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Statecraft in the Virú Valley, Peru, in the First Millennium A.D.

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Graduate Program in Anthropology

A thesis submitted in partial fulfillment of the requirements for the degree in Doctor of Philosophy

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STATECRAFT IN THE VIRÚ VALLEY, PERU, IN THE FIRST MILLENNIUM A.D.

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by

Jordan T. Downey

Graduate Program in Anthropology

A thesis submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy

The School of Graduate and Postdoctoral Studies
The University of Western Ontario
London, Ontario, Canada

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Abstract

This dissertation is an archaeological study of statecraft in the Virú Valley, Peru, during the Early Intermediate Period (ca. 400 B.C. – A.D. 800). Virú was the subject of an influential research program in the 1940s (the Virú Valley Project), which produced important datasets for studying early complex societies in the region. But recent work has begun to upend many of the original conclusions, pointing to the need for a thorough review of the chronological foundation on which they rested, and calling for the re-analysis of ancient settlement patterns and infrastructure projects as proxies of the increasing centralization of authority during this key period of Andean prehistory.

The starting point for this research is Gordon Willey’s (1953) settlement pattern study and James Ford’s (1949) ceramic seriation—what I call the Ford-Willey sequence. These were seminal works but their conclusions are no longer entirely tenable. The first part of this dissertation re-analyses and updates Ford’s work. It is concluded that corporate and domestic ware ceramics are fundamentally different classes of object that developed along separate timescales and should not be seriated together, that the Virú Valley sequence shows far more continuity than the Ford-Willey sequence indicated, and that the period from ca. 400 B.C. – A.D. 750 should be considered a single cultural sequence—Virú—with an Early, Middle, and Late phase. This updated cultural sequence for Virú provides a more reliable scheme for dating settlement patterns than was previously available. The second part of this dissertation explores Early and Middle Virú statecraft by mapping sites using satellite imagery and Geographic Information Systems (GIS) software. It is concluded that the valley was unified into a single polity with its capital at the Gallinazo Group during the Middle Virú Period, and that this polity sponsored a program of infrastructure building to materialize its power and to develop political authority over the valley.

Keywords
Andes, Andean archaeology, Early Intermediate Period, early states, Gallinazo, Geographic Information Systems (GIS), Gordon Willey, irrigation, James Ford, Moche, monumental architecture, north coast Peru, Puerto Moorin, remote sensing, Salinar, seriation, settlement patterns, statecraft, warfare, Virú
Acknowledgments

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I would like to thank the members of my dissertation committee, Dr. Lisa Hodgetts and Dr. Theresa Topic, for their insight and input as this project took form. They were both instrumental in shaping my project and I am glad to have been able to call on them for advice. I also thank the members of my examination committee, who provided me with very thought-provoking and insightful feedback on my dissertation; I acknowledge the input of Dr. Charles Spencer, Dr. Chris Ellis, Dr. Theresa Topic, and Dr. Micha Pazner. Their comments and corrections have strengthened this dissertation and consequently subsequent publications based on this material.

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I am thankful to have worked alongside Estuardo La Torre several times in Virú, most notably during my field research in 2010. Estuardo assisted me with my fieldwork, arranged all accommodations, and guided my understanding of both the archaeology and the geography of the Virú Valley. It is no stretch to say that he also played a considerable role in shaping my understanding and appreciation of Peru.

My friend and colleague Flannery Surette has guided me considerably during my Ph.D. program, through our several trips together to Peru and to various conferences, and through
our regular discussion about all things archaeology. Her input and ideas have shaped my own in many ways.

Many people have assisted my project in various capacities and I can only hope that I convey my gratitude here: James Keron for aiding me with the statistics. Jesus Briceño very kindly met with me while in Trujillo in 2010 and gave me useful advice for my project. Victoria Garcia assisted me during a pilot project in the Virú Valley in 2009, along with Estuardo and Flannery. Dr. Régulo Franco and the Complejo Arqueológico El Brujo y Museo de Sitio Cao who provided me the opportunity to volunteer in 2010. Sra. Jesus and Felipe hosted me during my stay at El Brujo.

