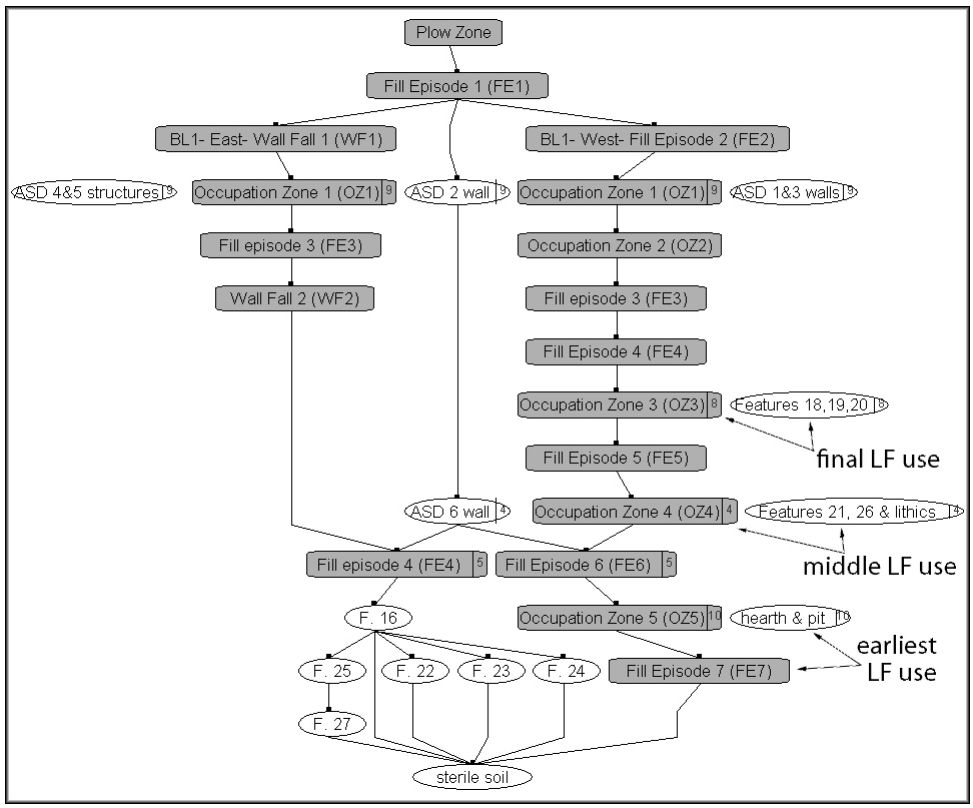
Block 1

Block 1 was originally a 5-m-x-5-m area with its southwest corner located at 4990N 5070E on the site grid (see Figure 13). The area was chosen based on the presence of both globular and linear anomalies in the geophysical survey data that were interpreted as architectural features oriented north-south and as possible thermal features. Later in the excavation season, 25 additional 1-m-x-1-m units were opened to the north and west (to 4967E and 4996N) to clarify the Altiplano period

use of the area and a single 1-m-x-2-m unit was opened at the far eastern edge of the block (5075E) to further expose the earliest Formative period occupation.

Block 1 had three consecutive Late Formative (LF) occupations with overlying Altiplano period use and re-use of the area (Figure 14). The dominant feature of Block 1 was ASD2/6, a one-meter-wide wall running north-south in the 5072E row. The wall is designated by two ASD (architectural sub-divisions) numbers because it was constructed during the Formative period (ASD6) and then modified and re-used during the Altiplano period (ASD2). This is the only area of the 2001 excavations in which the Colla clearly reutilized a Pukara feature, but while modifying it in a way that was distinctive from its original form and scale.

Figure 14- Block 1, simplified Harris Matrix



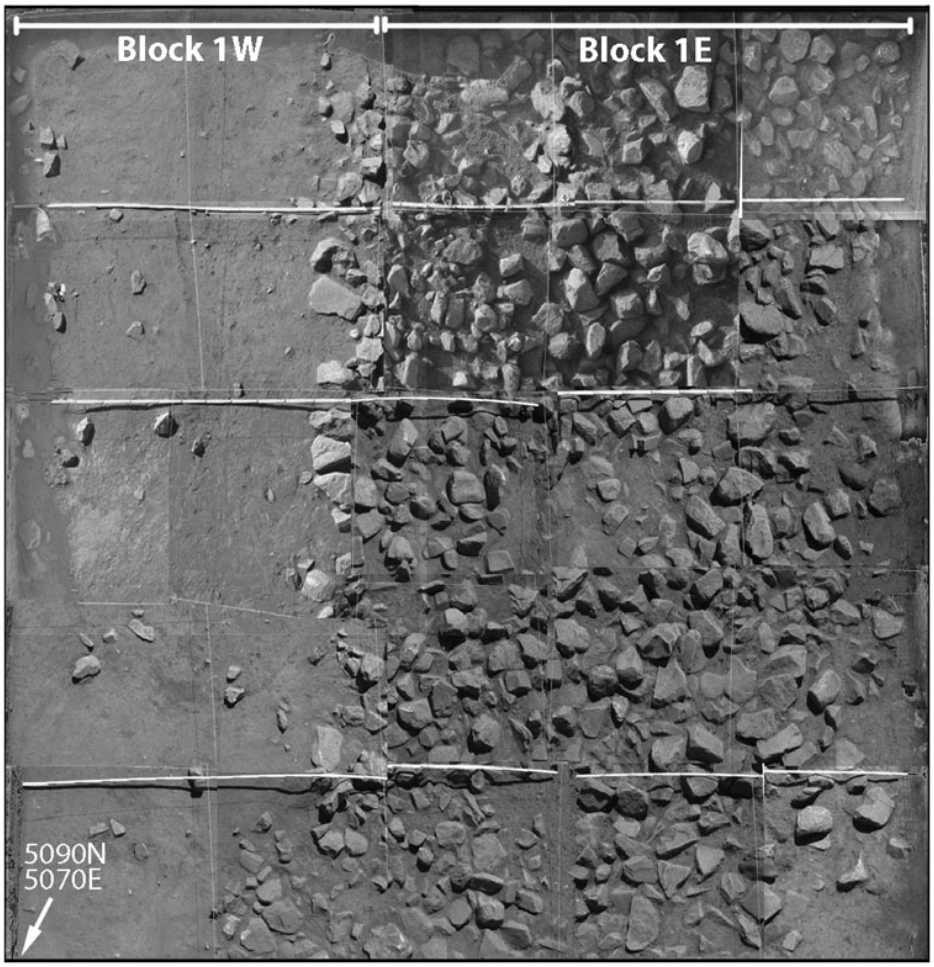
The depth and composition of the plow zone was established during the excavation of Block 1 and served as a guide for the subsequent excavations in Blocks 2 and 3. The deposit was a mixed context that measured 10-20 cm in depth[22]. Block 1 was located in the middle of a modern agricultural field that had been planted the previous year and remnants of cultivation scars (*surcos*) were present, in addition to fragments of potato buds, modern garbage, and the remains of the offering (*pago*) we burned and buried before beginning fieldwork. These disturbances were mapped and noted in the case that further disturbances in those areas were encountered in deeper levels. There was a clear stratigraphic change at the base of the plow zone as the soil became more compact, contained fewer roots, the number of small pebbles increased, and limited remnants of architecture were uncovered.

Fill episode 1 was the mixed fill under the plow zone and above the latest Colla occupation. At the base of this fill episode it was clear that the east and west halves of the block were distinct contexts; these were separated into BL1E (Block 1 East) and BL1W (Block 1 West) for the remainder of the excavation and are described separately below (Figure 15). The separation of the sides was based on the presence of a solid layer of 10-20 cm rocks in the 5072-5074E units that was not

[22] Traditionally this area has been plowed using the foot plow (*chaquitaclla*) that produces a shallow (10-15 cm), uniform layer of churned soil. However, in 2001 several land owners rented a tractor to plow adjacent to the excavation blocks. It was clear from the noise generated that the increased depth of the plowing was disturbing buried rock walls across this area.

present in the 5070-5071E rows at the base of *fill episode 1*. ASD2 was not yet exposed, with the exception of one section of the large slab in 5093N 5072E. The smaller rocks covering the eastern half likely had served as the upper courses of ASD2 during the Altiplano period.

Figure 15- Block 1 divided into east (BL1E) and west (BL1W). Total area measures 5 m x 5 m (1 inch=1 meter).



Altiplano/ Late Intermediate Period Use of BL1W

Fill episode 2, located only in the western half of the block dates to the Altiplano period (post-A.D. 1100). It is unclear if this was an intentional fill, the

latest use of the area, or a post-abandonment accumulation of materials. It directly overlies the latest formal Colla occupation of the block, *occupation zone 1*. This occupation layer is associated with the base of the stone alignments of ASD1 and ASD3, two smaller walls running along the western side of ASD2 and to the northwest that appear to be from the same structure (Figure 16). It is also characterized by areas of dense carbon concentrations and horizontally oriented, articulated animal bones. *Occupation zone 2*, distinguished by an increase in the density of carbon inclusions, was the first formal occupation by the Colla of the western half and expanded areas of Block 1. In order to leave the Colla architecture intact, further excavations were limited to 21 1-m-x-1-m units in the southern part of the block. Excavated materials from this area primarily date to the Altiplano period and were generally horizontal in orientation, except along the area of ASD2. The base of the occupation was indicated by a soil color change

Fill episode 3 was used by the Colla to level the area for occupation over an uneven deposit below. The fill was excavated in only eight units in the 4970-1E rows due to time constraints, but was present in the majority of the 4990-3N 5070E row and in the western half of the 4990-3N 5071E row. It is noted that the artifacts (high percentage of the sherds are Collao) are generally not horizontally oriented and that the leveling is at the base of ASD2, perhaps creating a use surface on which *occupation zone 2* accumulated.

In addition to ASD2, there were wall fragments, possible wall trenches, and areas of wall fall encountered in Block 1. ASD1 was a narrow wall with a single

course remaining *in situ*. It appears to have been the eastern wall of an Altiplano period structure that ran parallel to ASD2. The fall from ASD1 rested on *fill episode 3* to the west and the wall trench area of ASD2 on the east. The northern wall of the same building (ASD3) was located in the northern part of the extension of Block 1 (4995-6N). It is interesting that the ASD1 and 3 walls were part of a rectangular structure in BL1W while the structures excavated in BL1E were circular. Analysis of the Collao should clarify if this was an issue of chronology or, more likely, related to building function.

Altiplano/ Late Intermediate Period Use of BL1E

At the base of *fill episode* 2, the east half of Block 1 was covered with a solid layer of rocks averaging 10-20 cm. The function of this area was unclear when first exposed, but it was hypothesized that the rocks represented either wall fall or small, collapsed slab-cyst tombs. The rocks were drawn, elevations were recorded, and removed in three separate layers to document form in the case that they were associated with *in situ* features. It became clear during their removal that the rocks were wall fall (*wall fall 1*) from the superstructure of ASD2 located in the 5072E row.

In the fourth "layer" of rock removal, one half of a roughly circular structure (ASD4) was uncovered in the northeastern corner of the block (4993-4N 5073-4E). This signaled a shift to *in situ* contexts under the extensive wall fall. The structure was identified by the presence of a doubled-faced wall that was clearly differentiated

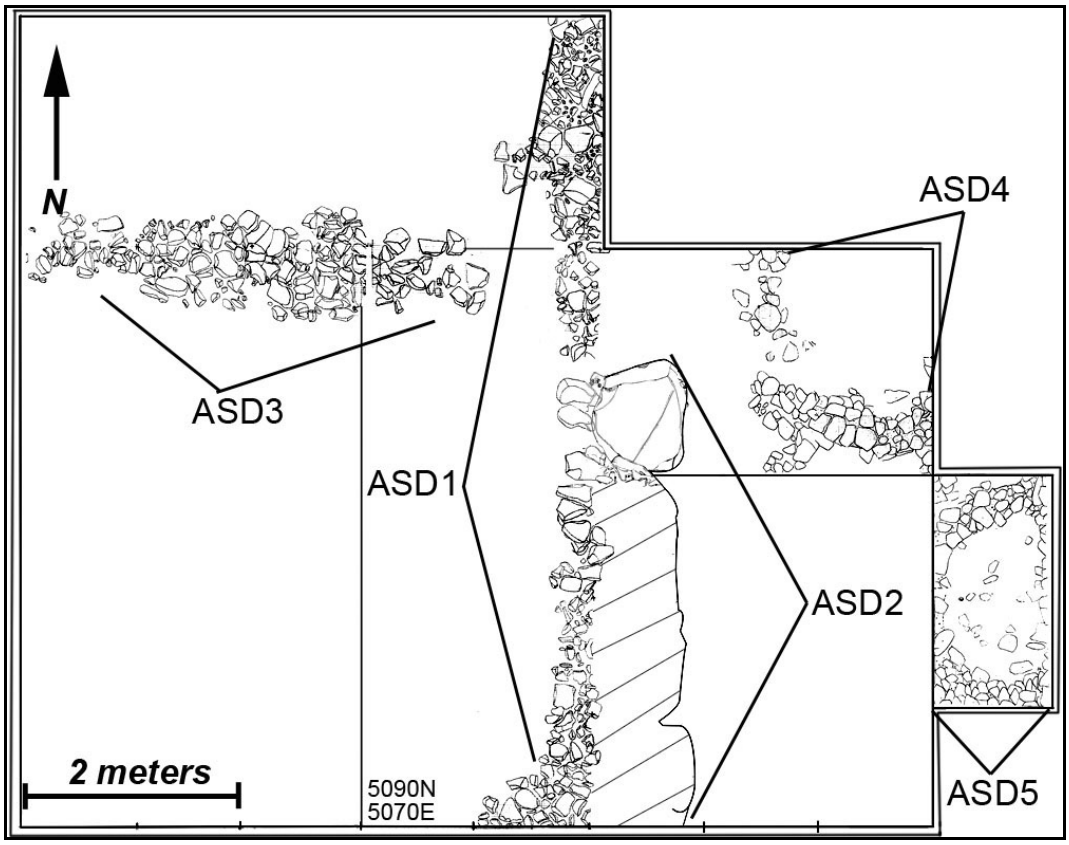
from the surrounding wall fall of ASD2. Only half of the structure was exposed, but it was possible to estimate its size at two to three meters in width (see Figure 16). The surface surrounding the wall was very compact and had Collao ceramics at the base. Based on the associated artifacts and the relationship between the ASD2 wall fall and the ASD4 structure, the two constructions were contemporaneous. Artifacts were collected from the surface of the structure and the wall was left intact for future investigations.

A second, contemporary circular structure (ASD5) was exposed in 4991-2N 5075E, a 1-m-x-2-m extension unit placed to the east of the block to follow out the earliest Formative period middens in the block[23]. Because the surrounding units had been excavated, it was possible to follow the previously established stratigraphy and clarify a number of contexts. There was a clear difference between the rocks aligned for the walls of the ASD5 structure and those from the wall fall surrounding them. The interior wall face was better constructed than the exterior face and the central area of the structure had a compact surface with a single Collao sherd *in situ*. The structure also measured between two and three meters in width. The soil was described as semi-compact and it did not appear that there was a formal foundation or evidence of wall trenches. These loci were designated as *occupation zone 1*, but are likely a mixture of the wall fall above (*wall fall 1*) and the first few centimeters

[23] The semi-circular structure in the 4993N row was left completely intact and we felt removing the fragment in 5075E was justified because the area included less than half of the complete structure and the remaining half could be located for future excavations in 5076E.

of the fill below (*fill episode 3*). *Fill episode 3* continued until reaching a darker soil and the further exposure of large, angular rocks. As in the rest of BL1E, *fill episode 3* in 5075E appears to be a combination of intentional fill to make a level surface for the Colla occupation and wall fall from the earlier Formative period wall under ASD 2. In the rest of BL1E, it is possible that there were additional structures that were heavily disturbed by the wall fall and not identified because of the density of rocks.

Figure 16- Block 1- full extent of excavations with ASDs indicated



Surrounding the two circular structures was a contemporaneous occupation zone onto which *wall fall 1* collapsed. This context was designated as *wall fall 1/ occupation zone 1*. It was noted on several locus forms that there was a clear color change, absence of rocks, and sherds present after removal of the wall fall rocks. These changes marked the transition to *fill episode 3,* an Altiplano period fill episode was used to create the surface for construction of ASD4 and ASD5. The uppermost centimeters would have been used as an occupation surface (*occupation zone 1*), likely contemporary with the surfaces of ASD4 and ASD5. *Fill episode 3* was the first use of the BL1E area by the Colla inhabitants of the central pampa.

The Late Formative Period Use of BL1E

There were two Late Formative period occupations of Bl1E encountered under the thick layer of wall fall and Colla fill. As described above, underlying ASD2 was an earlier Formative period wall, ASD6. In the profile drawing of ASD2/ASD6 (Figure 17)**,** the morphological differences between the building episodes are clear; the earlier wall was constructed with a line of similarly sized, worked and unworked base stones. Based on the quantity, size, and distance of the wall fall from ASD6 (*wall fall 2*), the stone wall was several courses high. The wall collapsed to the east and had been covered with an intentional fill by the Colla to level the area (*fill episode 3*). When this fill was removed there were the large stones from the wall in a thick and jumbled deposit. Compared to *wall fall 1*, the stones of *wall fall 2* are much larger (up to 50 cm), with angular edges and some signs of

having been intentionally modified (Figure 18). As also noted for *wall fall 1*, all of *wall fall 2* was located on the eastern side of the block. When excavated, *wall fall 2* was a thick layer of mottled soil and large rocks resting on a surface that sloped dramatically from west to east. All ceramics recovered from the wall fall were dated to the Late Formative.

Among the wall fall removed from ASD6 was a single monolith lying flat and oriented north-south in the 4992N unit from 5074.05-5074.45E. The block measured 90 x 33 x 35 cm and the edges were worked, but there were no images on either of its two faces. It was partially exposed at the level of ASD6, clarified through the removal of *fill episode 3* and *wall fall 2,* and removed in the continuation of *wall fall 2*. It is unclear how or why this monolith was included in the wall fall from ASD6, or where it was originally situated[24] (Figure 19). At the base of the wall fall and underlying ASD6 was *fill episode 4*, an intentional fill used to cover a dense, sloping midden area (Feature 16) and to create a level surface for the construction of the Formative period wall (ASD6) in 5072E. The most important element of this stratum was that it could be traced below ASD6 into BL1W, connecting the activities across the entire block that predated the wall construction.

[24] Kidder encountered a large, dressed, but undecorated stone slab in Area IV. When the monolith was removed, human cranial elements were encountered under it, approximately 75 cm below the surface (Chávez 1992:63-64).

Figure 17- Block 1 East- Profile and cross-section of ASD2/6

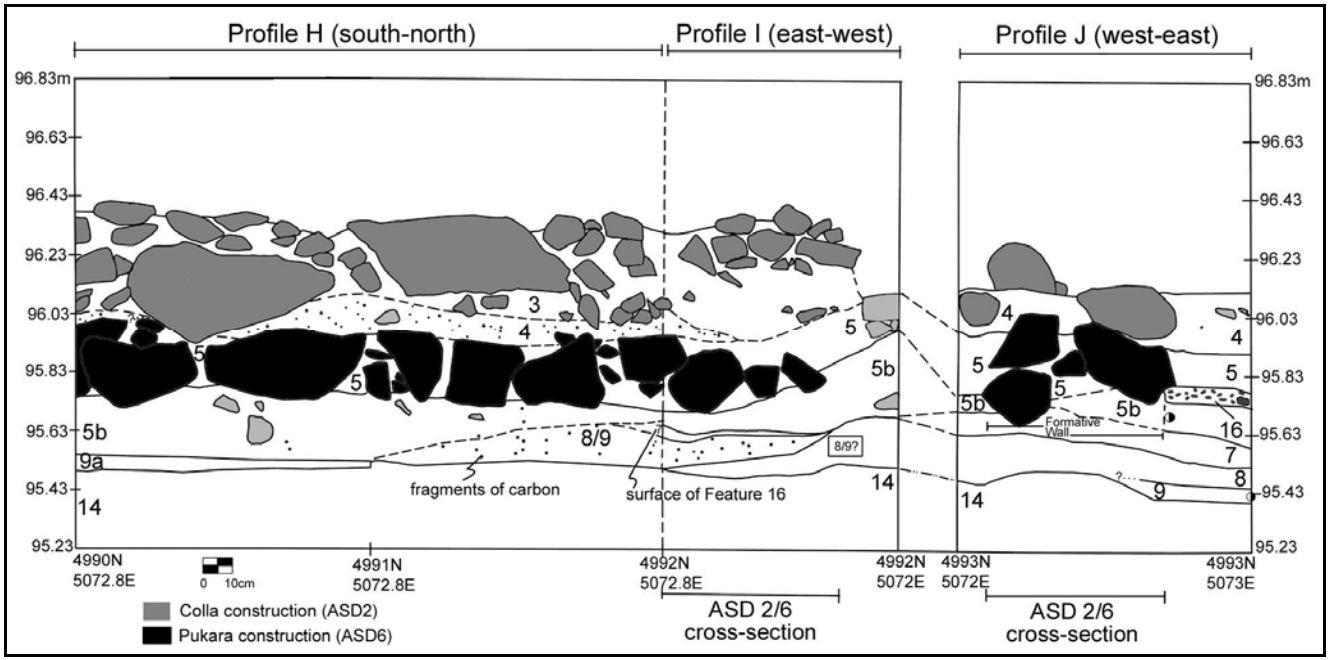


Figure 18- Block 1 East- southern profile of block showing Pukara (ASD6) and Colla (ASD2) wall fall

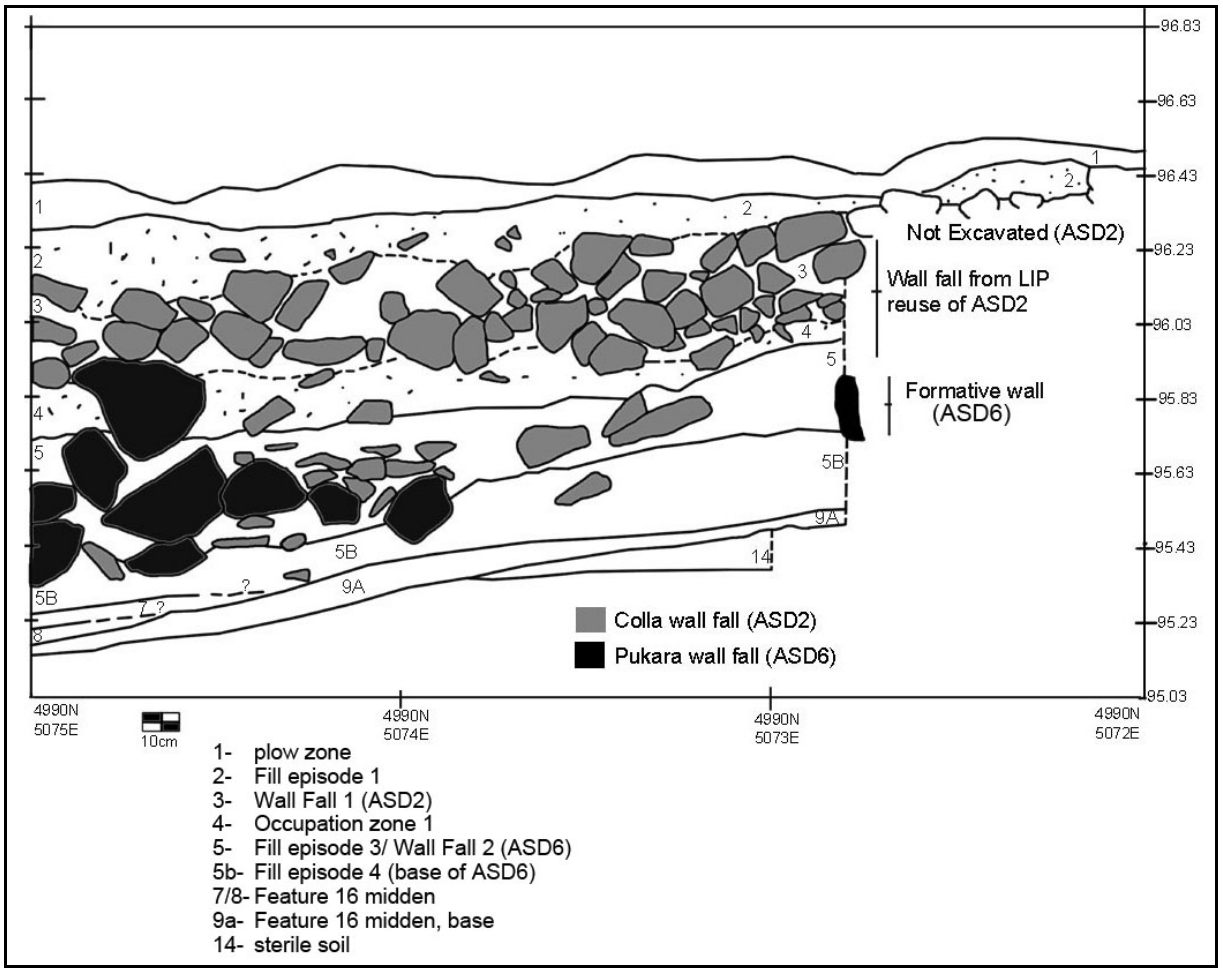
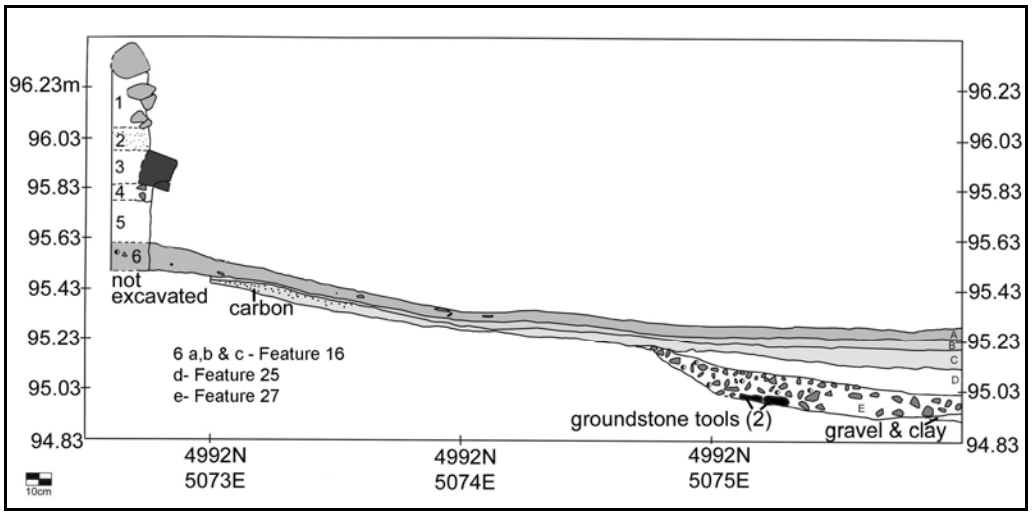


Figure 19- Block 1 East- Late Formative monolith within wall fall

The earliest evidence for use of BL1E was a series of superimposed, dense midden deposits that were separated into several features based on types of cultural materials present, density, form, location, and presence of inclusions such as rocks or ash (Figure 20). The three layers of Feature 16 were treated as a single context for analysis, but it was possible that they represented a series of small dumping episodes. The base of Feature 16 was sterile soil in much of BL1E, but in the farthest eastern edge it was superimposed on midden Features 22, 23, 24, and 25. Sterile soil was a light gray, sandy loam without cultural materials at the base of these middens and similar to that designated as sterile soil in BL1W. The surface sloped dramatically from west to east and was irregular at its base.

Figure 20- Block 1 East- middens in profile (facing north)



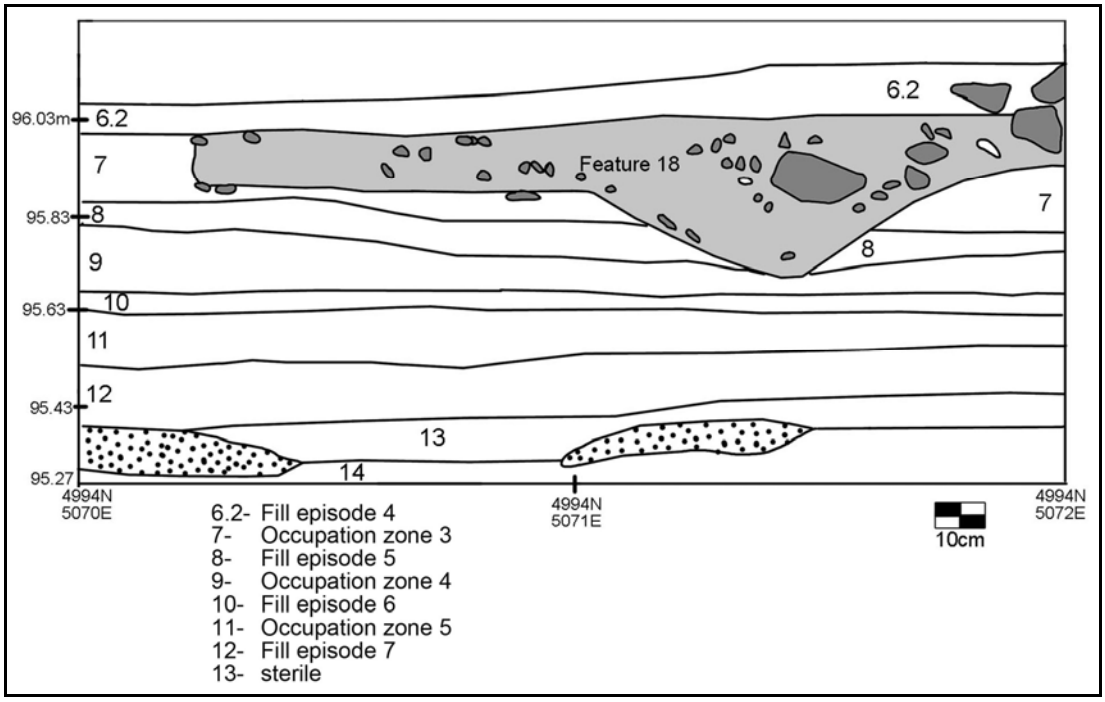
The Late Formative Period Use of BL1W

On the west side of ASD2/6, there were also superimposed Formative period deposits; they are first described and the overall use of Block 1 is then summarized. Due to the nature of the stratigraphy and the use of space in Block 1, context designations were treated separately for each side of ASD2/6 and then connected at the end of this section. For example, *fill episode 4* in BL1E and *fill episode 4* in BL1W were not the same context; the formation processes on either side of the wall were not continuous after the construction of ASD6 during the Formative period and were excavated and documented separately.

Due to time constraints and intact later period architecture, a limited area of BL1W was excavated to expose the Formative period contexts and reach sterile soil. The excavations were within the 5070E and 5071E rows from 4990N to 4993N and covered a total of eight contiguous 1-m-x-1-m units adjacent to ASD2/6. The latest

Formative occupation level in BL1W is designated *occupation zone 3* (Figure 21). The area of 4990N 5071E along the southern edge was distinct; there were concentrations of clay and reddish stains in the soil that may have been the result of disturbance from later use of the area. In the remaining units there were various activity areas, with scattered animal bones and ceramics, and also artifacts contained within small, more formal midden areas. Features 18, 19, and 20 were midden-filled pits associated with the consecutive use episodes within the final Late Formative period occupation. Because there were no formal, prepared use surfaces recorded from Block 1 it was difficult to determine contemporaneity of the features.

Figure 21- Block 1 West- segment of northern profile



Features Associated with the Final Late Formative Period Use of BL1W

There are three features associated with the last Formative use of the BL1W (Figure 22). The first of these, Feature 20, appears to be the only midden that could be confidently associated with the accumulated deposits from use of the area during *occupation zone 3*. During excavations, the top of the pit was noted just below the base of Feature 18. Feature 20 was described as cutting entirely through *fill episode 5* and midway into *occupation zone 4*. It was also noted that it appeared to continue into the profile on the east, but this was likely due to the fact that it was not possible to expose ASD6 on the west side because of the risk of undercutting ASD2 (Figure 23). However, the pit cut was more confusing when examined in profile. In the eastern profile, the top edge of Feature 20 was at the top of *occupation zone 3* (making it above or contemporary with the Feature 18 midden) and measured 20 cm deep. It is assumed that differences between Feature 18 and Feature 20 that were identified in horizontal excavation were difficult to define in the eastern profile. This would also explain why Feature 20 appears to be cut into the top surface of *occupation zone 3* instead of falling somewhere near its base in the profile drawing. Lastly, it is possible that the wall trench for ASD2 disturbed these deposits.

Feature 19, a shallow garbage pit holding two groundstone artifacts and half of a ceramic bowl, was first identified at the base of *fill episode 4*. On the associated surface there was an additional small groundstone artifact. The excavator noted that the soil looked jumbled (*removida*), indicating that this may have been an informal

toss zone instead of a well-formed pit that was intentionally filled. The pit feature cut through *occupation zone 3* and *fill episode 5* and ended at the top of *occupation zone 4* below. The top edge of the pit cut was at the top of *occupation zone 3*; it was likely constructed and filled during the initial use of *fill episode 4*. Feature 18, a primary midden deposit in a shallow pit, was visible in the northern profile, indicating that its entire extent was not exposed and excavated (see Figure 21)

Figure 22- Final Late Formative use of Block 1 West

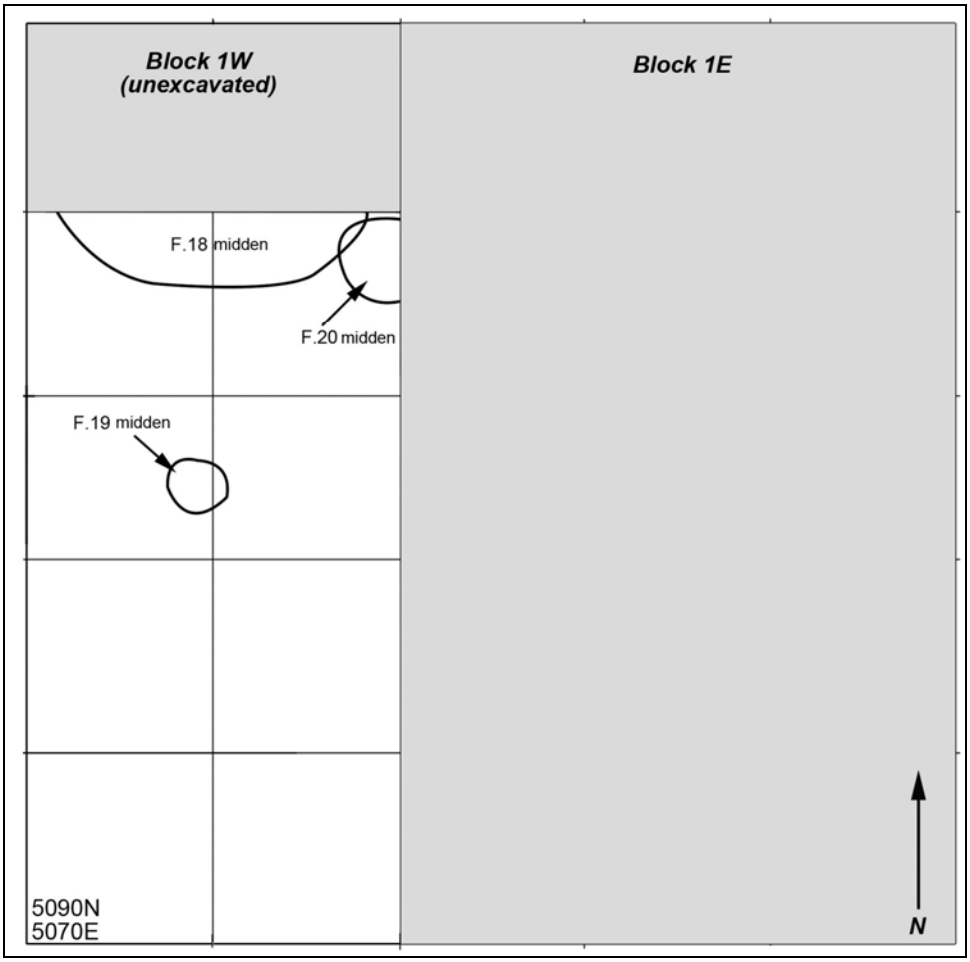
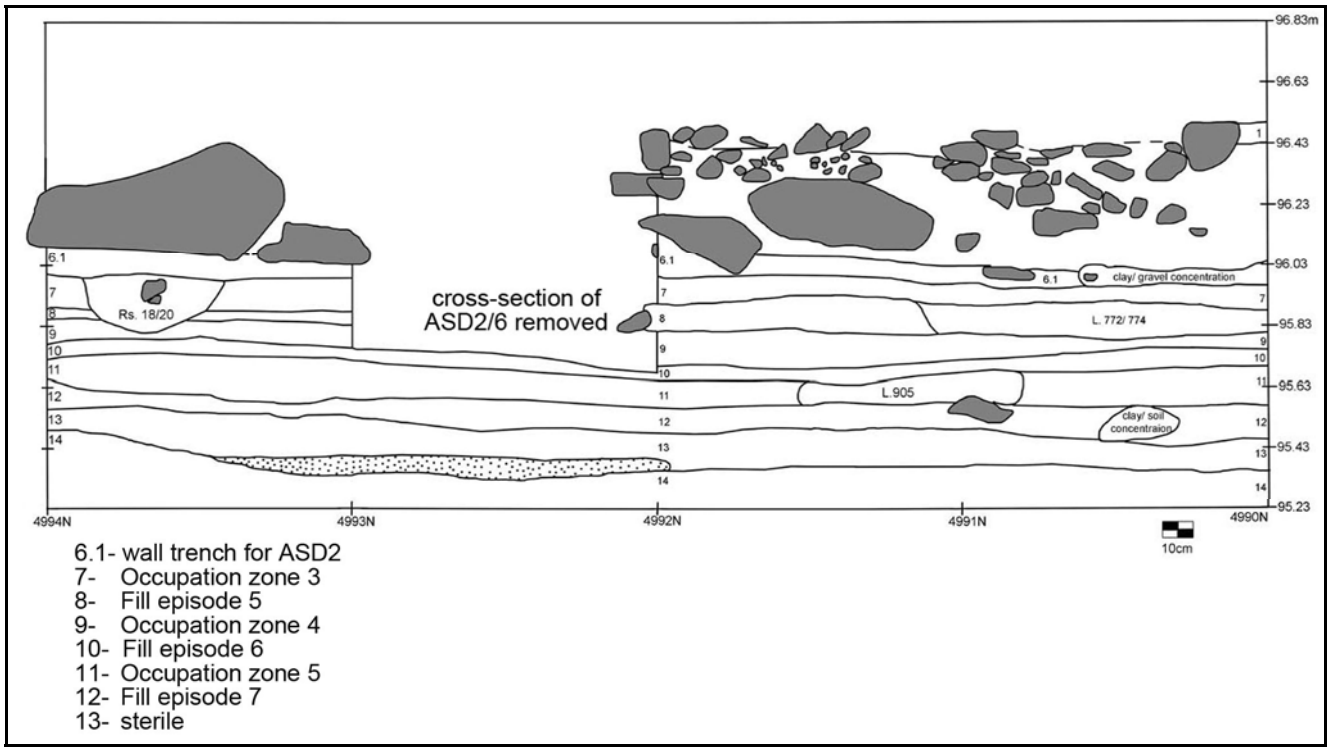


Figure 23- Block 1 West- profile of western half of ASD2/6



The Middle Late Formative Period Use of BL1W

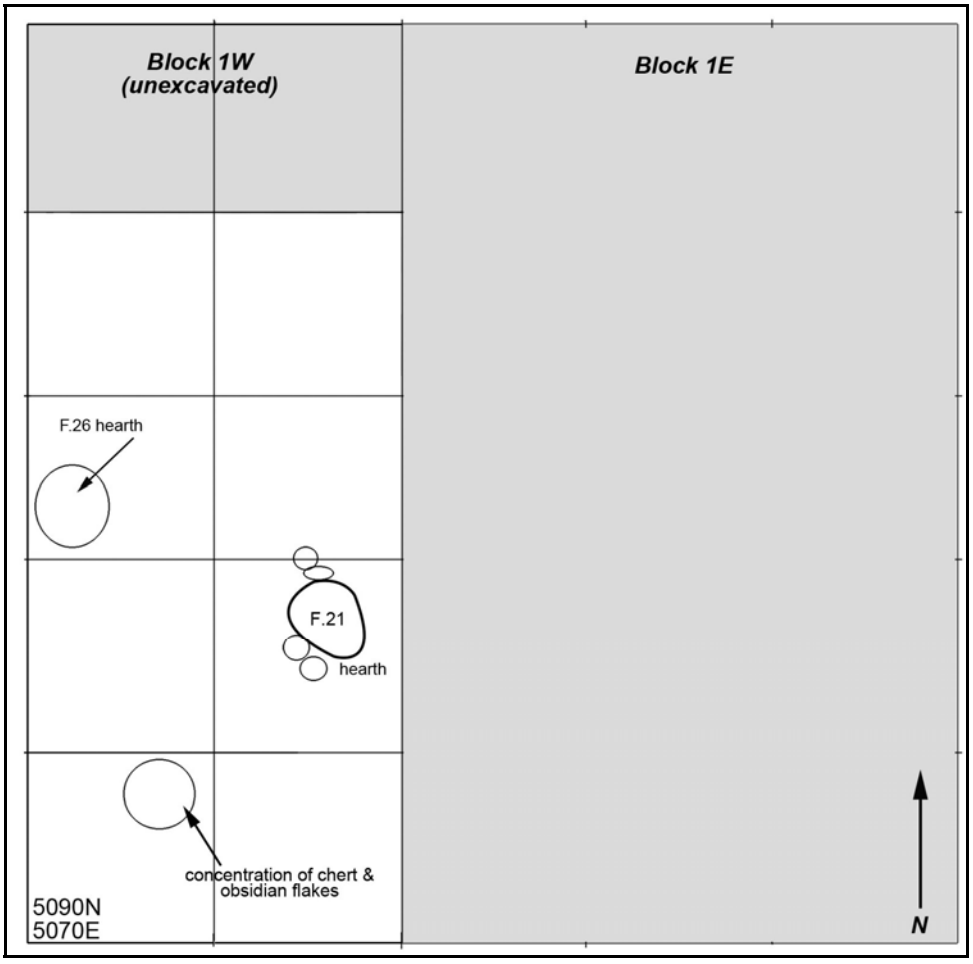
Underlying *occupation zone 3* was *fill episode 5*, a dark deposit with abundant, jumbled artifacts. Several of the features from the overlying occupation were cut into this fill episode. In 4990N 5071E, the eastern half of the unit was excavated as a separate area because of color and texture differences. These differences were identified at the base of the overlying occupation and appeared in profile to cut almost to the base of *occupation zone 4* below. The function of this area is unclear, but possible explanations include fill for a Formative period wall trench or possibly a shallow midden. The deposit measures 15 cm in depth and artifacts were encountered at a variety of orientations. *Occupation zone 4*, the middle Late Formative period occupation, had a number of superimposed activity areas for food preparation and stone tool working. The deposit averaged approximately 7 cm and artifacts were generally resting horizontally. Ceramics date to the Late Formative period, with some unidentified or non-local wares.

Features Associated with the Middle Late Formative Period use of BL1W

There are several activity areas within the middle Formative period occupation (Figure 24). Feature 26, a slightly bell-shaped circular pit, was originally noted as a concentration of burned clay in *occupation zone 4*, but not clarified as a feature until *fill episode 6*. It was located in the southwest corner of unit 4992N 5070E and may have continued into the western profile slightly. In profile, the top of the pit was located at the base of *occupation zone 4* and cut into *fill episode 6* and

occupation zone 5. Therefore, it was dated to the initial use surface of the middle Late Formative occupation. Feature 21, a shallow, slightly bell-shaped pit located in unit 4991N 5071E, was also a thermal feature. Lastly, a concentration of white chert flakes was encountered in the northeast corner of 4990N 5070E and scattered in nearby areas. The chert concentration, located near the base of *occupation zone 4*, measured 30 cm x 30 cm.

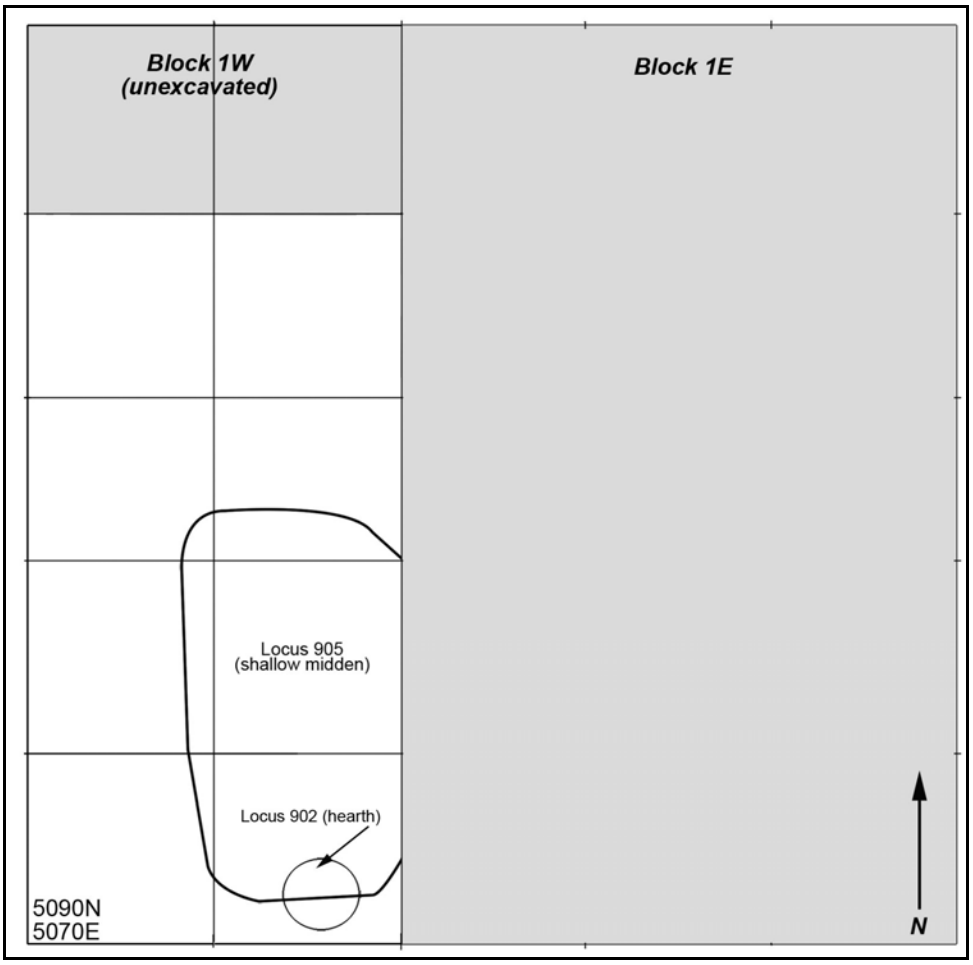
Figure 24- Middle Late Formative use of Block 1 West



The Initial Late Formative Period Use of BL1W

Fill episode 6 and an underlying pebbly fill were used to level the area above *occupation zone 5*, the earliest Late Formative use of the area (Figure 25). It was proposed in the field that *occupation zone 5* was a fill episode, but the presence of multiple activity areas, though fragmented, support that it was the earliest occupation level in BL1W. The occupation had ashy specks throughout, a low density of materials in general, and some large faunal remains. It sloped to the south and was subsequently leveled through the deposit of a pebble layer. Activity areas included a small hearth that was later filled with midden and a long, shallow midden pit. Due to the deteriorated nature of the activity areas in the earliest occupation and its sloping angle, this area was likely abandoned or neglected for some time before being filled in and leveled for subsequent occupations. Lastly, the earliest occupation rested on *fill episode 7*, a deposit located directly above sterile soil and associated with a leveling of the natural sloping ground surface. Ceramics from this fill were from the Late Formative period, the density of artifacts was relatively low, and their distribution irregular. Sterile soil was reached throughout the eight units in BL1W.

Figure 25- Initial Late Formative use of Block 1 West



Connecting BL1E and BL1W: Chronology and Function

During excavation it was difficult to determine the contemporaneity of the occupations in Block 1 because of the presence of ASD2/6 bisecting the area. By combining profile drawings, descriptions of the deposits, and the removal of a one-meter-wide cross-section of ASD2/6, it was possible to reconstruct the relationships across the entirety of the block and clarify the Late Formative Pukara and Altiplano period Colla occupation sequences.

Removal of ASD2/6 Cross Section

A one-meter segment from the 5072N row of the wall was chosen for excavation due to relative ease of access and because the slab used in this area of ASD2 was smaller than those in the adjoining units (70 cm x 70 cm). The removal of the wall segment clarified both wall construction techniques and the relationships between the occupation and fill episodes on either side of the wall.

The first step was to remove the smaller rocks accumulated over the principal slab of ASD2. Ceramics and bone were mixed in with the soil between the rocks; at the base of the layer of small rocks the large slab of the Altiplano period wall was exposed. The large slab of the later wall and the surrounding soil were removed to expose the eastern face of the underlying Formative period wall and a row of rocks placed on its western face to widen the wall during reconstruction.

By exposing both sides of ASD6 it became apparent that only the external face (the eastern side) of the stone wall was worked. Based on the presence of a stratum containing lithic debris documented in the northern profile, it appears that the stones were worked on their exterior surface once *in situ*. The soil change was very clear from the black soil surrounding the ASD2 slab to the brown soil of the ASD6 wall.

The worked stones of the Late Formative wall and the surrounding soil were removed. The base of this deposit, a reddish brown soil with fragments of bone, carbon and ceramics, measured only a few centimeters in thickness. The two loci clarify the sequence of wall construction; a shallow cap was placed over Feature 16,

followed by an additional fill under the base stones of ASD6. Below the shallow deposit the soil was sterile, as indicated by a light gray deposit found throughout the block, with a few scattered artifacts that were associated with Feature 16 from BL1E.

In BL1W, it was more difficult to distinguish which events corresponded to the construction of the Formative wall and subsequent uses of the area because we were not able to expose of the western face of ASD6 during excavations. This would have entailed undercutting the massive blocks of ASD2 to expose ASD6, risking its collapse. Therefore, it was necessary to rely on profile drawings and context descriptions to connect the eastern and western sequences.

The construction of ASD6 represented a complete restructuring of space across Block 1. It was clearly constructed upon *occupation zone 5* in BL1W and *fill episode 4*, in addition to the midden features in BL1E. However, the relationship between the initial construction of the wall and the occupation sequence abutting it was not initially clear. Specifically, was ASD6 used during only the last occupation of BL1W (*occupation zone 3*) or also during the underlying middle occupation (*occupation zone 4*)? Based on multiple lines of evidence, the wall was constructed after the earliest occupation and in use during both of the middle and final Late Formative period occupations.

Combining the descriptions, drawings, and elevations from the eastern profile of Bl1W with those from the profile of ASD2/6 clarified the relationships of the deposits on either side of the wall. Working from the bottom to the top, it was evident that there was continuous use of the entirety of Block 1 before the Formative

period construction of ASD6. This was indicated by the superimposed middens in BL1E overlying sterile soil that were subsequently covered by *fill episode 4*. This fill episode also served as the foundation for the construction of ASD6. In the western half of the block, the initial use was *occupation zone 5* and the subsequent *fill episode 6*. This association indicates that *fill episode 6* of BL1W and *fill episode 4* (the ASD6 wall foundation) of BL1E can be grouped as contemporaneous events. The base of ASD6 varies slightly across the block, but in general was at the same level as the uppermost surface of *fill episode 6*. It follows that the overlying stratum (*occupation zone 4)* was associated with the earliest use of wall. Additional information from the east-west cross-section drawing of ASD2/6 also supports these relationships.

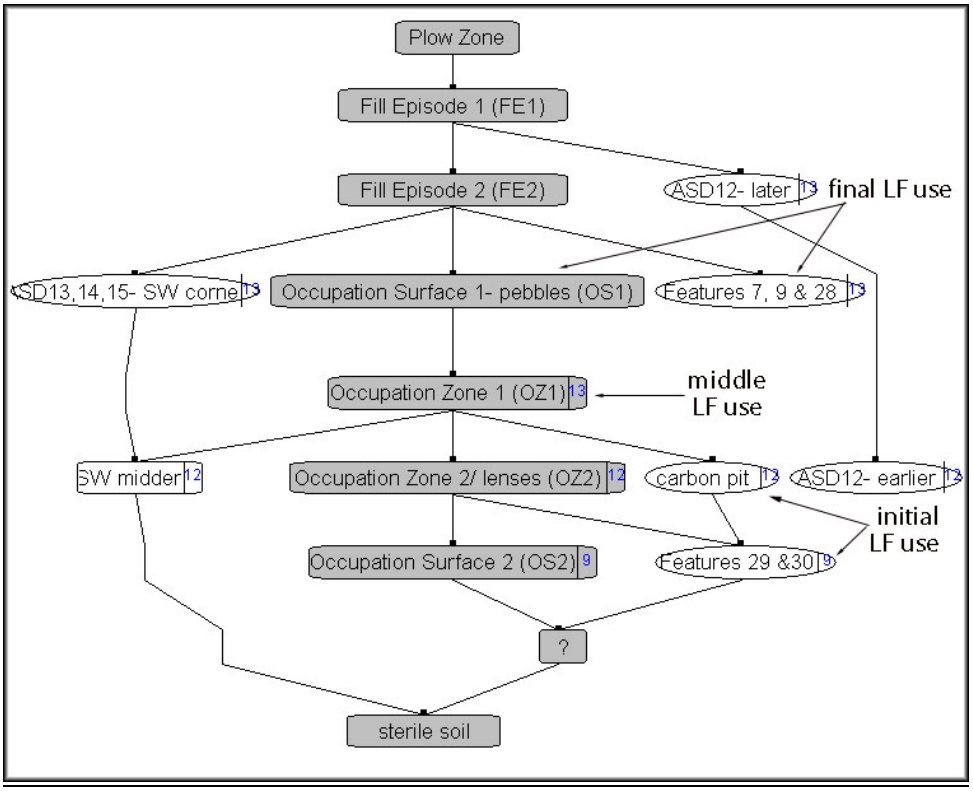
Block 2

Block 2 was a 5-m-x-5-m excavation area located at 4965N 5070E (see Figure 13). This area was chosen based on the presence of a linear anomaly in the geophysical survey that continued directly south from Block 1. Early in excavations the source of this anomaly, ASD12, was encountered in the 5074E row. There were multiple Late Formative period occupations in the block under mixed contexts with Altiplano period and other post-Pukara ceramics (Figure 26). Unlike Block 1, there was not a substantial use of Block 2 during the post-Pukara period and no architecture was identified or dated to later uses. The Formative period occupations, like those of Block 1, included an early series of activity areas with limited evidence

of associated architecture. These were followed by the initial constructions of ASD12, a series of superimposed activity areas, and lastly by further modification of ASD12 and construction of additional architectural features within the block (ASDs 13, 14, and 15). The presence throughout the deposits of *incensario* fragments, a very rare type of Pukara decorated ware, indicates that both the timing and nature of these Formative period events were distinct from those of Block 1.

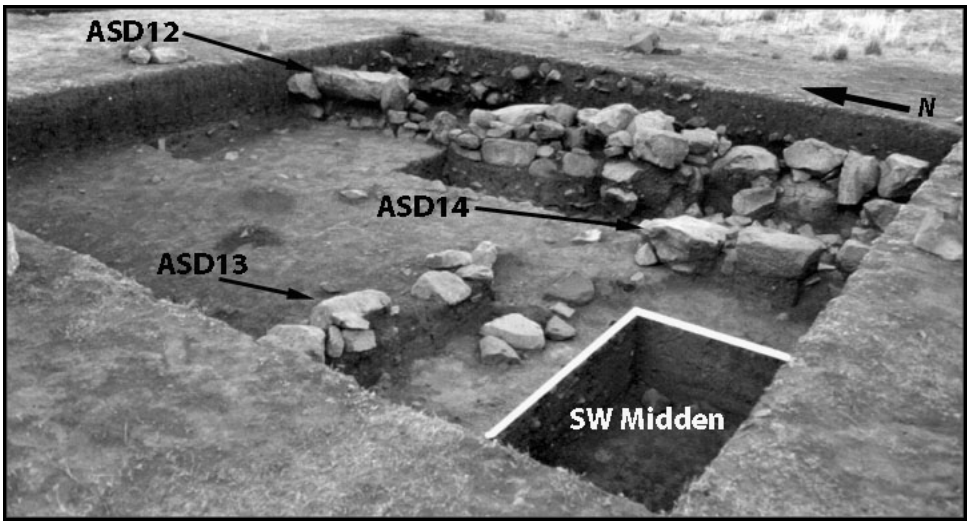
In 2001, the area of Block 2 had not been farmed for a few years and thick pasture grasses had to be removed before the plow zone could be excavated. This uppermost stratum included Collao, Colonial, and some Late Formative period ceramics. At the base of the plow zone a thin (2-3 cm) and patchy pebble layer was exposed in most of the block. In this fill, the uppermost signs of architecture were found along 4965-4969N 5074E. As in Block 1, there was a large north-south oriented wall (ASD12) located along the eastern edge of the area (Figure 27). The pebbly fill, combined with the 10 cm thick fill underlying it, were designated as *fill episode 1* and removed throughout the block. The underlying fill was consistent in color and texture, but included carbon inclusions and an increased number of artifacts.

Figure 26- Block 2, simplified Harris Matrix



At the base of *fill episode 1*, a division between the north and south areas of Block 2 became apparent in approximately the 4967N row of excavations. The difference is not visible in profile, but during excavations the north half was designated as *fill episode 2n* and the south half as *fill episode 2s*. In the northern area, *fill episode 2n* measured 10-20 cm in depth. In this context there was an increase in the number and size of artifacts and they tended to be located in small concentrations and pits. Pukara incised annular-based bowl fragments, a rare type of pottery also termed *incensarios*, were concentrated along the western edge of ASD12. *Fill episode 2s* was approximately 10 cm in depth and there were no areas located with concentrations of ceramic like those encountered in the northern area.

Figure 27- Block 2- locations of ASDs, facing northeast (block measures 5m x 5m)



To the east of ASD12, the deposit was distinct. Due to the limited size of the area, measuring less than one meter wide across most of its five meters of length, it was not excavated to the depth of the rest of the block. The uppermost loci below *fill episode 2n* were designated as *east wall fall*, a 10 cm thick deposit with rocks of all size grades. In some areas it appeared that these may have been part of a later, smaller-scale wall, but this was impossible to determine without expanding the block. In contrast to Block 1, there was not a high density of artifacts or associated activity areas from the post-Pukara use of Block 2.

The Final Late Formative Period Occupation of Block 2

Occupation surface 1, the final Late Formative period use of the area, was uncovered at the base of *fill episodes 2s* and *2n* in all areas west of ASD12, except the southwestern corner units of 4965-66N 5070-72E. The surface was an intentional deposit measuring 5-10 cm in thickness and comprised of 1-5 cm pebbles (30%) in a

clay rich matrix. During excavation, the deposit was clearly identified; it appeared red relative to the surrounding soils when initially uncovered. Few artifacts were found either directly lying on this surface or compressed within its matrix and almost all contexts contained exclusively Late Formative ceramics. In the northern profile, the relationship between *occupation surface 1* and ASD12 was visible; the surface continued almost to the western edge of the wall in 5073E (Figure 28).

The area in the southwest corner was enclosed within two 30 cm wide walls, ASD13 and ASD14 (Figure 29). ASD13 was a 1.5 m long wall fragment comprised of unworked blocks running east-west in 4966N 5070/1E. ASD14 was a 1.25 m long wall fragment running north-south in 4965/6N 5072E made of one to two courses of worked blocks. This southwestern area appears to be a room associated with the final Late Formative use of Block 2, with a gap in the northeastern corner where ASD13 and 14 would have intersected. It may have served as a doorway, but it was impossible to determine this and/or estimate the dimensions of the space because no fragments of the western and southern walls were exposed in either profile. It is clear that the areas within and outside of the walls were different contexts, most notably because of the lack of the pebbly occupation surface within the structure. This distribution is demonstrated in the western profile of Block 2; *occupation surface 1* abuts the northern edge of ASD13 (Figure 30). The wall fill surrounding and covering the worked and unworked stone blocks was fine clay with few artifacts. This contrasted markedly with the areas along the walls with dense concentrations of accumulated artifacts, presumably from cleaning events.

Figure 28- Block 2- northern profile

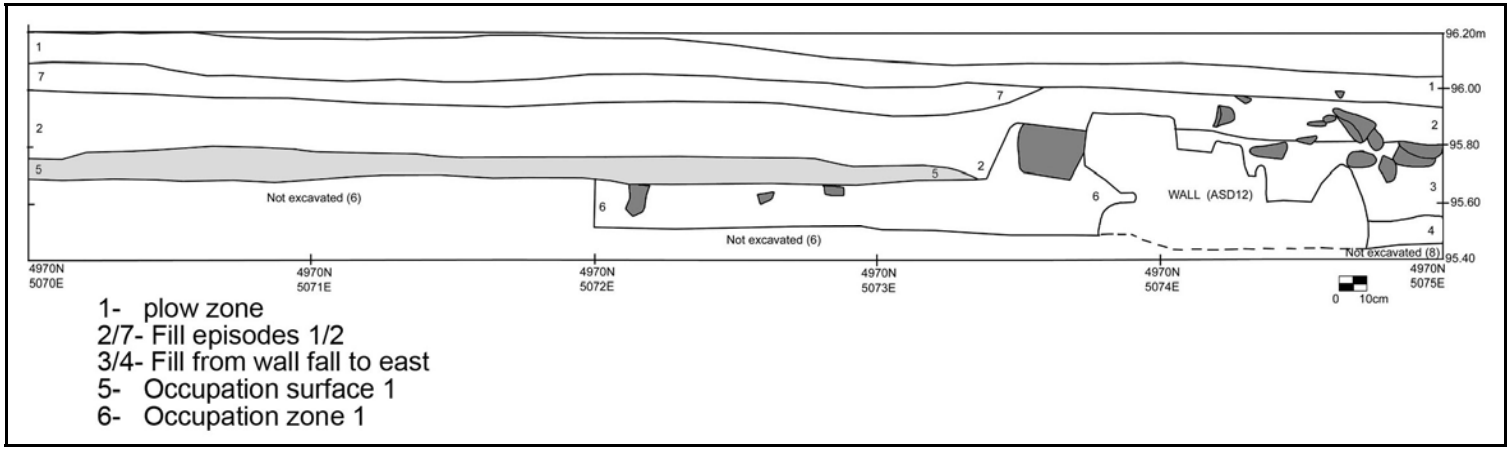


Figure 29- Block 2- Final Late Formative occupation with pebble paving (5m-x-5-m area). Feline incensarios were concentrated in the area of 4967.5-8N 5073-4E.

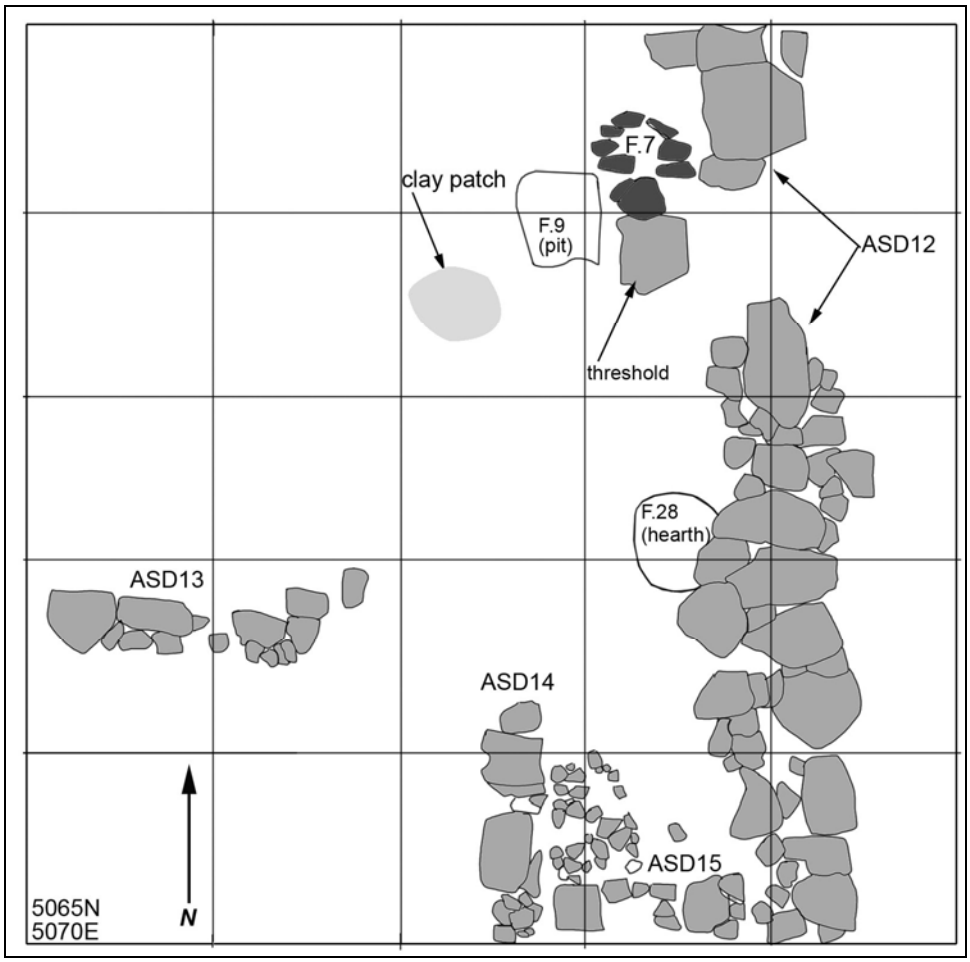
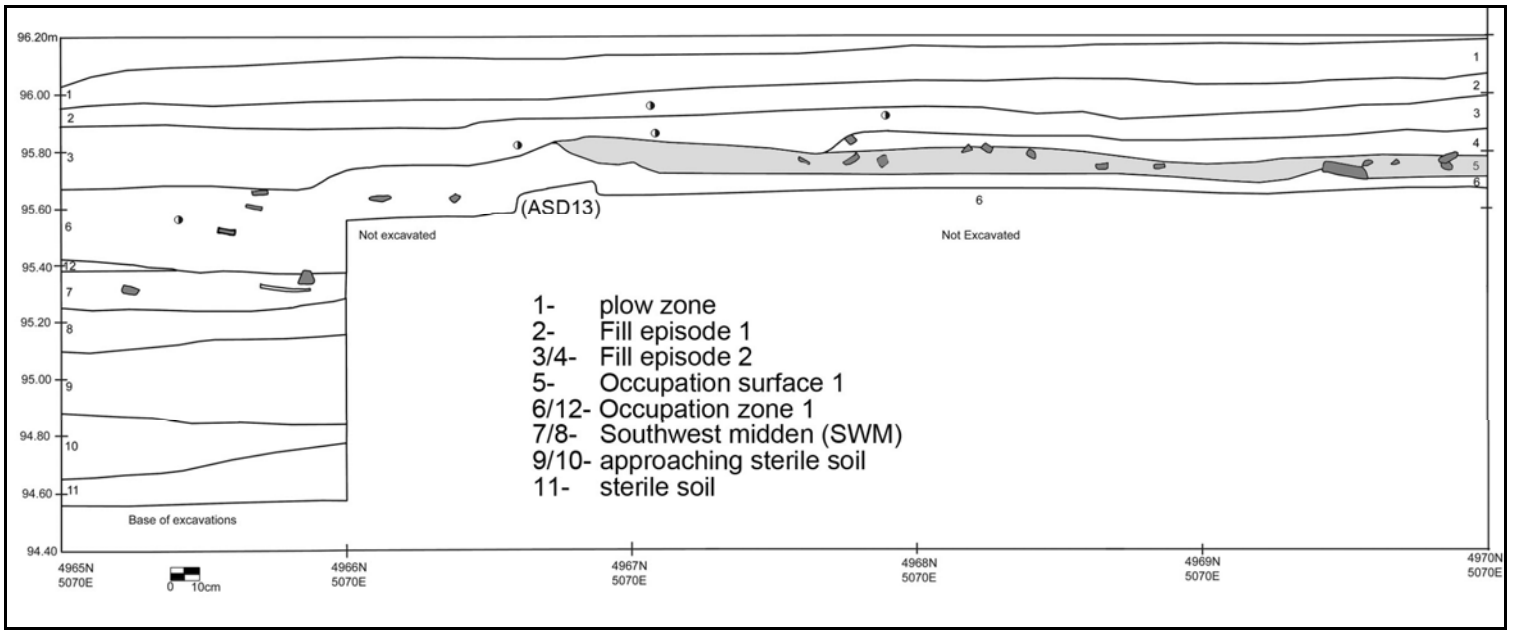


Figure 30- Block 2- western profile



Intersecting with ASD14 was ASD15, a one meter wall fragment running east-west in 4965N 5073E along the southern edge of the block. The wall was fragmentary, but may have connected the structure in the southwestern corner (ASDs 13 and 14) with ASD12. The wall was constructed with a mix of large stones (>20 cm) and some smaller rocks (10-20 cm). This wall fragment also included a burned clay fill that was similar to that found on and near ASD12.

