Ceramic Technology, Production, and Exchange as Seen through Macroscopic Analysis of Pottery Fragments from the Early Horizon Center Caylán, Nepeña Valley, Peru

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This thesis is dedicated to my future husband Aldo Watanave, without whom this endeavor would have never been attempted.
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# TABLE OF CONTENTS

ACKNOWLEDGEMENTS .......................................................................................................................... iii

LIST OF TABLES ........................................................................................................................................ vii

LIST OF FIGURES ...................................................................................................................................... viii

ABSTRACT ................................................................................................................................................... xiii

CHAPTER 1: INTRODUCTION ................................................................................................................... 1
  1.1 The Early Horizon: Development of Complex Societies ................................................................. 2
  1.2 Ceramic Production and Craft Specialization ............................................................................... 3
  1.3 Research Questions and Methods ................................................................................................. 6
  1.4 Organization of the Thesis ............................................................................................................. 7

CHAPTER 2: THEORETICAL BACKGROUND: THE ANTHROPOLOGY OF CERAMIC PRODUCTION AND ITS ARCHAEOLOGICAL STUDY .......................................................... 10
  2.1 Anthropology of Craft and Ceramic Production ......................................................................... 11
    2.1.1 Types of Ceramic-Making Environments ........................................................................ 13
    2.1.2 Individual and External Influences on Styles .................................................................... 16
    2.1.3 Trade ..................................................................................................................................... 18
  2.2 Ethnographic Studies of Pottery Making ..................................................................................... 20
    2.2.1 The Ceramic-Making Process ............................................................................................ 21
      2.2.1.1 Raw Materials ............................................................................................................. 21
      2.2.1.2 Forming the Vessel ..................................................................................................... 23
      2.2.1.3 Firing .......................................................................................................................... 26
    2.2.2 Factors of Ecology, Politics, and Expertise ....................................................................... 28
      2.2.2.1 Ecological Factors ...................................................................................................... 28
      2.2.2.2 Sociopolitical Factors ............................................................................................... 29
      2.2.2.3 Factors of Expertise .................................................................................................. 31
  2.3 Archaeological Study of Ceramics ................................................................................................. 32
    2.3.1 Chronology ........................................................................................................................... 33
    2.3.2 Function .................................................................................................................................. 35
    2.3.3 Manufacture .......................................................................................................................... 36
    2.3.4 Types of Ceramic Analyses .................................................................................................. 37
      2.3.4.1 Macroscopic Analysis and Description of Mineral Inclusions .................................... 38
      2.3.4.2 Petrographic Microscope Analysis ............................................................................. 40
      2.3.4.3 Neutron Activation Analysis (NAA) .......................................................................... 41
      2.3.4.4 X-Ray Fluorescence (XRF) ......................................................................................... 41
  2.4 Ceramic Studies in the Andes ........................................................................................................ 42

  3.1 Geographical Setting ....................................................................................................................... 48
CHAPTER 5: RESULTS: CERAMIC WARES AND THEIR DISTRIBUTION

5.1 Ceramic Ware Descriptions ................................................................. 88
  5.1.1 Early Horizon Ware Groups ......................................................... 89
    5.1.1.1 Ware Group 6: Mixed Inclusions with Mica ................................ 89
    5.1.1.2 Ware Group 8: Quartzite with Mica ........................................ 92
    5.1.1.3 Ware Group 10: Mixed Inclusions with Mica in a Black Paste .... 93
    5.1.1.4 Ware Group 9: Mixed Inclusions with Feldspar and Mica .......... 93
    5.1.1.5 Ware Group 3: Quartzite Inclusions ...................................... 94
    5.1.1.6 Ware Group 2: Diorite or Basalt Inclusions ............................ 95
    5.1.1.7 Ware Group 1: Mixed Inclusions ........................................... 95
    5.1.1.8 Ware Group 7: Diorite or Basalt Inclusions with Mica .......... 97
    5.1.1.9 Ware Group 5: Mixed Inclusions in a Black Paste ................. 98
    5.1.1.10 Ware Group 4: Mixed Inclusions with Feldspar .................. 98
  5.1.2 Intrusive Ware Groups ............................................................... 99
    5.1.2.1 Ware Group 11: Intrusive Wares with Mixed Inclusions .......... 100
    5.1.2.2 Ware Group 12: Intrusive Wares with No Inclusions ............ 100
    5.1.2.3 Ware Group 13: Intrusive Wares with Very Fine Inclusions with Mica .......... 101
    5.1.2.4 Ware Group 14: Intrusive Wares with Very Fine Inclusions .... 101

5.2 Correlation of Wares to other North-Central Coast Wares .................. 101
5.3 Correlation of Ware to Vessel Shape ............................................. 103
5.3.1 Function of Vessels Based on Form .......................................................... 104
5.3.2 Vessel Form by Unit .......................................................... 104
5.3.3 Vessel Form by Paste .......................................................... 106
5.3.4 Residue .......................................................... 107
5.4 Surface Finish and Decoration Present on Ceramic Vessels .......................................................... 108
5.4.1 Surface Finish .......................................................... 108
5.4.2 Decoration .......................................................... 110
5.5 Description of Pottery Sherds in Stratified Contexts .......................................................... 111
  5.5.1 Montículo Principal .......................................................... 111
5.5.2 Plaza-A .......................................................... 113
5.5.3 Compound-E .......................................................... 114
5.6 Summary of Results .......................................................... 115

CHAPTER 6: DISCUSSION AND CONCLUSIONS .......................................................... 118
  6.1 Ceramic Technology and Production at Caylán and Nepeña during the Early
  Horizon in Response to Research Questions .......................................................... 118
  6.2 Broader Implications in the Peruvian Andes .......................................................... 127
  6.3 Application of Macroscopic Analyses .......................................................... 128
  6.4 Concluding Thoughts and Future Research .......................................................... 128

REFERENCES .......................................................... 132

APPENDIX A: DESCRIPTIONS OF STRATIGRAPHY AND CERAMICS RECOVERED
FROM STRATIGRAPHIC LEVELS .......................................................... 150

APPENDIX B: TABLES .......................................................... 163

APPENDIX C: FIGURES .......................................................... 185

VITA .......................................................... 237
LIST OF TABLES

Table 1. Table of the Chronology of the Central Andes................................................................. 163

Table 2. Table of the Chronology of the Nepeña Valley in comparison to the Central Andes and the periods defined by the Virú Valley Project................................................................. 164

Table 3. Table describing the Plain Ware Groups defined by Strong and Evans (1952) ........ 165

Table 4. Table describing the Decorated Ware Types defined by Strong and Evans (1952)..... 167

Table 5. Table describing Early Horizon decorative techniques identified in the Nepeña Valley (Proulx 1973) .................................................................................................................... 171

Table 6. Table describing Early Horizon ceramic wares identified at Huambacho (Chicoine 2006a) ................................................................................................................................. 172

Table 7. Table describing decorative techniques identified at Cerro Blanco (Ikehara 2007)..... 173

Table 8. Table describing ceramic wares identified at Cerro Blanco (Ikehara 2007) ............ 175

Table 9. Summary of the analysis completed by Quispe of the ceramics of the Test Pits of Caylán and the closest corresponding paste group from this 2015 thesis................................. 176

Table 10. Inclusion size was identified using measurements from the Wentworth Scale and mm equivalents (Adopted from Dinocauze 2000:278) ................................................................. 179

Table 11. Table demonstrating wares grouped by general inclusions, disregarding size........ 179

Table 12. Table of ware and paste groups represented by the quantity and percentage of sherds ........................................................................................................................................ 180

Table 13. Table of the stratigraphic distribution of wares in the strata of UE4-T2 in the Montículo Principal .......................................................................................................................... 181

Table 14. Table of the stratigraphic distribution of wares in the strata of UE5 and its extensions in Plaza-A .......................................................................................................................... 182

Table 15. Table of the stratigraphic distribution of wares in the strata of UE6-Extension 3 in Compound-E .......................................................................................................................... 184
LIST OF FIGURES

Figure 1. Map of the location of Caylán in Nepeña Valley, Peru (modified from Chicoine 2010:318; Figure 1)................................................................................................................................. 185

Figure 2. Photo of the view from Pañamarca the south side of the valley looking north towards Caylán (Photo by author)......................................................................................................................... 186

Figure 3. Map of the location of Caylán in the Lower Nepeña Valley showing mountains and rivers ...................................................................................................................................................... 186

Figure 4. Map of the Caylán area highlighting the location of resources in the area (adopted from Google Earth)........................................................................................................................................ 187

Figure 5. Aerial orthophoto of Caylán (Ministerio de Cultura de Peru 2015).............................. 188

Figure 6. Map of raw material resources in the Nepeña Valley (modified from ONERN 1972; Instituto de Geología y Minería 1975)........................................................................................................ 188

Figure 7. Map of location of test pits (triangles) and excavation units (circles and rectangles) from 2009 (green) and 2010 (red) (orthophoto courtesy of the Ministerio de Cultura de Peru)........................................................................................................ 189

Figure 8. Map of Caylán showing test pits (HP) and excavation units (UE) from the 2010 field season of PIAC, highlighting the units examined here (modified from Chicoine & Ikehara 2010:93; Figure 4)........................................................................................................................................ 190

Figure 9. Photo of the view of the Montículo Principal where UE4 is located (Chicoine and Ikehara 2010:95; Figure 8)........................................................................................................................................ 191

Figure 10. Photo of the southern side of Montículo Principal showing UE4 and its extensions with Terrace 2 highlighted (Chicoine and Ikehara 2010:95; Figure 9)........................................ 191

Figure 11. Photo of the plan view of UE 5 and Extension 1 (Chicoine and Ikehara 2010:108; Figure 29)........................................................................................................................................ 192

Figure 12. Photo of the view of UE5 Extensions 3 and 4 (Chicoine and Ikehara 2010:109; Figure 32)........................................................................................................................................ 192

Figure 13. Photo of the view of UE 6 (Chicoine and Ikehara 2010:117; Figure 41)............... 193

Figure 14. Photo of the view of UE6 and Extensions 1, 3, and 4 (Chicoine and Ikehara 2010:118; Figure 44)........................................................................................................................................ 193
Figure 15. Photo of the view of UE6 and Extensions 2, 3, 5, 6, 7, and 8 (Chicoine and Ikehara 2010:119; Figure 47) ..................................................................................................................... 194

Figure 16. Map of the location of Museo Regional de Casma Max Uhle in the Casma Valley (modified from Suárez:2010; Figure 1) ..................................................................................................................... 195

Figure 17. Museo Regional de Casma Max Uhle where pottery sherds were stored and examined (Photo by author) .......................................................................................................................... 196

Figure 18. Possible forms of jars (tinajas) at Caylán .......................................................................................................................... 196

Figure 19. Possible forms of jugs (cántaros) at Caylán .......................................................................................................................... 197

Figure 20. Possible forms of pots (ollas) at Caylán .......................................................................................................................... 197

Figure 21. Possible forms of bottles (botellas) at Caylán .................................................................................................................... 198

Figure 22. Possible forms of bowls (cuencos) at Caylán .................................................................................................................... 198

Figure 23. Possible forms of cups (tazones) at Caylán ........................................................................................................................ 199

Figure 24. Hierarchical tree used in the field to easily classify paste groups based on the presence or absence of particular inclusions, Early Horizon pastes ........................................................................ 200

Figure 25. Hierarchical tree used in the field to easily classify paste groups based on the presence or absence of particular inclusions, late Intrusive pastes ........................................................................ 201

Figure 26. Photos of inclusions identified in ceramic pastes. A: diorite or basalt; B: milky and clear quartzite; C: muscovite mica; D: biotite mica; E: plagioclase feldspar; F: milky and yellow quartzite; G: hematite; H: epidote. Scale 2µm (photos by author) ........................................................................ 202

Figure 27. Photos of the profile of Wares 1 through 10 and the paste groups include within them in order of most common to least ........................................................................................................ 203

Figure 28. Photos of the profiles of the most commonly identified paste groups. D: coarse mixed inclusions with mica; E: medium mixed inclusions with mica; C: very coarse mixed inclusions with mica; F: coarse quartzite and mica; M: fine mixed inclusions with mica (photos by author) ........................................................................................................ 205

Figure 29. Unit 4 Terrace 2 Vessel Shapes ................................................................................................................................. 206

Figure 30. Unit 5, Extension 3, and Extension 4 Vessel Shapes ........................................................................................................ 206

Figure 31. Unit 6 – Extension 3 Vessel Shapes ................................................................................................................................. 207

Figure 32. Frequency of Vessel Shape in each Excavation Unit ........................................................................................................ 207
Figure 56. Ware groups of sherds identified in UE5-Ext3 Stratum 1 Level 1............................ 223
Figure 57. Ware groups of sherds identified in UE5-Ext3 Stratum 1 on Floor ......................... 223
Figure 58. Ware groups of sherds identified in UE5-Ext3 Stratum 1 Element 31 ...................... 224
Figure 59. Ware groups of sherds identified in UE5-Ext3 Stratum 2 Level A......................... 224
Figure 60. Ware groups of sherds identified in UE5-Ext3 Stratum 2 Level B ......................... 225
Figure 61. Ware groups of sherds identified in UE5-Ext3 Stratum 2 Debris .......................... 225
Figure 62. Ware groups of sherds identified in UE5-Ext3 Stratum 3................................. 226
Figure 63. Ware groups of sherds identified in UE5-Ext3 Stratum 4 Fill .............................. 226
Figure 64. Ware groups of sherds identified in UE5-Ext4 Stratum 1................................. 227
Figure 65. Ware groups of sherds identified in UE5-Ext4 Stratum 1 Level 1 .......................... 227
Figure 66. Ware groups of sherds identified in UE5-Ext4 Stratum 1 Over Possible Floor....... 228
Figure 67. Ware groups of sherds identified in UE5-Ext4 Stratum 2 Level A....................... 228
Figure 68. Ware groups of sherds identified in UE5-Ext4 Stratum 2 Level B ....................... 229
Figure 69. Ware groups of sherds identified in UE5-Ext4 Stratum 2 Fill Under Floor ............ 229
Figure 70. Ware groups of sherds identified in UE5-Ext4 Stratum 2 Fill Under Ramp.......... 230
Figure 71. Ware groups of sherds identified in UE5-Ext4 Stratum 2 Fill Under Floor 1 and Ramp ........................................................................................................ 230
Figure 72. Ware groups of sherds identified in UE5-Ext4 Stratum 3 Floor 2 ....................... 231
Figure 73. Ware groups of sherds identified in UE5-Ext4 Stratum 3 Under Floor ................. 231
Figure 74. Ware groups of sherds identified in UE5-Ext4 Stratum 3 Fill Under Ramp........... 232
Figure 75. Ware groups of sherds identified in UE5-Ext4 Stratum 4 Under Floor ................. 232
Figure 76. Ware Groups represented in UE6-Ext3 ............................................................... 233
Figure 77. Ware groups of sherds identified in UE6-Ext3 Stratum 1 Debris ......................... 233
Figure 78. Ware groups of sherds identified in UE6-Ext3 Stratum 1.................................. 234
Figure 79. Ware groups of sherds identified in UE6-Ext3 Stratum 2 Level 1............................ 234
Figure 80. Ware groups of sherds identified in UE6-Ext3 Stratum 2 Level 2............................ 235
Figure 81. Ware groups of sherds identified in UE6-Ext3 Stratum 2 Level 3............................ 235
Figure 82. Ware groups of sherds identified in UE6-Ext3 Stratum 2 Level 4............................ 236
ABSTRACT

In this thesis, I examine the production, use, and decoration of ceramic vessels at the Early Horizon center of Caylán (800-1 B. C. E.) on the Peruvian North Central-Coast. Pottery sherds are artifacts ubiquitously recovered at archaeological sites, especially in sedentary agrarian societies. Most studies of ceramics in Peru have focused on typological sequences. Recently investigators in the Nepeña Valley have focused on ceramic pastes and technologies.

The materials examined in this thesis were excavated from Caylán. Caylán is an incipient urban center, which developed during the Early Horizon (900-200 B. C. E.). Caylán’s dense urban core consists in 43 residential, walled compounds built around communal plazas. A monumental mound sits in front of a large public area. Archaeologists from the Proyecto de Investigación Arqueológica Caylán conducted excavations in 2009 and 2010. Six excavation units and sixteen test pits were placed throughout the site to sample the diversity of architecture and material remains.

I conducted a macroscopic analysis of a sample of pottery sherds (n=11,270) from three excavation units in the Main Mound, Plaza-A, and Compound-E. My analysis was conducted at the Museo Regional de Casma Max Uhle where the Caylán’s materials are stored. The analysis was a visual identification and classification of raw materials used to produce pottery. Early Horizon sherds were classified into paste and ware groups based on their features and mineral inclusions.

I identified ten Early Horizon ware groups based on the minerals visible in the analyzed sherds. Ware Group 6 is the most common. It was associated with all units, all vessel forms, and all surface finishes and decorations. The mixed sand inclusions were likely from deposits close to the ancient settlement where pots were produced, used, broken, and discarded. Paste groups,
divisions within ware groups, varied in size from very coarse to fine. Inclusions were likely screened before being added to the clay. Comparative studies indicate that Caylán wares align with ceramics recovered from the coeval sites Huambacho and Samanco. This study provides a first glimpse into the composition of Early Horizon ceramics and their making, opening up future avenues for other compositional analyses.
CHAPTER 1
INTRODUCTION

Pottery sherds are one of the most common types of artifacts recovered at archaeological sites. Indeed, fired clay objects tend to preserve well archaeologically, although they may fragment, leaving only pieces of the original artifact. In agrarian and complex urban societies where ceramic containers are commonly used, the analysis of pottery sherds is a critical component of the study of human materiality. The analysis of pottery sherds can inform on several aspects of ancient human societies such as ceramic technology, craft production, and trade. In the Central Andes, archaeologists have used ceramics to build chronological sequences, track cultural and stylistic changes, and study patterns of regional interaction.

This thesis examines ceramic technology as seen through the analysis of pottery fragments recovered at the archaeological complex of Caylán, Nepeña Valley, Perú (Figure 1). Caylán is an Early Horizon “incipient urban center” located on the north-central coast of Peru. The structure of the society at Caylán suggests the presence of craft specialists as well as the existence of various scales of exchange networks. Extensive exchange networks were achieved with the increased reliance on camelids as pack animals. Early Horizon coastal groups likely partook in interaction networks involving foreign groups. In this study, I examine the manufacture of ceramic containers, their production, and potential exchange patterns. I identify these factors through the macroscopic analysis of pottery.

In 2009 and 2010 David Chicoine and Hugo Ikehara (2009, 2010, 2011, 2014), directors of the Proyecto de Investigación Arqueológica Caylán (PIAC), carried out the first scientific excavations at the important Early Horizon settlement. Their team completed 16 weeks of fieldwork and recovered large quantities of artifacts including more than 48,000 pottery
fragments. In this thesis, I analyze more than 11,000 sherds from three excavation units. These contexts correspond to a monumental plaza (Plaza-A), raised platform (Main Platform Complex), and an urban residential complex (Compound-E). I conduct a comparative analysis to examine ceramic wares based on manufacture, technology (material, fabrication, finish, and firing), and vessel form to recognize patterns of production and trade in the Nepeña Valley during the first millennium B. C. E.

1.1 The Early Horizon: Development of Complex Societies

The Initial Period (1800-900 B. C. E.; Table 1) in Peru is marked by the development of pottery in several areas. People also invested much time and effort in large monumental architecture, and intensified agrarian practices, especially irrigation techniques and infrastructures. The Early Horizon in the Central Andes corresponds to the years 900-200 B. C. E. During this time period in the Ancash Region of Peru, a series of sociopolitical structural and settlement changes were taking place. Chavín de Huántar, a ceremonial center in the highlands of Ancash, influenced much of the north-central Andes with its architecture and art. Chavín served as a prominent pilgrimage center in Ancash. Visitors left offerings as tribute at the site, and spread its ideological views, art, and architectural styles. By 500 or 400 B. C. E., Chavín was apparently abandoned and its influence diminished.

In the lower Nepeña Valley, Cerro Blanco was a ceremonial center with strong Chavín and Cupisnique influences. Four phases have been defined based on the occupation of Cerro Blanco: the (1) Huambocayán Phase (1500-1100 B. C. E.), (2) Cerro Blanco Phase (1100-800 B. C. E.), (3) Nepeña Phase (800-450 B. C. E.), and (4) the Samanco Phase (450-150 B. C. E.; Shibata 2008; Table 2). The development of Cerro Blanco demonstrates the changes that
occurred in the Nepeña Valley. Chavín and Cupisnique influences are most reflected during the Cerro Blanco Phase when they were at their peak. The Nepeña and Samanco phases reflect a move toward more locally centered influences as the valley entered into a period of conflict as visible in the presence of fortifications and weapons.

Caylán first developed during the Nepeña Phase, with a localized architectural style built in a defendable location on the margins of the lower valley. It reached its peak during the subsequent Samanco Phase and appears to have been abandoned at the turn of the Common Era. Caylán is interpreted as an incipient urban center and consists of a dense core of monumental residential complexes and ceremonial structures. Forty-three compounds create the urban core, each with a plaza, series of non-connecting rooms, and streets connecting the compounds (Chicoine and Ikehara 2014; Whitten 2015).

1.2 Ceramic Production and Craft Specialization

Ceramics have been defined as a form of "art and technology which consists of shaping and manufacturing products made from earthly materials, and the application of heat to these materials to form useful products" (Kingery 1984:172). World-wide, pottery first emerges as early as 18,000 B. C. E. and was slowly adopted by cultures throughout the world (Wu et al. 2012). Hunter-gatherers began making pottery as the new technology was developed. Pots were made using techniques similar to basket making (Hommel 2014). Following the development of agriculture and sedentary life, pottery became a staple of domestic life, used in cooking, storage, and the transport of dry goods and liquids.

Pottery was produced in a variety of different social environments, including household production, ceramic workshops, and by traveling potters. Household production of pottery is a
generalized form of production realized on a small-scale. Potters are non-specialized and typically make pots in domestic spaces when there is a necessity. Larger ceramic workshops represent a specialized production. Some of the most important differences to identify generalized and specialized production are the amount of time spent on the activity, compensation for the work, and the existence of a special name or title for the specialist (Costin 1991). For specialization to exist, there must be some form of social organization that supports the specialist in a way that they do not have to perform other activities, such as food production.

Traveling potters represent a type of specialized potters who travel away from their home community to other communities to make pottery (Ramón 2013a). These potters typically travel to communities that do not have potters of their own. Itinerant potters typically manufacture vessels in their home community, then travel to other communities to sell them. Ramón (2008) borrows the term “swallow” worker from seasonally migrant workers who travel from Mexico to work in the US. Ramón applies this term to potters who travel seasonally to make pottery, following the agricultural cycle. Swallow potters take raw materials from their home community, travel to other communities, then produce pottery based on the requests of the community. I hypothesize that Caylán pottery was produced by local, household-based ceramicists. These vessels were likely traded within the community or valley.

The ceramic-making process includes four steps: collection, selection, and preparation of materials, manufacture of the object, surface treatment or finish, and firing. Raw materials are typically mined from areas close to the potting community (Arnold 2005). The selection of raw materials often depends on the geology of the area. Poor materials may lead to the decision to not make pottery or to travel farther to collect materials. The raw materials needed are clay, temper materials, and water. Unwanted particles are removed from the clay matrix. Water is mixed with
the clay to make it malleable. Temper materials, such as crushed rock, bone, shell, and vegetal remains, are added to create the correct consistency of clay. Temper may not be necessary and/or added if the clay already has non-plastic inclusions.

Next, the clay is formed into the desired form using hand-building or wheel-throwing. The wheel was not used in pre-Colombian societies. Rather, ceramicists relied on hand modeling, molds, paddle-and-anvil, and coil techniques. In many cases these techniques were combined. Once formed, the vessel is dried.

Surface finishes may be added for structural integrity or for decoration. Decorative techniques vary and can also be applied before and/or after firing. Surface finishes and decoration are often the result of artistic traditions, social contexts, and/or even political influence. Many decorative styles, especially complex painting and sculpting have been linked to political or religious phenomenon as ideological messages that could easily be shown to many people.

Finally, vessels are fired. Firing can be done in an open pit or in a kiln. The flow of oxygen during firing as well as the type of clay (e.g., terracotta vs. kaolinite) affects the final color of the ceramic piece. Early Horizon ceramics were fired at temperatures between 900-1200°C (Rice 1987:5). The poor construction of a vessel often results in its explosion or cracking. Well-fired pieces are cooled, then ready for use as watertight containers.

Pottery represents an important tool for archaeologists, especially in complex and agrarian societies. The variation of pottery shapes and decoration through time and space has been used by archaeologists to sequence ceramic objects and their styles, understand their function, and study the technology used in their production. In this way, archaeologists develop the cultural history of a site and region.
Archaeologists and ceramic specialists also use chemical and petrographic analyses to create more complete views of the origin of raw materials used in pottery manufacture. Macroscopic, petrographic microscope, neutron activation, and X-ray fluorescence analyses are just a few ways in which pottery can be analyzed and sourced. These provenance studies can help identify if pottery was traded or gifted, and if raw materials were traded and used in the production of otherwise local appearing ceramics.

1.3 Research Questions and Methods

The aim of this study is to identify and categorize groups of ceramic wares produced using different raw materials, and possibly to determine if pottery was produced by distinct potters or potting groups. In other words, do visually distinct ceramic pastes exist at Caylán? If so, do these pastes or wares represent distinct potters producing ceramics using different materials? At the site-level, can patterns of horizontal and/or vertical distributions inform on the occurrence of certain ceramic wares through space and time. More broadly, can foreign or imported wares or materials be identified? Does the relation of wares with vessel form and decoration tell us about ceramic styles and types of ceramic objects at Caylán during the Early Horizon? I answer these questions through a macroscopic analysis of ceramic pastes and a comparison of paste and ware categories with vessel shape, stratigraphic and unit location, and decoration present in the sherds.

My research consists of the macroscopic analysis of ceramics based on the methodology created by previous investigations into ceramic paste analysis at Cerro Blanco (Ikehara 2007), Huambacho (Chicoine 2006a), and Caylán (José Quispe, personal communication 2015). A total of 11,270 pottery sherds were sampled from three contexts at Caylán. Sherds from the Montículo Principal, Plaza-A, and Compound-E were sampled. The sample was created to create a
balanced view of stratigraphic contexts from the three contexts. Ceramics were analyzed using a hand lens to identify the texture, porosity, inclusions, inclusion size, sorting, and shape, and the sherd color to categorize sherds into paste and ware groups. Sorting is a term used by archaeologists referring to how evenly dispersed inclusions were throughout the paste of a sherd (Velde and Druc 1999). Paste groups were identified and grouped based on the presence of inclusions, their size and sorting within a sherd. These paste groups were then grouped into ware groups based on the composition, firing, and surface treatment of pottery and ceramics, excluding the size of inclusions (Rice 1987:5). Ten Early Horizon wares were identified. Ware Group 6 was the most common. It was present in all three contexts examined, consistently present through stratigraphic deposits, and was the most versatile ware, identified in almost all vessel forms and decoration techniques.

Photographs were taken of the profile of sherds from each paste group and a DinoLite was used to take photographs of specific types of inclusions. Vessel shapes were preliminarily identified based on rim sherds within the sample, following the general vessel forms outlined by Ortiz in her 2012 study of Compound-E ceramics. Surface finishes and decorations were recorded and identified following ceramic traditions on the north-central coast. Ware group, vessel form, and finish and decoration were compared to identify the most frequently identified and combined features.

1.4 Organization of the Thesis

This thesis is organized into six chapters. In the following chapter, I discuss the ceramic manufacture process and the basic steps required to manufacture pottery. I discuss the environments in which ceramics were made, the factors that influence the production, and the
possible use areas of ceramics. I then discuss ethnographic accounts and apply them to the
*chaine opératoire* of the collection, preparation, and production of clay pots. Next, I discuss the
archaeological implications of ceramic analysis, especially in relation to defining chronology,
activities, and the technology of the potters, as well as an overview of the types of ceramic
analyses employed by archaeologists. I conclude the chapter with a discussion on ceramic studies
in the Andes, beginning with contributions from the Virú Valley Project and ending with more
recent petrographic and geochemical analyses in the Ancash Region.

In chapter three I describe the geography of the Andes and the Ancash Region of the
North-Central Coast of Peru in relation to the geological deposits in the lower Nepeña Valley. I
then describe research that has been conducted in the Nepeña Valley, specifically relating to the
Early Horizon, and emphasizing ceramic studies. I then discuss how Caylán fits into the larger
sphere of Ancash and Nepeña during the Early Horizon. Finally, I present a summary of the
current understanding of the economy, settlement patterns, and ideology of Early Horizon
Ancash to present a framework for my research.

In chapter four I describe the methods used in previous fieldwork at Caylán by PIAC,
presenting an overview of the site organization. I then present a summary of block excavations
and test pits, emphasizing excavations at the Main Mound Complex, Plaza-A, and Compound-E.
I discuss ceramic analyses that have been conducted at Caylán, focusing on vessel forms and
paste analysis. Next, I present the methods used in my analysis, including the basic methodology
and details of the analysis, followed by research questions and the limitations of this type of
analysis based on the setting in which the research was conducted.
In chapter five I present the results of the macroscopic analysis. This chapter includes descriptions of the identified ware and paste groups, their distribution through the site, the correlation of paste and vessel, vessel function and surface finish and decoration.

In chapter six I discuss the implications of the identified ware groups and possible means of interaction within the scope of the greater Nepeña Valley during the Early Horizon. I discuss the potential application of this type of analysis to other regions and time frames. I conclude with final thoughts and future research that is being conceived for the ceramic collection at Caylán.
Ceramic vessels are especially useful to archaeologists due to their "ubiquity and apparent indestructability" (Orton and Hughes 2013:32). This ever-present nature of pottery sherds provides a wealth of data from which investigators can draw inferences. However, fired clay vessels were not used by all ancient cultures. Mobile hunting, gathering, and foraging groups made containers of hide, reeds, wood, and other flexible materials that were not difficult to move or as likely to break. These organic materials are much more perishable and are not as easily recognized in the archaeological record. More sedentary agrarian societies were able to accumulate objects and store more fragile materials such as ceramic containers. Ceramics still broke frequently, and were discarded, and replaced. The hard, mineral-based ceramics preserve well and hence represent a useful source of cultural information for archaeologists.

Distinct forms of vessels can be used for domestic, ceremonial, and trade activities. Over time, potters can change vessel forms as a result of ideological and technological variations in the manufacture process. Archaeologists observe the differences and evolution of ceramic vessels to build chronologies, identify human activities at a site, and understand manufacturing processes. In other words, ceramic analysis aims to understand chronological sequences, the technology of a group of people, and socioeconomic organization including exchange (Orton and Hughes 2013). This chapter presents the theories behind the ancient and modern production, study, and existence of ceramic vessels, especially in the ancient Andes.
2.1 The Anthropology of Craft and Ceramic Production

The term "ceramic" comes from the Greek word keramos or "earthenware", meaning a fired clay material (Rice 1987:3). In archaeology, ceramics refers to products such as cooking and serving utensils and artistic objects made of fired clay. It excludes construction materials such as cement and bricks. Pottery is a field within ceramics that includes earthenware, porcelain, and stoneware cooking and storage vessels.

The earliest ceramics may have been clay figurines partially fired in dugout earth kilns, made about 30,000 B.C.E. (De Guire 2014; Rice 1987). Pottery may have first emerged as early as 18,000 years B.C.E. in East Asia (Wu et al. 2012). Craig and colleagues (2013) suggest that hunter-gatherers first discovered the innovative technique, which provided new ways to process and consume foodstuffs. Little is known about the actual function of these early objects. As agriculture was more frequently used and population size increased, people adapted their tools and skills to support growing communities. Pottery became a staple of domestic life with the increase of permanent settlements, rise of agriculture, and urban centers (Kingery 1984).

Pottery was not adopted at the same time by all cultures, or even neighboring cultures. Cultures throughout the world independently developed ceramic technology and spread pottery techniques to surrounding communities. The first potter's wheel was invented around 6000 B.C.E., allowing faster, higher-quality ceramics to be produced. Successful agricultural techniques created a surplus. Larger quantities of ceramics were required to store these food supplies until they were used (Guisepi 2007:3). As more ceramics were required, specialized potters emerged to meet the demands of growing populations and associated status differences.

The description of the use of clays and production of pottery has a long history. Written documentation on the use of ceramics for trading and other transactions have been recorded in
cuneiform tablets of the Near East, as well as having been depicted in Egyptian art, demonstrating changes in the technology of ceramic vessels (Lucas and Harris 1962:367-385; Rye 1981:2). Although occasionally described, information about ceramics and the ceramic-making process was relatively rare in written documentation until recently (Rye 1981:2). The lack of documentation of the ceramic-making process is likely due to the use of oral tradition to pass on knowledge, the rarity of printed literature, and the lack of writing systems in some complex societies. With the industrial revolution, publications increased, spreading technological practices to a wider audience (Rye 1981:2). Twentieth century scholars recorded the practices of potters in small villages or communities in South America, the Mediterranean, India, Afghanistan, and Pakistan. These scholars described the ceramic process of traditional potters (Christensen 1955; Demont and Centlivres 1967; Linné 1925; Rye 1981:2-3; Rye and Evans 1976; Saraswati and Behura 1966). Other scholars at the time focused on more specific aspects of ceramics such as the history, seriation, and decoration of collections (Ericson and Stickel 1973; Goggin 1960; Kroeber 1928; Larco 1941; 1948; 1963; 1966; Shepard 1956; Strong and Evans 1952; Tschopik 1950).

The first people to combine clay and water, then fire it to form pottery created vessels for the collection, storage, or production of foodstuffs. Potters created utilitarian tools out of clay to facilitate daily activities. The simplest function of ceramic vessels is to contain things (food, liquid, other objects). There are three general types of containers based on their function. Ceramic containers are used for storage, processing or cooking, and transfer (Rice 1987:208-209). Ceramics for storage are long lasting, durable containers that hold liquids or dry goods. Ceramics for processing are used to mix, soak, grind, and cook foodstuffs. Cooks prefer ceramic vessels because they are rigid enough for grinding and mixing without damaging the vessel.
Ceramics are also watertight and can be set directly in a fire (Rice 1987:208-209). Ceramics used in the transfer of goods are customized for short- and long-distance transport. Containers used in short-distance transfer, such as plates, cups, and bowls, are used for presenting, serving, or consuming. Containers used in long-distance transfer may be similar to storage vessels but used for trading purposes. Transporters prefer ceramic vessels for the long-distance transfer of liquids. However due to the fragility of pottery, flexible, lightweight baskets may be preferred for dry goods (Rice 1987:208-209). Gourds and baskets were used as containers in pre-ceramic times and continued to be used once ceramics became popular. Gourds and baskets are flexible containers that do not break easily, especially during the transport of dry goods. Ceramic vessels, however, are more resistant to rodents, insects, and moisture, and can be sealed (Rice 1987:208-209). Ceramics also create a watertight container that can store liquids.