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Last, but by no means least, I am thankful for constant support of my parents, Martin and Deborah Downey, siblings Matthew Downey and Kendall Fraser (and their families), and our dogs Heidi and Molly. Thank you all for always being there and for constantly encouraging me, even if it sometimes seemed to fall on deaf ears. I am honoured that you take such pride in my work. And finally, I will always cherish the love and support of Stacey Guy. She may have only joined me on the final leg of this long journey, but she inspired me to finish it. Stacey has many amazing qualities, and one of them is her loving encouragement. I love you!
Dedication:

To my parents, Martin and Deborah. I am honoured that you take such pride in my work.
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Chapter 1

1 Introduction

Archaeologists have long been interested in the ways that landscapes can be political. People continually alter their landscape for various reasons and goals. Powerful centralized political authorities have the means to alter their landscapes to a greater extent than can smaller-scale societies, although the actions of any society can often be seen in the landscape. Indeed, all polities are marked by the unique way that they organize the land under their control and by the manner in which they transform the landscape, providing archaeologists with a means to document their political organization (Flannery 1972, 1998; A.T. Smith 2003; Spencer 2010; Wright and Johnson 1975). The north coast of Peru has long been important in shaping our understanding of these processes because the region is known to have very ancient evidence of political centralization, with the first hints of statecraft found in the Late Preceramic Period (ca. 3000 – 1800 B.C.). The Virú Valley (figure 1.1) has been especially influential in north coast archaeology because of a large research program conducted there in the 1940s. The Virú Valley Project chose to study this valley because it had evidence of occupation spanning the entire Prehispanic Period, but was small enough to be manageable for a comprehensive program that developed a chronology based on ceramic seriation (Ford 1949; Ford and Willey 1949), conducted excavations at several sites (Bennett 1950; Collier 1955; Strong and Evans 1952), and produced a seminal study of archaeological settlement patterns (Willey 1953). This work, and especially Willey’s study, has provided north coast specialists with rich datasets and has formed the basis for a number of interpretations of north coast statecraft, particularly within the Early Intermediate Period (ca. 400 B.C. – A.D. 800). Willey’s original study has never been thoroughly revisited, however, despite a growing body of research that has begun to call into question several of the conclusions made within it.

Research on statecraft during the Early Intermediate Period has primarily focused on the Moche Period (ca. A.D. 100 – 800) but recent research by Millaire (2010a) has identified the earlier Virú Period (ca. 200 B.C. – A.D. 600) as an important time for understanding
Figure 1.1: The Virú Valley. Key locations are listed. All satellite images in this dissertation are copyright of Bing and ESRI.
these processes within the Virú Valley. At present, it is thought that the Virú Valley and its important tributary, Huacapongo, were organized as a series of small, independent polities during the Puerto Moorin Period (ca. 400 – 200 B.C.) and later became integrated into a valley-wide political system during the Virú Period (Topic 1982; West 1971; Willey 1953). However much of this remains speculative, and recent studies have begun to upend several of Willey’s conclusions; indeed, they are in need of updating. The focus of this dissertation is on reanalyzing Puerto Morin and Virú settlement patterns using modern data, methods, and current models for north coast culture history.

I intend to do this through an emerging paradigm regarding the archaeology of social complexity, an approach that I refer to as statecraft. Statecraft, as I use it here, is literally the act of crafting a state. That said, at present I am not concerned with establishing the specific type or level of sociopolitical organization present in any given polity, but rather use statecraft as a means to explore political organization and political relationships as dynamic and emerging processes. Thus, I define statecraft as the processes by which a poltical agency builds and centralizes its own power and thus establishes itself as a governing body or political authority. The study of the political landscapes is a fundamental research component of this program.

The temporal focus of this dissertation is on the Early Intermediate Period (EIP) segment of the Virú Valley cultural sequence. New research is continually refining our understanding of the development and timing of these societies and as such the dates given for this period vary. The EIP is recognized as a period of regional development that falls between the Early Horizon (ca. 900 – 400 B.C.), a time of pan-Andean interaction centered at the site of Chavín de Huantar in the central highlands of Peru, and the Middle Horizon (ca. A.D. 800 – 1100), a time when the Huari and Tiwanaku polities controlled large portions of the central Andes and exerted their influence even farther afield (table 1.1). The EIP is characterized by three major cultural expressions on the north coast of