Features Associated with the Final Late Formative Period Occupation

There was a cluster of activity areas associated with *occupation surface 1* located just to the west of ASD12, including two small pits and an informal hearth abutting the wall (see Figure 29). Feature 7 was a formally constructed pit feature located at 4969-4969.7N 5073.1-5073.7E, directly north of the doorway in ASD12. Feature 9, located in 4968/9N 5072/3E, was a shallow, roughly circular, informal depression. It was noted in the field that both Feature 7 and 9 had a fine, clay base with yellow inclusions and similar fill, supporting that they were constructed contemporaneously. The last of the features associated with the latest Formative occupation is Feature 28, a small hearth located in 4966.8-4967.3N 5073.3-5073.6E along the western edge of ASD12. The hearth was constructed to abut ASD12 and did not undercut the large stones of the wall. In addition to the features, there were a few modifications to the occupation surface. To the south of Feature 7 was a flat, worked stone that apparently served as a threshold for the doorway. In 4968N 5072E, there was a 50 cm x 50 cm circular concentration of compact clay (3-5 cm

thick) with very few inclusions. It is possible that it represents a fragment of floor that did not preserve in additional areas.

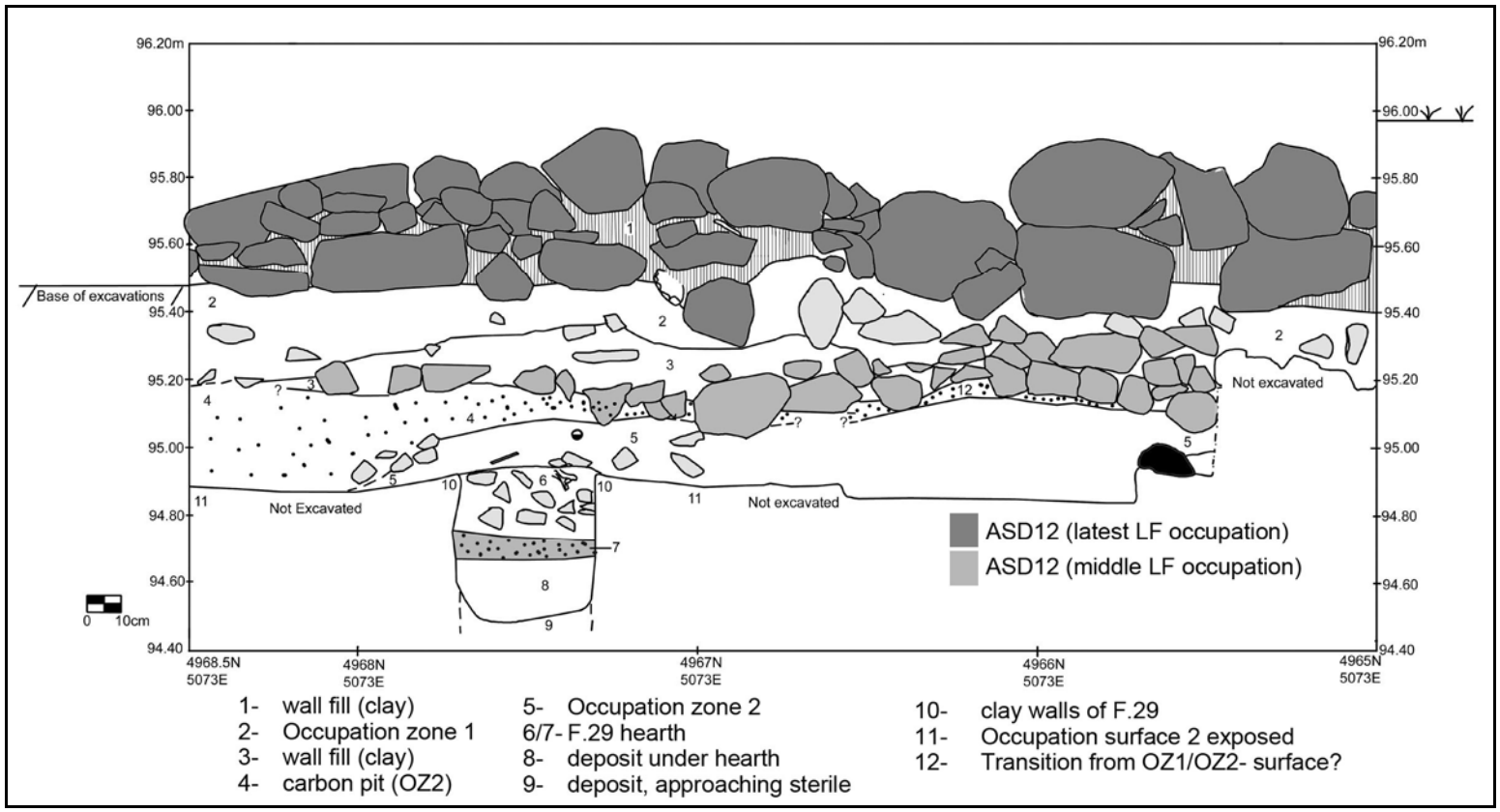
The Middle Late Formative Period Occupation of Block 2

Underlying *occupation surface 1* was *occupation zone 1*, a 20-30 cm thick accumulation throughout Block 2, located at the same elevation as the uppermost courses of ASD12 (Figure 31). The uppermost surface of the deposit had horizontally-oriented artifacts on it, but throughout the context there were lenses of jumbled artifacts, carbon flecks, and small areas with ash. Concentrations of clay were also present, perhaps representing remnants of use surfaces. It was unclear if this deposit represented a series of occupation lenses or if it was a thick, intentional fill episode used to create a level area for *occupation surface 1*. Features 7, 9, and 28 were excavated into the upper surface of this thick deposit.

The Initial Late Formative Period Occupation of Block 2

Due to time constraints, we selected two areas in Block 2 to excavate until reaching sterile soil. In order to clarify the wall construction and its relationship to the various occupations, the first area selected was the 5073E row from 4965N to 4968N. Underlying *occupation zone 1* in this area was *occupation zone 2*, a 30 cm thick, very dark brown deposit with small rocks, concentrations of carbon, and a clear increase in the density of bones and other artifact categories. Throughout the deposit there were lenses of artifacts, some appearing to be intentional dumps of sherds, and others related to activity areas.

Figure 31- Block 2- eastern profile of trench in 5073E



Based on profile drawings and excavation observations, there were a number of superimposed use surfaces throughout the deposit and some of these were defined by the presence of associated architectural features or concentrations of horizontal artifacts. For example, within *occupation zone 2* there was a context separated based on high densities of carbon (20%) and a 5-10 cm thick, horizontal layer of predominantly utilitarian ceramics deposited on it. The edges of a carbon-filled pit were located at the same height as this deposit and were likely contemporaneous. Both the carbon pit and concentration of ceramic were associated with an earlier phase of ASD12 wall construction that is detailed below (Figure 32).

After excavating 20-30 cm of the superimposed use surfaces and small fill events of *occupation zone 2*, a number of contemporaneous activity areas were reached and designated as *occupation surface 2*. This was the earliest use surface from this area of Block 2; associated features included two hearths and an informal use surface with *in situ* artifacts. There was not a clear division between the surrounding soil matrix of *occupation zone 2* and the use surface, all of the contexts in this area were dense with artifacts and inclusions, but the presence of hearths was a clear indication of a surface.

Figure 32- Block 2- western profile of trench in 5073E

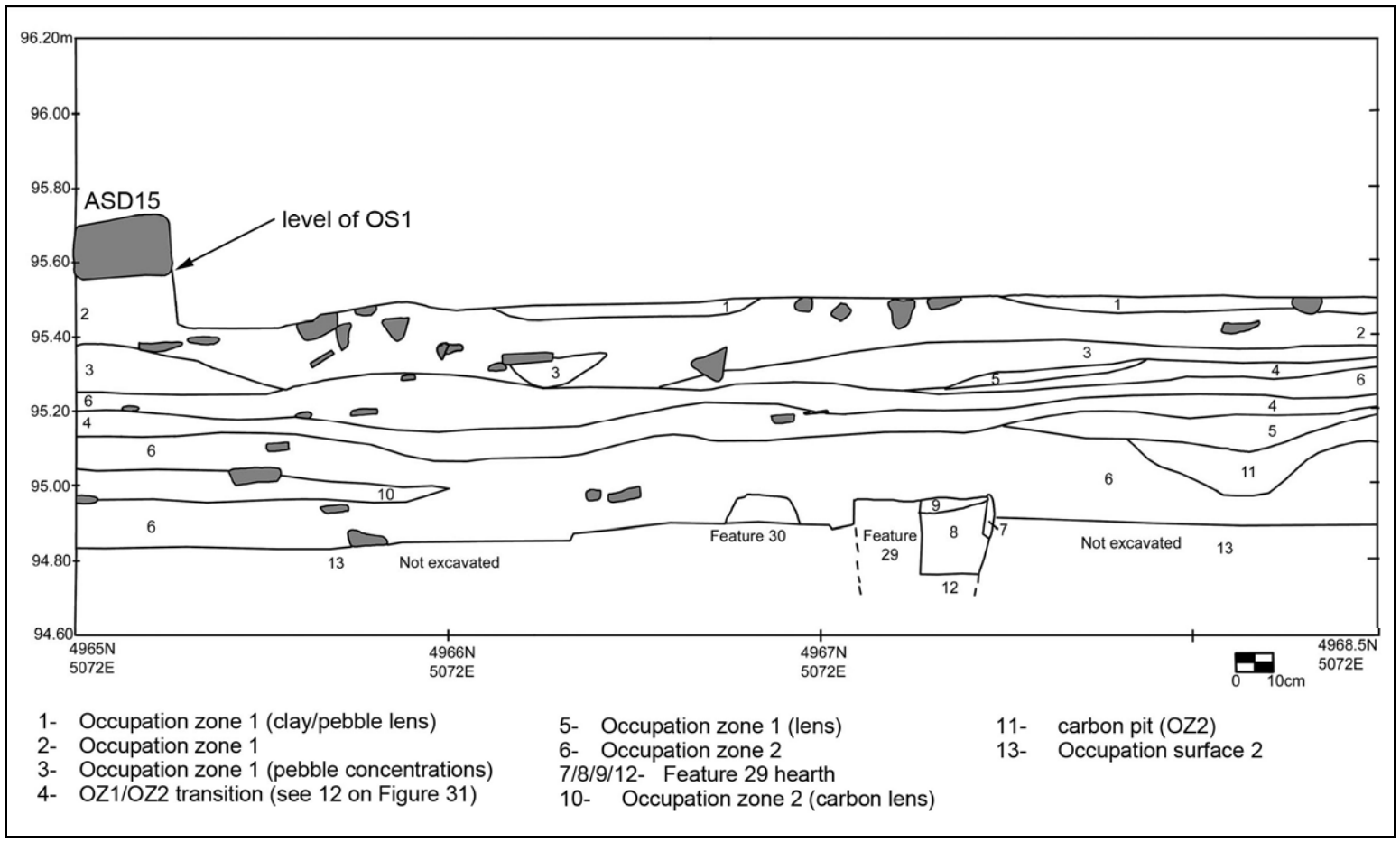
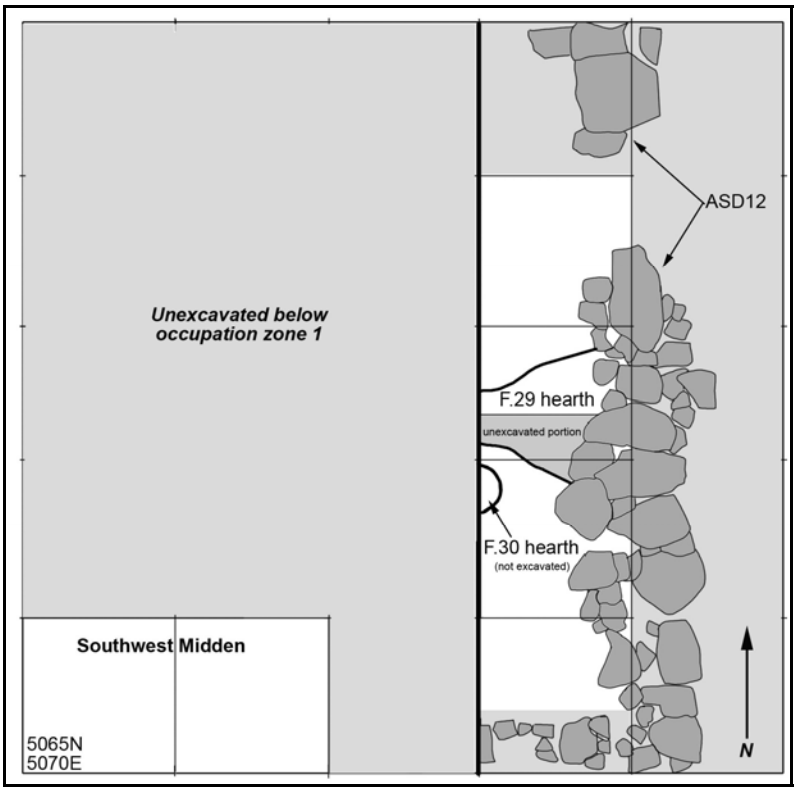


Figure 33- Block 2- Initial Late Formative occupation (5073E row and southwest midden)



Features Associated with the Initial Late Formative Period Occupations

A number of superimposed features and activity areas were excavated in the 5073E row (Figures 31 and 32). A carbon-filled pit feature was identified after approximately 20 cm at 4967.8-4968.5N in 5073E. It was originally proposed that the area served as a dump for the ash and carbon removed from hearth cleaning (Feature 29), but in profile it was clear that the pit predated use of the hearth. It is more likely that it was associated with one of the occupation lenses present through *occupation zone 2*.

Feature 29 was located just to the south at 4966.8-4967.7N 5073-5073.8E and used to establish the elevation of *occupation surface 2* (Figure 33). The hearth

was uncovered in the excavation of *occupation zone 2*. Due to time and space constraints the entire hearth was not exposed; it continued to both the east and west, likely undercutting ASD12. Excavations continued below the base of the hearth and, based on comparisons with the texture of sterile soil from the southwestern corner, *occupation surface 2* likely represented the earliest use of Block 2. The last feature associated with *occupation surface 2* was Feature 30, a hearth that was partially exposed at 4966.6-4967.1N 5073-5073.2E.

Southwest Corner Occupation Sequence

The second area selected to follow to sterile soil was the southwest corner in units 4965N 5070-1E. This area was chosen because of its location below the structure formed by ASDs 13, 14, and 15, and because it could be connected with the results of the 5073E row in the southern block profile (Figure 34). As noted above, the corner structure did not have the pebbly surface exposed in the majority of the block as *occupation surface 1*. Below this level was *occupation zone 1*, similar to the deposit recorded throughout the block. Underlying *occupation zone 1* was a distinctive midden deposit with a high density of burned and unburned bone (40% of total loci volume estimated in field) and ceramic materials. It was a mottled, very dark soil with a high percentage of carbon inclusions, small rocks (up to 20%), and patches of ash. Artifacts included large antler pieces, a bone spatula, high densities of slipped pottery, and the densest collection of bones in Block 2. Sterile soil was reached in this area, signaled by a sharp reduction in the number of artifacts and a

shift to sandy, light yellowish brown to dark grayish brown soils. Unfortunately, there was not a clear pit or edges defined for this dumping area, but it was grouped with the initial occupation of Block 2 based on elevation (see Figure 34).

ASD12- Construction and Occupation

The large wall that subdivided Block 2 was located in the 5074E row from 4965N to 4970N. ASD12 was uncovered in the uppermost excavation contexts, but Block 2 did not have a substantial Colla occupation and/ or re-utilization of ASD12. Based on stratigraphic associations, artifacts recovered, and lack of a Colla remodeling using large slabs, ASD12 and its associated occupations and activity areas were constructed during the Late Formative period. On average, the wall was approximately 50 cm wide and the western (or interior) face was exposed up to one meter in depth (see Figures 27 and 31).

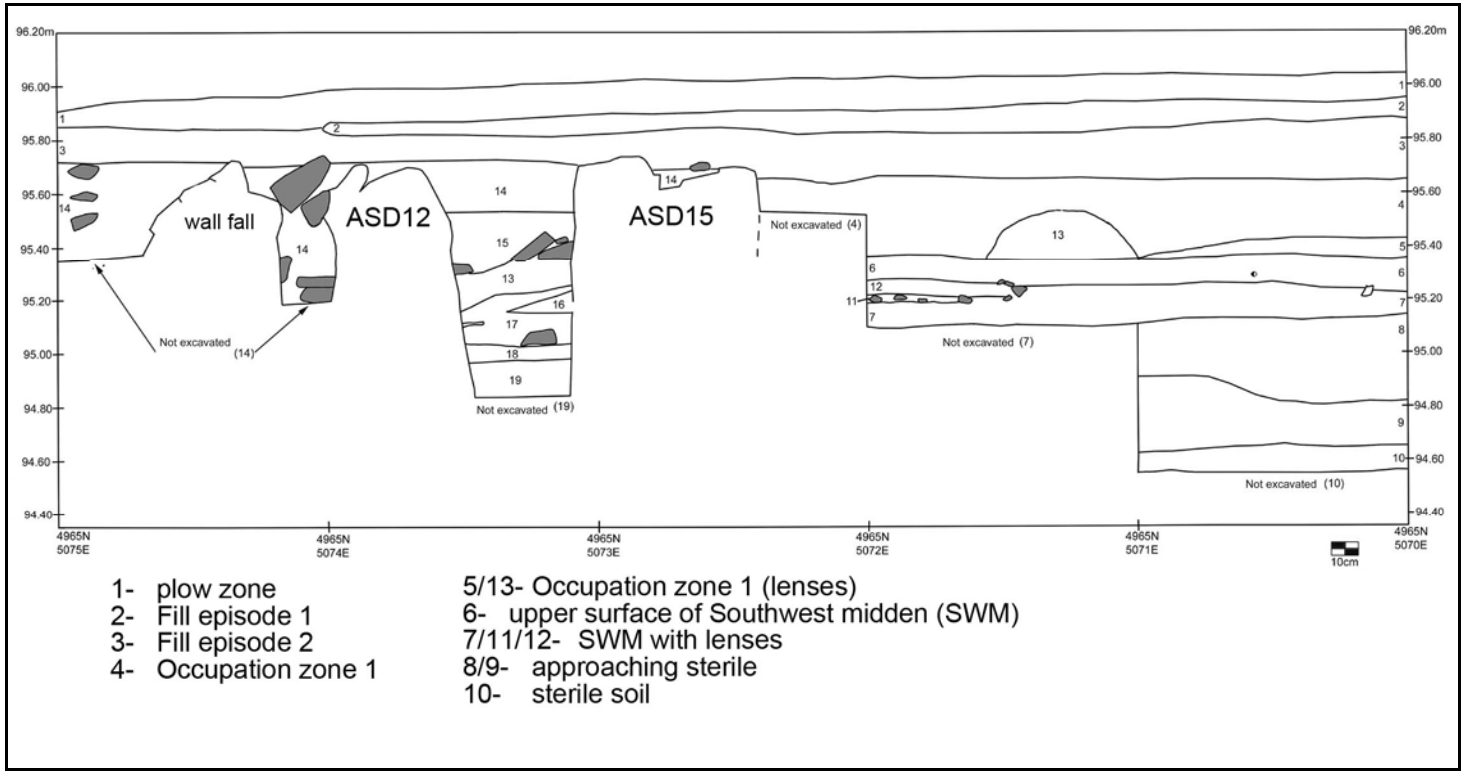
The uppermost surface of ASD12 was first exposed in *fill episode 1* and fully exposed after removal of *fill episode 2*. At this elevation it was clear that the wall had been coated with very dark brown, smooth clay surfacing with few inclusions. This clay was found only in this area of the block, nearby and slumping to the west from the interior face of ASD12. The largest stones of ASD12 measured over 50 cm in length and were found in both single and double courses, forming the most substantial construction of the wall. The latest reconstruction and use of the wall was resting on *occupation zone 1*. The northern section (4966.5-4968.5N) had stones (10-20 cm) which were capping the large wall. The southern half did not have these

smaller stones, likely representing an interior face of the wall, and in profile the large stones (>20 cm) are fully exposed. There was a gap in the wall from 4968.5-4969.2N and no wall fall to the east, indicating that this area was a doorway.

As is clear in profile, there were multiple construction episodes of ASD12. Below the larger stones of the uppermost course, the earliest construction of ASD12 was composed of one to two courses of smaller stones (10-20 cm). Considering the width of the wall in the subsequent occupations and the fact that the lower courses extend 20 cm to the west, it can be assumed that these stones represented an interior face of a wall and that ASD12 was quite a bit wider towards the east. At the base of this wall was an intentional deposit of pottery and the upper surface of the carbon filled pit, both likely related to this earlier construction and use of ASD12.

The earliest evidence of possible wall construction in this area was not in the area of ASD12, but was represented by a small (10-20 cm stones), single-course fragment in 4965N 5073E and 4966N 5074E. It ran east-west, perpendicular to the orientation of ASD12, and unfortunately only a single course was exposed at the base of excavations. This possible wall fragment was associated with the earliest activity areas of *occupation surface 2*. As is clear in the profile, these activity areas were encountered substantially below the base of the earlier constructions of ASD12. It was unfortunate that excavations could not expose this area further, but risk of undercutting the large wall made it unsafe to continue. While it was possible that there was additional evidence of early construction recorded for ASD12, the orientation and scale of the Feature 29 hearth makes this improbable.

Figure 34- Block 2- southern profile

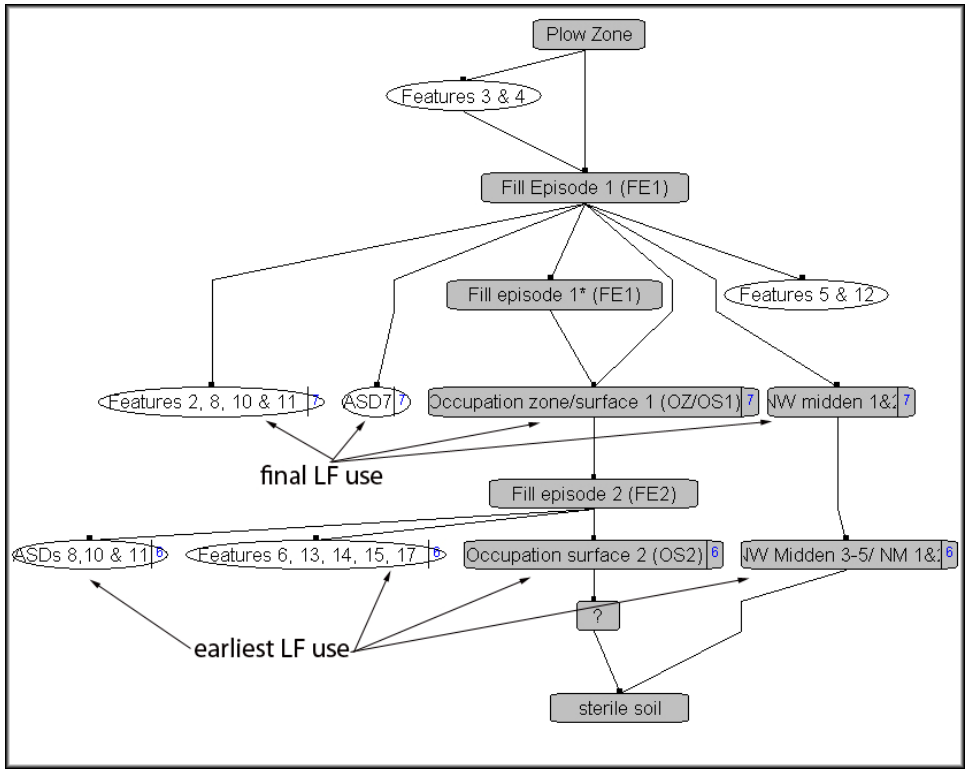


Block 3

Block 3, a 5-m-x-5-m area located in the southwestern corner of Quad 2 at 4950N 5050E, was selected because of the presence of the largest dipole recorded in the geophysical survey, indicating a likely thermal feature such as a hearth (see Figure 13). It was also the excavation block located closest to Kidder's Area IV and had potential to connect the 2001 excavations to the exposed architecture from the 1939 project (see Figures 4 and 5). The Altiplano period use of Block 3 was limited to two intrusive burials of an infant and juvenile in the northeast corner of the block. The two Late Formative period occupations were distinct, complex, and clearly separated by a fill episode (Figure 35). Neither of the Formative period occupations were associated with extensive architectural remains, unlike the occupations of Blocks 1 and 2. However, there were some wall fragments present in the earlier levels that also may have been used or at least exposed during the later of the occupations. Unfortunately, due to the high water table it was not possible to excavate to sterile soil except in the northwest corner.

In 2001, the area of and surrounding Block 3 had been cultivated for *quinoa* and potatoes on the flat, well-watered pampa. The modern ground surface was uneven and included clear furrows from the previous growing season. There were disturbances from remaining tubers in the soil, roots, and insect activity. The base was distinguished by a high percentage of small rocks throughout the matrix and the only architecture exposed was a few centimeters of the upper rocks of Feature 5 in the northeast quadrant of the block.

Figure 35- Block 3, simplified Harris Matrix



Below the plow zone, *fill episode 1* was encountered throughout the block. There was in increase in the number of small rocks (up to 10% of matrix) and the depth varied from 10-20 cm sloping towards the north. This context was a mixed fill with ceramics from all time periods, root disturbance, and insect activity. At the base of *fill episode 1,* four areas were separated by color, texture and inclusion changes: 1) continuation of the mixed fill; 2) an area where the final Late Formative occupation was exposed (*occupation zone 1*); 3) a midden (NWM) in the northwest corner; and 4) a cluster of large rocks in the northeast corner (Features 3, 4, and 5). These four areas were excavated separately in order to define the base of *fill episode 1* and determine the nature and extent of the newly exposed contexts.

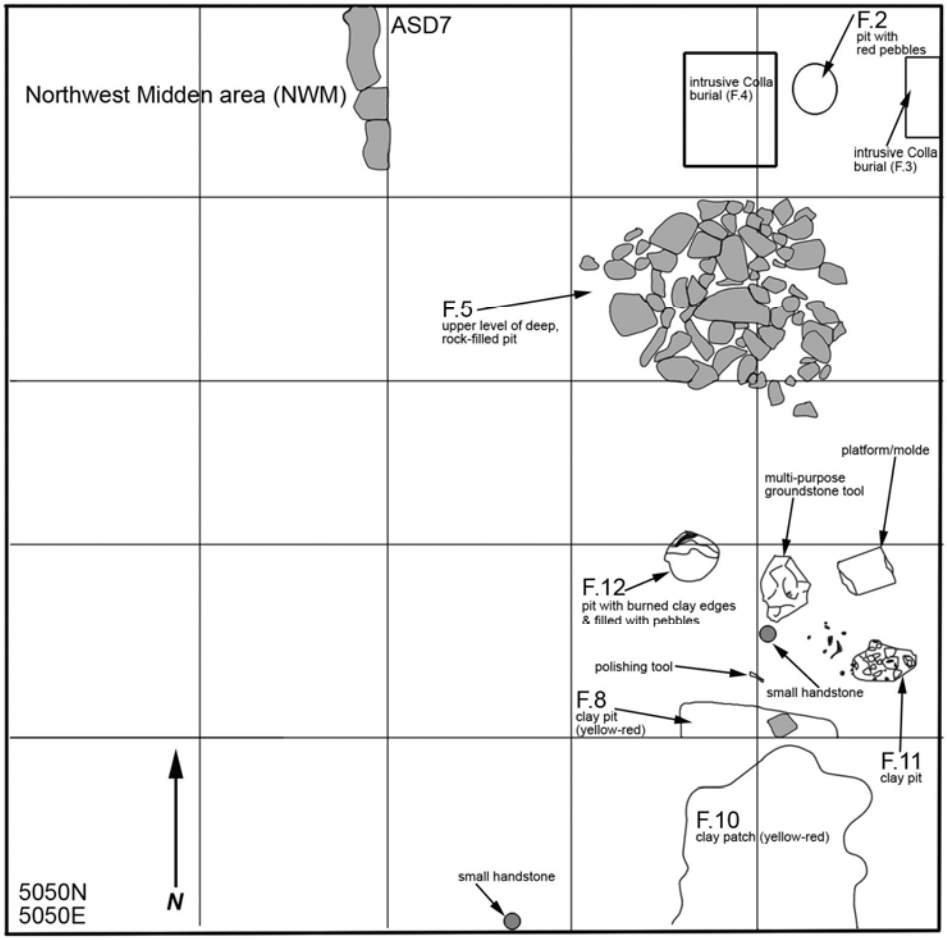
The Final Late Formative Period Occupation of Block 3

When the remainder of *fill episode 1* was removed, *occupation zone 1* was exposed, a thin layer of accumulated artifacts directly overlying patches of floor remnants and associated with various activity zones (Figure 36). The artifacts recovered from this context were almost entirely from the Late Formative, including diagnostic Pukara incised sherds. In general, this area did not have a formally prepared floor; *occupation surface 1* was a compact deposit (*apisonado*) measuring 1-9 cm in thickness, and the pieces of possible floor were patchy. These included a 1-4 cm thick pebbly (>30% at <1 cm), fragmentary floor exposed in the southwestern corner of the block. The rest of the occupation surface was identified by the presence of intrusive pit features, changes in the degree of soil compaction and inclusions, and a higher density of horizontally-oriented artifacts. Artifacts from both this series of loci and those excavated in *occupation zone 1* were treated as *in situ* finds, with many mapped and collected as specimens.

Associated with the final Late Formative occupation were a few areas with wall segments that are difficult to relate coherently to architectural units like rooms, structures, or compound walls. The fragments may have resulted from disassembling nearby or earlier walls to informally divide activity areas or may actually be the remains of walls that were disassembled and moved elsewhere for reuse. A wall fragment exposed in the northwest corner of the block (ASD7), running north-south along the eastern edge of 4954N 5051E, continued into the northern profile wall of the block. This fragment is significant because it served to separate the midden

contexts in the northwest corner mentioned above, designated as the northwest midden (NWM), from the rest of the block to the east at the base of *fill episode 1*. The base of the wall rests at the same elevation as the pebble floor fragments and the activity areas associated with the final Late Formative occupation.

Figure 36- Block 3- Final Late Formative occupation



The midden area was distinguished by the presence of a much darker soil, increased artifact densities, and limited concentration in the corner of the block. The area was used as an informal toss zone that accumulated throughout the occupation

of the block, instead of a midden deposit placed into an abandoned pit or structure. No edges were clearly defined and it does not seem likely that a Formative period pit was dug through both occupation zones and filled at a later date. It is likely that the area directly to the south was also part of this toss zone.

An additional line of evidence supporting the designation of these areas as occupation surfaces and accumulation zones was the low density of artifacts collected from these contexts relative to the fill episodes above and below. This was likely due to these areas being "high traffic" zones swept clean and leaving little opportunity for large (i.e., diagnostic bases and rims) or numerous artifacts to accumulate *in situ*. The toss zone in the northwest corner was clearly different from the rest of the occupation surface and associated features based on the higher density of artifacts, their orientation, and the presence of dark, carbon rich soils. The wall fragment (ASD7) bordering this toss zone and located at the level of occupation surface throughout the rest unit establishes the contemporaneity of the occupation surface, features, and toss zone.

Features Associated with the Final Late Formative Occupation

The features associated with the latest occupation of Block 3 were related to the initial stages of ceramic production. Feature 8 was a deposit of unfired yellowish red clay in the southeastern quadrant of Block 3 (4951N 5053-4 E). The base of the pit was located at the same elevation as the base of Feature 10, a patch of clay or clay floor fragment located directly to the south. Feature 10 was a 2-3 cm thick layer

of yellowish red clay covering the western half of 4950N 5054E and the eastern half of 4950N 5053E. The boundaries of the deposit were very clear and easily separated from the surrounding matrices for excavation. Within the clay were fragments of bone, Formative pottery, and carbon collected as a sample. The function of this feature is unclear; it does not appear to have been a prepared floor based on sharply defined edges and limited distribution. Feature 11 was another clay-filled pit feature associated in the southeastern quadrant of the block. In the northeastern corner unit (4954N 5054E) was Feature 2, a roughly circular pit feature full of small pebbles, an incised sherd, and a fragment of metal. Feature 2 was located between Features 3 and 4, two intrusive Colla burials. The last feature clearly associated with the latest Formative occupation of Block 3 was Feature 12, a pit that was used and re-used for a variety of functions in the southeastern quadrant of the area (4951-2N 5053E).

The most elusive feature excavated in 2001 was Feature 5, a large, rock-filled pit located in the northeastern quadrant of Block 3. The upper layers of rocks were exposed at the base of *fill episode 1* and excavations continued over one meter in depth to the base of excavations[25]. It was documented and excavated with great care because it appeared to be an intrusive tomb; this was based on its proximity to Features 3 and 4, the shape, and size. The limits at their greatest point measured over a meter and the pit was roughly circular and mound-shaped when first exposed.

---

[25] Excavations were halted several times as Feature 5 filled in with water due to the high water table on the pampa, a problem also noted by Kidder.

Once the upper layers of rocks were removed, the size of the pit decreased considerably and the edges were difficult to further define. The lowest layer of intact rocks was roughly circular and some of the stones had been worked. Determining its function may be the only option for relating its construction and use to the earlier, later, or both Late Formative Period occupations in Block 3.

The Initial Late Formative Occupation of Block 3

Underlying *occupation surface 1* was *fill episode 2.* The color, inclusions, and degree of compaction were different from those associated with the occupation surface above and the underlying occupation zone. The fill ranged from 5-20 cm thick and contained burned and unburned Late Formative period refuse oriented at all angles. The soil was moist and loose with a high density of fired clay (10-20%) and carbon (5%) mixed in with the mottled soil.

The removal of *fill episode 2* uncovered a series of features and an associated surface designated as *occupation surface 2*. In the remaining areas there was a change from *fill episode 2* to *occupation zone 2* before exposing the earlier *occupation surface 2*. Similar to the fill above it, this deposit was sloping to the south, as were many of the features and their associated surface. The deposit was identified during excavation because of increased percentages of fired clay, carbon, and lighter brown and orange inclusions in the soil relative to the fill above. It was very loose to excavate, in contrast to the occupations, and the matrix was composed of clay fragments (50%) and carbon flecks (10-20%). It was difficult to determine

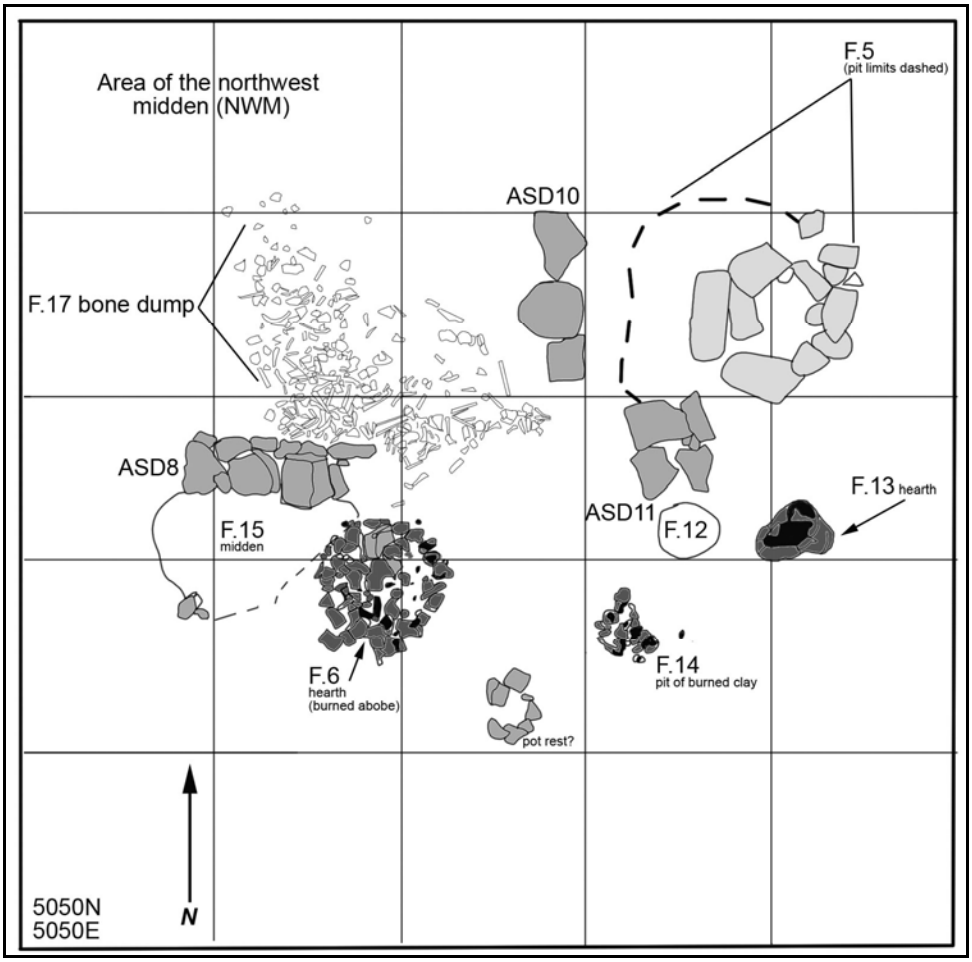
the division between *fill episode 2* and *occupation zone* and/or *surface 2*, but the presence of architectural fragments, associated features, and horizontally-oriented artifacts assisted in determining the location and nature of the transition. It is interesting that the surface slopes, especially in the southwest corner, serving as evidence that this was an outdoor activity area.

Architectural units included a number of wall fragments used to divide activity areas during the initial occupation of the block (Figure 37). The first of these (ASD8) was a well-constructed wall composed of large rocks (>20 cm) with a smaller series of chinking stones on the northern face located in 4952N 5051E. The very top of the wall was first partially exposed at the base of *fill episode 1,* further at the base of *occupation level 1,* and fully exposed at the base of *fill episode 2.* This one meter wall fragment is interesting for both its construction and function; it served to divide a cooking area (Feature 6) and associated midden from hearth cleaning (Feature 15) from a large primary toss zone covered in animal bones and ceramic fragments to the north (Feature 17).

The last major architectural features were two walls that were cut into or displaced by the construction of Feature 5, the large stone-filled pit in the northeastern quadrant of the block. In 4952N 5052E, a fragment of wall (ASD10) was constructed on *occupation surface 2* in the area just to the west of Feature 5. The rocks were flat, 40 cm wide, and placed north-south. A clayey soil was encountered in the 20-40 cm to the west and south of the wall, likely indicating melted adobe from a superstructure or some type of surfacing material. ASD11, a wall fragment in

4952N 5053E, was double-faced and also measured 40 cm in width. The base of the wall fragment was not exposed, leaving the possibility that the associated occupation surface was not fully exposed.

Figure 37- Block 3- Initial Late Formative occupation



In the southwest corner a possible fragment of a single-course wall was uncovered during removal of *occupation zone 2* (ASD9). This narrow wall fragment ran from the southwest to the northeast corner of the 4950N 5050E unit and could not be traced further. It is unclear how it was used to divide space in the area and the

construction and orientation were different than the other wall fragments found in the block during either occupation. It appears to have been constructed on *occupation surface 2,* the use surface that included Features 6 and 15.

Features Associated with the Initial Late Formative Occupation of Block 3

The features associated with the initial Late Formative occupation of Block 3 were distinct from those from those described above (Figure 38). There were three thermal features (6, 13, and 14), an associated midden from hearth cleaning (Feature 15), a pot rest, and a dense primary toss zone of animal bones and ceramics (Feature 17). The density of activity areas, the sloping and informally surfaced nature of the occupation, and irregular fragments of architecture without traces of wall collapse or roofing material are not what would be expected if this was patio area associated with a residential compound. This area was initially used for food-related activities, filled, and used as an area for craft production during the final Late Formative use of the block. The re-use of Feature 12 (and possibly of Feature 5), in addition to architectural fragments that were exposed during both occupations, indicate that relatively little time elapsed between the subsequent occupations of Block 3.

Feature 6, located in 4951/2N 5051/2E, was the most substantial thermal feature excavated in Block 3. The top and edges were first exposed at the base of the *fill episode 2* and were the first indication of an occupation surface below. In units 4952N 5050-1E, a midden pit designated as Feature 15 was also differentiated at the base of *fill episode 2*. The edges were clearly defined to the south and ASD8 served

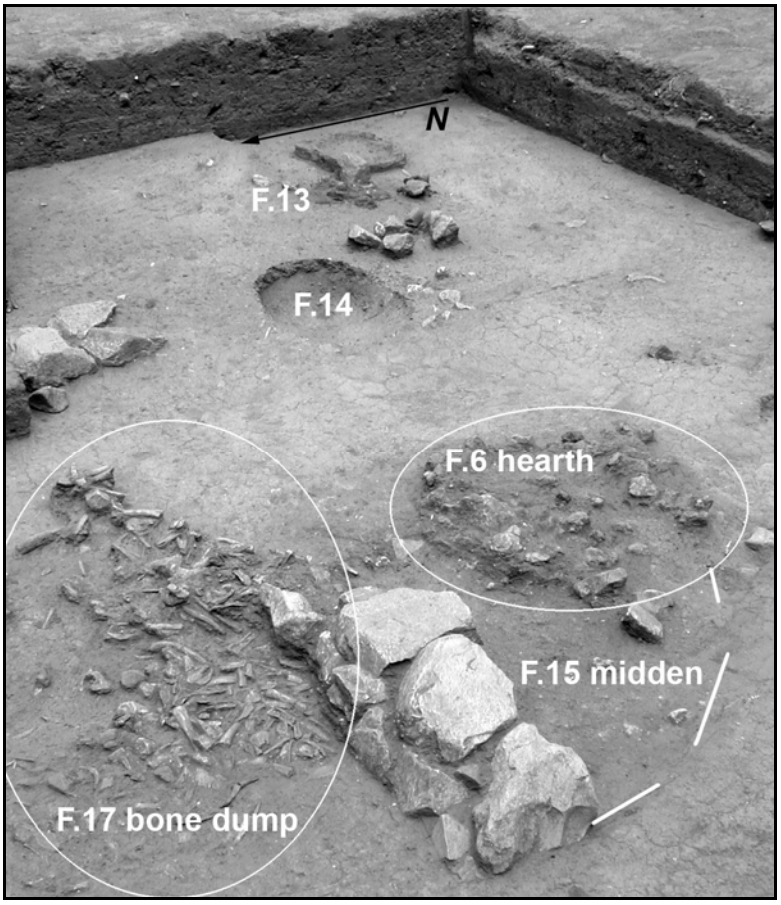
as a clear border to the north. The base of the pit was difficult to define because of the moistness of the soil and mottled nature of the deposit, but a decrease in the density of artifacts, carbon and burned clay was used as an indicator. The base of Feature 15 was 15-20 cm below the base of Feature 6, the hearth to the southeast. A second hearth, Feature 13, was identified by the presence of small burned bone fragments and carbon inclusions in a circular area at the base of *occupation zone 2* in 4951N 5054E. Feature 14, was a pit full of burned clay located in 4951N 5053E. The area was defined at the base of *fill episode 2* by the presence of reddish yellow chunks of burned clay and carbon flecks. Directly to the southeast was a small circle of rocks measuring approximately 15 cm across, proposed to be a pot rest.

In 4952-3N 5051-2E there was a clearly defined toss zone, Feature 17, defined at the base of *fill episode 2*. It measured 1.2 m east-west and one meter north-south and abutted the ASD8 wall fragment to the south. The base of the feature, defined by a significant decrease in the density of faunal materials, was at the same level as the units to the north and east, further indicating that this was a primary toss zone contemporaneous with *occupation zone 2*.

Lastly, a 30-cm-x-35-cm pit located along the northern edge of 4950N 5054E was exposed at the base of *fill episode 2*. The pit resembled Features 2 and the upper layer of Feature 12 and was dug into *fill episode 2* and possibly the surface below it. The pit was removed as a soil sample and included fragments of bone, ceramics, and pebbles to a depth of 5 cm. This pit was located directly east and slightly south of Feature 13, the smaller of the hearths, but it is difficult to determine the function of

this pit or its relation to the rest of the area. These small, shallow pits of pebbles appeared in both of the Late Formative occupations of Block 2.

Figure 38- Block 3- Initial occupation, close-up of activity areas



Northwest Corner Midden Area

The northern and western profile drawings clarify many of the spatial and temporal relationships observed in the field for Block 3. At the base of *fill episode 1*, it was noted that the 4953-4N 5050E units were distinctive midden areas without evidence of *occupation surface 1*. There were two walls fragments present, ASD7 visible in the northern profile at 5052E and the uppermost surface of ASD8 at 4952.5-.8N 5050/1E (Figure 39). Because the base of ASD8 was not uncovered until the excavations of lower levels, it was assumed that its use was dated to the earlier occupations of the block. However, based on the western profile, it is clear that the areas to the north of ASD8 (the 4953/4N 5050E units) were also clearly differentiated during the later occupations of the block (Figure 40). Therefore, ASD8 must have been in use during the later occupation of the block, possibly with an adobe superstructure or perhaps another course of stones. Also, there is no evidence that ASD8 continued into the western profile, supporting its designation as a wall fragment, not a continuous architectural feature from a structure. Based on the northern profile, ASD7 functioned to divide space during the later occupation; *occupation surface 1* was present to the east and the midden areas were contained to the west. It is unfortunate that the architecture in the block was so fragmentary, but profile and distribution data, when used it tandem, serve to establish the nature of the modifications of Block 3 during the Late Formative.

Figure 39- Block 3- northern profile

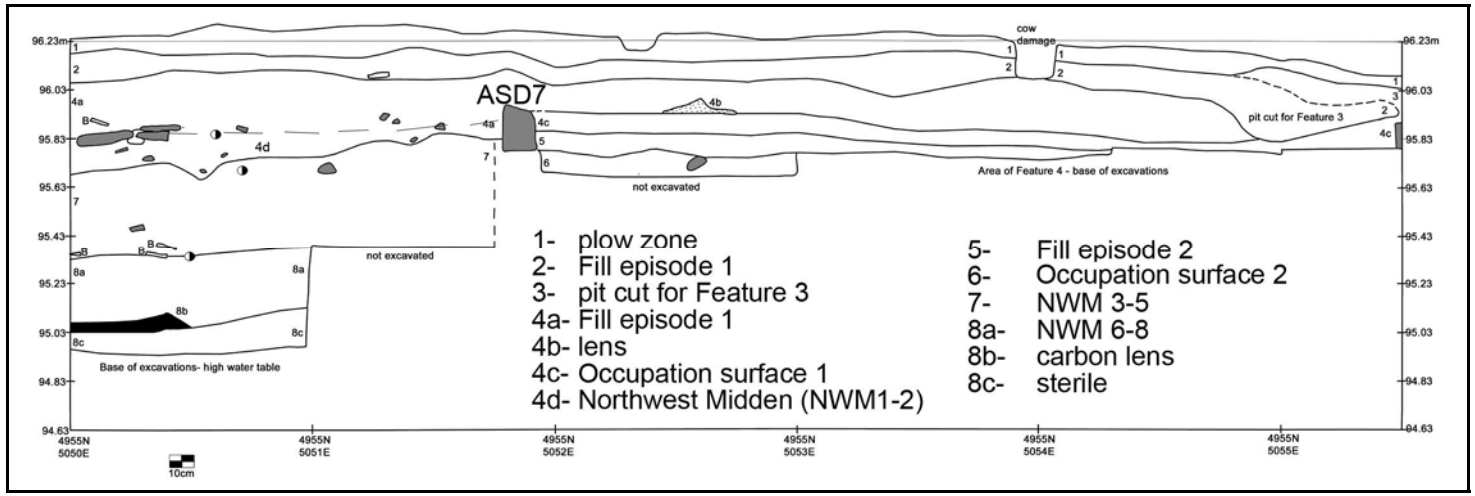
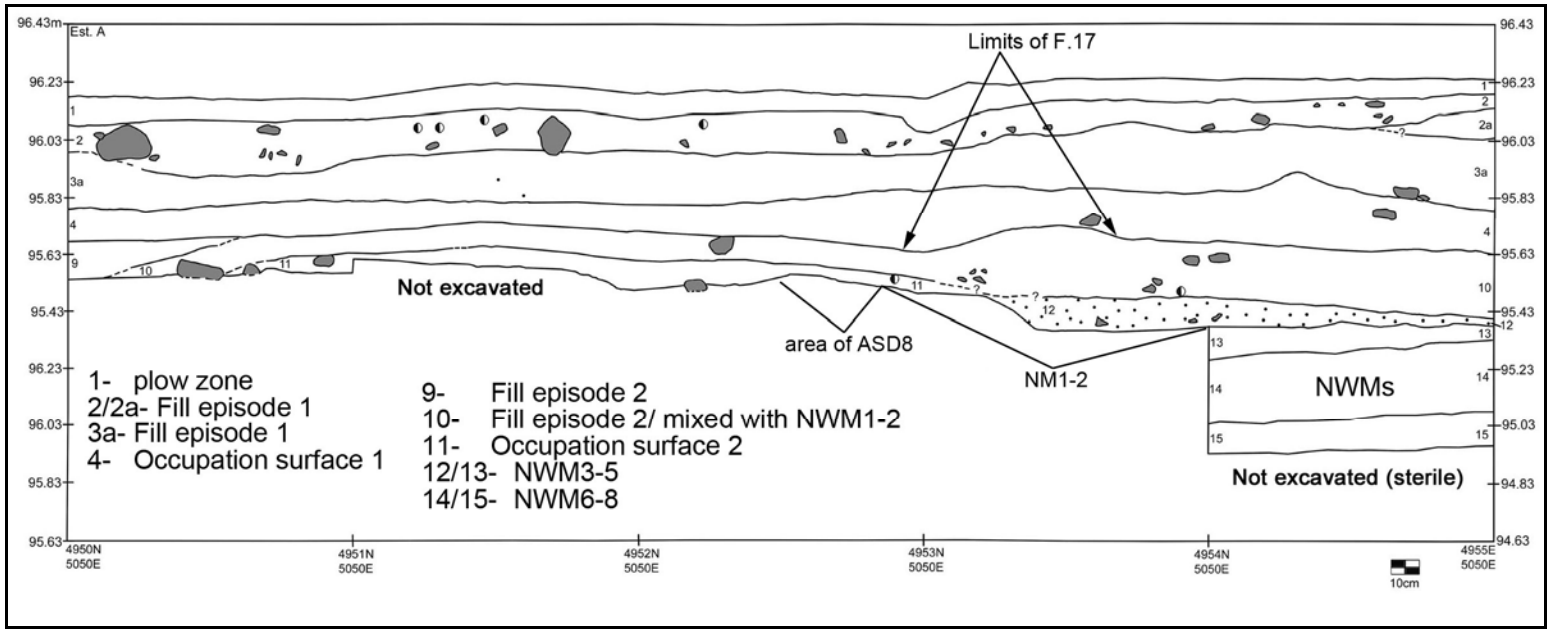


Figure 40- Block 3- western profile



Summary of Spatial and Temporal Patterning across the Central Pampa

The Altiplano Period (post-A.D. 1100)

The intensive use of the pampa during the Altiplano period, specifically the multiple occupations of Block 1, was unexpected. While Kidder reported finding a substantial number of Collao ceramics in the Area IV excavations (see Carlevato 1988), it is often presumed that Altiplano period populations limited their habitation to inaccessible hilltop locations (*pukaras*) to avoid conflict with neighboring groups. At Pukara, it has been posited that most of the Colla habitation was limited to a series of terraces below the Peñon and that the upper platforms of the Qalasaya were used for burials (Wheeler and Mujica 1981). However, the Block 1 data challenge this characterization of site use and illustrate that the Colla invested heavily in occupation on the open area of the central pampa.

Additionally, the Block 1 excavations add to our understanding of the diversity of Altiplano period architectural forms in the Colla region, a subject that has received little attention in the Titicaca Basin literature (see Aldenderfer 1993 for contemporaneous case studies from other areas of the south-central Andes). ASD2 was a massive wall that appears to have separated a large, rectangular structure (ASD1 and ASD3) from an area of at least two circular structures (ASD4 and ASD5). I argue that ASD4 and ASD5 are residential structures based on their size, the variety of ceramics encountered, and their similarities to structures identified in survey at other northern basin Colla sites (Elizabeth Arkush, personal

communication 2004). The function of the ASD1/ASD3 rectangular structure is undetermined, but should be clarified through ceramic analysis.

An interesting element of the Colla use of Block 1 was the placement of ASD2 directly over the worked base stones of the Formative period ASD6 construction and following the same orientation (Figure 41). It is clear from the size and quantity of Formative Period wall fall (*wall fall 2*) in BL1E that it would have been possible for the Colla to have simply reused the fallen blocks to reconstruct a relatively tall, substantial wall. Instead, they placed an intentional fill over the wall foundations and wall fall, which included a large, worked monolith, and constructed ASD2 out of massive slabs with smaller overlying rocks (*wall fall 1*) to presumably support an adobe superstructure.

Figure 41- Photo of ASD2/6, facing west (3 meter segment)

The construction of ASD2 was unlike any of the Late Formative walls or wall fragments. This clear break with Formative period building styles could have been due to technological, stylistic, or social concerns of the Colla. It is possible that the function of ASD2 was different than that of ASD6 and for this reason the fallen

blocks would not serve effectively for structural requirements. Another technological concern is that the pampa is an area with a high water table, a fact we encountered multiple times during excavation. Filling over the Formative period wall fall would have provided a solid foundation for Altiplano period buildings. Lastly, the Colla may have desired to clearly disassociate or distinguish their constructions from those of the Pukara culture. For example, Colla burials on the Qalasaya were placed on the large terraces of the lower platforms, not in the central spaces associated with the sunken courts and earlier Late Formative burials (Wheeler and Mujica 1981: Figure 36). These issues cannot be further addressed without additional excavations of areas with both Colla and Pukara occupations at the site. Ideally, further investigation of the post-Pukara occupations will also clarify the nature of the Middle Horizon component at the site, an issue that remains unresolved to date.

In Block 3, the Colla occupation was limited to the presence of two intrusive burials in the northeast corner. Each individual was associated with two complete Collao vessels, but unfortunately the bones were not well-preserved. The infant burial, Feature 3, was recovered from a shallow, stone-lined depression and only the rootless teeth preserved. Feature 4, the juvenile burial, was intact enough to be drawn and photographed, but the bones dissolved when removed. These burials were cut into the final Late Formative occupation and the fill surrounding them included a mixture of Collao and Late Formative sherds. The edges of the intrusive pits were difficult to define, but the burials were ringed by stones and the soil matrix

surrounding the human remains was distinct. Overall, the use of Blocks 2 and 3 by the Colla was quite limited relative to Block 1.

The Late Formative Period (500 B.C. - A.D. 400)

During the Late Formative, multiple, superimposed occupations were established for all three blocks. While Block 3 was difficult to associate directly with Blocks 1 and 2, the presence of ASD2/6 and ASD12 served to connect the occupation sequences of the two areas. In both blocks these architectural features were located in the 5073-4 E rows, utilized some similar construction techniques, and were the largest of the walls encountered in the excavations. A series of 1-m-x-1-m units were placed at 4973N 5073E, 4976N 5073E, 4979N 5072E, 4979N 5073E, 4982N 5072/3E, and 4985N 5072/3E (see Figure 13).

Due to time constraints, the units were excavated until the top of the wall was exposed and the edges were defined in each. While it would have been ideal to date the wall construction through exposure of associated occupation surfaces, the 1-m-x-1-m units were not wide enough to continue. In spite of these limitations, a wall fragment was encountered in each of the units, allowing for general connections to be made between the two blocks and their occupations.

Based on the excavations of the extension test units, the results of the magnetometer survey, and the orientation of the walls, ASD12 and ASD2/6 were related and may have been a continuous architectural feature during the middle and final Late Formative period use of the pampa. There are a number of possible

functions for these walls—serving as house compound walls or to delimit the central pampa from the surrounding areas—and there may have been open spaces for doorways or structure subdivisions that were not encountered in the test units. The wall construction techniques and the variability of the elevations at which the walls were encountered are clearly illustrated in profile and plan drawings of the units. There was quite a bit of variability from unit to unit, supporting either multiple constructions or variable functions. Based on the massive amount of wall fall to the east of ASD2/6, some clearly from a toppled Formative period construction and then covered with a fill event, it is likely that the wall was quite substantial in height during both periods.

Construction techniques were not static over time, as illustrated through the Late Formative and Altiplano constructions from Block 1. However, during the Formative there were clear similarities in the scale, orientation, and construction of walls between Blocks 1 and 2 and general similarities with the wall fragments recovered from Block 3. It was also possible to outline larger patterns of pampa use through comparisons with architectural data from the 1939 excavations. Wall fragments from the Kidder excavations, some measuring several meters in length, are identifiable on the modern ground surface and were mapped with the total station in 2000 during the geophysical survey. There were similarities in terms of wall width, scale of construction (the west wall of Area IV measures over 30 m in length), and orientation. Kidder also uncovered pebbly surfaces associated with the Area IV walls, similar to those from Blocks 2 and 3.

An overall occupation sequence for the central pampa during the Late Formative can be inferred through comparing the data from 2001 with those described by Kidder (Chávez 1992). In 2001, the earliest use of the pampa was associated with thermal features and dense middens, but with little to no evidence of associated architectural features. In contrast, the subsequent Late Formative occupations were associated with wall and structure construction in Blocks 1, 2, and the extension units. Based on Chávez's (1992) summary, a similar pattern can be inferred from the Kidder Area IV excavations. The large compound walls and internal subdivisions of the compound were constructed on a dense, earlier midden deposit. These patterns are discussed in detail in Chapter 8.

Chapter 7: Artifact Descriptions and Analysis

This chapter presents the range of artifact types recovered in the 2001 excavations, provides general descriptions organized by material, and outlines a preliminary ceramic typology. The following categories of artifacts are included: ceramics, lithics, bone tools, and less common artifacts, such as beads and metal.

Ceramics

Due to the rich modern and prehistoric ceramic traditions of the Andes, studies of archaeological collections from the region are often highly descriptive studies of iconography, decorative techniques, and ceremonial vessel forms. While these approaches are appropriate for discussions of ritual activities, ethnicity, interregional interaction, and for developing broad regional chronologies, they are insufficient for addressing issues of site organization, area function, and local chronology. In order to collect data for addressing these fine-grained issues, an attribute analysis of all Formative period diagnostic and selected groups of body sherds was conducted from December 2001 to June 2002. The primary goal of the ceramic analysis was formulating a vessel typology that could be used, in

conjunction with architecture and activity areas to determine area function across the central pampa.

This section begins with a brief introduction to the major studies of Pukara pottery from previous excavations and museum collections to contextualize the present study. This is followed by a description of the methods used for analysis and formulation of expectations for vessel types from the 2001 excavations. To conclude, the results of the analyses are presented and, when possible, compared to those from previous investigations in the region.

Previous Studies of Pukara Pottery

Pukara ceramics were first described by Valcárcel (1925, 1935) and subsequent publications focused on defining the characteristics of the Classic Pukara style from pieces in Lima museums (e.g., Rowe and Brandel 1971). Classic Pukara decorated ceramics are incised, polychrome, well-fired, highly decorated pieces produced in a number of standardized vessel forms (Chávez 1992). Early published examples of Pukara iconography were used in various comparative stylistic analyses in the south-central Andes, often in order to compare Pukara to later Tiwanaku and Huari materials (Conklin and Moseley 1988; Cook 1994; Wallace 1957).

The Kidder excavations produced massive quantities of Pukara ceramics, in addition to later Collao and Inca styles, and the materials were divided between museums in Lima, the Peabody Museum at Harvard, and several other institutions (Chávez 1992). Kidder published short, descriptive reports in which he presented

initial categories for Pukara wares based on paste color, inclusions, and finish (1943, 1948). Formative period ceramics, both decorated and plainware, were placed into broad categories, but the highly mixed nature of the excavation contexts made it impossible to subdivide the Pukara materials into chronologically coherent occupations or internally divisible phases (Chávez 1992).

Several researchers have published subsequent stylistic and technological studies of the ceramics from the 1939 excavations in articles and theses (Carlevato 1988; Chávez 1992; Franquemont 1986; Mujica 1987). Each has approached the collections from slightly different methodological and theoretical perspectives, but all faced the same limitations of the collections in formulating their projects. The ceramic collections, housed at the Peabody Museum at Harvard, are from mixed excavation contexts, favor decorated wares relative to utilitarian wares, and likely do not represent the diversity of artifacts from the 1939 project. In spite of these limitations, the results have contributed to formulations of regional culture history, discussions of iconographic traditions, and determining patterns of interregional exchange during the Late Formative.

Franquemont formulated the first stylistic typology of Pukara pottery for his bachelor's thesis at Harvard (1967). Franquemont's study was circulated informally to colleagues and was formally published in 1986 in Ñawpa Pacha, a regional journal published by the Institute of Andean Studies at University of California-Berkeley. Due to the mixed nature of the excavation contexts, the primary goal of Franquemont's study was to use stylistic change to develop a ceramic chronology for

the Pukara period. In addition to the ceramic study, he also provided the first widely accessible summary of research at the site and concluded with a discussion of Pukara ceramics within regional and interregional contexts. While the study is fundamentally a stylistic typology, a discussion of ware categories (paste types) adds a technological element.

Franquemont concluded that he could not confidently sub-divide the Pukara pottery style with the limitations of the existing data set, but proposed two phases for the material, Pucara Pampa and Pucara River, to be tested through further study. He added a chronological element by arguing that Cusipata, a pottery style first described by Kidder (1942) as "polished red ware with simple designs executed in white," was quite distinct and represented a pre-Pukara phase at the site. It was noted that fragments were collected from the lowest levels of the Area IV excavations (Kidder 1948:89), but only 12 of the 30 examples were listed with provenience (Franquemont 1986).

In a subsequent study, Mujica (1987) reviewed Franquemont's description of Cusipata wares and concluded that the forms represent a phase between Qaluyu ("village-level society" from 1000-500 B.C.) and Pukara ("initial complex society" from 200 B.C. - A.D. 200). This is based on both the early contexts in Area IV documented by Kidder and the excavation contexts from which Cusipata pottery was recovered on the Qalasaya platforms during the Copesco project. These materials were recovered from below the red clay fill episode that marks the reconstruction of the Qalasaya platforms and sunken courts (Mujica 1987:24-25). Mujica further

divided the style into Incised Cusipata and Red-Slipped Cusipata and described two forms of vessels, including open vessels (bowls) and closed vessels (*ollas* and short-necked pitchers). In terms of technology, Cusipata wares were produced using the same clay sources and temper as Pukara wares, but the later Pukara vessels were better fired (Mujica 1987). He also concluded that Pukara period necked *ollas* were considerably larger than Cusipata *ollas* (Mujica 1987:26), but the small sample of Cusipata wares makes it difficult to assess this assertion. At this time the sample of Cusipata sherds needs to be expanded in order to understand the timing, composition, and distribution of this vessel style, but they do serve as a valuable indicator of pre-Classic Pukara occupations in the region.

The most extensive study of Pukara ceramics from the Kidder project was conducted by Sergio Chávez and published in his Ph.D. dissertation (Chávez 1992). The study was a stylistic and technological analysis of 10,000 sherds recovered from a variety of excavation contexts. Chávez conducted a detailed attribute analysis and concluded that vessel shapes, temper, surface finish, and iconography on Pukara ceramics were very standardized. The main focus of this study was the decorated Pukara style pottery with representational images (Chávez 1992:14). The highly stylized and standardized iconography on Pucara vessels features depictions of felines, camelids, trophy heads, human figures, and some geometric motifs.

> Such powerful symbols expressed with such clarity, repetition and in public contexts serve as a means of controlling a political and economic reality by manipulating these symbols. Control or access to supernatural power might provide the basis for access to political and economic power, without the use of force… The emerging elite of Pucara would have found the control over these powerful images and the ceremonies and economic production and

> distribution that accompanied them, to be useful for actual control. The imagery would have served to sanctify their status. The consistent ("standardized") explicitness and precision of the images would have been important to maintain and as would the ritual paraphernalia upon which they occurred, strongly suggesting some control over production of this pottery [Chávez 1992: 539-540].

Additional information from Chávez's analysis, specifically related to categories of vessel and paste types, is included in the comparative discussion below.

The ceramic analyses from the Copesco/ INC excavations have not been published in detail, but there are preliminary descriptions in a report to the National Science Foundation (Wheeler and Mujica 1981). The report includes ceramic drawings with examples of the styles defined as Zeta (a proposed pre-Pukara local style), Initial Pukara, Cusipata, Ramis (a proposed non-local style), Pukara, Inca, Saxamar (also known as Pacajes), and Collao-Inca recovered from the excavations. The drawings are referenced when applicable, but the lack of provenience or attribute information limits the utility of the publication for comparative analysis. Fortunately, the excavated materials from this project are stored in the Pukara Museum and can be reviewed in future studies.

2002 Ceramic Analysis

The major challenge of formulating a Pukara ceramic typology is a lack of complete or reconstructable vessels recovered from Pukara contexts. For example, there are examples of existing reconstructable vessels, but of these only a single specimen, a small jar, is complete enough to be measured for vessel volume (Chávez

1992: Figures 4, 86, and 87). There are also a few complete or nearly complete vessels in the Pukara site museum, but most have been recovered from eroding middens or unearthed during building projects in the town. These vessels, like the sample accessioned by the Peabody, are primarily decorated specimens and probably not representative of the entire spectrum of Pukara wares. Unfortunately, the 2001 excavations did not improve this situation, as not a single complete Pukara vessel was recovered. However, a substantial number (n= 36,692) of both decorated and undecorated wares was recovered from stratified contexts and is used to refine categories of vessel shape, function, and preliminary details of local chronology.

Preliminary Sorting: Pukara and post-Pukara Pottery Styles

In the 2001 excavations of the central pampa, ceramic materials recovered included modern, Colonial, Late Horizon, Late Intermediate/Altiplano period, and Formative styles, representing the entire occupation history of the site. Previous research in the region allowed a quick initial sort into these broad categories. If a more specific designation was possible (such as Pukara or Qaluyu within the Formative period), this was also noted. Special attention was paid to specimens that were not easily separated into previously established groups because a local Middle Horizon style has yet to be identified for the northern basin. Unfortunately, this component was not identified either in excavations or ceramic analysis from the 2001 project.

Post-Pukara sherds from the Late Horizon and Late Intermediate/Altiplano period were categorized based on Denise Carlevato's (1988) analysis of the Kidder materials. The Collao ceramic style, divided into Collao Plain and Collao Black on Red, was originally defined by Marion Tschopik (1946) based on her field research throughout the western basin. Shape categories included beakers (or tumblers), one-handled jars, and deep bowls decorated with black paint on a red-slipped or, more commonly, on an unslipped background. The designs are linear and curvilinear, a clear break from Formative period decorative techniques. Nondiagnostic body sherds were identified by the presence of large inclusions (1-3 mm) that have been identified as schist, phyllite, and magnetite/hematite, with the schist and phyllite likely added as tempering materials (Carlevato 1988). During the Late Horizon, local copies of Inca styles were also produced with Collao pastes, in addition to imported wares from Cuzco. Examples of these later vessel types, termed Collao-Inca, are included in Carlevato's study (1988) and the NSF report compiled by Wheeler and Mujica (1981: Figure 51).

Late Formative sherds were initially identified based on decorative elements. While examples of Pukara decorated wares have been included in various publications since the 1920s, the most detailed study of decorative attributes was published by Chávez:

> Fancy ware represents the most complex pottery development in the northern portion of the Titicaca Basin and is particularly emphasized in this study. Technologically, this group is well made, has one or more surfaces slipped and well smoothed or polished, possesses iconography that combines some or all of the following attributes: pre-fired polychrome painting in areas of black, cream, and red, outlined by incision; bichrome painting in black and

> cream; incision alone on either a red or a black surface; excision, appliqué or modeling; inlaying; and in same cases post-fired painting without incisions [Chávez 1992:22].