2.1.1 Types of Ceramic-Making Environments

Sociopolitical factors of a community influence the settings in which crafts are produced. Two main ways to organize production exist, generalized and specialized production. Generalized craft production takes place on a small scale, known as household or cottage production. In non-specialized production, a space is not strictly restricted to that activity. Craft production takes place in a shared domestic space (Aoyama 2007:19). Crafts are produced as needed and often the individual partakes in various craft production and non-craft related activities, such as food production. Studies of potters worldwide suggest that potters making vessels on a small scale for individual and local use tend to be women (Murdock and Provost 1973).
Specialized production can be differentiated from generalized based on the amount of time spent on the activity, the compensation for the work, the existence of a title or name for the person, and the payment of the specialist (Costin 1991:3; Tatje and Naroll 1973). Costin (1986:328) defines specialization as "the regular, repeated provision of some commodity or service in exchange for some other". Specialized workshops are typically men who either live in a community with a food surplus to sustain them, or who lack arable land on which they can produce sufficient resources (Arnold 1985; Byrne 1994). Specialized production can be done on a small or large scale depending on the demand and status of the specialized artisan or group of artisans.

Muller (1984) differentiates between site specialization and producer specialization. In site specialization, an entire social group meets its own needs through a single, short-term activity. Producer specialization is where an individual makes a livelihood through a specialized activity. Inomata (2001:322) states that craft specialization is the "production of alienable goods by a segment of the population for consumption outside the producers' own household". With these and other definitions of specialization, the central tenant is that a household does not produce all the goods it consumes (Costin 1991:4).

To have specialization, there must be a degree of social organization with both horizontal and vertical social differences. Nonetheless, there can be a continuum. A low degree of specialization will exist when there are many producers compared to consumers. A high degree of specialization exists when there are few specialists compared to consumers (Costin 1991:4). The continuum of specialization also depends on the relation of the specialists with the consumers. The context in which specialized crafts are produced ranges from the individual or household level producing goods for local use to large nucleated workshops within a community.
producing for regional use to large-scale retainer workshops working full-time for an elite patron in a specialized, "attached" facility (Costin 1991:8-9). The most notable difference between individual specialists and attached specialists is that individuals produce crafts for the potential consumers, while attached specialists produce on command.

The crafts that are produced by the different specialists also respond to different needs. Individual specialists respond to utilitarian needs, while attached specialists more frequently produce luxury items. In order for attached specialization to arise, an elite class must exist. According to Costin (1991:12-13) attached specialization evolves with social inequality as a way for “elites and governments to supply themselves with special, high-value goods, to finance their activities, and to control the ideology and technology of power.”

Traveling artisans can also exist within specialized production as Itinerant and Swallow artisans. Itinerant potters follow the structure of specialized craft producers, whether in household or workshop production centers within their community. Itinerant artisans first manufacture their goods in their home community, then travel to other communities in search of customers (Cremonte 1984).

Ramón (2008) examines the production of swallow producers. The greatest difference between swallow production and previously discussed types of production is that artisans travel to other communities before they manufacture their goods (Ramón 2008:236). According to ethnographic investigations, swallow producers travel following the agricultural calendar, typically in the harvest season, and plan their route before traveling (Ramón 2008:237). Swallow potters take their prepared raw materials and tools to their target communities where local customers request specific vessels. The work done can be exchanged for crops or other goods.
Modern swallow potters in the Central Andes indicate that they travel to specific villages because the people there do not have the skill or the materials to create their own pots (Ramón 2008:238). Druc (1996) mentions that in the past highland "itinerant" (but likely swallow) potters traveled to the Casma, Sechin, and Nepeña valleys in the north coast of Peru with their own materials to manufacture vessels. Although these valleys have abundant raw materials, there are no potters to make ceramic vessels. Traveling potters would occasionally use local soil as a temper, non-clay materials to decrease the flexibility of a clay, but mainly use their own clay because it is familiar to them and easier to work (Druc 1996). The vessels are made in both highland and local styles.

Regardless of the origin of the raw materials and the type of potter, ceramic vessels are made to order based on requests from the individuals in the community (Druc 1996:29).

2.1.2 Individual and External Influences on Styles

The personal preferences of artisans impact how they make goods. The preferences and ideology of each craft producer creates a diversity in the goods produced in a certain time or place. Rice (1984:51) suggests that variations in ceramic elaboration occur because potters have their own “mental template.” Variation in mental template means that as a style or image is reproduced through time and space, individuals alter the original model based on their interpretation. For example, when applying handles to a pot, one potter might add a wide, thin handle attached only at the superior and posterior parts of the loop. Another might add a small, rounded ball that is applied to the vessel without gaps with a small hole in the middle serving as the handle.
These distinctions demonstrate not only the differences in mental templates, but also in the needs and wants dictated by social stratification. Social stratification is typically marked by differing access to prestige goods (Rice 1984). Stylistic features such as form, decoration, and texture of a ceramic vessel suggest to an archaeologist the vessel’s function and its owner’s status. In daily life, people use simple, utilitarian vessels such as plates, cups, bowls, graters, pots, and jars in food preparation, storage, and daily serving (Ikehara 2005). Utilitarian vessels are used and replaced frequently. Little effort is used to produce them. Potters typically collect raw materials from locations close to the place of production. Most people living in an ancient center used these types of coarse utilitarian vessels in their daily lives, regardless of social standing.

Finely crafted and decorated vessels can be present in all levels of social hierarchy. However, they are much less frequent in lower classes. More elaborate vessels contain solid and liquid objects, and can convey the political and ideological worldviews of the artisan who constructed them and the person for whom they were produced. The use of finely-crafted and decorated cups, plates, and bottles for special, often religious occasions can theoretically reinforce and spread an ideological view to all who participate. False handles and spouts are occasionally added to fine vessels, surpassing utilitarian needs (Rice 2012). The manner in which handles are applied can also be a good indicator of the origin of a vessel. Certain techniques are more desirable in some areas than in others (Orton and Hughes 2013:30). These additions can be reminiscent of previous styles and do not necessarily add to the function of a vessel. Serving wares in general are more labor intensive to produce than other small to medium sized vessels, and therefore may be given more importance, especially if the vessel has elaborate decoration (Rice 2012). Vessels used for serving food and drinks during special occasions are often made
using fine materials. These materials are not ideal for everyday items due to the more intense labor needed to produce them and the fragility of the vessels.

2.1.3 Trade

Pottery is not only produced for local use. Trade over short and long distances resulted in the movement of pots to different areas. Pots can be exchanged as goods, given as gifts, purchased as souvenirs of travels, and as containers for food, liquids, or other materials (Davey and Hodges 1983; Foster 1963; Moorhouse 1978; Orton and Hughes 2013; Wheeler and Locker 1985). According to Orton and Hughes (2013), pots may have been exchanged in contexts of travelers, consumers collecting pots from production centers, through local markets, and centers dedicated to supplying a particular site. As seen above, foreign materials could also have been made into pots through swallow or itinerant potters. The latter methods demonstrate that even utilitarian coarse wares can travel far from their source, not just fine wares.

Ceramic production centers and individual potters may produce a variety of wares using the same materials (Druc 1996). Nonetheless, not all potters and groups of potters produce the same vessels. Typically, individual potters in a community manufacture utilitarian vessels for local use. Many individual producers of ceramic take orders and make the typical ceramic vessel as they are requested (Druc 1996:29). Other more specialized potters only produce certain vessels or produce larger vessels in addition to the typical pots. For example, Druc states that potters from Taricá in the highland Huaraz province make cooking pots and tourist souvenirs. Potters in the Pariahuancá district of the highland Huancayo province of Peru typically produce pots and large jars for chicha (maize beer; 1996:29). Jars for chicha are important in highland communities, however the larger pots are more difficult to make and need an experienced
potter(s). Large vessels, therefore, become regionally traded goods. Jars are sold at markets in larger towns, can have a 140-kilometer radius of distribution, and constitute a large percent of domestic inventory (Druc 1996:32). Tourist ceramics travel even farther throughout the world, moving goods far from their mineral and cultural origin.

Trade and politics may limit access to finer goods reinforcing their special status (Arnold 2000:334). Elite control and power influence the choice of raw materials through restriction of access to deposits of materials. Elites can also influence the choice of materials through the patronage of potters who use certain materials more frequently than others. This phenomenon is similar to modern celebrities endorsing one brand over another, creating a preference in all classes for that particular brand. The same principal applies for trade. Certain materials or vessels become more popular or preferred at certain points in time. As a result, the level of difficulty to obtain the object, through cost or travel, determines its status. A more expensive material will be given a higher status.

Trade of pottery can influence the styles and forms of pottery vessels as they are introduced into a community. As highly desired, imported ceramics are popularized, the local potting community often begins to replicate the external style using local materials. One example of this replicative process can be found in the Jequetepeque Valley on the north coast of Peru. During the Late Moche and Transitional Periods (ca. 700-900 C. E.) at San José de Moro, various foreign highland and highland style ceramics were present in funerary and ceremonial contexts (Castillo et al. 2007:33). Highland Cajamarca plates were made of a fine, white, kaolin clay, had a tripod or round base, and with fine paintings in geometric and natural designs depicting felines and humans (Watanabe 2009:210). As this style became more common in the Jequetepeque Valley, potters replicated highland Cajamarca plates using materials available on
the coast. Cajamarca Costeño style plates were made of a red-orange local clay. They were often slipped or painted white to resemble kaolin clay. Designs similar to the Cajamarca style were painted on the interior of plates, but the designs were typically made with wider lines and were less refined (Castillo et al. 2007). The influence of the highlands culture and pottery styles was gradually incorporated into the coastal Moche technical styles. Recent chemical analyses have also suggested that although raw materials were not exchanged to produce coastal vessels, coastal potters began using previously unused manganese ores to replicate the colors of the Highland pots (del Solar et al. 2015).

Trade and exchange activities resulted in the geographic dispersal of pots, styles, and techniques as they were shared between cultures and potting communities.

2.2 Ethnographic Studies of Pottery Making

In order to understand the theories and analysis of ceramic material, one must understand the chaine opéraire of the ceramic-making process (see Lemonier 1986). Leroi-Gourhan’s (1964) comparative work of tool manufacture and raw material transformation processes systematized the analysis of technical activities as a chain of operations. The chaine opéraire of the ceramic-making process traces the raw materials through the manufacture, use, and discard of a vessel. By examining the relation of raw material procurement, manufacture, use, and discard of a pot, archaeologists can reconstruct the technological strategies of pottery making (Sellet 1993:107).
2.2.1 The Ceramic-Making Process

The technical skill and knowledge of a potter is illuminated in the ceramic production process. The ceramic-making process typically includes four steps: collection and selection materials, manufacture of the object, surface treatment or finish, and firing.

2.2.1.1 Raw Materials

First, potters select and mine the raw materials to be used. The primary material in ceramic production is clay. Clay is a sedimentary mineral composed of silicate hydrate that is present in virtually all parts of the world (Sinton 2006:87). Clay consists of particles less than 0.002mm in diameter. When mixed with water, clay becomes a sticky, plastic, moldable mass. When dried, clay becomes hard and brittle and keeps its shape, plasticity can be returned by adding water. Once fired, clay becomes hard and resistant to water (Worrall 1968:xi). Clays frequently contain mineral impurities such as quartz, mica, and pyrites that can affect its structure in different ways (Worrall 1968). Clay is formed as primary minerals, particularly igneous rocks, are weathered. If they remain in situ, they can become a residual (primary) clay deposit with inclusions of the primary mineral. Clays can also erode from their origin, be transported by streams and rivers, and be deposited where the water velocity decreases. Here they form sedimentary (secondary) deposits as they settle to the bottom of the body of water (Sinton 2006:97-98). Clays with larger, heavier inclusions will create deposits closer to the origin, while finer, lighter inclusions can be carried farther from the source. Sedimentary deposits of clay are more susceptible to the inclusion of extraneous minerals such as feldspar, quartz, mica, and iron oxides (Sinton 2006:98).
Clays must be mined from their deposits before they can be processed for pottery manufacture. Most clay used for potting is mined from secondary deposits using shovels to remove the selected clay (Orton and Hughes 2013:123). According to Arnold's (2005) ethnographic research, potters typically collect the raw materials from a location close to their community. The frequency of production and the mode of transportation may influence the distance traveled to collect raw materials. Arnold (2005:16) states that materials are on average gathered from 4km or less from the community, although some materials are collected at a maximum of 7km. Druc's 1996 ethnographic analysis of potters in the Ancash Region of Peru, however, approximated that potters can travel up to 12km (7 hours) from their community to collect raw materials. If a desired clay is 7 hours from the potting community, they travel on foot with donkeys to the mine, work for two hours to collect the clay, then load the donkeys with the materials and travel 8 hours home at a slower pace (Druc 1996:27). Modern raw material collection may be influenced by vehicles allowing more expansive distances to be covered quickly.

Once collected, potters take the raw materials to their workplace to prepare the materials for use. The selection and preparation of the raw materials will vary depending on the other steps in the manufacture process. Preparation consists in purification and/or altering the properties. Purification involves the removal of unwanted materials such as organic materials and large pebbles by hand or with a sieve. The purpose of altering the properties of a clay is to create a uniform material more suitable for the forming and firing techniques. Alteration may be done through sorting, separation in water to sort coarse and fine minerals, mixing two or more types of clay, or through the addition of non-plastic tempers (Orton and Hughes 2013:125). The mixture of clay and tempers is precise. Pure clay may be mixed 6:1 with a sand high in silica. Other
potters may mix a black clay and a yellow clay 2:1 (Druc 1996:28). These ratios aim to create the perfect consistency of plastic and non-plastic materials to form a durable ceramic vessel.

The basic materials to create ceramics are clay and water. When water and clay are thoroughly mixed, clay becomes plastic. Plasticity means that the material can be formed and deformed under stress, yet hold its shape when the stress is removed (Worrall 1968:75). Temper inclusions may be added to reduce the plasticity of the clay. Modern ethnographic accounts suggest that tempers are typically local and close to the area of production. The materials used for tempering clay are much more abundant and less specific than the clay. However, some desired tempers, such as slate, are exclusively mined for use, similar to clay being brought from places up to 6 hours away on foot (Druc 1996:25). Tempers include crushed rock, bone, shell, textile, vegetal remains, and sand (Rice 2012).

In the case of rock inclusions, it can be difficult to visually determine if a temper was added or if the inclusions were already present in the clay. Nonetheless, added materials commonly differ from the inclusions present in the raw clay. If crushed rock were added to sedimentary clay containing rounded quartz, the inclusions would be distinguishable by the differing shapes of the materials (Orton and Hughes 2013:123). Once the clay is prepared, potters mix the materials with water and shape the resulting paste into the desired form.

2.2.1.2 Forming the Vessel

Potters form vessels using hand-building or wheel-throwing techniques. Hand-building means that the potter formed the clay with their hands using the following techniques: pinching, coiling, slab-building, or molding. Pinching involves creating a hollow in the center of a lump of clay by pinching it between the thumb and fingers (Orton and Hughes 2013:126). The walls are
lengthened and thinned by pinching the sides of the hollow. This method is typically used to make small pots or in combination with another technique to add to a vessel. Coiling is a common technique in which a series of long coils are rolled and joined together as rings or as a continuous spiral (Orton and Hughes 2013:126). The rings are typically joined by being smoothed. However the places where coils are joined are frequently places of weakness. Slab building is a method that uses flat sheets of clay that are joined by squeezing, pinching, or blending the edges together. According to Orton and Hughes (2013:126), this technique is best suited for rectangular vessels, but spherical pots can be made as well. Molding involves a variety of techniques, but the most simple description is that a hollow object is used to "hold and shape clay during the hand-forming" to create the desired shape (Orton and Hughes 2013:128). During the hand-building process, when a pot becomes too large to easily move while working, it may be placed on a "mobile support." A mat, potter's plate, large broken sherd, or a simple turntable allows the potter to rotate the vessel to face them (Orton and Hughes 2013:127-128). These supports differ from a potter's wheel in that they are turned as needed and do not create centrifugal force when turned, shaping the pot.

Wheel-throwing is the process of forming clay into a vessel "on a wheel which is rotated at a speed sufficient to allow the potter to use centrifugal force as an active agent in the forming and shaping of the vessel" (Orton and Hughes 2013:126). Two types of wheels exists, the simple wheel and the pit wheel. The simple wheel, or single wheel, consists of a "single flywheel rotating on a central pivot" (Orton and Hughes 2013:129). The balance of the wheel creates an even rotation. The potter or an assistant turns the wheel using a stick inserted in a socket near the edge. A pit wheel, or kick or double wheel, consists of two flywheels attached by a long spindle. The upper wheel is the throwing surface. The lower wheel is heavier and stores the momentum.
The potter kicks the lower wheel, or uses a motor in modern ceramic-making, to make it turn (Orton and Hughes 2013:130).

It is important to note that in most cases, these techniques are not used exclusively. Potters frequently combine these and other techniques to produce a more elaborate vessel. The basic techniques described above form the basis of a vessel before they are further refined. Once formed, potters finish shaping vessels using paddle and anvil, trimming, scraping (Rye 1981:84-89; Sinopoli 1991:23). Traces of the techniques used are left on the vessel in the form of impressions and cuts on the surface. Surface treatments such as smoothing, burnishing, polishing, or slipping may be used to create a finished surface. Smoothing uses a hard tool to flatten the surface to a uniform, matte texture. Burnishing and polishing are when a smooth rock, typically a river pebble, is rubbed along the surface of a leather-hard, or partially dried but not fired, pot to compact and create varying degrees of luster on the surface (Orton and Hughes 2013:134).

Additional decorative finishes can be added in the form of slips, textures, incisions, and other elements before firing. Slips may be added using a different color of wet clay applied to an unfired vessel, often covering the entire surface. Textures are added to the surface of a vessel through impressions of objects such as textiles or stamped with designs made in wood, ceramics, or other media. Various types of incisions can be made in both wet and leather-hard ceramics, creating different finishes. Most incisions are made during the leather-hard stage because they produce a cleaner design. Wet incisions misplace clay, leaving tags, which are difficult to remove or smooth. Other decorations such as paint, glazes, perforation, and appliqués can also be added before a vessel is dried.
Once finished, a vessel must be dried before firing to remove the water within the matrix. To dry, a pot is placed in an open, shaded area, out of direct sunlight (Sinopoli 1991:12). Drying a pot too quickly or in direct sunlight can cause the pot to dry unevenly and crack (Rice 1987; Worrall 1968:89). When a pot dries, it will shrink between 4 and 15% of its original size as it loses water and gases (Sinopoli 1991:29). Once dry, the pot can be fired.

2.2.1.3 Firing

The process of firing transforms clay into ceramic. Firing is the most critical stage of pottery-production (Cleland and Shimada 1998). Chemical and physical reactions occur when clay is heated to 550 degrees Celsius (°C) or more, converting it into a hard, durable material (Rice 1987:90-93). There are two main categories of pottery firing: open firing and kiln firing. Open firing, or pit firing, occurs when the pots and fuel are stacked on the ground or in a shallow pit, similar to a bonfire. In this traditional method, layers of fuel and vessels are mixed together and more fuel is stacked on top. In this method, the temperature quickly reaches its maximum and the firing is short (Orton and Hughes 2013:135). Open firings can fire from one to two vessels to many vessels at a time with more flexibility than a kiln. Kiln firing occurs when the pots are placed in a chamber that is heated from below by the hot gas and flames from the fuel (Orton and Hughes 2013:135). In this method, the pottery and fuel are kept separate. Unlike open firings, kilns are permanent structures that can be used and reused many times.

Ceramics can be grouped into five categories based on the temperature at which they were fired. Terra cotta, a type of earthenware, is a relatively coarse, porous ware typically fired at 900°C or less. This ceramic often has a red color after firing due to high levels of iron in the clay. Earthenwares are porous, unvitrified (non-glass like) ware, fired between 900-1200°C. This
ceramic is usually composed of coarse, plastic earthenware clay and has a red color after firing (Rice 1987:5). Stonewares are hard, partially vitrified wares fired between 1200-1350°C. This ceramic is usually composed of highly plastic stoneware clays low in iron. After firing, the clay is opaque and often grey or light brown in color. China is a white, vitrified tableware fired between 1100-1200°C. Porcelain is a thin, hard-bodied, vitrified ware fired between 1280-1400°C. This ceramic is composed of white kaolin clay. After firing, the ceramic is white, translucent, and very hard. The translucent nature of the finished product is traditionally obtained through the addition of a feldspar temper; however modern "bone china" added bone ash to achieve this effect (Rice 1987:6). Most prominently, the firing temperature of a vessel can be determined by the color and hardness of the finished product.

In addition to the firing location, an important aspect is the firing atmosphere. An oxidized, or oxygen rich, atmosphere creates an excess of oxygen, allowing carbon to burn and escape from the vessel's fabric as carbon dioxide. In oxidized atmospheres, clays with high percentages of iron will fire to a red, orange, or brown color (Sinopoli 1991:12). A reducing environment without an excess of oxygen does not allow the carbon to burn out of the fabric, resulting in a dark grey or black core (Orton and Hughes 2013:152; Sinopoli 1991). The color of a pottery sherd is the most indicative of firing atmosphere and temperature, although they can also indicate other processes that occur as the chemicals in the clay transform in the heat. Iron-rich clays in oxidizing atmospheres are typically red while in reduced atmospheres they are grey (Sinopoli 1991:12). Multiple layers of colors in a sherd is typically the result of changes in the firing atmosphere, whether an increase in temperature from the addition of fuels, or an influx of air when opening a kiln to remove or check vessels.
Once a vessel is taken out of the firing area, it is cooled, and ready for use. Post-firing decorations include painting and incisions. Post-firing painting is susceptible to the elements and can be easily washed or rubbed away. Incisions are shallow and imprecise. Post-firing incision is not a preferred decoration, but rather is often the result of graffiti.

2.2.2 Factors of Ecology, Politics, and Expertise

Choices made in the manufacture process are not random. The technical and stylistic decisions a potter makes depends on ecological, sociopolitical, and ideological factors. The availability of materials to form ceramics can be limited by restricted material sources, scarcity, natural occurrences such as droughts or floods, specialization of technology, and limited exchange of goods (Ikehara 2015). These factors affect the manufacture process and create variations in ceramic styles and technologies among potters, communities, and regions (Rice 1984; Van Der Leeuw 1984).

2.2.2.1 Ecological Factors

Ecological factors include the availability of material resources and tools in combination with the presence of individuals capable of producing pottery. Environmental factors such as droughts, flooding, and geological deposits can determine the availability of resources. Mines with the best clays are in high ground, in zones with the most erosion (Druc 1996).

Ethnographer’s accounts of modern potting communities note that potters typically collect raw materials (i.e., clay and temper) from local sources or obtain them through exchange networks (Arnold 1985; Rice 2012). Potters tend to make these vessels from materials found close to their community and using local techniques. According to ethnographic reports, the
majority of materials are gathered 4km or less from the potting community (Arnold 2005:16). In the past, uncommon nonlocal tempers and pigments were used in small quantities, as they were more likely obtained through trade (Arnold 1985; Rice 2012). The geological composition of a region is typically the most important factor in the availability and selection of raw materials.

Environmental factors also affect the availability of fuel for firing. Wood for firing became a limiting factor during the early colonial period in the Southeast United States (Oliver 2005:104). Colonial homes and forts were made with wood. Forests were rapidly depleted as occupations grew. On the north coast of Peru, very few trees grow in the large desert areas between valleys. Wood is often reused for different purposes. Other materials such as corncobs, cane, and animal dung are preferred for firing purposes.

Generations of potters may standardize production by continuing technical and stylistic methods used by their predecessors (Van Der Leeuw 1984). In order to produce a large quantity of vessels over time, potters must have access to clay, temper, and fuel nearby (Van Der Leeuw 1984). Therefore, wares produced frequently in a community should exhibit pastes that are mineralogically similar to the local area. When archaeologists identify pastes and technologies, they hypothesize that frequently used materials and styles represent locally made goods. Less frequently used materials and styles may represent foreign goods.

2.2.2.2 Sociopolitical Factors

Sociopolitical factors influence ceramic manufacture. A community of potters has "etic behavioral correlates" that can be noted as varying from the typical "emic design" (Arnold 1984:147). Constant, repeated methods of forming and decorating pottery can indicate production by a particular potting community (Arnold 1984). Variations on these techniques can
represent other potters of outside influences demanding change. Potters may introduce new variations of shapes and designs into use to show resistance to traditional practices. This variation may be due to factional or political reasons to shift norms. Outside forces influence ceramic-making, varying from the standard technique. Migration, changes in production organization, consumer preference, natural disasters, disease, and warfare can affect the passage of craft knowledge from one generation to the next (Gelbert 2001; Graves 1982).

The increase of urban centers and elite class differences resulted in the "perceived need" for specialized products, mass production, and luxury items (Kingery 1984:173). As the demand for ceramic vessels increases, artisans may explore new sources of materials and develop innovative manufacturing techniques to enhanced production. Kingery (1984:171) states that the "development of ceramics techniques and materials is always a consequence of societal change", not a cause. Elite figures can also determine who can produce pottery. The preferential treatment of potters in attached workshops would give them access to materials and tools not available in other production centers.

In addition to influencing how pottery is designed and formed, privileged social groups can control who has access to resources and can specialize in pottery making. By restricting access to areas rich in quality raw materials, people can control the supply of clays and tempers. Druc (1996) records that modern potters in the Central Andes use the same materials for all types of pots. In the case of potters in the Ancash region of Peru, traditional potters stated in ethnographic interviews that the white kaolin clay is only for use by artisans. Most traditional potters use red clay bought from community supplies (Druc 1996:27). This segregation of clay use by potters can be dictated by prestigious potters using kaolin or by other privileged individuals.
Raw materials that are imported from other regions can be expected to have a restricted use and distribution. Unequal use of imported materials is typically related to the wealth and status of an individual. Equal distribution of an exotic material would be seen if the material were easily available, or if local elites distributed the goods to the public (Ikehara 2015:129). Ikehara (2015:136), in his study of settlement patterns and surface ceramics from the Moro region of the Middle Nepeña Valley, identifies exotic wares during the early part of the Early Horizon (800-500 B. C. E.). While exotic wares were widely distributed in densely populated areas, they were more common in higher status households.

Modern ceramic making is highly influenced by external factors such as art tourism or souvenir ceramics. Here, tourists represent higher-status figures that alter the design and form of vessels because they demand pottery similar to ancient styles, or modern shapes that channel ancient designs.

2.2.2.3 Factors of Expertise

Perhaps the most important factor in the ceramic-making process is the expertise of the potter. Each step in the manufacture of pottery (collecting the correct materials, creating the correct ratio of clay to temper to water, forming a vessel, drying a vessel, finishing and decorating a vessel, and firing a vessel) relies on the knowledge of the potter or potters involved. Vessels may even have several individuals involved in the production process, with each contributing their skills, such as firing, or fine decoration (Arnold 1999). The skills involved in this process, however, are not acquired easily.

The technology of ceramic-making can be acquired in various ways. Traditionally, techniques are passed from one generation to the next or are learned through a process of trial
and error (Crown 2014). Inspiration can be also derived from abandoned practices in revitalization movements, which blend abandoned traditions with modern ones.

Regardless of the manner in which pottery technology was acquired, potters must pass through increasingly complex phases in which they learn to create ceramics (Brown 1975; Golomb 1993). Task segmentation based on age, sex, and skill may divide the production process (Crown 2007; London 1986). Children under five may play with clay or help gather materials. Between five and ten years of age, children begin to learn to make ceramics (Crown 2014). At age eight, children may be taken as apprentices to potters (Kramer 1997:28). Beginner potters are slow and make mistakes. First, they learn the least dangerous tasks, such as collecting materials, cleaning, forming and decorating vessels, and finally firing them (Lave and Wenger 1991). With practice, beginners become consistent and are able to create vessels from start to finish.

Studies show that expert potters reach a high level of skill after ten years of practice. Experts tend to create the highest quality vessels in their thirties and forties (Ericsson and Lehmann 1996:278). However, even the most skilled potters may not learn some skills. The skills required for forming and firing large storage vessels, for example, differ from those required for smaller vessels (Bowser 2000; Kramer 1997:28).

### 2.3 Archaeological Study of Ceramics

Pottery represents an important tool for archaeologists investigating agrarian and complex societies. The durable, ever-present artifact allows archaeologists to understand the general age and function of a deposit while in the field. Further analysis indicates the relative age
and function of a context, as well as the technology used by the people at the time in the manufacture of ceramics.

While archaeologists would ideally study whole ceramic vessels to understand form and function, ceramics are most often recovered as sherds. In general, fragmented pottery sherds are catalogued differently than other objects made of ceramic because they fall within a distinct class of goods and require a different type of analysis. Fragments are more difficult to analyze because the original form is not apparent without detailed knowledge. Due to issues of preservation (i.e., archaeologists prefer to not destroy complete vessels), potsherds provide more accessible samples for petrographic and chemical analyses than whole vessels.

In order to identify aspects of a culture through ceramics, archaeologists use a variety of techniques. Archaeologists frequently sequence ceramics by technological features to recognize changes in the characteristics of a regional cultural sequence. Most often, these “diagnostic” characteristics are used to provide a relative date for an archaeological site. Moreover, the distribution of styles and technologies can provide important information about regional and interregional exchange patterns and interaction spheres.

2.3.1 Chronology

Pots vary. Over time and space, a number of factors change in the manufacture and use of pottery. People change pots by modifying the materials and techniques used, the location where they were produced, and the purpose and individual for which they were made (Orton and Hughes 2013:25). Changes can be seen and interpreted from the fabric, form, technology, and decoration of sherds. A sequence or seriation can be built to notice the differences between ceramics made using differing techniques. A sequence is made when certain classes of vessels
are associated with the stratigraphic levels within an archaeological site and/or a region (Sinopoli 1991:74). Following the principle of stratigraphy, sherds and vessels that are excavated in a lower level are older than those discovered closer to the surface. Absolute dating methods such as carbon-14 dating and dendrochronology can more definitely date a sequence. If a sequence is repeated at multiple sites in the same region, the sequence can be applied to the entire region (Sinopoli 1991:74).

Seriation is a relative dating technique based on ordering changes in relative frequencies of types or variables in an assemblage over time (Orton and Hughes 2013:226; Sinopoli 1991:229). A seriation can be used to develop a chronological sequence when there is a lack of stratified contexts or other materials able to be absolutely dated. Largely independent of the context, this method creates a chronology by "arranging local remains of the same cultural tradition in the order that produces the most consistent patterning of their cultural traits" (Rouse 1967:157). Seriation is based on the principle that new objects are slowly introduced into use and gradually increase in popularity before they decline and disappear (Sinopoli 1991:74). Features present in the ceramic assemblage are categorized. Features that do not appear in all ceramics or that occur in certain strata are considered chronologically sensitive. Finally, vessels that present similar features can be placed on a temporal scale, assuming that similar and co-occurring features would correspond to a similar time (Sinopoli 1991:80).

The use of ceramics in the definition of a chronology is one of the most frequent focuses of ceramic studies.
2.3.2 Function

Identifying the function of a pot is often difficult. Small variations in characteristics can reflect large variations in the function (Orton and Hughes 2013). The traditional basis for hypotheses about the function of a vessel is the archaeological context in which the vessel is recovered (Rice 1987:211). However, potsherds do not always pertain to the context in which they were used. Ethnographic analogies and experimental archaeology provide the most useful way of approximating function.

The difference between similar-looking vessels is not always obvious. Giving these vessels names analogous to modern versions can further muddle the identification. By naming a low, straight walled, open vessel a bowl because it seems to have similar shape to modern bowls implies a certain use and excludes it from other categories of vessels (Rice 1987:211). The same vessel may describe a shallow cooking dish such as a cast-iron skillet or a casserole dish.

The function of a vessel can become muddled when remnant features are added to vessels superfluously. False handles and spouts added to pots may not be structurally useful or necessary for the function of the pot. However, they may be included in the design of the vessel due to a stylistic preference or remnants of the previous production form. For example, in the Swift Creek Period of the Florida panhandle, folded rims were the hallmark of the Late Swift Creek phase (600-850 C. E.). During the waning Late Swift Creek phase, also known as the Kelvin Phase (600-900 C. E.), unfused or false folded rims began to appear. Crooked River potters also created a false fold by incising a line below the rim of the vessel (Ashley and Wallis 2006). False folded rims emulated the original folded rims as these styles were replicated. In this way, features present on a pot mislead the researcher from its true function. Nonetheless, a general
understanding of the function of a vessel can be inferred from the form, even if the more specific function is unknown.

2.3.3 Manufacture

Pots can be made in different ways and in different places. Technologies and, more so, materials differ between production centers. Researchers examine material evidence of decisions made in the process to address questions about how ceramics were made and in what context.

Archaeologists identify the “analytical individual” or potters and potting communities by the technological and stylistic decisions made in ceramic production (Ikehara 2005; Redman 1977). Rice defines the analytical individual as the “smallest constellation of stylistic consistencies that can be reliably isolated in the archaeological record” (Rice 1987:392). While the identification a single person involved in an activity is nearly impossible, the analytical individual represents a person or group of people producing ceramics following a distinct potting community.

Specialized pottery production centers can be identified by differential distribution of debris, tools, and facilities associated with production (Costin 1991:43). However, depending on the firing method used in ceramic production, it can be close to impossible to determine if small-scale ceramic production existed at a site. Pit firing leaves remains similar to a hearth and pits may be repurposed as middens or hearths once the desired ceramic has been fired (Orton and Hughes 2013:135). Pottery-making tools are frequently made of organic materials that may not survive preservation. Other tools that may have been used in the ceramic-making process include fragments of ceramics that have been repurposed. Such tools may not be recognized as specific to the production of ceramic vessels.
The materials used to create ceramic vessels can be indicative of the origin of a vessel. The raw materials available for production are dependent on the geological formations present in the area. Researchers typically interpret the most common vessel attributes found in one location as locally made (Arnold 2000). As pots are traded or gifted, forms, decorations, and materials distinct to one region can travel far from their origin. Exchange networks are identified through the analysis of ceramic pastes and styles. Macroscopic analysis can generally place the region in which a vessel was created based on the combination of inclusions in comparison to the geological features. Chemical and petrographic analyses such as macroscopic analysis, petrographic analysis of thin sections, Neutron Activation Analysis (NAA), and X-ray fluorescence (XRF) can more definitively identify a source by tracing inclusions and elements composing the ceramic to the mine from which the materials were sourced. Using these types of analyses, archaeologists can identify the material origins and a likely potting community that produced a vessel.

2.3.4 Types of Ceramic Analyses

In this study, I focus on the first part of the manufacture process: the minerals, clay, and tempers that constitute the paste. Here I use paste and fabric interchangeably, both referring to the clay and other inclusions constituting the raw materials of a vessel. Paste refers to the naturally occurring clay and inclusions within it, before adding tempering materials (Stoltman 2001:304). Fabric is includes both the natural clay and added temper materials (Gibson and Woods 1997). Orton and Hughes (2013:71) define fabric analysis as “the study and classification of pottery using the characteristics of the clay body from which the pottery is made.” This
classification includes three classes of features: those resulting from (1) firing temperature and conditions, (2) the clay matrix, and (3) the inclusions.