\[1\] Refer to supplemental files in kmz (Google Earth) file format for location of sites used in this dissertation, Virú Valley place names, and some of the analyses performed in chapters 5 and 6.
Peru: Salinar, Virú, and Moche. In the Virú Valley these three periods are represented by the local variants Puerto Morin, Virú, and Huancaco (Willey 1953). In the Moche Valley, a close and well-studied neighbor of the Virú Valley, the Salinar Period is generally dated to ca. 400 – 150 B.C. the Moche Period ca. 100 – 800 A.D., and the Virú Period is poorly-understood but thought to date between these two (Benson 2012; Billman 1996, 1999; Quilter 2014). Most of the work on the cultural sequences of the Virú Valley was conducted prior to the development of radiocarbon dating in archaeology and calendar dates for Virú Valley cultural expressions are not well-established. Recent research by Millaire (2010a, 2010b, n.d.) has called into question the accepted cultural sequence in the Virú Valley. Millaire dates the Virú Period to ca. 200 B.C. – A.D. 600, and the Huancaco Period to A.D. 600 – 750 and only considers the Puerto Morin Period to begin before 200 B.C. I use Millaire’s dates for the Virú and Huancaco Periods. Because the Puerto Morin Period is similar to Salinar, its equivalent in the Moche Valley, I date it from ca. 400 – 200 B.C. I therefore consider the EIP to date from ca. 400 B.C. – A.D. 750 in the Virú Valley.

Table 1.1: Major periods of the Andean chronology and their phases on the north coast. Note overlapping dates between Virú and Moche; this is due to different chronologies in neighbouring valleys. Dates and periods from Haas and Creamer (2006), Millaire (n.d.), Quilter (2014), and Rowe (1962).

<table>
<thead>
<tr>
<th>Period</th>
<th>Years</th>
<th>North Coast Phases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late Horizon</td>
<td>A.D. 1470 – 1532</td>
<td>Chimú-Inca</td>
</tr>
<tr>
<td>Late Intermediate Period</td>
<td>A.D. 1100 – 1470</td>
<td>Chimú</td>
</tr>
<tr>
<td>Middle Horizon</td>
<td>A.D. 800 – 1100</td>
<td>Lambayeque</td>
</tr>
<tr>
<td>Early Intermediate Period</td>
<td>A.D. 100 – 800</td>
<td>Moche</td>
</tr>
<tr>
<td></td>
<td>200 B.C. – A.D. 600</td>
<td>Virú</td>
</tr>
<tr>
<td></td>
<td>400 – 200 B.C.</td>
<td>Salinar</td>
</tr>
<tr>
<td>Early Horizon</td>
<td>900 – 400 B.C.</td>
<td>Cupisnique</td>
</tr>
<tr>
<td>Initial Period</td>
<td>1800 – 900 B.C.</td>
<td>Initial Period</td>
</tr>
<tr>
<td>Late Preceramic</td>
<td>3000 – 1800 B.C.</td>
<td>Late Preceramic</td>
</tr>
<tr>
<td>Preceramic</td>
<td>14,000? – 3000 B.C.</td>
<td>Preceramic</td>
</tr>
</tbody>
</table>

In this chapter I will address several major issues with the original Virú Valley Project research findings, most notable being that they were essentially preliminary but have

---

2 This period has often been referred to as “Gallinazo,” including by Willey (1953). I prefer to follow Millaire’s (2009a) usage of “Virú” for reasons that are discussed below.
been used uncritically for the last 70 years. I will highlight the key issues that require reanalysis of the Virú Valley data. Before that, however, it is useful to set the context of where the Puerto Morin and Virú Periods fall within the history of the north coast of Peru, a history of increasing political centralization.

1.1 Centralization of authority on the north coast of Peru

The beginnings of social complexity and political centralization developed along the north and central coasts of Peru during the Late Preclassic Period (3000 B.C. to 1800 B.C) and the Initial Period (1800-900 B.C.; Haas and Creamer 2006; Haas et al. 1987; Haas et al. 2005; Moseley 2001; Quilter 2014). These periods were marked by a proliferation of large tell-like mounds and sites with monumental architecture, the size and complexity of which led some scholars to argue that the first cities and states in the Andean region developed during the Initial or even the Late Preclassic period (Haas 1987; Keatinge 1981; S. Pozorski 1987; T. Pozorski and S. Pozorski 1987; Shady Solis 2006, 2009). These arguments remain unconvincing, however, because none of these communities have been shown to have dominated over their neighbours or incorporated the region into a centralized polity during this time (Haas and Creamer 2006; Quilter 1991; Stanish 2001). Nevertheless, it is clear that the first sedentary and complex societies in the Andean region developed at this time on the central and north coasts of Peru. The proliferation of monumental civic-ceremonial centres began in the Norte Chico region of the central coast during the Late Preclassic Period. The Initial Period is defined by the sudden appearance of ceramics and a gradual expansion of civic-ceremonial architecture outside of the Norte Chico, but otherwise both periods were similar. These early developments in many ways set the tone for the region, which witnessed major social, political, and economic transformations throughout the millennia (Elera 1998; Haas and Creamer 2004; T. Pozorski and S. Pozorski 1987).