Incised and/or polychrome sherds with Pukara motifs were separated from other decorated examples based on a variety of ceramic studies from the region (Lumbreras and Amat 1968; Mohr-Chávez 1977; Rowe and Brandel 1971; Stanish and Steadman 1994; Steadman 1995; Wheeler and Mujica 1981). Compositional characteristics were used to separate Formative period undecorated sherds. The presence of mica and smaller mineral inclusions (relative to those of the Collao wares) is characteristic of Late Formative period pottery in the northern basin (Carlevato 1988; Chávez 1992; Franquemont 1986). In sum, substantial differences in tempering materials, shape categories, and decorative techniques greatly facilitated the sorting of both the diagnostic and non-diagnostic Formative and post-Formative body sherds.

Formulating a Vessel Typology through Use-related Attributes

To formulate a vessel typology, attribute data were collected from vessel rim sherds and decorated body sherds, with additional data incorporated from base sherds when possible (Appendix 5a; following Braun 1983; Eerkens 2001; Rice 1987; Shepard 1956; Skibo 1992; Steadman 1995). Recording methods were based on Lee Steadman's (1995) study of ceramics from the site of Camata, but not to the same degree of detail in some categories (e.g., rim shape, thickness measurements). In addition to chronological overlap and their proximity in the Titicaca Basin, the

predominance of utilitarian wares at Camata provided a comparative framework for using rim and upper body wall profiles to develop a typology for utilitarian wares at Pukara (Steadman 1995:56). From outside the Andes, Jelmer Eerkens's (2001) study of Great Basin plainwares from the western United States was also used to record attributes and develop expectations for the Pukara vessel typology.

Shape and Form

As summarized by Rice (1987:225), "[f]our major use-related properties of ceramic containers are directly related to form or shape: capacity, stability, accessibility of contents, and transportability or ease of movement" (Appendix 5b). The first of these, capacity, depends on both size and shape of the vessel and can be expressed through volumetric units in the case of whole vessels. In the case of fragments, it is only possible to compare width of orifice and infer relative size classes based on attributes present. Stability is determined by a number of factors, including shape, center of gravity, and base. Unfortunately, determining stability is difficult without a collection of whole vessels to measure. Access to vessel contents is affected by the restriction of the orifice and is used to establish what type of material would have been kept in the vessel and the treatment of that material. Lastly, transportability can be inferred from form, size, weight, quality and "graspability" of a vessel.

Combining the four properties, storage vessels are expected to be restricted forms with an orifice designed to be both closed or covered and used for pouring.

Cooking vessels are typically unrestricted, rounded, conical or globular vessels lacking sharp angles in order to prevent thermal stress and uneven heating over the fire (Rye 1981). Food preparation vessels not used on heat are generally simple, unrestricted shapes. Serving vessels are unrestricted for easy access, have flat bases, and often handles. Lastly, vessels for transport are expected to be stackable, have handles, and a restricted orifice. The attributes of mouth diameter, rim form, neck form, shoulder or neck height, lip shape and lateralization, and the presence or absence of handles, are factored into the creation of shape categories.

Technology and Function

In addition to vessel form, "four properties or clusters of properties can be described as use-related characteristics that derive from composition, forming, and firing of a vessel… wall thickness, resistance to mechanical stress, thermal behavior, and permeability/porosity/density." (Rice 1987:226-227). Surface treatment also affects pot use and is also included. While vessel creation involves a number of decisions by potters who must weigh the advantages of certain characteristics over the disadvantages of others, there are a few general trends that are noted for vessel types.

In terms of wall thickness, cooking pots tend to be thinner in order to conduct heat better, cook food faster, save fuel, and increase thermal shock resistance (Rice 1987:227). In contrast, thicker walls and base are favorable for storage vessels for both increased stability and moisture control. For processing subsistence goods by

stirring or pounding, thicker walls are preferred for their durability and for transferring goods the balance between thick walls for strength and thinner walls for weight is often a compromise. As noted by Rice (1987:228), paste composition is frequently manipulated to change the properties of a vessel instead of changing thicknesses of the vessel wall.

The hardness and strength of a vessel influence its resistance to mechanical stress and are determined by paste composition and firing conditions (Rice 1987: 228). Mechanical stresses may occur while moving a vessel, stirring its content, moving it onto the fire, stacking it, or a number of other situations. Hardness and strength are always important vessel attributes (Rice 1987:238).

Controlling reactions to thermal stresses is especially important for cooking vessels both during heating and cooling processes. Both wall thickness and paste composition are commonly manipulated to lessen the impacts of thermal stresses on cooking pots. In general, thinner walls are preferable to thicker walls, as are curved instead of angular vessel walls. In terms of composition, inclusions (or temper) such as crushed sherds, shell, calcite, and several others are frequently added to cooking pots to increase thermal shock resistance (Rice 1987; Rye 1981). Pores, typically created through the inclusions of fibrous materials that burn off during ceramic production, are also used to resist thermal stress.

Composition and manufacturing determine the permeability, porosity, and density of a pottery vessel (Rice 1987:230-231). The relationships between these characteristics are complex and they are typically discussed together as they relate to

the constraints or benefits conferred on different vessel classes. For cooking pots, porosity can be used to reduce thermal stress and it functions well for toasting or parching, but can lead to seepage in vessels used for longer cooking periods or for holding liquids (Rice 1987). At the extreme, boiling liquids in porous vessels can cause the vessel to crack. For short-term liquid storage, porosity can be advantageous for its cooling effects, but over time highly porous vessels will lose large amounts of liquid through evaporation.

Surface treatment is also discussed in this context because modifications of the surface can help reduce permeability in both storage and processing vessels (Rice 1987:232). Slipping or burnishing a surface creates a dense surface of particles; slips can also be used on vessel interiors and lips to make transfer of liquids easier. For transfer, roughened surfaces are easier to carry when wet, as is often the case of large water jars. Lastly, uneven exteriors also change the thermal properties of a vessel, causing it to absorb more heat or evaporate more liquid. Corrugation, striating, stamping, and surface coating can be used to enhance the properties of cooking vessels. In sum, paste composition, wall thickness, and firing conditions are attributes treated as reflections of vessel function from a technological perspective.

The categorization and analysis of decorative attributes, another element of surface treatment, is far from straightforward. To avoid confusion, Rice's definition is employed in this study: "decoration means embellishment of a vessel beyond the procedures used in forming the clay mass into the final vessel shape and finishing its overall surface" (Rice 1987:144). Therefore, a vessel that is burnished and slipped is

not considered decorated because the treatments are part of the overall surface. This distinction is applicable to the study of Pukara pottery; sherds that are polished, slipped, incised, and painted are the result of a greater labor investment than the burnished, monochrome slipped vessels in the assemblage, and primarily restricted to serving and ceremonial vessels.

The last data set to consider includes evidence of vessel use, including use-wear, residue analysis, and fire clouding and sooting patterns (Rice 1987:234). There are numerous variables that are considered by a potter in the creation of cooking, storage, and serving vessels. However, consumers are flexible and vessels may be used for multiple purposes throughout their use-life and after their breakage. As noted by Rice (1987:235), it is difficult to conduct use-wear analysis based simply on sherds instead of having a substantial sample of complete vessels to study. However, general observations about the presence of sooting, residues, and use-wear on different types of vessel bases can be used to infer which types of vessels were exposed to fire and the type of cooking technology used.

Pukara Vessel Typology

Shape and Form: Previous Studies

Chávez (1992) divided specimens from the Kidder collections into two major groups, unrestricted and restricted vessels, and developed an extensive typology of types and sub-types based on attribute analyses. Unrestricted vessels, including bowls and beakers, are divided into 19 sub-types based on height, wall angle, and a

variety of other features (Figure 42). Jars, the major category of restricted vessels, are divided into 22 sub-types, including bulging necked jars and general categories of small, medium, and large based on rim diameter and neck height (Figures 43).

Figure 42- Unrestricted Pukara vessels (Chávez 1992: Figure 4)

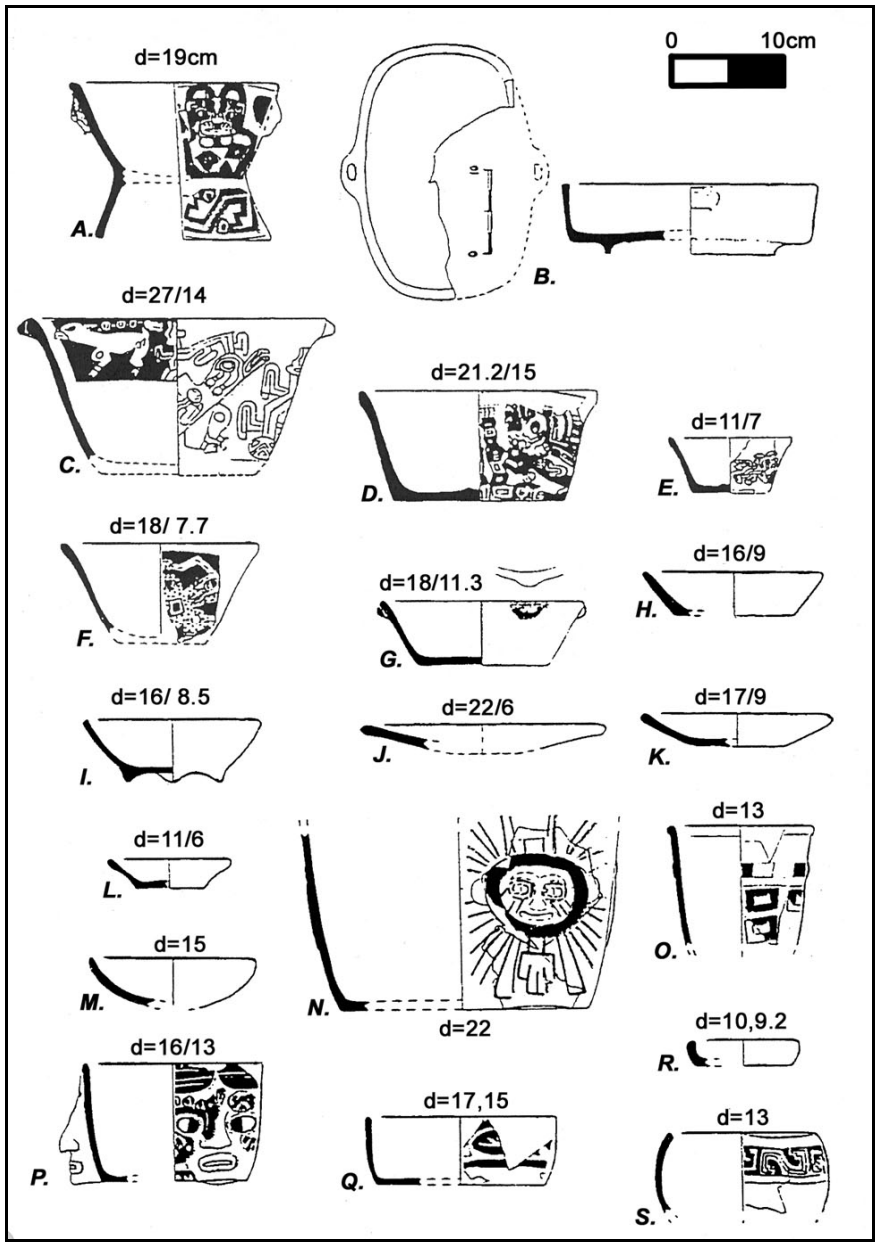
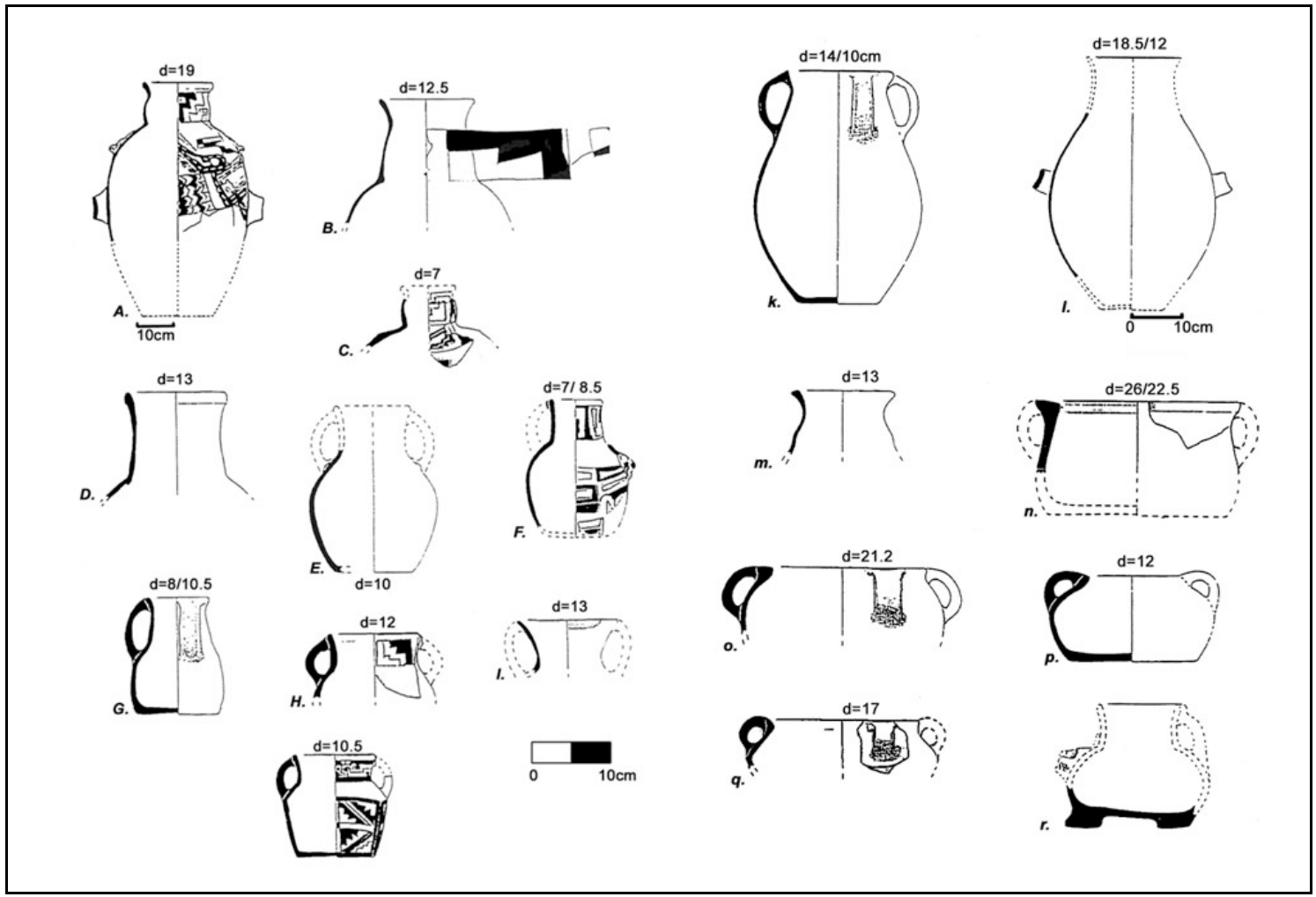


Figure 43- Restricted Pukara vessels (Chávez 1992: Figures 86-87)



Franquemont (1986) divided the Kidder collections into seven major vessel shape categories and then subdivided five of the shape categories into subtypes. Each category includes a detailed description of ware used, form, rim shape and diameter, surface finish, decoration (slipped, painted, incised), design motifs, and variations. The first vessel form is the open bowl, including three types of bowls (A, B and C) and annular-based vessels (*incensarios*). Necked jars are divided into four different types based on form, diameter, and presence of decoration: Jar A (decorated); Jar B (cooking *olla* with straight-sided neck, all with red slip, some with painting and incision); Jar C (decanters); and Jar D (*ollas* in a variety of shapes). The third shape category, ceramic tubes or trumpets, are highly polished, polychrome, and include complex iconography. Vessels defined as beakers (*keros*) are the fourth category, incurved bowls and tumblers with convex sides are the fifth, and box-shaped vessels the sixth. The last vessel shape category is the "other ceramic artifacts" group of unidentifiable fragments. In general, the categories developed by both Chávez and Franquemont can be used to classify highly decorated vessels such as *incensarios* and decorated bowls, but could not be used to categorize undecorated, utilitarian wares.

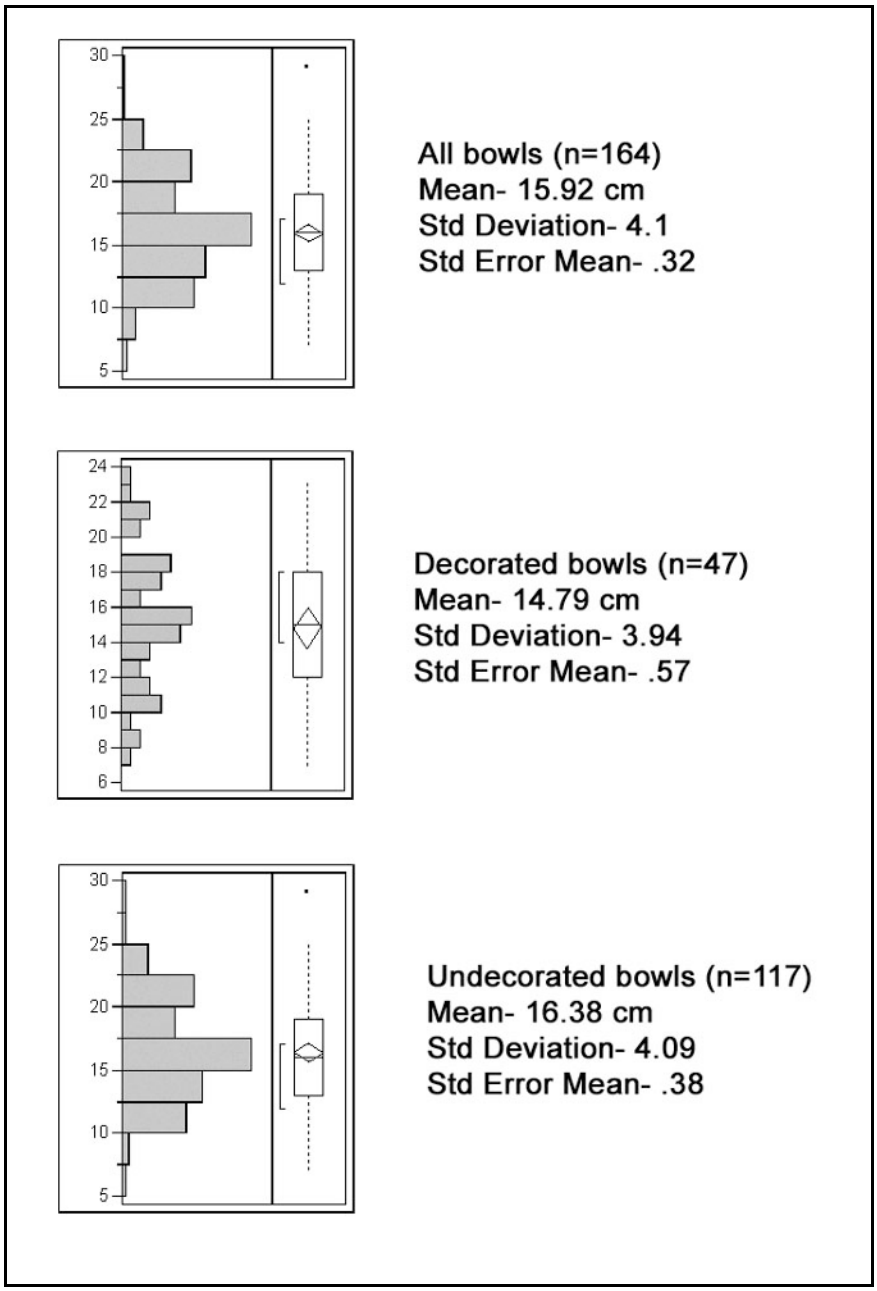
Shape and Form: Methods and Results (2002)

Based on shape and form-related attributes, rim sherds from the central pampa excavations were first divided into the general categories of restricted and unrestricted forms. Unrestricted types include bowls and restricted types include jars

that are further sub-divided into the categories of *vasija*s, *ollas*, and *tinaja*s (tall-necked, short-necked, and wide-mouthed forms). These terms are commonly used for differentiating types of restricted vessels in ceramic assemblages from the Titicaca Basin (Appendix 5c). In these typologies, *vasijas* function as serving or storage vessels for liquids, *ollas* as cooking and storage vessels, and *tinaja*s as storage or fermentation vessels. However, the initial sorting of restricted vessels into sub-types in this study was completed under the assumption that use-related attributes would be used to determine if categories based on shape and those on function were consistent within the assemblage.

Unrestricted vessels (bowls) were first separated based on interior wall angle into convex (or incurved), straight (or direct), and vertical groups. They were further sub-divided based on rim and/or lip attributes into rounded, slightly rounded, beveled, and flat (Appendix 5d). The following sub-types were created: 1) convex-rounded; 2) convex-slightly rounded; 3) convex-flat; 4) straight-rounded; 5) straight-slightly rounded; 6) straight-flat; 7) straight-beveled; 8) vertical-rounded; 9) vertical-beveled. Within all unrestricted vessels, there is a normal distribution of rim sizes (n=164). It is interesting to note that when separated into decorated and undecorated vessels, the undecorated vessels maintain their normal distribution and measures for diameters while the decorated vessels have a uniform distribution (Figure 44). There is more variability among decorated vessels, but they are also more evenly spaced. Unlike ceramic assemblages from the subsequent Tiwanaku Period, no *keros* (flared drinking vessels) or *tazones* (flared bowls) were recorded in the Pukara collection.

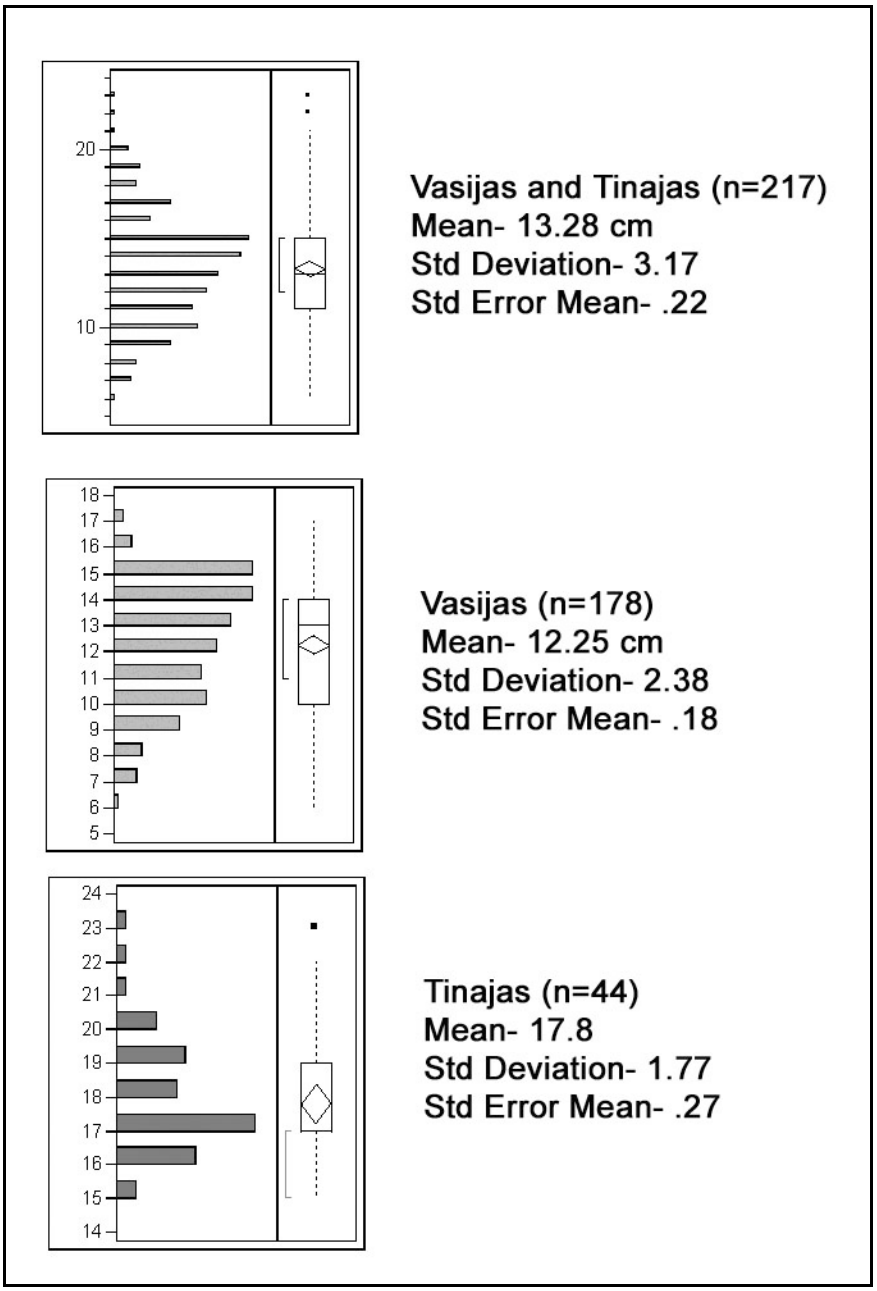
Figure 44- Distribution of bowl diameters (cm)



Within the category of restricted vessels (jars), *vasija*s are distinguished from *ollas* by a taller neck (Steadman 1995) and less globular bodies and from *tinaja*s by their smaller size (Janusek 2003a). *Vasija*s were separated into the categories of direct, flaring, or very flaring based on the angle of the vessel neck (or inferred from the rim if the neck/ shoulder juncture was not present). The second attribute used was lip shape and this included the categories of rounded, slightly rounded, and flat. A combination of these attributes resulted in the following sub-types: 1) direct-rounded; 2) direct-slightly rounded; 3) direct-flat; 4) flaring-rounded; 5) flaring-slightly rounded; 6) flaring-flat; 7) very flaring-rounded; 8) very flaring-slightly rounded; 9) very flaring-flat (Appendix 5e). Their diameters range from 6-16 cm, with 16 serving as the size division between *vasijas* and *tinajas* (Figure 45). The diameter distribution is normal with slight skewing and no significant outliers (n=178).

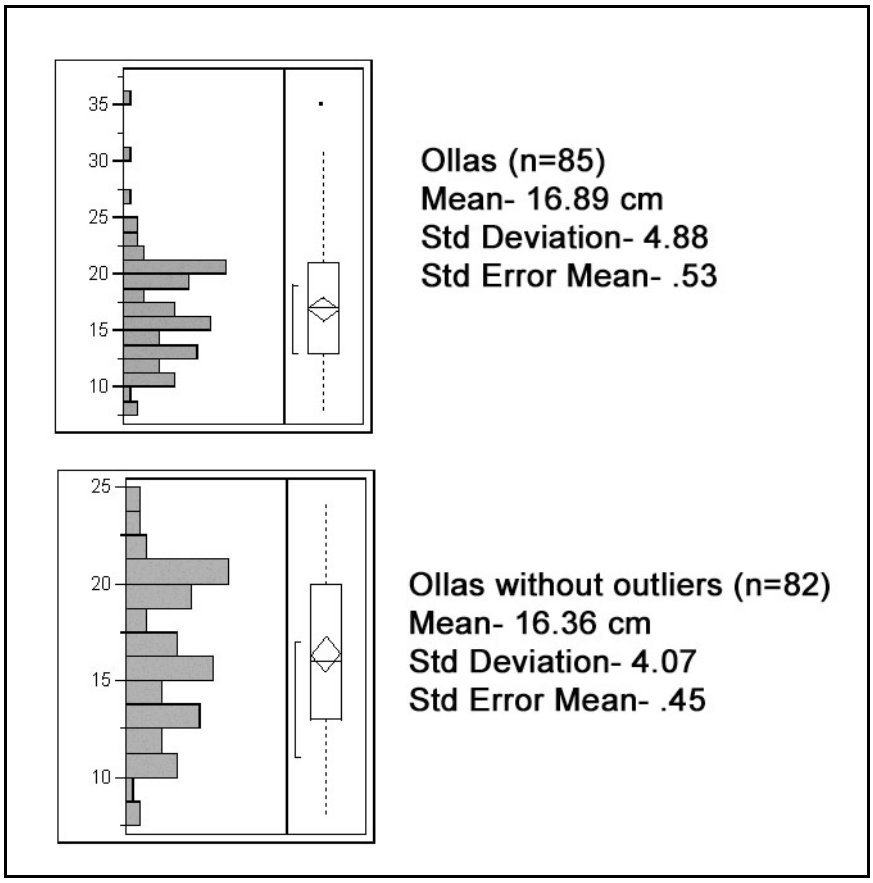
The second group of restricted vessel is the *tinaja*. In general, the rim and neck of a *tinaja* are similar to those of *vasijas*. However, *tinaja*s are distinguished by their greater size (mouth diameter over 16 cm) and variations in lip shape. Based on neck angle, *tinajas* are divided into flaring and very flaring sub-types with rounded, semi-rounded, and exteriorly thickened rims/lips (Appendix 5f). The diameter of *tinajas* are normally distributed with slight skewing (n=44).

Figure 45- Distribution of *vasija* and *tinaja* diameters (cm)



Lastly, *Ollas* are restricted vessels with short necks or collars (Steadman 1995). In the Pukara collection there are both necked and neckless varieties, with the necked group divided into straight and flaring sub-groups (Appendix 5g). Because of the limited number of sherds without complete necks, it was not possible to develop sub-categories for flaring *ollas* such as short, medium, and tall to further clarify the distinctions between *ollas* and other restricted vessels. Therefore, the following *olla* sub-types were used: 1) neckless; 2) straight (direct); and 3) flaring. When the outliers are removed, the distribution becomes more uniform (n= 85).

Figure 46- Distribution of olla diameters (cm)



Technology and Function: Previous Studies

As early as Kidder's (1943) first classification of Pukara pottery, the presence of highly micaceous pastes was noted and used to differentiate types within the category of "culinary wares" (Pucara Mica Plain, Pucara Plain Brown, and Pucara Plain Red). Decorated types were defined as Pucara Red Incised and Pucara Black Incised. In a later publication, Kidder (1948) modified these groups slightly by dividing Pucara Red Incised into Pucara Polychrome and Pucara Polished Red, both commonly found as bowls with flat bases and flaring sides. Plainwares were also further described; Pucara Mica Plain was distinguished from Pucara Plain Brown by its lighter color and role as a cooking vessel, as evidenced by sooting (Kidder 1943, 1948). Pucara Plain Red was further described as an unslipped, smoothed redware.

Franquemont's (1986) analysis builds upon Kidder's early publications and also separated the Pukara pottery into two main groups—plainwares with heavy mica temper and sophisticated wares with plastic, painted, and incised decorations. Pastes were differentiated by the presence of crushed rocks or micaceous flakes and Franquemont suggested that these distinctions were likely functional. The crushed rock is described as angular and white when oxidized and red when incompletely oxidized and the mica is divided into black (biotite), white (muscovite) and gold-brown (phlogopite) groups. Six ware categories were developed based on inclusions, color differences, firing technology, and surface treatment (Franquemont 1986).

Carlevato (1988) and Mohr-Chávez (1977) expanded upon Franquemont's categories through petrographic analysis of the Kidder collections. The fineware Pukara pottery is described as a highly oxidized orange-red clay with small (averaging <1 mm) inclusions of weathered feldspar fragments, some intrusive igneous rocks, and various amounts of ferro-magnesium minerals (Mohr-Chávez 1977:1167).

Chávez (1992:21) formulated a series of 24 paste types based on the attribute analysis of the Kidder collections. All sherds were examined with a 10x-20x hand lens and/or stereoscopic microscope and a sample was thin-sectioned for petrographic analyses (Chávez 1992:21, 84-96). As with previous classifications, the major paste groups defined by Chávez (1992:84-96, 519-521) are separated into decorated and plainwares, with some pastes used for a variety of vessel types. Pastes #1 and #1A, the "overwhelming majority of decorated fancy wares" (Chávez 1992: 519), have dacite as their primary constituent. Dacite appears as "white matte opaque grains, angular to subangular, appearing to the naked eye homogeneous (less than 1 mm) and evenly distributed" (Chávez 1992:87). The paste is almost always completely oxidized to an orange-red color.

Pastes #4A-4D, comprised of plainwares such as cooking jars, are tempered with abundant large, gold mica (1-2 mm, platy, hexagonal) and a reddish pink to darkish red grain identified as arkosic sandstone (Chávez 1992:88). Paste #4 oxidizes to beige, yellowish brown or light gray, Paste #4A to red, Paste #4B to an orangey-brown, Paste #4C to orange, and #4D to orange-red (Chávez 1992:90-91).

According to Chávez, these groups correspond to Kidder's Mica Plain group. There were no sherds with representational motifs in the Paste #4 grouping.

Lastly, Pastes #8 and #8A include both plain and decorated wares, especially decorated jars, and are characterized by the presence of "very dull lustrous white angular to sub-angular to sub-rounded grains containing gold to black mica" and "reddish-pink matte opaque rounded grains" in some sherds (Chávez 1992:92). Paste #8 oxidizes to an orangey brick red and #8A sherds tend to have a buff colored core (Chávez 1992:93). These groupings correspond with Kidder's Plain Red and Plain Brown (Chávez 1992:520).

Direct evidence of vessel use was recorded by Chávez for the Pukara collection and also by Steadman for the Camata collection. Chávez (1992:511-516) presents a detailed description of use-wear patterns related to vessel function in the Pukara assemblage. He recorded post-fire usage and accumulations and compared them to ethnographic observations from the Titicaca Basin. Unrestricted vessels (bowls) show evidence of use for storage or serving. For example, some bowls with polished red slipped interiors have areas where the slip has become matte and thin from use. Pedestal-based bowls show consistent patterns of blackened or sooty areas on their interiors, hence their designation as ceremonial burners. For restricted vessels, the patterns of surface use-wear are not present to the same extent as for unrestricted vessels, but heavy soot accumulations on the exteriors of plain tall jars support that they were used directly on fire, presumably for cooking (Chávez 1992:514). White residues have been recorded and collected from the interiors of

polished red slipped, fancy regular-sized jars, and miniature jars. In many cases the residue reacts to HCl, supporting its designation as calcium carbonate or lime, a chemical used in the consumption of coca (Chávez 1992:514). Some restricted shapes (e.g., oversized bulging neck jars) do not have residues or blackened surfaces and Chávez proposes that these vessels were used for "storage, transportation, preparation, and perhaps even fermentation of an alcoholic drink such as that made today of the native quinoa grain" (Chávez 1992:514).

Steadman (1995) documents use-wear with multiple, complementary data sets and emphasizes that vessel form cannot be used to determine function without considering direct evidence of vessel use. The first data set is from technological studies of cooking pots. Similar to the discussion above, characteristics typical of a "successful" cook pot, including paste composition, surface finish, and form, are described (Steadman 1995: Chapter 4). Steadman also includes ethnohistoric accounts of local cooking technologies such as hot rock cooking (Bertonio 1984, Volume 2, 251 in Steadman 1995) to inform expectations for cooking vessels in the region. Lastly, patterns of charring and sooting are used to determine cooking technology (Steadman 1995: Table 9, 560; 151-152). For example, the presence of soot on the bottom, base, and vessel wall indicates that a pot was suspended over a fire; sooting on mid-vessel wall with none on the bottom is indicative of a vessel that was placed directly in the fire; and if the center of the base is gray, the outer ring is oxidized, and the upper walls are sooted, the center of the vessel's base was placed directly in the fuel of the fire (Hally 1983 in Steadman 1995:151). Steadman also

discusses the relationship between interior charring patterns and cooking methods (see also Skibo 1992).

Technology and Function: Methods and Results (2002)

Paste composition, surface treatment, firing atmosphere, and direct evidence of use were recorded during the 2002 analyses. All diagnostic sherds were included in the paste analysis[26], as were non-diagnostic body sherds from Formative contexts as the paste categories became better defined. The observations were recorded using a 10x hand lens on a cleanly broken sherd profile on both unburned and burned areas of the fragment. Originally, the sherds were divided into 50 groups based on the type of inclusions present, size, shape, density, orientation and characteristics of the clay body such as porosity, hardness, and surface appearance. The specimens were then separated into two major groups, A and B, based on the presence of mineral temper or mica as the primary constituent (Appendix 5h). Each group has a series of sub-groups based on minor variations (A1-A6 and B1-B2) and most sherds fit into Groups A1 and B1. A limited number of sherds were put into group C, the "other" or unidentified group. No sherds were identified with fiber temper in the sample, a significant difference from the Formative period collections from Camata (Steadman 1995).

---

[26] Cecilia Chávez Justo and I conducted the attribute analyses with the exception of the paste type study; Ms. Chávez completed this recording in order to maintain consistency in groupings.

Surface treatment includes both modification of the clay body during production and the use of coverings such as slips, paints, and other decorative techniques. Treatments were recorded by type (wiped, burnished, polished, eroded, deteriorated, unfinished and/ or burned), width (narrow, medium, wide), and directionality (vertical, horizontal, diagonal, circular and mixed). In the coding system, A (*alisado*) was used for wiped sherds, B (*bruñido*) for burnished sherds, and P (*pulido*) for polished sherds (Appendix 5i). A numbering system was also used to record the width and directionality of the surface treatment (e.g., A1 is a horizontal, medium wiping of the vessel's surface). Slip and paint were recorded by color, location (slip limited to lip, for example), and degree of preservation. For all sherds, colors were recorded using a Munsell Color Chart on the interior, exterior, and a cross-section, and assigned color names based on Steadman's (1995) key.

Firing atmosphere codes were developed to document the variability present on sherd cross sections or "cores" for both the decorated and utilitarian wares. The codes include a number for the main clay body color (I for brown, II for light brown, etc.) and a letter (A-Z) used to document the variability in cross-section (Rye 1981:115). For example, I-A is a sherd that has a brown clay body, indicating that it was fully oxidized during firing. I-B has a brown interior, but light brown center and black exterior. As noted by Steadman (1995:69), it is necessary to conduct refiring tests to fully investigate firing technology, but some inferences can be made from these preliminary observations and are outlined below.

Direct evidence of use was also recorded, including presence and location of sooting, residues, and damage from activities like pounding or mixing. Sherds with residue and evidence of sooting were not washed; samples were also collected from the former group for future residue analysis (e.g., GC/MS fatty acid residue analysis, Heron and Evershed 1993). Considering the presence of hearths and food preparation areas, it was surprising how few diagnostic sherds had clear evidence of sooting. This is discussed further below. Also, depending on the nature of cooking technology at Pukara, further analysis of body sherds may clarify these patterns.

Considering Ethnoarchaeological Data

Ethnoarchaeological and ethnographic studies conducted in the Lake Titicaca Basin provide further information about the possible relationships between vessel forms and use (Mohr-Chávez 1987; Sillar 2000; Vokral 1991). Bill Sillar's (2000:137-148) ethnoarchaeological study of northern basin household organization and craft production provides insights into the diversity of vessel types utilized in the processes of cooking, storing, serving, and celebrating in the region today. Important to note, Sillar (2000:137) is clear to distinguish between pre- and post-contact cuisine, including changes in available foods and preparation techniques. These data are included in detail to emphasize a number of key points: the diversity of vessel types used in the region, the multi-purpose nature of most vessel types, and local classification schemes that should be considered in interpretations of prehistoric ceramic assemblages.

The first category distinguishes between utilitarian pots used on the fire and those that are not. Pots used on open fire include *ollas* (*manku/armu*)[27] for cooking. These are globular vessels with rounded bases that have two to four handles and vary in size (10-50 cm high and .5-50 liters in volume) depending on function. The rounded bases are to protect against thermal shock and the handles for lifting the pot off the fire. In terms of use-alteration, the vessels are typically seasoned (*arini*) before use and become blackened on the exterior. The second major group of vessels is for dry toasting grains (wheat, maize, beans, and coffee in modern contexts) over the fire. *Tostadoras* (*k'analla*) are concave bowls with single handles that are used on the hearth and covered during use. The third major group of vessels to be used on the fire are *cafeteras/chocolateras* (*chatu, yuru, p'uñu, jank'a k'analla, jiuk'i*). These are single-handled jars, with or without lips, which have a globular body and restricted neck. They vary in size (15-30 cm in height) and are smaller than jugs used to collect water or serve *chicha*. Also, the bases are rounded on jars used directly on the hearth.

Utilitarian vessels not used on the fire include numerous types. *Platos* (*p'uku, chuwa*), which are small concave plates or bowls, have up to a two liter capacity and their size varies based on the consumer. For example, a child would receive their

[27] Names are given in Spanish and Quechua, following Sillar (2000).

food in a smaller *plato* than an adult man[28]. *Lavadoras* (*fuente, librillio/ puruña, llata, chillami*) are wide bowls or basins with two handles just below the rim that are used for a variety of purposes. At home, they are frequently found on the patio and are used for washing and soaking beans or *chuño*. For parties, they are taken beyond the household and are used to serve large amounts of food. Another type of *plato* (*fuente/puruña, puruku*) is a large bowl without handles that also is used as a lid for storage vessels. A *fuente* (*llata, chamaka, puchilla, puruña*) is another type of wide bowl or basin, but with handles on the belly of the pot and more squat body than a *lavadora*. These are used for washing, peeling and soaking vegetables and to cook in some areas. Their smaller forms are also used to collect blood from sacrifices. A small pot, an *ollita* (*azucarero/manka, armitu, qulqui manka*), is similar in shape to an *olla*, but is too small to be used on the fire and is therefore used as a household container or for making buried offerings. The *wichi'i* is a small, wide-mouthed jug with a single handle and can be with or without a pouring lip. This type of jug is used for a variety of purposes, including soaking beans and *chuño*, and also for moving chicha from vessel to vessel. The last type of vessel not used on the fire is the *molde*, a thick disk often with a pedestal base (10-35 cm). These are used in the process of pottery production, but also encountered in domestic contexts as a jar lid.

[28] This is an interesting pattern to consider when discussing the possible relationships between vessel diameter sizes and prehistoric feasting activities.

A third category of vessels relate to brewing and storage. A *tinaja* (*chumba/ raki, wirqi*) is a large jar with wide neck and two handles on the belly. It is large enough to be relatively immobile and can often be found dug into a floor surface for stability. They are designed to be used in the process of chicha brewing (for mixing of boiling water and ground *wiñapu*, prior to separating off different fractions), but once cracked they are used for storing grains and *chuñu*. *Wirkis* vary because of their direct, straight necks and *rakis* have both recurved, short necks, some of which are very angled. *Urpus* (*P'uñu*) are very large restricted jars (80-130 cm tall) with two handles on the body that are used to ferment chicha. They are typically sunk 15-25 cm in the ground and used to store grain for the greater part of the year. *P'uñu* (*mak'a, tumin*) are small to medium sized jars with restricted necks and two handles on the belly of the pot. They are typically not used for storage, but for carrying water or chicha. Along with cooking pots, these are the most essential of household pottery forms. They vary in size depending on the person carrying them and the number of people consuming chicha at an event (Sillar 2000:145). The last vessel type in this category is the *kamaña* (*chawana, apachacha, wich'i*), a small, squat jar with a wide mouth, globular body, and two handles. They are used in the chicha fermentation process and in the serving of chicha to cups. When not used for chicha, they are for small-scale storage or soaking *chuñu*.

The last major category includes vessels connected with drinking activities. *Taza* (*trampa vasos/ t'inki, tarkayuru, llamas, turus, samiri*) is the general term for cups, but Sillar (2000) notes that many drinking vessels are made from wood,

gourds, glass and enamel, but some clay vessels are used for drinking chicha. Clay animal vessels, such as *toros*, are also used for drinking chicha. *Cántaros* (*p'unu, aysa/aysana, chatu, yuru*) are jugs with a single handle, both with and without a lip, that stand approximately 20-50 cm tall. They are typically wide, with an almost globular body and a restricted neck. They are used to carry small amounts of water and chicha from larger vessels and also for serving. If the base is rounded they may also be used above the stove.

Conclusions from the 2002 Ceramic Analysis

Previous studies provide detailed descriptions of the variation within decorated wares in the Pukara assemblage (Chávez 1992; Franquemont 1986; Rowe and Brandel 1971). To complement these existing data sets, the primary goal of the present study was to develop a typology for the undecorated or utilitarian pottery, with some additional descriptions of decorated wares and non-local wares, which are detailed below. In this section, the ceramic typology developed from shape categories is further developed and refined through incorporation of use-related attributes, insights from local ethnographic studies, and comparative data from contemporaneous Late Formative 1 (200 B.C. - A.D. 200) assemblages from the southern Titicaca Basin.

Combining Shape and Use-related Attributes

As outlined above, the rim sherds from the Pukara collection were divided into four general shape categories—bowls, *ollas*, *vasijas*, and *tinajas*—based

primarily on neck shape, shoulder, and body angle. In this section, results of the attribute analyses are compiled and compared to determine if there is consistency between initial classifications based primarily on shape and those based on use-related attributes. In other words, do differences in shape reflect differences in use? Are *ollas* exclusively cooking vessels or is there evidence of cooking on other types of restricted vessels? The major issue to resolve is whether the Pukara assemblage has clearly defined single-use vessel types or multi-purpose utilitarian wares of different shapes that were used interchangeably for cooking, storing, and serving activities.

Data collected from use-related attributes are presented as percentages because the small number of vessels in each category, combined with the large number of shape categories, was problematic for chi-square and correlation analyses. Based on composition, surface finish, surface color, slip and paint colors, presence of sooting, and the nature of the firing atmosphere, there are trends that can be noted for the Pukara assemblage (Appendix 5j). Overall, there are differences between the major groupings of restricted and unrestricted vessels, but within the unrestricted groups of *ollas*, *tinajas* and *vasijas* there are few use-related differences recorded.

Based on rim sherds, there was little preference for Paste A or Paste B within the restricted vessel types, while unrestricted vessels and decorated body sherds were predominantly produced with Paste A (80-86%). Based on restricted rim sherds, Paste B was used for 51% of *ollas*, 46% of *vasijas*, and 60% of *tinajas* relative to Paste A used for 47% of *ollas*, 54% of *vasijas*, and 38% of *tinajas* (Appendix 5k).

When bases with evidence of sooting are considered, the highly micaceous Paste B was used for 63% of these vessels, in comparison with 32% of Paste A and 5% of Paste C. At initial consideration, the results for restricted vessels were unexpected; compositional studies show that platy mica included in clay bodies blocks crack propagation and has low or comparable thermal expansion (Rice 1987:407), making it a suitable inclusion in cooking vessels. However, it is important to consider that there is some mica present in almost all paste types and that the major difference between Paste A and B is that it is the *primary* inclusion in the latter. In Paste B the mica is also larger and more abundant; considering that mica can cause laminar fractures (Rice 1987), possibly smaller, more dispersed mica was preferable for some types of utilitarian vessels. Clearly, further compositional analyses are required in order to further develop the relationships between vessel form, paste composition, and vessel use in the Pukara assemblage. In the context of previous studies, our Paste A is comparable with Franquemont's Groups A and B and Chávez's Paste 1 and our Group B with Franquemont's E and F and Chávez's Pastes 4 and 8.

Surface finish followed expected trends; unrestricted vessels had higher percentages of burnished surfaces, especially on the vessel interior, relative to restricted vessels that were more commonly wiped. Third, surface color was consistent for all vessel types. The predominant surface color for all vessel forms was light brown (40-69%), followed by light orange (17-23%), and then a number of small percentages of other colors. Fourth, slip color used was predominantly light red (29-60%) across all vessel types, but the percentage of each vessel type with slip

varied substantially. For example, 59% of unrestricted vessels were slipped on the exterior and 46% on the interior, while 16-25% of restricted vessels were slipped on the exterior and 9-14% on the interior. Also, on restricted vessels it was common for the slip to simply cover the upper edges of the interior rim to facilitate liquid transfer.

Sooting patterns were consistent across vessel types and the number of vessel rims with sooting evidence was very low overall (2-14%). The small percentage was not unexpected, the rim is often not affected by exposure to cooking fires, but the presence of sooting on all types of restricted vessels indicates that these were multi-purpose shape types. The percentage of bases with sooting evidence was higher (20%), but still not substantial enough to be used to determine the relationship between rim shapes and base types for restricted vessels within the assemblage. It is likely that the low percentages of sooted utilitarian vessels reflect variability in cooking technology, not a lack of cooking activities. It is possible that hot rock cooking was used at Pukara, a technology documented for the Andes (Bertonio 1984:Volume 2, 251 in Steadman 1995:150), and this would not have produced sooting patterns such as those present on vessels in direct contact with a cooking fire. From the variation in hearth morphology present at Pukara, it is likely that some types were used for heating stones, others used heated clay and adobe chunks for long-term boiling or simmering, and others were used for cooking directly over a flame.

Lastly, firing atmosphere was consistent across unrestricted and restricted vessel types, with a few exceptions. For all types, a fully oxidized, light brown clay body was most common (15-33%), followed by reddish brown (16-27%), brown (13-23%), and variations of black (7-17%). For unrestricted types and decorated body sherds, a reddish brown clay body was more common (27% and 37%, respectively) than for restricted types (16-20%). Overall, there was significant variability in ceramic firing, as indicated by the presence of close to 200 different firing codes used to record the Pukara assemblage. These comments are preliminary; further study is needed, including refiring experiments, to argue definitively about the temperature and atmospheric conditions responsible for the Pukara assemblage. "Different firing processes… can produce the same final paste color, and additional factors, such as the properties of the clay, the temperature of firing, and duration of firing must also be taken into account" (Steadman 1995:68; see also Shepard 1956 and Rice 1987).

In sum, through comparison of form attributes and those related to function, the Pukara ceramics from the excavations on the central pampa support a multi-purpose utilitarian assemblage without a highly differentiated set of vessel types. In other words, *ollas* are not the only utilitarian vessels used as cook pots, nor were there clear distinctions between storage and serving vessels for liquids. These results are similar to those from the Camata assemblage: "[o]nly basic functions are implied for the vessel shape categories used in the this volume: bowls for mixing and serving food and short-term storage, sooted vessel shapes such as neckless *ollas* and necked

vessels for cooking, and necked vessels without sooting for short and long-term storage and transport of liquid or solid items" (Steadman 1995:50).

However, the variability documented from the central pampa assemblage contrasts with the conclusions of previously conducted attribute analysis of the Kidder collections: "[a]side from relatively minor variations, which would be expected in hand-made vessels or attributed to individual potters, Pucara style vessels are standardized in size, shape, surface finish, and paste" (Chávez's 1992: 510). Based on the detailed documentation provided by Chávez, the differences appear to be based on the nature of the collections utilized in each study. For example, many of the highly decorated vessel types and the associated iconography described for the Kidder collection were not recovered on the central pampa. In contrast, there were a variety of utilitarian vessel forms recovered in 2001 that were not present in the Kidder collections. Therefore, Chávez's results and those from the recent excavations appear to work in tandem to produce a more representative account of the entire Pukara assemblage. Additionally, the greater uniformity in highly decorated vessels such as *incensarios* may indicate that the production of certain highly valued vessels was controlled by elites at Pukara, as argued by Chávez (1992), but the data from the pampa excavations do not support standardized production for most vessels types.

Insights from Ethnographic Analogy

Based primarily on Sillar's (2000) study, there are a few major differences between modern assemblages from the region and those from the Late Formative period at Pukara. First and most generally speaking, modern assemblages are more differentiated by function. There is a clear distinction between utilitarian vessels used on the fire and those not, but in the Pukara assemblage there is evidence of sooting on various types of utilitarian wares, primarily *ollas* and *vasija*s. Also, *ollas* from the prehistoric assemblage frequently do not have handles on the rim (they may be further down on the body) and there are no examples of sherds with completely rounded bases that are not on short, thickened pedestals. We have not identified any vessels for toasting grains and very few single-handled jars.

For utilitarian vessels not used on the fire, there are also differences between ethnohistoric and prehistoric assemblages. For example, the range of bowl sizes is much larger for the modern assemblage, especially the predominance of very large bowls with handles on the rim used for soaking and serving at large gatherings. In modern assemblages there are also various sizes of smaller bowls used for individual serving that range in size depending on the recipient. In the Pukara assemblage, all bowls together have a normal distribution of diameters, as do utilitarian bowls, but decorated bowls are less normally distributed and may represent size classes.

Lastly, we have not identified in the Pukara assemblage the range of vessels connected to brewing, storage, and drinking activities that are recorded ethnographically. The *tinaja*s from Late Formative period Pukara are relatively large

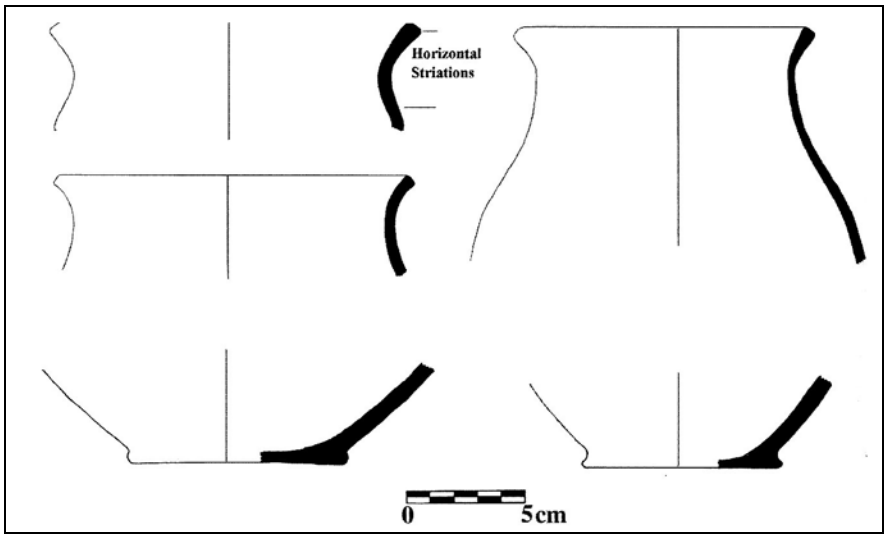
and may have served as liquid storage or fermentation vessels, but they are only identified by their large diameters and flaring necks. Therefore, it is unclear if they were large enough to have been placed into floor surfaces, had handles, or evidence of use-related activities such as boiling. In contrast to modern collections, we are also unclear about the nature of drinking vessels from Pukara. It is possible that they were made of gourds or wood, as noted by Sillar (2000) for the modern collection, or that they have yet to be differentiated within the assemblage.

In sum, there are a number of differences between the prehistoric and modern assemblages from the northern basin, as would be expected considering changes in diet, food preparation technology, and other factors affecting vessel types. The most notable is the change in cooking vessel technology, likely indicating a shift in cooking technology and the orientation of the vessel in relation to the heat source. The limited number of single-handled jugs for use on the fire and as serving vessels is notable; it may be an indicator that the serving of liquids did not play a large role in Pukara cuisine, or possibly not outside household contexts. Lastly, the multi-use and re-use of vessels recorded ethnographically is a reminder of the factors to consider when interpreting the archaeological contexts of sherds. A fermentation vessel may be used half of the year to store grain, a cracked serving vessel may serve for dry storage once mended, and broken vessel fragments are frequently used as lids or stoppers.

Comparative Ceramic Data from the Late Formative 1

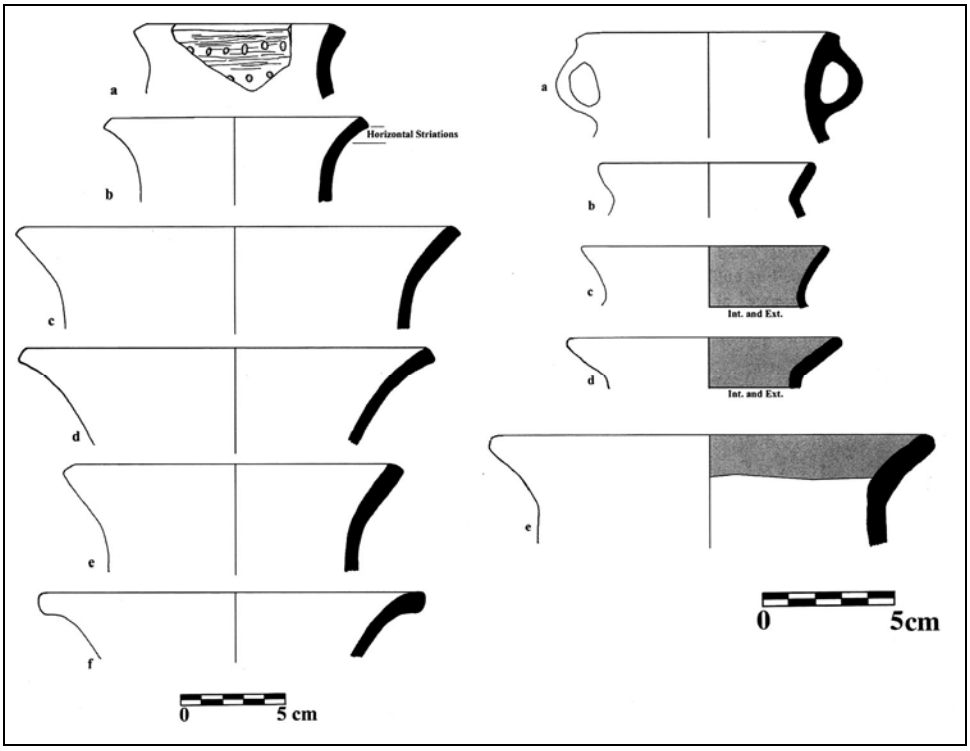
In the southern Titicaca Basin, Late Formative 1 (LF1 or Kalasasaya) dates from 200 B.C. - A.D. 200, a transition at A.D. 250-300, and Late Formative 2 (LF2 or Qeya) dates from A.D. 300-500. The most common vessels types during the Late Formative were *ollas*, jars, small jars (*vasijas*), and bowls (Janusek 2003a:40-46). There were two types of *ollas*: wide, globular vessels with slightly restricted mouths and taller "pear-shaped" *ollas* with longer, sloping necks and opposing handles (Figure 47). Bases were rounded, with some on thickened pedestals. Paste types are porous and vary in color, temper and texture from site to site. Surface treatment was minimal, usually restricted to horizontal striations on the exterior of the rim, but the surfaces were unburnished and combed.

Figure 47- Examples of LF 1 *ollas* from the southern basin (Janusek 2003a: Figure 3.8)



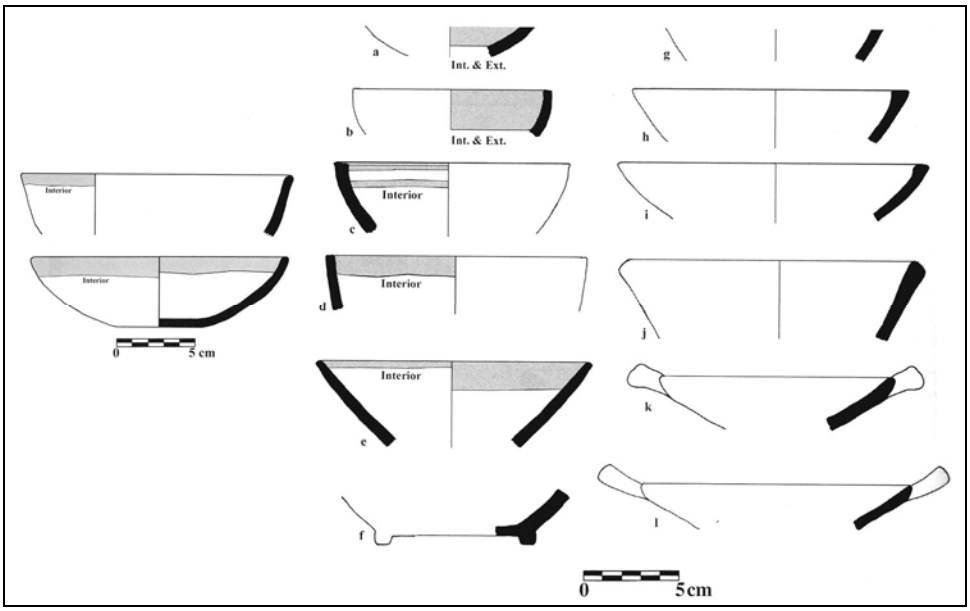
Jars were large to medium-sized during the Late Formative, but large jars were generally more common at larger sites. These large jars are globular vessels with a flaring rim, restricted neck, and with thick walls (Janusek 2003a:41). The pastes tended to be less coarse and porous than that used for *ollas*. Medium-sized vessels have less flaring rims and shorter necks, but basically the same form. In Late Formative 1, some of the rims of larger jars were painted red (Figure 48). Small jars (*vasijas*) were small pitcher-shaped vessels with short restricted necks, with or without a single side handle (Janusek 2003a:41). Lastly, bowls were highly varied and included ellipsoid varieties (*cuencos*), ellipsoid bowls with slightly everted lips, bowls with straight flaring walls, shallow bowls/plates with opposing horizontal handles, and annular based bowls with fiber temper (Janusek 2003a:41-42).

Figure 48- Examples of LF 1 jars from the southern basin (Janusek 2003a: Figures 3.9, 3.10)



There are examples of decorated *vasijas* from Late Formative contexts at Tiwanaku and decorated bowls, the most elaborate of which are from Tiwanaku and Lukurmata (Janusek 2003a:41-42). Decorated *vasijas* have wide bodies, thin cylindrical necks, horizontal side handles, and incised and painted decoration, including punctates. Decorated bowls have incised and painted decoration with one vertical, or sometimes horizontal, handle (Figure 49). Red paint was commonly located on the exterior and/or interior rim.

Figure 49- Examples of LF1 bowls from the southern basin (Janusek 2003a: Figures 3.11, 3.12)



In the Late Formative southern basin assemblages, it is often difficult to distinguish between jar and *olla* fragments, the same situation noted above for the Pukara collections. According to Janusek, this indicates: "1) that the vessel types were not highly differentiated and 2) that their functions may have overlapped (e.g., cooking, storage)" (Janusek 2003a:41). Steadman (1995) notes a similar situation for Formative periods from Camata in the western basin. In contrast, during the

Tiwanaku period, there was an interesting combination of continuity and innovation in the southern basin ceramic assemblages. For example, *ollas* changed little in terms of form and technology, but this was accompanied by "substantial innovation in the functions, technologies, and material styles of certain classes of ceramic vessels" (Janusek 2003a:56). For example, large *tinaja* storage vessels did not appear until the Tiwanaku period and serving dishes for both food (*tazones* and *escudillas*) and beverages (*keros*) became standardized and highly decorated. In sum, there was a "wide but remarkably standard range of ceramic form, treatment and iconography" (Janusek 2003a:57) in the Middle Horizon, especially when compared to the overlapping functions of Late Formative period assemblages.

Pukara Ritual Vessels

In addition to the utilitarian assemblage, ritual vessels include pedestal-based bowls, miniature jars, ceramic trumpets, and oversized jars (Chávez 1992:517): "[a]ll of these shapes, as well as others having representational and supernatural imagery, have been found in public and religious contexts, again corroborating their religious or ceremonial function." In comparison with other vessel types, the categorization of ritual or religious vessels is relatively straightforward. Pedestal-based bowls (also called annular vessels and *incensarios*) are made exclusively of Paste A and are highly polished, finely incised, feature complex iconography and geometric designs, and are typically polychrome, but also occasionally black (Appendices 5l-5n).

Miniature vessels have been reported from a variety of archaeological contexts in the Lake Titicaca Basin (Steadman 1995), including examples from Pukara (Chávez 1992; Franquemont 1986; Rowe and Brandel 1971: Figure 72). They include polychrome trumpets, jars with and without handles, incurved bowls, and other relatively rare forms. If miniatures were to be separated solely by size, there is a clustering of specimens at 3-5 cm in diameter at both the mouth and the base. However, they are also characterized by their form and use of decorative techniques for those with slightly larger diameters (ranging up to 9 cm). For example, the mouth diameter a trumpet fragment rim sherd may be the same as the mouth diameter of a narrow jar or bottle, but the polychrome paint, incision, and flaring shape makes distinguishing between the vessel forms clear.

Miniatures are divided into bowl forms, jars, and ceramic tubes or trumpets. Tubes were manufactured by forming a clay tube around a bundle of reeds or grass then burned off during the firing process (Franquemont 1986; Steadman 1995). Fragmented trumpet specimens from the Kidder excavations were published by Franquemont (1986: Figures 61-65) and include examples of both the mouthpiece end and the short, flaring bell. He noted three different types of decoration: raised appliqué bands, incised feline motifs (see also Rowe and Brandel 1971: Figure 72), and winged animals in appliqué (see also Rowe and Brandel 1971: Figures 71, 73-74, 76). Two of the bells recovered from the Kidder project were described in detail and are very similar to those from the 2001 excavations in decoration and size. Their diameters are 6.5 cm and 6 cm and decorative motifs include incised, alternating

triangles and stepped designs (Franquemont 1986: Figures 62 and 63). The two bells have slightly different shapes at the "neck" of the sherd and Franquemont noted that the fragment recovered from Excavation III near the river had carbonaceous deposits on the inner surface. This supports that not all tubes were used as trumpets (Franquemont 1986). Ceramic tubes or trumpets from the 2001 excavations were decorated with geometric motifs and their mouth/ bell diameters ranged from 3-9 centimeters (Appendix 5o). Two of the tubes were slipped, painted, and incised and the remaining were slipped, incised, and may have been painted. There was no sign of either burning or other types of use-wear present.

Several of the miniatures are undecorated bowls or bases that were likely from bowls. These tend to be incurved and often "sloppily" executed relative to the highly decorated miniatures jars and ceramic tubes. Similar examples have been recovered from the Tiwanaku Temple at Omo 10 and from ceremonial structures at Chen Chen M1 in context with *tupus*, *incensarios*, bone tubes, textiles, and a stone miniature of court complex (Goldstein and Owen 2001: Figures 18 and 19).

There are a variety of both decorated and undecorated jar types. In Block 3, the entire profile of an incised jar was recovered (Appendix 5p-1).The jar has a very small mouth diameter (3 cm), a short, straight neck, an angled shoulder, and a slightly globular body with a 4 cm wide base. This complete specimen was used to infer the upper dimensions of two fragmentary vessels with very similar shapes (Appendix 5p-2,3). Another type is represented by a single specimen with a straight, short neck covered in horizontal incisions (Appendix 5p-4). A very interesting

miniature jar (Appendix 5p-5), possibly a non-local specimen, has an incised feline face on which small nubs in the middle of the vessel served as the nose. This was recovered in Block 2, the area with the largest concentration of annular based, feline *incensarios* from the pampa excavations. Based on shared, rare motifs and location it is possible that there was a relationship between the two vessel forms at the site. Lastly, a single, incised jar without handles (Appendix 5p-6) was recovered. For undecorated jars, there were two specimens with handles (Appendix 5p-7, 8) and a single, undecorated, flaring jar without handles (Appendix 5p-9).

Non-locals Vessels

A total of 52 of the approximately 1600 diagnostic sherds were categorized as non-local, unidentified, or of unclear cultural affiliation from the 2001 excavations (3%). These were categorized into a few groupings: 1) banded punctates; 2) incised; 3) painted without incision; 4) others. Due to their small percentage of the total collection and concentration in the earliest excavation levels on the pampa, this sample of sherds provides some of the most useful insights into intrasite spatial and temporal differences of all artifact types.

Banded Punctates

The first and largest group is a series of body sherds with horizontal, slightly raised bands that have been modified with a variety of punctate patterns. Following Rice (1987:145), these are surface modifications made by pressing an object into the clay, anything from a fingernail to a formal tool, which causes displacement of the

material to create a design. A single specimen has two rows of parallel pin-sized holes on either side of the band (Appendix 5q-1) and the remaining 16 sherds have larger ovular, linear, or inconsistently shaped impressions made into the raised band at varying orientations and depths (Appendix 5q-2, 3)

Non-Pukara Incised Sherds

The second group includes incised rim and body sherds that differ from Pukara incised vessels in terms of design form, manner of execution, or technical aspects such as firing or paste type. There are a few sub-groupings within the incised category. A group of black sherds with deep incisions and post-fire paint (Appendix 5q-4) may be of the Ramis Style identified by Wheeler and Mujica (1981) in the excavations from the Qalasaya (also Lynch 1981). Three additional black, incised sherds may fit into this group, but there were no traces of paint, possibly due to the post-fire paint deteriorating over time. These include a black, very micaceous sherd with half of a modeled and incised face of a figure, possibly a feline (Appendix 5q-5); a handle with fine, black incisions; and a black, incised body sherd. A second sub-group includes handles or nubs with deep incisions (Appendix 5q-6). There is also a sub-grouping of light grey sherds with wider and deeper incisions than the Pukara style (Appendix 5q-7).