Firing temperature refers to the temperature at which pottery was fired. Firing condition refers to the context in which pots were fired, in a bonfire, closed, or pit kiln, and the amount of oxygen allowed to flow during the firing. The matrix, made of clay minerals, contains particles less than 0.002mm across, indistinguishable to the naked eye; inclusions are larger features deliberately added or naturally occurring in the clay (Orton 1993). Temper is any intentionally added inclusion, such as sand, volcanic ash, plant fibers, or crushed rock, shell, or pottery (Rice 2012).

The following descriptions of ceramic analyses are listed from the most general to the most complex and costly. Ceramic analyses are not limited to these four methods. However, these methods are representative of frequently used techniques.

2.3.4.1 Macroscopic Analysis and Description of Mineral Inclusions

Macroscopic analysis is a visual method to identify and categorize paste groups based on the mineral inclusions located within the matrix of the pottery sherd. This method considers a sherd assemblage to classify ceramics with similar compositional characteristics. Paste typologies rely on the characterization of the inclusions within the paste, grain size and shape, porosity, and the sorting or organization of the grains inside the paste (Velde and Druc 1999:258).

Macroscopic analysis uses a low power magnifying lens to examine and identify the inclusions of each sherd. Inclusions are identified by mineral, size, and shape. In the case that the mineral is unknown or appears in different colors, color can be used to create a preliminary
classification until the mineral can be further identified. Grains are typically sized using the Wentworth Scale, or a similar division of particles based on size, fine to very coarse. The shape, or angularity, of grains yields information on whether the material was acquired close to the source or no. A grain that has traveled more, especially in water, will be rounder (Velde and Druc 1999:191). A grain that has been obtained by crushing a rock before incorporation to the clay will be more angular. Angularity ranges from angular, subangular, subrounded, to rounded.

Porosity considers the quantity and size of pores in the fabric. Pores, or spaces filled with air, in the ceramic paste affect the thermal stress resistance, air and water circulation in a vessel. Pores are a natural phenomenon in clay, but large spaces can be a sign of rapid construction or poor technique (Velde and Druc 1999:111-112; 160). Typically, well-made ceramics have minimal pore space. Sorting is the organization of grains in the paste of a sherd. Sorting can indicate the purposeful selection of inclusions or the thoroughness of mixing of clay and temper. Sorting can be quantified using a chart estimating percentage compositions, such as Barraclough’s inclusion sorting chart (1992). The Munsell Color Chart is typically used by archaeologists to considered color to a small degree, but the variation of colors within a single sherd can be great, limiting the usefulness of this type of classification.

Macroscopic analysis is especially useful to rapidly classify body sherds without decoration (Velde and Druc 1999:258). However, recording vessel form, decorative elements, and other features such as rim lip form and sherd thickness is also important (Graham et al. 2014). From a macroscopic analysis, tentative ware groups can be identified. Once tentative groups are identified, a sample can be taken for more detailed, time consuming, and costly analyses such as petrographic analysis (thin sections) or NAA.
For this thesis, I completed a macroscopic sorting of the fabric and mineral inclusions of more than 11,000 Early Horizon pottery sherds. This analysis resulted in a preliminary sorting of the ceramic pastes using a rapid, macroscopic classification. The goal of this classification was to define the technological variability of the Caylán ceramic corpus. Future research will take samples of these classified groups to further identify minerals and sources as well as corroborate the findings.

2.3.4.2 Petrographic Microscope Analysis

Petrographic Microscope analysis is a visual method to identify the inclusions and the structure of the clay matrix (Velde and Druc 1999:267). Thin sections are cut from a pottery sherd at a size of 0.03mm thickness and mounted on slides. Polarized light shines through the sample to allow minerals to be identified. The power of a microscope comes close to clay-sized material and gives good definition of non-plastic materials in the ceramic (Velde and Druc 1999:269). In this method, minerals are identified by their optical properties as they react to a beam of polarized light passing through them (Rice 1987:376). Microscopic analysis also allows size and shape of inclusions to be identified, giving evidence to the sources used by potters (Sinopoli 1991:58). Some grounding in mineralogy and petrology is necessary to correctly identify the minerals observed in the sample. Thin sections can allow the identification of different kinds of minerals, their quantities, particle orientation, void size, shape and location, surface treatments, changes from firing and other features. The results of petrographic microscope analysis are measured using analyses such as Stoltman statistics. The identification of various elements in a sherd makes this type of visual analysis especially useful.
2.3.4.3 Neutron Activation Analysis (NAA)

NAA is a chemical analysis that uses nuclear reactions in atoms to estimate chemical elements in a pottery sherd. The reactions in the atoms emit high-energy radiation over different periods of time allowing an estimation of the amount of each chemical element present in sample (Velde and Druc 1999:279). NAA uses a complex, but efficient machine that can detect the presence of elements to 1 part per million. NAA is especially suitable for small quantities of rare or trace elements. The characterization of these elements can be used to differentiate between different sources of clay. For this analysis, researchers grind a small sample into powder, destroying the sample (Rice 1987:397; Velde and Druc 1999:279). Once the atoms are bombarded with neutrons, the elements begin to decay. Elements are identified by the half-life identified through the radiation (Rice 1987:397). NAA is a very precise and sensitive analysis. Sample sizes are small and quickly prepared, many samples can be tested simultaneously, and accuracy is typically within ±5% (Rice 1987:397). The disadvantage of this method is that it is costly and the samples are rendered radioactive.

2.3.4.4 X-Ray Fluorescence (XRF)

XRF is a chemical analysis method that gives the relative abundance of chemical elements present in the whole sample (Velde and Druc 1999:267). In this method, X-radiation excites atoms, which reemit X-radiation (X-Ray Fluorescence) that is in proportion to the number of atoms in the sample. The specific wavelengths given off by the atoms correspond to the intensity and abundance of an element. The result of the analysis is a graph (i.e., bar graph) demonstrating the abundance of each element present (Rice 1987:393). Approximately eighty elements can be usefully analyzed, however elements below number 9 are detected with
difficulty due to their low energy (Rice 1987:394). Approximately one gram of a sample must be
ground into a powder or melted into a bead for analysis (Velde and Druc 1999:278). Sherds can
be left whole when using XRF. However, the radiation will only penetrate and identify elements
close to the surface of the fragment (20-200μm below the surface; Rice 1987:394).

XRF provides a secondary option in the portable XRF (pXRF). This tool allows
archaeologists to take the pXRF device to the field to identify elements *in situ* or in field
laboratories. This mobility is a particularly useful feature in the analysis of ceramics as analyses
of materials can be done in mines that could be the origin of materials used in ceramic making.
XRF and pXRF are relatively inexpensive, can be non-destructive, and precision is around ±5%.

### 2.4 Ceramic Studies in the Andes

Around four thousand years before the Common Era, some ancient Andean peoples
began experimenting with ceramic technologies. Ceramics served as instruments for storing and
serving as well as for transmitting ideologies from one social group to another. At the end of the
Late Preceramic Period (3000-1800 B. C. E.; Table 1), ceramics replaced stone containers and
organic containers such as gourds and baskets (Sawyer 1966). During the following Initial Period
(1800-900 B. C. E.) ceramic forms spread throughout the Central Andes. During the Early
Horizon Period (900-200 B. C. E.; Table 2), artisans formed clay into ceramic containers,
musical instruments, figurines, and spindle whorls, among other objects. The wheel did not
arrive to the Andes until the colonial period. All Pre-Hispanic cultures in the Andes, therefore
built ceramics using hand-building techniques such as coils, molds, pinching, and slab building,
and in some parts used turn-table like bases to manually turn vessels. (Ramón 2008; Rice 2012;
Sawyer 1966; Sinopoli 1991).
Studies focusing on the ceramics of pre-Columbian Peru began to be completed in the early 20th century. However, long before scientific studies, looters valued the highly decorated fine ceramic vessels produced by pre-Columbian societies in the Andes. The earliest ceramic studies were done by collectors funding excavations (specifically looking for ceramics). They later sorted the finds into seriated ceramic collections. As excavations became more standardized and scientific, looters became incorporated into the process as informants and field workers.

German archaeologist Max Uhle was the first to conduct scientific archaeological studies in the Andes. Between 1892 and 1905 Uhle laid the foundations for Andean archaeology. Uhle was the first to apply modern principles of stratigraphy and seriation to materials to create chronological sequences in the Americas (Rowe 1954:1). Uhle compared styles of pottery to chronologically place occupations. The chronologies Uhle defined were later confirmed through stratigraphic excavations. His work was most successful on the Peruvian coast, particularly Ica, Chincha, Trujillo, Ancón, Pachacamac, and Chancay. Uhle’s methods were widely replicated and considered standard until the 1930’s when W. C. Bennett’s published his *Excavations at Tiahuanaco* (Rowe 1954).

In the 1920s and 1930s, Rafael Larco collected and seriated ceramic vessels from the north coast of Peru. Larco collected and classified approximately 30,000 ceramic vessels in an attempt to build ceramic typologies. His work helped define the Cupisnique, Salinar, Virú, Lambayeque cultures based on decorated pottery (Larco Hoyle 1941; 1945; 1948). His most notable research was conducted on Moche fineline ceramic vessels. Larco was able to classify these ceramics into five distinct phases based on the decorative styles and the form of the vessel lip (Museo Arqueológico Rafael Larco Herrera 2001; Castillo and Uceda 2007). Larco’s Moche typology still holds today in the southern Moche territory.
The Virú Valley Project of the 1940s was one of the most complete studies that focused on an entire valley in the Andes. This project relied on the collaboration of several archaeologists, geographers, and anthropologists from different fields to form a complete view of the cultural occupations of the Virú Valley. The team, Bennett, Strong, Evans, Collier, Ford, and Willey, completed extensive stratigraphic excavations and surveys. Ford (1949) collected approximately 180,000 surface ceramics from over 300 sites and seriated them to establish a chronological sequence for the valley. Before this work, no researcher had seriated domestic ceramics or conducted a valley-wide survey. This ceramic sequence has since been used and revisited (see Downey 2015) as the basis for seriation on the north coast. Ford and colleagues (1949) determined the cultures present during certain periods on the North Coast. The Cupisnique occupied the area during the Early Horizon, during the Early Intermediate Period (400 B.C.E.-800 C.E.) occupations were established by Salinar, Virú, and Moche (previously known as Puerto Moorin, Gallinazo, and Huancaco), and during the Middle Horizon the valley was occupied by the Huari and Lambayeque. Ford’s focus on domestic wares highlighted the gradual change of ceramic styles in the Virú Valley during 1,000 years of occupation. In addition to being one of the first to specifically study domestic ceramics, Ford emphasized that pots signify the progression of time. This understanding contrasted Willey’s view that pots signify cultures and people (Ford 1949:39).

Although these pottery types are now highly contested, Strong and Evans (1952) elaborated on Ford’s analysis by identifying the ware types common in the Virú Valley. These ware types provide a comparison that has been used on the North-Central Coast for the past 70 years. However archaeologists such as Downey (2015) are revisiting these classifications as new information arises. Strong and Evans’ work was novel at the time it was published because it was
one of the first studies to focus on plain wares as well as decorated pottery. Strong and Evans described twelve distinct plain wares from the Virú Valley. They described the vessel paste, surface color and texture, vessel form, size, body shape, and base, and the chronological position in the Virú Valley sequence for each of the twelve wares. The same information was described for the twenty-three decorated pottery types identified, with the addition of descriptions of designs and the relation with plain wares if noted (Strong and Evans 1952). These plain wares and decorative wares will be described in more detail in Chapter 3 Section 3.

These studies represent some of the earliest examinations of ceramic vessels and technology in the Andes. In the past few decades, ceramic studies have begun to incorporate modern technology, such as chemical analysis, to sequence, classify, and identify ceramic traditions and culture groups. Many modern scholars have emphasized the identification of trade routes based on the use of these chemical analyses to source materials (Druc 1998, 2001, 2004; Ikehara 2007; 2015; Shibata 2008). Others emphasize the identification of technical styles and ceramic technology through ethnographic analogy and archaeological comparison. In some cases these two styles of investigation have been combined to create a clearer view of the provenance of a pot.

Archaeologists such as Isabelle Druc (1996, 2000, 2001, 2004, 2009, 2011, 2013, 2015) have examined clays, tempers, and archaeologically excavated pottery to identify where and when the materials used in ancient times may have existed and used. Druc’s studies have combined ethnographic and petrographic studies to create a wider vision of the materials used by potters in distinct periods in Andean history. Her studies have mainly focused on the Callejón de Huaylas area and have included petrographic, carbon, XRF, and SEM-EDX analyses. Druc has
also greatly contributed to the study of ceramics with her 2015 *Atlas of Ceramic Pastes*, which was consulted in the preparation of the study in this thesis.

Koichiro Shibata (2006, 2008) has focused within the Nepeña Valley and Ancash Region on the interactions of various Initial Period and Early Horizon communities. Shibata’s investigations were designed to identify long distance communication chains based on the stylistic features of artifacts and architecture in the Nepeña Valley. The valley and the cultures who lived within it had contact and with influence from Cupisnique, Chavín, and other cultures during the Early Horizon, contributing to the development of ceremonial centers and the political autonomy of the valley. Shibata’s investigations, specifically at Cerro Blanco, have identified a strong link to Chavín as well as Cupisnique characteristics. These interactions occurred during the first part of the Early Horizon. During the second half of the Early Horizon, these interactions were reduced as the valley entered a period mostly indicative of conflict and localized influence. Caylán principally developed during the latter period, as seen through the generally local styles of art and architecture that have been identified.

Hugo Ikehara (2007, 2010, 2015) pioneered the study of ceramic vessels and the changes potters made due to technological, social, and economic factors in the Nepeña Valley during the Early Horizon. Ikehara’s studies have focused on typological and paste analyses. The ceramic classifications he created not only provide a basis for the work in this thesis, but also allow the comparison of ceramic wares and technologies used throughout the valley during ancient times.

Finally, Gabriel Ramón (2008, 2013a, 2013b; Ramón and Bell 1999) has done ethnographic and ethnoarchaeological research on the investigation of itinerant and swallow potters in the Andes. His investigations have focused on the migratory patterns of potters and the changes in the *chaine operatoire* that they employ to create their pots. The stylistic techniques
can be used to identify the origin of the potters, or their base town where they learned ceramic production techniques. Accounts of Swallow potters suggest that decorative techniques are more closely related to the town in which the pots are produced, or the destination town (Ramón 2013:14). Swallow potters often transport materials with them from their base town to the destination town, creating ceramics by request with local stylistic finishes. As a result, ceramics will appear local, however the clay can be traced through chemical analyses to deposits outside of the immediate vicinity.

The investigations mentioned above are just a few examples of the use of chemical and technological analyses of ceramics in the Central Andes. These investigations and studies like them have been especially productive in the Ancash region during the Early Horizon with the Chavín de Huántar phenomenon. Analyses by Druc (2004) have revealed that approximately 30% of ceramics found at the site of Chavín are nonlocal. This coincides with the general idea of offerings left at this regional ceremonial center. Burger and Matos (2002) and Quilter (2014) noted that the site of Atalla in Huancavelica, 450 km south of Chavín, demonstrates Chavín influence. Although ceramics are locally made, they emulate Chavin styles, possibly as a result of the location of a cinnabar mine close to the site. This demonstrates the influential status of the Chavin phenomenon during the Early Horizon as well as the spread of stylistic features and long-distance trade of the period.
CHAPTER 3
THE EARLY HORIZON IN NORTH-CENTRAL PERU:
SETTINGS, MODELS, AND THE HISTORY OF RESEARCH

This chapter presents the setting in which the Caylán urban center developed. The geographic and geological contexts of the area surrounding Caylán are presented to emphasize local resources that would have been available and utilized in craft production. Next, I present the history of research in the Ancash Region of Peru, including some of the most notable investigations in the Nepeña Valley. Finally, I explore the implications of the Early Horizon in Ancash and Nepeña and the current understandings of the period in Ancash.

3.1 Geographical Setting

The Andes Mountain Range divides Peru into three geographic regions: (1) coastal deserts and valleys, (2) highlands, and (3) lowland/jungle. These regions account for some of the most diverse ecosystems, species, and cultures in the world. Over the past 10,000 years, many civilizations developed within and throughout these regions. In north-central Peru, the Cordillera Blanca and Cordillera Negra Mountain ranges separate the coast from the Amazon jungle. The Santa River splits the mountains on a north-south axis, creating the Santa Valley, or Callejón de Huaylas.

The north coast of the central Andes is made of river valleys separated by desert and the Andean foothills. The north central coast extends from the Jequetepeque Valley in the north to the Casma Valley in the south, including the Chicama, Moche, Virú, Chao, Santa, Nepeña, Casma, Seco, Huarmey, and Culebras river valleys (Willey 1953). These valleys are frequently divided into the upper (highlands) and lower (lowlands) valley. The lower valley extends from the coast to the beginning of low hills (approx. 500m above sea level). The middle valley in
Nepeña corresponds to the Moro Pocket and lies at an elevation between approximately 500 and 1200m asl. The lands above 1200m asl are considered part of the upper valley. In Nepeña, the upper valley begins above the town of Jimbe and extends to the highlands of the Andes.

The Nepeña Valley is located approximately 390 km north of the modern capital of Lima in a region that is comprised of coastal deserts and river valleys with highland mountains and plateaus. The Nepeña River originates in the Chupicocha Lagoon in the Cordillera Negra and flows into the Pacific Ocean. The valley is approximately 74 km long and 8 km wide (ONERN 1972). The Nepeña valley consists mainly of cultivated land, four major towns, and approximately 360 archaeological sites (Daggett 1984, 1985; Proulx 1968, 1973, 1985; Figure 2). Systematic archaeological surveys have been carried out by Donald Proulx (1968, 1973, 1985) and Richard Daggett (1984) between 1967 and 1980. In 2015, Ikehara conducted a survey of the Middle Nepeña Valley with the goal of identifying human settlements. He and his team identified 2952 occurrences of high-density surface ceramic deposits possibly indicating ancient human settlements (Ikehara 2015:54).

My research focuses on Caylán, an archaeological site in the lower Nepeña Valley, Nepeña District, Santa Province, Department of Ancash, Peru (Figure 1). The archaeological site Caylán (770 cal B. C. E. - 66 cal C. E. [2σ]; Chicoine and Ikehara 2014) is located in the lower part of the Nepeña Valley. The Nepeña, Jimbe, Vinchamarca, also known as the “Loco” River, and Salitre Rivers run through the valley creating the fertile area where Caylán is located (Chicoine and Ikehara 2010; Figures 3, 4 and 5). Caylán is in the margins of the valley at the base of Cerro Caylán in a dry pampa. A small lagoon and marshlands lie to the southeast of the site, surrounded by modern-day agricultural fields. The geography of the hills and marshland mean that the urban center of Caylán is nestled into a V-shaped area on the pampa floor. In the
hills around Caylán, stone and mineral deposits were mined to provide the large stone slabs used in the construction of the walled compounds in the urban core. In these areas, or in locations close by, materials were likely mined for use as ceramic tempers.

The Early Horizon period developed during an interruption of earlier cultural manifestations (Cupisnique, Chavin, Manchay; Shibata 2006, 2011). Some social or natural phenomenon, or a simple change in thinking, caused the elite to slowly abandon their sacred sites. Competing factions and/or groups promoting different ideas and forms of community organization encouraged the establishment of new settlements including Caylán, Huambacho, Samanco and Sute Bajo. Monumental U-shaped complexes were deserted and populations moved to margins where they built settlements with distinct architectural features. These shifts in settlement patterns and architectural styles are suggestive of changes in political organization (Chicoine 2006b; Chicoine and Ikehara 2014).

Caylán is seemingly in a phase that some investigators call “transitional”, where elites looked to homogenize their dominion through alliances or interactions with other close settlements. Without a clearly defined social stratification, the production of ceramics was carried out at a familial level without the standardization of production or marked segregation of use.

Ceramics in Caylán were likely made and used locally in familial contexts. Pottery was made for daily use and was likely exchanged between neighboring compounds. The social interaction of the producer-consumer was carried out through a person or familial group with the larger population of Caylán. Foreign ceramic producers also likely existed in this setting, mixing traditions and customs of ceramic making with the local population of Caylán. Differences between production groups are based on the techniques used to chose and process the materials,
such as screening inclusions before using the clay (Druc 1996). The decorations of the pots is simple. Caylán continued the simple decorations of a local population with more paraphernalia of the tradition of familial ideas or of the area. However, some decorative styles are reminiscent of the Chavín Janabarriu Phase, which possibly emulates jaguar motifs. This motif is possibly a simplified version of a religious iconography that has a long tradition in Peru.

3.2 Geological Setting

The Andes Mountain range forms one of the most prominent mount ranges in the world. The mountains were formed by the Cenozoic (65 million years ago to present) tectonic activity of continental and oceanic plates (Grosjean et al. 2007). As the Nazca plate moved below the adjacent South American continental plate, the Andes Mountains were thrust upward and formed, and continue to be formed. The formation and continual movement of these plates results in the frequent natural hazards such as earthquakes, volcanic eruptions, tsunamis, and landslides that occur along the mountain range (Grosjean et al. 2007). Volcanic eruptions in historic, Holocene, and late-glacial times would have triggered debris flow, the collapse of massifs, or sections of the earth’s crust with faults, and could have changed the geological composition of large areas affected by the volcano (Grosjean et al. 2007:58). Natural disasters, however, are not frequent. Events such as alluvial activity or glacial melting rapidly deposit sediments across large areas, creating shallow stratigraphic events. These events easily bring minerals from higher elevations to be deposited in valley floors and along riverbeds. In this way, minerals from the highland headwaters may be transported to lowland deposits, being washed along and gradually being smoothed through erosion.
The Ancash Region of Peru is set in the section of the Andes that include two major ridges called the Cordillera Negra and Cordillera Blanca. The Cordillera Negra, located on the western side of the Andes, reaches 5200m and runs north-south for approximately 250km (Lane 2005). Unlike the neighboring Cordillera Blanca, there are no permanent glaciers in the Cordillera Negra. As such, the lack of a dependable water supply created a distinct ecological biome that did not rely as heavily on water. While the Cordillera Negra forms the eastern border of the Nepeña Valley, its foothills extend towards the Pacific Ocean, dividing the region into a number of valleys.

Each valley of the coastal region contains a distinct geological composition. The mineralogical composition of each area are important contributors to the technology of ancient inhabitants of these valleys. The availability of rich mineral deposits or volcanic rocks dictate the resources available to craftsmen, including potters.

Grosjean et al. (2007:103) indicate that modern geographic and geological conditions were established approximately 2000 B. C. E. in the Andes. As such, researchers can conclude that modern geology is similar to that of the Early Horizon. Due to the narrow nature of the Nepeña Valley, if changes such as river migration occurred, the difference in location would not likely have made an impact to this study. For instance, a shift in the river channel in 1998 following a major ENSO event only affected the area between the Pacific littoral and Huambacho, some 6 km from the coast.

According to Lanning (1967), Pleistocene glaciers created the foothills separating the Nepeña Valley from the surrounding valleys. Geological data collected by the Instituto de Geología y Minería (1975) demonstrates that the Nepeña Valley is mostly composed of sheet wash, wind, glacial runoff, and glacially accumulated deposits of soils and rocks. Surveys
completed by the Peruvian National Office of Evaluation of Natural Resources (ONERN 172) highlighted areas throughout the valley as containing fine, medium, coarse, and very coarse sandy and clay soils. Very coarse soils were the most superficial, while fine soils were deeper. Low, irregular levels of precipitation in the valley affect the deposition of these soils through the valley (Ministerio de Agricultura 2009). Low water levels would carry fine soils, but leave coarser soils in deposits where the water levels drop. Flooding would carry all soils dispersing them through the affected area.

In the areas surrounding the valley basin, minerals identified are tonalite, granodiorite, granite, diorite, and quartz monzonite (Instituto de Geología y Minería 1975). Figure 6 presents the distribution of these minerals and other resources in the valley based on maps from 1970s surveys by the ONERN and Instituto de Geología y Minería. Although marked in Figure 6, cultivated lands have been greatly expanded since the 1970s, and now occupy the majority of the valley floor.

Tonalite is an intrusive igneous rock with a felsic composition composed of plagioclase feldspar, quartz, and amphiboles. Granodiorite is an intrusive igneous rock similar to granite, but containing more plagioclase feldspar than other feldspars. Granodiorite also contains large quantities of quartz. Granite is an intrusive igneous rock consisting of feldspar, quartz, mica, and amphibole minerals. Depending on the mineralogy, granite can be white, pink, or grey in color.

Diorite is an intrusive igneous rock mainly composed of plagioclase feldspar, biotite, amphibole, and pyroxene, and can contain small amounts of quartz, microcline, olivine, and minor amounts of muscovite (mica). The color of diorite can range from grey, to black, to bluish-grey, and can have a greenish tint (Fichter 2000). A 1981 revisit to the Nepeña valley also
identified gabbro in parts of the valley close to the location of Caylán. Gabbro is a dark intrusive igneous rock chemically equivalent to basalt (Instituto de Geología y Minería 1975).

More research into the geology of the region has been conducted in the Casma Valley to the south. In his publication on mining and metallurgy, Georg Petersen notes that Adán Mine in Casma has various types of quartz, including milky, rose, and clear (Petersen 2010). People in early societies who lived in the Nepeña Valley would have taken advantage of the natural resources surrounding them as they developed their urban and agricultural centers.

In the areas surrounding Caylán, informal prospections by members of PIAC have identified possible sources of raw materials for craft and construction materials (Figure 4). Members of PIAC identified possible sources of cut stone slabs in the hills surrounding Caylán to the west, Cerro Caylán and Cerro Cabeza de León. Surveys by Chicoine at Huambacho, approximately 6 km from Caylán, identified quartz outcrops in the area. Sand is abundant in the pampa at the foot of the hills on the west side of the urban core of Caylán. This sand could have been easily screened by potters and used as inclusions in ceramic pastes. Clay and water could be gathered from Caylán Lagoon on the southeast edge of the site, or from the Nepeña River approximately 3 km away, on the southern edge of the valley. Fuel used in the firing of ceramics would also have been materials locally available to residents of Caylán. Although the Nepeña Valley mostly consists of modern cultivated fields, primarily growing sugar cane, inhabitants suggest the valley was not always made of agricultural fields. Currently, a small, modern forested area is located to the west of Caylán (ONERN 1972). However, inhabitants of the local area report that before the land in the valley was prepared for modern cultivation, the area was a densely wooded. If these woods were also present during the time Caylán was occupied, they
would have provided sufficient fuel for firing pottery. Additional sources of fuel would have been animal dung, vegetal remains, or other trash.

3.3 History of Research

Archaeological research was first begun in the Nepeña Valley during the first half of the 20th century. Early investigations focused on the Chavín-like stylistic features in the art and architecture. As more research is conducted in the region, the understanding of the Nepeña Valley, Chavín influence, and the art and architecture of the Early Horizon have evolved.

The earliest investigations at Cerro Blanco and Punkurí (Tello 2005 [1959]) in the Nepeña Valley indicated that the Chavín influence was strongly influential in the earliest phases of architectural construction. Recent studies at Punkurí have indicated that the site reflects characteristics more similar to that of the Sechín phenomenon than that of Chavín. Investigations also concluded that this religious center was constructed before the introduction of ceramics into the Nepeña Valley (Samaniego 2012).

Subsequent investigations at Cerro Blanco have determined that not only was it influenced by Chavín, but also had Cupisnique influences (Shibata 2008). The ceremonial site presents specific phases throughout the site, representing distinct phases of construction and stylistic influence. The first phase, Huambocayán (1500-1100 B.C.E.), is the oldest occupation of the site with pottery sherds associated with areas of burning, however there is no architecture. The Cerro Blanco Phase (1100-800 B.C.E.) presents several phases of ceremonial construction and evidence of feasting activities. During the Nepeña Phase (800-450 B.C.E.), the Principal Platform was remodeled with megalithic rocks, eliminating all adobes from external walls. The ceramic materials from this phase demonstrate changes to the form and decoration, and the
introduction of materials such as obsidian. In the Samanco Phase (450-150 B. C. E.), the accesses to the megalithic construction were sealed, and areas around the main construction areas were used as middens. The general shape of ceramic vessels continued, however the variety of decorative styles was greatly reduced (Shibata 2008). Chavín and Cupisnique influences would have been the strongest during Cerro Blanco Phase when Chavín was at its peak. The Nepeña and Samanco phases reflect the more locally centered influences as the valley entered into conflict and reduced long-distance trade.

As noted through Shibata’s chronology of Cerro Blanco, Chavín and Cupisnique styles are present in architecture, settlement patterns, and iconography at sites occupied during the first half of the Early Horizon. Recent researchers, however, postulate that they were not the only influences in the valley during the Early Horizon (Burger 2008; Chicoine 2006a; Proulx 1973; Shibata 2011).

Investigations in the Casma, Nepeña, and Santa valleys reveal a multitude of centers that demonstrate localized development (Pozorski and Pozorski 1987). During the second half of the Early Horizon, these valleys entered into a time of conflict and diminished long-distance interactions. Architecture and public art suggest the power of local cultures and the focus on local techniques. Defense systems suggest resistance to outside forces (Burger 2008; Chicoine 2006a; Ghezzi 2006; Treloar 2014). Sites in Nepeña, such as Huambacho and Caylán, exhibit local designs of public art that likely continued from earlier periods, although new architectural styles appeared (Chicoine 2006b; Chicoine 2010; Proulx ca. 2007). Investigations at Caylán examining architecture have shown that Caylán differs from Chavín (Chicoine and Ikehara 2010, 2014). Although the site developed during the end of the Chavín era, Caylán and many sites in the Nepeña Valley noticeably did not replicate the Chavín art and architectural traditions.
3.3.1 History of Research at Caylán

Bennett (1939) first reported the presence of complex architecture while conducting an investigation on prehistoric irrigation and agriculture. Kosok (1965) completed early ground surveys at the site, noting the complexity of the structures. Donald Proulx completed a systematic survey of the Nepeña valley identifying 260 sites during the 1960s and 70s, including at Caylán (Proulx 1993). The surface collection of pottery led Proulx to propose a Middle Horizon occupation at Caylán (Proulx 1968). In the 1980s, Proulx’s student, Richard Daggett (1999) continued the survey, finding an additional 103 sites. He identified pottery styles produced during the Early Horizon (Chicoine and Ikehara 2009; Proulx 1993). In 1995, Daggett returned to the site to sketch a map of the site core, based on aerial photographs (Chicoine and Ikehara 2014:339). Members of the Proyecto Arqueológico Huambacho carried out brief surveys that confirmed the Early Horizon age of the site in 2003 (Chicoine and Pimentel 2004).

In 2009 and 2010, David Chicoine and Hugo Ikehara began a long-term research project at Caylán titled the Proyecto de Investigación Arqueológica Caylán. Their investigations are the first scientific excavations and systematic mapping that have been conducted at the site. The analyses of the features and remains discovered have been contributing to the understanding of Caylán (Chicoine and Rojas 2013; Chicoine et al. in press; Clement 2012; Helmer 2011, 2015; Helmer and Chicoine 2013; Helmer et al. 2012; Ikehara 2015; McNabb 2013; Ortiz 2012; Treloar 2014; Warner 2015; Whitten 2015). The site is identified as an incipient urban center (Chicoine and Ikehara 2011, 2014). Throughout the site, stone and mud walls stand several meters above the surface of the pampa. Dozens of strategically placed stone walls provide defense and show signs of reconstruction as the site was reused (Chicoine and Ikehara 2014). The location of Caylán provides views of the contemporary sites Huambacho and Sute Bajo.
Initial Period and Early Horizon mounds at Cerro Blanco, Huca Partida, and Pañamarca can also be seen from this site.

3.3.2 History of Ceramic Studies on the North-Central Coast

Ceramic studies on the North-Central coast have, for the most part, focused on the creation of a typology or chronological sequence based on vessel forms in a region. Studies that focus on ceramic wares are much less frequent, but have become more popular in recent investigations. One of the first studies to focus on wares was done by Strong and Evans (1952) as part of the Virú Valley Project. Their identification of plain wares is still used as a comparison today for the North-Coast, although recent data has caused the wares to be questioned. Tables 3 and 4 present a brief overview of the plain and decorated wares identified by Strong and Evans. These wares can be compared to the results of my analysis as a comparative of common wares on the North Coast.

Donald Proulx (1973), after his initial surveys in the Nepeña Valley, identified decorative types based on surface collection sherds from the Early Horizon Period. Proulx determined an Early Horizon date to sites and ceramic collections based on the presence of circle and dot motifs, which was present in virtually all sites surveyed. Other techniques highlighted by Proulx include burnishing, incision, appliques, punctation, and zoned punctation. A summary of decorative techniques identified by Proulx can be seen in Table 5. Proulx’s identification of decorative types relied on his surface surveys as well as work done previously in Nepeña (Tello 1943; 1956; Willey and Corbett 1954).

At Huambacho, in the lower Nepeña Valley, Chicoine (2006a) defined Early Horizon ceramic wares and decorated wares, contributing to previous investigations focusing on the
typology and decoration of north-central coastal ceramics. Chicione focused both on the ceramic paste, defining five wares, as well as decorative techniques such as incision, paint, burnishing, stamp, and textile impression. A summary of Chicoine’s wares can be found in Table 6.

Investigations at Cerro Blanco constitute one of the most thorough studies of ceramic decorations and pastes in the Nepeña Valley to date. Based on excavations from 2002 and 2004, Shibata (2008) defined a sequence that can be applied to the greater Nepeña Valley. This chronology was based on material remains, architecture, stratigraphy, and radiocarbon dates of the site. The Huambocayán, Cerro Blanco, Nepeña, and Samanco phases were defined based on differences in decorative styles and the forms of vessels, especially the necks and lips of pots. Ikehara (2007) expanded on the ceramic analysis of Cerro Blanco through extensive descriptions of vessel forms, decorative techniques, and paste analysis. Summaries of the six decorative techniques can be found in Table 7. These techniques can be applied in conjunction with others and occur with differing frequencies. Ikehara’s macroscopic paste analysis considered texture, porosity, and the visible non-plastic materials in the profile of the fragment (Table 8). The decorative styles and pastes are very similar in composition to those found at Huambacho and Caylán.

Investigations at Samanco have revealed similar pastes and decorative styles to other Nepeña sites. Helmer (2015) follows decorative techniques identified by Proulx, Chicoine, and Ikehara, with the addition of certain Samanco specific decorative style. Samanco Modeled is a fine modeled technique made of thick appliqué bands modeled in curvilinear designs, similar to Cupisnique incised designs (Helmer 2015:107). This style had instances of painting, slips, and negative designs on separate vessels. Helmer proposes this style as a possible transitional era style from the Early Horizon to the Early Intermediate Period.
Helmer also completed a basic paste analysis of rim and decorated sherds. Three paste groups were identified. Paste 1 has fine sand inclusions, a grey core and red-brown “sandwich” effect. Large jars used larger sand while bottles had finer sand; this paste was excavated from all strata. Paste 2 has a fine grey paste with few inclusions, and was associated with polished red, brown, and black fineware (Helmer 2015:109). Paste 3 has a yellow-orange paste with small gravel and sand inclusions. Paste 3 was associated with all vessel shapes and decorations and was excavated primarily from the final layers of Samanco’s occupation (Helmer 2015:110).