Late Preclassic and Initial Period developments occurred in a context of incipient agriculture and very limited irrigation. Coastal populations relied heavily on maritime resources from the rich Pacific Ocean supplemented by wild and domesticated plant
foods such as beans, squash, tubers, and tree fruits\(^3\), and also cultivated cotton and bottle gourds to make fishing nets (Moseley 1975, 1999, 2001; Moseley and Feldman 1988; S. Pozorski 1976; Quilter 1991, 1992; Quilter and Stocker 1983; Quilter et al. 1991). The densest populations during these periods were at inland centres where agriculture could be practiced with limited irrigation. Sedentary coastal populations subsisted primarily on protein from maritime resources and traded with the inland centres, receiving supplemental fruits and vegetables and industrial crops in return (Haas et al. 2005; S. Pozorski and T. Pozorski 2008; Shady Solis 2006; Sandweiss 2009). Thus limited and small-scale agriculture and fishing were able to support large sedentary populations and the construction of monumental architecture.

The Cupisnique Period developed out of the Initial Period around 900 B.C. Cupisnique is the north coast expression of the Chavín style that spread throughout the central Andes during the Early Horizon. Cupisnique ceramics were first identified by Rafael Larco Hoyle (1945a, 1948) from burials he excavated in the Chicama Valley and the Cupisnique style is largely confined to the region between the Jequetepeque and Virú valleys (Burger 1992: 90; Larco Hoyle 1945a, 1966; Toshihara 2002: 77-78). Cupisnique society remains poorly studied and little understood but social complexity can be inferred from the high degree of skill seen in Cupisnique ceramics and metallurgy (Burger 1992: 98-99), and from public ceremonial centers such as Huaca de los Reyes at the Caballo Muerto complex and Caña Huaca in the Moche Valley (Billman 1996: 158; Burger 1992: 92; Chauchat et al. 2006; T. Pozorski 1976, 1980). Although Cupisnique society had clear ties to the highland center of Chavín de Huantar, which had far-reaching influence, this is considered to be a time of shared iconography—and presumably ideology—across many independent polities, with Chavín de Huantar serving as a popular pilgrimage centre rather than the capital of an expansive state. Cupisnique society was similarly made up of a variety of independent but interrelated communities (Burger 1992; Elera 1998: 280-281; T. Pozorski and S. Pozorski 1987; Toshihara 2002: 463). That said, the

\(^3\) It is not clear whether maize, of vital importance to later Andean societies, was present at Preceramic coastal Andean sites. If it was present it was not cultivated in abundance (Feldman 2009; Quilter and Stocker 1983).
Cupisnique period was marked by increasing levels of interaction and the development of very long-distance coastal and highland exchange networks, and it was these developments that paved the way for the growth of larger and more powerful polities during the subsequent Salinar period.