Several other types of incised sherds were found in a limited number. In addition to the possible feline mentioned above, there is a specimen with a modeled and incised face (Appendix 5q-8), but is unclear if it represents an animal or human

figure. Two sherds have deep and wide incisions, but with clearly defined edges, possibly Qaluyu sherds (Appendix 5q-9). Lastly, there are a number of incised sherds that could not be further grouped.

Painted Sherds

The majority of the painted sherds without incision are very small and difficult to identify beyond the color of the paint and its general location on the vessel. There is a small group with cream on a red exterior and a single fragment with a cream-colored circular painted design on a brown background. A small group of painted sherds likely belong to the Cusipata Style (Franquemont 1986; Mujica 1987). They are bevel-rim bowls with cream designs on the bevel and the exterior of the vessel with a red or brown slip overall (Appendix 5q-10, 11).

The final category includes two rare specimens recovered from the Late Formative contexts. The first is a base with concentric rings of basketry imprinted on its exterior (Appendix 5q-12). The vessel was unslipped and the presence of sooting indicates that it was used for cooking. In spite of a small base (diameter 10cm), the base angle indicates a large overall vessel. The shape and size are further supported by a more complete specimen from the Pukara museum collections. An additional basket-based vessel was recovered from a later, mixed context in Block 3. The second "other" specimen is a small rim fragment of a very thin miniature vessel with a raised "coffee bean" eye and possible post-fire paint (see Appendix 5p-5).

Ceramic Tools

Ceramic vessel fragments can serve a number of purposes between the time a vessel breaks and when the sherds are disposed of, if ever, in a midden context. Sherds are used as kiln furniture to support vessels during firing, in walls and on roofs as construction materials, as containers or resting places for small objects, as formal tools such as spindle whorls, or expedient tools like scrapers (Appendix 6).

A total of 15 partial or complete spindle whorls were recovered, including 10 from Late Formative contexts. All of the whorls, excluding a single specimen, were made from broken sherds of vessels with Formative pastes. These are generally utilitarian, highly micaceous pastes and some of the specimens have evidence of burning on the exterior surface from the vessel's original use as a cook pot. The unique whorl was not made from a re-used sherd, but modeled using a diagnostic Collao paste and found in a post-Pukara context.

A total of 58 modified ceramic sherds were recovered, including 43 from Late Formative contexts. Based on ethnographic analogy, it is often assumed that ceramic scrapers from prehistoric contexts were primarily used in ceramic production to smooth the seams between coils of a hand-built vessel. However, considering the quantity and distribution encountered in the 2001 excavations this seems unlikely to have been their major use.

Lithics

The lithic assemblage from the 2001 excavations was generally classified based on comparative studies from the Titicaca region (Bermann 1994, 2003; Giesso

2003; Janusek 1994, 2003b; Seddon in Stanish and Steadman 1994; Steadman 1995). The two main categories are chipped tools and groundstone tools, with a third category including small polishers. From all excavation blocks a number of chipped stone tools and utilized flakes made of obsidian were recovered (Appendix 7), but the debitage analysis has yet to be completed. A single, fragmentary hoe blade made of a dense, green chipped stone was recovered from an occupation surface in Block 3. The groundstone tool kit recovered includes *batanes*, grinders, and crushers, but few of these specimens were complete or recovered *in situ*. However, there was some evidence of ochre processing on a few of the artifacts and a concentrated area of groundstone tools related to ceramic production in Block 3. Many groundstone fragments were recovered from midden contexts or in wall construction. If the specimen could not be categorized by function, it was simply designated as a handstone or netherstone, based primarily on size and shape of the artifact (Adams 2002).

Bone Tools

Bone tools are identified by the presence of clear shape modification and edge polish along one or more surfaces (Appendix 8). Their categorization is based on ethnographically recorded tools, primarily related to weaving and hide working, and preliminary observations of use-wear (Bermann 1994:222; Janusek 1994: Figures 8.4 and 10.15; Moore 1999; Stevenson 1974; Webster and Janusek 2003). For this discussion, guidelines and groupings defined by Moore (1999:75) from her study of the bone tools from Chiripa were followed: 1) awls and other pointed tools;

2) scrapers and related tools; 3) tools for netting; 4) tools for spinning and weaving; 5) worked bone for ornaments and ritual purposes; and 6) indeterminate worn or shaped fragments.

Bone awls and other perforating tools are the first group, totaling five specimens from the 2001 excavations. The tools ranged from finely rounded to more splintered, likely representing both formal and expedient forms. It is unfortunate that all the bone awls were incomplete, making it difficult to determine specific functions. Based on comparative studies, these tools were likely used in hide working and textile production and heavier awls may have also been used in southeastern basin in the production of twined basketry (Moore 1999:78). Rivera (2003:309, Figure 11.23) documented similarly shaped bone tools from Ch'iji Jawira at Tiwanaku, an area of craft production, and designated them as possible engravers used in the process of pottery production.

The largest grouping includes long bone tools and these are functionally characterized as blunt tools and scrapers (Moore 1999:78)[29]. The specimens include considerable variation in morphology and use-wear patterns. The Chiripa sample is separated into groups based on their working ends into rounded, blunt, and squared long bone tools, but it can be difficult to assign specific functions to these implements (Moore 1999:78-79). In the Pukara sample there are a number of

[29] An exception is the category of 'long bone-pointed' which are grouped with awls (Moore 1999: Table 4).

fragmentary long bone implements in this category. The shape of their working edge was recorded in an attempt to create sub-groupings, but the number of total specimens is quite small.

The most commonly discussed bone tool recovered from archaeological contexts in the region, the *wichuña*, is also made of camelid long bone (often the metatarsal) and is quite similar to modern tools used in loom weaving to separate the weft of a textile (Webster and Janusek 2003:356). The broken edge can be rounded, smoothed, or pointy and they are found both whole and fragmentary, making them difficult to distinguish from other types of tools. In this study, tools were only designated specifically as *wichuña*s if their articular end (the handle) was present. In addition to *wichuña*s, there is a category of bone tools for weaving and fiber processing. From Chiripa, these tools include combs used in loom weaving, a bone spindle whorl, shuttles for yarn, and toggles (Moore 1999:85). Based on similarities to two specimens from Chiripa (Moore 1999: Figures 28c and 28d), there is a single specimen from the Pukara excavations that may have been used as a toggle. It is a straight, smoothed bone with a single notch located near one end. It is suggested that these are useful for securing cordage or straps in boating, fishing, and harness equipment (Moore 1999:85).

Moore's category of net gauges comprised a substantial part of the Chiripa collection (14.1%; Moore 1999:85), but were not identified in the Pukara collections. She notes that these have been misidentified in previous studies as knives, spatulas, and ornaments and it may be possible that some from Pukara may be identified

during the comprehensive faunal analysis. It is also possible that fishing and hunting birds, key economic activities at Chiripa (Moore 1999; Moore et al. 1999), did not comprise as large of a part of the diet at Pukara, a site located far inland from the shores of Lake Titicaca.

In the indeterminate worn or shaped fragments group are three specimens with similar shapes and edge-wear, a single very small specimen, and a fragmentary bone shaft. The first three are short, very flat relative to long bone tools, and have clearly worked edges. If these objects were scrapers, it is possible that they were used in ceramic production for coil smoothing; they are similar in size and shape to stone and ceramic tools used for the same purpose (Rivera 2003: Figure 11.2).

Metal Artifacts, Beads, Chalk artifacts, Pigment, and Burned Clay

Most metal artifacts were from the plow zones and latest fill episodes in each of the three blocks. Only three metal artifacts were identified from Formative Period contexts; two of these were small metal fragments from the earliest midden feature in Block 1 and the third was a fragment recovered within the red pebbly matrix of the Feature 2 pit in the final Late Formative occupation in Block 3. A variety of other material types were recovered from the excavations, including beads, minerals, pigment in various sizes and colors, small artifacts made of a chalky substance, and fragments of burned clay. A single, broken bead was within the wall fill in Block 2 and the remaining two bead fragments from Block 3 (Appendix 9). The two beads from Block 3 appear to have never been completed, the central hole is drilled, but the edges are rough. Although it is very limited, this is the only evidence of bead

production recovered from the 2001 excavations. Lastly, there were a few artifacts made of a chalky substance (Appendix 10). Two of these objects are in the shape of small bowls and one is a small, incised object of unclear function. Marc Bermann (1994:73-75), in his excavations at Lukurmata, recovered similar "cups" made of an "unknown lime/plaster-like material" from many domestic contexts. He proposed that they may have been *llipta* (hardened lime) used by coca chewers or molds or crucibles used in metal working. The remaining artifact types were counted and weighed by context.

Chapter 8: Architecture, Activities, and Artifacts

The central pampa was a dynamic locus of activity throughout the growth and development of Pukara. In this chapter, architectural, activity area, and artifact data sets are presented collectively in order to trace the changing nature of the pampa throughout the Late Formative. The chapter begins by presenting a general summary of pampa use in all three blocks. In the second section, a series of four measures—timing, scale, permanence, and status[30]—are used to systematize the categorization and comparison of these occupations. The chapter concludes with a discussion of the relationship between the occupation sequence of the pampa and that of the Qalasaya complex. In this synthesis, transformations of both areas are used to develop a general occupation history for the central ceremonial district during the Late Formative period.

---

[30] These measures have been adapted from those developed by Jerry Moore (1996) for the study of Andean monumental architecture. His original framework used permanence, scale, centrality, uniqueness, and visibility.

Pampa Use during the Late Formative Period

Area use within each block and occupation context is determined through the composition of artifact assemblages and related activity areas. Each block is described by four tables that synthesize the relevant data sets for determining area function: 1) ratios of ceramic vessel types; 2) descriptions of diagnostic artifacts; 3) activities as reflected by tool types and features; and 4) densities of artifacts organized by material type (grams/ liter). The tables are presented in Appendix 12 and organized by excavation block.

Ceramics, divided into the general categories of serving (bowls) and non-serving vessels (*ollas*, *tinajas*, and *vasijas*), are treated as a major indicator of area function across the central pampa. A recent analysis of ceramic materials from the site of Chiripa, Bolivia, is used to guide the interpretation of vessel type ratios from the Pukara excavation contexts (Roddick 2002). Based on the connection between ritual activity and food in the Andes (i.e., feasting) established through ethnographic and archaeological studies, it is possible to make "an analytical connection of fancy pottery types to serving and the presentation of food within the context of ritual activity" (Roddick 2002:15). Using measures developed through ethnographic and archaeological case studies of both domestic and ritual spaces, ratios of serving to non-serving vessels measuring less than one (<1) are interpreted as domestic assemblages and those measuring more than one (>1) are indicative of ritual assemblages. This is based on the hypothesis that "*[a]n abundance of cooking and storage vessels, and an equal or lesser number of serving vessels, will suggest a*

domestic function, whereas a proportionally high number of serving vessels will suggest a more ceremonial, ritual function" (Roddick 2002:15, italics in original). In the case studies utilized, the ratio of serving to non-serving vessels within all domestic contexts ranged from .17 to 1. While controlling for variable breakage rates by vessel type, serving vessels comprised 11% of assemblages in small households and 47% in elite households, while non-serving vessels comprised 40% in elite compounds to 89% in non-elite contexts (Roddick 2002: Table 2). In order to refine these measures within the category of domestic contexts, the closer the ratio is to 1, the more likely that the assemblage represents elite residential contexts. For ritual contexts, serving to non-serving vessel ratios from the archaeological case studies varied from 1.0 to 4.0. These ratios did not include special ceramics like incense burners or transport and storage vessels (Roddick 2002: Table 3).

In the initial Late Formative occupation of the central pampa, Block 1 had a series of dense middens on the east (BL1E) and an occupation zone on the west (BL1W) with a few, ephemeral features. The ratio of vessel types is .92, indicating a domestic function for the area. There was a single cooking feature on BL1W that, based on its small size and informal construction, was likely used for reheating instead of long-term boiling or roasting activities. The diagnostic artifacts indicate a number of functions for the area, but there is not a concentration of tools directed at any singular activity. There were groundstone and chipped stone tools, ornaments, evidence of ochre use, and miniature vessels present in an area primarily dedicated to food-related activities. Based on the density of faunal remains and depositional

patterns of the middens, the numbers of decorated bowls and serving vessels, the presence of 7 *tinaja*s, and the informal hearth, the earliest use of Block 1 was as an area dedicated to eating, possibly drinking, and likely reheating food, but not in a manner that was solely limited to elements of daily cuisine.

Overall, Block 2 was "busier" and distinct in function from Block 1 during the Late Formative as use and re-use occurred in short episodes throughout the block. The initial use of Block 2 was exposed in the southwest corner and the 5073E row below ASD12. These areas included at least two hearths, a pit filled with carbon and ash, an associated use surface along ASD12, a series of occupation lenses, and a dense midden area in the southwest corner. Overall, the vessel ratio of this initial occupation was 1.12, indicating a ritual use of the area. However, when *occupation zone 2* and the southwestern midden are treated separately, the former has a vessel ratio of .69 and the midden a ratio of 1.44. Considering the location of two hearths (Features 29 and 30) in the area underlying *occupation zone 2*, a vessel ratio indicating a domestic function for the area is not surprising. While there was an emphasis on food preparation and disposal, additional artifacts such as several bone tools, a finely-made spatula, and a miniature vessel indicate the presence of craft-related and ritual activities also.

Lastly, the earliest occupation of Block 3 featured multiple activity areas related to subsistence-related activities. The features, including a number of hearths and primary and secondary trash deposits, support the use of the area for cooking and eating activities. The vessel ratio of .96 is also indicative of a domestic context,

with primary middens having higher ratios of serving vessels relative to secondary middens.

The function of the pampa shifted significantly throughout the Late Formative occupations of the area. In Block 1, the construction of ASD6 marked a major change in architectural, artifactual, and activity areas present. The construction of the wall created interior and exterior spaces, with no evidence for use to the east of the wall. The vessel ratio for the middle occupation was 2.7, indicating a ritual assemblage associated with serving activities. Craft activities (quite possibly related to food production) were evidenced by a dense concentration of chert and obsidian flakes in the occupation area west of the wall. Two small thermal features (21 and 26) served unclear functions; they were not as formal as hearths recovered in Blocks 2 and 3.

The final Late Formative period use of Block 1 was also limited to the west (or interior) of ASD6 and included a dense primary deposit of animal bones in a pit (Feature 18), two small pit features (Features 19 and 20), three handstones *in situ* on the use surface, and a few items of ritual paraphernalia. The vessel ratio decreased to .82, similar to that from the initial use of the area, with a clear difference between the pit features (.16) and *occupation zone 3* (1.63) figures.

Like Block 1, the middle occupation of Block 2 was marked by the construction of a large-scale wall running north-south and a shift in vessel ratios towards serving vessels (1.12 to 1.63). As noted above, this deposit (*occupation zone 1*) was difficult to define; it appears to have been a series of short-term use episodes

without evidence of surfaces or associated activity areas. Small dumps of burned ceramics, broken *incensarios*, and ritual artifacts were encountered. The final Late Formative period use of Block 2 continues the trend towards ritual activities in this area of the pampa. This occupation is marked by the presence of a clean, pebbly floor with deposits of broken *incensario* fragments concentrated just to the west of ASD12. Only four *vasijas* were recovered from *occupation surface 1* and the remaining artifact types were limited to 12 *incensario* fragments, four bases, and two ceramic scrapers. Based on the presence of a clean and intentionally placed pebble surface, a number of ritual vessels, a few pit features, and a very small hearth along ASD12, Block 2 was transformed from an area of food and craft-related activities to one focused exclusively on ritual events focusing on ceramic offerings. In this context there is not evidence that eating and drinking played a role in the type of ritual activities conducted in Block 2 during the final Late Formative period use of the area.

Lastly, Block 3 did not have a middle occupation, but there was a clear shift between the food-related activities of the initial occupation to craft-related activities in the final Late Formative period occupation. These activities are evidenced by the presence of spindle whorls, multiple handstones and netherstones, clay deposits, tempering materials, and other indicators. The vessel ratio decreased slightly from .96 to .82, marking a continued domestic function for this area. However, the lack of hearths is interesting considering the number of utilitarian (or non-serving) vessels present. Additionally, within non-serving vessels there were very few *ollas* present

in the final use of the area (n=4) relative to *vasijas* (n=23) and *tinajas* (n=6). Also, there were serving bowls and decorated body sherds present, indicating that the area was not exclusively used for crafting. There are many possible interpretations of this area; one interesting possibility is that craft producers were supplied with food in bowls and beverages in *vasijas* during their workday and therefore did not have to process or prepare those goods in cooking pots or on hearths.

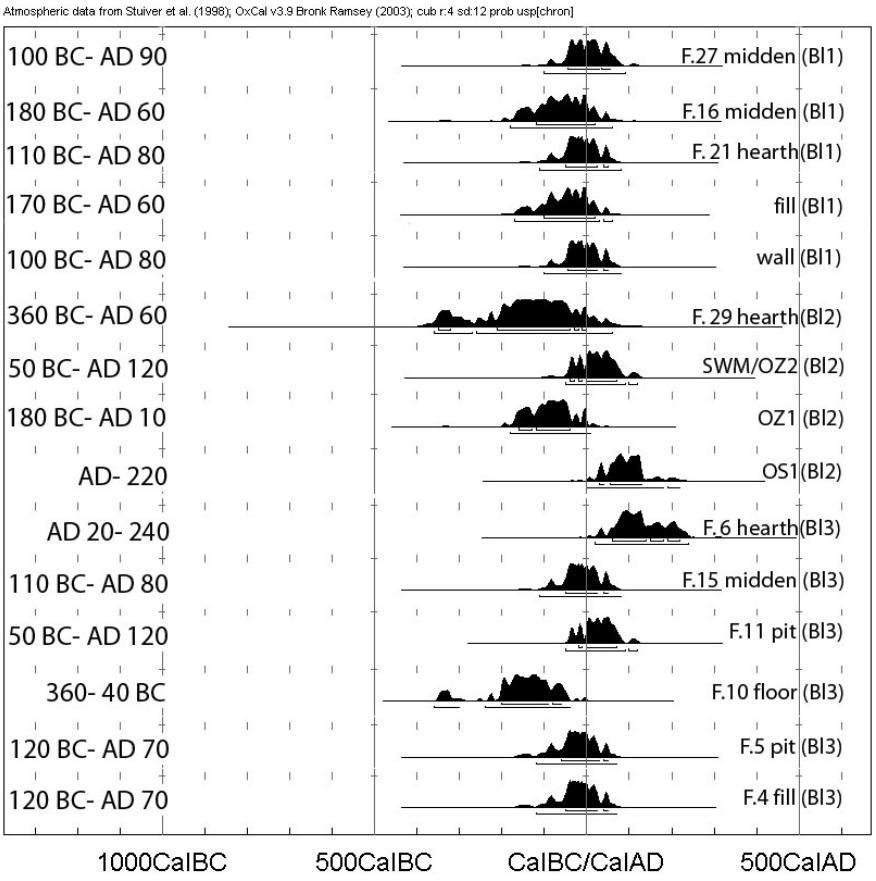
Measuring Variability: Timing, Scale, Permanence & Status

Timing

While the previous section provided a general synthesis of pampa use, the measures of timing, scale, permanence and status are used in the following section to refine area chronology and area use across blocks. The first measure is timing, which combines data from radiocarbon samples, stratigraphic associations, and chronologically significant artifact types. A total of 15 radiocarbon samples were collected from contexts with diagnostic Formative period ceramics in all three excavation blocks. Samples were processed at the University of Arizona AMS Facilities and calibrated using OxCal v.3.9 (Bronk Ramsey 2003). In Figure 50, the results are displayed by block and from earliest to latest stratigraphic context. The 15 dates range from 360 B.C. - A.D. 240, with 11 falling between 180 B.C. - A.D. 120. Unfortunately, because the samples are statistically indistinguishable at 2 sigma, they cannot be used to sub-divide the Pukara period. Dates from Middle and Late Formative contexts from earlier excavations at the site (Mujica 1985; Ralph 1959)

and contemporaneous sites from the region (Mohr-Chávez 1977; Steadman 1995) are included in Appendix 1. The published dates from earlier projects were also calibrated using OxCal v.3.9 for comparative purposes.

Figure 50- Pukara 2001 calibrated radiocarbon dates



Considering the radiocarbon overlap, determining the contemporaneity of the occupations among the excavation blocks relies upon the distribution of comparable architectural units and chronologically sensitive artifact types. The presence of the large north-south wall running through and between Blocks 1 and 2 (ASD 2/6 and ASD12, respectively) guided the interpretation of contexts between the two areas.

Both blocks had substantial occupations pre-dating the construction of the Late Formative period walls. Therefore, based on architecture and stratigraphy, there was an initial occupation of the pampa (overlying sterile soil in several areas), followed by fill episodes and wall construction, and at least one subsequent occupation in each block that was contemporaneous with use of the wall. Unfortunately, Block 3 could not be connected with Blocks 1 and 2 through architectural units; determining the relationships between the areas relied upon chronologically sensitive artifact types.

Non-local vessel types and bevel-rimmed bowls constituted the two major chronologically sensitive ceramic types. The very limited distribution of non-local sherds was used to establish an archaeologically contemporary relationship among blocks (Figure 51). In Block 1, non-local specimens were concentrated in the earliest middens in the eastern half of the block (n=12) and in the middle occupations on the western half of the block (n=10). Due to the difficulties of exposing the base of the Late Formative wall on the western side of the block, it was unclear if the middle occupation of the western half pre-dated the construction of ASD6. However, the presence of only one non-local sherd in the final Late Formative period use of Block 1 further supports the use of these types as chronological indicators.

Block 2 had a single non-local sherd underlying the hearth on *occupation surface 2* (Feature 29), two sherds in the overlying *occupation zone 2* and southwestern midden, two from mixed contexts, and most non-local sherds in *occupation zone 1* (n=4). In this case, the concentration of non-local sherds was recovered from the middle occupation of the block, but the function and

accumulation rates of *occupation zone 1* remain unclear. It may have been a fill episode pre-dating the pebbly *occupation surface 1* or a series of use episodes that accumulated over time and were difficult to differentiate during excavation. In either case, there are no non-local sherds associated with the final occupation surface.

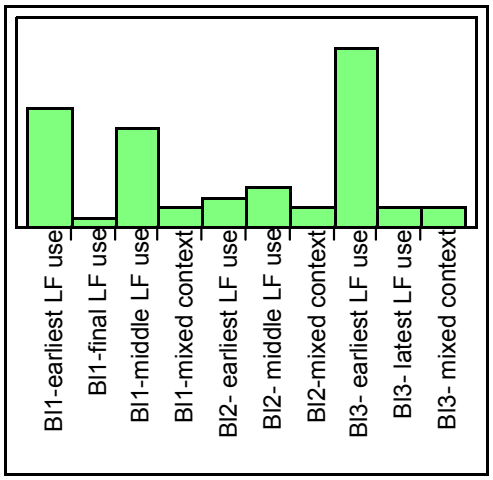
Lastly, in Block 3, non-local sherds were clearly concentrated in the earliest occupation and subsequent fill episode. Most sherds were recovered from midden contexts (two from Feature 15, one from Feature 17, seven from the north and northwestern middens, and four from a possible midden) and four from the fill episode overlying these features. Two were associated with the last Late Formative period use of Block 3 and two were from unclear, Formative period contexts.

Bevel-rim bowls were identified as chronologically sensitive types by Franquemont (1986); they were also concentrated in the earliest levels from the 2001 excavations (Figure 52). In Block 1, a total of 11 bevel-rim bowls were recovered from the earliest middens on the eastern half of the block, two from the middle occupation, and two from mixed contexts. In Block 2, bevel-rim bowls were limited to the earliest (southwestern midden) and middle (*occupation zone 1)* occupations, the same contexts in which non-local ceramics were concentrated. Finally, in Block 3 bevel-rim bowls were primarily recovered from the earliest Late Formative occupation (n=17), with four from the final use. Based on the presence of both non-local and bevel-rim bowls in NWM1-2, it is possible that these upper levels of the northwestern midden accumulated during the same period as NWM3-5, not during the latest Late Formative occupation of the block.

Finally, the Cusipata style, a sub-type of bevel-rimmed bowls, was also a useful chronological indicator from the 2001 excavations. The style, characterized by painted designs on the interior bevel and exterior surface of bowls, was first identified from the early contexts of Kidder's Area IV, located within a few meters of Block 3. From the 2001 excavations, only five specimens from Cusipata style bowls were recovered and their distributions were limited to early contexts. Four were from the earliest occupation of Block 3 (*fill episode 2* and Feature 15) and a single Cusipata sherd was from the southwestern midden of Block 2. In contrast to the earlier descriptions of the Cusipata style, two of the painted sherds were beveled and the remaining rims were rounded or flat, but the painted decoration was consistent with those described by Franquemont (1986) and Mujica (1987).

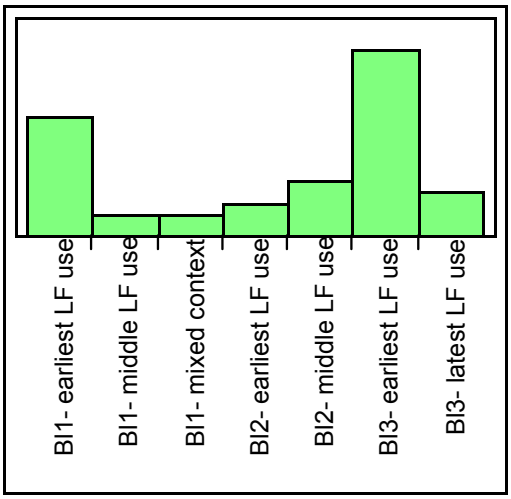
In summary, data sets that reflect area function and timing support the division of the pampa sequence into initial, middle and final occupations. Across all three blocks, the initial occupations are treated as roughly contemporaneous based on their relationship to sterile deposits and the presence of rare, chronologically sensitive ceramics types in each. The blocks also share a common focus on the preparation and consumption of food. During their middle occupations, Blocks 1 and 2 were connected through the construction and early use of ASD2/6 and ASD12. The large-scale wall marked a major transformation in the nature of spatial organization on the pampa, a shift also indicated by the activities present. Lastly, the final occupation of all three blocks is argued to be roughly contemporaneous based on the lack of early sherd types and stratigraphic and architectural associations.

Figure 51- Distribution of non-local ceramics



Level	Count	Prob
BI1- earliest LF use	12	0.21429
BI1- final LF use	1	0.01786
BI1- middle LF use	10	0.17857
BI1- mixed context	2	0.03571
BI2- earliest LF use	3	0.05357
BI2- middle LF use	4	0.07143
BI2- mixed context	2	0.03571
BI3- earliest LF use	18	0.32143
BI3- latest LF use	2	0.03571
BI3- mixed context	2	0.03571
Total	56	1.00000

Figure 52- Distribution of bevel-rim bowls



Level	Count	Prob
BI1- earliest LF use	11	0.25000
BI1- middle LF use	2	0.04545
BI1- mixed context	2	0.04545
BI2- earliest LF use	3	0.06818
BI2- middle LF use	5	0.11364
BI3- earliest LF use	17	0.38636
BI3- latest LF use	4	0.09091
Total	44	1.00000

Scale

Scale is determined by the size, redundancy, and periodicity of activities present, and through both features and artifact classes. Measures of scale are frequently utilized in studies of food preparation and serving in order to determine if these activities were organized at household or suprahousehold levels (Crown 2000; Dietler 2001; Hayden 2001; Kelly 2001; Mills 1999; Pauketat et al. 2001; Potter 2000) and where they occurred within a site (Blinman 1989; Blitz 1993). In addition to food-related activities, determining the scale and organization of craft production is also a key factor for understanding pampa use. Scale (or organization) of craft production is typically characterized as specialized/non-specialized or attached/ independent within models that seek to determine the relationship between craft production and the development of sociopolitical complexity (Brumfiel and Earle 1987; Clark and Parry 1990; Costin 1991; Costin and Hagstrum 1995; Janusek 1999).

Across all three blocks, the initial use of the pampa was primarily dedicated to food-related activities. A number of indicators can be used to determine if food was processed and/or served at the household or suprahousehold level. The first of these, hearth size and morphology, is difficult to address in detail because of the small number excavated at Pukara, but a few conclusions can be made based on regional comparisons. In Block 2, the size of Feature 29 is significantly larger than the average size of those recorded from household contexts in excavated sites from

the region (Bermann 1994, 2003; Janusek 1994, 2003). In Block 3, the concentration and variety of hearths is uncommon for residential contexts. Feature 6, a possible *watiya*-style hearth, could have been used for suprahousehold tuber and meat roasting, as is the modern practice in the region. Additionally, several small hearths with different construction techniques, fuel sources, and associated artifacts are interpreted as indicators that this was a multi-purpose processing and cooking area, not a household-level kitchen.

In addition to hearths, midden contexts are used to determine the scale of food-related activities on the pampa. Ceramic vessel ratios, combined with dense deposits of faunal materials, present further possibilities for area use. In Blocks 1 and 3, vessel ratios from the initial occupations are within the parameters of the domestic category (.92 and .96, respectively), but their proximity to the lower limit of the ritual category presents interesting possibilities for interpretation. Roddick proposed that borderline ratios could be indicative of either elite households or multi-purpose areas in which both domestic and ritual activities are common (Roddick 2002; e.g., the Putuni complex at Tiwanaku, as discussed in Chapter 4). The presence of dense, primary bone dumps in each (Features 16, 23, 24, 25, and 27 in Block 1 and Feature 17 in Block 3) further complicates the scenario. In Block 1 the materials are part of a toss zone that included both serving and non-serving vessels and in Block 3 the dump is on an occupation surface next to a hearth and several other midden deposits. Even in Block 2, the only area with a ratio in the ritual category (1.12) in the early occupation, dense midden deposits of bones were recovered in the southwest corner

from the earliest use of the block. In the earliest Late Formative occupations of all three blocks, ceramic ratios, hearth distribution, and the dense middens rich with faunal material are consistent with expectations developed for differentiated meals beyond the scope of daily cuisine.

The middle and late occupations of the pampa are marked by an increasing diversification of area use; new evidence of craft and ritual activities complement continued evidence of food-related activities. The most relevant data related to measures of scale are from the final occupation of Block 3. The presence of groundstone artifacts *in situ*, small pits of clay and tempering materials, and the production tools indicate that this area was used for the early stages of ceramic production. Unfortunately, due to the restricted spatial extent of the excavations it is impossible to determine how widely distributed these areas were on the pampa during the final Late Formative occupation. However, based on the limited number of tools recovered and the small sizes of the pits and raw materials present, I argue that this area represented small-scale, possibly household level ceramic production at the site. There were no formal spatial divisions, large stashes of raw materials, drying areas, centralized firing facilities, or any of the other common indicators of large-scale ceramic production. In sum, considering the limited distribution of craft-related activities on the central pampa, it is unlikely that this area served as a centralized workshop zone during the Late Formative.

Permanence

Degree of permanence is measured through: 1) investment in architectural features and associated surfaces; 2) multiple uses of features (e.g., multi-use hearths, stratified midden deposits, large-scale storage vessels *in situ*); 3) clear/formal division of spaces by function (internal/external spatial divisions, different structure types); and 4) the presence of a diversity of activities (subsistence and craft-related activities). In all blocks, the initial occupation of the pampa is characterized by a lack of architecture, informal use surfaces, and ephemeral activity areas. In Block 1, the earliest use of the area followed the natural slope of the pampa, with activity areas located on the higher ground to the west and the lower area to the east serving as a primary toss zone. In this toss zone, thin midden deposits were clearly differentiated during excavation. The lack of soil accumulation between layers, preservation of ceramic surfaces, and well-preserved faunal materials support that these deposits accumulated rapidly during the initial use of the block. Overall, in Block 1 there were no permanent features, prepared surfaces or architecture present. In Block 2, a possible wall fragment was exposed below ASD12, but due to the limited excavation area this remains unclear. Nor was there a prepared surface associated with the Feature 29 and 30 hearths. Lastly, in Block 3 cooking areas were separated from toss zones with small wall fragments, but no evidence of permanent architecture or prepared floors was present. The multiple hearths were not stratified, as would be expected from long-term use, nor was there evidence of much

investment in their construction with formal foundations or stone collars. Across the pampa the initial occupation showed low degrees of permanence.

A clear shift in the degree of permanence during the middle and final occupations is indicated by the construction of ASD2/6 in Block 1 and ASD12 in Block 2. The materials used illustrate a higher degree of investment and the construction created clear divisions between interior and exterior spaces during the later occupations. In Block 1, evidence of use during the middle and late pampa occupations was limited to the area to the west of ASD6. However, based on a lack of prepared surfaces and the presence of *in situ* activity areas associated with the use surfaces (e.g., lithic debitage and dense primary midden deposits), this area likely served as an exterior patio space within a larger area, such as a compound.

Presumably, excavations further to the west would have encountered structures and additional activity areas. The area to the east showed no evidence of use after the construction of ASD6. In Block 2, evidence of use was also restricted to the west of the large-scale wall, but exposed in a limited area due to the proximity of the block's eastern edge. The middle occupation of Block 2 was characterized by a lack of prepared surfaces and the presence of numerous, superimposed, occupation lenses throughout the block. In contrast, the final occupation of the block shows the most substantial investment in materials and maintenance. There was a red, pebbly surface across the block, a large, flat stone that served as a threshold in the doorway of ASD12, a small structure with worked stones in the southwest corner, and a few pit features. As discussed above, there were few artifacts recovered from this final

use surface or pressed into it, indicating maintenance activities such as sweeping. Lastly, in the final occupation Block 3 served as an exterior activity area dedicated to ceramic production. There were a few patches of pebbles that may have been remnants of a prepared surface, but the deposits were relatively sloping and the use surfaces were crowded with pits of clay, *in situ* groundstone, and other tools. The lack of architecture, prepared surfaces, or thermal features supports use of this area for crafting, and not full-time residential activities.

Status

Lastly, the status of area inhabitants is indicated by: 1) relative investment and quality of architectural features; 2) presence of prestige goods (rare, non-local, or high valued goods such as ritual objects); 3) access to special foods or beverages; and 4) the quality and functional composition of the ceramic assemblage[31]. In the case of Pukara, non-local goods include ceramics from various regions and obsidian, likely procured from the region of Arequipa (Burger et al. 2000). Ritual objects have been identified as pedestal-based bowls (*incensarios*), highly decorated and rare vessel types, and elements of snuff kits such as tablets, spoons, and possibly miniature vessels (Torres 2001). Because determining the "quality" of the ceramic assemblage is quite subjective, in this study it is based on whether the pampa assemblage included the diversity of decorated vessel types identified in previous

[31] Measures of status are adapted from those developed in studies of household archaeology (e.g., Hirth 1989, 1993; Smith 1987)

studies. The absence can be argued that certain types of rare vessels were limited to consumption in certain contexts or, in the case of status measures, only by certain members of the population.

The first indicator of status, investment in architecture, can only be addressed for the middle and late occupations of the pampa. From previous excavations there is a limited amount of information available about construction techniques used at the site, but there are a few general conclusions that can be drawn. Kidder's excavations exposed three "levels" of construction investment. The areas ranged from the cobble constructions of the small structures near the river to the mixed worked and unworked blocks of the Area IV compound on the pampa to the cut-stone blocks and slabs of the sunken courts of the Qalasaya complex (Chávez 1992; Inojosa 1940). Not surprisingly, the pampa constructions from the recent excavations were also in this intermediate category. ASD2/6 and ASD12 were both comprised of relatively large blocks (over 50 cm), with some limited evidence of surface modification, as were the wall fragments from the structure in the southwest corner of Block 2.

Rare, non-local, and ritual objects were present in all occupations, but in varying concentrations. Non-local ceramics, as discussed above, were limited to the early and middle occupations of all three blocks, but found in the highest numbers in Block 3. Diagnostic, non-local ceramic specimens indicate that during the initial Late Formative use of the pampa there was interaction between Pukara and a variety of areas both within and beyond the Lake Titicaca Basin. The nature and degree of this interaction remains unclear, but the association of non-local vessels with the

initial occupations dedicated to food-related activities may provide insight into the intended audiences for suprahousehold meals on the pampa.

For example, there is evidence of interaction between Pukara and areas to the south and east in the Titicaca Basin. A banded punctate sherd with parallel lines of small holes is similar to a vessel from a Tiwanaku III context from Lukurmata (Bermann 1994:126, Figure 8.22). A major difference is that the sherd recovered from Block 1 was mineral-tempered, in contrast to the fiber-tempered sherd from the south. However, the decoration and form are comparable. Steadman also recovered two specimens from Camata that are similar to the banded punctates recovered from Pukara. The first of these is an *appliqué* fillet from a Pucara 1 context and the other is an incised fillet from a Pucara 2 context (Steadman 1995: Figures 61b, 67d and 67e).

Beyond the Titicaca Basin, non-local ceramic evidence supports interactions between Pukara and Cuzco to the north and the Bolivian lowlands to the southeast. Deeply incised sherds recovered from Pukara are similar to several specimens from Cuzco published by Bauer (1999) and Mohr-Chávez (1985). The Paruro style of Formative bowls from Cuzco has horizontal and vertical nubs with parallel incisions (Bauer 1999:134, 138), similar to those recovered from the initial Late Formative levels of Pukara. Also, a small group of deeply incised sherds show some similarities with the early Tiwanaku-related ceramics first published by Mohr-Chávez (1985) and also encountered by Bauer (1999:130). Lastly, the “coffee bean” eye on one of

the miniature vessels is similar to examples identified on Paruro vessels from Cuzco (Bauer 1999:139, Drawings 4-9).

It is also possible that the "coffee bean" eye sherd, in addition to basket-imprinted sherds, is evidence for interaction between Pukara and areas to the southeast in Bolivia. "Coffee bean" eyes also have been identified on ceramics from the Bolivian lowlands (Pereira el al. 2001:171). Additionally, the practice of using basketry for ceramic molds during the Formative has been recorded from the Bolivian altiplano, Cochabamba, northern Argentina, and the western Amazon Basin (Brockington et al. 1995:46-52 in Pereira et al. 2001:172). Lastly, it has been suggested that the Ramis style, a "crudely made, poorly fired, black paste ware decorated with incised geometric designs which have been filled with bright red and light green paint after firing" (Wheeler and Mujica 1981:40), may be from the eastern lowlands because it is unlike any pottery identified from the western slopes or the altiplano. Clearly this is a tentative assertion, but worth considering based on the presence of basket-imprinted and "coffee-bean" sherds recovered from Pukara.

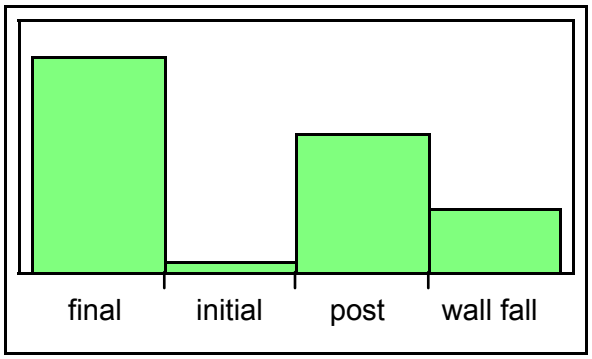
The most ubiquitous non-local resource documented at Pukara is obsidian, as detailed in a recent synthesis by Burger et al. (2000). For the Late Formative period, the authors sourced artifacts recovered by Kidder at Pukara, by Mohr-Chávez from Qaluyu, and from Pukara contexts excavated on the northern Taraco peninsula. While most contemporary sites in the Titicaca Basin only had access to the Chivay source, located 143 km to the west, Pukara is unique in its high percentage of obsidian obtained from the Alca source (20-30%), located 258 km to the west

(Burger et al. 2000). The authors argue that the presence of Alca obsidian not only reinforces the relative importance of Pukara as a political and religious center, but supports high levels of interregional interaction between the Titicaca Basin and Cuzco during this time. In 2001, obsidian debitage and/or tools were encountered in all Late Formative contexts, supporting the assertion that its general consumption throughout the occupation history of the central pampa. Further analysis must be completed before details of provenience, processing, and consumption patterns are available, but the distribution of obsidian across all contexts may indicate that within Pukara there was generalized access to the material and thus that it may not serve as an indicator of intrasite status differences.

Ritual objects were recovered in small numbers from throughout the pampa occupations, but there was a concentration of *incensarios* in Block 2 during the final occupation and abandonment of the area. *Incensario* fragments with polychrome feline and monochrome geometric motifs were encountered primarily in association with the prepared pebbly floor from the final occupation. However, as an isolated artifact type, it is unclear if the presence of *incensarios* is primarily indicative of status, other elements of social identity, or area function. For example, during Tiwanaku IV *sahumadores* (ceremonial burners) are present in most ceramic contexts in the Tiwanaku and Katari valleys; distribution and use-related evidence support that they likely served both ceremonial and mundane roles (Janusek 2003a: 70-71). At Pukara, based on their limited distribution they are used to infer area

function for Block 2, but their relationship to status and other elements of social identity require further investigation.

Figure 53- Distribution of *incensario* fragments in Block 2



Level	Count	Prob
Final occupation	17	0.50000
Initial occupation	1	0.02941
post-OZ1 use	11	0.32353
wall fall	5	0.14706
Total	34	1.00000

The last two measures of status are access to specialty subsistence items and the quality of the ceramic assemblage. Because the faunal and botanical analyses have not been completed, access to special foods and beverages can only be inferred through functional analyses of the ceramic assemblage. The significance of serving and non-serving vessel ratios was discussed above; decorated serving bowls were used throughout the pampa occupations and served as indicators of both timing and function. The remaining issue is whether *chicha* was produced and/or consumed at the site. In the region, studies of Tiwanaku assemblages from both the center and peripheries have documented the presence of decorated *keros* for serving *chicha*. At Tiwanaku, the first serving vessels from the transitional Late Formative 2 to Tiwanaku IV periods were *keros*, small *escudillas*, undecorated *vasijas* and *tazon*

basins, indicating the development of ceremonial meals during the Tiwanaku period (Janusek 2003a:81-82). For the periphery, it has been argued that maize beer was used as a social lubricant by the Tiwanaku during political feasting (Goldstein 1993; 2003). Unfortunately, for Pukara the issue of *chicha* consumption remains unclear. While Chávez presented a few examples of *kero*-style vessels (slightly outflaring beakers), there is no evidence from the 2001 excavations for specialized drinking vessels in the Pukara assemblage. In terms of fermentation vessels, it is possible that *tinajas* were used in this context, as has been proposed for this vessel shape from Tiwanaku assemblages (Couture 2003; Janusek 2003a), but only rims have been identified from this vessel type at Pukara and their function is tentative at this point.

Lastly, measuring the "quality" of the pampa ceramics is used to determine whether the vessel types recovered from the pampa were consistent with and include all previously defined vessel types from Pukara assemblages (Chávez 1992; Franquemont 1986; Rowe and Brandel 1971). Even during the initial sorting of the materials, it was clear that many of the identified vessel types were not present in pampa contexts. The most notable absences were many of the polychrome decorated wares such as bulging necked jars, four-sided jars, effigy head vessels, tripod bowls, and other special-purpose vessels, as defined by Chávez (1992). This could be the result of numerous processes, but I propose that this discrepancy reflects functional and status differences at the site, not processes such as disposal patterns. For example, in the case of Tiwanaku, vessel types are restricted in their distribution and reflect important social and economic differences: "The absence of *keros* and

drinking paraphernalia in temple use contexts suggests that Tiwanaku temple ceremonies may have been quite distinct from drinking ceremonies carried out at the household and corporate levels" (Goldstein 2003:165). In addition to a lack of several vessel types on the pampa, many of the images in the iconography detailed by Chávez (1992, 2002) were not recorded on any of the polychrome, incised pottery recovered. Feline imagery on pedestal-based bowls or *incensarios* was consistent with documented types documented, but the complex iconographic canons outlined by Chávez were not reflected in the decorated materials from the pampa. Further analyses of these images is necessary; iconography was not a focus of the present study, but merits further attention. The discrepancies in both vessel types and iconography are important indicators of the diversity of the ceramic assemblage and complexity of Pukara's iconographic traditions.

The Central Ceremonial District: Contextualizing the Central Pampa

A key element to understanding Pukara development is determining the relationship between the pampa and the Qalasaya complex throughout the Late Formative period. The major issue to resolve is contemporaneity. Unfortunately, there are not comparable, published absolute dates from earlier projects and the radiocarbon dates from the 2001 excavations generally overlap. Therefore, it is necessary to rely on ceramic cross-dating to compare the sequences of the two areas. Based on the limited distribution of non-local and chronologically sensitive early ceramic types in both areas, I conclude that the initial use of the pampa was roughly contemporaneous with the first large-scale constructions of the Qalasaya. As detailed

in Chapter 3, the initial construction of the Qalasaya was only exposed in a limited area, but it featured a smaller pyramid with at least one, rectangular niched building that solidly pre-dated the reconstruction of the terraces and the construction of the sunken courts. The initial constructions of the Qalasaya are designated as Epoch 3 (850- 200 B.C.) by the Copesco project (Wheeler and Mujica 1981) and presumably to the Initial Pukara period (500- 200 B.C) in the subsequent chronology by Mujica (1988). While the absolute dates of the Qalasaya contexts need further support, the ceramic styles are consistent. Both the early pampa and the Initial Pukara Qalasaya contexts include Initial Pukara, Ramis style, and Cusipata style vessels in limited concentrations and from secure contexts.

If the initial occupations were contemporaneous, how did the subsequent use of the pampa correspond with the reconstruction of the Qalasaya complex during the Classic or Middle Pukara period (200 B.C. - A.D. 100)? Based on the concentration of absolute dates from the pampa excavations within this range, the general alignment of ASD2/6 and 12 with the walls of the Qalasaya terraces, lack of a large fill episode or accumulated deposits between Late Formative period occupations, and the presence of Classic Pukara decorated vessel such as feline *incensarios* recovered from the pampa, I argue that these subsequent occupations were also roughly contemporaneous. The combination of activity area, artifact, and architectural data serve as strong indicators that the middle and late occupations of the central pampa can be treated in tandem and compared with the Middle Pukara constructions of the Qalasaya complex.

Chapter 9: Conclusions and Directions for Future Research

The major theoretical issue addressed in this dissertation is how the development and transformation of the central ceremonial district can be used to define the nature of early leadership strategies at Pukara. The major methodological issue is how to interpret the use of monumental space in the site's central district as a reflection of inclusionary or exclusionary strategies throughout the Late Formative period. Various categories of data were used to determine area function and the measures of timing, scale, permanence and status were then employed to refine the characterization of pampa use, trace its change over time, and contextualize the central pampa within the ceremonial district.

Evidence from the initial occupation of the central pampa supports the use of inclusive or corporate strategies by early leaders. In terms of intrasite spatial organization, the central pampa was organized as an open, public space during the initial Late Formative occupation. While "public, social space is shaped in a variety of ways, often connected with the manipulation of access by crowds of people" (M. Smith 2003b:19), there is no evidence that access to the central pampa was restricted during this time. Following Moore (1996:180), "the *absence* of internally divided

space is thought to reflect the lack of major social divisions between insiders and outsiders" (Moore 1996a:180).

The monumental space of the central pampa would have "provided an ideal venue for socially integrative activities" (Yaeger 2003:136). Based on activity area and artifact data, I argue that this early occupation was primarily dedicated to the preparation and consumption of foodstuffs. The concentration and scale of thermal features and primary midden deposits are interpreted as indicators of food preparation and consumption beyond the level expected of daily, household activities. Based on the public setting of these activities and a lack of highly specialized serving vessels in most areas, the material remains of these events are most consistent with the expectations developed for patron-role or entrepreneurial feasts (Dietler 1996), both elements of inclusionary leadership strategies.

In this scenario, the initial occupations of the central pampa and the earliest constructions of the Qalasaya were spatially and functionally distinct, but complementary aspects of public activities in the site's central district. In contrast to the small structure exposed on Qalasaya complex, there is little evidence from the central pampa occupations of ritual paraphernalia such as ceramic *incensarios*, trumpets, and decorated monoliths characteristic of the Yaya-Mama Religious Tradition. The separate functions of the central pampa and Qalasaya may indicate similar patterns to those proposed by Goldstein (2003:165):"[t]he absence of *keros* and drinking paraphernalia in temple use contexts suggests that Tiwanaku temple

ceremonies may have been quite distinct from drinking ceremonies carried out at the household and corporate levels."

During subsequent occupations, the nature of the pampa and the Qalasaya complex shifted significantly, signaling a change in layout and function of the central ceremonial district. During the middle and final occupations on the pampa, the Qalasaya complex was reconstructed into the massive, terraced platforms and sunken courts that are visible at the site today. Contemporaneously, the pampa occupation was divided into a number of highly differentiated spaces—a small-scale craft production zone, an area dedicated to ritual activities, and a residential space. The division of the pampa into differentiated spaces would have had a number of important effects. First, it would have lost its "monumental" nature through the construction of walls and the subdivision of space. It was no longer a large-scale, public space, but a series of private and semi-private spaces. Second, the activities of the pampa would no longer have been openly visible to those above in the monumental architecture or to people using other areas of the pampa. Lastly, the presence of structures in this area may have affected the flow of traffic to the Qalasaya and possibly access to the main entrance. Overall, these changes not only indicate a new conceptualization of the pampa as private and semi-private spaces, but a changing role of the area relative to the Qalasaya. While in the initial occupation they served as complementary elements of the central ceremonial core, during subsequent use the architectural components of the central district were clearly differentiated as mundane and monumental spaces.

The major questions that remain to tie the change in area function to shifting leadership strategies are who directed this change and who was using each space? During the middle and final occupations, the residents of the central pampa were involved in the local craft economy, continued to focus on subsistence activities, and also performed ritual activities. There was a clear shift in the degree of architectural investment between the earlier and later uses of the pampa, as illustrated by the large wall running through Blocks 1 and 2, but this was not matched by an investment in permanent features nor prepared surfaces outside of Block 2. Relative to the degree of labor investment and of craftsmanship evident in the sunken courts and terraces, the constructions of the pampa are not consistent with expectations for an elite district within the site. Also, if access to the pampa was controlled by elites we would expect a higher degree of planning, uniformity in construction, and coordinated organization of the area. Lastly, relative to the variety and quality of ceramics found by Kidder in the Qalasaya excavations, the pampa ceramics are limited in the variety of highly decorated ritual and serving types and in their distribution across the area. Therefore, I argue that the later uses of the pampa represent local responses to the decentralization of a monumental space (e.g., Smith 2003b:19). The space was "filled in" by artisans, locals performing small-scale ritual, and domestic activities. Considering the presence of such a diversity of activities across the pampa, this space may be interpreted as a "middle class" residential zone; the large-scale wall could have served to delineate a *barrio*, as seen at Tiwanaku (Janusek 1994), or to divide residential and workshop areas.

I suggest that the marginalization of the pampa within the central district was accompanied by a transformation of the Qalasaya into an increasingly esoteric space. Previous studies of Titicaca Basin architecture have proposed a number of functions for the sunken courts. As proposed by Mohr-Chávez (1988:26), the structures around the courts were bins for the storage of agricultural surplus for "ceremonies, public feasting, maintenance of the high status authorities and their families." William Conklin (1991:288), based on studies of the Chiripa sunken court, proposed that each structure was a habitation unit that faced public events carried on in the central area. Lastly, Moore (1996b:797) agrees that Titicaca Basin courts/plazas were scenes of ritual activities and argues that based on their small size, enclosed nature, and prominent positions within sites, the participants would have been limited in number.

The sunken courts, terraces, and surrounding structures served as a setting of public ritual and likely for elite residential activities, however it remains unclear what segments of the Pukara population were included in the events hosted on the Qalasaya. However, when the central ceremonial district is treated as a single architectural unit and traced over time, the restriction of public activities to the Qalasaya complex in the later occupations is consistent with expectations for exclusive strategies in which monumental spaces can be utilized as sources of ideological power: “[b]y exercising ownership of public facilities, elites can further restrict their use and closely monitor the staging of ceremonies through agents and institutions under their supervision” (DeMarrais et al. 1996:19). This trend, in which general access to public spaces is increasingly restricted over time, is consistent with

patterns recorded for the Main Plaza at Monte Albán and at the Putuni complex at Tiwanaku, as outlined in Chapters 2 and 4.

The results of the 2001 excavations both support and challenge elements of the three models that have been proposed for Pukara site and polity organization. Evidence for centralized control of craft production was not recovered from the central pampa; the limited remains of ceramic production recorded in Block 3 were consistent with expectations for small-scale production. Therefore, if there was control of ceramic and monolith production, as either an economic or ideological resource for elite control, it did not occur in centralized workshops on the pampa. However, the possibility that feasting was used as a political resource for early leaders was supported through evidence for the preparation and consumption of meals at suprahousehold levels within the public areas of the central pampa. Further analysis of the midden contexts from the initial pampa occupations will serve to clarify the composition of these meals, how they varied across the zone, and if they were used to solidify relationships between incipient leaders and their supporters.

Pukara, a massive and highly differentiated regional center, holds the potential for years of future field research. In order to further develop data sets related to early leadership strategies and site development, there are several areas within the site to target for excavations and geophysical survey. The first step is to systematically record the boundaries of the site and to document the surface architecture within and beyond the central ceremonial district. Additional excavations are necessary on the Qalasaya complex, specifically in the areas behind

and on the terraces below the sunken courts, to test for elite residential areas. If encountered, it is possible that evidence for attached specialization for the production of highly decorated ceramics and monoliths would be present in these contexts. Residential data could then be compared between the Qalasaya, the later occupations of the central pampa, and from Kidder's excavations near the riverbank to develop a broad perspective on intrasite spatial organization, levels of status differentiation, and the development of these differences throughout the Late Formative period.

Based on the data collected from the Pukara pampa and comparative studies of large-scale sites, transformations of monumental, centralized spaces can be used to define and trace changes within leadership strategies in early population centers. While some elements of the three models for Pukara organization were supported through the pampa excavation, the overall occupation history of the area illustrates the utility of considering new directions in the study of leadership, especially those from actor-based approaches. At Pukara, both the shifting interests of the polity elite and local responses to these changes were reflected in the occupational history of the central pampa during the Late Formative. Further research addressing the scope of social and economic inequality will provide further insight into these relationships and, ultimately, will provide insight into the factors influencing the collapse of the Pukara polity. While previous frameworks have treated interpolity competition and environmental factors as likely catalysts for collapse (Stanish 2003), it may be more fruitful to explore the possibility that intrapolity conflict resulting from exclusionary

leadership strategies triggered the abandonment of Pukara after several hundred years of growth and development.

REFERENCES CITED

Adams, J. L.
2002 *Groundstone Analysis: A Technological Approach*. The University of Utah Press, Salt Lake City.

Alconini Mujica, S.
1995 *Rito, Símbolo, e Historia en la Pirámide de Akapana, Tiwanaku: Un análisis de cerámica ceremonial prehispánica*. Editorial Acción, La Paz, Bolivia.

Aldenderfer, M.S.
1989 Archaic Period in the South-Central Andes. *Journal of World Prehistory* 3(2):117-158.

1991 Continuity and Change in Ceremonial Structures at Late Preceramic Asana, Southern Peru. *Latin American Antiquity* 2(3):227-258.

1998 *Montane Foragers: Asana and the South-Central Andean Archaic*. University of Iowa Press, Iowa City.

Aldenderfer, M.S. (editor)
1993 *Domestic Architecture, Ethnicity, and Complementarity in the South-Central Andes*. University of Iowa Press, Iowa City.

Ames, K.M.
1995 Chiefly Power and Household Production on the Northwest Coast. In *Foundations of Social Inequality*, edited by T. D. Price and G. M. Feinman, pp. 155-187. Plenum Press, New York.

Arnold, J. (editor)
1996 *Emergent Complexity: The Evolution of Intermediate Societies*. International Monographs in Prehistory, Ann Arbor.

Ashmore, W. and A. B. Knapp (editors)
1999 *Archaeologies of Landscape: Contemporary Perspectives*. Blackwell Publishers, Malden, MA.

Bandelier, A.
1905 The Aboriginal Remains of Sillustani, Peru. *American Anthropologist* 7:48-69.

1910 *The Islands of Titicaca and Koati*. The Hispanic Society of America, New York.

Bandy, M. S.
1999 History of Investigations at the Site of Chiripa. In *Early Settlement at Chiripa, Bolivia: Research of the Taraco Archaeological Project*, edited by C. A. Hastorf, pp. 9-16. vol. 57. Contributions of the University of California Archaeological Research Facility, Berkeley.

2001 *Population and History in the Ancient Titicaca Basin.* Unpublished Ph.D. dissertation, University of California, Berkeley.

Bauer, B. S.
1999 The Early Ceramics of the Inca Heartland. *Fieldiana* Number 31.

Beck, R.
2004 *Platforms of Power: House, Community, and Social Change in the Formative Lake Titicaca Basin.* Unpublished Ph.D. dissertation, Northwestern University.

Bermann, M.
1994 *Lukurmata: Household Archaeology in Prehispanic Bolivia*. Princeton University Press, Princeton.

2003 The Archaeology of Households at Lukurmata. In *Tiwanaku and its Hinterland: Archaeology and Paleoecology of an Andean Civilization, Urban and Rural Archaeology*, edited by A. L. Kolata, pp. 327- 340. vol. 2. Smithsonian Institution Press, Washington and London.

Binford, M. and A. Kolata
1996 The Natural and Human Setting. In *Tiwanaku and its Hinterland: Archaeology and Paleoecology of an Andean Civilization*, edited by A. L. Kolata, pp. 23-56. vol. 1. Smithsonian Institution Press, Washington, D.C.

Blanton, R. E., G. M. Feinman, S. A. Kowalewski and P. N. Peregrine
1996 A Dual-Processual Theory for the Evolution of Mesoamerican Civilization. *Current Anthropology* 37(1):1-14.

Blinman, E.
1989 Potluck in the Protokiva: Ceramics and Ceremonialism in Pueblo I Villages. In *The Architecture of Social Integration in Prehistoric Pueblos*, edited by W. D. Lipe and M. Hegmon, pp. 113-124. Crow Canyon Archaeological Center, Cortez, Colorado.

Blitz, J.
1993 Big Pots for Big Shots: Feasting and Storage in a Mississippian Community. *American Antiquity* 58(1):80-96.

Bourdieu, P.
1977 *Outline of a Theory of Practice*. Cambridge University Press, New York.

Braun, D.
1983 Pots as Tools. In *Archaeological Hammers and Theories*, edited by A. S. Keene and J. A. Moore, pp. 107-134. Academic Press, New York.

Bray, T. (editor)
2003a *The Archaeology and Politics of Food and Feasting in Early States and Empires*. Kluwer/ Plenum, New York.

2003b To Dine Splendidly: Imperial Pottery, Commensal Politics, and the Inca State. In *The Archaeology and Politics of Food and Feasting in Early States and Empires*, edited by T. Bray, pp. 93-142. Kluwer/ Plenum, New York.

Bronk-Ramsey, C.
2003 OxCal Version 3.9. Oxford Radiocarbon Accelerator Unit, Oxford.

Browman, D. L.
1980 Tiwanaku Expansion and Altiplano Economic Patterns. *Estudios arqueológicos* 5:107-120.

Brumfiel, E. and J. Fox (editors)
1994 *Factional Competition and Political Development in the New World.* Cambridge University Press, Cambridge.

Brumfiel, E. M.
1995 Heterarchy and the Analysis of Complex Societies: Comments. In *Heterarchy and the Analysis of Complex Societies*, edited by R. M. Ehrenreich, C. L. Crumley and J. E. Levy, pp. 125-131. Archaeological Papers of the American Anthropological Association. vol. 6. American Anthropological Association, Arlington, Virginia.

Brumfiel, E. M. and T. K. Earle
1987 Specialization, Exchange, and Complex Societies: an Introduction. In *Specialization, Exchange and Complex Societies*, edited by E. M. Brumfiel and T. K. Earle, pp. 1-9. Cambridge University Press, Cambridge.

Burger, R. L., K. L. Mohr-Chávez and S. J. Chávez
2000 Through the Glass Darkly: Prehispanic Obsidian Procurement and Exchange in Southern Peru and Northern Bolivia. *Journal of World Prehistory* 14(3):267- 362.

Burns, T. and C. D. L. Jr.
1979 Ritual and Social Power. In *The Spectrum of Ritual: A Biogenetic Structural Analysis*, edited by E. G. d'Aquili, C. D. L. Jr. and J. McManus, pp. 249-279. Columbia University Press, New York.

Cardona, A.
2002 *Arqueología de Arequipa: de sus albores a los Incas*. CIARQ, Arequipa, Peru.

Carlevato, D.
1988 Late Ceramics from Pucara, Peru: An Indicator of Changing Site Function. *Expeditions* 30(3):39-45.

Chávez Ballón, M.
1950 Arqueología del sur andino. *Tradición* 1(2):41-48.

Chávez, S. J.
1988 Archaeological Reconnaissance in the Province of Chumbivilcas, South Highland Peru. *Expeditions* 30(3):27-38.

1992 *The Conventionalized Rules in Pucara Pottery Technology and Iconography: Implications of Socio- Political Development in the Northern Titicaca Basin.* Unpublished Ph.D. dissertation, Michigan State University.

2002 Identification of the Camelid Woman and Feline Man Themes, Motifs and Designs in Pucara Style Pottery. In *Andean Archaeology II: Art, Landscape, and Society*, edited by H. Silverman and W. H. Isbell, pp. 35-69. Kluwer/ Plenum, New York.

Chávez, S. J. and K. L. Mohr-Chávez
1975 A Carved Stela from Taraco, Puno, Peru, and the Definition of an Early Style of Stone Sculpture from the Altiplano of Peru and Bolivia. *Ñawpa Pacha* 13:45-84.

Cieza de León, P.
1959 [1553] *The Incas of Pedro de Cieza de León*. University of Oklahoma Press, Norman, OK.

Clark, J. E. and M. Blake
1994 The Power of Prestige: Competitive Generosity and the Emergence of Rank Societies in Lowland Mesoamerica. In *Factional Competition and Political Development in the New World*, edited by E. Brumfiel and J. Fox, pp. 17-30. Cambridge University Press, Cambridge.

Clark, J. E.
1995 Craft Specialization as an Archaeological Context. *Research in Economic Anthropology* 16:267-294.

2004 Early Ceremonial Centers, Leaders, and Communities. In *Mesoamerican Archaeology: Theory and Practice*, edited by J. A. Hendon and R. A. Joyce, pp. 43-72. Blackwell Publishing, Malden, MA.

Clark, J. E. and W. J. Parry
1990 Craft Specialization and Cultural Complexity. *Research in Economic Anthropology* 12:289-346.

Conklin, W. J.
1991 Tiahuanaco and Huari: Architectural Comparisons and Interpretations. In *Huari Administrative Structure: Prehistoric Monumental Architecture and State Government*, edited by W. H. Isbell and G. F. McEwan, pp. 281- 291. Dumbarton Oaks Research Library and Collection, Washington, DC.

Conklin, W. J. and M. E. Moseley
1988 The Patterns of Art and Power in the Early Intermediate Period. In *Peruvian Prehistory*, edited by R. W. Keatinge, pp. 145-163. Cambridge University Press, Cambridge.

Cook, A. G.
1994 *Wari y Tiwanaku: entre el estilo y la imágen*. Pontificia Universidad Católica del Perú, Fondo Editorial, Lima, Peru.

Costin, C. L.
1986 *From Chiefdom to Empire State: Ceramic Economy Among the Prehispanic Wanka of Highland Peru.* Unpublished Ph.D. dissertation, University of California, Los Angeles.

Costin, C. L. and M. B. Hagstrum
1995 Standardization, Labor Investment, Skill and the Organization of Ceramic Production in Late Prehispanic Highland Peru. *American Antiquity* 60(4):619-639.

Couture, N. C.
2002 *The Construction of Power: Monumental Space and Elite Residence at Tiwanaku, Bolivia.* Unpublished Ph.D. dissertation, University of Chicago.

2003 Ritual, Monumentalism, and Residence at Mollo Kontu, Tiwanaku. In *Tiwanaku and its Hinterland: Archaeology and Paleoecology of an Andean Civilization, Urban and Rural Archaeology*, edited by A. L. Kolata, pp. 202-225. vol. 2. Smithsonian Institution Press, Washington and London.

Crown, P. L.
2000 Women's Role in Changing Cuisine. In *Women and Men in the Prehispanic Southwest: Labor, Power and Prestige*, edited by P. L. Crown, pp. 221-266. SAR Press, Santa Fe, NM.

Crumley, C. L.
1995 Heterarchy and the Analysis of Complex Societies. In *Heterarchy and the Analysis of Complex Societies*, edited by R. M. Ehrenreich, C. L. Crumley and J. E. Levy, pp. 1-6. Archaeological Papers of the American Anthropological Association. vol. 6. American Anthropological Association, Arlington, Virginia.

D'Altroy, T. and T. K. Earle
1985 Staple Finance, Wealth Finance, and Storage in the Inka Political Economy. *Current Anthropology* 26:187-206.

D'Altroy, T. N.
2001 A View of the Plains from the Mountains: Comments on Uruk by an Andeanist. In *Uruk Mesopotamia and its Neighbors: Cross-Cultural Interactions in the Era of State Formation*, edited by M. S. Rothman, pp. 445-475. School of American Research Press and James Curry, Santa Fe and Oxford.

Dean, E. and D. Kojan
2001 Ceremonial Households and Domestic Temples: "Fuzzy" Definitions in the Andean Formative. In *Past Ritual and the Everyday*, edited by C. Hastorf, pp. 109-135. vol. 85. Kroeber Anthropological Society Papers, Berkeley, CA.

DeMarrais, E., L. J. Castillo and T. Earle
1996 Ideology, Materialization, and Power Strategies. *Current Anthropology* 37(1):15- 32.

Dietler, M.
1996 Feasts and Commensal Politics in the Political Economy: Food, Power, and Status in Prehistoric Europe. In *Food and the Status Quest: An Interdisciplinary Perspective*, edited by P. Weissner and W. Schiefenhovel, pp. 87-126. Berghahn Books, Oxford.

Dietler, M. and B. Hayden
2001 Feasts: Archaeological and Ethnographic Perspectives on Food, Politics, and Power. Smithsonian Institution Press, Washington and London.

Dietler, M. and I. Herbich
2001 Feasts and Labor Mobilization: Dissecting a Fundamental Economic Practice. In *Feasts: Archaeological and Ethnographic Perspectives on Food, Politics, and Power*, edited by M. Dietler and B. Hayden, pp. 240- 266. Smithsonian Institution Press, Washington and London.

Dobres, M.A. and J. Robb (editors)
2000 *Agency in Archaeology*. Routledge, London and New York.

Donley-Reid, L.
1990 A Structuring Structure: The Swahili House. In *Domestic Architecture and the Use of Space: An Interdisciplinary Cross-Cultural Study*, edited by S. Kent, pp. 114-126. Cambrige University Press, Cambridge.

Dornan, J. L.
2002 Agency and Archaeology: Past, Present, and Future Directions. *Journal of Archaeological Method and Theory* 9(4):303- 329.

Earle, T. (editor)
1991 *Chiefdoms: Power, Economy, and Ideology*. Cambridge University Press, Cambridge.

1997 *How Chiefs Come to Power: The Political Economy in Prehistory*. Stanford University Press, Stanford.

Eerkens, J. W.
2001 *The Origins of Pottery Among Late Prehistoric Hunter-Gatherers in California and the Western Great Basin.* Unpublished Ph.D. dissertation, University of California, Santa Barbara.

Erickson, C.
1988 Raised Field Agriculture in the Lake Titicaca Basin: Putting Ancient Agriculture Back to Work. *Expedition* 30(3):8-16.

2000 The Lake Titicaca Basin: A Precolumbian Built Landscape. In *Imperfect Balance: Landscape Transformations in the Precolumbian Americas*, edited by D. Lentz, pp. 311- 356. Columbia University Press, New York.

Feinman, G. M.

1995 The Emergence of Inequality. In *Foundations of Social Inequality*, edited by D.T. Price and G. Feinman, pp. 255-279. Plenum Press, New York.

1999 Rethinking our Assumptions: Economic Specialization at the Household Scale in Ancient Ejutla, Oaxaca, Mexico. In *Pottery and People: A Dynamic Interaction*, edited by J. M. Skibo and G. Feinman, pp. 81-98. University of Iowa Press, Salt Lake City.