The studies and types identified in this section were used as a guideline in the preparation, elaboration, and development of this thesis. The ware groups and styles noted are similar throughout the Nepeña Valley during the Early Horizon, and are similar to those found at Caylán.

3.4 Meanings and Implications in the Case of Early Horizon Peru, Focusing on Ancash and Nepeña

One of the main questions researchers have of the Ancash region is at what point did Andean people begin living in cities. The development of urban centers and the transition to multitier sociopolitical hierarchies does not necessarily follow a linear model (Tables 1 and 2).

The Initial Period (1800-900 B. C. E.) is marked by large monumental architecture, the appearance of ceramics and a gradual expansion of civic-ceremonial centers (Haas 1987; Pozorski and Pozorski 1987). Pottery was developed and/or introduced at several locales with distinct vessel forms and decorations from the central coastal Lima, highlands Kotosh, and jungle Yarinacocha. During this period, intensive agriculture began to develop, however limited irrigation restricted more expansive growth. Maize (Zea mays), manioc (Manihot esculenta), beans (Phaseolus spp.), squash (Cucurbita spp.), and peanuts (Arachis hypogea) spread to the
coastal regions from the highlands and Amazonian lowlands. Coastal and inland centers relied on maritime resources to supplement their diet and provide most of the animal proteins (Moseley 2001; Pozorski 1976, 1979; Quilter 1992). These resources would have depended on interactions between coastal and inland centers to transport marine resources (Pozorski and Pozorski 1979).

The transition from the Initial Period to the Early Horizon is marked by changes in the sociopolitical structure and settlement patterns on the coast (Burger 1992:184). The Initial Period ends with the development and spread of the Chavín phenomenon.

Chavín de Huántar is a ceremonial center located in the eastern edge of Ancash, approximately 300km away from Caylán. Chavín was the most influential center during this time period (1500-400 B. C. E.; Burger 1984; Rick et al. 2009). The Chavín influence extended throughout much of the north-central highlands and coast in the late Initial Period and first half of the Early Horizon. As a ceremonial center, Chavín is notable due to its monumental construction of sunken plazas, high platforms, and underground galleries with complex architectural designs (Burger 1984; Lumbreras 1977; Rick 2006). Chavín and Chavín-influenced art (e.g. anthropomorphic felines, birds, and serpents) and architecture (e.g. low reliefs, carvings, sculptures) are recognizable by the highly stylized designs ornamenting them. The Chavín art style was expressed in textiles, pottery, metalwork, sculpted conch shells, and stone carvings that influenced the many contemporary and subsequent cultures.

Julio C. Tello, argued that Chavín de Huántar was the mother culture of Andean civilizations in Peru, Argentina, Bolivia, and Ecuador (Burger 2008; Tello 1934, 1942, 1943, 1960). Evidence from his 1933 investigations at Cerro Blanco and Punkuri in Nepeña conceived Chavín as the earliest civilization in Peru and the foundation of other early constructions. Rafael Larco, an early Andean researcher and contemporary of Tello, argued that Chavín styles were
too developed to be the source of all cultures. Larco proposed that sites in the Nepeña Valley were pre-Chavín and related to the contemporary coastal Cupisnique (Larco 1948). Although various cultures existed before Chavín, researchers still consider Chavín to have been one of the most influential developments in Early Horizon Peru. Rick (2006:202) states that the Chavín “religion” was the agent of “transcendental changes” in societies of this period. The Chavín ceremonial center influenced the region through the distribution of ideological views and art and architectural styles spread by its visitors. Visitors to the Chavín ceremonial center spread ideological views, art, and architectural styles through complex interaction networks, disseminating its influence through the region.

Recent investigations at Chavín understand it to have been a prominent pilgrimage site for people in the Ancash region. Individuals frequently visited Chavín and left offerings and tributes. The styles and techniques of Chavín art and architecture were carried and replicated by pilgrims in their home regions. By about 800 B. C. E., the Chavín phenomenon began to diminish. Chavín was abandoned by 500-400 B. C. E., (Rick et al. 2009). Researchers in the first half of the twentieth century believed that Chavín had a large amount of technological and stylistic influence over the Nepeña Valley, including Caylán. Changes in the chronology of Chavín, however suggest that Chavín influence waned when Caylán was being developed. Rather, in Nepeña this period corresponds with the introduction of new settlement patterns, architectural techniques, and social structures (Chicoine 2010:320).

During the Early Horizon, settlements in the Nepeña and Casma valleys shift from U-shaped monuments to enclosed residential compounds located on the valley margins (Chicoine 2010:194; Daggett 1987; Pozorski and Pozorski 1987). In the upper Nepeña valley, megalithic citadels, such as Kiske and Kushipampa, were built in defensive locations (Ikehara 2010). In the
lower valley, large settlements such as Caylán, Huambacho, Samanco, and Sute Bajo were organized in densely placed walled compounds (Chicoine 2006a; Chicoine and Ikehara 2010, 2014; Cotrina et al. 2003; Helmer 2015; Helmer and Chicoine 2015). Chicoine and Ikehara (2010) postulate that Caylán was the primary center in the lower valley due to the size and complexity of the settlement. Huambacho and Samanco could have acted as secondary centers due to their smaller size.

The introduction of camelids to the coastal region affected economic, social, and ritual practices in Ancash. Before the arrival of the Spanish to South America, camelids (llamas [Lama glama] and alpacas [Vicugna pacos]) were the only large domesticated mammal species. Camelids were used for their meat, wool, dung, and as pack animals (deFrance 2010; Millaire 2008; Miller and Burger 1995; Pozorski 1979; Stahl 1988; Szpak et al. 2015; Winterhalder et al. 1974). These animals were important not only in daily life, but also in ceremonial events related to politics and religion, and were represented in iconographic depictions of the time (Donnan and Foote 1978; Millaire 2015; Shimada and Shimada 1985).

The Early Horizon appears to have marked the intensification of the use of camelids as pack animals in coastal Ancash (Szpak et al. 2015). Evidence from Caylán, however suggests that, while camelids were locally raised and consumed, they were not as important in Nepeña as in other centers on the coast during this time (Szpak et al. 2015). Camelids became more important and successfully bred during the Early Intermediate Period to the Middle Horizon (Shimada and Shimada 1985). The slow increase of camelids in Coastal Ancash began a reliance on them as pack animals. They then played a main role in the development of long-distance trade and the establishment of trade networks (Szpak et al. 2015).
The relatively light reliance on camelids as pack animals during the Caylán occupation supports evidence of a decrease in long-distance trade and a focus on local interactions. As such, camelids would not have contributed to an exotic influx of materials used in activities such as craft production. In any case, it appears that most exotics in Nepeña were imported prior to the increased importance of camelids as pack animals, perhaps emphasizing a form of trade focusing on prestige items and ritual paraphernalia. In contrast, camelids are most useful in the bulk exchange of goods, especially subsistence production. While pack animals were possibly used for the transport of local materials to produce ceramics, the introduction of camelids likely did not greatly change the methods of material gathering until a later time.

Maize was introduced to Nepeña during the Early Horizon. The development of new vessel forms to process maize (Ikehara et al. 2013) and innovations in commensal politics exemplify the intensification of maize production (Chicoine 2011). One of the most important aspects of the introduction of maize is that it can be made into an alcoholic drink. The shift from drinking manioc beer to drinking chicha de maíz not only influenced diet, but also necessitated a change in vessels used to prepare and store the beverage. Chicha beer is a very important beverage in the Andes, even today (Jennings and Bowser 2008). In societies that rely on reciprocity systems for status, payment of labor forces, and creation of social relationships, the sharing of food and drink in feasts is very important.

The period of time transitioning from the Initial Period to the Early Horizon was a period of development on the north-central Peruvian coast. Transformations in sociocultural, economic, and technological features of society, such as settlement patterns, architectural designs, metallurgy, ceramic, and textile production techniques gained popularity during the Early Horizon (Makowski 2002). Previous forms and ideologies collapsed, being replaced by a new
order. Not only did architecture and craft production change, but there was also a transformation on the political order. Some of the more visible ways in which transformation occurred include the construction of urban centers, large monuments, and roadways required social organization to assemble laborers as well as pay them. In the moneyless labor system of the Andes, economic transactions were based on reciprocity, redistribution, and gift giving (Jennings 2005; Jennings and Bowser 2008; Morris 1979).

Feasts can serve to create and maintain social relationships through exchange and reciprocity (Spielmann 2002). Feasting was and is used to mobilize labor, whether voluntary or mandatory (Dietler and Herbich 2001, Erasmus 1965; Moore 1975). Work done by laborers was paid through feasting with chicha in a system of reciprocity. Large group of people eating and drinking together would require many people to prepare the feast, large cooking vessels, multitudes of serving containers, and large amounts of foodstuffs to be shared. Although not strictly related to changes in sociopolitical organization, feasting demonstrates the presence of higher status individuals with large enough surpluses of food and beverages to host large meals and construct monumental projects (Chicoine 2011).

One of the most indicative indicators of feasting activities in the archaeological record is the presence of large pots used in the storage and production of chicha beer. Serving vessels such as cups and bowls would also be indicative of feasting activities. However gourds may have been used instead of ceramics. The presence of many fragments of large vessels and servingwares, as identified by Ikehara (2007) at Cerro Blanco, would imply feasting events at Caylán.

In the Nepeña Valley, evidence of feasting is present in various settlements and time periods (Chicoine 2011; Ikehara 2007; Ikehara et al. 2013; Ikehara and Shibata 2005). In the lower valley, Cerro Blanco was a U-shaped ceremonial center that exhibited three feasting events
in the Cerro Blanco Phase (1100-800 B. C. E.), the Cerro Blanco/Nepeña transition, and the Nepeña Phase (800-450 B. C. E.) (Ikehara and Shibata 2005). Due to the location of feasts and refuse deposits and the design of items used in the celebrations, feasts at Cerro Blanco are interpreted as events sponsored by patrons to “mobilize labor, strengthen alliances, and delimit communal identities in the lower Nepeña Valley” (Ikehara and Shibata 2005:151). Huambacho (800-200 B. C. E.) likely had smaller feasts during this time to reaffirm social hierarchies. The limitations of storage areas meant that elites at Huambacho relied on gifts, offerings, and ritual contributions to host feast activities (Chicoine 2011:449). During the Nepeña Phase, when feasts became much larger events, architectural and social transformations occurred.

One of the main questions of the study of ceramics and their origin in the Ancash Region of Peru is how to identify production and characterize pottery. According to studies by Druc (1996) the materials, techniques, and vessel forms used by potters does not vary greatly from one valley to the next. Only the preparation of the raw materials, the selection for finer or coarser inclusions, changes. According to her, the most efficient way to distinguish between the origins of production is by the decoration (Druc 1996:34). During the second half of the Early Horizon, however, the identification a specific production area is more difficult without chemical analyses due to the similarities of pots and their decorations within valleys.

Previous investigations in the Nepeña Valley at Huambacho, Cerro Blanco, Caylán, and Samanco (Chicoine 2006a; Helmer 2015; Ikehara 2008; José Quispe personal communication, July 2015) employed macroscopic analyses to identify paste categories. In this study I employ similar methods and classification categories in order to facilitate analogous analyses. The use of similar methodologies in ceramic analyses will allow researchers to make future comparisons.
among sites in the valley, to define possible communities of ceramic production, and to identify interaction networks.

3.5 Current Understanding of Early Horizon Ancash

Early Horizon Ancash was a period of transitions and developments caused by development and conflict in the region. Ecological conditions of the time resembled current conditions. By the middle of the Early Horizon (ca. 500 B. C. E.), most major crops and animals had been domesticated. Unreliable water sources in the Cordillera Negra would have created a need for irrigation for large-scale agriculture, however small crops could be produced with little problem. In this way, a degree of specialization had been reached, however specialization was not attained throughout the region evenly. Craft and sustenance production were on a reduced scale, catering small, local groups, with the ability to conduct small-scale local and long-distance trade.

The Ancash Region during the end of the Nepeña phase in the Early Horizon corresponds to a period of social change characterized by the abandonment of Initial Period U-shaped megalithic ceremonial centers, and stylistic elements related to the Chavín and Cupisnique phenomena (Chicoine 2011; Shibata 2008). Local styles of architecture and art became the preferred features as social groups resettled along the valley margins. This abandonment of Chavín and Cupisnique influences also signifies the abandonment of the ideologies related to these groups. Chavin de Huántar and its anthropomorphic feline depictions represent one of the largest spread religious ideologies in the Andes. The abandonment of the art, architecture, and subsequently the messages, in preference for local influence demonstrates the shift of power from larger centers to local polities.
Although they deserted external stylistic influences, sites in the upper valley maintained megalithic architectural styles with residential areas erected close to ceremonial and defensive centers (Daggett 1984; Ikehara 2010). Ikehara and Chicoine (2011) interpret these centers as competing political entities.

Centers along the lower valley margins, such as Samanco, Caylán, Sute Bajo, and Huambacho present varying degrees of defensive structures, indicating a period of conflict in the valley (Chicoine 2006a; Chicoine and Ikehara 2014; Cotrina et al. 2003; Helmer and Chicoine 2013). The rising conflict was combined with a reduction in long-distance trade. These sites appear to have been part of a localized trade network, exhibiting similar architecture and material assemblages. Investigators have hypothesized that coastal sites provided shellfish to inland Caylán, where shellfish were then distributed to occupants (Chicoine and Rojas 2013). Caylán is the largest site in the Nepeña Valley during this time. Chicoine and Ikehara (2014) propose Caylán could have served as a regional center to other sites in the valley that lacked Chavín influence.

Caylán’s spatial organization includes platforms, corridors, and plazas that are representative of the social, geopolitical, and ecological conditions linked to early urbanism on the Peruvian coast (Chicoine and Ikehara 2009). The dense urban core at Caylán is composed of a number of walled compounds of different sizes with small rooms branching from the entrance plaza. Whitten (2015) hypothesizes that the size of the compounds is related to the status of the household who resided within it. Two larger compounds, A and B, have friezes that could indicate social differentiation. However, the only other excavated compound, medium-sized E, did not reveal decoration (Whitten 2015:96). More excavation will be needed to form conclusions of status based on plaza size and decoration.
Whitten (2015) hypothesizes that the plaza entrances to the compounds would have acted as public areas for daily activities, visitors, and feasting activities. The inner patios leading from the plaza provide a more private area, possibly for production or family group living and sleeping areas. These patios do not connect with each other, suggesting the possibility of multiple family groups occupying the same compound (Whitten 2015:98). Warner’s (2015) research supports the use of patios as areas where craft production and food preparation were elaborated. He argues that trash deposits featuring refuse and tools from craft and food production in residential contexts implies a generalized domestic economy (Warner 2015:74). It is currently unknown if Caylán’s occupants participated in agriculture due to a lack of identified farming tools. However, tools to process harvested crops, including grindstones, have been identified. Similarly, no direct evidence of ceramic production has been identified, but polishing stones and pottery sherds are abundant (Warner 2015:75).

The combination of these factors indicates that Caylán residents were likely household producers, not specialized in specific activities. Distinct assemblages and the separation of living areas imply the beginnings of specialized activities. The presence of varying sizes of compounds suggests some form of social stratification. A lack of specialization suggests a relatively homogeneous population with generalized, domestic economy producing goods for personal use, and potentially local trade and ritual events (Warner 2015:80). Thus, Caylán presents a socially complex center that was in the process of becoming a socially stratified center.

### 3.6 Previous Research at Caylán

Caylán is an incipient urban center located on the margins of the lower Nepeña Valley. The site was principally occupied during approximately 700 years of the Early Horizon Period.
Caylán was likely abandoned around 1 B.C.E. Caylán was then reoccupied during the Middle Horizon Period and intrusive burials were identified. Groups producing Casma style ceramics and later Chimú objects of the Later Intermediate Period claimed the abandoned urban ruins as a cemetery. Early Horizon Caylán was organized into a series of walled compounds with low mounds and plazas. On the outskirts of the urban center, hills contain terraces, modified areas, and areas with minor architecture. A large mound, named the Montículo Principal is located in the south-central portion of the urban center. The mound rises 10 meters above the pampa floor and faces a large open plaza (Plaza Mayor). The function of the structure is not known, but it is hypothesized to be civic-ceremonial.

Surface surveys and limited excavations have allowed the identification of 43 walled compounds interpreted as multifunctional residential complexes (Whitten 2015). Mapping shows that large portions were centrally planned and built around avenues, suggesting a short construction period to house a large population (Chicoine and Ikehara 2010:365). Walls were constructed of vertically placed large stone slabs filled with debris. Rocks were stacked on top of the slabs with a mud mortar. A fine clay plaster mix was then added to form a smooth façade; some compounds demonstrate frieze decorations (Whiten 2015:29). The entrance to each compound leads into the main plaza that would have been decorated, had covered areas, and benches. These plazas would likely have been used as a common area for inhabitants and visitors (Helmer and Chicoine 2013; Helmer et al. 2012). From the plaza, small, interconnected patios create areas for production or common household areas.

Data from Compound-E and the lack of identified workshops suggests that craft and tool production occurred colonnaded patios. In some compounds, several patios are present. Whitten (2015:97) hypothesized that more than one family unit would occupy a compound in this case.
Patios led into smaller, covered rooms that would potentially be used as sleeping quarters. Baffled or hidden entrances served as a restricted entrance for those entering the consecutively smaller rooms, separating public and private areas (Whitten 2015:97). Although the compounds range in size, the general structure of each compound is the same. The smallest compound measures approximately 650 sq m, while the largest measures approximately 8290 sq m. Compounds are linked through a series of small roads or pathways running between the walled structures.

3.6.1 Excavations at Caylán

Excavations at Caylán were carried out by the Proyecto de Investigación Arqueológica Caylán in 2009 and 2010. In 2009, three excavation units, or Unidades de Excavaciones (UE1, UE2, and UE3) and five test pits, or Hoyos de Prueba (HP1 through HP5) were excavated. In 2010, three excavation units (UE4, UE5, and UE6) and eleven test pits (HP6 through HP16) were excavated (Figure 7).

The registry of the excavation data was completed through a thorough record of field notebooks, inventory tickets, excavation and stratigraphy forms, floor, cross section, and stratigraphic profile drawings made on scales between 1:20 and 1:50 on the surface, and between 1:1 and 1:20 for the excavation record. A photographic record was made with a digital camera with a record of the number of photo, details, date, author, and time (Chicoine and Ikehara 2011:25). Visible structures such as walls, corners, access ways, and partially visible structures were recorded using a total station.

The goal of excavations was to investigate, identify, and delimit the constructions in the site, and understanding their occupation sequence, use, and abandonment. Natural or cultural
levels were excavated, and each level, context and respective associations were recorded through written, graphic, and photographic records. The soil removed during the excavation process was screened and accumulated close to the unit to posteriorly refill the units (Chicoine and Ikehara 2011:27).

During the excavations, all materials were collected. Soil was screened using 3mm (1/8 inch) mesh. This comprehensive collection of materials, especially decorated, undecorated, and ceramic body sherds, provides a representative sample of the quantity of pot sherds discarded in each excavation context. Examining ceramic pastes contrasts the traditional archaeological practices on the north coast of Peru, which typically focus on decorated wares, rim sherds, and complete vessels. Each artifact or remain was recorded by the stratigraphic position, type of material, date of excavation, and name of the person responsible for the excavation unit. Each evening, materials were cleaned and cataloged. The materials were placed by material type in bags and/or plastic or cardboard recipients. The bags and recipients were placed in cardboard boxed with identification numbers on the exterior. All materials were turned in to the Instituto Nacional de la Cultura (now known as the Ministerio de Cultura) and deposited in a storage unit built in 2009 at the Museo Regional Max Uhle, Sechín, Casma.

3.6.2 Block Excavations at Caylán

Six block excavation units have been investigated at Caylán. These units were located in: the Main Monumental Complex, Plaza-A, and Compound-E. Excavation units 1, 2, 3, 4, 5, and 6 were located in these structures with the goal of identifying the function and associations of each area (Figure 8). The units examined in this thesis are units 4, 5, and 6 from the 2010 field season.
3.6.2.1 Main Mound Complex

Excavation unit 1 (UE1) was located on the northeast side of the Montículo Principal, or main monumental structure (Chicoine and Ikehara 2010). A total of 30m$^2$ were excavated in this unit. Excavations revealed a yellow, black, white, and red painted mural. The stratigraphy of this unit revealed two occupational floors as well as evidence of architectural collapse of the mound.

Excavation unit 4 (UE4) was located on the southwest upper section of the Montículo Principal (Chicoine and Ikehara 2011:28; Figures 9 and 10). Unit 4 measured 8 m north-south by 15 m east-west and was divided into four terraces. Terrace-1 was located in the superior zone of the structure, and Terrace-4 in the inferior zone. Two extensions were opened in the superior and inferior zones, respectively. The stratigraphy in the unit included surface debris, rainwash, fallen rocks, and materials constituting construction fill. The excavations of the Montículo Principal determined that at least four phases of mud brick construction exist. A series of remodels included the construction of new walls, columns, and rooms. Radiocarbon measurements date this construction to approximately 400-385 B. C. E. (Chicoine and Ikehara 2014).

The function of the structure is not known due to the large amount of construction fill excavated from the units (Chicoine and Ikehara 2011:34). However, given the scale, elaborate architecture, and location of the mound in front of the sole open public space at Caylán, the Montículo Principal is hypothesized to have had some form of civic-ceremonial function. This hypothesis is further supported by the internal structures of the mound, which greatly contrast the more than forty residential compounds identified in the urban core. Excavations thus far have focused on understanding the building sequence and organization of the mound.

A total of 13,658 sherds were excavated from the 150m$^2$ excavated at the Montículo Principal. Excavation Unit 1 consisted of 30m$^2$ with 532 sherds excavated, resulting in
approximately 18 sherds per square meter. Excavation Unit 4 consisted of approximately 120m² with approximately 13,126 sherds excavated, resulting in approximately 109 sherds per square meter. The ceramic materials analyzed from this mound, especially UE4, have mainly come from construction fill, and have not yet greatly contributed to the understanding of the function of the mound.

3.6.2.2 Plaza-A

Unit 2 (UE2) was located in the west corner of Plaza-A. Approximately 75m² were excavated from this unit. Excavations revealed a decorated mural, a complex system of accesses, and artifacts associated with monumental architecture. Niches and friezes were identified on the walls abutting benches along the walls of the plaza.

Unit 5 (UE5) was located in the east side of Plaza-A (Figures 11 and 12). In 2010, unit 5 was excavated to understand the function of the compound based on architecture, spatial distribution, and artifacts. Unit 5 and its extensions formed an L shape measuring 19 x 19 m and was 2 m wide (Chicoine and Ikehara 2011:35). The stratigraphy of this unit was composed of surface debris of fallen rocks in a clay matrix. Layers consisted in clay-like soil, clay sediments from plaster walls, floors, and construction fills. The original excavation area (2 x 19 m) revealed a wall and bench. Extensions revealed two benches, a corridor, and a sample of floor. Two phases of construction were identified in UE5, the first creating a stairway to access the sunken plaza and benches in Plaza-A, and the second of rocks, trash, and mud to seal this access (Chicoine and Ikehara 2011:36). Radiocarbon measurements from Unit 2 in Plaza-A date occupations in a range of 518 to 232 B. C. E. over four stratigraphic deposits (Chicoine and Ikehara 2014).
The plaza, with its walls, corridors, staircases, and sealed entrances suggest that there was a control over who was able to access it. The decorated friezes were repeated through the plaza along with columns with “S” motifs and stepped designs. These designs likely indicate an important ideological message. The large amounts of shell and plant remains suggest one possible use of this plaza in the processing of foodstuffs and other goods.

A total of 7,241 sherds were recovered from the 166m² excavated at Plaza-A. Excavation Unit 2 consisted of 75m² with 1,969 sherds excavated, resulting in approximately 26 sherds per square meter. Excavation Unit 5 and its extensions consisted of approximately 91m² with approximately 5,272 sherds excavated, resulting in approximately 58 sherds per square meter.

3.6.2.3 Excavation Unit 3

Unit 3 (UE3) was located to the south of the Montículo Principal and to the east of the funerary area. Excavations consisted of an area of approximately 20m². Excavations of this unit revealed the collapse of the walls adjacent to the area excavated, as well as large quantities of materials deposited, possibly using this space as a midden after its collapse. The large amounts of materials and fallen rocks resulted in the fact that excavations did not reach the sterile level.

A total of 3,399 sherds were excavated from the 20m² excavated at Unit 3. Sherd density is calculated at approximately 170 sherds per square meter.

3.6.2.4 Compound-E

Unit 6 and its extensions were excavated in Compound-E (Figures 13, 14, and 15). Compound-E was divided into Plaza E and Rooms 1-6, which were located on the southeast side of the corridor running to Plaza E (Chicoine and Ikehara 2011:37). The stratigraphy of this unit
differed between the areas excavated in this compound. In general, the rooms presented a layer of fallen rocks in clay, a horizontal layer of clay sediments from plaster walls, fine sand, and floors varying with the intensity of use. The various excavations and extensions in this compound had a sum of approximately 165 m². Compound-E was one of the most extensively excavated areas, aiming to identify the function of the architectural structures related to the plaza within the compound. The rooms are interpreted as having distinct functions, including sleeping rooms and spaces for domestic activities. Chicoine and Ikehara (2011:38) hypothesize that his sector of the site could represent an elite residence. Radiocarbon measurements date Extension 3 to approximately 405-390 B. C. E. Extension 7, meanwhile, was dated to approximately 380-230 B. C. E. (Chicoine and Ikehara 2014). After the abandon of this compound, sections were reused as latrines and middens.

Unit 6 and its extensions consisted in a total of 164.25m² that were excavated. A total of 14,896 sherds were excavated from the unit. Sherd density is calculated at approximately 91 sherds per square meter.

3.6.3 Test Pits at Caylán

In addition to the block excavations described above, sixteen test pits were placed throughout Caylán to understand the variety of human activities and materials in different contexts. Test pits were placed in open plazas (HP12), terraces (HP5), side rooms (HP 1, 4, 8), and platforms (HP6, 7, 13, 14) to understand architectural elements. The remaining test pits were placed in streets (HP9, 10, 11), open-air middens (HP2, 15, 16), and at a defensive wall (HP3; Warner 2015:40). The total area excavated from these units is approximately 50m². A total of 8845 pottery sherds were excavated from the test pits. The sherds were macroscopically analyzed
by Quispe in 2013 to provide preliminary information about the technology of ceramics (Quispe, personal communication July 2015).

3.6.4 Ceramic Analyses at Caylán

Various analyses have been completed on the materials recovered from the excavations at Caylán. Two studies have aimed to understand the ceramic assemblage of Caylán. In 2012, Jessica Ortiz completed a study of the vessel forms recovered at Compound-E. Her work created a vessel shape typology based on rim sherds, which was influenced by Shibata's work (2004; 2006; 2010; 2011) at Cerro Blanco and Huaca Partida in the Nepeña Valley. Ortiz also identified decorative techniques and designs using the general terminology used by investigators in the Nepeña Valley.

During her investigation, Ortiz identified six vessel forms that were present in Compound-E of Caylán: cup, bowl, bottle, bottle, jug, neckless pot, and jar. Cups are open vessels with a flat base, straight walls, and where the maximum diameter of the vessel corresponds to the mouth. Cups have both an internal and external burnished finish and may have external decoration. Cups are serving vessels (Ortiz 2012:102). Bowls are open vessels with curved walls and a convex base. They have an internal and external finely burnished or polished finish. Decoration may be added, even though Ortiz identified a minimal number of decorated bowls. Bowls are serving vessels (Ortiz 2012:102-103). Bottles are vessels of a reduced size with a restricted access where the height of the neck is two or three times greater than that of the mouth opening. Bottles have a well polished external surface and no decorated vessels were identified. Bottles are serving vessels (Ortiz 2012:105).
Jugs (cántaros) are a closed vessel with a generally globular body and a mouth defined by a neck whose height is less than double the diameter of the opening, or with a minimum opening of 4cm. Jugs have an external surface that is smoothed or polished with a smoothed interior. Jugs are interpreted as serving vessels (Ortiz 2012:106). Neckless pots (ollas sin cuello) are characterized by being semiclosed, with the diameter of the mouth measuring less than the diameter of the body. The exterior surface is generally partially burnished with a roughly smoothed interior. Pots are utilitarian vessels used in the processing of food and beverages (Ortiz 2012:108-109). Finally, jars (tinajas) are very large vessels. The exterior is smoothed or roughly burnished, and the interior is smoothed. Jars are utilitarian vessels used in the storage of dry goods or liquids (Ortiz 2012:110).

Ortiz also described the decorative techniques and designs identified on the sherds from Compound-E. Decorative techniques include incision, punctate, paint, textile impression, appliques of high relief, and stamping or impression. Incision uses different thicknesses and depths of incised lines on leather-hard vessels. Punctate presents various dimensions, direction, and depth of small dots on the surface of the vessel (Ortiz 2012:112). Paint includes white and blue-grey pre- and post-firing paint, typically delimited by incised or painted lines. Textile impression is the use of textile or nets to mark the surface; at least three types of textiles were identified. Appliqué or high reliefs are created by placing a small amount of clay over the vessel to create different zones of depth. And stamping likely used cane reeds to leave shallow outlines of circles and dots on the surface of the vessel (Ortiz 2012:113).

Ortiz identified a number of designs utilizing the above techniques to decorate vessels. These designs include, but are not limited to: parallel incised lines, parallel incised lines with punctated circles, parallel incised lines with textile impression, parallel incised lines delimiting
cream and black paint, stamped circle and dot, blue-grey pre-firing paint over a red slip, and textile impression (Ortiz 2012:114).

In 2013, José Quispe and David Chicoine completed a macroscopic analysis of the pottery sherds recovered from the 16 test pits distributed throughout Caylán. Quispe's analysis was based on Ikehara's 2007 investigation of ceramics from Cerro Blanco, which included a study of the morphology, decoration, and technology of the sherds (José Quispe, personal communication, July 2015). Quispe also participated in the macroscopic sorting of pottery sherds from the middle Nepeña Valley collected during the PhD dissertation of Ikehara (2015). Quispe analyzed approximately 9,000 fragments from Caylán and categorized them into categories based on the texture, porosity, inclusions, size, roundness, sorting, and color of paste (Table 9). He also included a cursory classification based on the form of the vessel according to Ortiz and Ikehara's works. Quispe's work remains unpublished, but I was given access to his tables, images, and ware descriptions. I was able to revisit his classifications first hand by observing the wares he had classified as he had separated those into different bags.

In sum, my study builds upon the previous ceramic analyses at Caylán and in the Nepeña Valley to create a preliminary classification of pottery sherds based on their pastes. The basis for the analysis was influenced by previous macroscopic analyses at archaeological sites on the North Coast. The most significant analyses that have been done were at Cerro Blanco (Ikehara 2007) and Huambacho (Chicoine 2006a). More recent analyses have been done at Samanco (Helmer 2015). Ikehara’s study at Cerro Blanco has been the most thorough to date and as such was the basis for both Quispe’s analysis and my own.
CHAPTER 4
MATERIALS AND METHODS: ARCHAEOLOGICAL FIELDWORK AT CAYLÁN AND THE ANALYSIS OF THE CERAMIC ASSEMBLAGE

In this chapter, I present the goals and results of previous excavations and analyses that have been conducted at Caylán. These results contribute to the understanding of the contexts discussed in the following chapter as well as to the overall goals of the project. I then present the materials and methods I used in this ceramic analysis with my research questions and the limitations of my analysis.

4.1 Research Questions

In this investigation of the ceramic assemblage from Caylán, I aim to answer the following questions:

1. Are there visually different ceramic pastes at Caylán? Can ceramic pastes be classified based on technological choices tailored to production styles and vessel types?
2. Do paste groups represent distinct potters or communities of ceramic producers such as workshops? Did potters or groups of potters use the same materials in the production of their vessels?
3. How do ceramic pastes vary among the archaeological units and stratigraphic layers? Does sherd composition change through time? Do certain vessels or pastes appear in distinct contexts?
4. Is there evidence to suggest foreign wares? Are there minerals inclusions that differ from what is typically found near Caylán and in the Nepeña Valley more broadly?
5. What can the relationship between form and paste tell us about the use of raw materials in the production of ceramics? Are certain pastes reserved for a specific type of vessel? Is the material is used to produce a vessel an important factor or can they be interchanged?

4.2 Methods

4.2.1 Location and Basic Methodology

The first-hand analysis of materials was completed at the Museo Regional de Casma Max Uhle (Max Uhle Regional Museum of Casma) located at the Cerro Sechin archaeological complex in the Casma province of the Ancash region of Peru (Figures 16 and 17). This museum is the official depository for archaeological materials discovered in the Larcamarca, Nepeña, Casma, and Huarmey coastal valleys. Due to export regulations and the size of the ceramic collection to be examined (n=11,270 sherds), research took place directly at the museum.

Laboratory research was completed with the approval of a permit from the Ministry of Culture of Peru (Resolución Directoral: 008-2015-DGM-VMPCIC/MC). Ceramics were analyzed for five and a half weeks between June and August 2015. The research was funded in part by a Robert C. West Graduate Student Field Research Award from the Department of Geography and Anthropology at Louisiana State University. My research was completed with the help of David Chicoine, Daniel Nicholson, and José Quispe who each visited me at some point in Casma. I also hired a research assistant, Sintia Santisteban Barrantes of the Universidad Nacional de Trujillo, for two and a half weeks of my analysis.

Using macroscopic analysis, I categorized 11,270 pottery sherds from three units excavated at Caylán: Plaza-A, Mound-A, and Compound-E. My study extended Quispe’s analysis to a sample of ceramics from the excavation units, providing a more complete
variability of categories throughout the site. The ceramics investigated represent a sample of the total ceramic assemblage excavated to date by the PIAC. Approximately 48,000 sherds were documented from test pits and excavations during the 2009 and 2010 field seasons. Sixteen test pits were placed throughout the Caylán archaeological complex to sample different contexts including open air middens, streets, plazas, platforms, patios, and ridges (Chicoine and Ikehara 2009; 2014; Figure 7). Due to this distribution, the sample likely represents most of the ceramic diversity found at Caylán through both time and space.

The 11,270 sherds analyzed in my study consist of rim, body, and decorated sherds from the 2010 excavations of the Main Platform Complex (Unit 4-Terrace 2), Plaza-A (Unit 5, 5-Extension 3, 5-Extension 4), and Compound-E (Unit 6-Extension 3). My sample includes contexts of use, discard, and potential production. My analysis, in combination with Quispe’s analysis, provides a macroscopic view of 20,103 sherds, approximately 41% of the total ceramic assemblage of Caylán (n=48,837 sherds). The purpose of this sample, which could be used in conjunction with the classification of the test pits, is to understand the variability of the ceramic assemblage of Caylán. The combination of these analyses creates an overview of the ceramics used throughout the urban area of the site. Although the test pits were not systematically placed, their locations provide a representative sample of distinct contexts. In combination with the stratified block excavations, the majority of paste types likely are represented in the samples analyzed. Other paste types may exist in unexcavated areas of the site. However these pastes would not greatly change to the understanding of the ceramic pastes produced at Caylán during the Early Horizon.
4.2.2 Details of Analysis

In the Spring semester of 2015 I reviewed the work Quispe had done in 2013, especially photographs of the different ware types, paste descriptions, and distribution tables. I familiarized myself with his paste categories and later visually examined the sherds he had separated based on these categories. After revisiting Quispe’s analysis and classification, updated categories were developed to account for the characteristics of the paste observed in each sherd. Pastes were differentiated by texture, porosity, inclusions, size and shape of inclusions, sorting, and color. The size of inclusions was measured using the Wentworth scale and a size grain chart (Table 10).