The Salinar Period (ca. 400 – 150 B.C.) marks the beginning of the Early Intermediate Period. Salinar was first identified by Larco Hoyle (1944) based on fancy ceramic bottles he recovered in grave excavations in the Chicama Valley. This style shows marked continuity from the earlier Cupisnique, but Salinar potters were more experienced than their earlier counterparts and they developed a more sophisticated ceramic technology, introducing many of the features that would become perfected by later Moche potters (Bawden and Conrad 1982; Larco Hoyle 1966: 80-81; Sidoroff 2005: 80). The transition from Cupisnique to Salinar is poorly understood, but there was clearly a major social upheaval whose effects lasted throughout the period (Burger 1992; Quilter 2014). Quilter (2014: 169) refers to the Early Horizon as being a time of “Pax Chavinensis” that broke down in the Salinar Period when large civic-ceremonial structures stopped being built and people apparently moved into fortified hilltop locations. Indeed, the Salinar period is marked by an increase in warfare throughout the north coast, either due to invasions from the highlands or intravalley conflict (Billman 1996; Willey 1953; Wilson 1988). In the Moche Valley, the population abandoned their settlements and aggregated into a small number of easily-defended village sites on the margins of the middle valley (Billman 1996). In Virú, the population increased dramatically during this period (locally called Puerto Morin) and the defensible Huacapongo branch of the valley was home to a large population (Willey 1953). Further south, the transition in the Santa Valley was less dramatic but many new settlements were founded and about half of the Early Horizon sites were abandoned (Wilson 1983, 1988). The best of the limited data on the transition from Cupisnique to Salinar comes from the site of Puemape, located north of Virú on the coast between the Chicama and Jequetepeque valleys. The Puemape site was apparently abandoned towards the end of the Cupisnique period but has a small Salinar reoccupation following a major El Niño event, leading Elera (1997) to suggest that Salinar developed out of the destroyed remains of Cupisnique while maintaining a fundamental cultural continuity with it.
This period is poorly-studied and, apart from a few site excavations and limited settlement pattern data, little is known about the sociopolitical organization of Salinar societies or about their interactions throughout the region. The Salinar Period Virú (Puerto Morin) is among the better-studied stemming from Willey’s (1953) extensive settlement pattern project, but Willey was careful to not speculate on how Puerto Morin society was organized although he did not think that a unified polity was in control of the valley at this time. The Moche Valley was sparsely-populated and was scattered in defensible locations in the middle valley above fields and irrigation canals during the early Salinar Period (Billman 1996, 1999). No early phase settlements are known in the lower valley, possibly indicating that irrigation networks were not strong enough to bring water there. Most sites were small and none were dominant. Earlier civic-ceremonial centres were abandoned and not replaced during this period, leading to a 70-90% drop in the amount of public ritual and administrative space in the valley (Billman 1996: 234). The population grew considerably during the Late Salinar phase. The site of Cerro Arena was settled and quickly became an incipient urban centre, the largest in the valley and the entire region at this time, marking the beginnings of the impressive north coast urban tradition (Brennan 1980, 1982). Several small clusters of sites, likely autonomous but weak polities, developed at this time, each with their own irrigation networks and defensive strategies (Billman 1996, 1999). While some, namely Cerro Oreja, were large, none matched the size or military strength of Cerro Arena. Cerro Arena society was clearly hierarchical and the site controlled a centralized polity (Brennan 1978, 1980, 1982), but no single polity was dominant throughout the valley. Overall, sociopolitical organization was diverse and in flux during the Salinar Period and was largely decentralized, but some trends toward increased centralization began at this time. Although the earlier periods are associated with large civic-ceremonial structures while Salinar is not, it is during the Salinar Period that urbanization, clear political control of irrigation and warfare, and a definite social hierarchy first developed.

At the close of the Salinar period the Moche Valley underwent a major reorganization. Most Late Salinar sites, including Cerro Arena, were abandoned and the valley population became concentrated in the middle valley (Billman 1996, 1999). Warfare both increased in extent and changed from raiding and small-scale combat within the valley to
extensive warfare with foreigners from the highlands. Cerro Oreja in the middle valley and Pampa Cruz in the lower valley both grew to house a significant proportion of the valley’s total population. The amount of ceremonial space increased by 400%, and a very large and prominent pyramid mound was constructed at Cerro Oreja as a powerful visual marker of centralized authority (Billman 1996: 251). The irrigation network was also greatly expanded and settlement was more-evenly distributed rather than clustered as it was during the Late Salinar period, suggesting that the middle valley was centralized into a single polity centered at Cerro Oreja, and the lower valley was centralized into a smaller polity at Pampa Cruz (Billman 1996). Similar developments occurred further north in the Chicama Valley as an urban center with monumental architecture developed at the site of Mocollope towards the end of the Virú Period and was associated with a major settlement pattern change, possibly indicating the formation of a centralized polity (Attarian 2009; Billman 1996: 261-262).