2000 Dual-Processual Theory and Social Formations in the Southwest. In *Alternative Leadership Strategies in the Prehispanic Southwest*, edited by B. J. Mills, pp. 207- 224. University of Arizona Press, Tucson.

Feinman, G. M., K. G. Lightfoot and S. Upham

2000 Political Hierarchies and Organizational Strategies in the Puebloan Southwest. *American Antiquity* 65(3):449-470.

Feldman, R.

1989 The Early Ceramic Period of Moquegua. In *Ecology and Settlement in the Osmore Drainage, Peru*, edited by D. S. Rice, C. Stanish and P. Scarr, pp. 207-217. vol. 545 (2). BAR International Series, Oxford.

Flores-Ochoa, J. and A. M. Fries

1989 *Puna, Qheswa, Yunga: El hombre y su medio en Q'ero*. Colecciones Andinas.

Flores Ochoa, J. and M. P. Paz Flores

1983 La Agricultura en Lagunas del Altiplano. *Ñawpa Pacha* 21:127-152.

Franke, E.

1995 Ceramic Craft Specialization at Ch'iji Jawira, Tiwanaku: Organization and Technology. *Journal of the Steward Anthropological Society* 23(1 and 2):111-120.

Franquemont, E.

1986 The Ancient Pottery from Pucara, Peru. *Ñawpa Pacha* 24:1-30.

Giddens, A.
1984 *The Constitution of Society*. Polity, Cambridge Press.

Giesso, M.
2003 Stone Tool Production in the Tiwanaku Hinterland. In *Tiwanaku and its Hinterland: Archaeology and Paleoecology of an Andean Civilization, Urban and Rural Archaeology*, edited by A. L. Kolata, pp. 363-383. vol. 2. Smithsonian Institution Press, Washington and London.

Goldstein, P. S.
1993 House, Community, and State in the Earliest Tiwanaku Colony: Domestic Patterns and State Integration at Omo M12, Moquegua. In *Domestic Architecture, Ethnicity, and Complementarity in the South-Central Andes*, edited by M. Aldenderfer, pp. 25-41. University of Iowa Press, Iowa City.

2000 Exotic Goods and Everyday Chiefs: Long-Distance Exchange and Indigenous Sociopolitical Development in the South Central Andes. *Latin American Antiquity* 11(4):335-361.

2003 From Stew-Eaters to Maize-Drinkers: The *Chicha* Economy and the Tiwanaku Expansion. In *The Archaeology and Politics of Food and Feasting in Early States and Empires*, edited by T. Bray, pp. 143-172. Kluwer/ Plenum, New York.

Goldstein, P. S. and B. Owen
2001 Tiwanaku en Moquegua: Las Colonias Altiplanicas. In *Huari y Tiwanaku: Modelos vs. Evidencias (Segunda Parte)*, edited by P. Kaulicke and W. H. Isbell, pp. 139-168. vol. 5. Pontifica Universidad Catolica del Peru, Lima, Peru.

Goody, J.
1982 *Cooking, Class and Cuisine: A Study in Comparative Sociology*. Cambridge University Press, Cambridge.

Graffam, G.
1992 Beyond State Collapse: Rural History, Raised Fields, and Pastoralism in the South Andes. *American Anthropologist* 94(4):882-904.

Graves, W. M. and K. A. Spielmann
2000 Leadership, Long-Distance Exchange, and Feasting in the Protohistoric Rio Grande. In *Alternative Leadership Strategies in the Prehispanic Southwest*, edited by B. J. Mills, pp. 45-59. University of Arizona Press, Tucson.

Hagstrum, M. B.
1999 The Goal of Domestic Autonomy Among Highland Peruvian Farmer-Potters: Home Economics of Rural Craft Specialists. *Economic Anthropology* 20:265-298.

Hastorf, C.A. (editor)
1999 *Early Settlement at Chiripa, Bolivia: Research of the Taraco Archaeological Project*. vol. 57. Contributions of the University of California Archaeological Research Facility, Berkeley.

2003 Community with the Ancestors: Ceremonies and Social Memory in the Middle Formative at Chiripa, Bolivia. *Journal of Anthropological Archaeology* 22:305-332.

Hastorf, C. A. and M. S. Bandy
1999 Excavation Methodology and Field Procedures. In *Early Settlement at Chiripa, Bolivia: Research of the Taraco Archaeological Project*, edited by C. A. Hastorf, pp. 29-30. vol. 57. Contributions of the University of California Archaeological Research Facility, Berkeley.

Hayden, B.
1995 Pathways to Power: Principles for Creating Socioeconomic Inequalities. In *Foundations of Social Inequality*, edited by D. T. Price and G. M. Feinman, pp. 13-86. Plenum, New York.

2001 Fabulous Feasts: A Prolegomenon to the Importance of Feasting. In *Feasts: Archaeological and Ethnographic Perspectives on Food, Politics and Power*, edited by M. Dietler and B. Hayden, pp. 23-64. Smithsonian Institution Press, Washington and London.

Heron, C. and R. P. Evershed
1993 The Analysis of Organic Residues and the Study Pottery Use. *Archaeological Method and Theory* 5:247-284.

Hirth, K.
1993 The Household as an Analytic Unit: Problems in Method and Theory. In *Prehispanic Domestic Units in Western Mesoamerica*, edited by R. S. Santley and K. G. Hirth, pp. 21-36. CRC Press, Boca Raton.

1996 Political Economy and Archaeology: Perspectives on Exchange and Production. *Journal of Archaeological Research* 4(3):203- 239.

Hyslop, J.
1976 *An Archaeological Investigation of the Lupaqa Kingdom and its Origins*. Unpublished Ph.D. dissertation, Columbia University.

1990 *Inka Settlement Planning*. University of Texas Press, Austin.

Inojosa, J. M.
1940 Informe sobre los trabajos arqueológicos de la Misión Kidder en Pukara, Peru (enero a julio de 1939). *Revista del Museo Nacional* 9(1):128-142.

Janusek, J. W.
1994 *State and Local Power in a Prehispanic Andean Polity: Changing Patterns of Urban Residence in Tiwanaku and Lukurmata, Bolivia*. Unpublished Ph.D. dissertation, University of Chicago.

1999 Craft and Local Power: Embedded Specialization in Tiwanaku Cities. *Latin American Antiquity* 10(2):107-131.

2003a Vessels, Time and Society: Toward a Ceramic Chronology in the Tiwanaku Hinterland. In *Tiwanaku and its Hinterland: Archaeology and Paleoecology of an Andean Civilization, Urban and Rural Archaeology*, edited by A. L. Kolata, pp. 30-89. vol. 2. Smithsonian Institution Press, Washington and London.

2003b The Changing Face of Tiwanaku Residential Life. In *Tiwanaku and its Hinterland: Archaeology and Paleoecology of an Andean Civilization, Urban and Rural Archaeology*, edited by A. L. Kolata, pp. 264-295. vol. 2. Smithsonian Institution Press, Washington and London.

2004 Tiwanaku and Its Precursors: Recent Research and Emerging Perspectives. *Journal of Archaeological Research* 12(2):121- 183.

Joyce, A. A.
1997 Ideology, Power, and State Formation in the Valley of Oaxaca. In *Emergence and Change in Early Urban Societies*, edited by L. Manzanilla, pp. 133-168. Plenum Press, New York and London.

2000 Ideology, Power, and State Formation in the Valley of Oaxaca. In *Emergence and Change in Early Urban Societies*, edited by L. Manzanilla, pp. 133-168. Plenum Press, New York and London.

2004 Sacred Space and Social Relations in Oaxaca. In *Mesoamerican Archaeology: Theory and Practice*, edited by J. A. Hendon and R. A. Joyce, pp. 192-216. Blackwell Publishing, Malden, M.A.

Joyce, A. A. and M. Winter
1996 Ideology, Power, and Urban Society in Pre-Hispanic Oaxaca. *Current Anthropology* 37(1):33-47.

Joyce, R. A.
2004 Unintended Consequences? Monumentality As a Novel Experience in Formative Mesoamerica. *Journal of Archaeological Method and Theory* 11(1):5-29.

Junker, L.
1999 *Raiding, Trading, and Feasting: The Political Economy of Philippine Chiefdoms*. University of Hawai'i Press, Honolulu.

Kaulicke, P. and W. H. Isbell (editors)
2001 *Huari and Tiwanaku: Modelos vs. Evidencias*. Pontificia Universidad Católica del Peru, Lima, Peru.

Kelly, L.
2001 A Case of Ritual Feasting at the Cahokia Site. In *Feasts: Archaeological and Ethnographic Perspectives on Food, Politics, and Power*, edited by M. Dietler and B. Hayden, pp. 334- 367. Smithsonian Institution Press, Washington and London.

Kidder II, A.
1942 Preliminary Notes on the Archaeology of Pucara, Puno, Peru. *Actas y Trabajos Científicos de XXVII Congreso Internacional de Americanistas (Lima 1939)* 1:341-345.

1943 *Some Early Sites in the Northern Lake Titicaca Basin*. Peabody Museum of American Archaeology and Ethnography, Harvard University.

1948 The Position of Pucara in Titicaca Basin Archaeology. In *Reappraisal of Peruvian Archaeology*, edited by W. C. Bennett, pp. 87-89. Society for American Archaeology and the Institute of Andean Research, Menasha, WI.

1956a Digging in the Titicaca Basin. *University Museum Bulletin* 20(3):16-29.

1956b Archaeology in the Lake Titicaca Basin. *Philadelphia Anthropological Society Bulletin* 9(2):7-9.

Kidder, M. B.
1942 *No Limits but the Sky: The Journal of an Archaeologist's Wife in Peru*. Harvard University Press, Cambridge, MA.

Klarich, E. A. and N. Craig
2001 Geophysical Survey in the Lake Titicaca Basin: Uncovering Domestic Architecture at the Upper Formative Center of Pucara, Peru. Paper presented at the Society for American Archaeology 66th Annual Meeting, New Orleans, LA.

Klarich, E. A. and M. T. Seddon
1997 Tiwanaku Domestic Occupation of the Site of Chucaripupata, Isla del Sol, Bolivia. Paper presented at the 62nd Annual Meetings for the Society for American Archaeology.

Klink, C. and M. S. Aldenderfer
2004 A Projectile Point Chronology for the South-Central Andean Highlands. In *Advances in Titicaca Basin Archaeology*, edited by C. S. Stanish, A. Cohen and M. S. Aldenderfer, pp. 25-54. vol. 2. Cotsen Institute of Archaeology, Los Angeles.

Kolata, A.L.
1993 *The Tiwanaku: Portrait of an Andean Civilization*. Blackwell Publishing, Cambridge MA and Oxford UK.

Kolata, A. L. (editor)
1996 *Tiwanaku and its Hinterland: Archaeology and Paleoecology of an Andean Civilization*. Volume 1. Smithsonian Institution Press, Washington and London.

2003 *Tiwanaku and its Hinterland: Archaeology and Paleoecology of an Andean Civilization, Urban and Rural Archaeology*. Volume 2. Smithsonian Institution Press, Washington and London.

Lanning, E. P.
1967 *Peru Before the Incas*. Prentice Hall, Englewood Cliffs, N.J.

Le Count, L. J.
2001 Like Water for Chocolate: Feasting and Political Ritual among the Late Classic Maya at Xunantunich, Belize. *American Anthropologist* 103(4):935-953.

Lennstrom, H. A. and C. A. Hastorf
1995 Interpretation in Context: Sampling and Analysis in Paleoethnobotany. *American Antiquity* 60(4):701-721.

Lorandi, A. M.
1984 Soñocamayoc: Los Olleras del Inka en los Centros Manufactureros del Tucuma'n. *Revista del Museo de la Plata* 8:303- 327.

Low, S.
1995 Indigenous Architecture and the Spanish American Plaza in Mesoamerica and the Caribbean. *American Anthropologist* 97(4):748- 762.

Lumbreras, L. G.
1974 *The Peoples and Cultures of Ancient Peru*. Translated by B. J. Meggers. Smithsonian Institution Press, Washington D.C.

1981 *Arqueología de la America Andina*. Editorial Milla Batres, Lima.

Lumbreras, L. G. and H. Amat
1968 Secuencia Arqueológica del altiplano occidental de Titicaca. *37th International Congress of Americanists (1966)* 2:75-106.

Lynch, T.
1981 Current Research. *American Antiquity* 46(1):203-204.

Marcus, J. and K. Flannery
1996 *Zapotec Civilization: How Urban Society Evolved in Mexico's Oaxaca Valley*. Thames and Hudson, London and New York.

McGuire, R. H. and D. J. Saitta
1996 Although They Have Petty Captains, They Obey Them Badly: The Dialectics of Prehispanic Western Pueblo Social Organization. *American Antiquity* 61:197-216.

McRae, S. D.
1980 *Resource Allocation Alternatives in an Andean Herding System: A Simulation Approach*. Discussions in Environmental Health Planning. Environmental Health Planning Training Program and the Program in Urban and Regional Studies, Cornell University, Ithaca, New York.

Menzel, D., J. H. Rowe and L. E. Dawson
1964 *The Paracas Pottery of Ica: A Study in Style and Time*. University of California Publications in American Archaeology and Ethnology 50. University of California Press, Berkeley and Los Angeles.

Mills, B. J. (editor)
2004 *Identity, Feasting and the Archaeology of the Greater Southwest*. University Press of Colorado, Boulder.

2000a *Alternative Leadership Strategies in the Prehispanic Southwest*. University of Arizona Press, Tucson.

Mills, B. J.
1999 Ceramics and the Social Contexts of Food Consumption in the Northern Southwest. In *Pottery and People: A Dynamic Interaction*, edited by J. M. Skibo and G. Feinman, pp. 99-114. University of Iowa Press, Salt Lake City.

2000b Alternative Models, Alternative Strategies. In *Alternative Leadership Strategies in the Prehispanic Southwest*, edited by B. J. Mills, pp. 3-18. University of Arizona Press, Tucson.

Mohr-Chávez, K.L.
1977 *Marcavalle: The Ceramics from an Early Horizon Site in the Valley of Cuzco, Peru, and Implications for South Highland Socioeconomic Interaction.* Unpublished Ph.D. dissertation, University of Pennsylvania.

1985 Early Tiahuanco-Related Ceremonial Burners from Cuzco, Peru. *Dialogo Andino* 4:137-178.

1987 Traditional Pottery of Raqch'i, Cuzco, Peru: A Preliminary Study of its Production, Distribution, and Consumption. *Ñawpa Pacha* 22-23(1984-1985):161-210.

1988 The Significance of Chiripa in Lake Titicaca Basin Developments. *Expeditions* 30(3):17-26.

Moore, J. D.
1989 Pre-Hispanic Beer in Coastal Peru: Technology and Social Context of Prehistoric Production. *American Anthropologist* 91(3):682-695.

1996a *Architecture and Power in the Ancient Andes: The Archaeology of Public Buildings*. New Studies in Archaeology. Cambridge University Press.

1996b The Archaeology of Plazas and the Proxemics of Ritual: Three Andean Traditions. *American Anthropologist* 98(4):789-802.

Moore, K. M.
1999 Chiripa Worked Bone and Bone Tools. In *Early Settlement at Chiripa, Bolivia: Research of the Taraco Archaeological Project*, edited by C. Hastorf, pp. 73- 93. vol. 57. Contributions of the University of California Archaeological Research Facility, Berkeley.

Moore, K. M., D. Steadman and S. de France
1999 Herds, Fish and Fowl in the Domestic and Ritual Economy of Formative Chiripa. In *Early Settlement at Chiripa, Bolivia: Research of the Taraco Archaeological Project*, edited by C. Hastorf, pp. 104-116. vol. 57. Contributions of the University of California Archaeological Research Facility, Berkeley.

Mujica, E.
1978 Nueva Hipótesis sobre el desarrollo temprano del altiplano, del Titicaca y de sus áreas de interacción. *Arte y Arqueología 5*-6:285- 308.

1979 Excavaciones en Pucara, Peru. *Arqueologia Peruana*:184-197.

1985 Altiplano-Coast Relationships in the South-Central Andes: From Indirect to Direct Complementarity. In *Andean Ecology and Civilization*, edited by S. Masuda, I. Shimada and C. Morris, pp. 103-140. University of Tokyo Press, Tokyo.

1987 Cusipata: una fase pre-Pukara en la cuenca norte del Titicaca. *Gaceta Arqueológica Andina* 4(13):22-28.

1988 Peculiaridades del proceso histórico temprano en la cuenca norte del Titicaca: una propuesta inicial. *Boletín del laboratorio de arqueología* 2:75-122.

1991 Pukara: Una sociedad compleja temprana en la cuenca norte de Titicaca. In *Los Incas y El Antiguo Peru: 3000 Años de Historia*, pp. 272-297. Tomo 1. Sociedad Estatal Quinto Centenario, Madrid.

1996 La Pirámide Qalasaya. *Medio de Construcción* 120:18-23.

Muller, J.
1997 *Mississippian Political Economy*. Plenum Press, New York and London.

Murra, J. V.
1975 *Formaciones económicas y políticas del mundo andino*. 1. ed. Historia andina; Instituto de Estudios Peruanos, Lima.

Nelson, B.
1995 Complexity, Hierarchy, and Scale: A Controlled Comparison Between Chaco Canyon, New Mexico, and La Quemada, Zacatecas. *American Antiquity* 60(4):597-618.

Ortner, S. B.
1984 Theory in Anthropology Since the Sixties. *Society for Comparative Study of Society and History* 26(1):126-166.

Palacios-Rios, F.
1988 Bilateralidad y Propiedad en Una Comunidad de Pastores. In *Llamichos y Paqocheros*, edited by J. Flores Ochoa, pp. 179-190. Editoria Universitaria, Cuzco, Peru.

Paredes, R.
1985 *Excavaciones Arqueológicas en Pukara, Puno.* Tesis de Licenciatura, La Universidad Nacional San Antonio Abad del Cuzco.

Pauketat, T. R., L. S. Kelly, G. J. Fritz, N. H. Lopinot, S. Elias and E. Hargrave
2001 The Residues of Feasting and Public Ritual at Cahokia. *American Antiquity* 67(2):257-279.

Pearsall, D. M.
2000 *Paleoethnobotany: A Handbook of Procedures*. 2nd ed. Academic Press, San Diego.

Pereira-Herrera, D. M., R. S. Rocha and D. Brokington
2001 Investigaciones del Proyecto Arqueologico Formativo en Cochabamba, Bolivia. In *El Periodo Formativo en Bolivia: Regiones y Sociedades*, edited by C. Rivera-Casanovas, M. R. M. Lopez and J. M. C. Flores, pp. 167- 182. Textos Antropologicos. vol. 13 (Numbers 1 and 2). Universidad Mayor de San Andres, La Paz, Bolivia.

Potter, J. M.
2000 Pots, Parties and Politics: Communal Feasting in the American Southwest. *American Antiquity* 65(3):471- 492.

Potter, J. M. and E. M. Perry
2000 Ritual as a Power Resource in the American Southwest. In *Alternative Leadership Strategies in the Prehispanic Southwest*, edited by B. J. Mills, pp. 60-78. University of Arizona Press, Tucson.

Price, T. D. and G. M. Feinman (editors)
1995 *Foundations of Social Inequality*. Plenum Press, New York and London.

Ralph, E.
1959 University of Pennsylvania Radiocarbon Dates III. *American Journal of Science Radiocarbon Supplement* 1:45-58.

Renfrew, C.
1974 Beyond a Subsistence Economy: The Evolution of Social Organization in Prehistoric Europe. In *Reconstructing Complex Societies: An Archaeological Colloquium*, edited by C. B. Moore, pp. 69-95. Supplement to the Bulletin of the American Schools of Oriental Research, Cambridge, MA.

Rice, D. S.
1993 The Making of Latin American Horizons: An Introduction to the Volume. In *Latin American Horizons*, edited by D. S. Rice, pp. 1-14. Dumbarton Oaks Research Library and Collections, Washington, D.C.

Rice, P. M.
1987 *Pottery Analysis: A Sourcebook*. The University of Chicago Press, Chicago and London.

Rivera, C. S.
1994 *Ch'iji Jawira: evidencias sobre la producción de cerámica en Tiwanaku.* Unpublished M.A. thesis, Universidad Mayor de San Andrés, La Paz, Bolivia.

2003 Ch'iji Jawira: A Case of Ceramic Specialization. In *Tiwanaku and its Hinterland: Archaeology and Paleoecology of an Andean Civilization, Urban and Rural Archaeology*, edited by A. L. Kolata. vol. 2. Smithsonian Institution Press, Washington and London.

Roddick, A.
2002 *Archaeological Approaches to Ritual in the Andes: Ceramic Analysis of Ceremonial Space at the Formative Period Site of Chiripa, Bolivia.* Unpublished M.A. thesis, University of British Columbia.

Rose, C. E.
2001 *Household and Community Organization of a Formative Period, Bolivian Settlement.* Unpublished Ph.D. dissertation, University of Pittsburgh.

Rowe, J. H.
1942 Sitios históricos en la región de Pucara, Puno. *Revista del Instituto Arqueológico* 6(10/11):66-75.

1956 Archaeological Explorations in Southern Peru, 1954-1955. *American Antiquity* XXII(2):135-151.

1960 Cultural Unity and Diversification in Peruvian Archaeology. Paper presented at the Man and Cultures: Selected Papers of the Fifth International Congress of Anthropological and Ethnological Science, Philadelphia.

1962 Stages and Periods in Archaeological Interpretation. *Southwestern Journal of Anthropology* 18(1):40-54.

1963 Urban Settlements in Ancient Peru. *Ñawpa Pacha* 1:1-26.

Rowe, J. H. and C. T. Brandel
1971 Pucara Style Pottery Designs. *Ñawpa Pacha* 7-8 (1969-1970):1-16.

Rye, O. S.
1981 *Pottery Technology: Principles and Reconstruction*. Taraxacum, Inc., Washington, D.C.

Schiffer, M. B.
1987 *Formation Processes of the Archaeological Record*. University of New Mexico Press, Albuquerque.

Seddon, M. T.
1998 *Ritual, Power, and the Development of a Complex Society: The Island of the Sun and the Tiwanaku State.* Unpublished Ph.D. dissertation, University of Chicago.

Shepard, A. O.
1956 *Ceramics for the Archaeologist*. Carnegie Instititon of Washington, Washington.

Shimada, I. (editor)
1994 *Tecnología y Organización de la Producción de Cerámica Prehispánica en los Andes*. Pontificia Universidad Católica del Peru, Lima.

Sillar, B.
2000 *Shaping Culture: Making Pots and Constructing Households: An Ethnoarchaeological Study of Pottery Production, Trade and Use in the Andes*. BAR International Series 883. Hadrian Books, Oxford.

Skibo, J. M.
1992 *Pottery Function: A Use-Alteration Perspective*. Plenum Press, New York.

Smith, A.
2003 *The Political Landscape: Constellations of Authority in Early Complex Polities*. University of California Press, Berkeley.

Smith, M.
1987 Household Possessions and Wealth in Agrarian States: Implications for Archaeology. *Journal of Anthropological Archaeology* 6:297-335.

Smith, M. L.
2003a *The Social Construction of Ancient Cities*. Smithsonian Books, Washington and London.

2003b Introduction: The Social Construction of Cities. In *The Social Construction of Ancient Cities*, edited by M. L. Smith, pp.1-36. Smithsonian Books, Washington and London.

Spurling, G. E.
1992 *The Organization of Craft Production in the Inka State: The Potters and Weavers of Milliraya (Peru)*. Unpublished Ph.D. dissertation, Cornell University.

Squier, E. G.
1973[1877] *Peru: Incidents of Travel and Exploration in the Land of the Incas*. introduction by Gordon R. Willey ed. AMS Press, New York.

Stanish, C. S.
1994 Hydraulic Hypothesis Revisited: Lake Titicaca Basin Raised Fields in Theoretical Perspective. *Latin American Antiquity* 5(4):312-332.

2003 *Ancient Titicaca: The Evolution of Complex Society in Southern Peru and Northern Bolivia*. University of California Press, Berkeley and Los Angeles.

Stanish, C. S., E. de la Vega M., L. Steadman, C. C. Justo, K. L. Frye, L. O. Mamani, M. T. Seddon and P. C. Chuquimia
1997 Archaeological Survey in the Juli-Desaguadero Region of Lake Titicaca Basin, Southern Peru. *Fieldiana* 29 (Publication 1488).

Stanish, C. S. and L. H. Steadman
1994 Archaeological Research at Tumatumani, Juli, Peru. *Fieldiana Anthropology* 23.

Steadman, L. H.
1995 *Excavations at Camata: an Early Ceramic Chronology for the Western Titicaca Basin, Peru.* Unpublished Ph.D. dissertation, University of California, Berkeley.

Stevenson, I. N.
1974 *Andean Village Technology*. Pitt Rivers Museum and Department of Ethnology and Prehistory, Oxford.

Torres, C.
2001 Iconografia Tiwanaku en la Parafernalia Inhalatoria de los Andes Centro-Sur. In *Huari y Tiwanaku: Modelos vs. Evidencias (Segunda Parte)*, edited by P. Kaulicke and W. H. Isbell, pp. 427- 454. Pontifica Universidad Catolica del Peru, Lima, Peru.

Trigger, B. G.
1990 Monumental Architecture: A Thermodynamic Explanation of Symbolic Behaviour. *World Archaeology* 22(2):119-132.

Troll, C. (editor)
1968 *Geo-Ecology of the Mountainous Regions of the Tropical Americas*. Ferd. Dummlers Verlag, Bonn.

Trubitt, M. B.
2000 Mound Building and Prestige Goods Exchange: Changing Strategies in the Cahokia Chiefdom. *American Antiquity* 65(4):669-690.

Tschopik Jr., H.
1950 An Andean Ceramic Tradition in Historical Perspective. *American Antiquity* 3:196-218.

Tschopik, M. H.
1946 Some Notes on the Archaeology of the Department of Puno, Peru. Papers of the Peabody Museum of American Archaeology and Ethnology 27 (3).

Valcárcel, L.E.
1925 Informe sobre la exploración arqueológica de Pukara. *Revista Universitaria del Cuzco* 15(48):14-21.

1932 El personaje mítico de Pukara. *Revista del Museo Nacional* 1:18-30.

1935 Litoesculturas y cerámica de Pukara. *Revista del Museo Nacional* 4(1):25-28.

Van Keuren, S.
2000 Ceramic Decoration as Power: Late Prehistoric Design Change in East-Central Arizona. In *Alternative Leadership Strategies in the Prehispanic Southwest*, edited by B. J. Mills, pp. 79- 94. University of Arizona Press, Tucson.

Vidal de Milla, D.
2000 *El Arte Textíl en los Andes Surperuanos*. Cervesur, Cuzco, Peru.

Vokral, E. V.
1991 *Qoñi-Chiri: La organización de la cocina y estructuras simbólicas en el Altiplano del Peru*. COTESU, Quito, Ecuador.

Wallace, D.
1957 *The Tiahuanaco Horizon Style in the Peruvian and Bolivian Highlands*. Unpublished Ph.D. Dissertation, University of California.

Webster, A. D. and J. W. Janusek
2003 Tiwanaku Camelids: Subsistence, Sacrifice and Social Reproduction. In *Tiwanaku and its Hinterland: Archaeology and Paleoecology of an Andean Civilization, Urban and Rural Archaeology*, edited by A. Kolata, pp. 343- 362. vol. 2. Smithsonian Institution Press, Washington and London.

Weismantel, M.
1988 *Food, Gender and Poverty in the Ecuadorian Andes*. University of Pennsylvania Press, Philadelphia.

Wheeler, J. and E. Mujica
1981 *Prehistoric Pastoralism in the Lake Titicaca Basin, Peru (1979-1980 Field Season)*. Submitted to Report submitted to the National Science Foundation.

Winterhalder, B. P. and R. B. Thomas
1978 *Geoecology of Southern Highland Peru: A Human Adaptation Perspective*. University of Colorado Institute of Arctic and Alpine Research.

Yaeger, J.
2003 Untangling the Ties that Bind: The City, The Countyside, and the Nature of Maya Urbanism at Xunantunich, Belize. In *The Social Construction of Ancient Cities*, edited by M. L. Smith, pp. 121-155. Smithsonian Books, Washington and London.

Yoffee, N.
1993 Too Many Chiefs? (Or, Safe Texts for the 90s). In *Archaeological Theory: Who Sets the Agenda*, edited by N. Yoffee and A. Sherratt, pp. 60-78. Cambridge University Press, Cambridge and New York.

APPENDICES

Appendix 1: Radiocarbon data from the Pukara 2001 excavations and regional Late Formative contexts

Lab ID	MATERIAL	DC_13 VALUE	Radiocarbon Years BP	Calibrated Age (2 sigma)	Context	Code
AA51767	wood charcoal	-21.9	2016±33	110 BC- AD 80	Bl1-Feature 21; hearth	C-0056
AA51768	wood charcoal	-23.1	2101±73	260 BC- AD 60 (81.8%) & 360- 270 BC (13.6%)	Bl2-Feature 29; hearth	C-0068
AA51769	wood charcoal	-23.6	1889±40	AD 20- AD 240	Bl3-Feature 6; hearth	C-0042
AA51770	wood charcoal	-23.9	1917±33	AD- AD 180 (92.5%) & AD 190- AD 220 (2.9%)	Bl2- occupation surface 1	C-0011
AA51771	wood charcoal	-24.2	2120±38	240 BC- 40 BC (87.2%) & 360- 300 BC (8.2%)	Bl3-Feature 10; clay patch	C-0017
AA51772	wood charcoal	-22.6	2001±37	100 BC- AD 90	Bl1-Feature 27; midden	C-0062
AA57008	wood charcoal	-23.48	2042±34	170 BC- AD 30 (93.4%) & AD 40- AD 60 (2%)	Bl1-fill; between contexts	C-0071
AA57009	wood charcoal	-24.9	2049±42	180 BC- AD 60	Bl1-Feature 16; midden	C-0043
AA57010	wood charcoal	-24.3	2024±34	120 BC- AD 70	Bl3-Feature 5; pit Feature	C-0035
AA57011	wood charcoal	-24.3	2012±31	100 BC- AD 80	Bl1-wall construction; same level as Feature 21	C-0065
AA57012	wood charcoal	-23.5	2016±34	110 BC- AD 80	Bl3-Feature 15; midden	C-0040
AA57013	wood charcoal	-22.5	1976±31	50 BC- AD 90 (92.9%) & AD 100- 120 (2.5%)	Bl3-Feature 11; pit of clay chunks	C-0018
AA57014	wood charcoal	-21.78	1981±35	50 BC- AD 90 (92.4%) & AD 100- 120 (3%)	Bl2-SW midden; occupation zone 2	C-0034
AA57015	wood charcoal	-25.1	2072±33	180 BC- AD 10	Bl2-occupation zone 1	C-0027
AA57016	wood charcoal	-23.69	2021±33	120 BC- AD 70	Bl3-Feature 4; fill in bowl in Colla burial	C-0006

Steadman 1995: 541-542 (Camata)						
9385	charred food		2800±60	1130- 820 BC	4/22- Initial Pucara	
9449	charred food		2210±60	400- 110 BC	2/9- Initial Pucara	
9393	charcoal		2190±50	390- 110 BC	4/20- Pucara 1	
9387	charcoal		2160±70	390- 40 BC	4/19- Pucara 1	
9392	charcoal		2020±60	180 BC- AD 90 (92.9%) & AD 100- 130 (2.5%)	4/12- Pucara 2	
9394	charcoal		2070±60	350- 320 BC (3%) & 210 BC- AD 70 (92.4%)	4/10- Pucara 2	
9381	charred food		1920±40	AD- AD 220	4/5- Late Pucara	
9383	charred food		1760±60	AD 130- 160 (1.5%), AD 170- 200 (2%) & AD 210- 390 (91.9%)	4/4- Late Pucara	
Mohr-Chávez 1977: 1144 (Qaluyu)						
			1942 ±52	50 BC- AD 220	Pucara level	
Kidder 1955 in Ralph 1959: 57 (Pukara)						
P-152	wood charcoal		2101±108	400 BC- AD 150	Classic Pucara midden	Pu-A1
P-153	wood charcoal		2041±107	400 BC- AD 250	Classic Pucara midden	Pu-A5/6
P-154	wood charcoal		1847±106	100 BC- AD 450	Classic Pucara midden	Pu-A3
P-170	wood charcoal		2032±106	400 BC- AD 250	Classic Pucara midden	Pu-A2
P-172	wood charcoal		2040±109	400 BC- AD 250	Classic Pucara midden	Pu-A4
P-217	wood charcoal		1960±90	200 BC- AD 350	Classic Pucara midden	Pu-A3
Mujica 1985: 123 (Pukara/ Qalasaya)						
Beta 3430			1570±100	AD 250- 660	latest Pucara dates	
Beta 3428			1790±90	AD 20- 430	latest Pucara dates	

Appendix 2: Late Formative contexts organized by block and occupation

LOCUS	LITERS	CERAMICS		LITHICS		BONE	
		count	weight	count	weight	count	weight
BLOCK 1			(grams)		(grams)		(grams)
906 [F.27]	272	281	1593.4	46	819.3	852	3291.90
F.25							
794	56	8	71.9	3	1.6	16	73.80
795	77	39	401	20	107.2	184	1022.10
797	24	12	117	1	14.5	33	203.30
798	104	50	541.4	12	63.2	142	723.60
	261	**109**	**1131.30**	**36**	**186.50**	**375**	**2022.80**
793 [F.23]	41	1	15.73	8	17.4	10	54.30
796 [F.24]	120	54	616	8	59	156	575.00
901 [F.22]	19	2	6.4	2	4.9	36	77.10
F.16-1							
737	10	11	119.50	0	0	65	166.90
738	29	24	161.50	6	11.90	98	121.00
739	37	40	354.20	7	36.80	162	521.50
740	69	70	470.40	21	136.40	388	646.60
741	73	55	423.50	15	13.20	190	283.40
742	80	114	692.70	32	46.50	464	661.60
743	52	113	704.70	9	30.6	246	305.50
744	96	155	1185.90	24	145.90	439	522.20
F.16-2							
761	71	36	191.3	13	42.5	88	95.40
762	39	22	199.40	7	10.20	84	279.80
763	64	39	249.60	7	10.60	101	215.70
764	48	62	392.60	11	106.80	113	145.90
765	8	10	164.1	9	14.00	47	166.30
766	40	61	700.8	10	134.90	214	451.40
767	37	67	597.6	10	74.4	204	357.90
768	73	46	375.6	4	22.00	174	307.20
F.16-3							
781	24	12	117.5	2	20.00	32	138.40
782	75	5	35.9	5	14.10	20	37.20
783	96	16	98.5	5	12.60	56	98.80
784	86	74	429.2	37	91.80	223	349.50
785	21	0	0	2	2.60	7	26.50
786	72	26	352.3	10	29.50	91	342.20
787	70	48	360.4	10	14.30	110	498.60
788	113	70	599.7	12	21.60	262	674.80
F.16-4							
759	34	1	11.8	1	12.20	0	0
760	59	23	159.2	8	105.90	25	29.60

780	110	2	17.4	2	56.00	21	40.50
F.16/ASD6							
914	68	21	139.50	6	29.60	65	84.70
	1654	**1223**	**9304.80**	**285**	**1246.90**	**3989**	**7569.10**
FE 7							
789	104	3	11.3	1	1	15	43.1
907	*1112*	7	36.2	10	8.00	37	44.60
	1216	**10**	**47.5**	**11**	**9**	**52**	**87.7**
OZ 5							
779	144	16	100.5	1	0.3	89	173
904	953	26	165.4	15	9.3	122	380.4
	1097	**42**	**265.9**	**16**	**9.6**	**211**	**553.4**
Informal midden pit							
905	112	5	45.3	4	1.7	10	173.10
FE 4							
673	151	26	142.7	9	38.7	12	14.00
674	96	50	311.6	10	61.5	47	43.60
675	120	29	242.1	7	86.1	72	57.50
676	57	49	304.8	10	47.7	125	79.60
677	93	25	120.1	8	33.2	78	62.50
682	26	10	87.7	4	8.6	36	28.50
683	24	12	82	2	7.5	52	51.90
684	24	13	30.3	3	3.2	70	90.10
687	140	20	160.6	14	53.4	35	57.60
699	48	24	176.7	6	9.50	30	71.70
713	56	47	229.8	24	97.70	52	82.50
721	107	45	246.3	13	66.80	104	104.00
722	17	1	7.2	1	1.30	7	12.90
725	24	10	54	2	8.00	38	38.50
726	16	15	65.5	3	7.80	34	48.60
727	72	40	190	5	38.90	64	73.40
728	68	82	440.1	24	129.20	176	174.90
732	54	32	173.3	6	40.00	11	16.20
734	72	27	229.6	6	12.50	60	90.20
736	24	4	27.5	0	0	9	8.00
747	52	20	132.9	5	11.90	90	237.00
748	136	59	444.3	6	2.50	48	73.10
749	40	28	195.2	1	1.00	27	50.50
758	93	21	152.3	4	88.60	10	7.80
	1610	**689**	**4246.6**	**173**	**855.6**	**1287**	**1574.6**
FE 6							
773	104	34	137.1	4	2.7	85	82.90
776	57	20	96.9	3	2.8	79	100.50
799	296	67	317.2	20	21	266	346.70
903	264	61	361.5	8	6.8	165	418.40

	721	**182**	**912.7**	**35**	**33.3**	**595**	**948.5**
FE4/6	**2331**	**871**	**5159.3**	**208**	**888.9**	**1882**	**2523.1**
FE 4/ wall fill [under ASD6]							
913	136	67	507.8	13	86.90	160	218.3
FE 4? R. 16?							
729	93	114	477.4	14	192.8	170	132.10
730	94	114	502.8	16	111.7	208	158.6
	323	**295**	**1488**	**43**	**391.4**	**538**	**509**
OZ 4							
771	64	52	265.5	82	51.20	105	141.60
790	742	192	943.5	273	174.00	552	992.70
	806	**244**	**1209**	**355**	**225.2**	**657**	**1134.3**
791 [F.21]	21	all flot					
800 [F.26]	small	0	0	3	14	6	13.60
909 [F.26]	17	1	4.5	1	1.4	6	16.70
FE 5							
770	144	62	317.4	8	4	181	203.10
777	704	280	1528	59	109	684	1061.30
	848	**342**	**1845.4**	**67**	**113**	**865**	**1264.4**
OZ 3							
750	58	32	272.5	2	5.7	17	22.5
751	48	13	85.4	1	1.4	20	40.4
752	80	37	464.9	1	0.8	39	112
753	26	19	312.1	2	3.5	42	n.a.
756	32	24	156.8	4	34.8	22	41.9
757	105	41	297.2	4	3.60	79	64.70
775	136.5	95	619	16	131.20	334	501.12
	485.5	**261**	**2207.9**	**30**	**181**	**553**	**782.62***
769 [F.18]	47.5	141	1051.3	28	63.4	1292	2336.50
733 [F.19]	1.5	6	164.2	0	0	0	0
778 [F.20]	17.5	34	510.70	6	3.6	183	602.80
wall fall/ wall trench							
735	38	2	5.1	0	0	5	2.2
686	100	14	56.6	6	3	6	1.3
731	44.5	17	98.3	7	7.5	7	5.1
745	36	24	387.2	2	30.5	17	31.2
746	32	14	75	6	65.4	31	81.5
772	66.5	36	279.2	7	6.3	88	91.8
774	52	6	49.7	3	2.8	44	81.00
WF 2/ FE 4							
678	89	117	793.1	19	71.2	n.a.	16.40
WF 2/ wall fill [exposing base of ASD 6]							
667	16	4	12.70	2	6.40	9	11.40
668	24	10	40.90	4	22.60	8	16.20
669	32	13	44.10	5	44.40	24	14.40

ASD2/ ASD6 fill- mixed							
911	24	3	17.3	3	40.1	23	30.6

	LITERS	CERAMICS		LITHICS		BONE	
BLOCK 2		**count**	**weight**	**count**	**weight**	**count**	**weight**
OS 1							
431	59	15	47.30	3	74.50	15	13.70
441	26	4	24.80	2	2.10	15	14.40
442	128	7	61.40	0	0	18	54.40
444	182	12	108.80	2	40.20	10	24.50
445	16	2	6.70	0	0	17	8.40
447	86	4	28.50	0	0	7	2.10
449	300	26	162.3	4	138.80	59	87.20
450	86	12	35.3	4	41.1	46	21.90
451	118	1	14.2	4	12.10	7	9.70
452	29	1	4.5	1	3.00	5	2.00
453	30	1	3.50	2	2.70	12	20.60
454	88	6	49.9	6	14.1	9	61.2
	1148	**91**	**547.2**	**28**	**328.6**	**220**	**320.1**
OS 1 (just above surface)							
195	2	17	82.20	0	0	1	0.30
410	64	9	124.50	6	9.00	9	10.20
433	28	9	106.70	2	7.40	8	5.90
434	57	11	41.60	2	8.30	8	7.80
461	78	28	273.90	6	16.20	27	21.10
480	96	32	655.50	7	8.50	31	23.20
485	70	9	65.10	2	29.10	12	11.30
487	66	8	47.50	2	6.20	16	12.90
489	87	13	85.7	1	0.5	29	16.7
	548	**136**	**1482.7**	**28**	**85.2**	**141**	**109.4**
OZ 1							
448	27	6	19.50	3	4.20	14	14.10
455	45	15	94.10	8	12.60	33	53.10
456	88	64	475.60	5	10.00	68	105.20
458	136	49	312.90	14	47.20	64	69.00
460	224	54	194.00	8	53.3	65	43.60
463	51	19	182.40	0	0	30	18.10
465	136	52	175.60	8	9.2	82	130.80
466	71	9	64.9	4	9.70	26	25.20
467	395	36	311.9	3	168.50	65	140.70
469	40	7	58.2	1	7.00	45	23.20
470	65	13	90.9	3	55.2	11	21.90
472	122	6	78	6	66.4	18	38.80
473	254	83	568.2	10	31.6	178	507.4

475	67	13	90.20	3	55.60	10	19.60
490	184	59	403.60	9	34.10	128	353.2
492	86	12	57.2	2	1.3	60	64.1
495	86	14	69.1	2	2.9	58	116.8
496	126	28	186.7	3	9.7	91	162.6
498	142	n.a.	n.a.	3	12.2	282	552.4
832	163	28	244.60	3	56.00	75	199.20
834	158	37	342.1	2	148	66	219.3
837	226	45	356.3	13	194.3	126	443.7
840	42	10	95.3	1	0.9	7	9.2
841	174	34	280	4	37.6	138	268.3
844	98	36	215.7	5	39.3	159	443
851	46	7	56.1	0	0	9	20.3
855	88	12	83.7	7	47.7	32	47.3
857	89	26	200	8	55.8	95	163.9
860	175	26	192.6	6	121.8	97	233.9
862	98	20	187.6	4	24.4	25	53.9
864	89	51	623	4	25.9	201	580.4
867	31	9	84.6	2	10.60	28	42.30
868	73	44	255.5	19	59.6	161	330.7
872	68	16	128.2	2	17.5	28	63.8
874	68	24	198.10	4	409.4	86	199.9
875	32	5	27.10	3	18.60	46	53.00
883	150	37	389.4	13	60.4	152	243.6
	4213	**1006**	**7392.90**	**195**	**1918.5**	**2859**	**6075.5**
F. 28							
881	0.6	0	0	0	0	0	0.00
882	0.4	1	12.3	2	0.7	4	39.00
F. 7							
177	32	2	5.2	1	1.4	9	14.60
178	11	1	13.2	0	0	3	2.40
179	10	7	n.a.	2	10.2	1	0.70
199	1.6	0	0	0	0	0	0.00
847	8	1	30.3	4	0.4	2	1.5
F. 9							
486	13	5	33	0	0	4	4.4
OZ 1/2 (transition)							
871	144	16	106.5	7	25.1	106	174.4
876	62	39	525 [+n.a.]	3	19.8	75	212.4
877	60	19	101.1	4	18.6	58	135.5
	266	**74**	**n.a.**	**14**	**63.5**	**239**	**522.3**
OZ 2							
859	90	45	370.5	11	49.5	258	506.5
861	102	35	266.7	5	22.2	78	213

866	54	4	49.4	2	91.6	14	32.4
878	54	19	152.1	2	16.1	46	102.5
880	102	44	482.2	8	174	94	341.2
885	30	8	61.1	6	46	58	67.2
887	102	154	2180.4	6	7.7	181	452.5
888	114	35	578.9	12	55.2	61	272.5
890	89	24	309.6	7	24.1	63	290.1
	737	**368**	**4450.9**	**59**	**486.4**	**853**	**2277.9**
OZ 2 (lens)							
869	66	49	264.9	8	15.5	167	417.5
	803	**417**	**4715.8**	**67**	**501.9**	**1020**	**2695.4**
OS2							
870	66	45	478.3	3	36.9	62	213.90
886	30	35	99.3	3	7.2	24	31.20
	96	**80**	**577.6**	**6**	**44.1**	**86**	**245.1**
F. 29							
892	54	4	62.9	4	20.2	20	125.50
893	12	0	0	0	0	0	0.00
894	26	8	98	0	0	10	18.20
carbon pit	n.a.	0	0	0	0	0	0.00
863	90	34	271.8	16	232.1	102	332.30
865	12	4	95.8	0	0	8	26.50
SW Midden							
491	101	56	578.8	6	34.8	187	603.1
SW Midden (uppermost lens)				0	0	0	0
497	88	145	1864.4	0	0	782	3101.6
	189	**201**	**2443.2**	**6**	**34.8**	**969**	**3704.7**
SW Midden							
500	114	52	374.5	4	25.4	309	737.8
836	106	17	141.4	5	2.3	111	224.72
839	182	19	155.4	6	46.8	80	224.5
845	86	50	502.3	12	48	365	705.70
850	134	37	317.3	5	32.9	90	487.3
852	106	22	213.4	5	29.1	64	179.9
854	106	6	19.7	3	262.9	28	50.2
493	66	30	246.8	0	0	250	608.2
846	86	43	374.9	1	1.9	127	321.7
856	88	16	54.6	5	12.1	29	43.5
	1074	**292**	**2400.3**	**46**	**461.4**	**1453**	**3583.52**
858[sterile]	158	2	28.7	0	0	5	4
clay circle							
476	6	4	3.6	3	13.7	8	3.6
ASD12 wall fill							
404	8	3	7.4	1	0.1	2	0.6
464	20	0	0	0	0	0	0

843	22	1	8.1	1	22.1	4	13.80
853	65	14	61.5	4	17.1	59	131.6
873	16	3	13.2	3	24.8	0	0
Wall fill (SW corner)							
468	28	8	61.5	6	40.7	14	50.3
477	24	3	17.4	0	0	13	37.1
Wall fill- mixed							
833	46	8	64	0	0	41	6.80
838	150	35	214.7	0	0	94	225.50
OZ 1 & mixed							
474	59	2	8.2	3	31.5	4	9.3
499	n.a.	0	0	0	0	15	8.6
842	46	8	66.9	1	46.3	100	300.7

	LITERS	**CERAMICS**		**LITHICS**		**BONE**	
BLOCK 3		**count**	**weight**	**count**	**weight**	**count**	**weight**
OZ 1							
266	110	28	183.9	7	5.7	37	32.2
271	186	78	463.1	10	5.6	80	53.6
281	150	28	145.4	10	11.6	28	25.3
282	146	44	299.5	9	18.1	49	38.8
299	18	2	8	3	16.5	5	3.2
506	24	3	17.6	2	19.9	5	1.6
513	14	7	58.4	3	8.4	2	2.7
524	24	2	11.8	2	4	15	7.9
529	72	30	245.7	8	5.1	39	27.1
530	78	7	21.8	4	11.4	12	12.4
531	57	16	60.8	7	19.3	10	14.6
532	75	12	86.4	3	2.2	30	26.6
533	78	33	124.5	5	20.9	26	23.4
534	28	3	58	3	9.2	13	10.2
535	26	18	90.6	3	171	0	0
536	30	10	44.9	3	1.5	21	12
537	26	21	78.4	1	1	0	0
538	30	19	117.8	0	0	14	13.1
539	27	14	64.7	7	9.5	28	24.3
540	20	4	5.8	6	13.7	8	5.9
541	14	7	12.2	0	0	5	2.4
542	14	2	11.6	2	1.2	4	0.5
	1247	**388**	**2210.90**	**98**	**355.80**	**431**	**337.80**
OS 1							
504	14	3	53.3	0	0	1	1.5
512	40	11	44.4	4	33.5	14	7.5
515	18	8	512	2	3.2	19	9.7

519	22	7	66.5	0	0	24	63.2
543	24	2	6.2	0	0	5	1.7
554	24	0	0	0	0	8	34.7
556	57	14	82.2	0	0	11	5.6
558	88	23	100.4	1	0.3	56	102.8
559	93	24	300	7	18.7	82	134.1
560 [F.12]	64	11	43.5	1	19.4	32	26.6
561	56	16	183.6	2	2	39	66.1
563	79	90	318.6	5	10.6	65	35.9
564	102	127	706.3	11	50.2	350	522.9
565	107	100	530.7	8	15	255	323.9
566	33	9	86.6	4	19.4	49	79.8
567	110	30	183.1	11	6.6	104	116.7
568	46	25	182.3	5	18.6	28	15.6
584	73	13	50.4	4	4.9	12	7.4
	1050	**513**	**3399.7**	**65**	**202.4**	**1154**	**1555.7**
FE 2							
507	182	41	276.5	2	4.2	65	119.6
510	54	11	76.3	1	1.8	3	11
514	318	82	664.1	13	27.8	73	108.8
521	198	45	326.5	2	9.7	58	169.9
525	178	54	325.9	5	65.3	48	64.2
527	208	35	232.2	11	82.2	81	78.8
569	95	21	215.4	6	10.3	80	73.6
570	105	24	235.8	0	0	171	262.2
572	206	120	1141.6	23	66.6	493	818.2
573	60	64	707.9	2	6.2	240	343.5
581	70	35	338.5	4	4.9	95	295.5
588	80	14	88.1	2	6.6	45	93.6
589	158	21	158.8	2	2.9	33	93
591	38	3	16.3	3	3	5	5.4
595	96	40	312.2	8	6.9	101	148.4
596	86	28	155.8	12	6.7	19	21.9
	2132	**638**	**5271.9**	**96**	**305.1**	**1610**	**2707.6**
FE 2 w/ OZ 2							
518	374	99	570.5	20	29.8	138	230.5
582	57	21	127.8	3	2.1	45	78.2
583	50	1	41	2	1	10	6.2
586	119	31	226.7	5	7.3	33	78.2
	600	**152**	**966**	**30**	**40.2**	**226**	**393.1**
FE 2							
574	34	24	172.6	1	1.2	210	342.8
575	83	74	922.1	3	0.9	530	1179.3
576	176	84	692.5	10	71.7	560	1128.8
577	78	40	399.5	5	31.5	190	266.3

578	25	21	207.2	3	2.4	90	149.6
579	60	18	123.8	2	3.3	90	214.6
580	75	38	300.6	3	19.6	100	298.5
	531	**299**	**2818.3**	**27**	**130.6**	**1770**	**3579.90**
OZ 2							
511	118	43	196.5	16	48.6	33	65.2
516	136	25	306.9	6	23.9	41	134.7
522	162	13	143.7	5	9.5	55	139.8
526	142	29	182.9 [+n.a.]	2	25.2	89	169.1
528	150	23	141	5	20.3	70	101.9
585	56	7	124.5	3	2.1	30	19.4
590	8	1	8.4	1	5.8	1	4.8
592	48	5	191.8	0	0	31	90.9
593	46	3	22.3	1	1.4	0	0
808	110	32	258.2	4	4.5	39	72.1
812	25	9	38	1	4.4	17	44.5
822	130	80	450	14	96.60	152	327.1
	1131	**270**	**n.a.**	**58**	**242.3**	**558**	**1169.5**
F. 5							
293	120	16	67.3	4	14.8	24	25.7
297	176	10	79.5	5	9.6	3	0.1
505	208	19	242.1	6	8.1	39	131.4
807	40	8	79.4	7	10.7	24	23.6
809	14	11	39.5	2	28	20	43.9
815	46	13	94.8	1	7.9	23	101.1
823	16	2	7.4	0	0	1	15.3
824	72	13	35.3	1	0.5	8	11.6
825	170	32	187.8	7	10.1	41	67.8
826	128	15	57.3	2	6.8	16	85.1
828	112	8	44.6	1	5.3	2	5.7
	1102	**147**	**935**	**36**	**101.8**	**201**	**511.30**
F. 6							
810	18	0	0	0	0	15	23.80
811	94	0	0	1	2.8	7	5.70
	112			**1**	**2.8**	**22**	**29.50**
279 [F.2]	7	2	21	0	0	0	0
550 [F.10]	17	0	0	0	0	0	0
552 [F.11]	6	0	0	0	0	0	0
F. 12							
555	2	0	0	0	0	0	0
587	<1	0	0	0	0	56	55.6
F. 13							
819	11	2	100.3	0	0	45	82.9
827	6	0	0	0	0	0	0

830	11	0	0	0	0	0	0
F.14							
594	15	1	8.8			11	20.9
803	26	3	27	4	126.9	29	45.4
F.15							
571	68	21	180.7	7	17.8	63	136
806	60	9	32.5	0	0	n.a.	44
813	113	36	303.7	5	21.5	108	296
814	124	14	123.4	2	51	32	88.6
	365	**80**	**640.3**	**14**	**90.3**	**n.a.**	**564.6**
804 [F.17]	44	39	394	6	17.5	400	2131.6
NWM 1-2							
267 [1]	153	68	456.7	4	2.5	86	80.2
270 [1]	156	101	455.6	13	21.4	11	0.9
298 [2]	112	46	477.3	4	17.9	25	34.8
300 [2]	144	38	292.7	10	14.5	30	63.6
	565	**253**	**1682.3**	**31**	**56.3**	**152**	**179.5**
NWM 3-5							
501 [3]	118	28	382.9	5	7.4	111	357.8
502 [3]	118	21	387.7	4	140.7	33	239.8
503 [4*]	112	19	124.9	5	113.9	68	426.6
597 [4*]	195	107	1098.8	13	20.1	168	688.3
598 [5]	198	51	367.7	9	14.4	130	807
802 [5]	186	57	359.3	14	44.8	120	358.6
	927	**283**	**2721.3**	**50**	**341.3**	**630**	**2878.10**
NWM 6-8							
599 [6]	172	22	176.2	1	1.5	71	170.4
600 [7]	206	3	10.3	2	6.3	16	31
801 [8]	238	2	9.5	0	0	1	0.6
	616	**27**	**27**	**3**	**7.8**	**88**	**202.00**
NM-1/2							
816 [1]	198	131	1151.3	30	94.1	285	1318.6
818 [1]	222	129	1174.5	20	65.5	280	1604.7
817 [2]	98	56	388.6	14	22.6	74	486.3
821 [2]	174	84	570	19	39.4	280	1135.6
820 [1/2]	33	22.00	119.5	1	1.2	55	185.9
	725	**422**	**3403.9**	**84**	**222.8**	**974**	**4731.10**
unclear; along W of Feature 5							
829	72	20	133.2	6	6	60	141

Appendix 3: Late Formative features organized by block and occupation

BLOCK 1

Feature Number	Context	Description
27	BL1E- initial occupation; overlying sterile soil.	Midden; distinguished from Feature 25 by higher density of small (1-10 cm) rocks (>50%) and the presence of carbon and ash. There was a very high density of ceramics, but these were outnumbered by animal bones. A hoe fragment, groundstone, bone instrument, and spindle whirl were also recovered from this context.
25	BL1E- initial occupation	Midden; high density of rocks (30-50%) located primarily in 5075E, but extending slightly in 5074E. There were ceramics, bones, and a concentration of obsidian flakes.
24	BL1E- initial occupation	Midden; distinctive deposit of sloping black soil measuring approximately 1.4 m from east-west and 70 cm north-south with a high density of rocks (30%), ash, carbon, pigment and sooted ceramics overlying sterile soil.
23	BL1E- initial occupation	Midden; small, circular depression, overlying sterile soil and filled with a slightly darker soil than Feature 16.
22	BL1E- initial occupation	Midden; small depression measuring 65 cm north-south and 43 cm east-west and 7 cm in depth; soil was slightly darker than that of Feature 16.
16	BL1E- initial occupation	Midden; multi-layered and eastward sloping. Most notable was the quantity of complete bones recovered. Ceramics included both burned and unburned decorated and plainware specimens.
L. 902	BL1W- initial occupation	Concentration of burned soil and carbon; likely was a small (30 cm x 30 cm), informal circular hearth filled in after its last use. The depression was shallow (6 cm), associated with burned bone and ceramics, and there were scattered clumps of burned clay on the surrounding surface.
L. 905	BL1W- initial occupation	roughly ovular pit area measuring 1.10 m long x .65 m wide; clearly differentiated by its texture (sandy loam), color (grayish brown) and inclusions that included red pigment, carbon, and a few complete animal bones; likely a shallow midden area associated with Locus 902 to the south or another possible thermal feature to the north and west, Locus 909.
26	BL1W- middle occupation	slightly bell-shaped, circular pit measuring 30 cm x 30 cm at the upper edges, originally noted as a concentration of burned clay. The structure of pit includes a ring of clay chunks associated with concentrations of carbon, burned soil, and burned animal bone both in the pit and

		surrounding it. The soil within the feature included reddish burned clay and a gray soil with various inclusions at the base. No ceramics were recovered.
21	BL1W- middle occupation	slightly bell-shaped pit, generally circular, with limits defined by burned soil and compacted carbon. The fill within the feature included burned bone and burned ceramics and all materials were collected in the soil sample. The base forms a slight depression, but the feature is relatively shallow (10 cm deep). Fragments of burned clay were scattered along the area to the north of the feature.
L. 790	BLW- middle occupation	Concentration of white chert flakes and obsidian encountered *in situ* on the occupation surface of the northeast corner of 4990N 5070E.
20	BL1W- final occupation	Midden; roughly round pit with small rocks delimiting its upper edges; measures approximately 30-40 cm north-south (eastern edge not defined), and 10 cm (maximum of 15 cm) in depth; bone and ceramic materials were burned and a *cuy* bone was noted in the fill. It seems likely that this was a storage pit later filled with refuse instead of a reused hearth based on the lack of burned clay fragments or ash.
19	BL1W- final occupation	Very shallow garbage pit; the upper edge was defined by a ring of rocks. Contents included 2 handstones and half of a ceramic bowl. On a nearby surface was a small handstone.
18	BL1W- final occupation	Midden area; it measured 2 m wide and 10-30 cm deep. Fill included small rocks, ceramics, lithics and pigment, but was predominantly comprised of animal bone. The deposit was likely a primary midden deposit based on the size of the midden distribution, the informal edges of the area, and its shallow nature.

BLOCK 2

Feature Number	**Context**	**Description**
29	Bl2- initial occupation surface	Hearth; below and west of ASD12 in 4966.8-4967.7N 5073-5073.8E. It measured 40-80 cm in width, with an estimated total length of 1.2 m and was 20-35cm deep. The pit had clay-lined walls that formed a bell-shape. The fill was carbon rich (30%), with small stones (30% at 1-10 cm), and only 10% of these were burned, including some flakes. Stones were concentrated along eastern edge with ceramic and bone, possibly at the actual center of the hearth. The Fill also included clay (20%) and ash (30%), with several large stones at base (10-20 cm).
30	Bl2- initial	Unexcavated hearth. It was partially exposed in 4966.6-

	occupation surface	4967.1N 5073-5073.2E. It was circular and associated with the same occupation as Feature 29.
SWM	Bl2- middle occupation	Midden; dense concentration in 4965N 5070-5071E. It was unclear if it was placed in a pit or was a generalized deposit. The soil was very mottled, with areas of clay, pebbles and carbon. Artifacts included bone in very high densities, antler, bone tools, and ceramics.
28	Bl2- final occupation	Hearth; small and shallow (10 cm) feature located just to the west of ASD12 in 4966.8-4967.3N 5073.3-5073.6E. The edges were unclear, with high numbers of burned clay fragments and carbon inclusions. The surface contained stones on the edges, some of which were upright, but had no clear signs of burning. The base was pebbled lined (<1 cm at 40%).
7	Bl2- final occupation	Pit; small, rock-lined pit near the doorway in ASD12 measuring 20 cm x 30 cm on the interior.
9	Bl2- final occupation	Pit; small, measuring approximately 40 cm x 40 cm, but not as well-defined as Feature 7.

BLOCK 3

Feature Number	Context	Description
17	Bl3- initial occupation	Primary toss zone; deposit covering an area of 1.2 m east-west and 1 m north-south in 4952/3N 5051/2E. The deposit included a number of ceramics and lithics, but the density of faunal remains defined the edges and base of the feature. This area abutted the ASD8 wall fragment located to the south and the base was defined when all bones were removed. None of the 400 animal bones collected from the 44 liter context were burned, in contrast to those encountered in Feature 15 and associated with the hearth areas.
15	Bl3- initial occupation	Midden; formal garbage pit, located south of ASD8 and northwest of Feature 6 hearth in units 4952N 5050/1E. The fill included ceramics, ceramic tools, lithics, animal bones, and large pieces of carbon (up to 3 cm), but the most notable components were chunks of burned clay ranging from 1-10 cm. The burned clay was similar in color and size to those used in Feature 6 and comprised up to 50% of the Feature 15 fill. It is possible that the feature was related to the cleaning of Feature 6. Artifacts were both burned and unburned and oriented at a variety of angles. ASD8 served as a clear border to the north and Feature 6 to southeast. The base of the pit was difficult to define, but generally distinguished by a decrease in artifact density.
14	Bl3- initial occupation	Pit of unclear function; the pit was located in 4951N 5053E, filled with reddish yellow (7.5 YR 6/6) chunks of

		burned clay and carbon flecks, and the edges and sloping base were clearly defined. The depth of the deposit ranged from 7 cm along the eastern edge to 17 cm in the center. A small number of animal bones, ceramics, and lithics were collected, but not at high densities. There was no fuel present in the pit. Directly to the southeast was a small circle of rocks measuring approximately 15 cm across, hypothesized to be a pot rest associated with this area.
13	Bl3- initial occupation	Thermal feature; the probable hearth was located in 4951N 5054E and included small burned bone fragments and carbon inclusions in a circular area measuring 40 cm east-west and 30 cm north-south. The upper pit edges were made of very hard, burned clay that was fully carbonized. The base of the upper stratum was solid 1-2 cm thick blackened clay with an underlying softer, mottled, carbon-rich pit fill and associated artifacts, including a few ceramics from a single vessel and burned and unburned faunal remains. At the base of the pit was an informal cap of 5-10 cm rocks, especially along the southern edge, and a reddish clay layer. The pit was slightly bell-shaped and included layers of superimposed deposits, including a dark, carbon- rich, and mottled deposit under the clay that reached a depth of 30 cm.
6	Bl3- initial occupation	Hearth; located in 4951/2N 5051/2E, roughly circular, and measuring 60 cm east-west and 70 cm north-south. The uppermost stratum was composed of 5 cm chunks of burned clay with fully reduced cores and very thin oxidized exterior edges. The underlying layer included much smaller burned clay pieces measuring 1-3 cm and in the base stratum the quantity of burned clay decreased and carbonized materials increased to comprise 75% of matrix. A carbon sample was collected and the remaining materials were removed to expose the base of the feature. At the base, small rocks appeared (>1cm) and one large stone (>30cm) along the southern edge, but there was not a formal stone-lined base. There were few artifacts associated with the feature, but there were areas of ash on the surrounding surfaces and a few burned animal bones along the edges. This was a unique thermal feature based on construction and use-related evidence. A straight-walled pit was dug into the initial occupation surface, a thick deposit of fuel was burned at the base, and small chunks of clay were then piled over the fuel source. There was not evidence of multiple uses. The morphology is similar to that recorded ethnographically in the *altiplano* from *watiya*-style roasting pits.
NWM	Bl3- initial	Midden; informal disposal area with undefined edges,

3-5	occupation	distinguished by darker soil, increased artifact densities, and spatial concentration. The deposits appear to have accumulated throughout the occupation of the block instead of as a midden placed into an abandoned pit or structure.
NM 1-2	Bl3- initial occupation	Midden; toss zone located to south of NWM.
12	B3- final occupation	Thermally modified pit; used and re-used for a variety of functions in the southeastern quadrant (4951-2N 5053E). The feature was originally used as a small hearth with ash along the northern clay-lined edge, followed by re-use for storage or disposal. Lastly, it was capped with a layer of small, reddish rocks and pebbles in an area measuring 25 cm x 25 cm (see also Feature 2).
11	B3- final occupation	Clay-filled pit. The feature was a well-defined, semi-circular pit measuring 35 cm east-west and 25 cm north-south filled with fired chunks of clay and no other artifacts. The clay was a light yellowish brown color (10YR 6/4) on the oxidized exterior and a dark grey to black on the interior. The deposit was 12 cm thick and extended a few centimeters above the latest Formative occupation surface. The upper layer consisted of well-fired clay pieces and the lower layers also, but of a smaller size and darker orange color. This may be a difference in exposure to heat or the result of the moister conditions in the pit. The base of the pit was a brown, carbon rich soil lacking large pieces of burned clay.
10	B3- final occupation	Thin deposit of colored clay. The function of this feature is unclear; it likely was not a prepared floor based of its shape and limited distribution. It was located directly south of Feature 8, a shallow pit filled with clay of the same color. The unit *maestro*, an active potter, proposed that the patch was an area where liquid clay for slipping vessels spilled or that it seeped out of Feature 8 during the process of pottery production (Honorato Ttacca, personal communication 2001). It is also possible that it was a fragment of a floor and if that is the case it is the only example of a prepared clay floor fragment recovered from all excavation areas.
8	B3- final occupation	Pit filled with clay; located in the southeastern quadrant of Block 3 (4951N 5053/4 E) and filled with a deposit of unfired yellowish red clay (5YR 4/6). The pit was roughly rectangular and shallow, measuring 70 cm east-west and 10-15 cm north-south and dug into the final occupation surface. There were also small fragments of obsidian, pottery, and rocks (<1 cm) in the pit. The entire deposit was taken as a soil sample. The deposit was raised a few

		centimeters above the occupation surface and measured 5-8 cm in thickness.
5	B3- final occupation?	Rock-filled pit of unclear function. The pit was located in the northeastern quad of the block and first exposed as a meter-wide mound of large rocks at the base of the plow zone. After removal of several layers of these large rocks (>50 cm), the underlying deposits included different colored clays, a limited number of artifacts, and a substantial concentration of burned wooden beam fragments. The specific temporal association of the feature is also unclear; it could have been related to the latest use of the area and created through accumulating stones from disturbed architectural features. The wooden beam dated to the Late Formative, but the construction sequence and use of the pit remains unclear.
2	B3- final occupation	Small pit; located in the northeastern corner of the block, the featured measured 25 cm x 23 cm. The top 4 cm were comprised of small pebbles (<1-5 cm) deposited above a thin layer of red, silty clay (2.5YR 5/6 red). In the pit, a piece of metal was recovered and two incised Pukara sherds. There was no carbon, bone, or any other artifacts in the pit. It is possible that the pit contents were tempering materials and pigment for ceramic production, but similar examples have not been cited in the area in ethnographic or archaeological contexts.
NWM 1-2	B3- final occupation	Midden; informal disposal area with undefined edges, distinguished by darker soil, increased artifact densities, and spatial concentration. The deposits appear to have accumulated throughout the occupation of the block instead of as a midden placed into an abandoned pit or structure (see above also).