It is important to note that Early Horizon wares at Caylán, and in Nepeña more generally, were exclusively tempered with mineral inclusions. These inclusions were likely locally available sands and crushed rock from the coastal desert landscape. Testing with hydrochloric acid did not reveal the presence of calcium, whether from shell remains and/or from limestone. This is especially significant considering the presence of white inclusions in Early Horizon sherds at Cerro Blanco, Huambacho, and Caylán. The testing of white inclusions was confirmed by microscopic examination, identifying them as quartzite inclusions.

The paste color for each ware was recorded as a range of shades using a Munsell color chart. Finally, photographs were taken of the surface and profiles samples of the each paste group with a DSLR camera with macro rings. A Dino Lite miniature digital microscope was used to take more detailed photos of each mineral inclusion identified.

Paste groups and ware groups were defined. Paste groups refer to the composition of sherds that have different inclusions, sizes, and sorting. Ware refers to a category based on the composition, firing, and surface treatment of pottery and ceramics (Rice 1987:5). Ware groups were based on the inclusions present, excluding size (Table 11). The ware typology used in my
The study was defined with the help of David Chicoine and Daniel Nicholson, a geoarchaeologist from the University of Texas at San Antonio. Nicholson has experience working with the geological composition of the Casma Valley and helped identify the mineralogical inclusions of the wares. The paste and ware groups were categorized with the additional reference to Ikehara’s 2007 undergraduate thesis and Druc’s 2015 *Atlas of Ceramic Pastes*.

Ceramics were examined macroscopically focusing on inclusions. Cross sections were photographed. The data were compiled in a database to identify the percentages of pastes in each unit. A magnifying glass, with x6 magnification, was used to examine the fabric of each pottery sherd. The pottery forms examined in this study were mainly fragments of containers used for storage, cooking, and serving. These forms are the most frequently recovered and provide the most information about interaction, chronology, and cultural worldviews due to their use in daily and ceremonial contexts.

Additionally, rim sherds were identified to vessel form. All rim sherds were drawn by members of the PIAC in the field during the 2009 and 2010 seasons. They have been scanned and processed with Adobe Illustrator by Chicoine and his team. Examination of the shape and size of rim sherds provides information about the form and function of a ceramic vessel. Rim sherds only represent a small percentage of the pottery sherds recovered in excavations. Therefore, when analyzing rim or body sherds, form and function are closely related. To relate form and function, an understanding of the ceramics produced during the Early Horizon period is needed.

The identification of vessel forms used during the Early Horizon follows Ortiz’s 2012 identification of ceramic rim sherds from Caylán. Storage vessels tend to be limited to large jars (*tinajas*) with or without necks, and some large jugs (*cántaros*). Processing vessels include pots
(ollas) with or without necks and grinding bowls (ralladores). Transfer vessels include bottles (botellas), jugs (cántaros), cups (tazones), plates (platos), and bowls (cuencos; Ortiz 2012; Figures 18-23). Each of these vessel forms could be produced in various sizes, technological, and styles.

Decorated fragments were identified by type of decoration. Upon the completion of the macroscopic analysis, descriptive statistics were compiled to demonstrate the frequency of pastes in each unit, at each level of excavation.

Correlations between vessel paste and shape based on identifiable rim sherds were identified. However this work should be elaborated to have a better understanding of the relation of vessels to the technological choices by potters.

The following chapter presents a description of the ware categories and paste groups identified in this analysis. Paste groups were identified based on the presence of distinctions in the types of inclusions observed. If inclusions presented distinct sizes, they were subgrouped using particle size classes defined with the Wentworth scale (Dincauze 2000:278; Table 10). At the Sechín museum laboratory the field, inclusions were sized using a grain size chart and a hierarchical tree was used to more easily group sherds based on presence or absence of inclusions (Figures 24 and 25).

Inclusions include quartzite (milky, clear, rose, citrine, light grey), diorite or basalt, mica (muscovite, biotite), plagioclase feldspar, hematite, epidote, and clay (Figure 26). My study focuses on the mineral inclusions either added to clay as temper, and/or present as impurities inside the clay minerals. The characterization of the clay and positive identification of minerals requires more detailed chemical analyses beyond the scope of this thesis. The size of particles identified ranged from gravel or granule (2.0-5.0 mm), very coarse (1.0-2.0 mm), coarse (0.5-1.0...
mm), medium (0.25-0.5 mm), to fine (0.125-0.25 mm). The separation of inclusions based on
size indicates a purposeful selection of inclusions based on the function of the vessel to be
produced. Sorting is a term used by archaeologists referring to how evenly dispersed inclusions
were throughout the paste of a sherd (Velde and Druc 1999). Sorting ranges from very good
(evenly dispersed inclusions throughout the paste) to poor (inclusions are grouped in one area of
the paste). Similar to size, sorting can indicate the purposeful selection and preference of
inclusions in a certain ware. Sorting can also be attributed to the thoroughness of the mixing of
clay and temper material during the preparation of materials.

A descriptive, statistical analysis of the recovered sherds is presented based on the results
of the macroscopic analysis. A percentage was calculated for each situation to demonstrate what
percentage of the total analyzed ceramic assemblage was represented in each desired analysis. In
some cases, various percentages were calculated using different factors to most thoroughly
represent the context.

Additionally, color was used to indicate firing techniques. Firing color was primarily
used to separate wares into probable Early Horizon (900-200 B. C. E.) and later Early
Intermediate Period (200 B. C. E.-600 C. E.) wares. Early Horizon wares ranged from dark
brown to dark orange or red pastes resulting from lower firing conditions, likely between 600 to
800ºC (Ikehara 2015; Rice 1987). Early Horizon wares are typically evenly fired and present
“fire-clouds” and “sandwich-like” sections, confirming that potters fired objects in bonfires with
little control over firing conditions, including temperatures and air flow. Early Intermediate
Period wares, especially the later paste associated with the Gallinazo and Moche styles, display a
consistent orange colored paste, suggesting that potters fired ceramics at a high temperature in a
better controlled, oxidized firing (Donnan 2004:38). Fine Early Intermediate Period wares are
also harder and vessel walls are typically thinner attesting to the better sorting and quality of ceramic pastes.

4.3 Limitations of Analysis

During the analysis described above, certain limitations were noted. Due to the fact that macroscopic analysis is a wholly visual analysis, lighting conditions must be constant. The conditions in which the analysis for this thesis was completed were not ideal. Because the analysis was completed in an outdoor, covered patio that did not have electric lights, the analysis relied completely on sunlight. Cloudy or cloudless days created an unstable light source varying daily and sometimes varying from morning to afternoon. The movement of the sun throughout the day also created an unstable source of light. During the morning, light angled directly onto the work table. During the afternoon, light angled to the opposite side of the patio, casting heavy shadows on the work area. As macroscopic analysis relies solely on the visual abilities of the investigator, the results of the analysis likely varied due to these changes in light conditions. Nevertheless, considering the large size of the sample and the length of the analysis (over five weeks), it is unlikely that variations in lighting affected the results in a significant manner.
CHAPTER 5
RESULTS: CERAMIC WARES AND THEIR DISTRIBUTION

Excavations at Caylán revealed 48,837 pottery sherds. In addition to fragments of vessels, approximately 1,100 remains of fired clay objects such as figurines, panpipes, spindle-whorls, and potter’s tools were identified. These categories of “other fired clay objects” were not considered in my analysis because they constitute non-container objects. My research analyzed a sample of 11,270 pottery sherds. This sample represents approximately 23% of the pottery sherds excavated at Caylán. In combination with the approximately 9,000 sherds identified by Quispe, approximately 42% of pottery fragments from Caylán have been analyzed. The analysis of these ceramics can, therefore, represents the majority, if not all, paste and ware groups present at Caylán.

After reviewing Quispe’s classifications and examining the pottery sherds, I distinguished 24 paste groups, which can be grouped into 14 ware groups. This difference is due to variation in analysis methods and personal ideas of the parameters defining each ware. Paste groups are based on the presence or absence of inclusions, size sorting, texture, porosity, and color of the fired clay. However, the proposed ware categories are based on identified inclusions, excluding size. The most common pastes are those with mixed sand and mica inclusions.

5.1 Ceramic Ware Descriptions

This section presents descriptions of ware groups based on their inclusions (Figure 27). Ware groups indicate distinct deposits of materials used by potters in the local and foreign areas. Wares are further subdivided into Paste Groups that differentiate between size, sorting, and color. These descriptions include Early Horizon and Early Intermediate wares. Early
Intermediate, Middle Horizon, and Later Intermediate Period wares are intrusive and post-Early Horizon occupation. Unless otherwise indicated, the wares discussed in this thesis are from the Early Horizon.

As mentioned above, the paste groups described below were defined and adapted from Quispe’s 2013 classification and in conjunction with geoarchaeologist Daniel Nicholson. Each ware was defined by the presence of certain inclusions as explained in the methods section of this thesis. Quantities and percentages listed below are approximate. Diorite and basalt are used to refer to a black mineral inclusion in the ceramic pastes. At this point, without more intensive analyses, we cannot identify the mineral. These minerals are located in the region, therefore, I hypothesize that the black mineral is either diorite or basalt.

The following descriptions include wares from the Early Horizon and Early Intermediate Periods. Early Horizon ware groups are present first, in order of the most frequently identified to the least frequently identified. Within each ware group, paste groups are described from the most fine to the most coarse inclusions.

In the following section (5.1.2), four intrusive Early Intermediate ware groups are described based on identification during excavations and on Quispe’s classifications. These ware groups were not included in the formal analysis presented in this thesis.

5.1.1 Early Horizon Ware Groups

5.1.1.1 Ware Group 6: Mixed Inclusions with Mica

This ware group, the most common at Caylán, is identified by mixed sand inclusions composed of clear, milky, rose, and citrine quartzite, diorite or basalt, muscovite and biotite mica, with occasional hematite and epidote. The ware group is
divided into four paste groups based on the size of the inclusions, ranging from fine, to
medium, to coarse, and very coarse. The pastes in this ware group ranged in color from
dark reddish brown (2.5 YR 3/4) to light grey (10 YR 7/2). Ware Group 6 is the most
identified group, representing 83.66% of the total analyzed assemblage (n=9,428 sherds).
Ware Group 6 is associated with bottles, jugs, bowls, figurines, necked and neckless pots,
plates, graters, and jars. Associated decorations include high relief, pre- and post-fired
paint, impression, zoned impression, textile impression, incision, zoned incision,
punctuation, modeling, molding, stamped circle and dot, stamped circle, net impressed,
and post-firing incision.

Paste Group M: The temper of this paste consists of a mixed sand of quartzite (clear,
milky, rose, citrine), diorite or basalt, and mica (muscovite) particles. Coarse inclusions
account for less than 3%, medium inclusions account for 10%, and fine inclusions
account for 40% of the total inclusions in a sherd. Inclusions are present in 5% of the
observable surface. The clay is sandy, fine, semicompact, and with good sorting of
inclusions. On average, sherds are 0.5cm in thickness, which is consistently thinner and
finer than other wares of this composition. This paste was identified in 2.29% of the
analyzed assemblage (n=258 sherds).

Paste Group E: The temper of this paste consists of a mixed sand of quartzite (clear,
milky, rose, citrine), diorite or basalt, and mica (biotite) particles. Coarse inclusions
account for 10%, medium inclusions account for 30%, and fine inclusions account for
30% of the total inclusions in a sherd. Very coarse inclusions account for less than 3% of
the total inclusions. The clay is silty, semiporous, and with good sorting of inclusions. This paste was identified in 18.01% of the analyzed assemblage (n=2030 sherds).

Paste Group D: The temper of this paste consists of a mixed sand of quartzite (clear, milky, rose, citrine), diorite or basalt, and mica (muscovite and biotite) with occasional hematite and epidote particles. Very coarse inclusions account for less than 3%, coarse inclusions account for 40%, medium inclusions account for 10%, and fine inclusions account for 30% of the total inclusions in a sherd. Gravel inclusions and plagioclase account for less than 1% of the total inclusions in select sherds. The clay is silty, semicompact, and with good sorting of inclusions. This was the most common paste identified. This paste was identified in 46.27% of the analyzed assemblage (n=5215 sherds).

Paste Group C: The temper of this paste consists of a mixed sand of quartzite (clear, milky, rose, citrine), diorite or basalt, and mica (muscovite and biotite) with occasional hematite and epidote particles. Very coarse inclusions account for approximately 30%, coarse inclusions account for 40%, medium inclusions account for 30%, and fine inclusions account for 10% of the total inclusions in a sherd. Gravel inclusions account for less than 5% of the total inclusions, and are present in approximately 5% of the total C sherds. The clay is sandy, compact, semiporous, and had medium-well sorted inclusions. On average, sherds are 0.5-1cm in thickness, which is consistently thicker than other wares of this composition. This paste was identified in 17.08% of the analyzed assemblage (n=1925 sherds).
5.1.1.2 Ware Group 8: Quartzite with Mica

This ware group is identified by clear, milky, rose, and citrine quartzite, and muscovite or biotite mica inclusions. The ware group was divided into two paste groups based on the size of the inclusions, fine and coarse. The pastes in this ware group ranged in color from red (2.5 YR 5/6) to grey (10 YR 5/1). Ware Group 8 represents 6.40% of the total analyzed assemblage (n=721 sherds). Ware Group 8 is associated with bottles, jugs, bowls, neckless pots, and jars. Associated decorations include high relief, zoned impression, textile impression, incision, modeling, and a possible slip.

Paste Group B: The temper of this paste consists of quartzite (typically clear and milky) and mica (muscovite or biotite used exclusively). These inclusions are fine. Mixed sand or other inclusions may be present in less than 5% of total inclusions. The clay is silty, semiporous, and with a medium sorting of inclusions. This paste was identified in 1.93% of the analyzed assemblage (n=218 sherds).

Paste Group F: The temper of this paste consists of quartzite (typically clear and milky) and mica (muscovite or biotite used exclusively). These inclusions are coarse. Mixed sand or other inclusions may be present in less than 5% of total inclusions. The clay is silty, semiporous, and with a medium sorting of inclusions. This paste was identified in 4.46% of the analyzed assemblage (n=503 sherds).
5.1.1.3 Ware Group 10: Mixed Inclusions with Mica in a Black Paste

This ware group is identified by an oxidized paste and almost unidentifiable mixed sand inclusions composed of quartzite, diorite or basalt, and muscovite and biotite mica. The ware group includes one paste group due to an inability to identify inclusion size variation. The pastes in this ware group ranged in color from very dark grey (2.5 YR 3/1) to very dark grey (7.5 YR 3/1). Ware Group 10 represents 1.88% of the total analyzed assemblage (n=212 sherds). Ware Group 10 is associated with a small number of neckless pots. No decoration was associated with this ware.

Paste Group N: This ware has a black or dark grey paste. It was likely fired in a reduced atmosphere. The temper of this paste is mixed sand of quartzite (clear and milky), diorite or basalt, and mica (muscovite and biotite) particles. Inclusions are present in 5% of the observable surface. The clay is silty, semiporous, and with poor sorting. This paste was identified in 1.88% of the analyzed assemblage (n=212 sherds).

5.1.1.4 Ware Group 9: Mixed Inclusions with Feldspar and Mica

This ware group is identified by mixed sand inclusions composed of clear, milky, rose, and citrine quartzite, diorite or basalt, muscovite and biotite mica, and plagioclase feldspar. The ware group includes one paste group due to a lack in the variation of inclusion size. Ware Group 9 represents 1.67% of the total analyzed assemblage (n=188 sherds). Ware Group 9 is associated with bottles, jugs, necked and neckless pots, graters, and jars. Associated decorations include textile impression, incision, modeling, and stamped circle and dot.
Paste Group X: The temper of this paste consists of a mixed sand of quartzite (clear or milky) diorite or basalt, mica (muscovite and biotite), and plagioclase feldspar passing 5% of total inclusions. The clay is silty, semiporous, and has poorly sorted inclusions. This paste was identified in 1.67% of the analyzed assemblage (n=188 sherds).

5.1.1.5 Ware Group 3: Quartzite Inclusions

This ware group is identified by clear, milky, rose, citrine quartzite inclusions. The ware group is divided into two paste groups based on the size of the inclusions, fine and coarse. The pastes in this ware group ranged in color from very dusky red (2.5 YR 2.5/2) to grey (7.5 YR 5/1). Ware Group 3 represents 1.46% of the total analyzed assemblage (n=165 sherds). Ware Group 3 is associated with small quantities of bottles, bowls, and neckless pots. There are no decorations associated with this ware.

Paste Group I: The temper of this paste is quartzite (typically clear and milky). These inclusions are fine. Mixed sand or other inclusions may be present in less than 5% of the total inclusions. The clay is sandy, semiporous, and with good sorting. This paste group was identified in 0.56% of the analyzed assemblage (n=63 sherds).

Paste Group P: The temper of this paste is quartzite (typically clear and milky). These inclusions are coarse. Mixed sand or other inclusions may be present in less than 5% of the total inclusions. The clay is sandy, semiporous, and with good sorting. This paste group was identified in 0.91% of the analyzed assemblage (n=102 sherds).
5.1.1.6 Ware Group 2: Diorite/Basalt Inclusions

This ware group is identified by diorite or basalt inclusions. The ware group is divided into two paste groups based on the size of the inclusions, coarse and very coarse. The pastes in this ware group ranged from reddish brown (2.5 YR 4/4) to 5 R 8/2 pink to brown (7.5 YR 5/4). Ware Group 2 represents 1.32% of the total analyzed assemblage (n=149 sherds). Ware Group 2 is associated with jugs, figurines, and neckless pots. One figurine fragment exhibited possible molding.

Paste Group K: The temper of this paste is black diorite or basalt. These inclusions are very coarse. Mixed sand or other inclusions may be present in less than 5% of the total inclusions. The clay is sandy, compact, and with medium sorting. This paste group was identified in 0.46% of the analyzed assemblage (n=52 sherds).

Paste Group L: The temper of this paste is black diorite or basalt. These inclusions are coarse. Mixed sand or other inclusions may be present in less than 5% of the total inclusions. The clay is sandy, compact, and with medium sorting. This paste group was identified in 0.86% of the analyzed assemblage (n=97 sherds).

5.1.1.7 Ware Group 1: Mixed Inclusions

This ware group is identified by mixed sand inclusions composed of clear, milky, rose, and citrine quartzite, diorite or basalt, and occasional hematite. The ware group is divided into four paste groups based on the size of the inclusions, ranging from fine, to medium, to coarse, and very coarse. The pastes in this ware group ranged in color from
reddish brown (2.5 YR 5/4) to brown (7.5 YR 5/4). Ware Group 1 represents 1.31% of the total analyzed assemblage (n=148 sherds). Ware Group 1 is associated with bottles, jugs, bowls, and necked pots. Associated decorations include pre-fired paint, textile impression, incision, modeling, and net impression.

Paste Group W: The temper of this paste consists of a mixed sand of quartzite (clear, milky, rose, citrine) and diorite or basalt. Coarse inclusions account for less than 3%, medium inclusions account for 10%, and fine inclusions account for 40% of the total inclusions in a sherd. Inclusions are present in 5% of the observable surface. The clay is sandy, fine, semicompact, and with good sorting of inclusions. This paste was identified in 0.18% of the ceramic analyzed assemblage (n=20 sherds).

Paste Group V: The temper of this paste consists of a mixed sand of quartzite (clear, milky, rose, citrine) and diorite or basalt. Coarse inclusions account for 10%, medium inclusions account for 30%, and fine inclusions account for 30% of the total inclusions in a sherd. Very coarse inclusions account for less than 3% of the total inclusions. The clay is silty, semiporous, and with good sorting of inclusions. This paste was identified in 0.3% of the analyzed assemblage (n=34 sherds).

Paste Group U: The temper of this paste consists of a mixed sand of quartzite (clear, milky, rose, citrine) and diorite or basalt, with occasional hematite and epidote particles. Very coarse inclusions account for less than 3%, coarse inclusions account for 40%, medium inclusions account for 10%, and fine inclusions account for 30% of the total
inclusions in a sherd. Gravel inclusions and plagioclase account for less than 1% of the total inclusions in select sherds. The clay is silty, semicompact, and with good sorting of inclusions. This paste was identified in 0.36% of the analyzed assemblage (n=41 sherds).

Paste Group O: The temper of this paste consists of a mixed sand of quartzite (clear, milky, rose, citrine) and diorite or basalt with occasional hematite and epidote particles. Very coarse inclusions account for approximately 30%, coarse inclusions account for 40%, medium inclusions account for 30%, and fine inclusions account for 10% of the total inclusions in a sherd. Gravel inclusions account for less than 5% of the total inclusions, and are present in approximately 5% of the total O sherds. The clay is sandy, compact, semiporous, and had medium sorted inclusions. This paste was identified in 0.47% of the analyzed assemblage (n=53 sherds).

5.1.1.8 Ware Group 7: Diorite/Basalt Inclusions with Mica

This ware group is identified by diorite or basalt and muscovite mica inclusions. The ware group includes one paste group due to a lack of variation in inclusion size. Ware Group 7 represents 1.22% of the total analyzed assemblage (n=128 sherds). Ware Group 7 is associated with jugs, neckless pots, plates, and jars. Associated decorations include impressions and textile impressions.

Paste Group T: The temper of this paste is black diorite or basalt and mica (muscovite). The inclusions range from medium to very coarse. Mixed sand or feldspar may be present in less than 5% of the total inclusions. The clay is silty, compact, with medium sorting,
and is orange. This paste was identified in 1.22% of the analyzed assemblage (n=128 sherds).

5.1.1.9 Ware Group 5: Mixed Inclusions in a Black Paste

This ware group is identified by an oxidized paste and almost unidentifiable mixed sand inclusions composed of quartzite and diorite or basalt. The ware group includes one paste group due to an inability to identify inclusion size variation. The pastes in this ware group ranged in color from dark reddish brown (2.5 YR 4/1) to very dark grey (10 YR 3/1). Ware Group 5 represents 0.28% of the total analyzed assemblage (n=32 sherds). Ware Group 5 could not be associated with any vessel shape. There are no decorations associated with this ware.

Paste Group J: This ware has a black or dark grey paste. It was likely fired in a reduced atmosphere. The temper of this paste is mixed sand of quartzite (clear, milky, rose, citrine) and diorite or basalt. The clay is fine, compact, and with good sorting. This paste was identified in 0.28% of the analyzed assemblage (n=32 sherds).

5.1.1.10 Ware Group 4: Mixed Inclusions with Feldspar

This ware group is identified by mixed sand inclusions composed of clear, milky, rose, and citrine quartzite, diorite or basalt, and plagioclase feldspar. The ware group includes one paste group due to a lack in the variation of inclusion size. The pastes in this ware group ranged in color from red (2.5 YR 5/6) to brown (7.5 YR 4/3). Ware Group 4
represents 0.37% of the total analyzed assemblage (n=42 sherds). Ware Group 4 could not be associated with any vessel shape. One textile impressed fragment was identified.

Paste Group A: The temper of this paste consists of a mixed sand of quartzite and diorite or basalt particles as well as quantities of plagioclase feldspar passing 5% of total inclusions. The clay is silty, semiporous, and has poorly sorted inclusions. This paste group was identified in 0.37% of the analyzed assemblage (n=42 sherds).

In sum, the most common ware group I identified in the sample was Ware Group 6 consisting of 83.66% of the total analyzed ceramic assemblage. Ware Group 8 followed with 6.4% of the assemblage. The most frequent paste identified is D (46.3%), followed by E (18%), C (17.1%), F (4.5%), and M (2.3%) (Figures 27, 28, and Table 12). Excluding Ware Groups 6, 8, and 9, too few rim sherds were identified to create a conclusive view of related vessel forms and decorations.

5.1.2 Intrusive Ware Groups

The following intrusive ware groups were identified in the field from the context or in the laboratory due to the beige or orange paste indicating a distinct firing temperature and atmosphere from the Early Horizon wares. The post-Early Horizon wares displayed very low frequencies in the excavation units. Descriptions are, therefore, largely based on Quispe’s analysis of these wares from test units. This observation is consistent with the assumption that most of the ware types present at Caylán would be present in the test units. These intrusive wares are excluded from the rest of this thesis due to the minimal quantities of sherds recovered. However, I present brief descriptions below.
5.1.2.1 Ware Group 11: Intrusive Wares with Mixed Inclusions

This ware group is identified by mixed sand inclusions composed of clear, milky, rose, and citrine quartzite, and diorite or basalt. The ware group is divided into two paste groups based on the size of the inclusions, ranging from fine to very coarse. The pastes in this ware group ranged in color from beige to orange. Ware Group 11 represents 0.26% of the total analyzed assemblage (n=29 sherds).

Paste Group R: This paste is an intrusive Early Intermediate Period paste present in very small quantities (0.1% of my study, n=11) at Caylán. The temper of this paste consists of mixed sand inclusions of quartzite (clear and milky), diorite or basalt. Gravel inclusions may account for 5% of the total inclusions. The clay is compact with good sorting, and is orange or beige.

Paste Group S: This paste is an intrusive Late Intermediate Period paste present in small quantities (0.16% of my study, n=18) at the site. The temper of this paste consists of mixed sand inclusions of quartzite (clear and milky), diorite or basalt. The clay is compact with good sorting, and is orange or beige.

5.1.2.2 Ware Group 12: Intrusive Wares with No Inclusions

Paste Group Q: This paste is an intrusive Early Intermediate Period paste present in small quantities (0.13% of my study, n=15). There is no observable temper added to the clay of this paste. Any inclusions are very fine and are distributed in less than 2% of the
observable surface of the sherd. The clay is very fine, semicompact, with very good sorting, and is orange.

5.1.2.3 Ware Group 13: Intrusive Wares with Very Fine Inclusions with Mica
Paste Group G: This paste is an intrusive Early Intermediate Period paste present in very small quantities (0.03%, n=3). The temper of this paste consists of mixed sand inclusions and mica. These inclusions are very fine and are distributed in less than 10% of the observable surface of the sherd. The clay is very fine, compact, with good sorting, and is orange.

5.1.2.4 Ware Group 14: Intrusive Wares with Very Fine Inclusions
Paste Group H: This paste is an intrusive Late Intermediate Period paste that was not identified in my study. However Quispe identified paste H sparingly (personal communications, July 2015). The temper of this paste consists of very fine mixed sand distributed in less than 10% of the observed surface. The clay is very fine, compact, with very good sorting, and is orange.

5.2 Correlation of Wares to other North-Central Coast Wares

The wares presented above can be generally compared to previous ceramic analyses on the north-central coast, such as by Strong and Evans (1952), Chicoine (2006), and Ikehara (2007). The wares I identify and those identified by other researchers do not completely match, however. General descriptions are compared based on similarities. The following wares are presented in numerical order.
Ware Group 1 with its well-sorted fine to coarse mixed sand inclusions and reddish-brown to brown color can be compared to Huambacho Ware D (Chicoine 2006a) and Cerro Blanco Paste H, although Ware Group 1 may also correspond to Cerro Blanco Pastes C, D, or F (Ikehara 2007).

Ware Group 2 is identified by its coarse to very coarse black diorite or basalt inclusions in a reddish-brown to pink paste. There is not a ware with which it can be directly compared at this moment.

Ware Group 3 is identified by its fine to coarse quartzite inclusions in a dusky red to grey paste. This group can be compared to a finer version of Cerro Blanco Paste L (Ikehara 2007).

Ware Group 4 is identified by its mixed sand with feldspar in a red to brown paste. Although not exact, this ware can be compared to Cerro Blanco Paste A or D, excluding the mica inclusions (Ikehara 2007).

Ware Group 5 is identified by its fine, mixed inclusions in a dark grey paste. Ware 5 can be compared to Tomoval Plain (Strong and Evans 1952), Huambacho Ware C (Chicoine 2006a) and Cerro Blanco Paste F, excluding the mica (Ikehara 2007).

Ware Group 6 is identified by its fine to very coarse mixed inclusions with mica in a dark reddish-brown to light grey paste. Ware 6 can be compared to Guañape Black, Red, and Coarse Wares (Strong and Evans 1952), Huambacho Wares C and E (Chicoine 2006a), and Cerro Blanco Pastes B, C, E, F, and H (Ikehara 2007).

Ware Group 7 is identified by its black diorite or basalt and mica inclusions in a pale orange paste. Ware 7 can be compared to Cerro Blanco Paste C (Ikehara 2007).
Ware Group 8 is identified by fine and coarse quartzite and mica inclusions in a red to grey paste. Ware 8 can be compared to Huambacho Ware E (Chicoine 2006a) and Cerro Blanco Paste B (Ikehara 2007).

Ware Group 9 with its poorly sorted mixed sand, mica, and feldspar inclusions can be compared to Cerro Blanco Paste A (Ikehara 2007).

Ware Group 10 is identified by mixed inclusions with mica in a black or dark grey oxidized paste. Ware 10 can be compared to Tomoval Plain (Strong and Evans 1952), Huambacho Ware D (Chicoine 2006a), and Cerro Blanco Paste G (Ikehara 2007).

5.3 Correlation of Ware to Vessel Shape

Using as a base the 2012 analysis of Ortiz, in the following section I identify vessel forms based on rim sherds and correlate them with the wares identified. Ortiz analyzed diagnostic ceramic vessel forms through the analysis of rim sherds excavated from Caylán’s Compound-E. In this case, “diagnostic” refers to the fact that the ceramic rim fragment allows the researcher to identify the vessel form or corresponding time period. Large body sherds with significant features to identify the vessel form are also included in this analysis. The vessel forms defined are: tazón (cup), cuenco (bowl), botella (bottle), cántaro (jug), olla con cuello (occ; pot with a neck); olla (pot with unidentifiable neck), olla sin cuello (osc; neckless pot), and tinaja (large storage jars), and figurine fragments (Ortiz 2012:102-110; Figures 18-23). Ortiz further breaks down these vessels by size, shape, and other specific characteristics. Unidentified forms were named using Quispe’s terminology of closed vessel (cv), indicating an unknown olla, cántaro, or tinaja. Desconocido (unknown) indicates a generally unknown or unidentified form due to the size of the rim.
5.3.1 Function of Vessels Based on Form

During the analysis of rim sherds and previous analyses (Chicoine 2006a, 2007, Ortiz 2012), I identify eight definitive types of vessels. Open vessels (bowls, plates, and graters) and closed, or restricted, vessels (bottles, jugs, necked and neckless pots, and jars) were distinguished by the angle of the opening of the vessel.

Plates are open serving vessels with straight walls and a convex base. Bowls are open vessels with curved walls and a convex base used in service (Ortiz 2012:102-3). Graters are open vessels with thick, curved walls and a scored interior used to process foodstuffs. Bottles are closed serving vessel where the height of the neck is two or three times larger than the opening (Ortiz 2012:105). Jugs are closed serving vessels with a globular body with a neck measuring less than half the mouth separating the mouth from the body (Ortiz 2012:106). Neckless pots are partially closed utilitarian vessels used for the processing of food and liquids. These pots have a globular body with a mouth measuring less than half the diameter of the body, without a neck (Ortiz 2012:108). Necked pots are used for the same function, however a neck or thick lip separates the mouth from the body. Jars are partially closed utilitarian vessels used for the storage of dry or liquid goods (Ortiz 2012:110). Jars are large in size and are typically partially buried in the ground to make them stand upright.

5.3.2 Vessel Form by Unit

My analysis was organized by the frequency of a vessel form within a unit and the frequency of paste for each vessel form. Analysis by unit and paste allowed me to understand the distribution of wares throughout the site and make a correlation between paste and vessel form.
This analysis will contribute to PIAC's understanding of the function of each compound and which wares may be of local origin.

Unit 4 – Terrace 2
A total of 156 identifiable rim and body sherds was recovered from Unit 4 Terrace 2. The vessel forms identified are as follows: bottle 16 (10%), jug 27 (17%), bowl 9 (6%), unknown 11 (7%), necked pot 6 (4%), neckless pot 75 (48%), plate 5 (3%), grater 2 (1%), and jar 5 (3%; Figure 29). Cooking vessels represent the majority of the rims, followed by jugs and bottles for serving.

Unit 5, Extension 3, Extension 4
A total of 224 identifiable rim and body sherds was recovered from Unit 5 and its extensions 3 and 4. Vessel forms identified were: bottle 5 (2%), jug 92 (41%), bowl 9 (4%), closed vessel 2 (1%), unknown 8 (3%), figurine 2 (1%), necked pot 11 (5%), neckless pot 85 (38%), grater 4 (2%), and jar 6 (2.5%; Figure 30). Throughout Unit 5, jugs represent more than half of the vessels, followed by cooking and vessels.

Unit 6 – Extension 3
A total of 103 identifiable rim and body sherds were identified in Unit 6 – Extension 3. Vessel forms identified were: jug 32 (31%), bowl 3 (3%), unknown 1 (1%) necked pot 2 (2%), neckless pot 61 (59%), plate 1 (1%), and jar 3 (3%; Figure 31). Cooking vessels represent more than half of the identified sherds, followed by jugs.

Considering the 499 diagnostic rim and body sherds identified, the most frequently-occurring vessel form was neckless cooking pots. In all units, except in Unit 5, neckless pots
accounted for more than one-third of all diagnostic sherds. Following pots, jugs accounted for between one-fourth and one-half of the vessels in each unit. While neckless pots were the most frequently identified vessels, jugs were the only vessel form consistently present throughout all five units examined (Figure 32). Other forms were identified in 10% or less.

5.3.3 Vessel Form by Paste

The following analysis compares the vessel shapes identified (bottles, bowls, cups, plates, jars, jugs, necked and neckless pots, described in section 5.3) with the pastes used in their elaboration. This analysis only considered rim sherds that could be associated with specific vessel shapes (n=430) to ensure the most accurate representation of the correlation between vessel form and ware.

Neckless pots and jugs were the most frequently identified vessel form. Considering these vessel forms, neckless pots were made with the most variety of mineral inclusions. Pots were made with the most diverse pastes, 12 pastes or 7 wares. Jugs were made with 11 pastes, or 6 wares. Necked pots, on the other hand, had the lowest paste diversity, only represented by three ware groups. All identified vessels, however, used Ware Group 6 in the production of vessels. Ware Groups 4 and 5 were not identified in relation to the most commonly identified vessel forms.

Pastes D (42.79%), C (21.63%), and E (13.95%) were the most widely documented, all from Ware Group 6. Paste D is most frequently associated with all types of pots and jugs. Paste C appears to be the most versatile paste since it is associated with every vessel type excluding graters (bottle, jug, bowl, closed vessel, unknown, necked pot, pot, neckless pot, plate, and jar). Infrequent pastes include F (6.51%; Ware Group 8), M (3.02%; Ware Group 6), and X (4.88%;
Ware Group 9). The majority of pastes (A, B, I, J, K, L, N, O, P, T, U, V, W) represent 1 percent or less of the identifiable rim sherds (Figures 33, 34, 35, and 36).