The largest and most-centralized polity at this time developed in the Virú Valley itself, however. This polity was centered at the Gallinazo Group, a city covering ca. 40 ha that consisted of dozens of adobe mounds—the largest, Huaca Gallinazo, with extensive public space, a large domestic sector, and a 25 m tall pyramid mound—and housed a population of approximately 10,000 – 14,400 residents (Bennett 1939, 1950; Millaire 2009a, 2010a; Millaire and Eastaugh 2011). Numerous smaller residential and civic-ceremonial sites were also scattered throughout the lower valley and both the Gallinazo Group and these smaller centres relied on irrigation agriculture (Willey 1953). The large administrative town of Huaca Santa Clara in the middle valley was well-integrated with the Gallinazo Group (Millaire 2004; 2009b). Evidence of a powerful Virú administration is also found in the size and quality of public architecture in the valley (Bennett 1950; Millaire 2010a; Strong and Evans 1952; Willey 1953). Combining the evidence of highly specialized Virú craft production, evidence of administrative control of irrigation and trade and impressive public architecture. Millaire (2010a) argued that the Virú polity was ruled by a highly-centralized elite who wielded considerable power from the Gallinazo Group and incorporated the entire valley into a single polity. Millaire’s work is starting to reveal fruitful new data and undermine existing interpretations about the Virú Period, but our knowledge of this time remains limited.
The Moche Period follows Virú. Moche societies are known for their artistic skill and their massive pyramid mounds and have received far more scholarly attention than any other north coast society, but many basic problems of Moche social, political, and economic organization remain to be worked out (see papers in Quilter and Castillo 2010). As with other north coast societies, Larco Hoyle (1938, 1939) was the first to describe Moche ceramics and culture in detail and identified a similar style throughout the entire north coast region. The Moche were long considered to be an aggressive, expansionist state centered at the capital city of Huacas de Moche in the Moche Valley, but more recent interpretations show the picture to be far more complicated than this and there is no consensus as to just what the Moche phenomenon represents (Quilter and Koons 2012). The current picture suggests that there were at least four centralized Moche polities in different regions of the north coast that clearly interacted with each other and shared a similar artistic canon, but were autonomous (Bourget 2010; Castillo and Donnan 1994; Castillo and Quilter 2010; Castillo and Uceda 2008; Donnan 2011; Shimada 1999). However this interpretation has also been critiqued (Quilter and Koons 2012) and it is clear that the Moche did not enjoy total authority even in their supposed heartland of the Moche and Chicama Valleys (Attarian 2003: 131-133; Russell and Jackson 2001), nor in Virú, their southern neighbour that was originally thought to have been the first valley to fall to an expanding Moche state (Bourget 2004, 2010; Millaire 2004).

Moche sociopolitical organization is complicated, but it is clear that Moche societies were powerful and that statecraft was being practiced throughout the region. Large urban centres were common during the Moche Period. The Huacas de Moche site in the Moche Valley was especially large and was likely a pilgrimage centre. This site is defined by two large pyramid mounds, Huaca de la Luna and Huaca del Sol. Huaca de la Luna is considered to be the ceremonial heart of the Moche site, Huaca del Sol was likely the seat of the secular elite at the site, and the sandy plain between these two mounds was a densely-occupied urban sector complete with residential centers and craft workshops and

4 Larco Hoyle also was the first to apply the term *Mochica* (Moche) to this culture that was previously known as Proto-Chimú or Early Chimú (Kroeber 1944: 56).
organized into districts and linked by avenues; in short, the site was a full-blown city (Bernier 2010; Chapdelaine 2001, 2002, 2003, 2011; Topic 1982; Uceda 2001; van Gijseghem 2001). Although the Moche were long thought to have violently conquered their neighbours (e.g. Billman 2002; see also Quilter 2002), the newer interpretations of Moche sociopolitical organization cast this view into doubt. Nevertheless, evidence from Moche art and iconography suggests that war and militarism was important to Moche societies, although it remains unclear just who the Moche were fighting or where these battles took place (Bourget 2006; Chapdelaine 2011). As with other north coast societies, the Moche relied on large-scale irrigation agriculture to feed the large populations that lived at dozens of large settlements and hundreds of smaller ones in several different valleys (Bawden 1996; Billman 2002; Chapdelaine 2011; Moseley 2001). These are just a few examples of this complex period of north coast culture history. It is clear that powerful societies and likely centralized polities were more widespread than during any previous period, but at present sociopolitical organization within the Moche world appears to consist of strong, hierarchical polities that shared a core set of beliefs and a similar art style but were politically autonomous, a sort of multi-nodal centralization.

The north coast of Peru witnessed the development and decline of successive polities over the 1000-year course of the Early Intermediate Period. Cupisnique transformed into Salinar, Salinar to Virú, and Virú to Moche. Despite these major transformations in political culture, there was fundamental cultural continuity, and there do not appear to be major upheavals in domestic ware ceramics or in the lives of most people living throughout the region (Donnan 2009; Makowski 2009). This suggests that the major developments discussed here were essentially political movements. These political developments are not clearcut or straightforward and there is considerable ebb and flow, but there is a trend towards larger, more urban societies led by stronger and stronger political authorities that built larger and more complex monuments and ensured that their citizens were safe by providing both food security (irrigation networks) and public safety through warfare. But political centralization was never complete or total during the Early Intermediate Period, although it is notable that the Chimú kingdom, arguably the first empire in South America, developed at the site of Chan Chan a few kilometres from Huacas de Moche a few centuries after the Moche phenomenon came to an end. It is now
clear that the poorly-studied Salinar (Puerto Morin) and Virú Periods are missing pieces in our understanding of these long-term processes on the north coast of Peru and their transition in the Virú constitute the main focus of this dissertation.