Appendix 4: Architectural Sub-divisions (ASDs) for all blocks

ASD number	Block	Description
1	1	LIP wall running north/south in 5071E
2	1	LIP wall running north/south in 5072E, large slabs
3	1	LIP wall running east/west in 5094-5N
4	1	LIP circular structure in 5093-4N 5073-4E
5	1	LIP circular structure in 5091-2N 5075E
6	1	Late Formative wall underlying ASD2 in 5072E, some worked stones (middle/final occupation)
7	3	Late Formative wall fragment running north/south in 5054N 5051-2E (final occupation)
8	3	Late Formative wall fragment running east/west in 5052N 5050-1E (initial occupation)
9	3	Late Formative possible wall fragment running diagonally in 5050N 5050E (initial occupation)
10	3	Late Formative wall fragment running north/south in 5053N 5052-3E (initial occupation)
11	3	Late Formative wall fragment running north/south in 50532N 5053E (initial occupation)
12	2	Late Formative wall running north-south in 5073-4E, some worked stones (middle/final occupation)
13	2	Late Formative wall fragment running east/west in 5066N 5070-1E (final occupation)
14	2	Late Formative wall fragment running north/south in 5065-6N 5072E
15	2	Late Formative wall fragment running east/west in 5065N 5072-3E (final occupation)

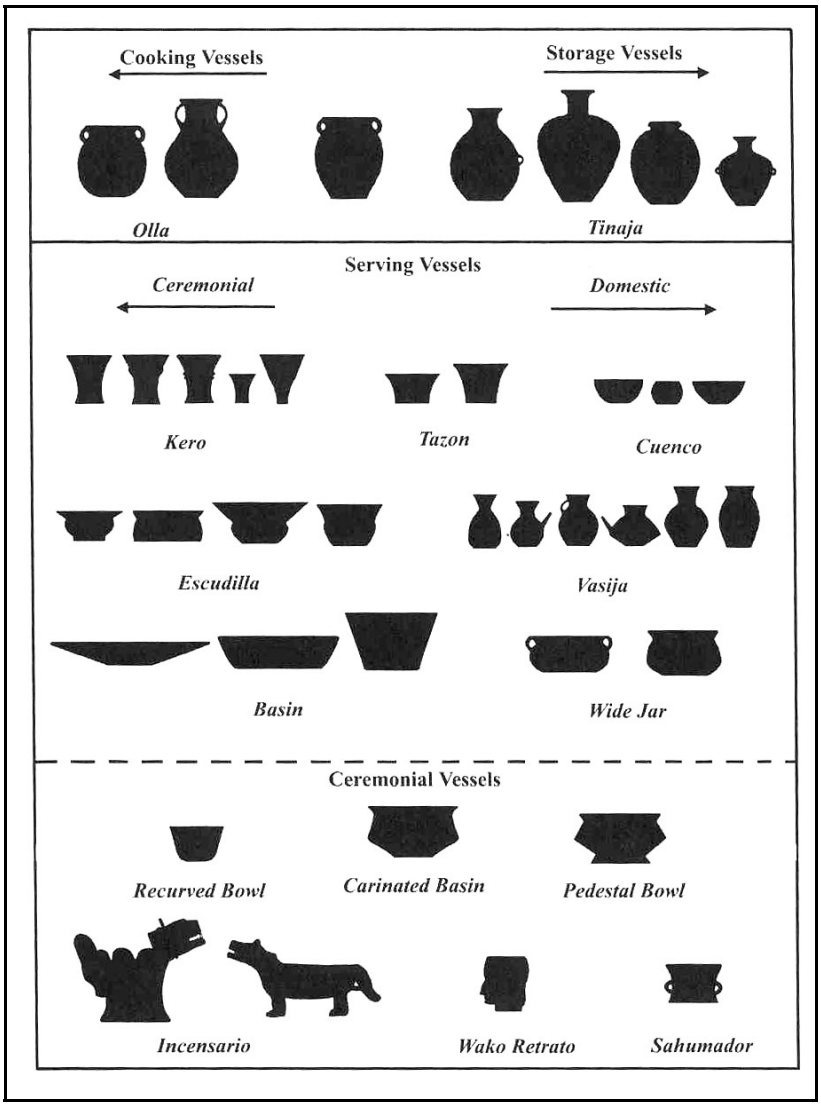
Appendix 5a: Ceramic attributes

Form/ shape attributes	Use-related attributes
1. mouth diameter (measured with rim gauge in centimeters) 2. rim/neck form (restricted or unrestricted) a. incurved (simple restricted form; Shepard 1968: 229) b. recurved (restricted; maximum diameter is below lip/neck) c. direct (unrestricted) i. straight ii. rounded d. "other" (not enough of the neck to determine form) 3. rim thickness (centimeters) 4. lip shape (Eerkens 2001) a. flat b. rounded c. pointed 5. lip lateralization (Eerkens 2001) a. interior b. exterior c. even 6. height (centimeters) a. restricted i. shoulder height ii. neck height b. unrestricted i. total vessel height 7. other observations a. shoulder angle b. body shape	1. decoration (interior/exterior) (Rice 1987:147) a. unslipped b. slipped c. slipped and painted d. incised 2. surface treatment/ finish (interior/ exterior) a. type (burnish, polished, wiped, none, or eroded) b. directionality (horizontal, vertical, circular, mixed) 3. handles a. presence/absence b. location (rim/ body) c. orientation (vertical/ horizontal) 4. paste type (with hand lens) a. primary inclusions (type, size, orientation) b. color (Munsell) c. hardness d. porosity 5. use-wear a. charring/ sooting (location/ degree) b. tool marks c. signs of repairs d. reutilization 6. firing code a. color (Munsell) b. core cross- section (Rye 1981: 116) 7. coiling melding techniques (if visible)

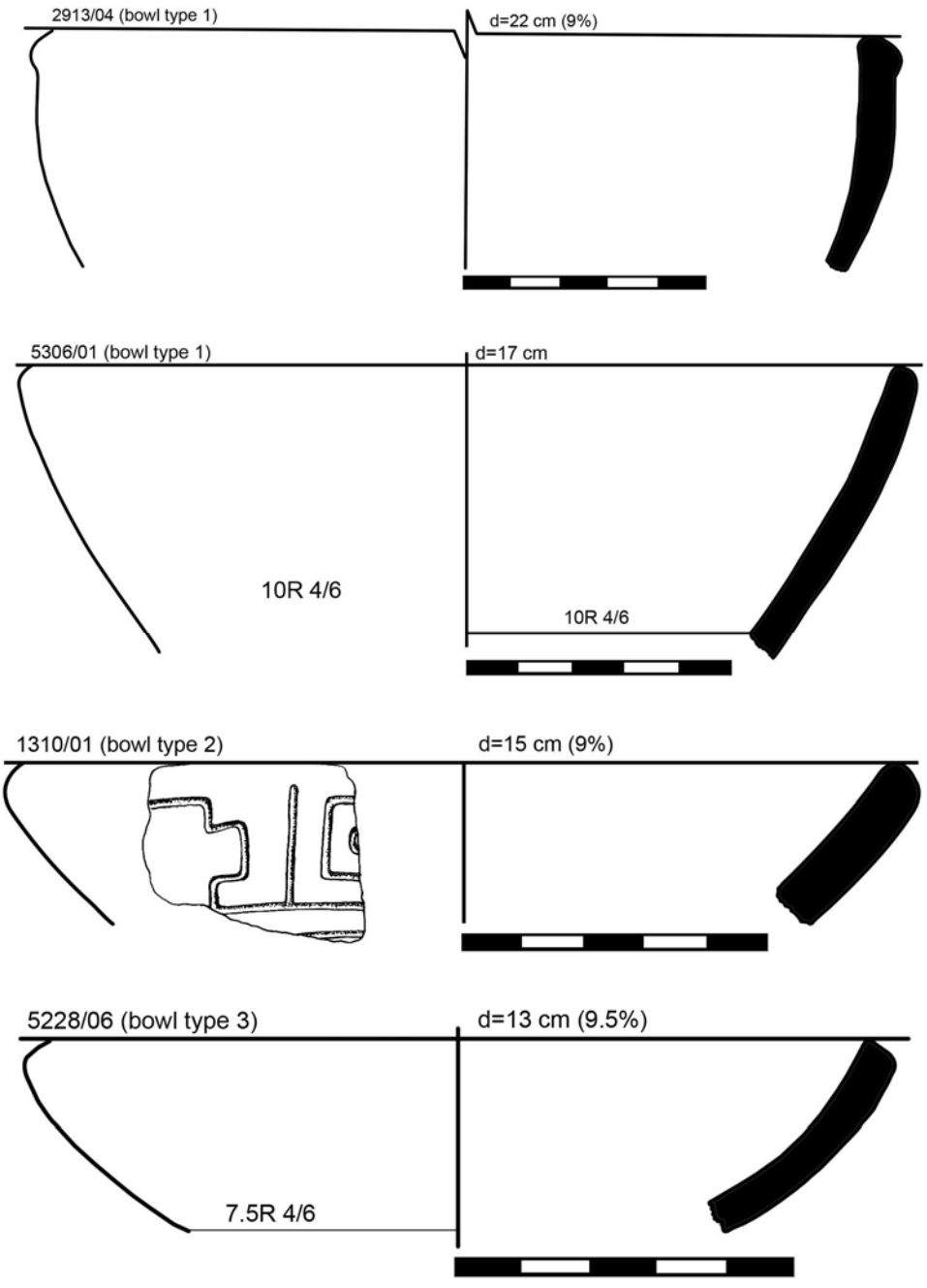
Appendix 5b: Predicted archaeological correlates of vessel function (Rice 1987: Table 7.2, from Howard 1981)

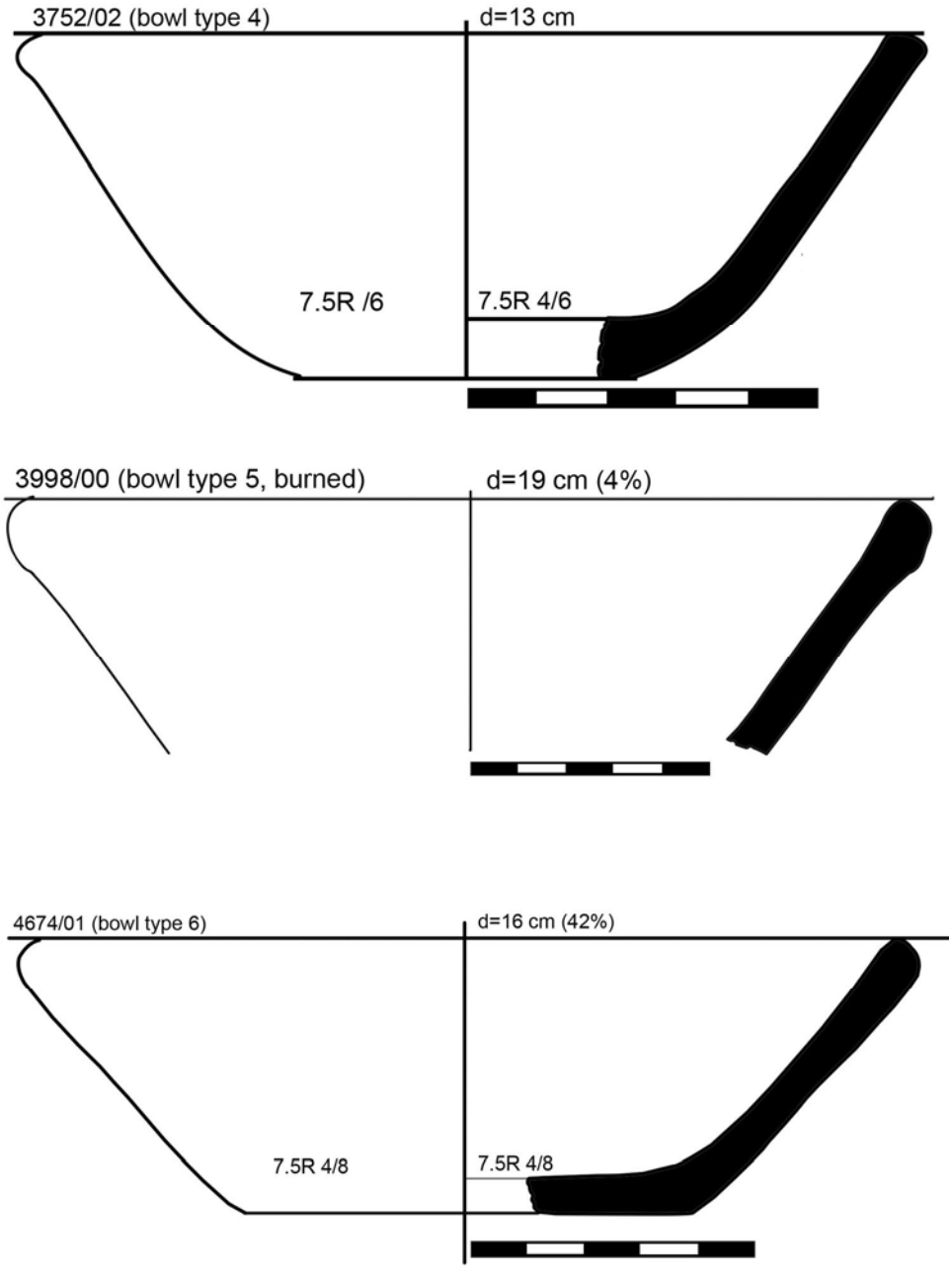
Functional Category	Shape	Material	Surface Treatment and Decoration	Depositional Context	Frequency	Clues
Storage vessels	Restricted forms, orifice modified for pouring or closure; appendages for suspension or movement (tipping)	Variable (possible concern for low porosity)	Variable for display or messages; slip or glaze to reduce permeability	Dwellings (sometimes set into ground); trash middens	Low (low replacement); may be reuse of broken or old vessels	Residues of stored goods in pores
Cooking pots	Rounded, conical, globular, unrestricted; generally lacking angles	Coarse and porous, thin walls, thermal shock resistant	Little to none; surface roughening for handling ease	Dwellings, trash middens; rarely in special deposits (e.g., burials)	High (frequent replacement)	Patterns of exterior sooting or blackening; burned contents
Food preparation (without heat)	Unrestricted forms, simple shapes	Emphasis on mechanical strength; relatively coarse, dense	Variable; generally low	Dwellings, trash middens	Moderate?	Internal wear; abrasion or pitting
Serving	Unrestricted for easy access; often with handles; flat bases or supports for stability	May be fine	Generally high, for display or symbolic roles	Dwellings, trash middens, special deposits (burials, caches)	High (frequent use and replacement)	Sizes correspond to individual servings or group size
Transport	Convenient for stacking; handles; lightweight; restricted orifice	Emphasis on mechanical strength; dense, hard	Variable, generally low; slip or glaze to reduce permeability	Trash middens, nondomestic (market) areas	Variable	Uniform size or multiple units of size; residues of contents

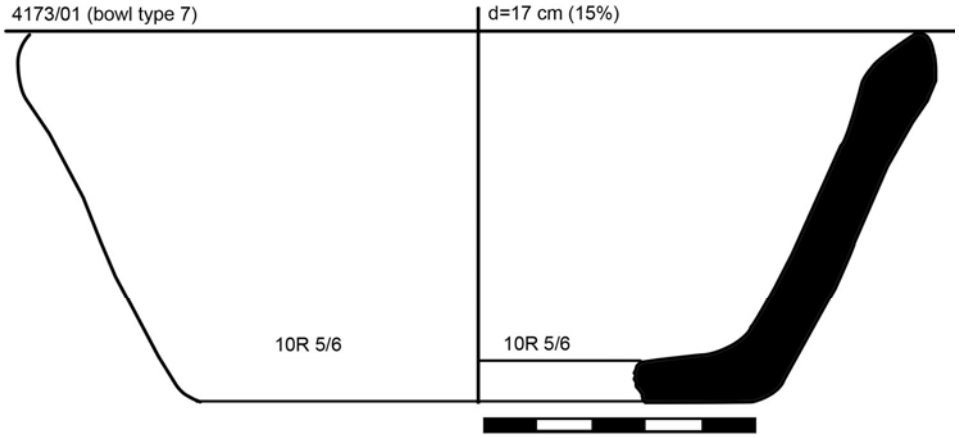
Appendix 5c: Tiwanaku ceramic assemblage (Janusek 2003a:57)

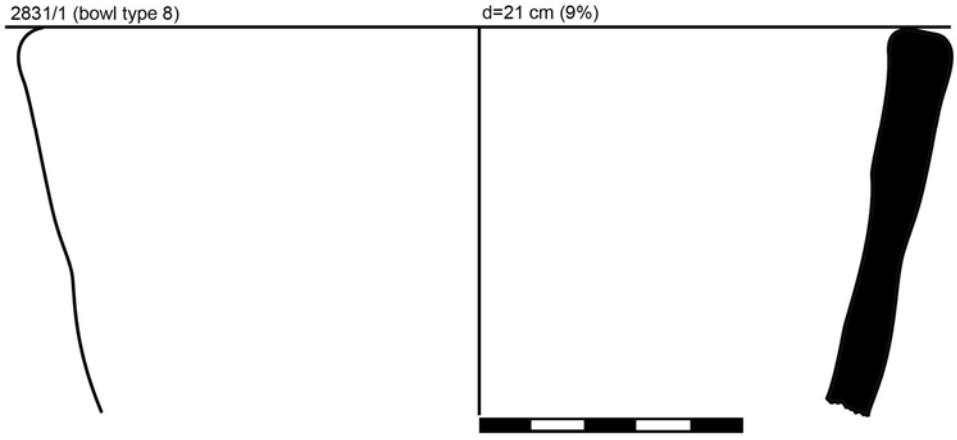


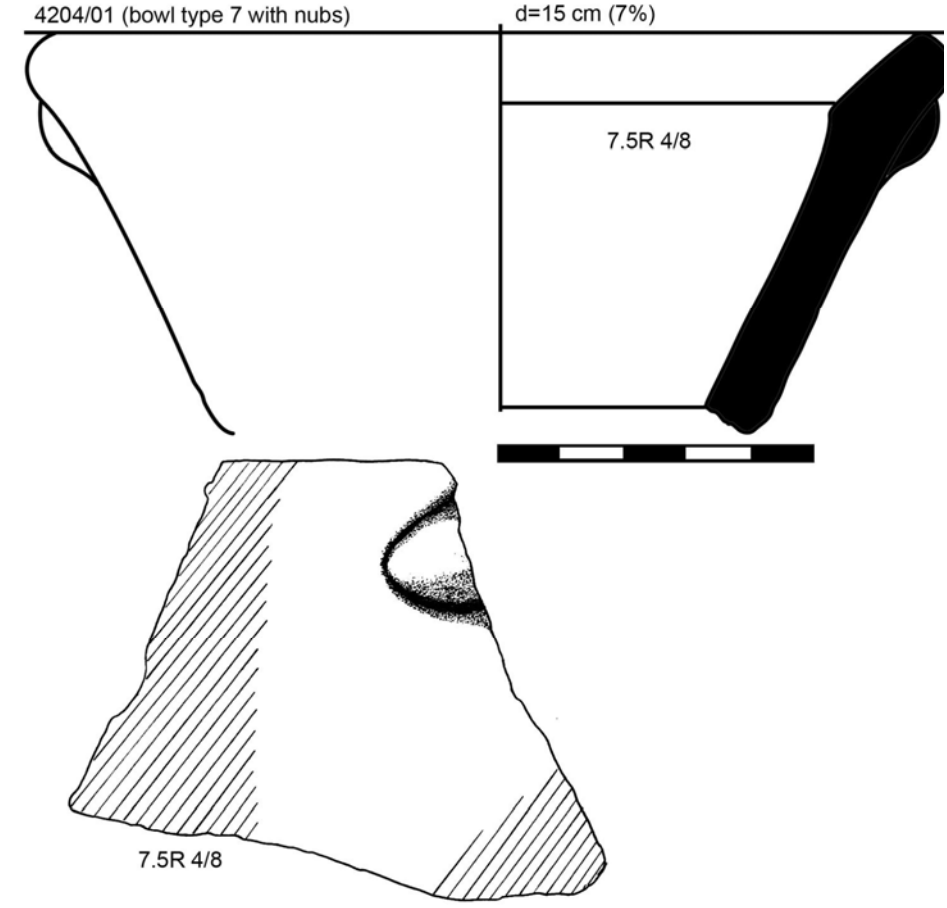
Appendix 5d: Unrestricted vessels (bowls)



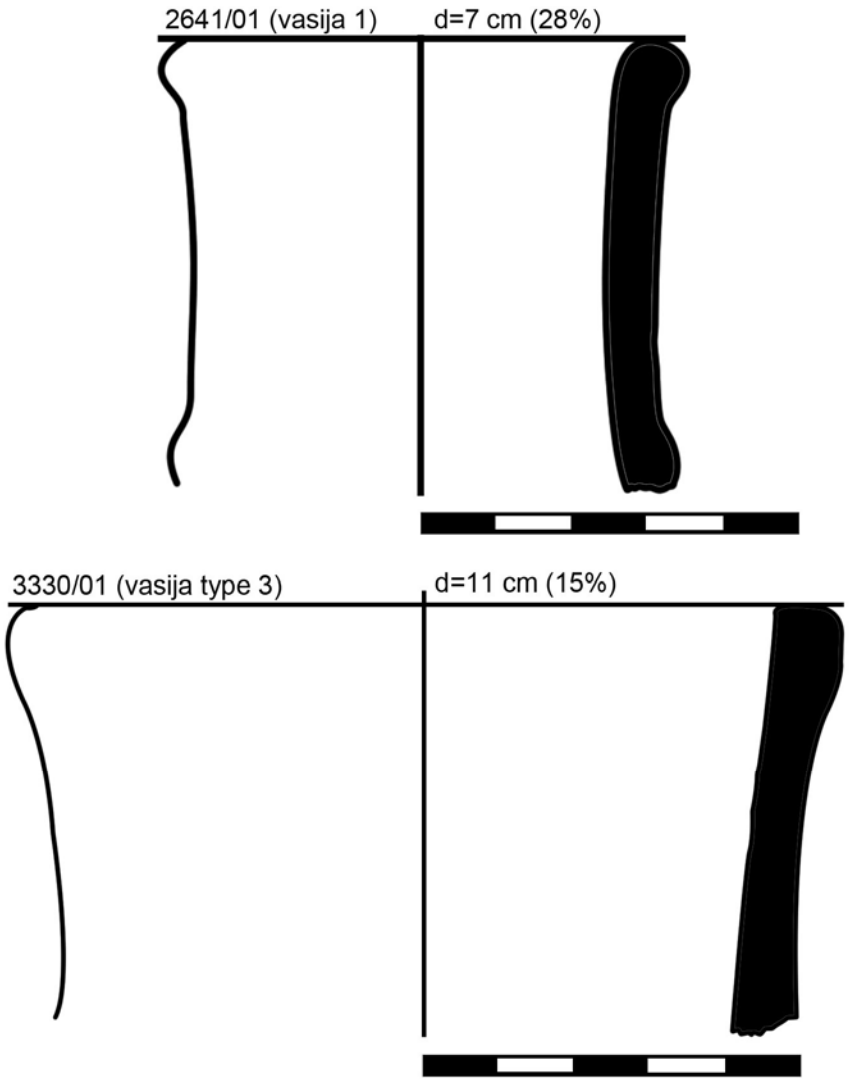

3752/02 (bowl type 4)
d=13 cm
7.5R /6
7.5R 4/6
3998/00 (bowl type 5, burned)
d=19 cm (4%)
4674/01 (bowl type 6)
d=16 cm (42%)
7.5R 4/8
7.5R 4/8

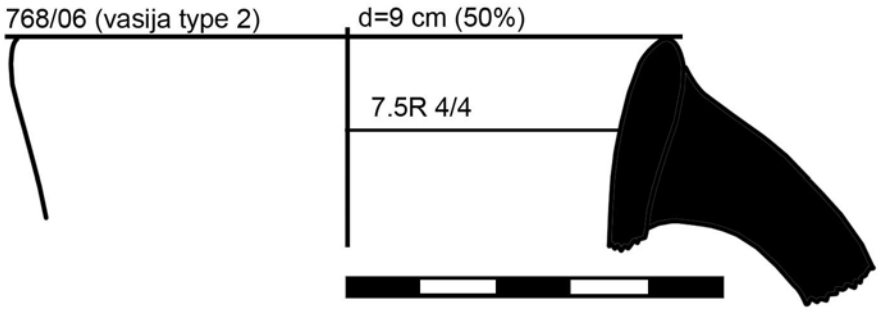

4173/01 (bowl type 7)
d=17 cm (15%)
10R 5/6
10R 5/6

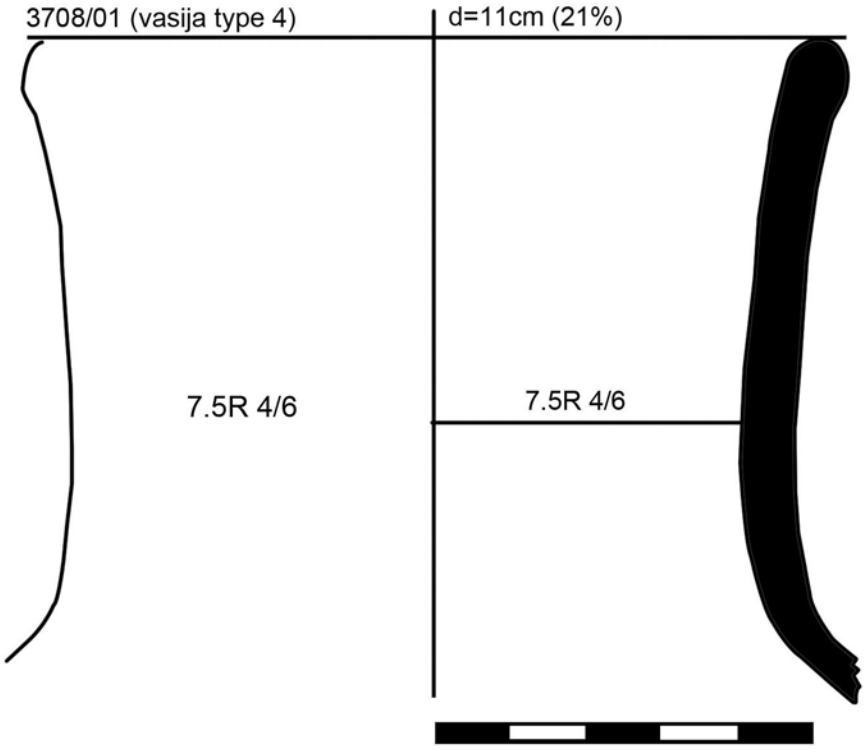

2831/1 (bowl type 8)
d=21 cm (9%)

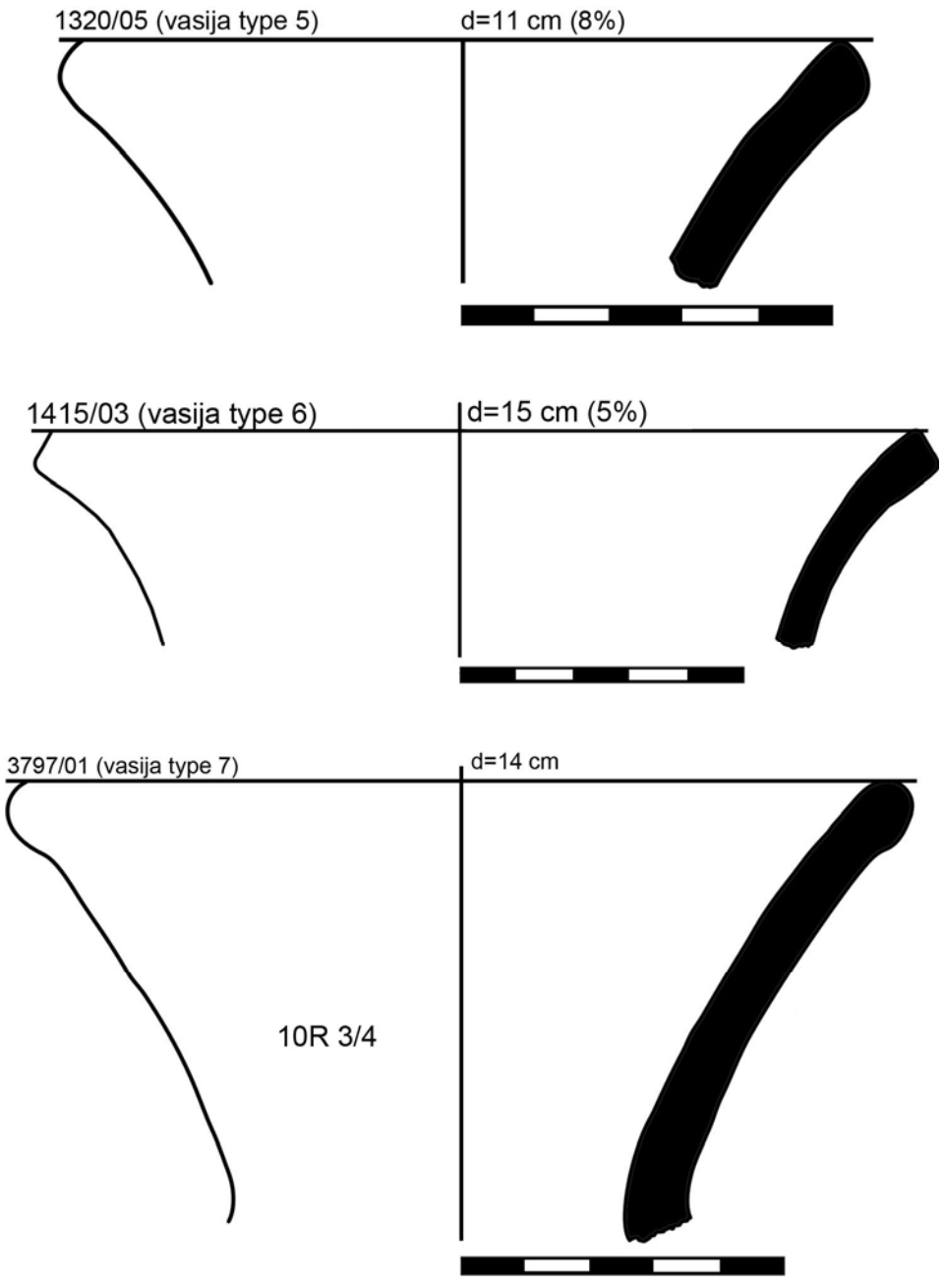

4204/01 (bowl type 7 with nubs)
d=15 cm (7%)
7.5R 4/8
7.5R 4/8
2603/03 (bowl type 9)
d=15 cm (4%)

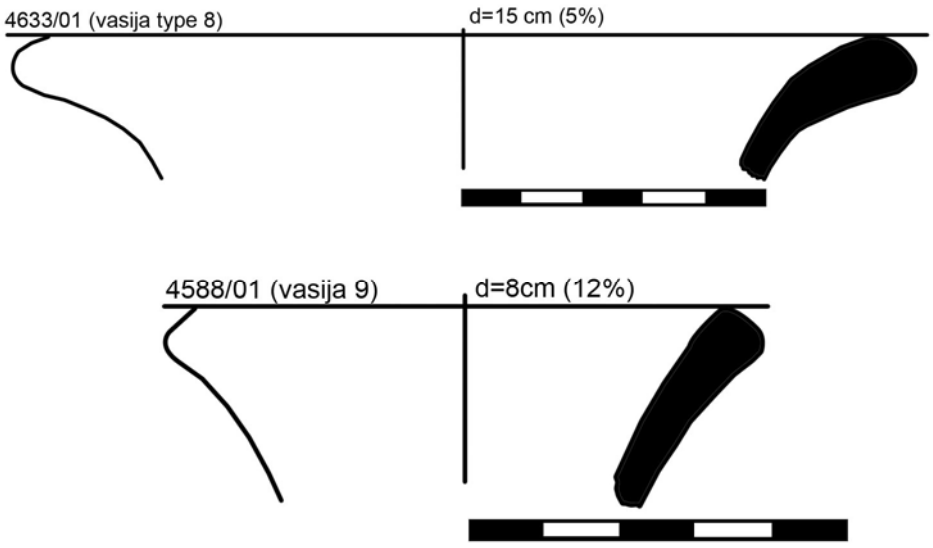
Appendix 5e: Restricted vessels (vasijas)



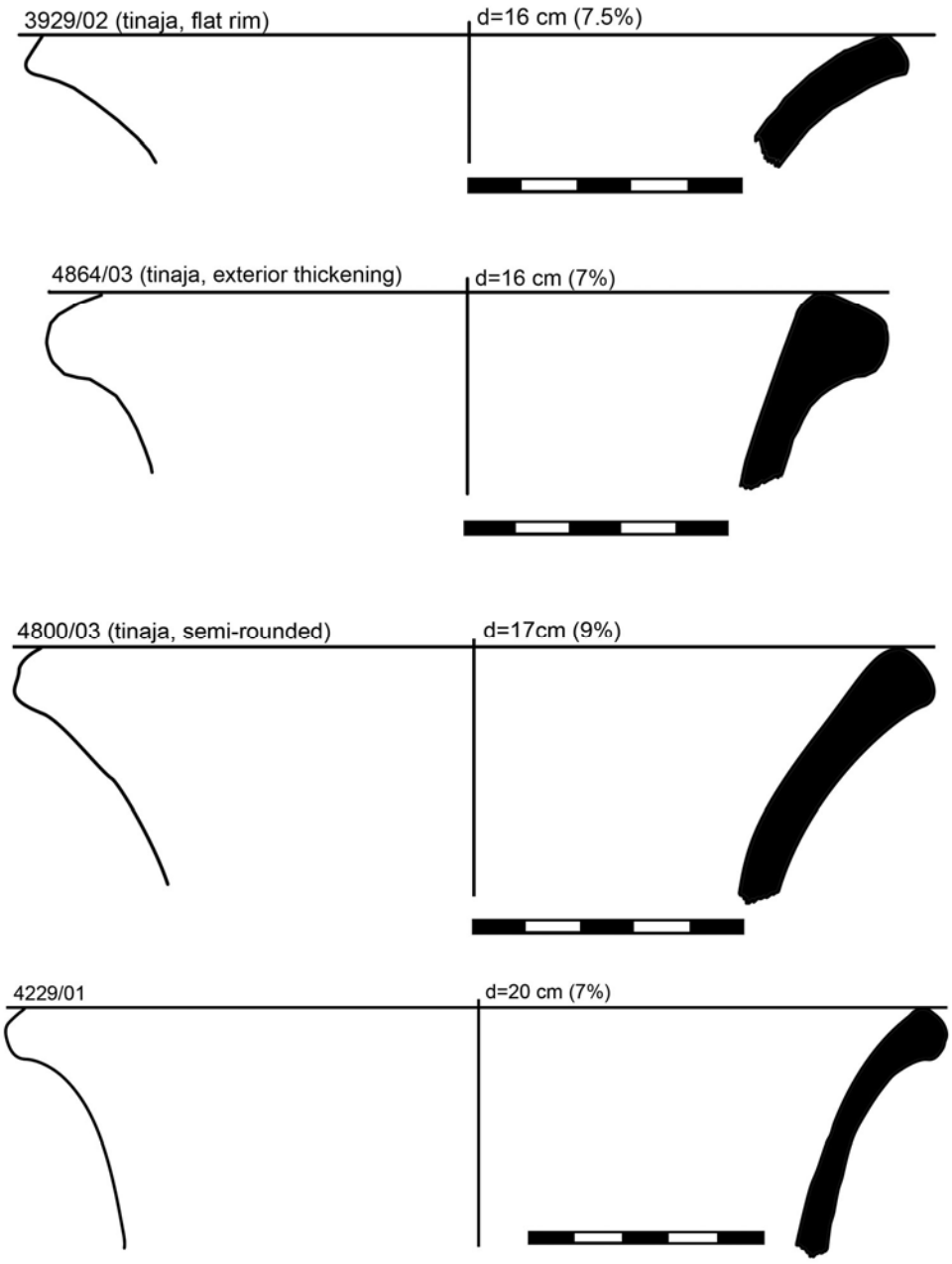

768/06 (vasija type 2)
d=9 cm (50%)
7.5R 4/4


3708/01 (vasija type 4)
d=11cm (21%)
7.5R 4/6
7.5R 4/6

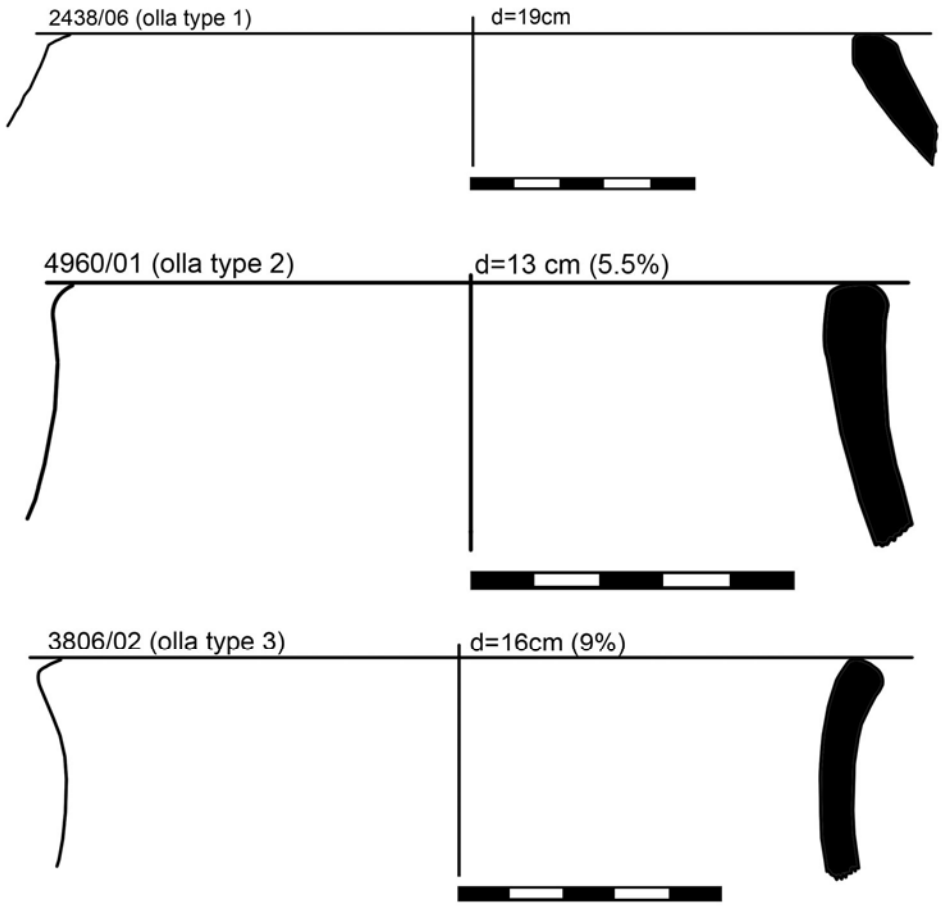

1320/05 (vasija type 5)
d=11 cm (8%)
1415/03 (vasija type 6)
d=15 cm (5%)
3797/01 (vasija type 7)
d=14 cm
10R 3/4

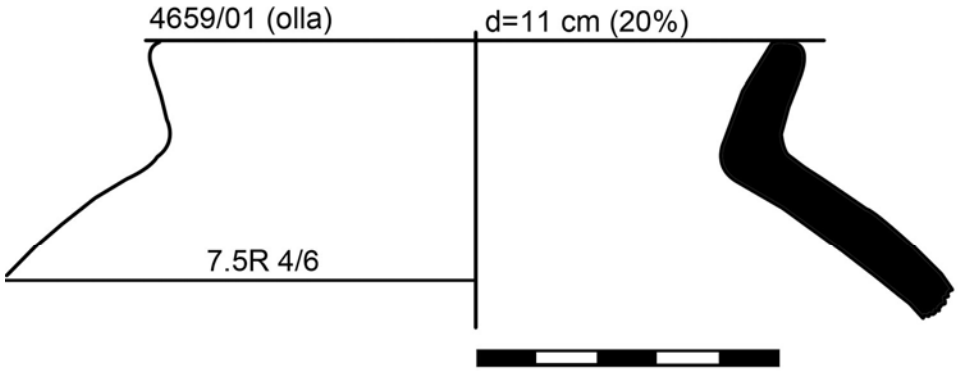

4633/01 (vasija type 8)
d=15 cm (5%)
4588/01 (vasija 9)
d=8cm (12%)

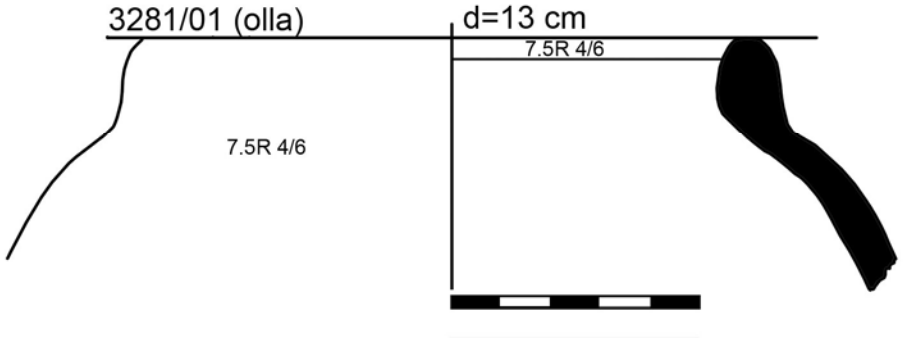
Appendix 5f: Restricted vessels (tinajas)

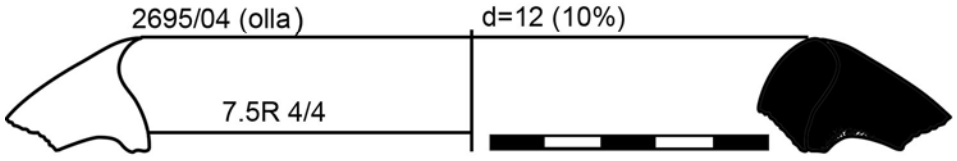


Appendix 5g: Restricted vessels (ollas)




4659/01 (olla)
d=11 cm (20%)
7.5R 4/6


3281/01 (olla)
d=13 cm
7.5R 4/6
7.5R 4/6


2695/04 (olla)
d=12 (10%)
7.5R 4/4

Appendix 5h: Paste group descriptions

Group A

- Primary constituent: slightly rounded, white grains (<1 mm) with regular distribution throughout the paste
- Other constituents (in order of prevalence): gold mica, clear grains, black grains, black mica
- Sherd body characteristics: regular distribution of inclusions, slightly porous, soft, medium fine, mica visible on both interior and exterior surfaces
- Colors: light brown, brown, dark brown, dark orange, reddish brown
- A groups= 62% of total sherds (n=1028); A1 is 47% of total (n=794)

Group B

- Primary constituent: gold and black mica (>1 mm) in profile and distributed across both the interior and exterior surfaces
- Other constituents: clear and black grains
- Sherd body characteristics: regular distribution of inclusions, slightly porous, soft to semi-compact, medium fine to fine, larger mica flakes visible on both interior and exterior surfaces
- Colors: light brown, brown
- B groups= 34% of total sherds (n=588); B1 is 32% of total (n=545)

Group C (other)

- C groups= 2% of total sherds (n=25) [32]

[32] 2% of sample did not fit any of the above groupings

Appendix 5i: Surface treatment codes

Alisado/ Wiped	Bruñido/ Burnished	Pulido/ Polished and others
A1- horizontal-medium	B1- horizontal-medium	P1- complete polishing
A2- horizontal-narrow	B2- horizontal-narrow	D- deteriorado/ deteriorated
A3- diagonal-medium	B3- horizontal- very narrow	E- erosionado/ eroded
A4- diagonal-narrow	B4- horizontal- wide	T- Tosco/ rough or unfinished
A5- horizontal- wide	B5- vertical-medium	Q- quemado/ burned
A6- mixed- narrow	B6- diagonal-medium	R- residuos/ residues
A7- circular- narrow	B7- vertical- wide	
A8- no marks	B8- diagonal- wide	
	B9- vertical- narrow	
	B10- horizontal-varied	
	B11- circular-medium	
	B12- mixed-medium	

Appendix 5j: Use-related attributes by vessel type

	Unrestricted Vessels	Restricted Vessels			Decorated Body Sherds	Bases
	Bowls	*Ollas*	*Vasijas*	*Tinajas*		
1. Composition	(n=164)	(n=85)	(n=174)	(n=44)	(n=128)	(n=123)
Paste A	80%	47%	54%	38%	86%	58%
Paste B	20%	51%	46%	60%	14%	39%
Paste C	<1%	2%	<1%	2%	<1%	3%
2a. Finish-exterior	(n=163)	(n=85)	(n=174)	(n=44)	(n=128)	(n=123)
Wiped	36%	66%	51%	66%	43%	53%
Burnished	47%	20%	25%	23%	33%	31%
Polished	1%	1%	<1%	0	4%	0
Rough	1%	4%	1%	0	0	0
Deteriorated	15%	9%	23%	11%	20%	16%
2b. Finish-interior	(n=163)	(n=85)	(n=174)	(n=44)	(n=128)	(n=123)
Wiped	49%	62%	51%	71%	51%	58%
Burnished	40%	7%	6%	7%	12%	13%
Polished	0	1%	<1%	0	0	0
Rough	1%	5%	6%	2%	1%	6%
Deteriorated	10%	25%	37%	20%	36%	23%
3a. Surface color- exterior	(n=57)	(n=65)	(n=131)	(n=35)	(n=57)	(n=73)
color names	lt brown (40%) lt orange (23%) black (16%) dk orange (9%) grey (7%) all others (5%)	lt brown (42%) lt orange (28%) black (14%) grey (6%) dk orange (6%) all others (4%)	lt brown (53%) lt orange (17%) black (11%) grey (8%) all others (11%)	lt brown (69%) lt orange (17%) dk orange (6%) all others (8%)	lt brown (33%) lt orange (32%) grey (14%) black (11%) all others (10%)	lt brown (45%) lt orange (19%) grey (14%) black (10%) brown (7%) all others (5%)

3b. Surface color- interior	(n=80)	(n=74)	(n=149)	(n=38)	(n=116)	(n=105)
color names	lt brown (51%) lt orange (18%) dk orange (10%) black (9%)	lt brown (50%) lt orange (30%) dk orange (8%) all others (12%)	lt brown (57%) lt orange (23%) dk orange (5%) grey (5%)	lt brown (61%) lt orange (21%) dk orange (8%) all others (10%)	lt orange (41%) lt brown (24%) black (9%) dk orange (9%)	lt brown (36%) lt orange (29%) black (13%) dk orange (10%)
	brown (5%) all others (7%)	all others (10%)			red-brown (6%) all others (11%)	all others (12%)
4a. Slip color- exterior	59% slipped (n=96)	20% slipped (n=17)	25% slipped (n=43)	16% slipped (n=7)	55% slipped (n=70)	35% slipped (n=43)
color names	lt red (49%) red (24%) brown (6%) dk red (5%) dk orange (5%) all others (11%)	lt red (59%) red (12%) lt orange (12%) brown (12%) all others (5%)	lt red (60%) red (12%) dk red (7%) brown (7%) lt brown (7%) all others (7%)	lt red (29%) dk orange (29%) dk red (14%) red (14%) orange (14%)	lt red (50%) cream (17%) red (14%) dk red (7%) all others (12%)	lt red (44%) red (19%) brown (12%) dk red (9%) all others (16%)
4b. Slip color- interior	46% slipped (n=75)	14% slipped (n=12)	13% slipped (n=23)	9% slipped (n=4)	9% slipped (n=12)	9% slipped (n=11)
color names	lt red (56%) red (19%) brown (10%) orange (5%) all others (10%)	lt red (50%) red (25%) brown (17%) dk red (8%)	lt red (65%) red (17%) red-brown (9%) brown (4.5%) dk red (4.5%)	lt red (25%) red (25%) dk red (25%) orange (25%)	lt red (75%) dk red (17%) lt orange (8%)	lt red (73%) red (18%) brown (9%)
5a. Sooting- exterior	8%	11%	7%	14%	9%	20%
5b. Sooting- interior	5%	7%	6%	2%	10%	21%

6. Firing Code	(n=160)	(n=85)	(n=174)	(n=44)	(n=128)	(n=123)
1a/ all 1s (brown)	12/ 13%	14/ 19%	20/ 22%	23/ 23%	7/ 9%	9/ 19%
2a/ all 2s (light brown)	16/ 25%	12/ 15%	28/ 33%	20/ 27%	13/ 17%	13/ 27%
3a/ all 3s (dk brown)	2/ 4%	1/ 1%	<1/ 2%	2/ 2%	0/ 1%	<1/ 3%
4a/ all 4s (orange)	6/ 7%	2/ 6%	<1/ 1%	2/ 7%	0/ 0	0/ 0
5a/ all 5s (dk orange)	5/ 6%	12/ 12%	5/ 7%	2/ 7%	2/ 3%	8/ 10%
6a/ all 6s (light orange)	4/ 6%	9/ 12%	4/ 5%	7/ 7%	10/ 13%	6/ 8%
7a/ all 7s (red-brown)	25/ 27%	13/ 16%	14/ 16%	18/ 20%	34/ 37%	16%
8a/ all 8s (black)	4/ 11%	5/ 17%	5/ 12%	5/ 7%	7/ 16%	2%/ 16%
9a/ all 9s (grey)	<1/ 1%	0/ 2%	<1/ 2%	0	0/ 1%	0/ 1%
					3% unclear	

Appendix 5k: Paste by vessel type

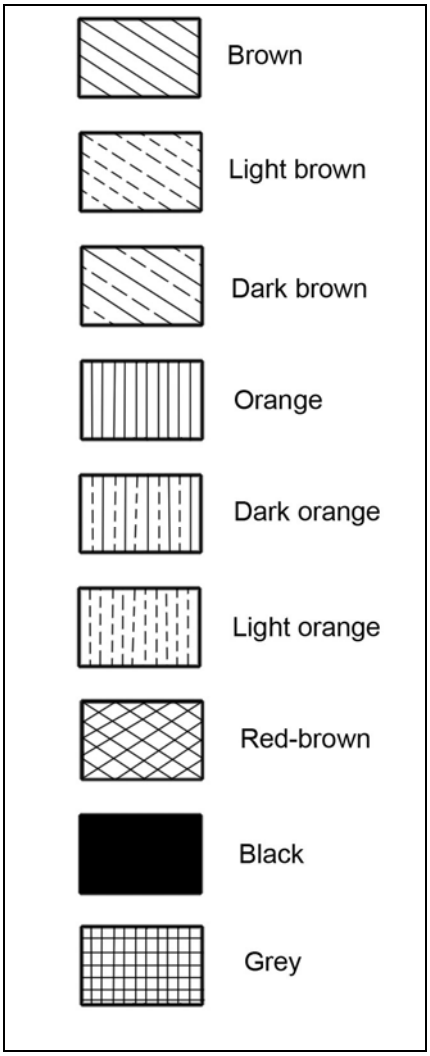
Vessel type	Group A	Group B	Group C
Restricted- *ollas*, *tinaja*s, *vasijas* (n=310)	50%	49%	1%
• *Vasijas* (jars)* (58% of restricted vessels)	54%	46%	<1%
• *Ollas* (26% of restricted vessels)	47%	51%	2%
• *Tinaja*s (14% of restricted vessels)	38% (A6= 14%)	60%	2%
Unclear (2%)			

*only 3 *vasijas* are decorated

Vessel type	Group A	Group B	Group C
Unrestricted- bowls (n=164)	80%	20%	<1%
• Undecorated bowls (73%, n=118)	77%	23%	<1%
• Decorated bowls (27%, n=46)	84%	16%	-

Other	Group A	Group B	Group C
Decorated body sherds from Formative contexts (n=129)	86%	14%	<1%
Decorated and undecorated miniature vessels (n=20)	90%	10%	-
Incensarios (n=34)	97%	-	3%
Handles (n=154)	40%	56%	4%

Appendix 5l: Color key for ceramic drawings



Appendix 5m: Munsell color key for ceramic drawings

Red
5R 4/6
5R 4/8
7.5R 3/8
7.5R 4/8
7.5R 5/8
10R 4/6
10R 5/6

Dark Red
2.5YR 2.5/2
5YR 2.5/2
7.5R 2.5/4
7.5R 3/4
7.5R 3/6
10R 3/2
10R 3/6
10R 4/3

Light Red
7.5R 4/4
7.5R 4/6
10R 3/3
10R 3/4
10R 4/2
10R 4/4

Red-Brown
2.5YR 4/4
2.5YR 4/6
2.5YR 3/4
2.5YR 3/6
2.5YR 5/4
2.5YR 5/3

Brown
5YR 3/4
5YR 4/2
5YR 4/3
5YR 4/4
5YR 4/6
7.5YR 4/4
7.5YR 4/6
7.5YR 5/6
7.5YR 4/3

Dark Brown
2.5Y 3/2
2.5YR 3/2
2.5YR 2.5/3
2.5YR 2.5/4
5YR 3/2
5YR 3/3
7.5YR 3/1
7.5YR 3/2
7.5YR 3/3
7.5YR 2.5/2
7.5YR 3/4
10YR 2/2
10YR 3/3
10YR 3/4

Light Brown
2.5YR 4/2
2.5YR 4/3
2.5YR 6/3
5YR 5/2
5YR 5/3
5YR 5/4
5YR 5/6
7.5YR 4/2
7.5YR 5/2
7.5YR 5/3
7.5YR 5/4
7.5YR 6/3
7.5YR 6/4
10YR 4/2
10YR 4/3
10YR 4/4
10YR 4/6
10YR 5/3
10YR 5/4
10YR 5/6
10YR 6/3
10YR 6/4
10YR 6/6

Orange
5YR 6/8
7.5R 5/6
10R 5/8

Dark Orange
2.5YR 6/6
2.5YR 4/8
2.5YR 5/8
2.5YR 6/8
5YR 5/8
10R 4/8

Light Orange
2.5YR 6/4
2.5YR 5/6
2.5YR 7/8
5YR 6/4
5YR 7/4
5YR 6/6
5YR 7/6
5YR 7/8
7.5YR 7/4
7.5YR 6/6
7.5YR 7/6
7.5YR 5/8
7.5YR 6/8
7.5YR 7/8
10R 6/8

Cream
2.5Y 7/2
2.5Y 7/3
2.5Y 8/3
10YR 7/2
10YR 7/3
10YR 7/4
10YR 8/3
10YR 8/4

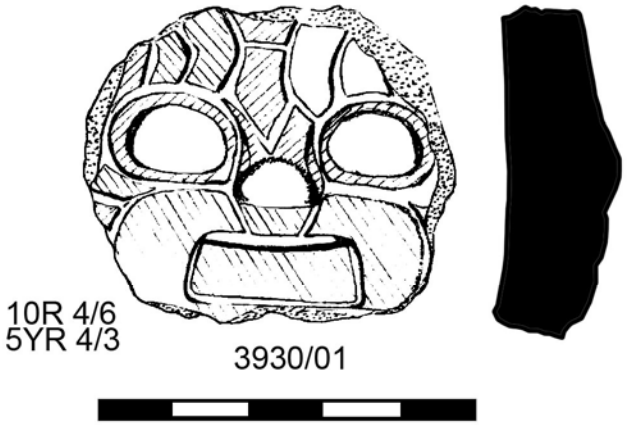
Pale Yellow
2.5Y 7/4
10YR 7/6
10YR 8/6
10YR 8/8

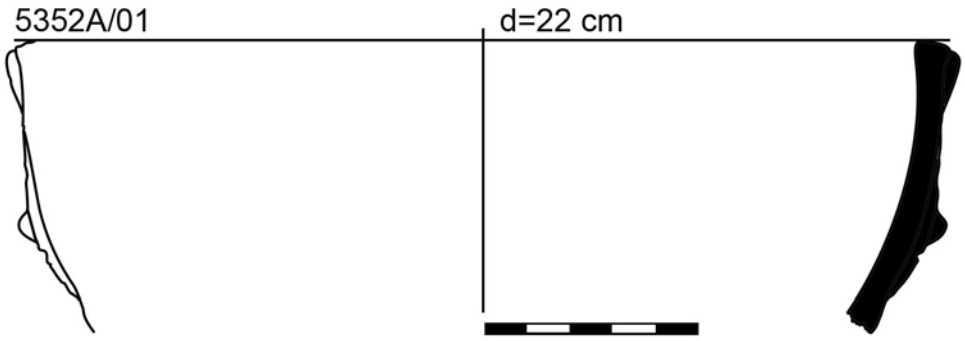
White
2.5Y 8/1
2.5Y 8/2
5Y 8/1
5Y 8/2
5YR 8/1
7.5YR 8/1
10YR 8/2

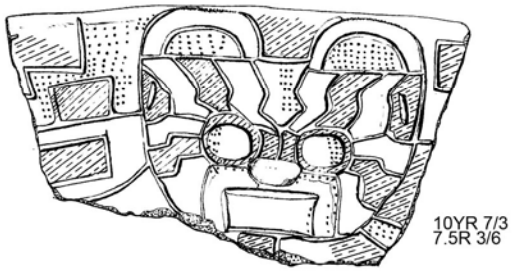
Grey
2.5Y 4/1
2.5Y 5/1
2.5Y 6/1
2.5YR 5/1
2.5YR 5/2
2.5YR 7/1
5YR 5/1
5YR 4/1
2.5Y 4/2
7.5R 5/1
7.5R 6/1
7.5YR 4/1
7.5YR 5/1
7.5YR 6/1
10YR 4/1
10YR 5/1
10YR 5/2
10YR 6/1
10YR 6/2
Gley 1 3N

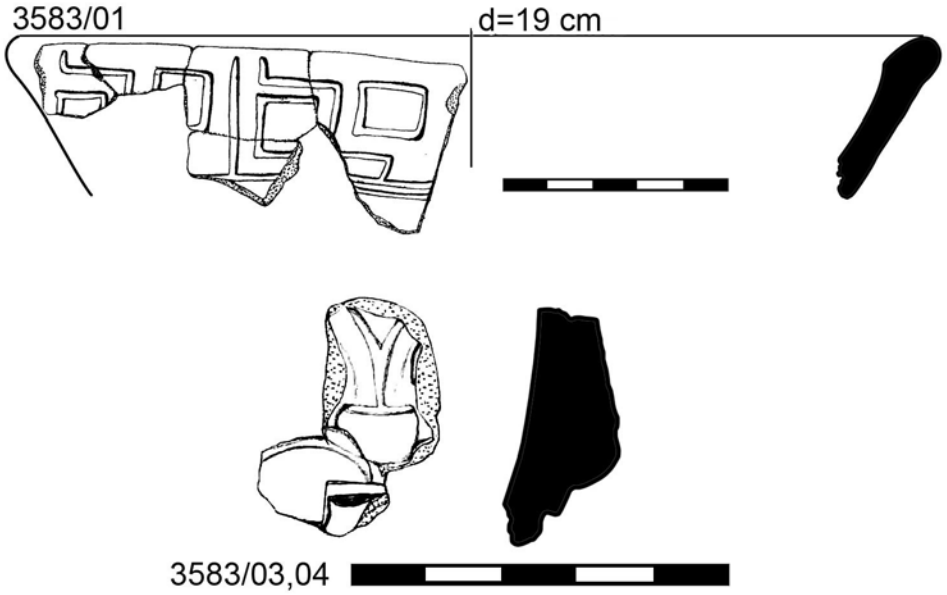
Black
2.5YR 2.5/1
5YR 2.5/1
5YR 3/1
7.5R 2.5/1
7.5YR 2.5/1
10YR 2/1
10YR 3/1
Gley 1 2.5N

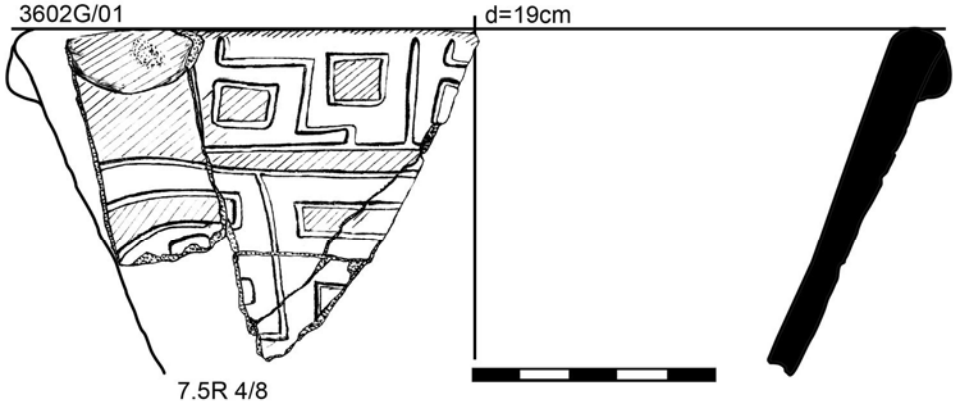
Appendix 5n: Pukara *incensarios*

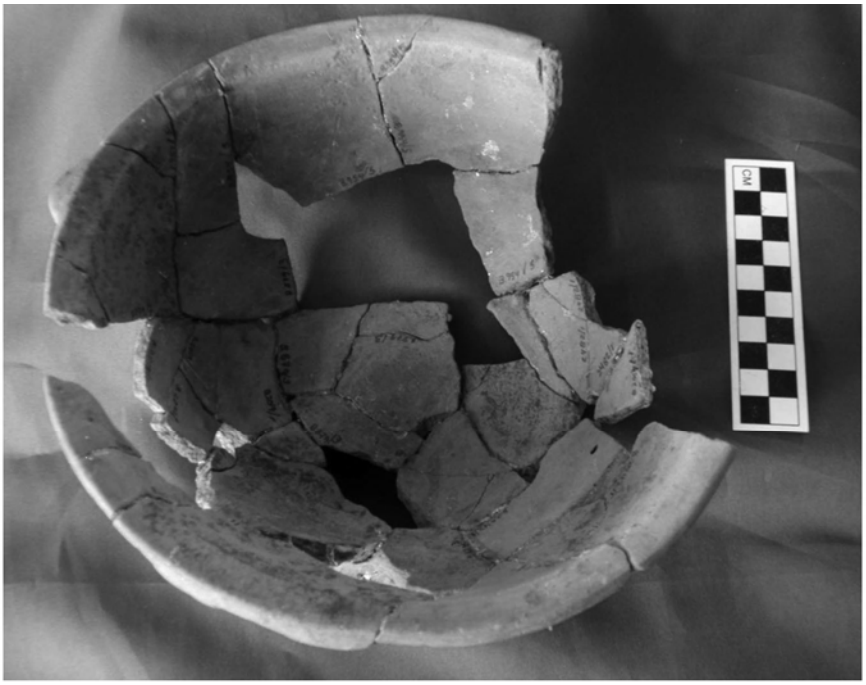






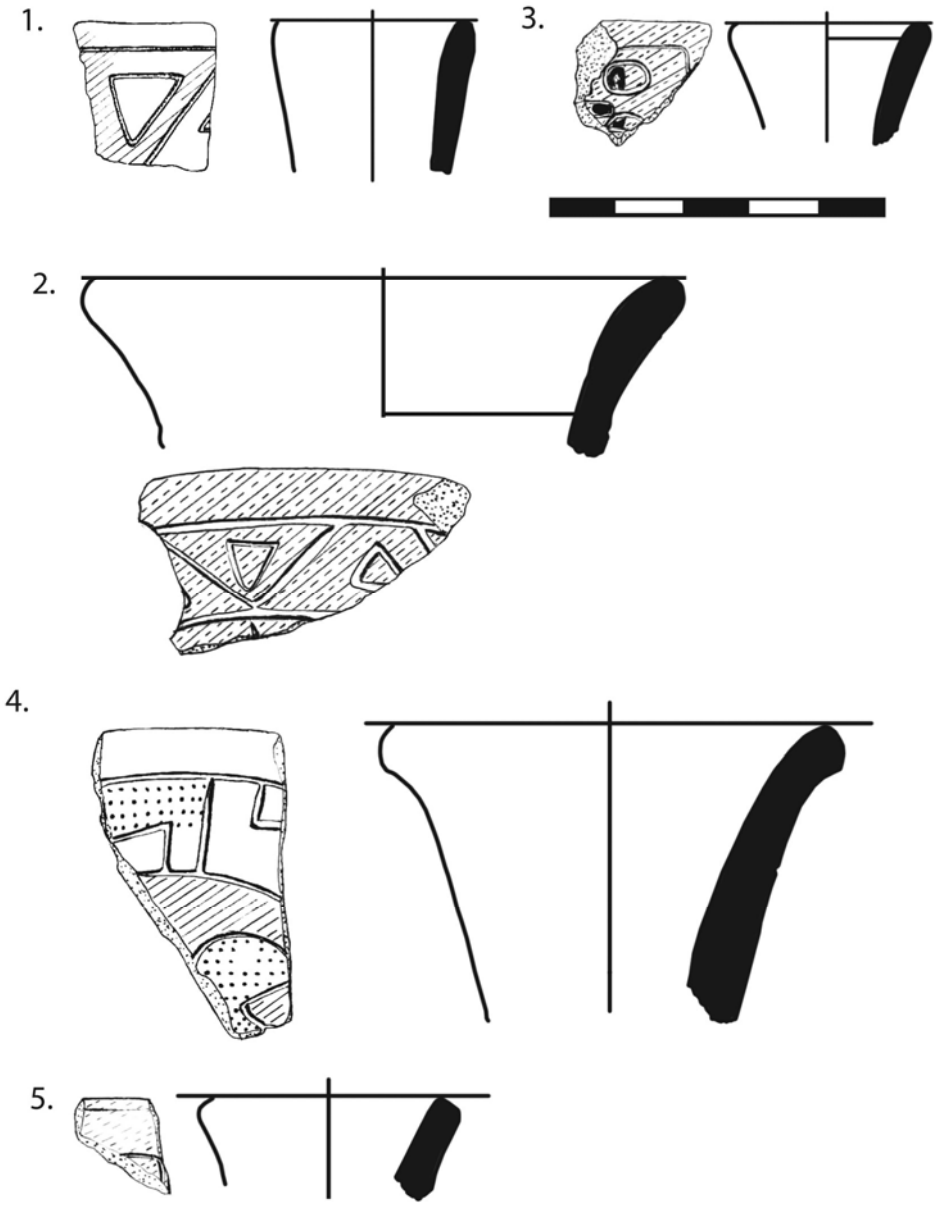

3583/01
d=19 cm
3583/03,04


3602G/01
d=19cm
7.5R 4/8

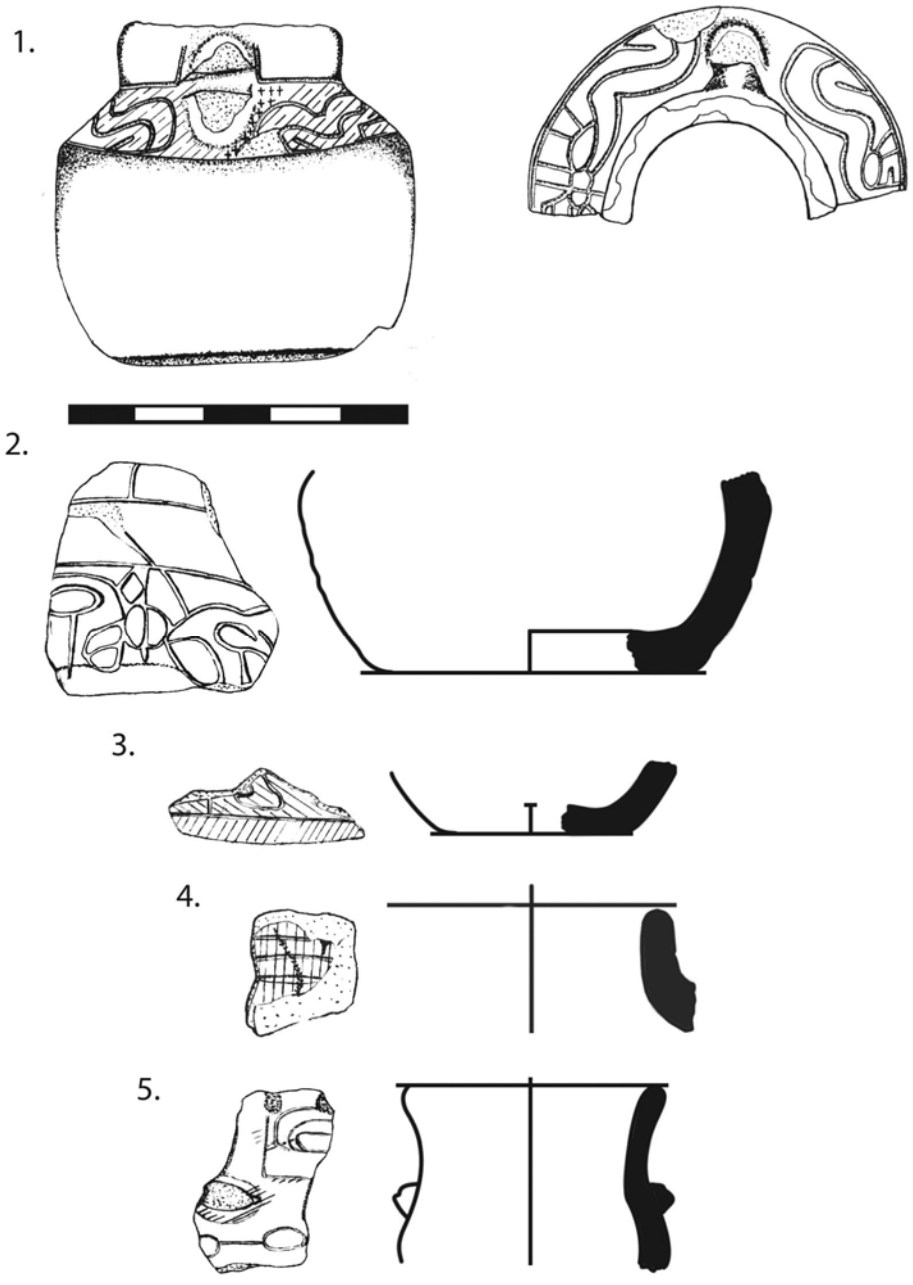


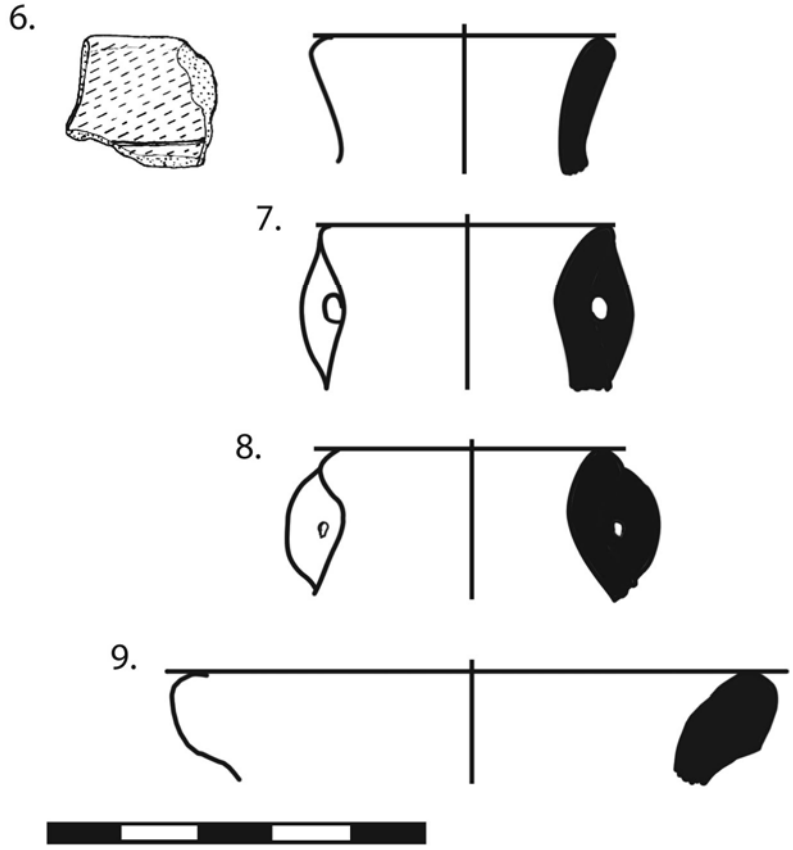

CM
Incensario 1
954/5
2482/1
879/3
2042/1
2019/1
3602/1/A

Appendix 5o: Miniature vessels (trumpets/ tubes)