5.3.4 Residue

Within the three excavation units, I also identified 49 body sherds that had organic material remains on the interior or exterior surface of a vessel. Two fragments had burned organic material on the exterior surface (Ware Groups 5 and 8). Forty-two fragments had multiple layers of yellow organic material on the interior surface; the color ranged from 10YR 6/3 to 10YR 7/4 (Ware Groups 3, 5, 6, 7, 8; includes four fragments of the same jug). Two fragments had yellow organic material on well-oxidized ceramics (Ware Group 6). One bowl fragment had white organic material on the interior surface (Ware Group 8). One fragment presented a blue-black burned organic material on the interior surface, however no ash or burning was present on the exterior surface (Ware Group 6). Finally, one grater fragment had organic remains, possibly maize, embedded in the grater scores (Ware Group 6). The presence of organic remains on these vessels indicates were likely used in the production of liquids, soups, and stews. The multiple layers of organic material suggest that liquids were repeatedly contained within the vessel, creating the deposits. Burned material suggests the vessel was used for cooking foodstuffs in the ash of a fire.

Metal slag was identified on a small number of fragments (n=6) in Ware Group 6. These vessels were likely heated near copper, gold, or silver artifacts, or metals were heated within them. Further analyses will be needed to positively identify the function of vessels and the remains reported in them.
This section only presents a cursory analysis of residual elements. Residue analysis (e.g. starch) will need to be completed before more can be inferred by the function of containers.

5.4 Surface Finish and Decoration Present on Ceramic Vessels

After the pastes were composed, the vessels were formed, and hardened, surface finishes and decorations were added as both techniques adding to the structural soundness of the vessel and as decorative elements. Different types of surface finishes were applied to the vessels during the manufacture process, before firing. Surface treatments applied to the vessels examined included smoothing, burnishing, and polishing. Decorative techniques applied after the surface treatments included incision, perforation, punctation, impression, appliqué, and paint. Separate artisans than those who produced the vessels may have applied the decorations. Other finishes used to shape the vessel before it was finished likely included paddle and anvil techniques as well as thinning. These finishes for shaping and decorating would have occurred when the pot has been dried to a leather hard state meaning the clay was not as flexible as when it was shaped, but the clay is still malleable (Sinopoli 1991:23).

5.4.1 Surface Finish

In order to note the surface finish of non-decorated vessels, we recorded sherds that exhibited intentional modifications to the exterior that were not intended as decorative elements (n=1835). These types of modifications included smoothing, burnishing, polishing, brushing, and textile pressing on the surface. The percentage of the surface that was burnished or polished was estimated and recorded based on approximations from the front of the Munsell Soil Color Book. The majority of burnished fragments exhibited lineal burnishing, typically parallel but sometimes
crossing. Fragments with 50% or less of the surface burnished were considered to have
“incomplete” burnishing. Fragments with 60% or more burnishing were considered to have
“thorough” burnishing. Approximately 95% of the sherds recorded with non-decorative surface
finishes were burnished. Of the burnished sherds, 71% were incompletely burnished and 29% were thoroughly burnished. Of the total burnished sherds, 99% of the sherds exhibited lineal burnishing. One percent exhibited a cross-hatch burnishing pattern. A small number of sherds had burnishing that was irregular; the lines were stuttered as if the vessel being burnished were moving quickly, as if on a potter’s wheel. The result looks like rocking patterns. Although ancient Peruvian potters did not have the potter’s wheel, in other regions, a round-based bowl was used to slowly spin vessels as they were formed (pottery demonstration in the Taller de Cerámica Emilia 2015; Ramón 2008). These discs are commonly called platos de alfareros in the Andes.

Smoothed, polished, and brushed vessels were noted with much less frequency. Two fragments were recorded as smoothed. Vessels were likely smoothed with more frequency than noted during this analysis. A total of 26 potsherds were polished; more than 80% of the sherds were polished blackware. One sherd had a surface that had thin, impressed parallel lines throughout the surface as if the surface had been brushed with a small brush or other tool. We also noted pottery with a finish textured by what seemed to be a crumpled textile. Sixty-nine potsherds (3.76% of the 1835 finished sherds) presented this finish. It is unknown whether this finish was the result of textile being laid over wet clay as shaped pots to more evenly dry them or if the marks of textiles were an intentional finish.

The majority of these surface finishes were present on Ware Groups 6, 10, 7, and 9. The other ware groups (4, 8, 3, 5, 2, and 1) had lower frequencies of finishes (Figure 37). The data
suggest that these types of finishes might have strengthened pots that would be repeatedly heated and cooled by compacting the surface.

5.4.2 Decoration

Decoration techniques that were considered intentional included high relief, various colors of pre- and post-firing paint, impressions, incisions, modeling, molding, perforation, slips, and added elements such as false handles. The most frequent decorative technique was incision, followed by paint, impression, modeling, molds, slip, high relief, and perforation (Figures 38 and 39). About 1/3 of the decorated fragments, techniques were combined to accentuate the design. In most cases, a design was delimited using incisions. Ware Group 6 was the most frequently decorated, followed by groups 8, 9, 1, 7, 2, and 4. Decoration was not identified in Ware Groups 3, 5, and 10.

The above decorative techniques were combined in different ways to create the most common decorative designs that are identifiable as Early Horizon designs. Decorative designs identified during this study include, but are not limited to, parallel lineal incisions, circular punctation, oval punctation, zoned punctation delimited by lineal incisions, textile impression, zoned textile impression, stamped circle and dot designs, and Patazca-style white on red painting delimited by lineal incisions. Although not as frequently identified in this study, designs also included lineal patterned burnishing, appliqués or high reliefs, and net impression like those found at San Diego in the Casma Valley (Pozorski and Pozorski 1987).

In the case of decorative finishes such as incising, we know that the incisions were made in a leather hard state because incisions made when the clay is wet the tool displaces amounts clay (Henderson 2001:123). When incisions are made on leather hard, dried pottery, less clay is
displaced, resulting in a smoother design. Of the ceramics examined, graters seemed to be incised while the clay was wet. All other incised designs on the surface of other vessels were likely made when the clay had dried to a leather hard state. One fragment exhibited incisions made after the vessel was fired, as noted by the shallow scratches present on the surface that slightly chipped away some of the clay while the incisions were being made. This decoration was recorded as a probable case of graffiti.

5.5 Description of Pottery Sherds in Stratified Contexts

Samples of the ceramic assemblage were taken from excavation units 4, 5, and 6. Ware Groups 6 and 8 were distributed throughout the excavation units observed. Ware Group 5 was the least common and was only identified in Excavation Unit 4. Ware Group 4 was the second least common and was only present in units 4, 5, and 5-Ext3.

Each excavation unit (UE4-T2, UE5, UE5-Ext3, UE5-EXT4, and UE6-Ext3) was analyzed to better understand the use of wares through time and space. Descriptions of the stratigraphy of each unit as well of charts presenting ceramic distribution are presented in Appendix 1.

Variation in ceramic wares and composition can be identified in different stratigraphic layers and different sectors of the site.

5.5.1 Montículo Principal

At the Montículo Principal, excavations on Terrace 2 (UE4-T2), the majority of sherds came from a thick layer of construction fill during renovation of the mound. These data can be viewed in Table 13. Radiocarbon dates taken from contexts in the mound date the occupation
between 733 B.C.E. and 20 C.E. (Chicoine and Ikehara 2014). The earliest of the four strata excavated revealed only three wares, Ware Group 6 (n=134), Ware Group 8 (n=3), and Ware Group 9 (n=6). In this stratum, Ware Group 6 was the most common. The third stratum revealed the same wares, in lower quantities: Ware Group 6 (n=10), Ware Group 8 (n=2), Ware Group 9 (n=2). Stratum 2 revealed the largest quantity of pottery sherds as well as the most diversity. Associated wares in order of decreasing quantity are: Wares 6, 8, 3, 10, 2, 1, 9, 7, 4, and 5. Stratum 1 demonstrated a similar diversity, but in much lower quantities. Associated wares in order of decreasing quantity are: Wares Groups 6, 8, 10, 1, 7, 3, 2, 9, and 4.

As demonstrated, the earliest strata demonstrate the least variety of wares. The later strata demonstrate a boom in the wares present. As strata correspond to both arbitrarily excavated levels and natural strata based on occupation events, it is unclear if they certain strata represent distinct events. For example, construction may have begun when a there was a limited variety of ceramic wares and was finished after an increase in ceramic diversity. High quantities of wares not frequently associated with the other two excavation contexts imply that certain ware groups (1, 2, 3, 4, and 5) may be associated with ritualized use. Although they are associated with other contexts, the low frequencies suggest they were not widely used. Another possibility is that certain individuals from Caylán began the construction using ceramics from their compound as a construction fill. The increase in ware diversity could be attributed to an increase in the number of individuals partaking in the construction, adding pottery sherds from distinct households of Caylán.
5.5.2 Plaza-A

At Plaza-A, excavation unit 5 and its extensions 3 and 4 were sampled for this analysis. The strata in the plaza correspond to construction fills, floors, collapsed walls, and alluvial deposits. Radiocarbon dates taken from contexts in the plaza date the occupation between 518 B. C. E. and 232 B. C. E. (Chicoine and Ikehara 2014). Similar to the Montículo Principal, the earliest strata excavated in Plaza-A were associated with Wares Group 6, Ware Group 8, and Ware Group 9 with occasional Ware Group 7 fragments (Table 14). This composition of wares stays rather consistent throughout the strata. Small quantities of Ware Groups 1, 2, 3, 4, and 10 are identified with no apparent pattern. Of these wares, Ware Groups 10 is the most consistently present. Ware 10 appears in two to five consecutive strata, then disappears for a few strata, then appears again. Ware 6 appears in all strata throughout the three units. Ware 8 appears in all strata in Extension 3. However, Ware 8 is not as consistent in the other units.

Due to the interpretation of Plaza-A as the public space for a large residential compound, the deposition of ceramics in the plaza is likely the result of discard by the residents and their guests during feasting events. The ubiquity of Ware 6 throughout all contexts, including on floors suggests that this ware was potentially produced in this compound. The presence of other ware groups in this plaza appear in low quantities. The low presence of certain wares could suggest pottery produced by other individuals, possibly as the result of trading activities. The greatest variety of wares occurs in construction fills, suggesting that debris was possibly collected from neighboring areas to rapidly fill areas for construction. In the majority of strata, there is a distinct lack of ware groups 1, 2, 3, 4, and 5. Helmer and colleagues (Helmer 2011; Helmer et al. 2012) have proposed that Plaza-A was the venue for public festivities. This hypothesis was formed due to the large amount of panpipe remains recovered in the plaza as well
as the acoustic environment created by the architectural elements of the plaza (Helmer and Chicoine 2013). My analysis did not include ceramic panpipes, but viewing the frequency of other vessels in the plaza, the ceramics are evidence of the more mundane, domestic activities that would have taken place there.

5.5.3 Compound-E

In Compound-E, ceramics from room 5 (UE6-Ext3) were sampled. This compound is interpreted as a medium-sized residential complex with a variety of rooms and patios branching from a small public plaza (Plaza-E). Radiocarbon dates taken from contexts in the mound date the occupation between 405 B. C. E. and 230 B. C. E. (Chicoine and Ikehara 2014). Extension 3 was located in Room 5 of the compound and has been interpreted as a midded deposit. In contrast to the strata in the previously described units, the earliest strata presented the greatest variety and largest quantity of ware groups (Table 15). The earliest stratum included the following wares in decreasing quantities: Ware Groups 6, 8, 1, 10, 3, 7, 9, and 2. This stratum included the second largest deposit of Ware 6 sherd s, after the second stratum of the main mound construction. Later strata in the unit were restricted to Wares 6 and 8 with limited appearances of Wares 9, 7 and 1.

Similar to the previous units, Ware 6 was identified in all strata at Compound-E. With the exception of the earliest stratum, Ware Groups 1 through 5 are not present in the later strata. Radiocarbon dates suggest sections of the compound were occupied for less time than Compound-A. As such, the occupation of the rooms of Compound-E roughly corresponds with the middle of the occupation of the other analyzed contexts. If this is the case, by the time the midded deposit was created, the observed variety of wares was likely already in existence. The
reduced variety of sherds could be contributed to a decrease in use of the midden, a cessation of ceramic production activities, or disuse of certain wares.

To summarize, the variations in the presence of ceramic vessels throughout the units examined described above indicate the differential use of wares, especially in their discard. Although more excavations and analysis are needed to identify more complex patterns, Ware Group 6 and Ware Group 8 are the most ubiquitous, regardless of the context. Local potters likely produced these wares within a compound, or there were multiple potters using the same materials for the production of pottery.

5.6 Summary of Results

Ten Early Horizon ware groups were identified based on the mineral components visible in the pastes of sherds analyzed. The most commonly observed ware is Ware Group 6. It exhibits a mixture of inclusions of differing sizes. These inclusions are likely from local deposits close to the urban nucleus. The angularity of the inclusions suggests that these inclusions were not the result of specifically choosing rocks and crushing them to add as a temper. Rather, the inclusions were likely minerals caused by erosion and carried by erosional and depositional processes to the area in which they were mined. The pampa of Caylán mainly consists of alluvial sands and minerals eroded from the nearby hills. Wind-blown sediments cover the coarser sand mix, but tend to blow away and accumulates in depressions of the hills as dunes when the context allows. The variation in the sizes from pastes C, D, E, and M within Ware Group 6 indicate that these inclusions were screened before being added, or that larger inclusions were removed before the clay was used. Ware Group 6 ware group was present in all excavation units, was used for all vessel forms, and had all surface finishes and decorations. More information is needed on the
sourcing of clay, but it is significant to note the nearby presence of a lagoon where clay is abundant. Otherwise, the river is located approximately 3km to the southeast of the ancient settlement.

The most frequently identified vessel shapes were neckless pots and jugs. Neckless pots were made using seven of the ten ware groups. Jugs were made using six ware groups. Ware group 6 was the most versatile ware group and was used to make every type of vessel identified in this study, excluding graters. Excavation Unit 4 had rim sherds representing all vessels (bottle, jug, bowl, necked pot, pot, neckless pot, plate, grater, and jar). In Excavation Unit 5, I identified all vessel forms (bottle, jug, bowl, figurine, necked pot, neckless pot, grater, and jars), excluding plates. Excavation Unit 6 revealed the least variety of vessels, only including jugs, bowls, necked pots, neckless pots, plates, and jars.

There is no correlation between the ware group and vessel form. Bottles, which are typically identified as finer vessels, were associated with fine through very coarse pastes of Ware Groups 1, 6, 8, and 9. Large storage jars, on the other hand, were typically associated with coarse pastes of Ware Groups 6, 7, 8, and 9. Ware Groups 4 and 5 could not be associated with any vessel. Although identified as corresponding to certain vessel forms, Ware Groups 2, 3, 7, and 10 were each represented by six fragments or less, making associations inconclusive.

Surface finishes and decorations were identified on approximately 1,900 sherds. Finishes and decorations were occasionally used in combination with each other to create more complex designs. Incomplete burnishing covering 50% or less of the surface of the pottery sherd was identified in all ware groups; if no other finish was identified, burnishing was the finish used. A more through burnishing was present on all ware groups, excluding Ware Groups 4 and 5. A
crumpled textile impressed finish was identified in all ware groups excluding 4, 5 and 9. Ware Group 6 is the only ware that had all finishes represented in its sherds.

Given the unpatterned nature of decorated pots, I suggest that there was no selection of specific pastes for fine or decorated wares. I suggest that there was no importation of decorated vessels or raw materials (at least for temper). Following the hypothesis that imported material would be more highly valued and would be distinct from what is available locally, we would expect to see decorated vessels with a consistently distinct mineralogical composition.

The most common decoration, textile impression, was identified on six of the ten ware groups in small numbers. The most commonly-identified decoration was incision. However incision was only represented in five ware groups. Similar to the other analyses, Ware Group 6 was the only ware group that used all styles of decoration identified. Likewise, there is no ware specifically associated with a certain decorative style. All decorative styles were noted on Ware 6, which is hypothesized as a utilitarian ware used for a variety of purposes. Only Ware Group 8 demonstrates a variety of decorative styles in low quantities. All other ware groups had decoration identified on less than 10 fragments. The most frequently identified ware groups (6 and 8) are the most frequently associated with certain vessel forms and decorative styles. The small quantities of all other sherds make association with specific vessel forms and decoration impossible.
CHAPTER 6
DISCUSSION AND CONCLUSIONS

In this chapter, I discuss the implications of the identified ware groups and possible means of interaction within the scope of the greater Nepeña Valley during the Early Horizon. I discuss the potential application of this type of analysis to other regions and time frames. I conclude with final thoughts and future research that is being conceived for the ceramic collection at Caylán.

As stated in chapter 5, excavations at Caylán revealed 48,837 pottery sherds. My research analyzed a sample of 11,270 pottery sherds. This sample represents approximately 23% of the pottery sherds excavated at Caylán. In combination with the approximately 9,000 sherds identified by Quispe, approximately 42% of pottery fragments from Caylán have been analyzed. The analysis of these ceramics can, therefore, represents the majority, if not all, paste and ware groups present at Caylán. With the thoroughness of my study in mind, I present the following discussion of pottery at Caylán.

6.1 Ceramic Technology and Production at Caylán and Nepeña during the Early Horizon in Response to Research Questions

Potters in the ancient urban center Caylán made choices when manufacturing ceramic vessels that are obvious in the analysis of ceramic remains. These choices include, but are not limited to, variations in the temper inclusions, firing atmosphere, and decorative elements applied to vessels. The pottery present at Caylán presents a view of small-scale production of vessels for mainly utilitarian functions of cooking, storing, and serving foodstuffs. The “recipes” and proportions of raw materials used to create pottery likely were passed from generation to generation and were perfected through the failure and success of a variation.
The research questions presented in chapter 4 have shaped the organization of this thesis, and in particular the following discussion. Here, I address these questions and provide a response to said questions.

1. Are there visually different ceramic pastes at Caylán? Can ceramic pastes be classified based on technological choices tailored to production styles and vessel types?

There are visually different ceramic pastes at Caylán. These pastes can be classified visually by the raw materials, preparation of clay, surface finishes, and firing used to produce the pottery. These technological choices can be identified and distinguished from one another through this type of macroscopic analysis.

2. Do paste groups represent distinct potters or communities of ceramic producers such as workshops? Did potters or groups of potters use the same materials in the production of their vessels?

Based on ethnoarchaeological research (Druc 1996, Arnold 2005), it can be proposed that distinct paste groups represent distinct potters or potting groups. Ethnoarchaeological data suggest each potter has their own source of raw materials that they use to produce all vessels. Large amounts of one source material, in combination with other evidence, would suggest the possibility of a workshop producing the majority of ceramics. A distinct lack of identified workshops within the limited excavations at Caylán currently suggests that pottery was being produced at a household level.

Given the large, ubiquitous use of Ware Groups 6, I suggest that many household potting groups at Caylán were using the same source of materials or different sources that had very
similar compositions. The temper materials that were added to the clay are likely available just outside the urban core of Caylán, in the sandy pampa at the foot of Cerro Caylán. Multiple household potting groups possibly collected raw materials from this source. If this hypothesis were true, distinct potting groups would be unidentifiable through a macroscopic analysis. Chemical or petrographic analyses would be needed to attempt to identify chemically distinct sources of raw materials, further suggesting individual potting groups.

Whether the materials were all collected from the same source or from distinct but compositionally similar sources, the Caylán potters consistently mixed their clays with local mineral inclusions to produce all forms of vessels with and without decoration. The quantity of sherds of this ware could also suggest that various, possibly related, household groups were using the same materials to produce ceramics. The presence of this ware throughout stratigraphic deposits additional suggests that the materials were available locally in abundance and that the ceramic-making tradition continued through generations of potters. The appearance of less common wares, such as Ware Groups 8, 9, 10, and 3, may represent distinct potters who found different sources of materials, producing vessels on a small scale. Other ware groups possibly represent a secondary source or materials used by potters also using Ware Group 6 materials.

3. How do ceramic pastes vary among the archaeological units and stratigraphic layers? Does sherd composition change through time? Do certain vessels or pastes appear in distinct contexts?

Throughout the archaeological units, and indeed throughout the test pits at the site, distribution of ware and paste groups throughout is relatively consistent. All units sampled have relatively consistent distribution of ware groups. However, Ware Groups 6 and 8 are ubiquitous. These
ware groups with mixed sand with mica (6) and with quartzite and mica (8) have been repeatedly identified throughout the site. Throughout the stratigraphic layers excavated, Ware Group 6 was present in every layer in large quantities. Each unit presents at least 2,500 sherds from this ware. Plaza-A, however had approximately 4,000 sherds made with Ware Group 6.

In Plaza-A and Compound-E, sherds from wares aside from Ware Group 6 constitute 400 sherds or less. In the Montículo Principal, on the other hand, almost 1,200 sherds of wares aside from Ware Group 6 are identified. The Montículo Principal is the only context to present significant quantities of Ware Groups 2, 3, 4, and 5. The mound also has significantly higher quantities of Ware Groups 1, 8, and 10. The diversity of the wares present in the main mound suggests an affiliation of certain wares to the main mound and probable ritual activities. The increase in ware diversity in later strata of the Montículo Principal could be attributed to an increase in the number of individuals partaking in the construction, adding pottery sherds from distinct households of Caylán. Interestingly, very few sherds from Ware Groups 2 through 5 were associated with distinct vessel shapes. So while body fragments were associated in relatively high quantities with the main mound, the lack of rim sherds suggests these vessels may not have been deposited in the mound, but moved from other areas.

Later strata throughout the site demonstrate greater diversity of wares than do the earliest strata. The earliest strata in Units 4 and 5 present between 2-5 ware groups. The latest strata presents between 3-9 ware groups. These data suggest that the earliest occupations at Caylán used less diverse materials. Later occupations had more diversity of raw materials, and likely had more potters who used these materials. However, Unit 6 presents the inverse of Units 4 and 5. The earliest stratum presents 8 ware groups, while the latest stratum presents only 3 wares. While Compound-E has been hypothesized as one of the earliest constructed compounds, Room
5, in which UE6-Ext3 was located, has been proposed as a midden deposit. The deposition of a greater variety of wares in earlier strata may represent the beginning of the use of this area as a midden.

Finally, most vessels appeared in similar quantities in the three units. Nonetheless, jugs were present in much higher quantities in Plaza-A than in the other units. This presence of jugs could be related to possible feasting activities believed to have occurred in the plaza. Bottles were present in slightly higher quantities in the Montículo Principal than in other units. However, identified bottles were still only present in minimal quantities.

4. Is there evidence to suggest foreign wares? Are there minerals inclusions that differ from what is typically found near Caylán and in the Nepeña Valley more broadly? The introduction of camelids to the area during the Early Horizon likely expanded the collection area of raw materials for ceramic production. Potters were able to travel longer distances and transport more raw materials than they were previously able to do so without the use of pack animals. However, long-distance trade of prestige items and prized exotics were reduced by the time Caylán developed, favoring locally made material culture, status objects, and art styles. The composition of the raw materials used also supports this idea. The clays and tempers used were generally consistent. Sand, quartz, and black stone tempers were mixed in a compact, sandy clay matrix. Although certain wares exhibit large percentages of just quartz or black diorite or basalt, these sherds likely also contained very fine sand similar to the other wares that was difficult to identify visually.
Currently, there is no evidence to suggest foreign ceramics or materials. Chemical analyses and sourcing would be needed to confirm this hypothesis. Nonetheless, if foreign wares were present, they would likely be in small quantities.

I hypothesize that all the raw materials used in the production of ceramics at Caylán were gathered from local sources. These materials were also available throughout the Nepeña Valley. Given the frequency of Ware Groups 6 and 8, I suggest that local potters produced vessels made from these pastes. The raw materials used to make local pastes would have been mined from deposits within seven kilometers of Caylán (Arnold 2005:16). This distance is the maximum length that potters typically travel from their production center in order to extract their materials; typically, materials are gathered from a place 4km from the community (Arnold 2005:16). Quarries in the hills surrounding Caylán, as well as the abundant layers of fine gravel and sand that litter the pampa, have been identified as the probable source of the large stone slabs used in the construction of compound walls. Raw materials used in the production of ceramic vessels likely came from similarly local sources. Less frequent Early Horizon pastes may indicate less frequent potting events or restricted access to certain mineral deposits.

The production of vessels and firing atmosphere are similar to those observed at other sites in the Nepeña Valley during the Early Horizon. Ceramic analyses at Cerro Blanco, Huambacho, and Samanco have demonstrated similar ware compositions. This similarity includes the identification of limited numbers of ceramics fired in a reduced atmosphere, with the majority of sherds fired in an oxidizing atmosphere, likely in open pit kilns. The distinct use of a reduced firing atmosphere for paste groups J and N suggests a purposeful selection for the dark grey-black color produced in the vessels. This color contrasts the red-brown colors of the vast majority of potsherds that were fired in an oxidizing atmosphere. The firing of vessels at
Caylán was somewhat poorly controlled and done in bonfires. Reducing atmospheres may have been created as technology and control improved during the firing process. The lack of identified ceramic production areas suggests small-scale production that has not yet been identified.

The decorative styles identified on pottery sherds from Caylán are similarly consistent with those found at Cerro Blanco, Huambacho, and Samanco (Chicoine 2006a; Helmer 2014; Ikehara 2007). The ubiquity of stamped circle and dot, pre-fired painting, incision, textile impression, and zoned designs is seen throughout these sites. Stamped circle and dot is arguably one of the most identifiable designs from Early Horizon Nepeña. The identification of these decorative styles on utilitarian vessels suggests that these decorative styles were not linked specifically with religious activities, such as fine line painting and effigy bottles in the later Early Intermediate Periods. Rather, they are probable symbols of a political cohesion that was present in the utilitarian vessels of individuals throughout the urban center. Similar designs found at Huambacho and Samanco support the theory of Caylán as a central power in the valley at the time, and likely confirm interactions between the communities. However, Samanco presented a decorative technique not seen at other sites in the valley, Samanco Modeled. Although most decorative styles were consistent throughout the lower Nepeña Valley, there was still a diversity and development of distinct decoration. This indicates that while there was interaction between the communities, the communities had the freedom to develop their own styles and techniques apart from the politically supported styles.

The decorative techniques at Caylán can be related to techniques described by Strong and Evans (1952), Chicoine (2006), and Ikehara (2007). The decorations during the Initial and Early Horizon Periods are similar, using similar tools, and focusing on geometric designs. The following decorative techniques were identified at Caylán listed with possible corresponding
decorative techniques. Sharp indentions in a leather hard clay appears to be similar to Guañape Punctate, Guañape Zoned Punctate, and Ancón Zoned Punctate, which can be compared to Ikehara’s (2007) crude and fine lineal dots decorated in patterns. White paint delimited by incisions on red clay seems to be similar to Puerto Moorin White-on-Red (Strong and Evans 1952) and can be directly related to Post-firing painting in red and white at Cerro Blanco (Ikehara 2007).

Linear incisions in geometric patterns could be identified as Ancón Fine- or Broad-Line Incisions (Strong and Evans 1952), Nepeña Valley deep incisions, incisions as zoned borders, or short dash-like incisions (Proulx 1973), and can be related to Cerro Blanco grooved, fine grooved, and sharp incisions (Ikehara 2007). The most iconic design, however, is a cane-stamped circle with or without a sharply made dot in the middle. This decoration has been identified as a stamped or impressed Circle-and-Dot and has been documented at various sites in the Nepeña Valley (Chicoine 2006a; Ikehara 2007; Proulx 1973). It is also typical of the Janabarriu Phase defined by Burger (1984) at Chavín de Huantar. This design possibly represents an allusion to religious cults where the jaguar plays an important role.

The decorations shared between the Nepeña Valley and Virú Valley are likely the result of potters adopting and sharing similar techniques common across the north and north-central coast of Peru during the Initial Period and Early Horizon. However, the Circle-and-dot design was not identified in the Virú Valley. Daggett (1984:439) correlates this design with Chavín decorations of the Janabarriu phase. Circle-and-dot is also identified at sites such as San Diego and Pampa Rosario in the Casma Valley to the south (Pozorski and Pozorski 1987). Daggett proposed that the designs seen in the Nepeña Valley were the result of highland migration that was likely embraced by Nepeña inhabitants.
5. What can the relationship between form and paste tell us about the use of raw materials in the production of ceramics? Are certain pastes reserved for a specific type of vessel? Is the material used to produce a vessel an important factor or can they be interchanged?

Correlations between paste group and vessel form suggest that paste groups were intentionally used to create vessels with a certain function. Nonetheless, there does not seem to be a pattern of use in the selection of raw materials for certain vessel forms. Ware Groups 1-3 were associated with smaller vessels such as neckless pots and bowls, and bottles, but not with larger jars and jugs. Rims from Ware Groups 4 and 5 were not able to be associated with any vessel forms. The most common ware, Ware Group 6, was associated with rim and body sherds from all vessel forms. Ware Groups 7 and 9 were associated principally with pots, jugs, and jars, but not as frequently with smaller serving vessels. Ware Group 8 was associated with pots, and some serving vessels. Ware Group 10 was only associated with pots.

Neckless pots were associated with all ware groups, excluding Ware Groups 4 and 5 (due to lack of identifiable rims). Following pots, jugs were associated with the most ware groups, excluding Ware Groups 3, 4, 5, and 10. The least commonly identified vessel forms based on rim sherds were plates and graters. Grater body sherds, however, are easily identifiable and grater bodies were associated with Ware Groups 6 and 9.

In most cases, it seems that the materials used to produce a vessel can be interchanged. Coarse pastes were more versatile and were used to shape different vessels. However, typically finer vessels (bottles, bowls) were also created with the same pastes as coarser vessels (jars, jugs). While finer inclusions were typically selected to make finer, thinner walled vessels, occasional fragments of finely created, thin vessels were made with coarse materials. Large, thick walled vessels were typically made with coarse or very coarse materials. However, they
sometimes used medium materials. That is not to say that the size of inclusions did not matter in the production of vessels, but rather that a variety of pastes were used in the production of vessels without identifiable problems. Clearly, the data present a continuum of technological choices that demonstrate the fluidity of production styles and practices.

6.2 Broader Implications in the Peruvian Andes

The results of my research have two broad implications in the Andes. Firstly, macroscopic analyses consist in a type of analysis that is not typically conducted in this region. Ceramic analyses in the Andes typically focus on the construction of typologies of ceramic vessels within an assemblage. Chemical and petrographic analyses are then tested using arbitrary samples of the assemblage. The use of macroscopic analysis would be beneficial to the study of ceramics by creating a base from which chemical analyses could be tested. Identifying ceramic pastes that are visually distinct, then chemically or petrographically testing these hypothesized pastes would provide a more thorough, and less random study of ceramic materials.

Secondly, the results of my research support the understanding of Caylán as an incipient urban center. It is undoubted that Caylán is a complex center. However, it also does not follow typical hypotheses that urban complexity is always coupled with craft specialization. Research at Caylán increasingly conflicts this theory. The development of urban centers is a much more complicated phenomenon than is typically considered. Debates in the Andes over the development of cultures in the Andes would do well to recognize the complexity of urban life and to note that urban centers, cities, and states are not the simple phenomena that textbook definitions make them seem.
6.3 Application of Macroscopic Analyses

The results of this thesis support the importance of macroscopic analyses as a form of ceramic analysis. As chemical and petrographic analyses have become more frequent forms of ceramic analyses, having a base from which to sample sherds will be important. Macroscopic analysis presents a low-cost, relatively simple, and rapid way in which to identify distinct technological decisions made in pottery manufacture.

Although my work represents a very thorough analysis, this analysis can be easily repeated to a lesser degree. Macroscopic analyses in the Nepeña Valley (Chicoine 2006, Helmer 2014, Ikehara 2007) present a range of analyses. Ikehara’s (2007) research focused on creating a thorough analysis of ceramic pastes at Cerro Blanco. Chicoine (2006) conducted a macroscopic analysis in addition to other analyses of Huambacho, although it was not the focus of the investigation. Helmer (2014) also conducted a macroscopic analysis of Samanco, although it was at a much smaller scale than the other analyses. Following these investigations, it is plausible to suggest that macroscopic analyses should be included as part of the analysis of artifacts following excavations at any archaeological site. While the categories of pastes presented from my research would be arguably too extensive for the majority of projects, the quantity ware groups presented would provide a thorough, yet not overwhelming, categorization of materials used in ceramic production. This analysis could additionally be applied to other fired clay objects such as panpipes and figurines, with similar results.

6.4 Concluding Thoughts and Future Research

Pottery sherds recovered from Caylán are abundant. Archaeologists have much to learn from them. During the Early Horizon, the diminishing influence of Chavin de Huántar allowed
local cultures to develop their own artistic practices and express different ideological beliefs. Styles and technologies used in ceramic vessels were adapted, leaving distinguishable elements indicating the time, place, and function of a ware and its context. In this study, I identified elements of the materials and technology used in the production of ceramics during the Early Horizon. These elements identify the analytical individual, or potters, who used distinct techniques in the manufacture of utilitarian and elite goods. My identification of wares and vessel forms provide preliminary insights into ceramic variation, function, and local or foreign origin.

In general, the ceramics at Caylán suggest a local production with localized decoration, produced by small-scale household potters. Potentially, vessels were traded between other, smaller centers in the valley, as evidenced by previously identified marine shellfish trade (Chicoine and Rojas 2013). Although Caylán was a densely populated urban core, and finely crafted objects have been recovered, no workshops have yet to be identified. Caylán had elements of a stratified society. However, a lack of evidence prevents us from knowing the extent of stratification. Should workshops be excavated, it would be plausible to conclude that specialized potters used Ware Group 6, while less specialized groups produced vessels with other materials. Nonetheless, this urban center presents the complex case of a developing society during the first millennium B. C. E.

There are a great variety of pastes used during the Early Horizon at Caylán. The most common ware (Ware Group 6) was used in jugs and neckless pots. There is no homogeneity evidenced being enforced by political force, as noted in the variety of pastes used to produce the same vessel. Although the use of certain vessels changed through time and space in the units examined, utilitarian vessels were ubiquitous and present in almost all contexts. The minimal
presence of certain wares may represent a skewed sample of certain more common vessels or may represent rare wares with outside influence. The wares presented in this thesis likely indicate the local and foreign vessel composition at the urban center Caylán. However, much more analysis and investigation is needed to confirm such a theory.

As stated throughout this thesis, the macroscopic analysis conducted here consists of one step in the process to understand the ceramic assemblage at Caylán. This sample of the ceramic assemblage at Caylán was designed to give an overview of the differences in ceramics paste compositions. Using the categories created in this analysis as a basis, future studies are planned to more thoroughly investigate the variety of ceramic pastes and to identify the origins of the materials used to manufacture the ceramics. Future analyses should include petrographic classifications (thin sections) of the mineral inclusions, as well as the chemical characterization of the clay used (e.g. NAA, XRF). The analysis of clay characterization should also include the sampling and testing of local and nearby clay sources.