1.2 Research problems

The Virú Valley was the focus of much scholarly attention in the mid-twentieth century (Bennett 1939, 1950; Collier 1955; Ford 1949; Ford and Willey 1949; Larco Hoyle 1945b; Strong and Evans 1952; Willey 1953). This work, and especially Willey’s pioneering settlement pattern study, has provided archaeologists working on the north coast with rich data and remains foundational today, but our interpretations of this data rely heavily on speculation and inference and have not been rigorously tested. At present, it is thought that the Virú Valley and its important tributary, Huacapongo, were organized as a series of small, independent polities during the Puerto Moorin phase and later became integrated into a valley-wide polity during the Virú Period (Topic 1982; West 1971; Willey 1953), but much of this is speculative at best. It is clear from Willey’s (1953) work that a major shift in settlement patterns occurred between the Puerto Moorin and Virú periods, but the timing, tempo, and extent of this shift has never been documented.

The Virú Valley Project developed several major conclusions for each of the periods being studied (see Willey 1953 for a full review). The Virú Valley received little scholarly attention from the 1940s to the 1990s, apart from some surveys that were focused on specific topics such as ecology and agriculture (Ericson et al. 1989; Parsons 1968; Parsons and Psuty 1975; West 1971, 1979, 1981; West and Whitaker 1979) or warfare (Topic, 1982; J. Topic and T. Topic 1978; T. Topic and J. Topic 1982). These studies generally relied on settlement patterns and site dates from Willey (1953) rather than questioning or critiquing them. The Virú Valley Project and Willey’s (1953) settlement pattern study were seminal and spawned similar studies in valleys north and south of Virú—often basing their ceramic typologies used for seriation on the original
Virú typology (e.g. Wilson 1988)—and ultimately framed our understanding of north coast culture history for the next four decades.

A full treatment of these conclusions is beyond the scope of this study but Willey’s observations regarding the Puerto Morin, Virú (which Willey referred to as Gallinazo), and Huancaco periods have implications for understanding processes of statecraft on the north coast. Willey (1953) considered the Puerto Morin Period to be a time of strife and warfare, and as a result settlement was concentrated in defensive hillside and hilltop locations. Puerto Morin settlement was densely-concentrated in the Huacapongo branch of the valley, which is surrounded by hills and presumably offered good defense. Willey considered the Virú Period to be much more peaceful. The Huacapongo Valley was virtually abandoned as settlement shifted off of the hillsides bordering the valley and onto the valley floor and especially to the Gallinazo Group, a large city near the coast. Willey considered Virú society to be a state and thought that the valley population was highest during this period, made possible by the construction of a massive irrigation network protected by six castillos, impressive hilltop fortifications in the valley neck. While the Puerto Morin Period was marked by intra-valley warfare, according to Willey, warfare was primarily external in the Virú Period. Finally, this time of peace was upended when the Moche polity expanded into Virú, displacing the Virú state and forcing the abandonment of the Gallinazo Group, and apparently established a provincial capital at the site of Huancaco (Strong and Evans 1952; Willey 1953). This final conclusion is not a minor point. The Moche have been much better-studied on the north coast than either Salinar or Virú, and Willey’s conclusions were very influential in shaping ideas about Moche violence, warfare, and territorial expansion that were persistent until the last decade or so (e.g. Billman 2002).

Research in Virú within the last 15 years has overturned Willey’s conclusions regarding the Virú-to-Huancaco transition in the Virú Valley. Bourget (2004, 2010) excavated at Huancaco and found that rather than being a provincial capital of a large Moche polity, the Virú polity actually remained intact and moved from the Gallinazo Group to Huancaco, presumably in response to pressure from Moche presence elsewhere in the valley (e.g. the Tomb of the Warrior-Prince at V-162, Huaca de la Cruz; Strong 1947).
Millaire (2004, 2009b; 2010b) excavated at Huaca Santa Clara (V-67), one of the six castillos in the Virú Valley neck that, according to Willey (1953), offered the best evidence of violent Moche expansion in Virú. Rather than this violent incursion, Millaire found that Huaca Santa Clara was an administrative town for a powerful Virú polity where no violent overtake ever took place. Millaire’s (2010a; Millaire and Eastaugh 2011) subsequent work at the Gallinazo Group has further demonstrated that the Virú period was marked by a strong polity, with a capital city at the Gallinazo Group, that controlled much if not all of the Virú Valley. According to Millaire, the Virú leadership moved to Huancaco around A.D. 450 and the polity remained unified in its new capital. This research has helped to shift our understanding of the Moche away from a violent and expansive state to a more nuanced and decentralized sociopolitical situation (Quilter and Koons 2012).