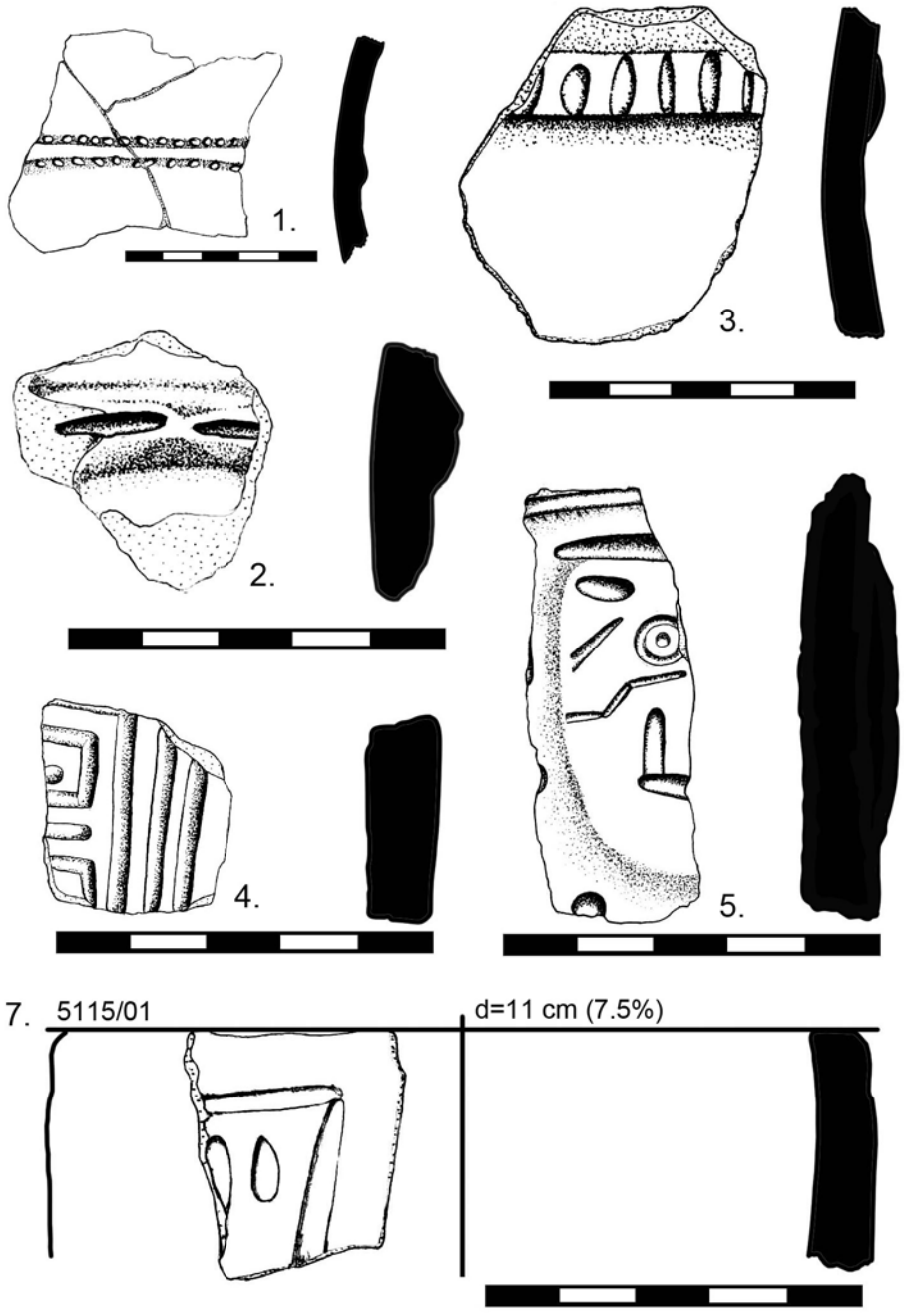


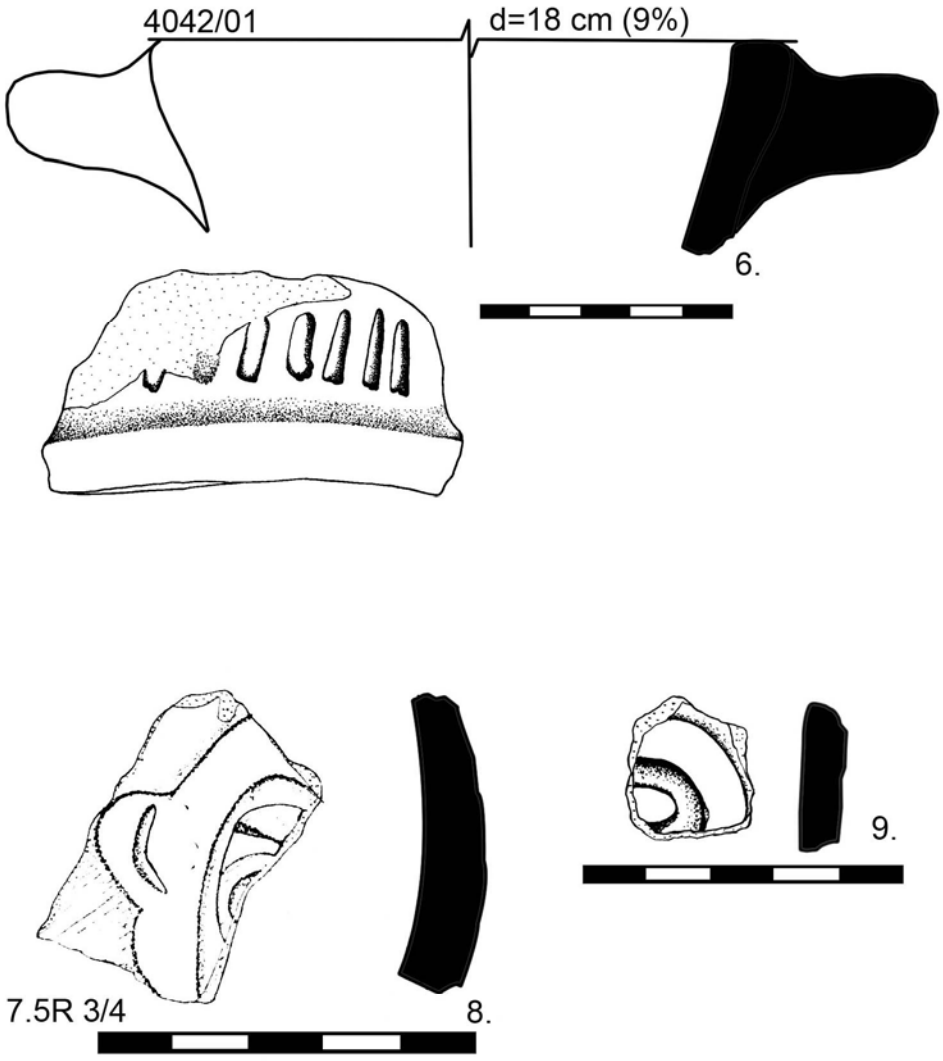
Appendix 5p: Miniature vessels

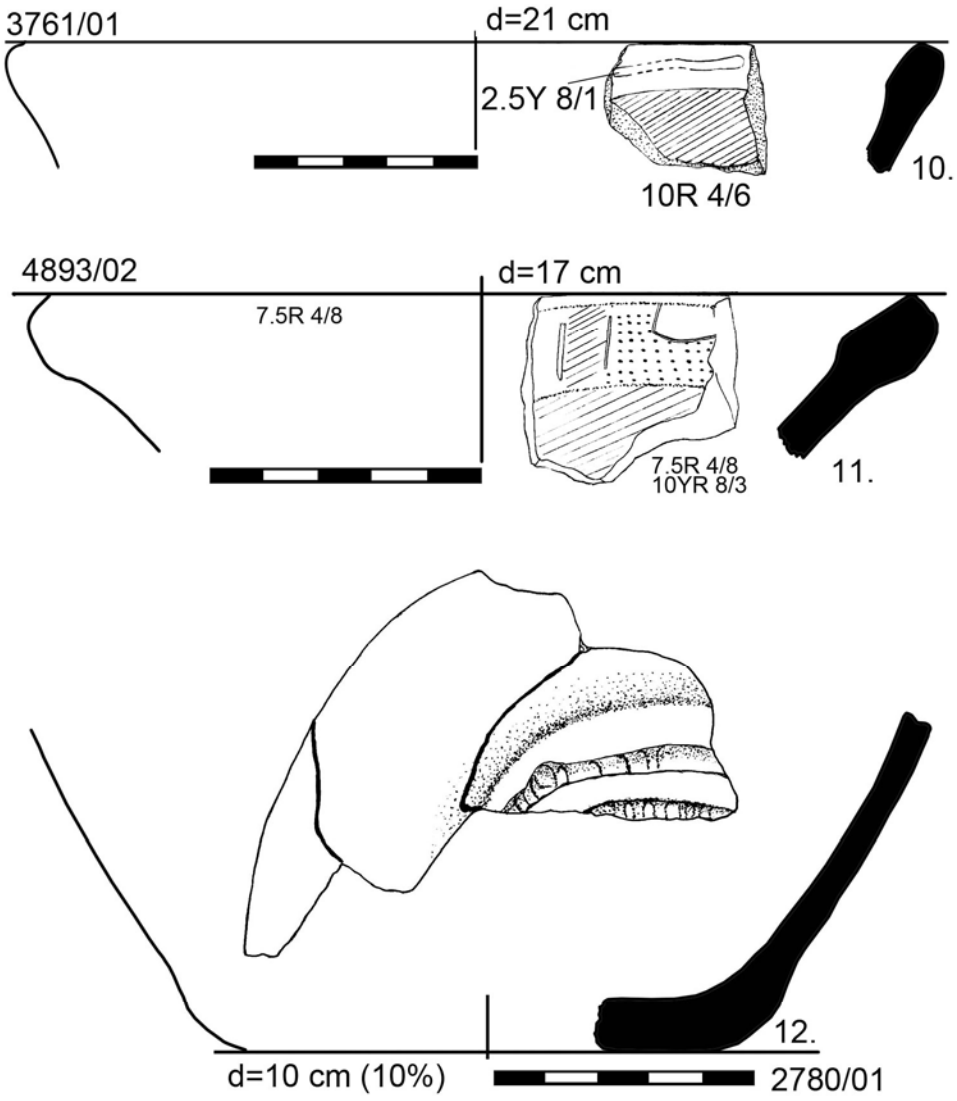



6.
7.
8.
9.

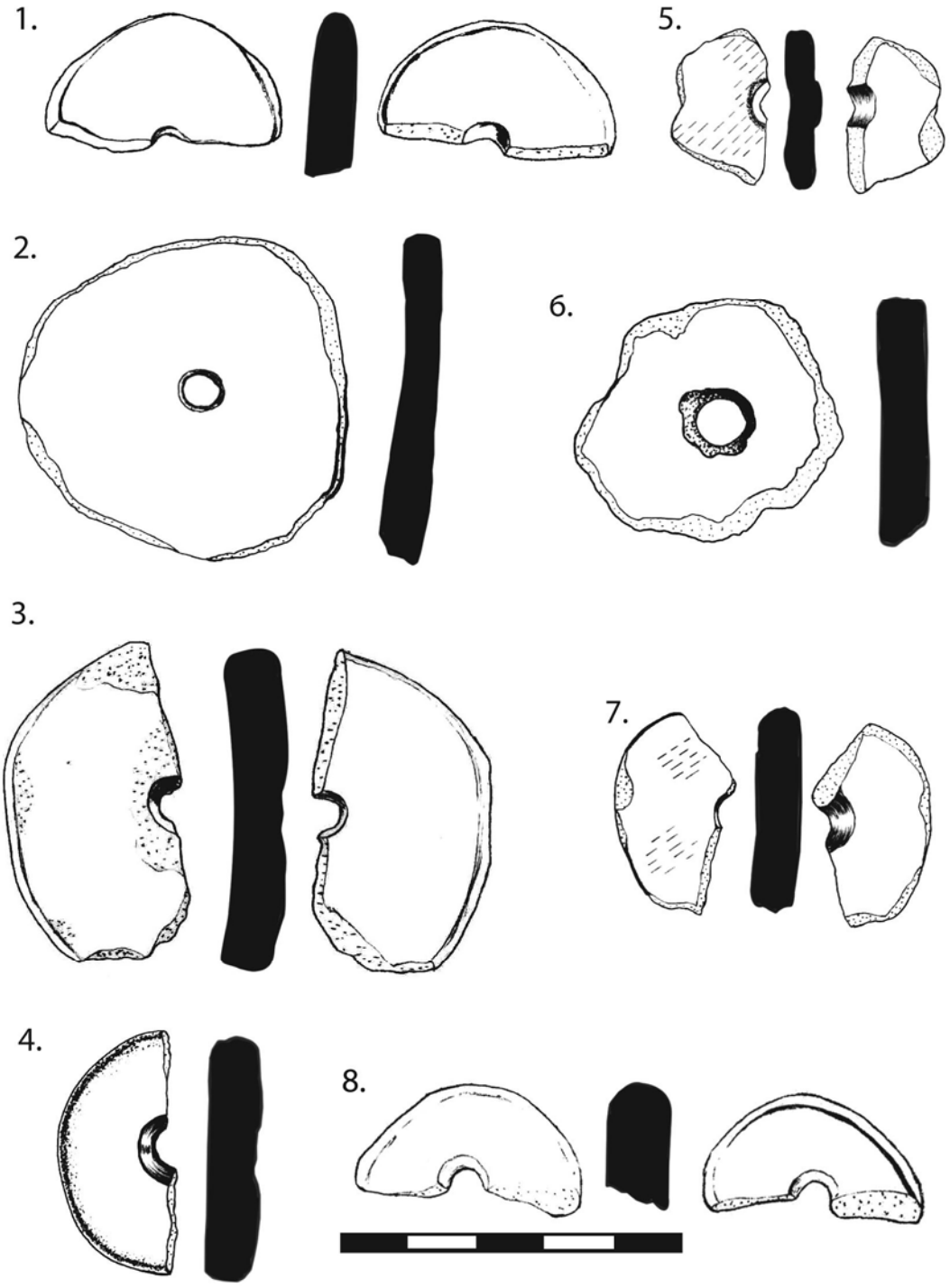
Appendix 5q: Non-local Ceramics

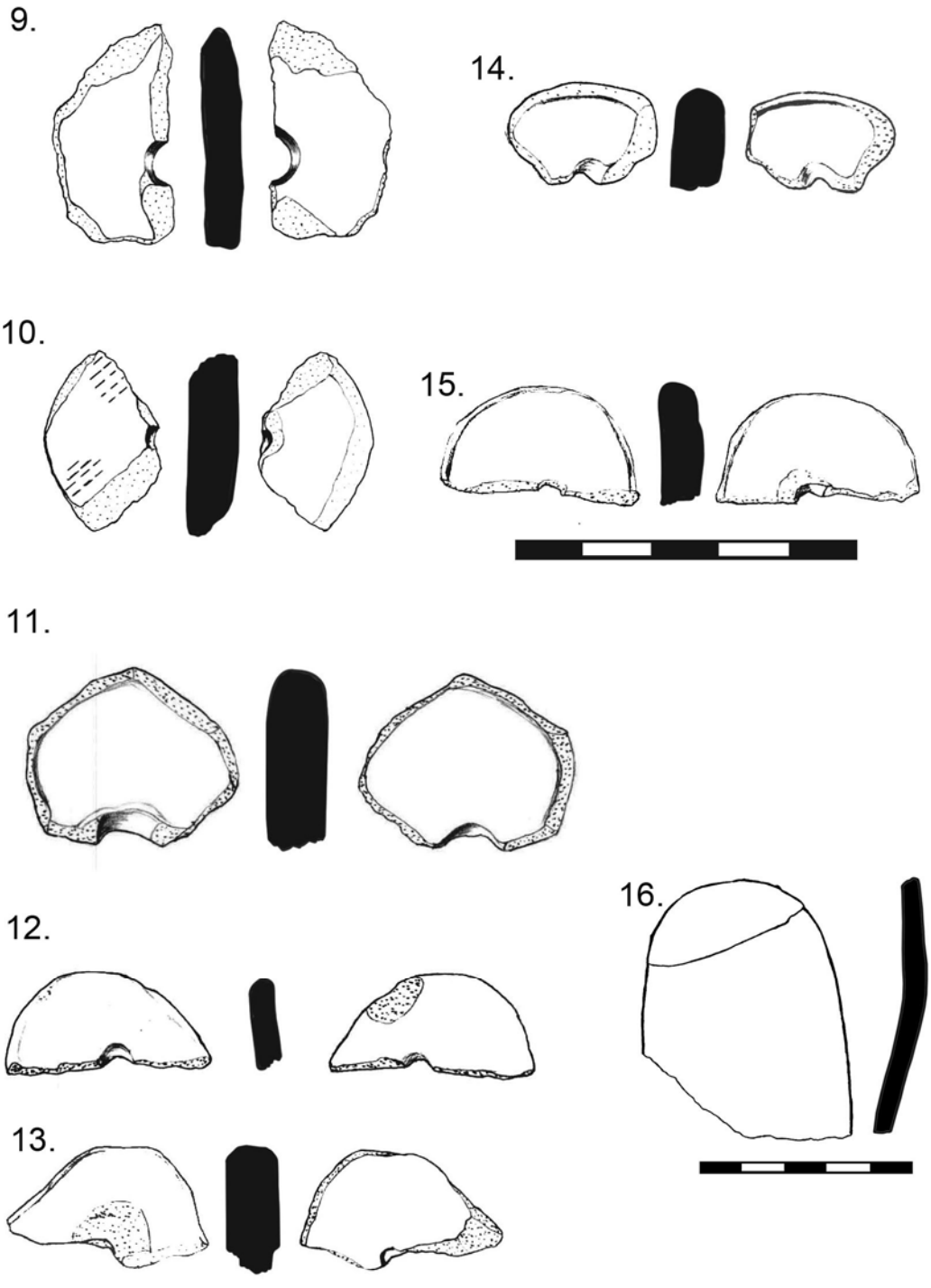



4042/01
d=18 cm (9%)
6.
7.5R 3/4
8.
9.

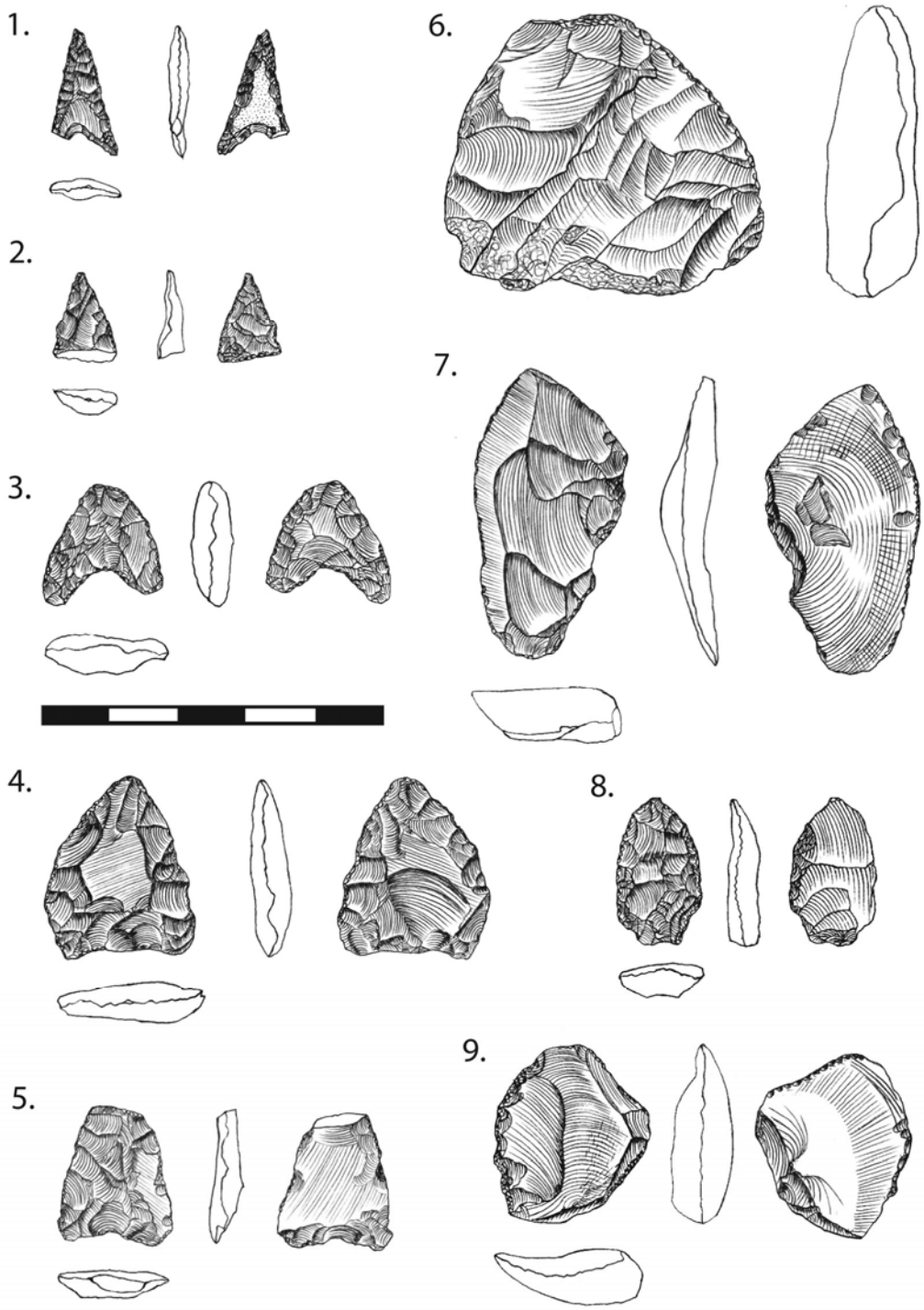

3761/01
d=21 cm
2.5Y 8/1
10R 4/6
10.
4893/02
d=17 cm
7.5R 4/8
7.5R 4/8
10YR 8/3
11.
12.
d=10 cm (10%)
2780/01

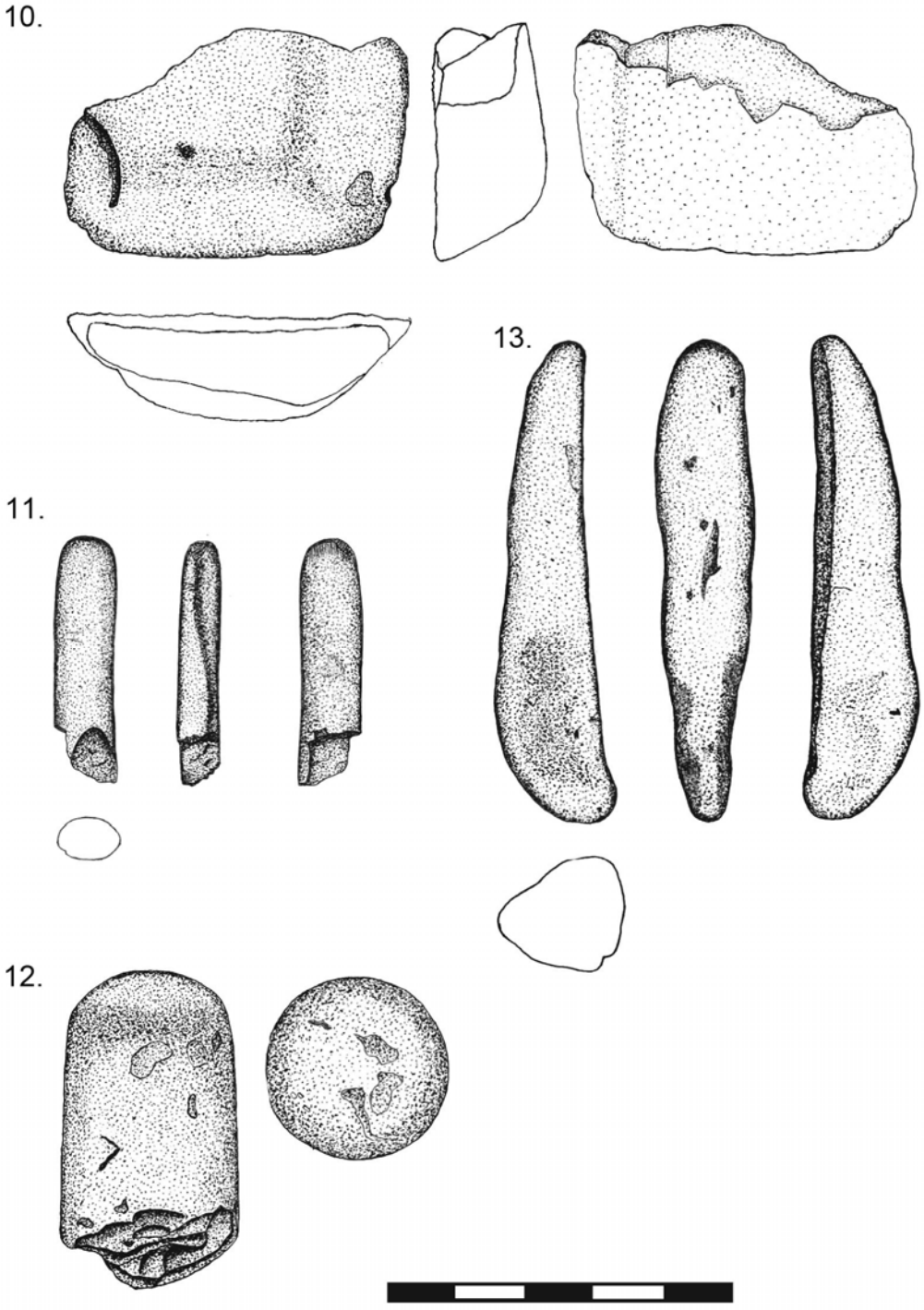
Appendix 6: Ceramic tools (whorls and scrapers)



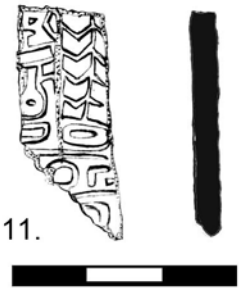

9.
14.
10.
15.
11.
16.
12.
13.

Appendix 7: Lithic tools

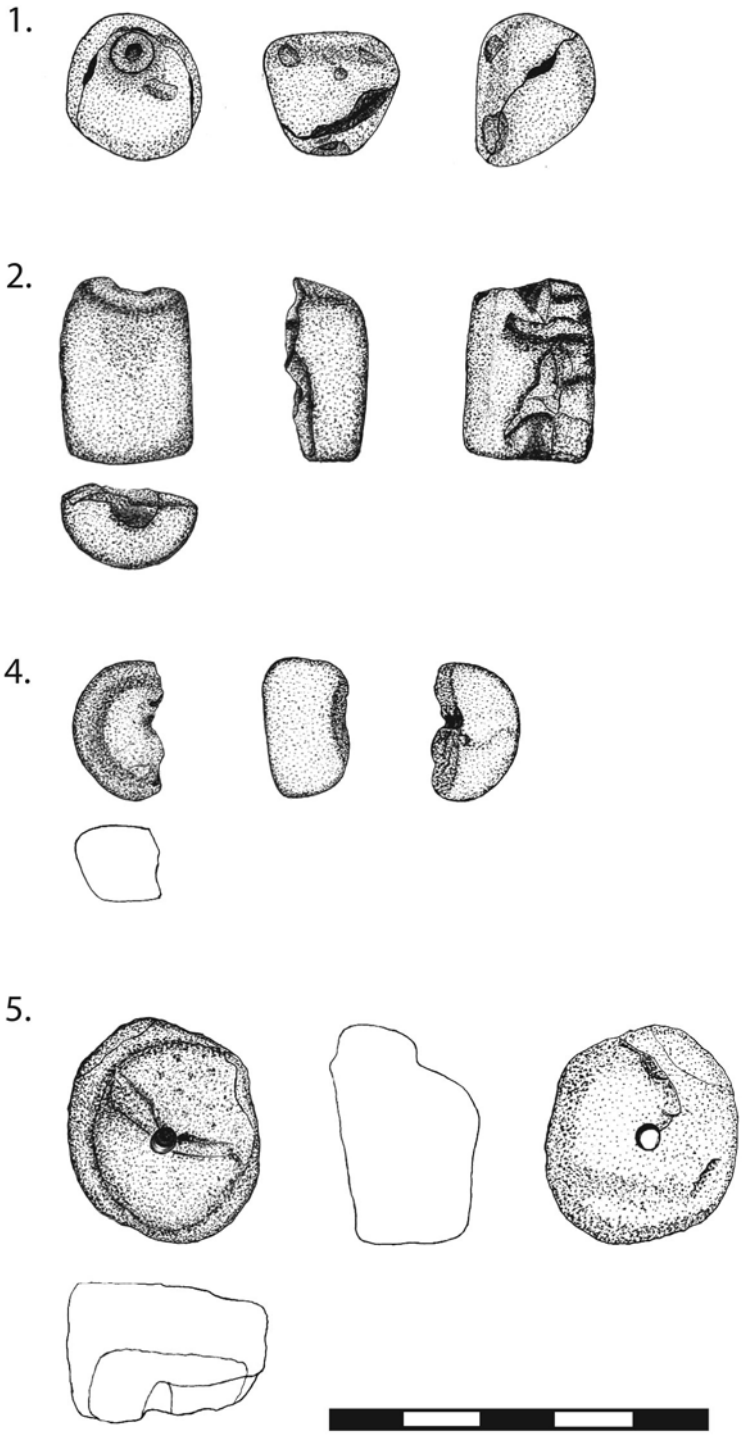



10.
11.
12.
13.

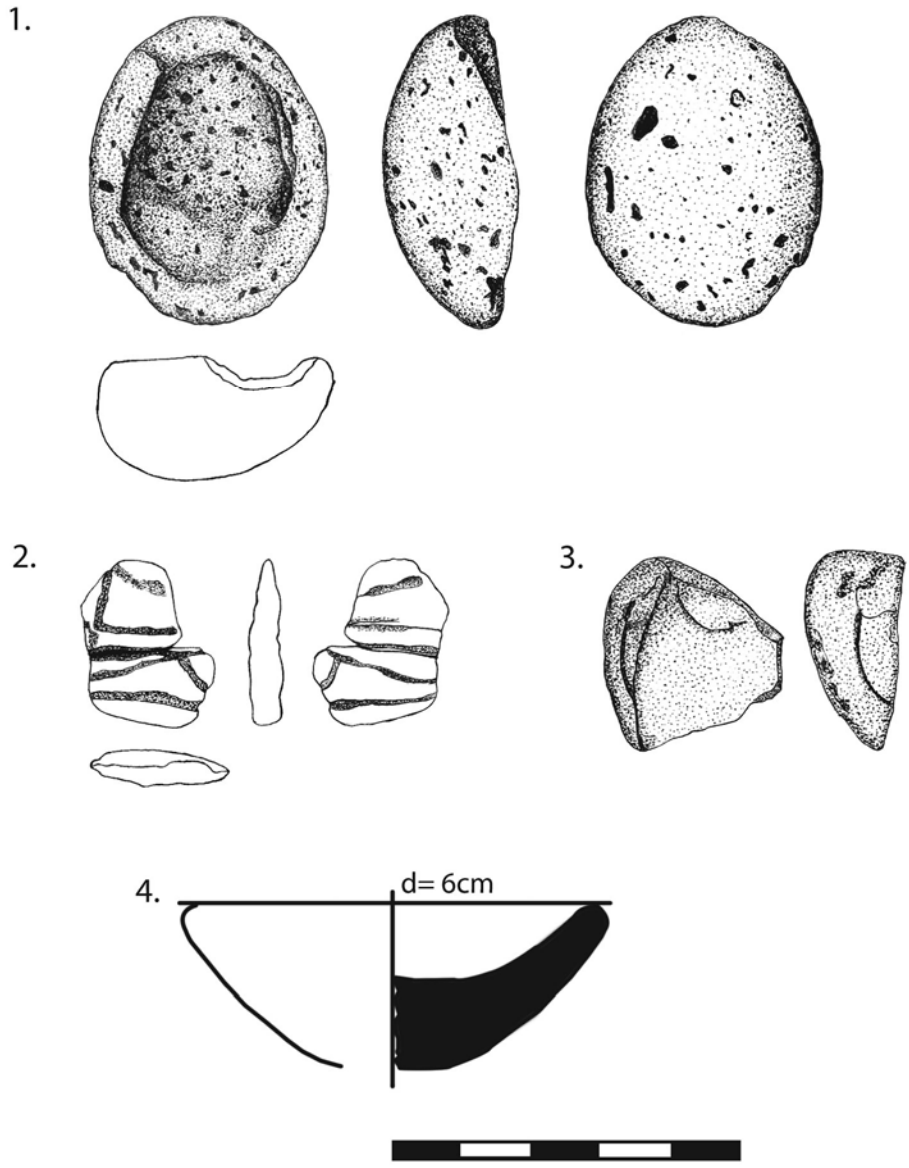
Appendix 8: Bone tools



Appendix 9: Stone beads



Appendix 10: Chalk artifacts



Appendix 11: Specimen list for Appendices

Appendix	Specimen Number	Artifact Description
5d	2913/04	Bowl type 1
5d	5306/01	Bowl type 1
5d	1310/01	Bowl type 2
5d	5228/06	Bowl type 3
5d	3752/02	Bowl type 4
5d	3998/00	Bowl type 5 (burned)
5d	4674/01	Bowl type 6
5d	4173/01	Bowl type 7
5d	4204/01	Bowl type 7 (with nubs)
5d	2831/01	Bowl type 8
5d	2603/03	Bowl type 9
5e	2641/01	Vasija type 1
5e	768/06	Vasija type 2
5e	3330/01	Vasija type 3
5e	3708/01	Vasija type 4
5e	1320/05	Vasija type 5
5e	1415/03	Vasija type 6
5e	3797/01	Vasija type 7
5e	4633/01	Vasija type 8
5e	4588/01	Vasija type 9
5f	3929/02	Tinaja (flat rim)
5f	4864/03	Tinaja (exterior thickening)
5f	4800/03	Tinaja (semi-rounded)
5f	4229/01	Tinaja (slight exterior thickening)
5g	2438/06	Olla type 1 (neckless)
5g	4960/01	Olla type 2 (straight)
5g	3806/02	Olla type 3 (flaring)
5g	4659/01	Olla (flaring)
5g	3281/01	Olla
5g	2695/04	Olla (with handles)
5n	3930/01	Incensario fragment- worked
5n	5352A/01	Incensario
5n	3583/01	Incensario 4 (black)
5n	3602G/01	Incensario
5n		Incensario 1 (photo)

5n		Incensario 1 (photo)
5-o-1	1358/01	Ceramic trumpet/ tube
5-o-2	3685/01	Ceramic trumpet/ tube
5-o-3	3729/03	Ceramic trumpet/ tube
5-o-4	5057/01	Ceramic trumpet/ tube
5-o-5	5144/05	Ceramic trumpet/ tube
5-o-6	4615/02	Ceramic trumpet/ tube
5-o-7	2446/04	Ceramic trumpet/ tube
5-o-8	4743/03	Ceramic trumpet/ tube
5-o-9	4991/04	Ceramic trumpet/ tube
5-p-1	2616/01	Miniature- incised jar
5-p-1	4581/01	Miniature- incised jar
5-p-2	4866/01	Miniature- incised base
5-p-3	4938/05	Miniature- incised jar
5-p-4	3776/02	Miniature- incised/ modeled jar
5-q-1	5185/01	Non-local sherd (punctate)
5-q-2	4100/03	Non-local sherd (banded punctate)
5-q-3	4052/12	Non-local sherd (banded punctate)
5-q-4	2913/12	Non-local sherd (Ramis style)
5-q-5	2767/01	Non-local sherd (feline?)
5-q-6	4042/01	Non-local sherd
5-q-7	5115/01	Non-local sherd (Paruro?)
5-q-8	5234/05	Non-local sherd
5-q-9	4075/01	Non-local sherd
5-q-10	3761/01	Non-local? (Cusipata)
5-q-11	4893/02	Non-local? (Cusipata)
5-q-12	2780/01	Non-local sherd (basket base)
6-1	0271/12	Spindle whorl- fragment
6-2	1499/01	Spindle whorl- complete
6-3	4061/06	Spindle whorl- fragment
6-4	3258/01	Spindle whorl- fragment
6-5	1384/09	Spindle whorl- fragment
6-6	4175/01	Spindle whorl- complete
6-7	2695/05	Spindle whorl- fragment
6-8	4520/27	Spindle whorl- fragment
6-9	2600/02	Spindle whorl- fragment
6-10	4036/02	Spindle whorl- fragment
6-11	4934/04	Spindle whorl- fragment
6-12	4588/05	Spindle whorl- fragment
6-13	3707/09	Spindle whorl- fragment?
6-14	3219/03	Spindle whorl- fragment?
6-15	4052/13	Spindle whorl- fragment

6-16	4157/01	Ceramic scraper
7-1	0101	Projectile point (chalcedony)
7-2	2195	Projectile point, fragment (obsidian)
7-3	3824	Projectile point (obsidian)
7-4	4199	Biface (obsidian)
7-5	4887	Biface (obsidian)
7-6	2854	Biface (chert)
7-7	3977	Modified flake (obsidian)
7-8	0756	Modified flake (obsidian)
7-9	3322	Modified flake (obsidian)
7-10	0398	Groundstone fragment
7-11	3423	Groundstone- polishing tool?
7-12	4728	Groundstone- pestle
7-13	2739	Groundstone- polishing tool?
8-1	3822	Bone tool- pressure flaker?
8-2	3833	Bone tool- wichuña
8-3	3757	Bone tool- long bone artifact
8-4	4182	Bone tool- wichuña?
8-5	4233	Bone tool- long bone artifact
8-6	4059	Bone tool- long bone artifact
8-7	4262	Bone tool- long bone tool
8-8	4241	Bone tool- spatula?
8-9	4158	Bone tool- unclear function
8-10	2936	Bone tool- unclear function
8-11	3295	Bone ornament- incised
9-1	0120	Stone bead
9-2	0746	Stone bead
9-3	0773	Stone bead
9-4	5188	Stone bead
10-1	1445	Chalk bowl
10-2	0340	Chalk fragment, incised
10-3	1675	Chalk fragment
10-4	3208	Chalk bowl

Appendix 12: Excavation data tables (Chapter 8)

Block 1, ratios of ceramic vessel types by context

	Initial Late Formative occupation		*Fill*	*Middle occupation*	*Fill*	*Final Late Formative occupation*	
	East Middens	**OZ5**	**FE4/6**	**OZ4 & F. 21 & 26**	**FE5**	**OZ3**	**F. 18, 19 & 20**
Serving							
Bowls	30	1	10	5[1]	2	5	1
D. Bodies	42	0	20	6	5	3	0
N. serving							
Ollas	19	0	10	1	0	2	0
Vasijas	53	1	15	3	8	3	4
Tinajas	7	0	1	0	0	0	2
Tools							
Scrapers	8	0	5	0	0	2	0
Whorls	0	0	2	0	0	0	0
Others							
Bases	50	2	19	2	7	3	3
Minis	4	1	4	0	2	3	1/ 1 trumpet
Handles	35	0	15	1	6	2	3
Unclear	3	0	2	0	0	0	3
Total Specs	**251**	**5**	**103**	**18**	**31**	**23**	**18**
No. [S & NS]	**72:79**	**S.S**	**30:26**	**11:4**	**7:8**	**8:5**	**1:6**
%Serv/ %NServ	**48/ 52 [.92]**		**54/46 [1.17]**	**73/27 [2.7]**	**47/53 [.89]**	**62/38 [1.63]**	**14/86 [.16]**
ratio	**.92**		**1.17**	**2.7**	**.89**	**.82**	

1. all incised on the interior

KEY
D. bodies= decorated bodies
Specs= specimens
Incens.= incensario
F= feature
SS= small sample
OZ= occupation zone
OS= occupation surface
FE= fill episode
N. serving= non-serving
No. [S & NS]= number, serving and non-serving
%Serv/ %NServ= percentage of serving/ percentage of non-serving

Block 1, distribution of diagnostic artifacts by context

Context	Artifact Description	Quantity
Initial occupation		
F. 27	netherstone/ batan	1
F. 27	handstone w/ ochre	1
F. 27	stone whorl or bead	1
F. 27	metal	2
F. 27	bone awl	1
F. 16-3	antler	1
F. 16-3	bone tool- generalized scraper	1
F. 16-2	bone tool- generalized scraper	1
F. 16-1	core	1
F. 16	ceramic scraper	8
F. 16	obsidian biface	1
BL1W	possible adze	1
Earlier fill episode		
FE 4	bone tool- weaving toggle?	2
FE 6	ceramic whorl	1
FE 4/6	ceramic scraper	7
Middle occupation		
	chert/ obsidian flake concentration	355
Later fill episode		
FE 5	bone tool (tube)	1
Final occupation context		
OZ 3	bone tool (tube)	1
F. 19	handstone	3
	ceramic scrapers	2

Block 1, summary of area function by material and context

	Initial	Middle	Final
Vessel ratios (serving & non-serving)	.92	2.7	.82 [OZ3=1.63 & Fs. 18,19,20=.16]
Food & beverage related activities			
Chipped stone	1 obsidian biface	-	-
Ground stone	1 *batan* fragment	-	3 handstones
Other tools	2 bone tools- general scrapers	-	-
Thermal features	1 informal hearth (L. 905)	2 sm. thermal features (Fs. 21 & 26)	-
Pot rests	-	-	-
Primary middens	East middens	-	Deposit of animal bones (F. 18)
Secondary middens	-	-	Fs. 19 & 20 pits
Craft- related activities			
Ceramics (processing)	-	-	-
Ceramics (firing)	-	-	-
Textiles	1 awl	-	-
Lithics	1 core	debitage concentration	-
Ornaments	1 small stone bead & 1 metal fragment	-	-
Use of pigment	1 handstone w/ ochre	-	-
Other		-	-
Consumption of ritual paraphernalia			
Incensarios	-	-	-
Miniatures	3 miniature bases & jar/trumpet fragment	-	2 jars (1 incised) & 1 trumpet
Snuff kit elements	-	-	1 bone tube
Non- local ceramics	5 banded punctates & 7 incised	3 banded punctates, 1 painted & 2 incised	1 incised
Other			
Tools- unclear function	8 ceramic scrapers	-	2 ceramic scrapers
	1 possible adze		

Block 1, artifact density by context (grams/ liter)

Block 1- initial occupation contexts	**Volume (liters)**	**Sherds (g)/ liter**	**Lithics (g)/ liter**	**Bones (g)/ liter**
BL1E				
F. 27 midden	272	6.0	3.0	12.1
F. 25 midden	261	4.3	.7	7.8
F. 24 midden	120	5.1	.5	4.8
F. 23 midden	41	.4	.4	1.3
F. 22 midden	19	.3	.3	4.1
F. 16 midden	1654	5.6	.8	4.6
BL1W				
Fill episode 7	1216	.04	.01	.1
Occupation zone 5	1097	.2	.01	.5
L.902 hearth/ L.905 pit	112	.4	.02	1.6
Block 1W- earlier fill episode				
Fill episode 4 [E]	1610	2.7	.5	1.0
Fill episode 6 [W]	721	1.3	.1	1.3
Both combined [E/W]	2331	2.2	.4	1.1
Fill episode 4/ F.16	323	4.6	1.2	1.6
Block 1W- middle occupation contexts				
Occupation zone 4	806	1.5	.3	1.4
F. 21 pit [all flot]	/	/	/	/
F. 26 pit [all flot]	/	/	/	/
Block 1W- second fill episode				
Fill episode 5	848	2.2	.1	1.5
Block 1W- final occupation contexts				
Occupation zone 3	485.5	4.6	.4	1.6
F. 18 midden	47.5	22.1	1.3	49.2
F. 19 pit	1.5	/	/	/
F. 20 pit	17.5	/	/	/

Block 2, ratios of ceramic vessel types by context

	Initial Late Formative occupation				***Middle occupation***	***Final Late Formative occupation***	
	OS2/ F. 29	**Carbon pit**	**OZ2 (lenses)**	**SWM**	**OZ1**	**OS1- pebbles**	**OS1 & F. 7, 9 & 28**
Serving							
Bowls	0	0	5[1]	9	22	0	0
D.Bodies	3	2	4	8	22	0	0
N.serving							
Ollas	0	2	7	3	15	0	0
Vasijas	0	0	0	7	5	0	4
Tinajas	0	1	6	2	9	0	0
Tools							
Scrapers	0	1	0	3	0	0	2
Whorls	0	0	0	1	0	0	0
Others							
Bases	0	1	8	12	17	1	4
Incens.	0	1[2]	0	0	3	1	12[3]
Minis	0	0	0	0	1	0	0
Handles	0	0	4	2	9	0	0
Unclear	0	0	3	3	7	0	0
Total Specs	**3**	**8**	**38**	**50**	**110**	**2**	**22**
No. [S & NS]	**S.S**	**S.S**	**9:13**	**17:12**	**47:29**	**S.S**	**0:4, w/12 incensarios**
%Serv/ %NServ			**41/59 [.69]**	**59/41 [1.44]**	**62/38 [1.63]**		
ratio	**(53/47) 1.12**				**1.63**	**>3 w/ incensarios**	

1. all bowls with diameter > 18cm
2. pendant shaped from incensario fragment
3. from at least four different incensarios

Block 2, distribution of diagnostic artifacts by context

Context	Artifact Description	Quantity
Initial occupation		
OZ2/OS2	worked bone	2
OS 2 pit	feline *incensario* pendant	1
OS 2 pit	ceramic scraper	1
OS 2	bone tool- awl	1
OS 2	obsidian biface	1
SWM	antler	1
SWM	bone tool- spatula	1
SWM	bone tool- *wichuña*	1
SWM	bone tool- pressure flaker	1
SWM	spindle whorl	1
SWM	ceramic scraper	3
SWM	miniature vessel	1
Middle occupation context		
OZ 1	bone tool- unclear	2
OZ 1	obsidian projectile point	1
OZ 1	bone tool- unclear	2
OZ 1	lithic tool	1
OZ 1	2 obsidian tools	2
OZ 1	bone tool- awl	1
OZ 1	bone tool- unclear	1
OZ 1	groundstone	4
OZ 1	miniature vessels	1
Final occupation context		
OS1	hematite	1
OS1	handstone	1
OS1	handstone	1
OS1	ceramic scrapers	2
F.7	netherstone/ batan	1
F.7	burned lithics	
F.7	lithic tool	1

Block 2, summary of area function by material and context

	Initial	Middle	Final
Vessel ratios (serving & non-serving)	1.12	1.63	>3 if *incensarios* are included
Food & beverage related activities			
Chipped stone	1 obsidian biface (next to F. 29)	-	-
Groundstone	-	4 fragments	2 handstones & 1 *batan*
Other tools/ features	-	-	-
Thermal features	Fs. 29 & 30	-	F. 28
Pot rests	-	-	-
Primary middens	Carbon pit	-	-
Secondary middens	Southwest midden (unclear)	-	Reuse of Fs. 7 & 9 pits
Craft- related activities			
Ceramics (processing)	-	-	-
Ceramics (firing)	-	-	-
Textiles	1 spindle whorl, 1 *wichuña*, 1 bone awl	1 awl	-
Lithics	1 bone pressure flaker	1 complete obsidian point	-
Ornaments	-	-	-
Use of pigment	-	-	-
Other	1 antler	-	-
Consumption of ritual paraphernalia			
Incensarios	1 feline pendant in carbon pit	3 fragments	13 fragments (+10 directly overlying OS1 & 5 east of ASD 12)
Miniatures	2 rims (trumpets?)	Jar w/ handles	-
Snuff kit elements	1 bone spatula	-	-
Non- local ceramics	3 painted	1 banded punctate & 1 painted & 2 incised	-
Other			
Tools- unclear function	4 or 5 ceramic scrapers	-	2 ceramic scrapers
	2 worked bones	3 bone tools	-

Block 2, artifact density by context (grams/ liter)

Block 2- initial occupation contexts	**Volume (liters)**	**Sherds (g)/ liter**	**Lithics (g)/ liter**	**Bones (g)/ liter**
Occupation surface 2	96	6.0	.5	2.6
Occupation zone 2	737	6.0	.7	3.1
Lens (OZ2)	66	4.0	.23	6.3
Carbon pit	ck			
Southwest midden	1074	2.2	.4	3.3
Southwest midden (upper surface)	189	13	.2	19.6
Block 2- middle occupation context				
Occupation zone 1	4213	1.8	.5	1.4
Block 2- final occupation context				
Occupation surface 1 [pebbles]	1148	.5	.3	.3
Final deposit on OS1	548	2.7	.2	.2
F. 28 hearth	/	/	/	/
F. 7 pit	/	/	/	/
F. 9 pit	/	/	/	/

Block 3, ratios of ceramic vessel types by context

	Initial Late Formative occupation					***Fill***	***Final Late Formative occupation***		
	OZ2	**NWM 3-5**	**NM 1/2**	**F.17**	**F.15**	**FE2**	**NWM 1/2**	**OS1**	**OZ1**
Serving									
Bowls	4	3	11	1	3	21	7	8	2
D.Bodies	3	2	3	1	1	10	1	4	5
N. serving									
Ollas	1	3	6	0	1	3	3	0	1
Vasijas	3	4	10	1	1	19	9	7	7
Tinajas	0	2	1	0	0	0	2	0	4
Tools									
Scrapers	3	1	6	0	1	2	2	1	0
Whorls	0	2	1	0	0	1	0	0	2
Others									
Bases	13	13	11	1	3	20	5	8	5
Minis	1	0	0	0	0	0	0	0	0
Handles	1	5	10	2	3	16	1	2	9
Unclear	7	4	9	0	2	21	4	0	4
Total Specs	**36**	**39**	**66**	**6**	**15**	**113**	**34**	**33**	**39**
No. [S & NS]	**7:4**	**5:9**	**14:17**	**2:1 (S.S)**	**4:2 (S.S)**	**31:22**	**8:14**	**12:7**	**8:12**
%Serv/ %NServ	**64/36 [1.78]**	**36/64 [.56]**	**45/55 [.81]**	**67/33 [2.03]**	**67/33 [2.03]**	**58/42 [1.38]**	**36/64 [.56]**	**63/37 [1.7]**	**40/60 [.67]**
ratio	**(32:33 or 49/51) .96**					**1.38**	**(27:33 or 45/55) .82**		

Block 3, distribution of diagnostic artifacts by context

Context	Artifact Description	Quantity
Initial occupation		
OZ 2	ceramic scrapers	3
OZ 2	miniature ceramic vessel	1
F.15	bone tool- unclear	1
F.15	ceramic scrapers	1
NWM 4	bone tool	1
NWM 3/5	ceramic scrapers	1
NWM 4/5	spindle whorl	2
NM 1	bone tool	1
NM 1	obsidian biface	1
NM 1	spindle whorl	1
NM 1/2	ceramic scrapers	6 or 7
Earlier fill episode		
FE 2	bone tool	1
FE 2	ceramic scrapers	2
FE 2	spindle whorl	1
Final occupation		
OZ 1	handstone w/ percussion	1
OZ 1	well- worked polishing tool	1
OZ 1	handstone/ *moleador* w/ ochre	1
OZ 1	netherstone/ *molde*	1
OZ 1	multi-purpose tool w/ ochre	1
OZ 1	chipped stone hoe fragment	1
OZ 1	expedient chipped tool- abrader?	1
OZ 1	handstone/ *moleador* & unclear groundstone	2
OZ 1	handstone & polishing stone	2
OZ 1	spindle whorl	2
OS 1	stone bead	2
OS 1	ceramic scraper	1
F. 2	metal	1
NWM 1/2	ceramic scraper	2 or 3

Block 3, summary of area function by material and context

	Initial	Final
Vessel ratios (serving & non-serving)	.96	.82
Food & beverage related activities		
Chipped stone	1 obsidian biface	-
Ground stone	-	-
Other tools	-	-
Thermal features	F. 6 (large hearth) & 13 (smaller hearth)	F. 12- small pit with changing function
Pot rests	Small ring of rocks	-
Primary middens	F. 15 pit, F. 17 bone deposit & NWM 3-5	NWM 1-2
Secondary middens	-	-
Craft-related activities		
Ceramics (processing)	-	8 examples of stone tools related to the early stages of ceramic production
	-	3 clay features (8,10,11) related to the early stages of ceramic production
Ceramics (firing)	-	F. 5 pit?
Textiles	3 spindle whorl fragments	2 spindle whorl fragments
Lithics	-	1 fragmentary green hoe
Ornaments	-	2 stone beads
Use of pigment	-	(See groundstone)
Other	-	1 piece of metal (F.2)
Consumption of ritual paraphernalia		
Incensarios	-	-
Miniatures	½ complete, incised jar	-
Snuff kit elements	-	-
Non- local ceramics	5 banded punctates & 2 painted & 3 incised [8 non-local sherds in fill between occupations/ 2 in unclear contexts]	1 basket imprint & 1 incised (black feline face)
Other		
Tools- unclear function	11-13 ceramic scrapers	3 ceramic scrapers
	3 bone tools	1 chipped stone tool- abrader?

Block 3, artifact density by context (grams/ liter)

Block 3- initial occupation contexts	**Volume (liters)**	**Sherds (g)/ liter**	**Lithics (g)/ liter**	**Bones (g)/ liter**
Occupation zone 2	1131	1.7	.3	1.0
North Midden 1-2	725	4.7	.3	6.5
NW Midden 3-5	927	3.0	.4	3.1
F. 5 unclear pit w/ rocks	1102	.9	.1	.5
F. 15 midden	365	1.8	.3	1.6
F. 17 primary midden	44	9.0	.4	48.5
Block 3- fill episode				
Fill episode 2	3263	2.8	.2	2.0
Block 3- final occupation contexts				
Occupation surface 1	1050	3.2	.2	.7
Occupation zone 1	1247	1.8	.3	.3
NW Midden 1-2	565	3.0	.1	.3

Appendix 13: Specimen data for the ceramic attribute analysis *[note: mislabeled in dissertation as 12]*

Block	Specimen Number	Diameter (cm)	Form	Paste code	Burning- Int	Burning- Ext	Ext Color Name	Int Color Name	Slip- Ext name	Slip- Int name	Firing	Finish- Ext	Finish- Int
3	1310/01	15	bowl (incised)	A1			Lt Orange	Brown				5	5
3	1311/05		handle	A1			Lt Orange	Lt Orange			7-A	A-8	A-8
3	1320/01	14	vasija	A1			Lt Orange	Lt Orange			6-A	A-8	4
3	1320/02	16	bowl (nubs)	B					Lt Red	Lt Red	7-A	A-8	A-8
3	1320/03	16	bowl (nubs)	A1		X		Lt Brown	Lt Red		7-A	B-2	A-8
3	1320/04	11	bowl	B1			Lt Brown	Lt Brown			1-A	A-8	A-1
3	1320/05	11	vasija	B1			Black	Black			8-A	A-2	6
3	1320/06	10	vasija	B			Lt Orange	Lt Orange			6-H	A-2	5
3	1320/07	12	bowl	A1				Lt Brown	Lt Red		7-A	A-8	5
3	1320/08	8	bowl (incised exterior)	A1			Lt Orange	Lt Orange			7-A	A-8	A-8
3	1320/11		scraper	A1			Lt Orange	Lt Orange			7-A	5	5
3	1320/12	7	jar (incised exterior)	A1			Black	Black			8-A	A-8	A-8
3	1320/13	16	olla	B1			Brown	Lt Orange			1-K	5	5
3	1342/01	16	tinaja	A6			Lt Brown	Lt Brown			2-D	A-2	5
3	1342/02	13	vasija	B			Brown	Lt Orange			3-H	A-2	5
3	1342/03	13	vasija	A1			Lt Brown	Lt Brown			7-A	A-2	4
3	1342/07		handle	A1					Lt Red	Lt Red	7-A	A-8	A-8
3	1342/08		body sherd (incised/ miniature)	B1			Grey	Lt Brown			7-A	5	A-2
3	1342/09		scraper	B1			Grey	Lt Brown			3-A	5	A-2
3	1348/01		body sherd (incised)	A1				Lt Orange	Dk Red		7-A	A-8	A-8
3	1350/01	17	tinaja	B1			Lt Brown	Lt Brown			2-A	A-2	5
3	1350/02	18	tinaja	A1					Lt Red	Lt Red	7-A	B-2	B-2
3	1350/06		handle	B			Lt Brown	Lt Brown			1-A	5	5

3	1350/07		body sherd (incised)	A1			Lt Orange	Lt Orange			7-A	5	A-8
3	1350/08		handle	B1		X	Black	Lt Brown			1-A	A-8	A-8
3	1409/02		handle	B1		X	Dk Brown	Lt Brown			2-A	A-8	A-8
3	1409/03		handle	B1	X		Lt Brown	Dk Brown			2-E	A-8	A-8
3	1409/04		body sherd (incised)	A1			Lt Brown	Lt Brown			2-A	5	5
3	1415/01	15	vasija	B1			Lt Brown	Lt Brown			1-A	5	5
3	1415/02	13	bowl	A6			Brown	Brown			3-G	A-8	5
3	1415/03	15	vasija	A6			Brown	Brown			2-M	5	5
3	1415/05		body sherd (incised)	A3		X	Dk Brown	Lt Brown			8?	A-8	5
3	1490/01	13	bowl (incised exterior)	A4					Red	Lt Red	6-A	5	5
3	1490/02		body sherd (incised)	B1			Black	Black			8-A	A-8	A-8
2	2019/02	18	Incensario 3	A1					Lt Red	Lt Red	7-A	B-1	B-1
2	2042/02	9	vasija	A1			Lt Brown	Lt Red	Lt Red		7-A	3	5
2	2307/01	23	incensario	A1				Lt Orange	Lt Red		7-A	3/ 5	A-8/ A-2
2	2309/01	7	vasija	A1			Lt Orange	Lt Orange			6-A	1	4
2	2435/01	17	Incensario 2	A1				Dk Red	Dk Red				
2	2438/01	19	tinaja	B1			Lt Brown	Lt Brown			1-A	1	1
2	2438/02	19	tinaja	B1			Lt Brown	Lt Brown			1-A	1	1
2	2438/03	24	olla	C1			Lt Orange	Lt Brown			6-A	1	1
2	2438/04	22	bowl	A2							5-A	A-8	A-8
2	2438/05	18	bowl (incised)	A6				Lt Red	Red		2-A	B-3	A-2
2	2438/06	19	olla	A6			Black	Black			1-D	1	1
2	2438/07		body sherd (incised)	A1	X	X	Black	Black			8-A	A-8/ Q	5/ Q
2	2438/09		body sherd (incised)	A1				Lt Orange	Lt Red		6-A	5	A-8
2	2446/01	21	olla	B1			Lt Brown	Lt Brown			1-A	A-2	5
2	2446/04	4	miniature	A1				Lt Orange	Lt Red		1-A	A-8	A-8

2	2446/05		handle	A3	X		Black	Black			8-C	A-8/ Q	A-8/ Q
2	2446/06		handle	A3				Lt Brown	Lt Red		2-A	A-8	5
2	2454/01		body sherd (incised)	A1				Lt Orange	Dk Red		7-A	5	A-2
2	2469/02	18	bowl	A1							4-A	5	A-8
2	2469/03	21	bowl	B1							2-M	A-2	A-2
2	2478/01	15	vasija	B1			Lt Brown	Lt Brown			2-A	1	1
2	2478/03		scraper	A1	X	X					8-I	A-8	A-2
2	2485/01		Incensario 1	A1				Red-Brown	Lt Red		6-A	5	B-4/ A-8
3	2517/01	13	vasija	B1			Black	Black			2-H	A-2	A-2
3	2517/02	10	vasija	B1					Lt Red	Lt Red	2-A	B-2	B-2
3	2523/01	13	vasija	B1			Lt Brown	Lt Brown			1-A	A-2	A-2
3	2523/02	22	tinaja	B1			Lt Brown	Lt Orange			1-A	A-2	A-2
3	2523/03	18	bowl	A1					Lt Red	Lt Red	7-A	A-8	A-2
3	2523/04	21	olla	A1			Lt Orange	Lt Orange			5-A	A-2	A-2
3	2523/06	11	vasija	A1			Lt Brown	Lt Brown			7-A	5	A-8
3	2528/01	17	bowl	A3					Lt Red	Lt Red	8-C	A-8	A-8
3	2528/02	22	olla	A3	X		Lt Brown	Lt Brown			7-J	A-8	A-2
3	2528/03	12	vasija	A1			Lt Brown	Lt Brown			1-A	A-8	5
3	2535/01	14	vasija	A1				Red-Brown	Lt Red		7-A	B-2	A-8
3	2535/02,03	15	vasija	B1	X	X	Lt Brown	Lt Brown			1-A	A-2	5
3	2535/04	16	olla	B1			Lt Brown	Lt Brown			2-H	A-2	A-2
3	2535/05		handle	A3			Lt Brown	Lt Brown			2-S	5	5
3	2541/01		handle	A3			Lt Brown	Lt Brown			2-A	5	5
3	2541/02		handle	B1	X	X	Black	Black			1-A	5	5
3	2546/01	14	olla	B1		X	Brown	Lt Brown			7-A	A-2	5
3	2553/01	9	vasija	B1			Lt Brown	Lt Brown			2-A	B-2	5
3	2557/01	13	vasija	A1			Lt Brown	Lt Brown			7-A	A-8	5

3	2567/02		handle	B		X	Grey	Lt Orange				5	5
3	2567/03		handle	B1	X	X	Black	Black				5	5
3	2572/01	15	vasija	B1				Lt Brown	Lt Red		6-C	B-2	5
3	2598/01		body sherd (incised)	A1			Lt Orange	Lt Orange			7-A	5	5
3	2600/01	10	vasija	A3			Brown	Red-Brown			1-M	5	5
3	2600/02		whorl	B1			Lt Brown	Lt Brown			1-A	5	5
3	2603/01	18	bowl	A1					Lt Red	Lt Red	7-A	5	A-8
3	2603/02	13	bowl (incised exterior)	A1					Lt Red	Lt Red	7-A	A-8	A-8
3	2603/03	15	bowl	A1					Lt Red	Lt Red	7-A	A-8	A-8
3	2603/05	14	vasija	B1			Lt Brown	Lt Brown			2-A	A-2	A-2
3	2603/06	19	olla	B1			Black	Grey			8-A	4	4
3	2603/09		handle	A3		X		Brown	Lt Red			A-8	5
3	2616/01		handle	A1				Lt Orange	Dk Red		7-A	A-8	4
3	2623/01		body sherd (incised)	A1			Lt Brown	Lt Brown			2-A	5	5
3	2624/01	20	bowl	B1				Lt Brown	Lt Red		7-A	A-8	A-2
3	2624/02	16	olla	A6			Grey	Lt Brown			8-Q	4	A-2
3	2624/05	7	vasija	A1				Lt Brown	Lt Red		2-A	A-8	A-8
3	2624/09		handle	B1	X	X	Black	Black			1-A	A-8	A-8
3	2624/10		body sherd (incised)	A1			Lt Brown	Lt Brown			7-A	A-8	A-2
3	2624/11		body sherd (incised)	A1			Lt Brown	Lt Brown			1-A	A-8	5
3	2641/01	7	vasija	A1					Lt Red	Lt Red	6-A	5	5
3	2641/02	9	vasija	A1				Lt Brown	Lt Red		7-A	A-8	5
3	2642/01	14	vasija	B1				Lt Brown	Lt Brown		2-A	A-2	A-2
3	2642/02	8	vasija	A1				Lt Brown	Lt Red		2-A	A-8	5
3	2649/01	15	vasija	A2			Lt Orange	Lt Brown			2-A	A-8	A-2
3	2655/01		body sherd (incised)	A1			Lt Orange	Lt Orange			7-A	A-8	A-8
3	2662/01		body sherd	A1				Lt Orange	Lt Red		7-A	A-8	A-2

			(incised)										
3	2662/02		body sherd (incised)	A1			Lt Brown			Lt Red	2-A	A-8	A-8
3	2664/01	9	bowl	B1			Grey	Lt Brown			2-A	A-8	A-8
3	2664/05		handle	B1		X	Lt Brown	Lt Brown			2-A	5	4
3	2670/01		body sherd (incised)	A1	X		Lt Orange	Lt Orange			7-E	5	A-8
3	2672/02		body sherd (incised)	A1			Lt Brown	Lt Brown			1-A	A-8	A-8
3	2672/03		scraper	B1			Lt Brown	Lt Brown			2-A	A-8	A-2
3	2679/02		handle	B		X	Black	Lt Brown			1-A	5	5
3	2687/01	19	bowl	A1	X	X	Red-Brown	Red-Brown			7-A	A-8	A-2
3	2695/01	18	tinaja	A1			Brown	Brown			7-A	B-6?	A-6
3	2695/04	12	olla	A1				Lt Orange	Lt Red		7-A	B-2	A-2
3	2695/05		whorl	B1				Lt Brown	Lt Red		1-A	5	5
3	2700/01	13	vasija	A1			Lt Orange	Lt Orange			6-A	5	5
3	2715/01		handle	B1	X		Lt Brown	Black				A-8	A-8
3	2743/01	16	tinaja	B1			Lt Brown	Lt Brown			2-A	A-2	A-2
3	2747/01	15	vasija	B1				Lt Brown			1-A	A-2	5
3	2747/03		handle	B1	X	X	Black	Black			8-D	5	5
3	2767/01		body sherd (incised)	B1			Black	Black			8-C	A-8	A-8
3	2768/01	23	bowl	A4			Lt Brown	Lt Brown			2-A	5	5
3	2768/02		handle	C1			Lt Brown	Lt Brown			2-A	5	5
3	2770/01		handle	A1			Orange	Brown			7-A	5	5
3	2826/02		body sherd (incised)	A1				Red-Brown	Lt Red			A-8	A-8
3	2831/01	13	bowl	A1			Lt Orange	Lt Orange			7-A	A-8	A-2
3	2831/02	13	vasija	B1			Lt Brown	Lt Brown			2-A	A-2	A-2
3	2831/03		scraper	B1	X		Lt Brown	Lt Brown			2-Q	B-1	A-2
3	2839/01	9	vasija	B1			Black	Lt Brown			8-F	5	5
3	2848/01	10	bowl	A1			Lt Orange	Lt Orange			6-A	A-8	A-2