I suggest that future ceramic studies at Caylán should identify correlations between vessel paste and shape based on identifiable rim sherds. This study should include the identification of shape based on drawings of rim sherds that were made upon the collection of sherds from Compound-E (UE6; Ortiz 2012). Additional studies should use my analysis as a base to chemically sample ceramic ware groups. I suggest that samples be taken from different pastes in Ware Group 6 to identify if this paste is as homogeneous as currently hypothesized. Samples should also be taken from Ware Group 1 to determine if the proposed differentiation of sherds with and without mica particles is correct. Finally, I propose that the most common wares should be compared to the least common wares to determine if the materials used to produce them are, in fact, of local origin.
In addition, clays and mineral deposits from the local area should be sampled to create a comparison between local raw materials and the ceramic collection. I also suggest that clays and mineral deposits closer to Huambacho and Samanco should be sampled. The ceramics analyzed at these contemporaneous sites appear to have been made with similar materials and techniques. An analysis of clay and mineral sources close to these sites could potentially indicate a ceramic trading system in addition to the trade of other goods and crafts.
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5.2.1 Unit 4 – Terrace 2

According to Chicoine and Ikehara (2011:28), excavation Unit 4 was located on the southwest upper section of the Montículo Principal, or main monumental structure, in Sector IV of the Caylán archaeological site. Radiocarbon dates taken from contexts in the mound date the occupation between 733 B.C.E. and 20 C.E. (Chicoine and Ikehara 2014). Unit 4 measured 8 m north-south by 15 m east-west and was divided into four terraces. Terrace 2 is the second level from the top of the mound, after Terrace 1, and is delimited by Walls 7 and 8. This unit mostly contained fill for sealing and covering a ceremonial structure. While a variety of materials are present, there is not a conclusive interpretation based on their mix. The most represented ware group in UE4-T2 is Ware Group 6. This group represents approximately 69% of the sherds examined from UE4-T2 (n=2,570 of 3,737) and represents approximately 23% of the 11,223 Early Horizon sherds (Figure 40).

Stratum 1 was made up of alluvial sediments and rocky debris from the collapse of walls. Part of a floor was noted in the East profile (Chicoine and Ikehara 2011:32). Artifacts recovered included camelid bones, burnishing stones, and quartz, various shell remains, ceramic panpipes, and wood. The ceramics recovered in this level consisted in 8.85% of the analyzed UE4-T2 sherds (n=330). The majority of sherds were from Ware Group 6 (Figure 41).

Stratum 1 Level A was located under the Stratum 1. In this level, there was a fill made of soil with organic material and a large amount of trash (pottery sherds, shell, bone, etc.). Although in
the beginning Chicoine and Ikehara believed this context to be a concentrated lens of material, the context actually formed a constructive fill 4.5 meters in depth, deposited in one event (2011).

Artifacts recovered included rodent, fish, bird, cameld, dog, large and medium mammals, and various animal bones, human teeth, metatarsals, vertebra, and ribs, carbon, quartz flakes, river stones, polished river stones, lithic flakes, polished slate flake, and burnishing stones, various shell remains, ceramic panpipes, disks, and spindle whorls, textile, basket, wood, avocado and squash seeds, peanut shell, gourd, yucca roots, sticks, poste fragments, leaves, and pacay. The ceramics recovered in this level consisted in 87.21% of the analyzed UE4-T2 sherds (n=3252). The majority of sherds were in Ware Group 6. Lower quantities of sherds were in ware groups 8, 3, 10, 2, 1, 9, 7, 4, and 5 (Figure 42).

**Stratum A Level 4** ceramic material consisted in 0.38% of the analyzed UE4-T2 sherds (n=14). Identified ware groups were 6, 8, and 9 (Figure 43).

**Stratum 2** was the original floor (Piso 1) of Terrace 2. Artifacts included fish and large mammal bones, clay, carbon, a burnishing stone, various shell remains, animal skin, ceramic panpipes, textile clothing, wood, seeds, maize, gourd, cane, and peanuts. The ceramics recovered in this level consisted in 3.82% of the analyzed UE4-T2 sherds (n=143). The most frequent ware group was 6, followed by 8 and 9 (Figure 44).

5.2.2 Unit 5: Plaza A

Excavation Unit 5 was located on the East side of Plaza-A. Radiocarbon dates taken from contexts in the plaza date the occupation between 518 B. C. E. and 232 B. C. E. (Chicoine and
Ikehara 2014). With its extension, Unit 5 formed an L shape measuring 19 m x 19 m and was 2 m wide. The original excavation area (2 x 19 m) revealed a wall and bench. Extensions revealed two benches, a corridor, and a sample of floor (Chicoine and Ikehara 2011:35). The plaza was likely a meeting place for residents to complete daily activities. Helmer and colleagues (2012), however argue that Plaza-A was designed for large-scale festivities as well as daily activities. Helmer and Chicoine (2013) suggest that the platform benches and sunken plaza create a stage in which musicians could have played panpipes for an audience. The architecture of the plaza creates an acoustic space that would have made the plaza a significant space in the public and private events of the compound. The concentrations of lithics in this unit, and lack thereof in its extensions suggest that lithic tools were being manufactured on a small scale in this area. The variety of vegetal and shell remains suggests the context may have been the location where goods were introduced to the compound for further processing. The ceramics collected in the combined UE5, Extensions 3 and 4, Ware Group 6 represented 91% of the assemblage (Figure 45).

The **Surface Level** consisted of rocks from fallen walls in a clay matrix. Ceramics from this level accounted for 3.15% of the analyzed UE5 sherds (n=18). Ware groups identified were 6, 1, and 7 (Figure 46).

**Stratum 1** was a horizontal clay sediment believed to be made of mortar and plaster from the walls that was destroyed by rainfall. Artifacts included carbon, lithic flakes, scrapers, burnishing stones, and a grinding stone, feathers, coprolites, worked reeds, worked gourds, animal wool,
seeds, maize, wood, and other vegetal remains. Ceramics from this level accounted for 1.92% of the analyzed UE5 sherds (n=11). Identified ware groups were 6, 7, 1, and 10 (Figure 47).

**Stratum 1 Level 1** artifacts included a sample of a mud wall, and a block of a painted column, lithic flakes, burnishing stones, axes, and various worked lithics, various types of shell, fragments of ceramic flutes, brown and black textile, wood and sticks, wood, peanuts, maize, pumpkin seeds, and various botanical remains. The ceramics recovered consisted in 33.04% of the analyzed UE5 sherds (n=189). The majority of sherds came from Ware Group 6, followed by groups 8, 1, 7, 2, 10, and 3 (Figure 48).

**Stratum 2** artifacts included lithic flakes, burnishing stones, and manos, coprolites, a gourd rim, ceramic discs, and a textile. Ceramics recovered consisted in 4.02% of the analyzed UE5 sherds (n=23). Identified ware groups were 6, 1, and 8 (Figure 49).

**Stratum 2 Level 2** artifacts included rodent, fish, and mammal bone, human ribs, lithics include burnishing stones, flakes, and various worked lithics, various worked and unworked shell remains, llama wool, coprolites, wood, gourd, maize, and other vegetal remains. Ceramics accounted for 23.60% of the analyzed UE5 sherds (n=135). The majority of sherds were from ware group 6, followed by groups 9, 4, 7, and 8 (Figure 50).

**Stratum 3** artifacts included lithic flakes, burnishing stones, and various worked lithics, copper, various shell remains, coprolites, gourd rim, a ceramic panpipe, wood, maize, and other vegetal
remains. Ceramics recovered consisted in 2.45% of the analyzed UE5 sherds (n=14). Ware groups identified were groups 6 and 9 (Figure 51).

**Stratum 4** artifacts included mammal and animal bones, a human foot, hand, and sternum, carbon, lithic flakes, grinding stones, mace head, and various worked lithics, whole vessel offering, copper and textile offering, camelid pelt, limestone, copper, various shell remains, fragments of a ceramic panpipe, wood, maize, gourds, and other vegetal remains. Ceramics recovered consisted in 15.91% of the analyzed UE5 sherds (n=91). Ware groups identified were groups 6, and 9 (Figure 52).

**Stratum 5** artifacts included fish, rodent, bird, and mammal bones, a lithic flake, various shell remains, maize, gourd, and wood. Ceramics recovered consisted in 11.54% of the analyzed UE5 sherds (n=66). Ware groups identified were groups 6, 8, and 9 (Figure 53).

**Stratum 6** artifacts included quartz and lithic flakes, various shell remains, maize, gourd, and sticks. Ceramics recovered consisted in 4.37% of the analyzed UE5 sherds (n=25). Ware groups identified were groups 6, and 9 (Figure 54).

5.2.3 Unit 5 – Extension 3

Extension 3 was located to the Northeast of the “L” formed by UE5 and UE5 – Ext1. This extension measured 2 m x 8 m. The extension exhibited the same general superposition as Unit 5. This unit did not contain lithic material. This unit was part of a plaza that is believed to have been a meeting place for residents and daily activities. The diversity of ceramic wares in this unit
suggests function may have been slightly different than in other areas, although the ceramics represents a small percentage of the total assemblage. This unit was also the site of intrusive activities.

**Stratum 1 Debris** consisted of rocks from fallen walls in a clay matrix. Artifacts included bird, camelid, rodent, guinea pig, and various mammal bones, carbon, various shell remains, feathers, worked reeds, spindle, coprolites, animal pelt, and worked gourd, spindle whorls, pottery sherd with graffiti, panpipes, and ceramic disks, textiles, cotton, string, rope, cane, maize, wood, peanuts, avocado seeds, leaves, cotton, beans, corn husk, lucuma, and reeds. Ceramics from this level accounted for 29.51% of the analyzed UE5-EXT3 sherds (n=497). The majority of sherds were from Ware Group 6, followed by groups 7, 8, 1, 10, 3, and 4 (Figure 55).

**Stratum 1 Level 1** artifacts included rodent, fish, and mammal bones, painted mud, human long bones and ribs, carbon, various shell remains, coprolites, ceramic disks, gourd, wood, maize, squash seeds, algae, peanut shell, and other vegetal remains. Ceramics recovered consisted in 29.45% of the analyzed UE5-EXT3 sherds (N=496). The majority of sherds were from Ware Group 6, followed by groups 8, 7, 9, 10, and 3 (Figure 56).

**Stratum 1 On Floor 1** artifacts included mammal bones, various shell remains, coprolites, feathers, rope, cord, cane, wood, maize, seeds, peanuts, gourd, and leaves. Ceramics recovered consisted in 0.77% of the analyzed UE5-EXT3 sherds (n=13). Ware groups identified were groups 6 and 8 (Figure 57).
**Stratum 1 Element 31** artifacts included various shell remains, wood, and cane. Ceramics recovered consisted in 0.59% of the analyzed UE5-EXT3 sherds (n=10). Ware groups identified were groups 6 and 8 (Figure 58).

**Stratum 2 Level A** artifacts included large mammal vertebra, various shell remains, ceramic disks, textile, gourd, and reed. Ceramics recovered consisted in 4.51% of the analyzed UE5-EXT3 sherds (n=76). Ware groups identified were groups 6, 9, and 10 (Figure 59).

**Stratum 2 Level B** artifacts included fish and small mammal bones, decorated and cone shaped mud bricks, a human cranium, carbon, various shell remains, animal wool, ceramic disks and panpipes, peanut, maize, squash seeds, gourd, and wood. Ceramics recovered consisted in 9.32% of the analyzed UE5-EXT3 sherds (n=157). The majority of sherds were from Ware group 6, followed by groups 9, 8, 1, and 10 (Figure 60).

**Stratum 2 Debris** artifacts included fish, and large and small mammal bones, ceramic tile and panpipes, wood, maize, peanut, gourd, and squash. Ceramics recovered consisted in 11.28% of the analyzed UE5-EXT3 sherds (n=190). The majority of sherds were from Ware Groups 6, followed by groups 8, 9, 7, and 10 (Figure 61).

**Stratum 3** artifacts included mammal bones, various shell remains, coprolites, and rope. Ceramics recovered consisted in 5.34% of the analyzed UE5-EXT3 sherds (n=90). Ware groups identified were 6 and 8 (Figure 62). Although not included here, it is notable that approximately half of the ceramics recovered in this layer corresponded to Early Intermediate wares.
Stratum 4 Fill ceramics recovered consisted in 9.20% of the analyzed UE5-EXT3 sherds (n=155). The majority of sherds were from Ware Groups 6, followed by groups 8, 9, and 7 (Figure 63).

5.2.4 Unit 5 – Extension 4
Extension 4 was located in the area to the northeast of the corner made by the “L” of Unit 5 and extensions 1-3. This extension measured 5 m x 5 m. No lithics were recorded in this unit. This unit was part of a plaza that is believed to have been a meeting place for residents of the compounds and the elaboration of daily activities.

Stratum 1 artifacts included various shell remains and ceramic disks. Ceramics recovered consisted in 1.28% of the analyzed UE5-EXT4 sherds (n=25). All sherds were identified as Ware Group 6 (Figure 64).

Stratum 1 Level 1 artifacts recovered were fish, rodent, mammal, and camelid bones, carbon, feather, ceramic panpipes, disks, and debitage, textile and orange textile, sticks, gourds, maize, squash seeds, and peanuts. Ceramics recovered consisted in 8.26% of the analyzed UE5-EXT4 sherds (n=180). The majority of sherds were from Ware Group 6, followed by groups 8, 10, 7, and 9 (Figure 65).

Stratum 1 Over Possible Floor Artifacts recovered were fish and small animal bones, various shell remains, and wood. Ceramics recovered consisted in 0.73% of the analyzed UE5-EXT4 sherds (n=16). All sherds were identified as Ware Group 6 (Figure 66).
Stratum 2 Level A artifacts recovered included mammal bones, carbon, various shell remains, ceramic disks, textile fragments, maize, gourd, wood, reed, and leaves. Ceramics recovered consisted in 4.08% of the analyzed UE5-EXT4 sherds (n=89). Ware groups identified were groups 6, 8, 10, 7, and 9 (Figure 67).

Stratum 2 Level B artifacts included canine teeth, carbon, various shell remains, coprolites, ceramic panpipes and disks, cane, gourd, wood, peanut, and seeds. Ceramics recovered consisted in 5.55% of the analyzed UE5-EXT4 sherds (n=121). The majority of sherds were from Ware Group 6, 8, 10, 7, and 9 (Figure 68).

Stratum 2 Fill Under Floor artifacts included fish, bird, and mammal bones, various shell remains, ceramic panpipes and disks, gourd, maize, peanut, wood, and avocado seed. Ceramics recovered consisted in 14.13% of the analyzed UE5-EXT4 sherds (n=308). The majority of sherds were from Ware Group 6, followed by groups 9, 8, 7, and 10 (Figure 69).

Stratum 2 Fill Under Ramp artifacts included large animal and rodent bones, white adobe bricks, carbon, various shell remains, coprolites, ceramic disks, maize, peanut, avocado, wood, and gourd. Ceramics recovered consisted in 6.24% of the analyzed UE5-EXT4 sherds (n=136). The majority of sherds were from Ware Group 6, followed by groups 8, 9, and 10 (Figure 70).

Stratum 2 Fill Under Floor 1 and Ramp artifacts included carbon, various shell remains, ceramic disks, gourd, maize, peanut, wood, llama wool, and squash seeds. Ceramics recovered
consisted in 10.19% of the analyzed UE5-EXT4 sherds (n=222). The majority of sherds were from Ware Group 6, followed by groups 8, 9, 10, and 7 (Figure 71).

**Stratum 3 Floor 2** artifacts recovered included textile. Ceramics recovered consisted in 0.05% of the analyzed UE5-EXT4 sherds (n=1). The only sherd is from Ware Group 6 (Figure 72).

**Stratum 3 Under Floor** artifacts included camelid, bird, canine, fish, and mammal bones, painted adobe bricks, carbon, gourd rim, ceramic panpipes and disks, gourd, wood, maize, peanut, and seeds. Ceramics recovered consisted in 31.44% of the analyzed UE5-EXT4 sherds (n=685). The majority of sherds were from Ware Group 6, followed by groups 8, 9, 10, 7, and 1 (Figure 73).

**Stratum 3 Fill Under Ramp** artifacts included fish and large mammal bones, and fragments of textiles. Ceramics recovered consisted in 3.81% of the analyzed UE5-EXT4 sherds (n=83). Ware groups identified were groups 6, 8, and 9 (Figure 74).

**Stratum 4 Under Floor** artifacts included fish and mammal bones, fragments of bricks with designs, carbon, ceramic panpipes and disks. Ceramics recovered consisted in 14.23% of the analyzed UE5-EXT4 sherds (n=310). The majority of sherds were from Ware Group 6, followed by groups 8, 10, 7, and 9 (Figure 75).
5.2.5 Unit 6 – Extension 3

Unit 6 and its extensions were excavated in Compound-E in Sector III of Caylán. Radiocarbon dates taken from contexts in the mound date the occupation between 405 B. C. E. and 230 B. C. E. (Chicoine and Ikehara 2014). Compound-E was divided into Plaza E and Rooms 1-6, which were located on the southeast side of the corridor running to Plaza E (Chicoine and Ikehara 2011:37). Extension 3 was located in the Eastern part of Room 5. This extension measured 2 m x 4 m. This unit is believed to be midden deposits within a residential compound. The variety of artifacts and utilitarian ceramics discovered within the deposit support this claim. As with the previous excavation units, Ware Group 6 represented 93% of the ceramics recovered from UE6-Ext3 (Figure 76).

**Stratum 1 Debris** consisted of rocks from fallen walls mixed with clay soil. Artifacts included fish, rodent, bird, large and medium mammal bones, human bones, carbon, burnishing stone, various shell remains, ceramic panpipes and disks, textile, gourd, maize, peanut, fruit skin, wood, and cane. Ceramics from this level accounted for 0.48% of the analyzed UE6 sherds (n=15). The only ware group identified was group 6 (Figure 77).

**Stratum 1** consisted in a horizontal layer of clay sediment that was the result of alluvial destruction of mortar and plaster. This layer was the likely result of rain from the El Niño phenomenon during the Middle Horizon due to the deposition of Middle Horizon ceramics over Formative Period materials (Chicoine and Ikehara 2011:38). Artifacts included mammal bones, carbon, burnishing stone, various shell remains, coprolites, ceramic panpipes, wood, seeds,
maize, and gourd. Ceramics constituted 1.97% of the analyzed UE6 sherds (n=61). Ware groups identified were groups 6, 8, and 7 (Figure 78).

**Stratum 2 Level 1** consisted in a fine sand layer that was likely deposited by the wind. This layer contained materials deposited after the abandonment of the structures (Chicoine and Ikehara 2011:38). Artifacts included fish, bird, and mammal bones, human bones, carbon, various shell remains, ceramic statue, textile, gourd, wood, and maize. Ceramics from this layer account for 6.75% of the analyzed UE6 sherds (n=209). The majority of sherds were from Ware Group 6, followed by groups 8 and 9 (Figure 79).

**Stratum 2 Level 2** artifacts included mammal bones, carbon, burnishing stone, various shell remains, ceramic spindle whorl and disks, and textile. Ceramics recovered consisted in 19.12% of the analyzed UE6 sherds (n=592). The majority of sherds were from Ware Group 6, followed by groups 8, 9, 1, and 7 (Figure 80).

**Stratum 2 Level 3** artifacts included a small canine with fish bones in the stomach, large and small mammals, and fish bones, carbon, burnishing stone, various shell remains, coprolites, ceramic panpipes and disks. Ceramics recovered consisted in 20.06% of the analyzed UE6 sherds (n=631). The majority of sherds were from Ware Group 6, 8, 7, and 9 (Figure 81).

**Stratum 2 Level 4** artifacts included mammal, fish, and bird bones, carbon, burnishing stone, flakes, manos, various shell remains, coprolites, ceramic disks, and panpipes. Ceramics
recovered consisted in 51.61% the analyzed UE6 sherds (n=1598). The majority of sherds were from Ware Group 6, followed by groups 8, 1, 10, 3, 7, 9, and 2 (Figure 82).
## Table 1. Chronology of the Central Andes

<table>
<thead>
<tr>
<th>Era</th>
<th>Central Andes</th>
<th>Associated Centers</th>
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</thead>
<tbody>
<tr>
<td>1470-1535 C.E.</td>
<td>Late Horizon</td>
<td>Inca</td>
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<tr>
<td></td>
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<td>Chimu</td>
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<tr>
<td>1100-1470 C.E.</td>
<td>Late Intermediate Period</td>
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<td>Chimu</td>
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<td>Lambayeque</td>
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<td>Lupaca</td>
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<td></td>
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<td>Colla</td>
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<tr>
<td>600-1100 C.E.</td>
<td>Middle Horizon</td>
<td>Wari</td>
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<td>Tiwanaku</td>
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<td>Moche</td>
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<td></td>
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<td>Nasca</td>
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<tr>
<td>200 B.C.E.-600 C.E.</td>
<td>Early Intermediate Period</td>
<td>Moche</td>
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<td>Lima</td>
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<td>Recuay</td>
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<td></td>
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<td>Paracas</td>
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<tr>
<td>900-200 B.C.E.</td>
<td>Early Horizon</td>
<td>Chavín</td>
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<td>Pacopampa</td>
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<td></td>
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<td>Kuntur Wasi</td>
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<tr>
<td>1800-900 B.C.E.</td>
<td>Initial Period</td>
<td>Sechin</td>
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<td>Kotosh</td>
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<td>Caral</td>
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<td>Manchay</td>
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<td>El Paraiso</td>
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<tr>
<td>3000-1800 B.C.E.</td>
<td>Preceramic</td>
<td>Paloma</td>
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<td>Aspero</td>
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</tbody>
</table>
Table 2. Chronology of the Nepeña Valley in comparison to the Central Andes and the periods defined by the Virú Valley Project

<table>
<thead>
<tr>
<th>Nepeña Valley</th>
<th>Central Andes</th>
<th>North Central Coast (Billman 2002)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Early Intermediate Period (200 B. C. E.-600 C. E.)</td>
<td>Late Salinar (Puerto Moorin, 200-1 B. C. E.)</td>
</tr>
<tr>
<td>B. C. E. 50</td>
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<td>100</td>
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<tr>
<td>150</td>
<td>Samanco (450-150 B. C. E.)</td>
<td>Early Salinar (Puerto Moorin, 400-200 B. C. E.)</td>
</tr>
<tr>
<td>200</td>
<td>Nepeña (800-450 B. C. E.)</td>
<td></td>
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<tr>
<td>250</td>
<td>Nepeña (800-450 B. C. E.)</td>
<td>Late Guañape (800-400 B. C. E.)</td>
</tr>
<tr>
<td>300</td>
<td>Cerro Blanco (1100-800 B. C. E.)</td>
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<td>350</td>
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<td>950</td>
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<tr>
<td>1000</td>
<td>Initial Period (1800-900 B. C. E.)</td>
<td>Middle Guañape (1300-800 B. C. E.)</td>
</tr>
<tr>
<td>1050</td>
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<tr>
<td>1100</td>
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<td>1450</td>
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<tr>
<td>1500</td>
<td></td>
<td>Early Guañape (1800-1300 B. C. E.)</td>
</tr>
</tbody>
</table>
Table 3. Plain Ware Groups defined by Strong and Evans (1952)

<table>
<thead>
<tr>
<th>Ware</th>
<th>Paste</th>
<th>Surface</th>
<th>Vessel Form</th>
<th>Chronology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guañape Black Plain</td>
<td>Hand modeled, moderate amount coarse sand, poorly sorted</td>
<td>Reddish-brown to sooty black, rough exterior, smoothed interior</td>
<td>Large jars, round jar with short neck, open bowls</td>
<td>Beginning of the Guañape Period</td>
</tr>
<tr>
<td>Guañape Red Plain</td>
<td>Hand modeled, large amount coarse sand, poorly sorted</td>
<td>Brownish-red to light orange-red, rough exterior, hand smoothed when wet</td>
<td>Same as Guañape Black Plain</td>
<td>Similar to Guañape Black Plain</td>
</tr>
<tr>
<td>Guañape Coarse Ware</td>
<td>Hand modeled, coiled, large amount coarse sand, poorly sorted</td>
<td>Reddish-brown to brownish-black, rough exterior, hard tooling</td>
<td>Similar to Guañape Black and Red Plain, but thicker</td>
<td>Small quantities through Guañape, ends in Early Puerto Moorin</td>
</tr>
<tr>
<td>Ancón Polished Black</td>
<td>Hand modeled, coiled, fine white quartz, well sorted</td>
<td>Light grey to reddish-brown, highly polished exterior, interior smoothed</td>
<td>Bottles (most common), short necked round jars, bowls</td>
<td>Later Guañape Period</td>
</tr>
<tr>
<td>Huacapongo Polished Plain</td>
<td>Hand formed, small amounts fine sand, well sorted</td>
<td>Orange-red to brownish-red, firing clouds, interiors well scraped, exterior smoothed and burnished</td>
<td>Large jars with differing rim forms, small round jars, open bowls</td>
<td>Latter third of Guañape Period through first half of Gallinazo Period</td>
</tr>
<tr>
<td>Sarraque Cream</td>
<td>Hand modeled, large amount sand, well sorted</td>
<td>Reddish-brown, with grey core, smoothed surface, interior rougher than exterior</td>
<td>Jar with round body and funnel-shaped rim, jar with vertical neck, small jars with short neck</td>
<td>End of Puerto Moorin through Gallinazo and Huancaco Periods</td>
</tr>
<tr>
<td>Gloria Polished Plain</td>
<td>Hand modeled, moderate amount fine sand, well sorted</td>
<td>Bright orange-red, well polished exterior, smoothed interior</td>
<td>Small jars with short neck, round bottle, “corn popper”</td>
<td>End of Puerto Moorin through Estera Period</td>
</tr>
<tr>
<td>Ware</td>
<td>Paste</td>
<td>Surface</td>
<td>Vessel Form</td>
<td>Chronology</td>
</tr>
<tr>
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</tr>
<tr>
<td>Castillo Plain</td>
<td>Hand modeled, coiled, large amount fine sand, well sorted</td>
<td>Bright orange-red to brownish-red, smoothed interior, smoothed exterior</td>
<td>Round jar with short neck, jar with long neck, egg-shaped jar with wide mouth, small bowl, globular jar, globular bottle</td>
<td>Late Puerto Moorin through Tomaval Period</td>
</tr>
<tr>
<td>Valle Plain</td>
<td>Hand modeled, large amounts medium coarse sand, well sorted</td>
<td>Brick red, slightly smoothed interior and exterior</td>
<td>Egg-shaped jar, large mouthed jar, globular vessel with long neck, shallow plate, deep bowl</td>
<td>Gallinazo Period through Tomoval Period</td>
</tr>
<tr>
<td>Virú Plain</td>
<td>Hand modeled, coiled, small gravel, poorly sorted</td>
<td>Dull orange-red to dark grey, rough, irregular interior and exterior</td>
<td>Wide-mouth jars with distinct rims, round bowl</td>
<td>Gallinazo and Huancaco through Estera Period</td>
</tr>
<tr>
<td>Queneto Polished Plain</td>
<td>Hand modeled, molded bowls, medium amount fine sand, well sorted</td>
<td>Brownish-black to black, highly polished exterior, smoothed interior</td>
<td>Open bowls, shouldered bowl, short necked jar, other unidentified forms</td>
<td>Early Gallinazo Period through Mochica through Colonial Period</td>
</tr>
<tr>
<td>Tomoval Plain</td>
<td>Hand modeled, coiled, molded, moderate amount medium coarse sand, well sorted</td>
<td>Black to grey, smoothed interior and exterior</td>
<td>Round bowl with curved or straight sides, shouldered bowl, short necked jar</td>
<td>Gallinazo Period through Tomoval Period</td>
</tr>
</tbody>
</table>
Table 4. Decorated Ware Typed defined by Strong and Evans (1952)

<table>
<thead>
<tr>
<th>Ware</th>
<th>Paste</th>
<th>Decoration</th>
<th>Vessel Form</th>
<th>Chronology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guañape Finger-Pressed Rib</td>
<td>Hand modeled, large amounts coarse sand, poorly sorted, red-brown to black-brown</td>
<td>Appliquéd ribs of clay decorated with finger-pressed punctations, ribs are irregular and rough</td>
<td>Large jars with constricted mouths, jars with short outcurving necks</td>
<td>Early Guañape Period (earliest decorated ware in Virú Valley) through Late Guañape</td>
</tr>
<tr>
<td>Guañape Incised Rib</td>
<td>Hand modeled, large amounts coarse sand, poorly sorted, Red-brown to black-brown</td>
<td>Incised ribs placed in standardized positions on vessel surface, appliquéd or modeled</td>
<td>Large jars with constricted mouths, jars with outslanting rims</td>
<td>Early Guañape through Late Guañape Period</td>
</tr>
<tr>
<td>Guañape Modeled</td>
<td>Hand modeled, large amounts very coarse sand, poorly sorted, red-brown to black</td>
<td>Modeled bands, ridges, swollen sides, appliquéd nodes with punctuation, irregular application of design</td>
<td>Jars with constricted mouths, jars with short curved necks</td>
<td>Early Guañape through Late Guañape Period</td>
</tr>
<tr>
<td>Guañape Punctate</td>
<td>Hand modeled, large amounts medium to coarse sand, red-brown to sooty black</td>
<td>Punctuation made with sharp or blunt-pointed instrument held vertically or at an angle to the surface, varied size and shape</td>
<td>Large jars with constricted mouths</td>
<td>Early Guañape through Late Guañape Period</td>
</tr>
<tr>
<td>Guañape Zoned Punctate</td>
<td>Hand modeled and coiled, medium-to coarse sand, red-brown to sooty black</td>
<td>Straight or curvilinear lines enclosing a zone of punctuation, size and shape varies</td>
<td>Large jars with constricted mouths, jars with slightly outslanting rims</td>
<td>Early and Middle Guañape through Late Guañape Period</td>
</tr>
<tr>
<td>Ancón Fine-Line Incised</td>
<td>Hand modeled, coiled, medium and coarse sand, poorly sorted, orange-red to black, usual brown-black</td>
<td>Fine incised lines arranged in simple geometric patterns. Placed in zone from shoulder to the rim on outside of vessel</td>
<td>Large jars with constricted mouths, necked jars, open shallow bowls, flat beakers, globular pots, stirrup spout bottles</td>
<td>Early Guañape through Late Guañape Period</td>
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</tr>
<tr>
<td>Ancón Broad-Line Incised</td>
<td>Hand modeled, coiled, fine sand, good to medium sorting, red-brown to black</td>
<td>Geometric and possibly naturalistic designs outlined by broad incised lines</td>
<td>Jars with short curved necks, globular jar with neck or stirrup spout, bowls, ovid jars</td>
<td>Middle Guañape through Late Guañape Period</td>
</tr>
<tr>
<td>Ancón Brushed</td>
<td>Hand modeled, very fine sand, well sorted, brown to black, with reddish-brown interior</td>
<td>Unfired surface brushed with fine-toothed implement producing parallel lines, alone or with geometric designs</td>
<td>Globular vessels</td>
<td>End of Middle Guañape Period</td>
</tr>
<tr>
<td>Ancón Engraved</td>
<td>Hand modeled, fine sand, well sorted, brownish-black with grey interior</td>
<td>Geometric lines and crosshatching engraved after firing and polishing</td>
<td>No definite forms</td>
<td>End of Middle Guañape Period</td>
</tr>
<tr>
<td>Ancón Molded</td>
<td>Hand molded, large amount fine sand, red-brown to black, grey interior</td>
<td>Modeled nodes on well polished vessel. Ribs pointing towards rim, outlined by incised lines</td>
<td>Jars with short necks or stirrup spouts</td>
<td>Middle Guañape Period</td>
</tr>
<tr>
<td>Puerto Moorin White-on-Red</td>
<td>Hand modeled, coiled, medium fine to coarse sand, medium sorting, light brick red to brown and grey</td>
<td>Simple white, geometric designs on red background. Some incising and modeling</td>
<td>Jars with various rim shapes, globular jars, simi-angular bottle with strap handle</td>
<td>Puerto Moorin (Salinar) through Gallinazo Period</td>
</tr>
<tr>
<td>Gallinazo Negative</td>
<td>Hand modeled, fine and medium sand, well sorted, brick red</td>
<td>Geometric negative designs made with negative techniques, appliques and modeled heads, incising and punctate</td>
<td>Rounded jars, open bowls, corn poppers, box-shaped vessels, spouted vessels, effigy jars, stirrup spout bottles</td>
<td>Gallinazo Period through Huancaco (Mochica) Period</td>
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<tr>
<td>Carmelo Negative</td>
<td>Hand modeled, fine sand, well sorted, light brick red interior, brick red exterior</td>
<td>Negative designs outlined in black on white slip, narrow black areas, simple geometric designs</td>
<td>Corn popper, rounded jars</td>
<td>Gallinazo Period</td>
</tr>
<tr>
<td>Castillo Molded</td>
<td>Hand molded, fine to medium sand, medium sorting, orange-red to black</td>
<td>Modeling and appliqué as basic form, gouging, incising, and punctating to finish design. Variety of substyles</td>
<td>Jars with varying rims, effigy jars, effigy bottles, spouted bottles, bird jars, stirrup spout bottles</td>
<td>Middle Puerto Moorin through Huancaco Period</td>
</tr>
<tr>
<td>Castillo Incised</td>
<td>Hand modeled, fine sand, well sorted, grey to bright brick red</td>
<td>Geometric designs, incising but also punctaing, some impression. Variety of substyles</td>
<td>Large jars in various shapes, bowls, graters</td>
<td>Middle Puerto Moorin through Huancaco Period</td>
</tr>
<tr>
<td>Gallinazo Broad-Line Incised</td>
<td>Hand-molded, fine sand, well sorted, light orange-red to black</td>
<td>Bold geometric designs, broad incised lines, alone or with punctuation</td>
<td>Bowls, rectilinear shaped-vessels</td>
<td>Gallinazo through early Huancaco Periods</td>
</tr>
<tr>
<td>Huancaco Red and White</td>
<td>Hand modeled, molded, fine sand, well sorted, red to white</td>
<td>Painting, modeling, or molding, uses geometric and naturalistic designs</td>
<td>Floreros, rounded jars, narrow spouted bottles, corn popper, double body bottle, bowls, medium jars, stirrup spout bottles, effigy jars, whistle spout bottle</td>
<td>Huancaco (Mochica) Period, although sporadic in end of Gallinazo Period</td>
</tr>
<tr>
<td>Strong and Evans (1952) Decorated Wares of the Virú Valley (cont.)</td>
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<tr>
<td><strong>Huancaco Red, White, Black</strong></td>
<td>Hand modeled, molded, fine sand, well sorted, red</td>
<td>Painting, modeling, or molding. Naturalistic or geometric white and black painted on red base</td>
<td>Large jars, medium jars, spouted bottles, stirrup spout bottles, effigy jars, effigy bottles, double body bottle</td>
<td>Huancaco (Mochica) Period</td>
</tr>
<tr>
<td><strong>Huancaco White and Black</strong></td>
<td>Hand modeled, fine sand, good sorting, red-brown to black</td>
<td>Broad white lines and semicircles on modeled or unmodeled sherds</td>
<td>Jars with medium-sized swollen necks, effigy jars</td>
<td>Huancaco Period</td>
</tr>
<tr>
<td><strong>Huancaco Misc. Modeled</strong></td>
<td>Molding and hand modeled, fine and very fine sand, well sorted, orange-red to grey</td>
<td>Miscellaneous modeled pieces</td>
<td>Tall-necked effigy vessels, effigy vessels</td>
<td>Huancaco Period</td>
</tr>
<tr>
<td><strong>Castillo White, Red, Orange</strong></td>
<td>Hand modeled, fine sand, well sorted, orange-red to black</td>
<td>Linear geometric designs in white and orange, positive painted on a red base</td>
<td>Bowls, rounded jars, tripod effigy vessels, spout and head bridge effigy bottles</td>
<td>Middle Gallinazo Period</td>
</tr>
<tr>
<td><strong>Callejón Three-Color Negative</strong></td>
<td>Hand modeled, fine sand, well sorted, red-brown interior, painted exterior</td>
<td>Black negative design on white slip overpainted with wide brown bands, complicated design</td>
<td>No definite forms</td>
<td>Middle Gallinazo Period</td>
</tr>
<tr>
<td><strong>Callejón Unclassified</strong></td>
<td>Variation of pastes and colors</td>
<td>1. Negative Painted wares</td>
<td>1. bowls, corn popper</td>
<td>Middle Gallinazo, probably other periods too</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Positive Painted Wares</td>
<td>2. bowls, small jars</td>
<td></td>
</tr>
</tbody>
</table>
Table 5. Early Horizon decorative techniques identified in the Nepeña Valley (Proulx 1973:23, 25-26)