3	2848/02	15	vasija	B1			Lt Brown	Lt Brown			1-A	A-2	5
3	2848/03		handle	A5			Lt Orange	Lt Orange				5	5
3	2848/04		body sherd (incised)	A1			Lt Brown	Lt Orange	Lt Red			5	5
3	2853/01	19	bowl	A4			Lt Brown	Lt Brown			7-A	A-8	A-2
3	2853/02	23	bowl	B1			Lt Brown	Lt Brown			2-M	5	5
3	2853/03	22	bowl	B1			Lt Brown	Brown			2-A	A-2	A-2
3	2853/04	17	bowl (incised interior)	A1					Lt Brown	Lt Brown	7-A	B-2	B-2
3	2861/01	16	bowl	A1					Lt Red	Lt Red	7-A	A-8	A-6
3	2861/02	14	bowl	A1			Black	Black			8-A	4	A-2
3	2861/03	8	vasija	B1			Lt Brown	Lt Brown			2-A	5	5
3	2861/04	12	vasija	B1			Grey	Grey			8-A	4	5
3	2882/01	12	vasija	A5			Dk Orange	Lt Brown			2-A	5	5
3	2882/02		handle	B1			Lt Brown	Lt Orange			2-A	5	5
3	2882/03		body sherd (incised)	A1				Brown	Red		1-A	A-8	A-8
3	2888/01	18	tinaja	A6					Dk Red	Dk Red	7-A	A-8	5
3	2888/02		handle	B1		X	Black	Lt Brown			1-S	A-8	A-6
3	2897/02		handle	B1		X	Lt Brown	Grey				A-8	A-2
3	2905/01	17	olla	B1			Lt Brown	Lt Brown			2-A	A-2	A-2
3	2905/03		handle	A1			Lt Orange	Lt Orange				5	5
3	2913/01	17	bowl	A1					Dk Red	Dk Red	7-A	B-2	B-2
3	2913/02	20	tinaja	B1			Lt Brown	Lt Brown			1-A	A-2	A-2
3	2913/03	12	vasija	A5			Lt Orange	Lt Orange			1-A	5	A-2
3	2913/04	22	bowl	A6			Black	Black			8-C	B-1	A-2
3	2913/05	9	vasija	A6			Dk Brown	Lt Brown			8-C	5	A-8
3	2913/06	6	vasija (handles)	A1			Lt Brown		Lt Red	Lt Red	2-A	B-2	A-8
3	2913/07	9	vasija	A1			Grey	Grey			8-C	A-8	A-2
3	2913/08	10	bowl	B1			Lt Brown	Black			9-C	5	A-2

3	2913/10		handle	B1	X	X	Lt Orange	Lt Orange				A-8	A-2
3	2913/11		handle	A3	X	X	Black	Black			1-A	A-8	4
3	2913/12		body sherd (incised) & painted	A1			Grey	Grey			8-C	A-8	A-8
3	2921/01	11	vasija	A1			Lt Brown	Lt Orange			7-G	5	A-2
3	2921/02	11	vasija	A1			Lt Brown	Lt Orange			2-A	A-8	4
3	2925/01	13	vasija	B1			Lt Brown	Lt Brown			2-A	A-2	A-2
3	2929/01	18	olla	B1			Black	Grey			8-R	A-5	A-2
3	2929/02	20	bowl	A1					Lt Red	Lt Red	7-A	B-2	B-2
3	2929/05		handle	A3			Lt Brown	Grey				5	5
3	2929/06		scraper	B1		X	Lt Brown	Lt Brown			8-H	B-1	A-2
3	2939/01	17	bowl (painted?)	A1					Lt Red	Lt Red	7-A	B-2	B-2
3	2939/02	22	bowl	A4					Lt Orange	Lt Brown	2-A	A-8	A-8
3	2939/08		handle	B1			Lt Brown	Lt Brown				B-4	A-2
3	2939/09		handle	A1				Red-Brown	Lt Red			A-8	A-8
3	2939/10		body sherd (incised/ non-local)	A1			Grey	Black			7-E	5	A-8
3	2939/11		handle	A1			Lt Orange	Lt Orange				A-8	A-8
3	2946/01	15	bowl (incised interior)	A1					Lt Red	Lt Red	7-A	B-2	B-2
3	2946/02		handle	B1		X	Black	Lt Brown				A-8	A-8
3	2946/03	7	bowl (incised exterior)	A1			Black	Brown			8-A	B-2	B-2
3	2949/01	16	bowl	A1			Lt Brown	Lt Brown	Lt Red	Lt Red	7-A	B-2	B-2
3	2953/01	14	vasija	B1			Lt Brown	Lt Brown			2-A	A-2	5
3	2957/01	9	vasija	B1			Lt Brown	Lt Brown			2-A	A-8	A-2
3	2959/01	11	bowl (painted)	A3					Lt Red	Lt Red	3-C	B-2	B-2
3	2959/02	18	bowl (painted exterior)	A1					Lt Red	Lt Red	6-A	B-2	B-2
3	2960/01	16	bowl (painted exterior)	A1					Lt Red	Lt Red	2-C	B-2	B-2

3	2964/01	16	bowl	A1					Lt Red	Red	7-A	B-2	B-2
3	2964/04		handle	B1	X	X	Black	Lt Brown				A-8	A-2
3	2964/05		body sherd (banded punctates)	B1			Lt Brown	Lt Brown			2-A	A-2	A-2
3	2968/04		scraper	A5			Lt Brown	Lt Brown				A-8	A-8
3	2969/01		body sherd (incised)	A1				Lt Orange	Lt Red		7-A	B-2	5
3	2984/01		body sherd (incised/ non-local)	A1				Lt Brown	Lt Red		7-A	B-2	A-2
3	2995/01	14	bowl	A1				Lt Brown	Lt Red		1-M	B-2	A-8
1	3167/01		handle	A1				Lt Brown	Lt Red		2-A	A-8	A-2
1	3172/01	12	vasija	B1			Black				2-A	A-8	A-2
1	3216/01		body sherd (incised)	A1			Grey	Grey			7-A	5	A-8
1	3216/02		handle	B1	X	X	Lt Brown	Lt Brown			1-A	5/ Q	5/ Q
1	3219/03		whorl	A6			Dk Orange	Dk Orange			5-A	A-8	A-8
1	3223/01	17	bowl	B1			Lt Brown	Lt Brown			1-A	A-8	A-8
1	3223/03		handle	B1			Lt Brown	Lt Brown			2-A	5	5
1	3226/01	11	bowl (incised exterior)	A1			Dk Orange			Lt Red	7-A	A-8	A-8
1	3262/01	19	olla	B1			Lt Brown	Lt Brown			2-A	A-2	A-2
1	3262/03		handle	A1			Lt Orange	Lt Orange			7-A	A-8	5
1	3274/01	15	vasija	B1			Lt Brown	Lt Brown			8-D	5	5
1	3274/03		handle	A3			Black	Lt Orange			8-J	5	5
1	3274/05		body sherd (incised)	A2				Lt Brown	Cream		2-A	A-8	A-8
1	3281/01	13	olla	A1				Dk Orange	Lt Red	Lt Red	7-A	B-1	A-2
1	3281/04		handle	A1				Lt Orange	Lt Red		7-A	A-8	5
1	3291/02		scraper	A6			Dk Brown	Lt Brown			8-C	4	A-8
1	3304/01	8	vasija	A1			Lt Brown	Lt Orange			2-A	A-2	A-2
1	3304/02		handle	B1			Lt Brown	Lt Brown			1-K	5	4

1	3317/01	15	olla	A1			Lt Brown	Lt Brown			7-A	A-2	A-2
1	3317/02	15	vasija	B1			Lt Brown	Lt Brown			8-A	A-5	A-2
1	3317/03	13	vasija	B1			Lt Orange	Lt Orange			1-G	A-8	A-5
1	3317/04	11	vasija	B1			Lt Brown	Lt Brown			2-S	A-2	A-2
1	3317/06	11	bowl	A1			Lt Brown			Lt Red	2-A	5	5
1	3317/09		handle	B1		X	Black	Lt Brown			1-K	5/ Q	5
1	3317/10		handle	A3			Lt Brown	Lt Brown			1-D	B-7	5
1	3317/11		body sherd (incised)	A1			Dk Orange	Dk Orange			7-A	5	5
1	3317/13		scraper	A1				Lt Brown	Dk Red		8-H	B-2	A-1
1	3330/01	11	vasija	A1			Lt Brown	Lt Brown			2-E	B-10	A-8
1	3345/01	12	bowl	A1			Black			Lt Red	8-A	A-2	A-8
1	3416/01	14	vasija	A1				Lt Orange	Lt Red		1-A	B-2	A-2
2	3508/01		body sherd (incised)	A1				Lt Orange			7-A	5	A-8
2	3517/01	19	tinaja	B1		X	Dk Brown	Lt Brown			3-A	A-2	A-2
2	3520/01	23	bowl	A1			Lt Orange	Lt Orange			7-A	A-8	A-8
2	3520/02	14	vasija	B1			Red-Brown	Red-Brown			7-A	A-8	A-8/ 4
2	3520/04		handle	B1			Lt Orange	Lt Orange			2-A	A-8	5
2	3520/05		body sherd (banded punctates)	A5			Lt Orange	Lt Orange			6-A	5	5
2	3528/02		body sherd (incised)	A1			Red-Brown	Red-Brown			6-A	A-8	5
2	3536/01	23	bowl	A1		X	Lt Orange	Dk Orange			6-A	B-1	A-8
2	3542/01	27	olla	A1					Lt Red	Lt Red	4-A	B-1	B-1
2	3552/01		body sherd (incised)	A1			Lt Orange	Lt Orange			2-A	A-8	A-8/ A-2
2	3568/01	17	tinaja	B1				Lt Orange	Dk Orange		2-A	A-4	A-3
2	3568/02	15	bowl	A1					Red		4-A	A-8	A-2
2	3568/03	21	olla	A1			Dk Orange	Dk Orange			5-A	A-8	A-8
2	3568/04	19	tinaja	B1			Lt Brown	Lt Orange			2-A	A-2	A-2

2	3568/05	18	olla	B1			Lt Brown	Lt Brown			1-A	A-8	A-8
2	3568/09		body sherd (incised)	A1				Lt Orange	Lt Red		6-A	B-2	A-8
2	3569/01	16	bowl (incised exterior)	A1	X	X					8-J	5	A-8
2	3569/02		body sherd (incised)	A1					Red	Lt Orange	6-A	5	5
2	3569/03		body sherd (incised/ non-local)	A1			Lt Orange	Lt Orange			6-F	5	A-8
2	3578/01		body sherd (incised)	A5				Lt Brown	Red		7-E	A-8	A-2
2	3601/02		scraper	A1				Brown	Lt Red		5-A	A-2	A-2
2	3602A/01	18	Incensario 1	A1			Red-Brown	Red-Brown	Orange		5-A	3/ 5	B-1
2	3602B/01		Incensario 2	A1								3	B-1
2	3602C/01		Incensario 2	A1									
2	3602E/01		Incensario 3	A1									
2	3602G/01	19	Incensario 2	A1					Red				
2	3602H/01	15	Incensario 3	A1							7-A	5	A-2/ A-8
2	3602I/01	7	vasija	A1							1-A	A-8	A-2
2	3637A/01	16	Incensario 2	A1				Lt Orange	Red		7-A	3/ 5	A-8/ A-2
2	3637B/01		incensario	?								3	A-8/ A-2
2	3666/02	22	olla	B1			Lt Brown				2-A	B-1	A-8
2	3666/03		handle	A1				Lt Orange	Lt Red		7-A	B-2	5
2	3666/04		body sherd (incised)	A1				Lt Orange	Lt Red		7-A	B-2	5
2	3673/02	11	vasija	A1				Lt Orange	Dk Red	Dk Red	2-A	B-2	A-8
2	3673/03	15	vasija	A1			Lt Orange	Red-Brown			7-A	A-2	A-2
2	3673/04	19	olla	B1		X		Lt Brown			3-A	A-1	A-1
2	3673/05	10	vasija	A1			Lt Orange	Lt Orange			6-A	B-1	A-1
2	3673/06	19	olla	B1	X	X					8-A	A-2	A-2
2	3673/10		body sherd (incised)	A1				Lt Orange	Lt Red		6-E	B-2	A-2

2	3680/01	16	olla	A1			Lt Brown	Orange			7-A	A-2	A-1
2	3684/02		body sherd (incised)	A1		X		Dk Orange			5-C	5	5
2	3685/01	9	trumpet/tube	A1					Dk Red	Dk Red	7-A	3	B-2
2	3702/01	8	olla	A2			Grey	Lt Orange			6-A	A-8	A-2
2	3702/02	18	bowl (incised)	A1				Dk Orange	Lt Red		5-A	B-2	B-4
2	3707/01	19	tinaja	B1			Lt Brown	Lt Orange			4-C	5/B-1	A-2
2	3707/02	12	vasija	A1				Lt Brown	Brown		8-A	B-3	A-2
2	3707/09		whorl	A6			Lt Orange				5-A	A-8/ 5	A-2
2	3708/02	20	bowl (nubs)	A1					Lt Red	Lt Red	2-B	B-2	B-2
2	3708/03	20	bowl	A1					Orange	Orange	4-A	B-2	B-2
2	3708/04		body sherd (incised)	A1				Dk Orange	Black		6-A	B-2	A-8
2	3708/05	22	bowl (incised exterior)	A1				Lt Orange	White	Lt Red	7-A	B-2	B-2
2	3714/01	15	vasija	B1							1-A	A-8	4
2	3714/02	19	tinaja	B1			Lt Orange	Lt Orange			6-A	B-4	A-2
2	3714/04		handle	A1			Lt Brown	Orange			5-P	A-8	A-8
2	3723/01	18	tinaja	B1					Orange	Orange	2-A	A-2	A-8/ A-2
2	3723/02	20	bowl	A2							6-A	A-8	A-1
2	3723/03		handle	B1		X	Black	Lt Brown			1-A	5/ Q	5
2	3723/04		body sherd (incised)	A1				Lt Brown	Red		2-A	A-8	5/ A-2
2	3729/01	10	vasija	A1			Lt Orange		Lt Orange		2-A	5	A-1
2	3729/02	9	vasija	A1					Lt Red	Lt Red	7-A	B-5	B-2/ 4
2	3729/03	3	miniature	A1				Lt Orange	Black	Dk Red	6-A	3	3/ A-2
2	3729/04		body sherd (incised)	A1				Dk Orange	Red		5-D	B-2	5/ A-2
2	3729/05		scraper	B1			Lt Orange	Lt Orange			2-A	A-8	A-1
2	3735/01	17	bowl	B1							1-A	B-1	B-1
2	3735/03		handle	A3		X	Grey	Lt Brown			2-A	A-8/ Q	A-8

2	3735/04		body sherd (incised)	B1		X	Black	Lt Brown			2-A	A-8/ Q	5
2	3752/01	16	tinaja	B1			Lt Orange	Lt Orange			4-D	A-2	A-4
2	3752/02	13	bowl	A1					Lt Red	Lt Red	3-A	B-1	B-1
2	3752/03	20	tinaja	A6		X		Lt Brown			1-A	A-8/ Q	4
2	3752/06		handle	A1			Lt Orange	Lt Red			7-A	5	4
2	3752/07		body sherd (incised)	B1	X		Lt Brown	Grey			8-A	A-8	A-2/ Q
2	3761/01	21	bowl (painted interior)	A6					Dk Orange	White	5-A	5	B-4
2	3761/03		handle	B1	X	X	Black	Black			8-A	A-8/ Q	A-8/ Q
2	3768/01	18	bowl	A1					Red	Red	4-A	B-1	B-1
2	3768/02	17	bowl (nubs)	A1				Dk Orange	Red		2-A	B-1	B-1
2	3768/03		body sherd (incised)	A1				Lt Orange	Red-Brown		2-A	B-2	A-6
2	3776/01	18	tinaja	B1				Lt Brown	Dk Orange		2-B	A-2	A-8/ A-2
2	3776/02	4	miniature	A1		X	Black	Lt Orange	Red		3-A	A-8	A-8
2	3776/03	12	vasija	C1			Lt Brown	Lt Brown			1-A	A-8	A-8
2	3776/04	10	vasija	A1	X				Red		1-A	B-1	5
2	3776/05		handle	B1			Lt Orange	Grey			2-A	5	5
2	3776/06		body sherd (incised)	B1			Grey	Dk Orange			2-H	A-8/ B-1	5
2	3788/01	13	vasija	B1			Lt Orange	Lt Orange			7-A	1	5
2	3788/02		scraper	A6	X	X	Lt Brown				2-B	B-2/ A-2	A-2
2	3793/01	18	olla	B1			Lt Orange	Lt Orange			4-A	A-2/ B-7	A-2
2	3793/02	20	bowl	A1				Lt Red	Lt Red		1-A	B-2	B-2
2	3796/01	10	bowl (incised exterior)	A1				Dk Orange	Lt Red	Lt Red	7-A	B-2/ 5	B-2/ A-2
2	3796/02	9	vasija	A1			Lt Orange	Lt Orange			2-B	A-2	A-2
2	3796/03	21	bowl	A1							4-A	B-2	A-1
2	3796/04	23	bowl	A1					Orange	Orange	4-A	4	A-8

2	3796/05	17	olla	B1			Lt Orange	Lt Brown			4-D	5	5
2	3797/01	14	vasija	A1				Lt Orange	Lt Red		6-A	B-5	4
2	3806/01	21	olla	B1			Lt Orange	Lt Orange			4-C	A-2/ A-4	A-8
2	3806/02	21	olla	B1			Lt Brown	Lt Brown			2-A	4/ A-2	4
2	3806/03	22	bowl	B1			Lt Orange	Lt Brown			2-D	B-1	A-2
2	3806/04		body sherd (incised)	B1	X	X	Grey	Black			6-A	A-8/ Q	5/ Q
2	3806/05		body sherd (incised)	A6				Grey	Red		2-E	B-9	A-2
2	3813/01	21	olla	A1			Lt Orange	Lt Orange			5-A	A-2/ B-8	A-2/ 4
2	3813/02	22	bowl	C1							2-B	A-1	A-2
2	3813/04	25	bowl	A1					Red	Red	7-A	B-1	B-2
2	3813/05	10	vasija	A6				Brown	Lt Orange	Red-Brown	1-A	B-5	B-1
2	3813/08		body sherd (incised)	A1					Lt Red	Lt Red	7-A	A-8	5
2	3813/09		scraper	B1	X		Lt Brown				8-A	B-1	A-1
2	3813/10	13	vasija	B1			Lt Brown	Lt Brown			2-A	B-1	A-2
2	3819/01	21	bowl	A2							1-A	A-8	A-8
2	3819/02	21	olla	A1					Red	Red	6-B	B-2	B-2
2	3819/04		body sherd (incised)	A1				Dk Orange	Red		6-A	B-2	A-2
2	3819/05		handle	B1		X	Black	Lt Brown			2-A	B-2/ Q	A-2
2	3825/01	21	bowl (incised exterior)	A1				Lt Brown	Red		2-A	B-2/ B-9	A-2
2	3825/02		body sherd (incised)	A1				Red-Brown	Cream		7-A	B-2	A-2
2	3829/01	20	olla	A1					Lt Red	Lt Red	5-A	B-1	B-1
2	3829/02	15	vasija	B1			Lt Brown				2-A	B-1	5
2	3830/01	9	bowl (incised exterior)	A1				Dk Orange	Dk Red		5-A	3/ 5	A-2
2	3837/01		body sherd (banded punctates)	A5				Lt Orange	Lt Red		5-C	A-8	5
2	3856/01	17	tinaja	A2			Dk Orange	Dk Orange			6-A	A-1	A-1

2	3856/03		body sherd (incised)	A1		X				Lt Red	1-F	B-1	B-2
2	3866/01		body sherd (incised)	B1	X	X	Black	Black			2-A	A-8/ Q	A-8/ Q
2	3884/01	22	bowl	A5					Red	Red	4-A	B-2	B-1
2	3884/02	19	olla	A1			Lt Orange	Lt Orange			7-A	B-10	A-2
2	3892/01	15	vasija	B1			Grey	Lt Brown			1-A	A-2	A-2
2	3896/01	20	bowl	B1							2-A	A-1	A-1
2	3896/03	21	olla	B1			Lt Orange	Lt Orange			6-A	A-2	A-2
2	3896/04	21	olla	B1			Grey	Lt Brown			1-A	A-1	A-1/ A-8
2	3896/05		handle	A1			Lt Orange	Lt Red			7-A	B-2	5
2	3896/06		body sherd (painted)	A1				Dk Orange	Dk Orange		6-A	3/ A-8	5
2	3898/01	17	tinaja	A1					Red	Red	4-A	B-2	B-2
2	3898/02	12	olla	A1					Lt Red	Lt Red	1-A	B-2	A-2
2	3905/01	22	bowl	A5	X						4-B	A-8	A-1
2	3915/01	21	bowl (incised)	A1				Dk Orange	Dk Red		5-A	B-2	B-2
2	3915/02	22	bowl	A1					Red	Red	4-A	B-3	B-3
2	3915/03	20	tinaja	A5			Dk Orange				7-A	5	5
2	3915/04		body sherd (incised)	B1	X		Lt Brown				1-C	B-2	A-2
2	3921/01	24	olla	A1			Lt Orange	Lt Orange			8-A	B-2	B-2
2	3921/02		handle	A3				Lt Brown	Lt Red		2-A	5	5
2	3922/01	29	bowl	A1					Red	Red	4-A	B-2	B-2
2	3929/01	21	olla	B1				Lt Orange	Lt Orange		2-A	B-2	A-2
2	3929/02	19	tinaja	A6	X	X	Lt Brown	Lt Brown			7-A	A-2	A-2
2	3929/03	19	olla	B1					Red	Red	1-A	3	3
2	3929/04		body sherd (incised)	B1	X	X	Grey				8-D	B-6	A-6
2	3929/05		scraper	B1			Lt Brown	Lt Orange			8-G	A-8	A-2
2	3930/01		Incensario-feline pendant	A1	X		Lt Brown	Lt Orange	Red		6-F	3	B-4

2	3937/02		body sherd (incised)	A1			Lt Orange	Lt Orange			2-H	B-1	5/ A-2
2	3942/01		body sherd (painted)	A1				Lt Orange	Cream	Dk Red	6-A	B-2	B-2/ A-2
2	3959/01	31	olla	C1			Lt Orange	Lt Orange			5-A	A-4	A-2
2	3960/01		body sherd (incised)	A1				Dk Orange			6-A	B-2	5
2	3967/01	17	tinaja	A1				Brown	Lt Red		6-A	2	2
2	3967/02	21	olla	B1				Dk Orange	Lt Brown	Red	4-D	A-2	A-2
2	3968/01	17	olla	A1			Lt Orange	Dk Orange			5-A	A-2	A-2
2	3974/01		body sherd (incised)	B1				Lt Orange	Lt Red		5-A	B-2	B-2
2	3974/02		body sherd (incised)	A1	X				Dk Red		7-A	3/ 5	B-1
2	3975/01		body sherd (incised)	B1				Lt Brown	Red		7-A	3	5
2	3981/01		scraper	A1				Dk Orange	Red		5-A	B-1	A-1
2	3987/01	7	miniature	A1	X				Lt Red		8-A	B-1	B-1
2	3996/01	17	tinaja	B1			Lt Brown	Lt Brown			2-A	B-1	A-1
3	4002/02	15	bowl	A1					Lt Red	Lt Red	7-A	B-2	B-2
3	4002/03		handle	B1		X	Black	Lt Brown				A-8	5
3	4024/01	14	bowl	A1			Lt Brown		Lt Red	Lt Red	6-A	B-2	B-2
3	4036/01		handle	B1		X	Black	Lt Brown				A-8	A-2
3	4036/02		whorl	A5				Lt Orange	Lt Red		6-A	A-8	5
3	4042/01	18	bowl (handles)	B1			Lt Brown	Lt Brown			2-A	A-2	A-8
3	4044/01	13	bowl	A6			Black	Lt Brown			8-F	A-8	A-2
3	4050/01	20	bowl (nubs)	A1					Lt Red	Lt Red	2-A	B-2	B-2
3	4052/01	15	vasija	A1		X	Grey	Lt Brown			2-A	A-2	4
3	4052/02	17	tinaja	B1			Lt Brown	Lt Brown			1-A	A-2	A-2
3	4052/03	15	bowl	A3	X				Red		8-E	B-2	B-2
3	4052/04	15	vasija	B1			Dk Brown	Lt Brown			1-A	A-2	A-2
3	4052/06	15	tinaja	B1			Lt Brown	Lt Brown			2-A	5	5
3	4052/07		handle	B1			Lt Orange	Lt Orange				5	5

3	4052/08	15	bowl (incised interior)	A1					Lt Red	Lt Red	7-A	B-2	B-2
3	4052/10		handle	B1	X	X	Black	Black				A-8	A-2
3	4052/11		handle	B1	X	X	Lt Brown	Black				A-2	4
3	4052/12		body sherd (banded punctates)	B1			Lt Brown	Lt Orange			2-A	5	A-6
3	4052/13		whorl	B1			Lt Brown	Lt Brown			2-S	B-2	5
3	4061/05		body sherd (painted)	A1					Lt Red			A-8	A-8
3	4061/06		whorl	B1			Grey	Lt Brown			2-A	A-8	A-2
3	4069/01	13	bowl (nubs)	B1			Lt Brown	Lt Brown			2-D	5	5
3	4069/02	17	tinaja	B1		X	Lt Brown	Grey			8-A	A-2	A-8
3	4075/01		body sherd (incised/ non-local)	?			Lt Brown	Lt Brown			6-C	B-2	B-2
3	4084/01	20	olla	B1			Lt Brown	Lt Brown			2-A	A-8	A-8
3	4084/06		handle	B1	X	X	Black	Black				5	5
3	4084/08		scraper	B1			Lt Brown	Lt Brown			2-D	5	5
3	4100/01	15	vasija	B1		X	Lt Brown	Lt Brown			8-F	A-2	A-9
3	4100/02	16	bowl	A1					Dk Red	Dk Red	7-A	B-2	B-2
3	4100/03		body sherd (banded punctates)	B1				Lt Brown	Lt Red		2-A	5	5
3	4100/05		handle	A1				Dk Orange	Lt Red			A-8	A-8
3	4100/06		handle	B1			Lt Brown	Lt Brown				5	4
3	4120/01		handle	B1	X		Lt Brown	Black				5	5
3	4125/01	12	vasija	B1		X	Black	Dk Brown			8-C	A-8	A-2
3	4125/04	14	bowl (handles)	B1		X	Lt Brown	Black			8-H	5	5
3	4150/01	15	bowl (painted exterior)	A1					Lt Red	Lt Red	2-A	B-2	B-2
3	4150/02	15	bowl (painted exterior)	A1					Lt Red	Lt Red	2-A	B-2	B-2
3	4150/03	14	vasija	B1			Lt Brown			Red-Brown	2-A	A-4	A-2

3	4150/05		body sherd (banded punctates)	B1				Lt Brown	Lt Red		2-A	B-3	A-8
3	4157/01		scraper	B1			Dk Brown	Lt Brown			2-A	B-4	A-2
3	4161/01	23	bowl	B1			Lt Brown	Black			2-E	B-4	A-2
3	4161/05		handle	B1	X	X	Black	Black				A-8	A-8
3	4161/06		handle	B1	X	X	Black	Black				A-8	A-8
3	4168/03		handle	B1	X	X	Dk Brown	Dk Brown				A-8	A-8
3	4168/04	16	tinaja	A1			Lt Orange	Lt Orange			7-A	B-8	A-2
3	4173/01	17	bowl	A1					Red	Red	1-A	B-4	B-4
3	4173/02	19	olla	B1	X		Black	Lt Brown			8-H	A-2	A-2
3	4173/03	13	vasija	B1			Lt Brown	Lt Brown			2-A	A-2	A-2
3	4173/04	14	vasija	B1			Lt Brown	Lt Brown			1-A	B-6	A-2
3	4173/05	15	bowl	A1					Lt Red	Lt Red	7-A	B-2	B-2
3	4173/07	0	vasija	B1			Lt Brown	Lt Brown				5	5
3	4173/15		handle- incised	B1				Lt Brown	Lt Red		2-A	A-8	4
3	4173/16		handle	A1				Lt Brown	Lt Red			B-2	A-2
3	4173/17		handle	B1			Lt Orange	Lt Brown				5	A-2
3	4173/18		handle	B1	X	X	Black	Black				A-8	4
3	4173/19		handle	B1	X	X	Black	Black				A-8	4
3	4173/20		body sherd (painted)	A1				Red-Brown	Lt Red			B-2	A-8
3	4173/21		body sherd (banded punctates)	A1				Lt Brown	Dk Orange		7-A	5	5
3	4175/01		whorl	B1			Grey	Black			1-C	B-2	A-2
3	4183/01	23	bowl (incised interior)	A1					Lt Red	Lt Red	7-A	B-2	B-2
3	4185/01	17	olla	B1	X	X	Lt Brown	Lt Brown			1-A	A-2	A-2
3	4185/02	16	olla	B1			Lt Brown	Lt Brown			1-A	A-2	5
3	4185/03	12	vasija	B2			Brown	Brown			2-D	A-2	A-6
3	4185/04	13	olla	B1		X	Black	Lt Brown			1-A	A-2	5

3	4185/06		body sherd (banded punctates)	B1			Lt Orange	Lt Brown			9-D	A-2	A-2
3	4185/07		scraper	B1			Lt Brown	Lt Brown			2-A	B-2	A-6
3	4185/08		scraper	B1		X			Lt Orange		8-H	B-4	A-2
3	4185/09		scraper	B1			Lt Brown	Lt Brown			8-A	A-8	5
3	4185/10		scraper	A3		X	Black	Lt Brown				A-8	A-8
3	4193/01	13	bowl	A1				Lt Brown	Lt Red		2-D	B-2	A-2
3	4193/02,6	12	vasija	B1			Lt Brown	Lt Brown			2-A	B-7	A-2
3	4193/03	15	vasija	B1		X		Lt Brown	Lt Brown		2-A	A-2	A-2
3	4193/04	17	bowl	A3			Grey	Lt Brown			8-F	A-8	A-8
3	4193/05	14	vasija	B1			Lt Brown	Lt Brown			2-A	A-2	5
3	4193/07	14	vasija	B1			Black	Lt Brown			2-A	A-2	A-2
3	4193/13		handle	A3			Lt Orange	Grey				A-8	5
3	4193/14		scraper	B1	X		Lt Brown	Black			1-C	A-8	R
3	4193/15		handle	B1			Lt Brown	Lt Brown				A-8	A-8
3	4193/16		handle	B1	X		Lt Brown	Black				A-8	A-8
3	4193/17		handle	B1		X	Black	Lt Brown				A-8	A-2
3	4193/18	12	bowl	A1					Dk Red	Dk Red	2-D	A-8	A-2
3	4200/01	13	bowl	B1				Lt Brown	Lt Red		2-D	B-2	A-2
3	4200/06		scraper	A1					Red	Red	6-A	5	B-2
3	4204/01	15	bowl (nubs)	A1	X	X			Red	Red	2-A	B-12	B-2
3	4205/01	13	olla	A5			Lt Brown	Lt Brown			1-A	A-2	5
3	4205/02	17	tinaja	C2			Lt Brown	Lt Brown			7-A	A-2	A-2
3	4205/04	14	olla	A1					Lt Red	Lt Red	7-A	B-2	B-2
3	4205/06	17	bowl	B1			Lt Brown	Lt Brown			8-F	5	A-8
3	4205/07	17	bowl	B1		X			Lt Red	Orange	1-A	B-2	B-2
3	4205/08	10	vasija	B1			Lt Brown	Lt Brown			2-A	A-2	A-2
3	4205/10		handle	B1			Lt Brown	Lt Brown				5	5
3	4205/12		handle	B1	X	X	Grey	Lt Brown				A-8	4

3	4211/01	15	vasija	B1	X	X	Black	Black			1-C	A-2	A-2
3	4211/02	14	olla	B2		X	Lt Brown	Lt Brown			2-D	A-2	A-2
3	4211/03	17	bowl (painted interior)	A1					Lt Red	Lt Red	2-A	B-2	B-2
3	4211/05		handle	C1		X	Black	Lt Orange				5	5
3	4211/06		scraper	B1	X		Black	Black			8-A	A-2	5
3	4211/07		scraper	B1			Grey	Grey			1-C	A-8	5
3	4219/01	15	vasija	A1			Lt Orange	Lt Orange			7-A	A-2	A-2
3	4224/01	8	bowl	A1				Lt Orange	Lt Red		7-A	B-2	4
3	4224/02	15	vasija	A5			Lt Brown	Lt Brown			7-A	5	5
3	4229/01	20	tinaja	A1			Lt Orange	Red-Brown			7-A	A-2	A-2
3	4229/04		handle	B1	X	X	Black	Black				A-8	A-8
3	4229/05		scraper	B1			Lt Brown	Lt Brown			2-D	B-2	5
3	4238/01	17	bowl	A1					Red	Red	2-H	B-2	B-2
3	4238/02	11	bowl	B1				Lt Brown	Lt Orange		8-A	A-2	A-2
3	4242/02		handle	B1				Lt Orange	Lt Red			A-8	5
3	4246/01	13	olla	A1			Lt Brown	Lt Brown			2-A	5	5
3	4246/03		handle	B1			Lt Brown	Lt Brown			2-A	5	5
3	4246/04		body sherd (incised)	B1			Grey	Black		Dk Red	8-D	A-8	A-8
3	4246/05		handle	B1	X	X	Black	Grey				A-2	A-6
1	4504/01		scraper	B1			Lt Orange	Lt Orange			6-G	A-2	A-2
1	4504/02	10	vasija	A1			Dk Orange	Dk Orange			5-A	B-	A-2
1	4504/03	11	vasija	A1					Lt Red	Lt Red	7-A	B-2	B-2
1	4504/04	12	olla	A1			Black	Black			8-C	A-2	A-2
1	4504/05	13	olla	B1			Lt Brown	Lt Brown			1-A	A-2	A-2
1	4511/02	11	vasija	B1			Lt Brown	Lt Brown			2-A	5	5
1	4525/02		scraper	A1			Lt Orange	Lt Orange			7-A	5	5
1	4525/03		handle	B1			Lt Brown	Lt Brown			2-A	A-8	A-8
1	4525/04		scraper	B1				Lt Brown	Lt Red		1-A	A-8	5

1	4545/01		handle	A1			Lt Orange	Lt Orange			5-A	5	5
1	4549/01		handle	B1			Grey	Lt Brown			2-A	5	5
1	4549/02	12	vasija	B1			Lt Brown	Lt Brown			1-A	A-2	A-2
1	4560/01	10	bowl	A1				Lt Brown	Lt Red		2-A	A-8	A-2
1	4560/02	16	bowl	B1			Lt Brown	Lt Brown			2-M	A-2	A-8
1	4560/05		handle	A1	X	X	Black	Black			8-D	5/ Q	5/ Q
1	4566/01	16	olla	B1			Lt Orange	Lt Brown			6-K	A-2	A-2
1	4575/01	13	olla	B1			Lt Orange	Lt Orange			7-E	A-2	5
1	4575/02	17	tinaja	B1			Grey	Lt Brown			8-H	A-2	5
1	4575/03		handle	B1			Lt Brown	Lt Brown			2-A	5	5
1	4575/04		scraper	A1				Lt Orange	Brown		1-A	A-8	5
1	4575/05		handle	B1			Lt Brown	Lt Brown			2-A	5	5
1	4581/01	5	miniature	A1			Black	Grey			8-A	A-8	A-2
1	4588/01	8	vasija	A3			Lt Brown	Lt Brown			7-A	5	5
1	4588/04		handle	B1			Lt Brown	Lt Brown			1-A	A-8	5
1	4588/05		whorl	B1			Lt Brown	Dk Orange			2-A	A-8	A-8
1	4599/01	17	olla	B1			Lt Brown	Lt Orange			8-H	A-8	5
1	4599/09	15	bowl	A			Grey	Grey			2-A	5	A-8
1	4606/06		scraper	A1					Lt Red		2-A	B-2	5
1	4615/01	11	bowl	A1			Dk Orange	Lt Orange			5-N	1	1
1	4615/02	4	miniature	A1				Lt Orange	Lt Red		7-A	A-8	A-2
1	4615/03	12	vasija	A1			Black	Lt Brown			8-A	2	1
1	4622/01		handle	B1				Lt Orange	Lt Red		6-A	5	5
1	4626/01	9	vasija	A1				Lt Brown	Red	Red	1-A	B-2	A-6
1	4628/01	17	olla	B1			Grey	Lt Brown			8-F	A-8	A-2
1	4628/02	4	miniature	A1				Grey	Dk Red	Dk Red	8-C	3/ 5	5
1	4633/01	15	vasija	B1			Lt Brown	Lt Brown			2-A	A-2	A-2
1	4636/03		body sherd (incised)	A1				Lt Orange	Cream		8-F	B-2	5

1	4636/04		scraper	A1			Black	Lt Brown			2-A	A-8	A-8
1	4640/02		handle	A5					Lt Red	Lt Red	2-A	5	5
1	4640/03		body sherd (banded punctates)	A1			Dk Orange	Lt Brown			1-A	A-2	A-8
1	4641/01	16	vasija	A1					Red	Red	2-G	B-2	B-2
1	4641/02	13	olla	A1			Lt Brown	Lt Brown	Lt Red		2-A	B-4	5
1	4641/03		handle	A5			Dk Orange	Dk Orange			5-A	A-8	4
1	4644/01	13	bowl	A1				Lt Brown	Brown		1-A	B-2	A-8
1	4644/03	15	vasija	A1					Lt Red	Lt Red	7-A	B-2	B-2
1	4650/01	15	olla	B1	X	X	Black	Black			7-A	A-8	A-1
1	4650/04	4	miniature	A1			Lt Brown		Red		1-A	A-8	A-2
1	4650/05		handle	B1		X	Lt Brown	Lt Brown			2-A	A-8/ Q	A-2
1	4650/06		body sherd (incised)	A1			Lt Brown	Lt Brown			3-H	B-4	A-2
1	4650/07		scraper	A5			Lt Orange	Lt Orange			6-D	A-8	A-2
1	4653/01	14	vasija	A4					Lt Red	Lt Red	7-A	B-2	B-2
1	4653/04	13	bowl	B1			Black	Black			8-A	5	5
1	4656/01		scraper	B1			Lt Brown	Lt Brown			2-A	B-7	A-2
1	4657/01	14	vasija	A1			Grey	Lt Brown			1-A	B-4	5
1	4659/01	11	olla	A1				Lt Brown	Brown		7-A	B-2	A-2
1	4659/03		body sherd (incised)	A1				Lt Brown	Cream		1-G	A-8	5
1	4669/01	10	bowl (incised exterior)	A1			Dk Orange	Dk Orange			1-A	A-2	A-1
1	4669/02		handle	A1			Lt Orange		Lt Red		7-A	B-2	4
1	4669/03		scraper	B1				Black	Brown		2-E	A-8	A-2
1	4674/01	16	bowl	A1				Red	Red		7-N	B-10	B-10
1	4677/01	18	bowl	A5			Red	Dk Orange			1-A	5	5
1	4684/01	14	vasija	B1			Lt Brown	Lt Brown			1-A	A-8	5
1	4686/01	15	olla	A1			Lt Brown	Lt Orange			2-A	A-2	5
1	4688/01	16	bowl	A1					Brown	Brown		5	B-2

1	4688/02	13	olla	B1			Lt Brown	Lt Brown			2-A	A-2	5
1	4691/01	10	bowl (incised exterior)	A1					Cream	Lt Red	2-A	B-2	B-2
1	4700/01	12	olla	A1			Lt Brown			Brown	7-A	A-2	B-2
1	4704/03		body sherd (incised)	A1				Lt Brown	Cream		8-D	B-2	A-2
1	4709/01	13	vasija	B1			Grey	Grey			9-A	A-2	A-2
1	4709/04		body sherd (incised)	A1				Lt Orange	Lt Red		7-A	A-8	5
1	4713/01	9	olla	A5			Dk Orange	Dk Orange			5-A	B-9	5
1	4713/02		body sherd (incised)	A1				Lt Brown	Cream		1-A	A-8	B-2
1	4716/01	14	vasija	A1				Lt Orange	Lt Red	Lt Red	7-G	B-2	A-2
1	4717/01	19	bowl	A1					Lt Red	Lt Red	7-A	B-2	B-2
1	4719/01		handle	A5			Orange	Orange			8-D	5	5
1	4721/01	17	tinaja	B			Lt Brown	Dk Orange			1-A	A-8	A-2
1	4721/04		scraper	B1			Lt Brown	Lt Brown			1-A	B-2	5
1	4725/01	12	vasija	B1			Lt Brown	Lt Orange			2-A	4	A-2
1	4725/02	10	bowl	A1					Brown	Brown	1-A	A-8	A-8
1	4725/03		handle	B1				Lt Brown	Lt Red		2-A	A-8	A-8
1	4730/01	17	tinaja	B			Lt Brown	Lt Brown			1-A	5	5
1	4730/02		body sherd (incised)	A1				Lt Orange			2-A	A-8	5
1	4731/01		body sherd (incised)	A1				Lt Orange	Dk Red		7-A	A-8	A-8
1	4733/02		body sherd (incised)	A1			Lt Brown	Black			1-A	A-8	B-4
1	4733/03		body sherd (incised)	A1				Lt Orange	Brown		1-A	A-8	5
1	4737/01		handle	B1			Lt Orange	Lt Orange			8-H	5	A-2
1	4738/01	15	vasija	B1			Lt Orange	Lt Orange			2-A	A-5	A-2
1	4743/03	4	miniature	A1			Grey	Black			8-A	A-8	5
1	4743/05	11	vasija (handles)	A5			Lt Orange	Lt Orange			2-A	5	A-2
1	4743/06	11	olla	A1				Lt Brown	Brown	Brown	1-A	A-8/ A-	A-2

												2	
1	4743/07		scraper	A1			Lt Orange	Lt Brown			7-A	A-7	A-8
1	4747/?		body sherd (incised)	B1			Lt Brown	Lt Orange			8-G	A-8	A-2
1	4747/01	15	vasija	B1			Black	Lt Brown			8-F	A-2	A-6
1	4747/02	10	bowl (incised exterior)	B1		X	Lt Brown	Lt Brown			1-A	A-8	A-2
1	4751/03	12	vasija	A1			Lt Brown	Lt Brown			7-A	5	5
1	4751/05		handle	B1				Lt Brown	Lt Red		2-A	A-2	A-2
1	4751/06		body sherd (incised)	A1			Lt Orange	Lt Orange			2-A	A-8	A-8
1	4760/01	14	vasija	B1	X		Black	Lt Brown			8-C	5	A-2
1	4760/02	13	olla	A1				Grey			9-B	A-8	A-8
1	4767/01	17	bowl (incised exterior)	A1				Lt Brown	Brown	Brown	2-A	3	A-8
1	4772/01	12	bowl (incised exterior)	A1			Lt Orange	Lt Orange			1-A	5	5
1	4772/03	12	vasija	A1				Lt Orange	Lt Red		2-A	A-8	5
1	4772/06		body sherd (incised)	A1			Dk Orange	Dk Orange			6-A	5	5
1	4772/07		scraper	A1				Lt Brown	Brown		2-A	A-8	5
1	4772/08		scraper	A1			Lt Orange	Lt Orange			7-A	A-8	5
1	4775/01	15	vasija	A1					Brown	Brown	1-A	A-2	B-2
1	4775/02	8	bowl (incised exterior)	A1				Lt Brown	Dk Orange		7-A	B-2	A-2
1	4775/03		body sherd (incised)	A1				Brown	Lt Red		7-A	A-8	A-8
1	4783/01	15	vasija	B1	X	X	Black	Lt Brown			2-E	B-1	A-5
1	4783/02		scraper	A6		X	Lt Brown	Lt Brown			8-F	A-8	A-8
1	4787/01	15	vasija	B1			Lt Brown	Lt Brown			1-D	A-6	A-5
1	4792/01	15	bowl	A1					Brown	Brown	7-E	B-2	B-2
1	4797/01	12	vasija	A1			Lt Orange	Lt Orange			1-A	5	5
1	4800/01	15	tinaja	A2			Lt Brown	Lt Brown			5-M	5	A-2
1	4800/02	13	vasija	B1			Lt Brown	Lt Brown			1-A	5	5

1	4800/03	17	tinaja	A2			Lt Brown	Lt Brown			1-A	A-2	5
1	4800/04	8	miniature	A1					Brown	Brown	1-A	B-2	B-2
1	4800/05	13	vasija	B1			Brown	Grey			5-O	A-7	5
1	4800/07	14	vasija	B1			Black	Grey			8-C	A-8	5
1	4800/09		handle	B1	X		Lt Brown	Lt Brown			7-A	5	5/ Q
1	4800/10		handle	B1	X	X	Black	Black			8-F	5/ Q	5/ Q
1	4806/01	10	vasija	A1			Lt Brown	Lt Brown			1-A	5	5
1	4806/02	3	miniature	A1				Lt Brown	Brown		2-A	A-8	4
1	4806/03		handle	B				Brown	Lt Brown		1-A	5	5
1	4813/01	0	bowl-incensario?	A1				Lt Brown			7-A	B-2	A-8
1	4821/01	11	vasija	A1				Lt Brown	Dk Red		1-A	B-2	A-8
1	4821/03		body sherd (incised)	A6				Grey	Red		8-A	A-8	5
1	4830/01	15	bowl	B1			Lt Brown	Lt Brown			1-A	B-1	A-2
1	4830/02		handle	A1				Lt Orange	Brown		6-A	B-4	A-2
1	4844/01	12	bowl (incised)	A1			Lt Brown			Lt Red	1-A	B-2	A-8
1	4844/03		handle	A3		X	Lt Brown	Lt Brown			2-A	5/ Q	5
1	4844/04		body sherd (incised)	A1			Lt Brown	Lt Brown			7-G	A-8	B-2
1	4844/05		body sherd (banded punctates)	B1	X	X		Lt Brown	Lt Red		1-C	A-8	A-8
1	4844/06		body sherd (painted)	A1				Lt Brown	Cream		7-A	3	5
1	4851/01	14	bowl (incised interior)	A4					Red	Brown	7-A	B-3	B-2
1	4853/01	12	vasija	B1			Lt Brown	Lt Brown			2-A	5	5
1	4855/01	13	vasija	B1			Lt Brown	Dk Orange			8-F	5	5
1	4860/01		handle	B1	X	X	Dk Brown	Dk Brown			8-C	A-8/ Q	4/ Q
1	4864/01	19	bowl	B			Lt Orange	Lt Orange			7-A	B-4	B-12
1	4864/02	8	vasija	A5			Dk Orange	Dk Orange			3-A	B-9	A-8
1	4864/03	16	tinaja	A6		X	Lt Orange	Lt Brown			8-A	B-4	A-2

1	4864/04	15	vasija	B1			Lt Brown	Lt Brown			1-A	A-8	A-6
1	4866/01	3	miniature	A1				Lt Brown	Lt Brown		1-A	B-2	A-2
1	4867/01		handle	A1		X	Brown	Lt Orange			3-J	5/ Q	5
1	4875/01	10	vasija	A1			Lt Brown	Lt Brown			1-A	B-4	A-2
1	4875/02	11	vasija	A1			Lt Brown	Lt Brown			1-A	A-8	A-8
1	4875/03	10	bowl	A4					Lt Red	Lt Red	2-A	A-8	B-2
1	4875/04	14	vasija	B1	X	X	Black	Black			8-A	5	5
1	4875/06	5	miniature	A4				Lt Orange	Lt Red		2-A	B-2	5
1	4875/08		body sherd (banded punctates)	B1			Lt Brown	Lt Brown			2-A	A-8	5
1	4877/02		handle	B1			Lt Orange	Lt Orange			9-D	A-8	A-8
1	4880/01	12	olla	A4			Lt Brown	Lt Orange			2-A	A-8	A-8
1	4885/01		scraper	B1		X	Lt Brown	Lt Orange			2-L	B-2	5
1	4888/01	12	bowl (incised exterior)	A1				Lt Brown	Red		2-A	B-2	A-4
1	4893/01	14	vasija	A1				Lt Orange	Red	Red	7-A	B-4	A-4
1	4893/02	17	bowl (painted interior)	A1					Red	Dk Brown	1-J	B-3	B-2
1	4900/03		handle	B1	X	X	Black	Grey			9-P	A-8/ Q	A-2/ Q
1	4900/04		scraper	A1				Lt Orange	Red		6-E	A-8	A-8
1	4905/02		body sherd (banded punctates)	B1				Lt Brown	Dk Orange		2-A	A-2	5
1	4905/03		body sherd (incised)	A1				Lt Orange	Lt Red		2-A	B-2	A-8
1	4908/01		handle	B1	X	X	Black	Black	Red		8-C	A-8	A-2
1	4915/01		body sherd (incised)	A1				Lt Orange	Lt Red		6-I	B-2	B-2
1	4915/02		body sherd (incised)	A1					Lt Red	Lt Red	7-A	A-8	A-8
1	4915/03		scraper	A1			Lt Brown	Lt Brown			8-H	A-2	A-2
1	4920/01		handle	A1				Lt Orange	Lt Red		7-A	5	5
1	4920/02		handle	B1				Lt Brown	Red		2-A	5	5

1	4920/03		body sherd (incised)	A4			Lt Brown	Lt Brown			7-A	A-8	A-8
1	4924/01	10	olla	B1			Black	Lt Brown			8-H	A-8	5
1	4928/01	15	bowl	A1			Lt Orange	Lt Orange		Brown	7-A	A-2	A-2
1	4928/03	4	miniature	B1	X	X	Lt Brown	Black			1-C	5	4
1	4934/01	12	vasija	B1	X	X	Grey	Grey			8-A	A-2	A-2
1	4934/03		handle	?			Grey	Lt Brown			2-D	A-8	A-8
1	4934/04		whorl	A1			Lt Brown	Black			1-A	5	5
1	4938/01	12	bowl (nubs)	A4				Lt Orange	Red		1-A	B-2	5
1	4938/04		handle	B1			Lt Brown	Lt Brown			2-A	5	5
1	4938/05	4	miniature	A1				Lt Orange	Orange		2-A	B-2	A-8
1	4938/06	10.20	miniature	A1			Brown	Lt Brown			1-A	A-8	A-8
1	4951/01		body sherd (incised)	A5				Brown	Brown		6-E	B-2	5
1	4953/01	12	vasija	B1		X	Lt Brown	Lt Brown			1-A	5	5
1	4955/01		body sherd (incised)	A1				Lt Brown	Lt Orange		8-F	B-2	B-2
1	4957/01		body sherd (incised)	A1			Lt Orange	Lt Orange			7-A	A-8	B-2
1	4960/01	13	olla	B1			Lt Brown	Lt Brown			1-J	A-2	A-6
1	4960/02	12	olla	B1				Grey	Brown	Brown	1-G	A-8	5
1	4961/01	12	bowl	A1					Lt Red	Lt Red	5-A	B-2	B-2
1	4970/01		handle	A1				Lt Orange	Lt Red		7-A	B-2	4
1	4972/01	9	vasija	B1			Grey	Grey			2-A	A-2	A-8
1	4991/01	11	vasija	A1			Lt Brown	Lt Brown			1-A	1	1
1	4991/02	14	vasija	A5			Lt Orange	Lt Orange			4-E	5	5
1	4991/03	10	vasija	A1			Lt Brown	Lt Brown			2-A	1	6
1	4991/04	6	miniature	A1					Lt Red	Lt Red	2-A	A-8	A-8
1	4991/05	10	vasija	A1			Lt Brown	Lt Brown			1-A	5	6
1	4991/13		handle	A5			Lt Brown	Lt Brown			1-A	5	5
1	4991/14		body sherd (incised)	C2			Lt Orange	Lt Orange			7-A	A-8	A-8

1	4991/15		body sherd (incised)	A1			Lt Orange	Lt Brown			7-A	A-8	A-8
1	4995/01	19	bowl	A1					Orange	Orange	7-A	2	2
1	4995/02	14	vasija	A6					Lt Red	Lt Red	1-A	1	1
1	4995/03	13	bowl	A1			Lt Orange			Lt Red		1	1
1	4995/05	10	vasija	A1			Lt Orange	Lt Orange			5-A	5	1
1	4995/07	9	vasija	A1				Lt Orange	Lt Brown		5-A	2	1
1	4995/11		handle	B1		X	Lt Brown	Lt Brown			2-A	5/ Q	5
1	4995/12		handle	A3	X		Lt Brown	Black			1-A	B-5	5/ Q
1	4995/13		handle	B1	X		Lt Brown	Lt Brown			7-E	5	5
1	4995/14		body sherd (incised)	A1				Lt Orange	Cream		2-A	B-2	5
1	4995/15		handle	B1			Dk Brown	Black			8-E	5/ Q	5/ Q
1	4995/16		body sherd (incised)	A1		X		Grey	Lt Red		8-H	A-8	A-8
1	4999/01	11	vasija	A1			Dk Orange	Dk Orange			7-A	5	5
1	5010/01	16	tinaja	B1			Lt Brown	Lt Brown			2-A	A-2	A-2
1	5018/01		handle	A1				Lt Orange	Lt Red		7-A	B-9	A-2
1	5024/01	11	vasija	A4			Red-Brown	Red-Brown			7-A	A-1	A-2
1	5027/01	11	vasija	A1					Red	Red	7-A	B-2	B-2
1	5027/02		handle	B1			Lt Brown	Lt Brown			2-A	A-8	4
1	5029/01	10	vasija	A1					Lt Red	Lt Red	2-A	B-2	5
1	5034/01		body sherd (incised)	A1	X			Red-Brown	Cream		7-E	3	B-2
1	5038/01	14	vasija	A5			Dk Orange	Dk Orange			5-A	A-2	5
1	5038/02	14	bowl	A3	X	X			Lt Red	Lt Red	8-K	5	A-8
1	5038/04	15	vasija	A5	X		Lt Brown	Lt Brown			5-A	A-2	5
1	5057/01	7	trumpet/tube	A3				Lt Orange	Cream	Orange	8-E	3	A-8
1	5058/01	12	bowl	B1			Black	Lt Brown			8-F	A-2	A-2
1	5058/03		handle	A6			Lt Brown	Grey			3-P	5	A-8
1	5058/04		handle	B1	X		Lt Brown	Black			1-C	A-8	A-8/ Q

1	5063/01	10	olla	B1			Lt Brown	Lt Brown			6-A	5	5
1	5063/02	13	bowl (nubs)	A1					Lt Red	Lt Red	7-A	B-2	B-2
1	5063/03	4	miniature	A1				Black	Lt Red		8-A	A-8	A-8
1	5089/01	14	bowl (incised exterior)	A4				Lt Brown	Cream	Lt Red	7-A	B-2	B-1
1	5089/02		body sherd (incised)	A1				Dk Orange	Cream		7-A	B-2	A-2
1	5090/01	11	vasija	B1			Lt Brown	Lt Brown			2-A	A-2	A-2
1	5090/02	14	vasija	B1			Lt Brown	Lt Brown			1-A	A-6	5
1	5090/03	13	bowl (non-local)	A6			Black	Black	Brown	Brown	8-K	A-2	A-2
1	5090/04	12	bowl	A3			Black	Dk Brown			2-A	A-8	A-8
1	5090/06		handle	A1				Lt Orange	Lt Red		7-A	A-8	A-6
1	5090/08		body sherd (incised)	A5			Grey	Black			9-C	A-8	5
1	5101/02	13	vasija	B1			Lt Brown	Lt Brown			2-A	A-2	5
1	5102/01		body sherd (incised)	A1	X			Brown	Cream		1-A	3	A-8
1	5104/01	14	bowl (incised exterior/ non-local)	B			Lt Orange	Lt Orange			7-F	A-2	A-2
1	5104/02	14	vasija	B1	X	X	Lt Orange	Lt Orange			1-K	A-2	A-2
1	5104/03	14	bowl (incised exterior)	B2					Lt Orange	Lt Orange	9-A	A-8	A-8
1	5104/04	14	vasija	B1				Lt Brown	Dk Orange		9-B	A-2	5
1	5104/06	13	vasija	A5			Lt Brown	Dk Orange			5-A	A-8	5
1	5104/07		handle	A6				Lt Orange	Lt Red		2-A	A-8	5
1	5108/01	16	tinaja	B1			Lt Orange	Lt Orange			2-G	B-4	A-6
1	5108/03	14	olla	B1			Lt Brown	Lt Brown			2-S	A-2	A-8
1	5110/01	12	vasija	A1				Lt Orange	Lt Red		7-A	B-2	A-2
1	5114/01	12	vasija	A3			Lt Brown	Lt Brown			5-G	5	5
1	5114/02		handle	A1				Lt Brown	Lt Red		6-A	B-4	A-2
1	5115/01	11	bowl (incised exterior/ non-local)	A6			Grey	Black			8-C	A-8	A-2

1	5116/01	14	bowl	B1				Lt Brown	Dk Orange		6-E	5	A-2
1	5116/02	10	vasija	A3			Lt Brown	Lt Brown			2-A	A-2	A-6
1	5124/01	12	vasija	B1			Lt Brown	Lt Brown			6-E	A-2	A-2
1	5124/02	17	bowl	A1			Lt Brown	Lt Brown			3-A	A-8	A-8
1	5124/03		handle	B			Lt Orange	Lt Orange			6-A	A-8	5
1	5124/04		body sherd (incised)	B				Lt Orange	Lt Red		2-A	5	5
1	5144/03	9	vasija	A5			Lt Brown	Lt Brown			2-A	A-8	A-2
1	5144/04		handle	B1		X	Grey	Lt Orange			2-A	B-4/ Q	A-2
1	5144/05	4	miniature	A1				Lt Brown	Brown		7-A	B-2	5
1	5147/01	18	bowl (incised exterior/ non-local)	A3		X	Lt Orange	Lt Orange			2-A	A-8	B-1
1	5147/02		body sherd (incised)	A1					Lt Red	Lt Red	8-O	B-2	B-2
1	5152/01	8	vasija	B1	X		Grey	Lt Brown			8-H	5	A-2
1	5152/03	8	olla	A1				Lt Orange	Lt Red		8-F	A-8	A-8
1	5152/04	13	vasija	B1			Red-Brown	Lt Orange			2-A	A-4	5
1	5152/05	18	bowl	B1	X	X			Red	Red	8-A	B-2	B-2
1	5152/06	12	vasija	A1			Lt Brown	Lt Brown			2-A	5	5
1	5152/07	12	bowl	A1			Lt Brown	Lt Brown			1-A	A-2	A-2
1	5152/09		body sherd (banded punctates)	A5			Dk Orange	Lt Orange			2-A	5	5
1	5152/10		body sherd (banded punctates)	B1				Lt Brown	Red		2-A	A-8	5
1	5152/11		body sherd (incised/ non-local)	B			Black	Black			7-A	5	4
1	5156/04	15	bowl	A1			Lt Brown	Lt Brown			6-E	5	A-2
1	5156/06		body sherd (banded punctates)	B1			Lt Brown				2-S	A-2	5
1	5156/07		body sherd (banded	A4			Lt Brown	Lt Brown			1-A	5	5

			punctates)										
1	5161/01	14	bowl	A1			Lt Brown	Lt Brown			8-P	A-2	A-2
1	5161/02	10	vasija	B1			Lt Orange	Lt Orange			6-E	5	5
1	5161/03	10	vasija	A1					Lt Red	Lt Red	7-A	B-2	B-2
1	5161/04		handle	B1			Lt Brown	Lt Brown			1-A	5	5
1	5161/05	5	miniature	B1					Lt Red		6-E	B-2	5
1	5161/07		handle	A3		X	Lt Orange	Lt Orange			1-A	5/ Q	A-6
1	5161/08		body sherd (banded punctates)	B1			Lt Brown	Lt Brown			1-G	A-2	5
1	5161/09		body sherd (incised)	B1	X	X		Brown	Lt Red		8-A	B-2	5
1	5161/10		body sherd (incised)	B1	X	X	Black	Black	Red		8-C	A-8	4
1	5182/01	16	bowl	A1					Red	Red	1-A	B-2	B-2
1	5182/02	13	bowl	A					Red	Red	2-A	5	B-2
1	5182/04	13	vasija	A4			Lt Brown	Lt Orange			2-C	5	5
1	5182/05	13	vasija	B			Lt Brown	Lt Brown			2-C	5	5
1	5182/06	13	vasija	A3					Lt Red	Lt Red	8-G	B-2	A-6
1	5182/07	14	bowl (incised interior)	B			Dk Orange			Lt Red	5-A	5	5
1	5182/08	14	vasija	A3				Lt Orange	Lt Red		2-A	5	5
1	5182/09	16	tinaja	A6			Lt Brown	Dk Orange			5-B	A-2	5
1	5182/10	14	vasija	A1					Lt Red	Lt Red	5-A	B-2	B-2
1	5182/11	14	vasija	B1			Lt Brown	Lt Brown			2-A	5	5
1	5182/13	13	bowl	A				Lt Orange	Dk Orange		6-E	5	5
1	5182/15	13	vasija	A4					Lt Red	Lt Red	7-E	B-2	A-2
1	5182/16	19	bowl	B1							1-A	B-2	B-2
1	5182/17	16	olla	A5			Lt Orange	Orange			6-G	A-2	5
1	5182/18	13	bowl	A2			Dk Orange	Dk Orange			5-A	A-2	5
1	5182/22	15	vasija	A1				Lt Brown	Lt Red		7-A	B-2	5
1	5182/23	10	olla	A4				Lt Orange	Lt Red		6-A	B-2	A-2

1	5182/24	15	olla	B1				Lt Brown	Lt Orange		9-D	5	A-8
1	5182/25	11	vasija	A1			Lt Brown	Lt Brown			1-A	A-8	A-8
1	5182/26	11	olla	A1			Lt Orange	Lt Orange			5-A	A-8	A-8
1	5182/28	17	olla	A1			Lt Brown	Lt Orange			8-F	A-8	A-2
1	5182/29	16	olla	B1	X	X	Lt Orange	Lt Brown			8-A	5	5
1	5182/30	12	bowl	B1			Lt Brown	Lt Brown			2-A	A-2	A-2
1	5182/31	11	olla	A3					Lt Red	Lt Red	6-A	5	5
1	5182/32	15	bowl	A6			Lt Brown	Lt Brown			3-C	A-8	A-8
1	5182/33	14	vasija	B1		X	Lt Brown	Lt Brown			8-H	B-4	5
1	5182/34	14	olla	A1			Dk Brown	Lt Brown			7-E	A-8	5
1	5182/37	15	bowl	A3	X	X			Lt Red	Lt Red	3-A	B-2	B-2
1	5182/56		handle	B1		X	Black	Lt Brown			8-H	A-8/ Q	A-2
1	5182/57		handle	A6			Lt Orange	Lt Brown			2-A	5	5
1	5182/58		handle	B1		X	Lt Brown	Lt Brown			8-H	A-8/ Q	5
1	5182/59		handle	A6			Grey	Lt Brown			8-G	A-8/ Q	A-8
1	5182/60		handle	A5			Lt Orange	Grey			9-I	5	5
1	5182/61		handle	A6			Lt Orange	Lt Brown			2-A	5	5
1	5182/62		handle	A5			Lt Brown	Red-Brown			9-A	5	5
1	5182/63		handle	A6			Lt Orange	Lt Orange			1-A	5	5
1	5182/64		handle	A6			Grey	Lt Brown			8-A	5	5
1	5182/65		handle	A1			Lt Orange	Dk Orange			7-A	A-8	A-8
1	5182/66		handle	B1		X	Lt Brown	Lt Brown			1-C	A-8/ Q	A-2
1	5182/67		handle	A1			Lt Orange	Lt Orange			7-A	A-8	A-8
1	5182/68		body sherd (incised)	B1			Lt Orange	Lt Orange			2-A	5	5
1	5182/70		body sherd (banded punctates)	B1				Grey	Red		2-A	A-2	5
1	5182/71		body sherd (incised)	A1				Lt Red	Lt Red		7-A	B-2	B-2
1	5182/72		body sherd (incised)	A4			Brown	Brown	Lt Red		6-A	A-8	A-8

1	5185/01		body sherd (punctates)	A1			Lt Brown	Dk Brown			8-H	B-12	5
1	5194/01	13	vasija	A1			Lt Orange	Lt Orange			2-A	A-2	A-2
1	5228/01	13	vasija	A5			Lt Orange	Lt Brown			5-P	A-8	5
1	5228/02	15	bowl (incised exterior)	A1				Lt Brown	Lt Red		2-A	A-8	A-2
1	5228/05	10	vasija	A5			Lt Brown	Grey			5-J	5	5
1	5228/06	13	bowl	A1				Lt Brown	Lt Red		1-A	5	5
1	5228/08		handle	B1	X		Brown	Lt Brown			7-A	5	5/ Q
1	5231/01		body sherd (incised)	A1				Lt Brown	Lt Red		7-A	B-2	B-2
1	5231/02		body sherd (incised)	A4				Lt Brown	Lt Red		2-A	B-2	5
1	5234/01	18	tinaja	B1			Lt Brown	Lt Brown			5-A	A-2	A-2
1	5234/02	9	vasija (handles)	A5			Dk Orange	Dk Orange			5-A	B-9	A-8
1	5234/05		body sherd (incised)	A6				Black	Dk Red		8-A	B-2	5
2	5304/01	23	olla	A1			Lt Orange	Lt Orange			7-A	A-2	A-2
2	5304/03		handle	A1				Lt Orange	Lt Red		7-A	5	A-8
2	5306/01	17	bowl	A1					Red	Red	6-A	B-1	B-1
2	5319/01	21	tinaja	A1			Lt Brown	Lt Brown			7-B	B-1	A-2
2	5319/02	22	olla	B1			Lt Brown	Lt Brown			6-A	A-5	A-2
2	5326/01	17	tinaja	B1			Lt Brown	Lt Brown			2-A	A-2/ A-4	A-2
2	5326/02		handle	B1			Lt Brown	Lt Brown			2-A	A-8	A-2
2	5348/01	11	vasija	A1	X				Dk Red		1-C	A-8	A-2/ Q
2	5348/02		body sherd (incised)	A1				Lt Orange	Lt Red		7-A	B-2	A-8
2	5352A/01	22	incensario	A1	X				Brown		7-E	3	A-2
2	5352B/01		incensario (base)	A1				Dk Orange	Red		1-A	3	A-1
2	5352D/01		incensario	A1	X			Black	Lt Brown		7-A	B-2	A-2/ Q
2	5355/01	19	bowl	A1					Lt Red	Lt Red	4-A	B-1	B-1

2	5355/02		body sherd (incised)	A1			Red-Brown	Lt Orange	Lt Red		7-A	B-2	A-8
2	5361/01		body sherd (incised)	A1				Red-Brown	Lt Red		7-A	B-2	A-2
2	5372/01	35	olla	B1			Lt Orange	Lt Orange			6-A	B-4	A-8/ A-2
2	5372/05		handle	B1	X		Lt Brown	Brown			2-A	4/ A-8	4/ Q
2	5374/01	18	bowl (incised exterior)	A1	X			Lt Brown	Dk Orange		7-A	B-2	A-2
2	5380/01	19	olla	B1			Black	Lt Brown			1-A	A-2	A-2
2	5392/01	23	tinaja	B1		X					1-A	A-2	A-2
2	5392/02	23	bolw (handles)	A6							5-A	B-1	B-1
2	5392/04		handle	B1	X	X	Black	Grey			8-C	4/ Q	A-8/ Q
2	5393/01		body sherd (incised)	A1				Lt Orange	White		6-A	B-12	A-2
2	5420/02		handle	A1			Lt Brown	Brown			6-A	A-8	A-2
2	5421/01	20	bowl (painted interior)	A1					Red	Red	2-C	B-2	B-2