<table>
<thead>
<tr>
<th>Decoration</th>
<th>Description</th>
<th>Location</th>
<th>Time Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circle and Dot</td>
<td>Unraised circle and dot, made by stamping a hollow reed on the vessel before firing, with a dot made in the middle of the circle</td>
<td>Nepeña Valley, Casm aValley, Chavin de Huántar, Ancón, Supe, Kotosh, Cajamarca area</td>
<td>Early Horizon, but was revived in the Middle Horizon continuing in to the Late Intermediate Period</td>
</tr>
<tr>
<td>Incision</td>
<td>Deep incision with broad and narrow lines on blackware</td>
<td>Cerro Blanco and Punkuri</td>
<td>Early Horizon</td>
</tr>
<tr>
<td></td>
<td>Shallow “scratch-like” incision in random patterns</td>
<td>Kushipampa, PV 31-157, PV 31-159,PV 31-159, PV 31-159, PV 31-159</td>
<td>Early Horizon</td>
</tr>
<tr>
<td></td>
<td>Incised geometric designs or as borders for punctuation</td>
<td>PV 31-175 West, PV 31-159, throughout Peru</td>
<td>Early Horizon</td>
</tr>
<tr>
<td></td>
<td>Raised nodes or fillets decorated with incision or punctation</td>
<td>PV 31-56, PV 31-157, PV 157 West, throughout Peru</td>
<td>Early Horizon</td>
</tr>
<tr>
<td></td>
<td>Short incised dash-like lines</td>
<td>PV 31-48, PV 31-61, PV 31-175 West, throughout Peru</td>
<td>Early Horizon</td>
</tr>
<tr>
<td>Pattern Burnishing</td>
<td>Criss-crossing smoothing of a damp surface with a small pebble in a restricted area</td>
<td>Kushipampa, PV31-38, PV 31-48, PV 31-159</td>
<td>Early Horizon</td>
</tr>
</tbody>
</table>
Table 6. Early Horizon ceramic wares identified at Huambacho (Chicoine 2006)

<table>
<thead>
<tr>
<th>Ware</th>
<th>Paste</th>
<th>Color and Firing</th>
<th>Finish and Decoration</th>
<th>Vessel Forms</th>
<th>Related to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ware A</td>
<td>Moderate amounts of medium and some fine or coarse sand inclusions with quartz</td>
<td>Red to black interior and exterior. Open air firing most common</td>
<td>Smoothed, polished, or wiped exterior, wiped, irregular, smooth, polished, fingered, or padded interior</td>
<td>Serving vessels: bottles, bowls, and jars</td>
<td>Proulx’s Nepeña Plain Black</td>
</tr>
<tr>
<td>Ware B</td>
<td>Moderate to abundant amounts of fine or medium sand and some very fine and coarse sand with quartz</td>
<td>Red to black interior and exterior. Oxidizing atmosphere most common</td>
<td>Highly polished exterior surface, occasionally with a cream or red slip applied pre-polishing</td>
<td>Serving vessels: bottles, jars and bowls</td>
<td>Proulx’s Nepeña Plain Black, Strong and Evans’ Ancón Polished Black</td>
</tr>
<tr>
<td>Ware C</td>
<td>Moderate amounts of coarse or very coarse gravel, sand, and quartz</td>
<td>Dark grey to red interior with a slightly lighter exterior. Oxidizing atmosphere fired with mouth down</td>
<td>Interior and exterior surfaces wiped and sometimes smoothed, infrequent cream and red slip, infrequent perforation, punctuation, application, fingerling</td>
<td>Cooking and storage vessels: jars</td>
<td>Strong and Evans’ Guañape Coarse Ware</td>
</tr>
<tr>
<td>Ware D</td>
<td>Moderate to abundant amounts of fine, medium, very fine sand and shell, occasional quartz, mica, and gravel</td>
<td>Red to black (most common). Reduction most common</td>
<td>Highly polished, decoration: zoning, textile impressed, stamped circle-and-dot, cylinder stamped, incised, appliqué, punctuation</td>
<td>Serving vessels: bottles, bowls, jars</td>
<td>All of Proulx’s decorated types excluding Nepeña Painted Incised</td>
</tr>
<tr>
<td>Ware E</td>
<td>Moderate amounts of medium or coarse sand, gravel, and quartz</td>
<td>Red (more common) to black interior, black exterior. Poorly controlled oxidizing atmosphere</td>
<td>Pattern burnished lines in cross-hatch pattern, using “rocking” motion leaving a “V” design, or in random patterns. Infrequent pre-firing incisions and post-fire scratches along patterned lines</td>
<td>Serving and cooking vessels: bowls, jars, neckless jars</td>
<td>Kushipampa Pattern-Burnished, Polished Wiped, Post-fire scratched</td>
</tr>
</tbody>
</table>
Table 7. Decorative techniques identified at Cerro Blanco (Ikehara 2007)

<table>
<thead>
<tr>
<th>Decoration</th>
<th>Technique</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incision</td>
<td>Grooved incised lines</td>
<td>Made in a leather hard paste with a rounded instrument</td>
</tr>
<tr>
<td></td>
<td>Fine grooved incised lines</td>
<td>Made in a leather hard paste with a round instrument less than 2mm in width</td>
</tr>
<tr>
<td></td>
<td>Sharp incised lines</td>
<td>Made in a leather hard paste with a sharp object less than 1mm in width</td>
</tr>
<tr>
<td></td>
<td>Incised lines in a dry paste</td>
<td>Made on a dry paste over a polished or burnished surface with a hard, pointed instrument</td>
</tr>
<tr>
<td></td>
<td>Post-firing incised lines</td>
<td>Made on a ceramic after firing with a hard, pointed instrument</td>
</tr>
<tr>
<td>Relief Decoration</td>
<td>Low Relief</td>
<td>The addition of paste over the surface of a vessel, then modeled. Or, leaving excess clay in the vessel wall and removing the excess to create the design. Design thickness is between 2-3mm</td>
</tr>
<tr>
<td></td>
<td>High Relief</td>
<td>Similar to low relief but with a thickness greater than 3mm</td>
</tr>
<tr>
<td></td>
<td>Appliqué</td>
<td>Decoration based on the addition of small portions of clay to give a thick, three-dimensional texture to the surface of the vessel</td>
</tr>
<tr>
<td>Impression</td>
<td>Impression</td>
<td>Made with an instrument that has a design or texture, applied with pressure over a leather hard vessel</td>
</tr>
<tr>
<td></td>
<td>Impressed cane circles</td>
<td>Made with the end of a cut cane reed, resulting in a circular design</td>
</tr>
<tr>
<td></td>
<td>Fine undulating impression</td>
<td>Using a curved, flat instrument that has textured edge, such as a bivalve shell, design is made by pressing the edge in a zigzag pattern over a polished or burnished leather hard surface</td>
</tr>
<tr>
<td></td>
<td>Thick undulating impression</td>
<td>Similar to the above but with a thicker instrument</td>
</tr>
<tr>
<td>Patterned Decoration</td>
<td>Brushed lines</td>
<td>Using a brush like instrument with non-flexible fibers, this creates a striated texture</td>
</tr>
<tr>
<td></td>
<td>Combed lines</td>
<td>Using a comb like instrument with rigid, spaced, pointed tines, it is dragged across the surface to create somewhat deep, well defined, constant lines</td>
</tr>
<tr>
<td></td>
<td>Crude dots</td>
<td>A thick, somewhat pointed instrument is used to create droplet shaped incisions in a distributed area</td>
</tr>
<tr>
<td></td>
<td>Fine lineal dots</td>
<td>Using a tool similar to that of the combed lines, dots are placed in regularly spaced rows</td>
</tr>
<tr>
<td></td>
<td>Spaced sharp incised lines</td>
<td>With a sharp instrument, vertical lines are drawn 2-3 cm long, widely spaced</td>
</tr>
<tr>
<td>Painted Decoration</td>
<td>Painting</td>
<td>Pre-firing painting using clay and other minerals in red, black, brown, and grey-black colors</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Post-firing painting</td>
<td>Post-firing painting in red and white. Red clay is possibly hematite and white could be white clay, limestone, or gypsum. Generally applied over incision</td>
</tr>
<tr>
<td>Sculptured Decoration</td>
<td>Manipulation of a vessel to represent an object, accompanied by sharp incisions on the surface</td>
<td></td>
</tr>
</tbody>
</table>
Table 8. Ceramic pastes identified at Cerro Blanco (Ikehara 2007)

<table>
<thead>
<tr>
<th>Paste Group</th>
<th>Paste</th>
<th>Porosity</th>
<th>Inclusions</th>
<th>Size of Inclusions</th>
<th>Color and Firing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paste A</td>
<td>Very fine</td>
<td>Medium to low</td>
<td>Quartz, black stone, white opaque inclusions, gold mica</td>
<td>Very fine</td>
<td>Light grey, good firing</td>
</tr>
<tr>
<td>Paste B</td>
<td>Fine and sandy</td>
<td>Medium to low</td>
<td>Quartz, black stone, gold mica</td>
<td>Fine</td>
<td>Grey to brown</td>
</tr>
<tr>
<td>Paste C</td>
<td>Sandy</td>
<td>Medium to low</td>
<td>Quartz, black stone, opaque black inclusions, gold mica</td>
<td>Medium and coarse</td>
<td>Brown to beige, oxidizing atmosphere</td>
</tr>
<tr>
<td>Paste D</td>
<td>Coarse</td>
<td>Medium</td>
<td>Opaque black inclusion, quartz, opaque white inclusions, black stone, iron oxide, mica</td>
<td>Very coarse</td>
<td>Beige</td>
</tr>
<tr>
<td>Paste E</td>
<td>Coarse</td>
<td>Medium</td>
<td>Quartz, opaque round black inclusions, gold mica</td>
<td>Very coarse</td>
<td>Brown, red-brown, beige</td>
</tr>
<tr>
<td>Paste F</td>
<td>Fine</td>
<td>Very high</td>
<td>Quartz, black stone, grey opaque inclusion, gold mica, vegetation</td>
<td>Medium</td>
<td>Grey, reducing atmosphere</td>
</tr>
<tr>
<td>Paste G</td>
<td>Sandy</td>
<td>Very high</td>
<td>Quartz, opaque black inclusion, mica</td>
<td>Medium to coarse</td>
<td>Grey, reducing atmosphere</td>
</tr>
<tr>
<td>Paste H</td>
<td>Fine</td>
<td>Very compact</td>
<td>Quartz, black stone, iron oxide, mica</td>
<td>Fine</td>
<td>Brown and dark brown</td>
</tr>
<tr>
<td>Paste I</td>
<td>Very coarse</td>
<td>High</td>
<td>Opaque quartz</td>
<td>Coarse and granular</td>
<td>Orange-red</td>
</tr>
<tr>
<td>Paste K</td>
<td>Coarse</td>
<td>Compact</td>
<td>Beige ground quartzite</td>
<td>Coarse to very coarse</td>
<td>Brown</td>
</tr>
<tr>
<td>Paste L</td>
<td>Coarse</td>
<td>Compact</td>
<td>Transparent quartz</td>
<td>Very coarse</td>
<td>Brown, brown with violet tones</td>
</tr>
<tr>
<td>Paste M</td>
<td>Fine</td>
<td>Compact</td>
<td>Scarce quartz and black stone</td>
<td>-----</td>
<td>-----</td>
</tr>
</tbody>
</table>
Table 9. Summary of the analysis completed by Quispe of the ceramics of the Test Pits of Caylán and the closest corresponding paste group from this 2015 thesis

<table>
<thead>
<tr>
<th>Paste Group</th>
<th>Quantity</th>
<th>Percent of Analyzed</th>
<th>Paste</th>
<th>Porosity</th>
<th>Inclusions</th>
<th>Size of Inclusions</th>
<th>Angularity</th>
<th>Sorting</th>
<th>Color</th>
<th>Corresponds to 2015 Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>3990</td>
<td>45.17</td>
<td>Sandy</td>
<td>Medium</td>
<td>Mixed sand and mica</td>
<td>Very coarse</td>
<td>Subangular</td>
<td>Medium</td>
<td>Dark red and brown</td>
<td>C</td>
</tr>
<tr>
<td>D</td>
<td>1360</td>
<td>15.40</td>
<td>Sandy</td>
<td>Semi-compact</td>
<td>Mixed sand and mica</td>
<td>Medium</td>
<td>Subangular</td>
<td>Good</td>
<td>Light and dark brown</td>
<td>D</td>
</tr>
<tr>
<td>B</td>
<td>701</td>
<td>7.94</td>
<td>Sandy</td>
<td>Semi-compact</td>
<td>White sand</td>
<td>Medium to coarse</td>
<td>Subangular</td>
<td>Medium</td>
<td>Sandwich of red with black interior</td>
<td>B</td>
</tr>
<tr>
<td>E</td>
<td>573</td>
<td>6.49</td>
<td>Sandy</td>
<td>Semi-porous</td>
<td>Mixed sand and mica</td>
<td>Medium to fine</td>
<td>Subangular</td>
<td>Good</td>
<td>Dark brown</td>
<td>E</td>
</tr>
<tr>
<td>F</td>
<td>561</td>
<td>6.35</td>
<td>Coarse</td>
<td>Semi-porous</td>
<td>Quartzite and Mica</td>
<td>Coarse to very coarse</td>
<td>Subrounded</td>
<td>Medium</td>
<td>Red to brown</td>
<td>F</td>
</tr>
<tr>
<td>O1</td>
<td>522</td>
<td>5.91</td>
<td>Medium</td>
<td>Compact</td>
<td>Mixed sand and quartz</td>
<td>Medium to coarse</td>
<td>Subangular</td>
<td>Medium</td>
<td>Pink and orange</td>
<td>O, U, V, W</td>
</tr>
<tr>
<td>A1</td>
<td>405</td>
<td>4.59</td>
<td>Sandy</td>
<td>Semi-porous</td>
<td>White and beige impurities</td>
<td>Medium</td>
<td>Subangular</td>
<td>Poor</td>
<td>Red and light brown</td>
<td>A or X</td>
</tr>
<tr>
<td>Paste Group</td>
<td>Quantity</td>
<td>Percent of Analyzed</td>
<td>Paste</td>
<td>Porosity</td>
<td>Inclusions</td>
<td>Size of inclusions</td>
<td>Angularity</td>
<td>Sorting</td>
<td>Color</td>
<td>Corresponds to 2015 Analysis</td>
</tr>
<tr>
<td>-------------</td>
<td>----------</td>
<td>---------------------</td>
<td>-------</td>
<td>----------</td>
<td>------------</td>
<td>-------------------</td>
<td>------------</td>
<td>---------</td>
<td>-------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>P</td>
<td>290</td>
<td>3.28</td>
<td>Coarse</td>
<td>Porous</td>
<td>White and black sand</td>
<td>Coarse</td>
<td>Subangular</td>
<td>Good</td>
<td>Red and brown</td>
<td>P or T</td>
</tr>
<tr>
<td>L</td>
<td>111</td>
<td>1.26</td>
<td>Medium</td>
<td>Compact</td>
<td>Crushed black stone and white sand</td>
<td>Coarse</td>
<td>Angular</td>
<td>Medium</td>
<td>Orange</td>
<td>L</td>
</tr>
<tr>
<td>R</td>
<td>86</td>
<td>0.97</td>
<td>Coarse</td>
<td>Compact</td>
<td>Round quartz</td>
<td>-----</td>
<td>Subrounded and rounded</td>
<td>Good</td>
<td>Orange and beige</td>
<td>R</td>
</tr>
<tr>
<td>A2</td>
<td>62</td>
<td>0.70</td>
<td>Sandy</td>
<td>Medium</td>
<td>White and beige impurities</td>
<td>Medium</td>
<td>Subangular</td>
<td>Poor</td>
<td>Dark brown</td>
<td>A or X</td>
</tr>
<tr>
<td>I</td>
<td>54</td>
<td>0.61</td>
<td>Sandy</td>
<td>Semi-porous</td>
<td>White Sand</td>
<td>Medium</td>
<td>Subangular</td>
<td>Good</td>
<td>Brown and grey</td>
<td>I</td>
</tr>
<tr>
<td>G</td>
<td>31</td>
<td>0.35</td>
<td>Fine</td>
<td>Compact</td>
<td>Very fine sand and mica</td>
<td>Very fine</td>
<td>Subrounded</td>
<td>Good</td>
<td>Orange</td>
<td>G</td>
</tr>
<tr>
<td>M</td>
<td>25</td>
<td>0.28</td>
<td>Very Fine</td>
<td>Compact</td>
<td>Mixed sand and mica</td>
<td>Very Fine</td>
<td>Subangular</td>
<td>Good</td>
<td>Red or orange</td>
<td>M</td>
</tr>
<tr>
<td>J</td>
<td>17</td>
<td>0.19</td>
<td>Fine</td>
<td>Compact</td>
<td>Mixed sand</td>
<td>Fine</td>
<td>Subangular</td>
<td>Very Good</td>
<td>Light Grey</td>
<td>J</td>
</tr>
<tr>
<td>H</td>
<td>13</td>
<td>0.15</td>
<td>Very Fine</td>
<td>Compact</td>
<td>Mixed sand</td>
<td>Very fine</td>
<td>Subangular</td>
<td>Very Good</td>
<td>Orange</td>
<td>H</td>
</tr>
<tr>
<td>N</td>
<td>9</td>
<td>0.10</td>
<td>Coarse</td>
<td>Porous</td>
<td>Coarse sand and mica</td>
<td>Medium to coarse</td>
<td>Subangular</td>
<td>Poor</td>
<td>Grey</td>
<td>N</td>
</tr>
<tr>
<td>Paste Group</td>
<td>Quantity</td>
<td>Percent of Analyzed</td>
<td>Paste Porosity</td>
<td>Inclusions</td>
<td>Size of Inclusions</td>
<td>Angularity</td>
<td>Sorting</td>
<td>Color</td>
<td>Corresponds to 2015 Analysis</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>----------</td>
<td>---------------------</td>
<td>----------------</td>
<td>------------</td>
<td>-------------------</td>
<td>------------</td>
<td>---------</td>
<td>-------</td>
<td>----------------------------</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>9</td>
<td>0.10</td>
<td>Medium Compact</td>
<td>Crushed black stone</td>
<td>Coarse to very coarse</td>
<td>Angular</td>
<td>Medium</td>
<td>Orange</td>
<td>K</td>
<td></td>
</tr>
<tr>
<td>O2</td>
<td>7</td>
<td>0.08</td>
<td>Medium Compact</td>
<td>Mixed sand and quartz</td>
<td>Medium to coarse</td>
<td>Subangular</td>
<td>Medium</td>
<td>Dark brown and grey</td>
<td>O, U, V, W</td>
<td></td>
</tr>
<tr>
<td>Q</td>
<td>4</td>
<td>0.05</td>
<td>Fine Semi-porous</td>
<td>Very scare inclusions</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>Tones of orange</td>
<td>Q</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>3</td>
<td>0.03</td>
<td>Medium Compact</td>
<td>Quartz, mixed sand, and black stone</td>
<td>-----</td>
<td>Subangular</td>
<td>Good</td>
<td>Orange and beige</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>8833</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Table 10. Inclusion size was identified using measurements from the Wentworth Scale and mm equivalents (adopted from Dincauze 2000:278)

<table>
<thead>
<tr>
<th>Wentworth Scale</th>
<th>Equivalents in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Granule</td>
<td>2.0 to 4.0</td>
</tr>
<tr>
<td>Very Coarse Sand</td>
<td>1.0 to 2.0</td>
</tr>
<tr>
<td>Coarse Sand</td>
<td>0.5 to 1.0</td>
</tr>
<tr>
<td>Medium Sand</td>
<td>0.25 to 0.5</td>
</tr>
<tr>
<td>Fine Sand</td>
<td>0.125 to 0.25</td>
</tr>
<tr>
<td>Very Fine Sand</td>
<td>0.0065 to 0.125</td>
</tr>
</tbody>
</table>

Table 11. Wares grouped by general inclusions, disregarding size

<table>
<thead>
<tr>
<th>Ware Groups</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>Group 4</th>
<th>Group 5</th>
<th>Group 6</th>
<th>Group 7</th>
<th>Group 8</th>
<th>Group 9</th>
<th>Group 10</th>
<th>Group 11</th>
<th>Group 12</th>
<th>Group 13</th>
<th>Group 14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed Inclusions</td>
<td>O</td>
<td>K</td>
<td>I</td>
<td>A</td>
<td>J</td>
<td>C</td>
<td>T</td>
<td>B</td>
<td>X</td>
<td>N</td>
<td>R</td>
<td>Q</td>
<td>G</td>
<td>H</td>
</tr>
<tr>
<td>Diorite/Basalt</td>
<td>U</td>
<td>L</td>
<td>P</td>
<td></td>
<td></td>
<td>D</td>
<td></td>
<td>C</td>
<td></td>
<td></td>
<td>S</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quartz</td>
<td>V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>E</td>
<td></td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feldspar</td>
<td>W</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>M</td>
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Table 12. Ware and paste groups represented by the quantity and percentage of sherds

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<th>Paste Group</th>
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Table 13. Table of the stratigraphic distribution of wares in the strata of UE4-T2 in the Montículo Principal

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<th>WARE GROUPS</th>
<th>Stratum 1</th>
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Table 14. Table of the stratigraphic distribution of wares in the strata of UE5 and its extensions in Plaza-A

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<th>Stratum 2 Level 2</th>
<th>Stratum 3</th>
<th>Stratum 4</th>
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<th>Stratum 6</th>
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<th>Stratum 1 on Floor</th>
<th>Stratum 1 Element 31</th>
<th>Stratum 2 Level A</th>
<th>Stratum 2 Level B</th>
<th>Stratum 2 Debris</th>
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<td>Stratum 2 Fill Under Ramp</td>
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Table 15. Table of the stratigraphic distribution of wares in the strata of UE6-Extension 3 in Compound-E

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<th>WARE GROUPS</th>
<th>Stratum 1</th>
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<th>Stratum 2 Level 1</th>
<th>Stratum 2 Level 2</th>
<th>Stratum 2 Level 3</th>
<th>Stratum 2 Level 4</th>
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Figure 1. Map of the location of Caylán in Nepeña Valley, Peru (modified from Chicoine 2008:318; Figure 1)
Figure 2. Photo of the view from Pañamarca the south side of the valley looking north towards Caylán (Photo by author)

Figure 3. Map of the location of Caylán in the Lower Nepeña Valley showing mountains and rivers
Figure 4. Map of the Caylán area highlighting the location of resources in the area (adopted from Google Earth)
Figure 5. Aerial orthophotograph of Caylán (Courtesy of the Ministerio de Cultura de Peru)

Figure 6. Map of raw material resources in the Nepeña Valley (modified from ONERN 1972; Instituto de Geología y Minería 1975)
Figure 7. Map of the location of test pits (triangles) and excavation units (circles and rectangles) from 2009 (green) and 2010 (red) (orthophoto courtesy of the Ministerio de Cultura de Peru)
Figure 8. Map of Caylán showing test pits (HP) and excavation units (UE) from the 2010 field season of PIAC, highlighting the units examined here (modified from Chicoine and Ikehara 2010:93; Figure 4)
Figure 9. Photo of the view of the *Montículo Principal* where UE4 is located (Chicoine and Ikehara 2010:95; Figure 8)

Figure 10. Photo of the southern side of *Montículo Principal* showing UE4 and its extensions with Terrace 2 highlighted (Chicoine and Ikehara 2010:95; Figure 9)
Figure 11. Photo of the plan view of UE 5 and Extension 1 (Chicoine and Ikehara 2010:108; Figure 29)

Figure 12. Photo of the view of UE5 Extensions 3 and 4 (Chicoine and Ikehara 2010:109; Figure 32)
Figure 13. Photo of the view of UE 6 (Chicoine and Ikehara 2010:117; Figure 41)

Figure 14. Photo of the view of UE6 and Extensions 1, 3, and 4 (Chicoine and Ikehara 2010:118; Figure 44)
Figure 15. Photo of the view of UE6 and Extensions 2, 3, 5, 6, 7, and 8 (Chicoine and Ikehara 2010:119; Figure 47)
Figure 16. Map of the location of Museo Regional de Casma Max Uhle in the Casma Valley (modified from Suárez:2010; Figure 1)
Figure 17. Photo of the *Museo Regional de Casma Max Uhle* where pottery sherds were stored and examined (Photo by author)

<table>
<thead>
<tr>
<th>Large Neckless Jar</th>
<th>Tinaja grande sin cuello</th>
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<tr>
<td>Large Necked Jar</td>
<td>Tinaja grande con cuello</td>
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Figure 18. Possible forms of jars (*tinajas*) at Caylán (Drawings by Ortiz 2012)
Figure 19. Possible forms of jugs (cántaros) at Caylán (Drawings by Ortiz 2012)

Figure 20. Possible forms of pots (ollas) at Caylán (Drawings by Ortiz 2012)
Figure 21. Possible forms of bottles (botellas) at Caylán (Drawings by Ortiz 2012)

| Stirrup Spout Bottle | Botella asa estribo |
| Simple Necked Bottle | Botella con gollete simple |

Figure 22. Possible forms of bowls (cuencos) at Caylán (Drawings by Ortiz 2012)

| Carinated Bowl | Cuenco con carenado |
| Bowl | Cuenco |
Figure 23. Possible forms of cups (*tazones*) at Caylán (Drawings by Ortiz 2012)
Figure 24. Hierarchical tree used in the field to easily classify wares based on the presence or absence of particular inclusions, Early Horizon pastes
Figure 25. Hierarchical tree used in the field to easily classify wares based on the presence or absence of particular inclusions, late intrusive pastes
Figure 26. Photos of inclusions identified in ceramic pastes. A: diorite or basalt; B: milky and clear quartzite; C: muscovite mica; D: biotite mica; E: plagioclase feldspar; F: milky and yellow quartzite; G: hematite; H: epidote. Scale 2µm (photos by author)
<table>
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<tr>
<th>Ware Group 6: Mixed basalt or diorite, quartzite, mica, and hematite inclusions in very coarse (C), coarse (D), medium (E), and fine (M) sizes.</th>
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<tr>
<td>Ware Group 8: Quartzite and mica inclusions in fine (B) and coarse (F) sizes.</td>
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<tr>
<td>Ware Group 10: Mixed inclusions with mica in a black or grey paste (N).</td>
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<tr>
<td>Ware Group 9: Mixed basalt or diorite, quartzite, mica, and feldspar inclusions (X).</td>
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<tr>
<td>Ware Group 3: Quartzite inclusions in fine (I) and coarse (P) sizes.</td>
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<tr>
<td>Ware Group 2: Basalt or diorite inclusions in very coarse (K) and coarse (L) sizes. Not pictured, but similar in composition to Ware Group 7.</td>
</tr>
<tr>
<td>Ware Group 1: Mixed basalt or diorite, quartzite, and hematite inclusions in very coarse (O), coarse (U), medium (V), and fine (W) sizes.</td>
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<tr>
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</tr>
<tr>
<td>O</td>
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<tr>
<td>U</td>
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<th>Ware Group 7: Diorite/basalt and mica inclusions (T).</th>
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<th>Ware Group 5: Mixed inclusions in a black or grey paste (J).</th>
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<th>Ware Group 4: Mixed basalt or diorite, quartzite, and feldspar inclusions (A).</th>
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Figure 27. Photos of the profile of Wares 1 through 10 and the paste groups include within them in order of most common to least
Figure 28. Photos of the profiles of the most commonly identified paste groups. D: coarse mixed inclusions with mica; E: medium mixed inclusions with mica; C: very coarse mixed inclusions with mica; F: coarse quartzite and mica; M: fine mixed inclusions with mica. Scale 3cm (photos by author)
Figure 29. Unit 4 Terrace 2 Vessel Shapes

Figure 30. Unit 5, Extension 3, and Extension 4 Vessel Shapes

206
Figure 31. Unit 6 – Extension 3 Vessel Shapes

Figure 32. Frequency of Vessel Shape in each Excavation Unit
Figure 33. Vessel Form represented by each Paste Group
Figure 34. Vessel Form represented by each Ware Group
<table>
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<th>Paste Groups</th>
<th>Olla sin Cuello</th>
<th>Olla con Cuello</th>
<th>Plato</th>
<th>Cuenco</th>
<th>Botella</th>
<th>Rallador</th>
<th>Desconocido</th>
<th>Cántaro</th>
<th>Tinaja</th>
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Figure 35. Paste Groups identified for each Vessel Form (Drawings by Ortiz 2012)
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<tr>
<th>Ware Groups</th>
<th>Olla sin Cuello</th>
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Figure 36. Ware Groups identified for each Vessel Form (Drawings by Ortiz 2012)
Figure 37. Ware Groups by Surface Finish
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<th>Punctate</th>
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<td>Incised Rib</td>
<td>Textile Impressed</td>
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<td>Textile Impressed with Polishing Delimited by Curvilinear Incision</td>
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<td>Cross-Hatch Incised Lines</td>
<td>Net Impressed</td>
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<td>Post-fired Scratches</td>
<td>Cream/White Painting Delimited by Incised Lines</td>
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Figure 38. Types of Decoration Identified at Caylán (Drawings by David Chicoine and Mary Lee Eggert)

Figure 39. Ware Groups by Decoration
Figure 40. Ware Groups represented in UE4-T2

Figure 41. Ware groups of sherds identified in UE4-T2, Stratum 1
Figure 42. Ware groups of sherds identified in UE4-T2 Stratum 1 Level 1

Figure 43. Ware groups of sherds identified in UE4-T2 Stratum A Level 4
Figure 44. Ware groups of sherds identified in UE4-T2 Stratum 2

Figure 45. Ware Groups represented in UE5 and its extensions
Figure 46. Ware groups of sherds identified in UE5 Surface

Figure 47. Ware groups of sherds identified in UE5 Stratum 1
Figure 48. Ware groups of sherds identified in UE5 Stratum 1 Level 1

Figure 49. Ware groups of sherds identified in UE5 Stratum 2
Figure 50. Ware groups of sherds identified in UE5 Stratum 2 Level 2

Figure 51. Ware groups of sherds identified in UE5 Stratum 3
Figure 52. Ware groups of sherds identified in UE5 Stratum 4

Figure 53. Ware groups of sherds identified in UE5 Stratum 5
Figure 54. Ware groups of sherds identified in UE5 Stratum 6

Figure 55. Ware groups of sherds identified in UE5-Ext3 Stratum 1 Debris
Figure 56. Ware groups of sherds identified in UE5-Ext3 Stratum 1 Level 1

Figure 57. Ware groups of sherds identified in UE5-Ext3 Stratum 1 on Floor
Figure 58. Ware groups of sherds identified in UE5-Ext3 Stratum 1 Element 31

Figure 59. Ware groups of sherds identified in UE5-Ext3 Stratum 2 Level A
Figure 60. Ware groups of sherds identified in UE5-Ext3 Stratum 2 Level B

Figure 61. Ware groups of sherds identified in UE5-Ext3 Stratum 2 Debris
Figure 62. Ware groups of sherds identified in UE5-Ext3 Stratum 3

Figure 63. Ware groups of sherds identified in UE5-Ext3 Stratum 4 Fill
Figure 64. Ware groups of sherds identified in UE5-Ext4 Stratum 1

Figure 65. Ware groups of sherds identified in UE5-Ext4 Stratum 1 Level 1
Figure 66. Ware groups of sherds identified in UE5-Ext4 Stratum 1 Over Possible Floor

Figure 67. Ware groups of sherds identified in UE5-Ext4 Stratum 2 Level A
Figure 68. Ware groups of sherds identified in UE5-Ext4 Stratum 2 Level B

Figure 69. Ware groups of sherds identified in UE5-Ext4 Stratum 2 Fill Under Floor
Figure 70. Ware groups of sherds identified in UE5-Ext4 Stratum 2 Fill Under Ramp

Figure 71. Ware groups of sherds identified in UE5-Ext4 Stratum 2 Fill Under Floor 1 and Ramp
Figure 72. Ware groups of sherds identified in UE5-Ext4 Stratum 3 Floor 2

Figure 73. Ware groups of sherds identified in UE5-Ext4 Stratum 3 Under Floor
Figure 74. Ware groups of sherds identified in UE5-Ext4 Stratum 3 Fill Under Ramp

Figure 75. Ware groups of sherds identified in UE5-Ext4 Stratum 4 Under Floor
Figure 76. Ware Groups represented in UE6-Ext3

Figure 77. Ware groups of sherds identified in UE6-Ext3 Stratum 1 Debris
Figure 78. Ware groups of sherds identified in UE6-Ext3 Stratum 1

Figure 79. Ware groups of sherds identified in UE6-Ext3 Stratum 2 Level 1
Figure 80. Ware groups of sherds identified in UE6-Ext3 Stratum 2 Level 2

Figure 81. Ware groups of sherds identified in UE6-Ext3 Stratum 2 Level 3
Figure 82. Ware groups of sherds identified in UE6-Ext3 Stratum 2 Level 4
Michelle Nicole Miller was born in Knoxville, Tennessee, in 1990 to Thomas D. Miller and Mary M. Couch. Michelle received a Bachelor of Arts in Anthropology and a Bachelor of Arts in Spanish from Auburn University in 2012. She attended Lund University in Sweden for courses in Virtual Reality, GIS, and Digital Archaeology in 2014. She has four seasons of archaeological experience on the North Coast of Peru from 2011 through 2014. Her current research interests include digital archaeology, ceramic studies, and development of cultures on the Andean coast. While at Louisiana State University, Michelle was awarded a Robert C. West Graduate Student Field Research Scholarship from the Department of Geography and Anthropology at Louisiana State University. She presented preliminary results of this thesis at the 81st Annual Meeting of the Society for American Archaeology titled Preliminary Results on Pottery Technology through Macroscopic Classification at the Early Horizon Center of Caylán, Coastal Ancash, Peru with David Chicoine. Michelle plans on continuing to work in archaeology, focusing on the development and interaction of cultures on the coast of Peru.