This new research on the Virú-to-Huancaco transition has questioned Willey’s (1953) foundational conclusions for the Virú Valley, conclusions that formed the basis of north coast culture history for decades. This highlights a major problem: if the Virú-to-Huancaco transition model is no longer supported, then it is also necessary to re-examine the Puerto Morin-to-Virú transition and the origins of the purported Virú state. This leads to the central research problem of this dissertation: using our current understanding of Virú Valley and north coast culture history and modern methods of spatial analysis, are Willey’s original settlement patterns and conclusions for the Puerto Morin-to-Virú transition in need of revision?

This question is tested here by mapping Puerto Morin and Virú settlement patterns using satellite imagery and the ArcGIS suite of software and testing two of Willey’s conclusions: (1) that the Huacapongo Valley was abandoned at the end of the Puerto Morin Period; and (2) that the Virú polity expanded irrigation networks, defended the valley, and was organized as a state. However, rather than approaching this question from an essentialist point of view, I have chosen to examine these issues through the lens of statecraft, a non-essentialist position that seeks to understand processes of political centralization and the building of political authority without overarching reference to specific levels of sociopolitical organization. This approach requires a relatively good
chronological control of the region being studied, which raises another issue with Willey’s original study and especially with Ford’s (1949) seriation of Virú Valley ceramics, upon which Willey’s settlement pattern dating was based.

1.2.1  Ceramics and the Virú Valley seriation

As with other north coast societies, the Virú culture is identified primarily by its distinctive ceramic styles, in this case two types of negative-resist painted fineware vessels known variously as Virú Negativo (Larco Hoyle 1945b), Gallinazo Negativo A and B (Bennett 1939), and Gallinazo Negative and Carmelo Negative (Bennett 1950; Ford 1949). Larco Hoyle (1945b, 1966) first identified Virú-style vessels from grave lots in the Moche and Virú Valleys in the early 1930s and he considered its origin to be in the Virú Valley. Shortly after Larco Hoyle identified this style, Bennett (1939, 1950) excavated at the Gallinazo Group and identified three phases within the Virú tradition, which he called Early, Middle and Late. Bennett and other members of the Virú Valley Project identified other Virú-period sites throughout the valley and established the Gallinazo Group as the capital of an integrated polity (Bennett 1950; Strong and Evans 1952; Willey 1953). The origins of Virú culture and the transition from Puerto Morin to Virú society remained uncertain, however in the mid-twentieth century it was sometimes thought that the Virú style had highland origins, mainly because negative-resist painting is more common in the highlands (Kroeber 1944: 63; Strong and Evans 1952: 215).

Strong and Evans note that several important Puerto Morin sites were still occupied in Virú times, despite the major shifts in settlement patterns, and there was no overhaul in the use of domestic ceramics, and thus there was likely fundamental cultural continuity, despite the changes that took place.

Based on ceramic evidence, it is thought that the Virú polity was largely confined to the Virú Valley itself although its members interacted with neighbouring valleys, most notably Moche and Chicama to the north. Gallinazo Negative ceramics have only been found in these three valleys (Topic 1982), but it is quite rare outside of Virú and is not even very abundant at the Gallinazo Group or throughout the valley (Bennett 1950: 84;
Billman 1996: 237; Millaire 2009a). However, the areal extent of Virú culture has been grossly overestimated due to a misinterpretation of ceramic styles. Alongside the Gallinazo (Virú) Negative and Carmelo Negative fineware styles, several plainwares with no decoration or with simple, but distinctive, modeled or incised decorations (Castillo Modeled and Castillo Incised styles) were common throughout the entire north coast during Virú times (Collier 1955; Ford 1949; Strong and Evans 1952). The Virú Valley Project conflated the association of Castillo-style and Negativo-style ceramics such that the Castillo wares were considered diagnostic of Virú culture, and their widespread distribution was interpreted evidence that Virú society was very widespread. This led Heidi Fogel (1993) to argue that the Gallinazo Group was the capital of a multi-valley state that expanded from the Virú Valley sometime between 100 B.C. and A.D. 200, but her argument was not well-received largely because it lacked solid chronological data to support her argument (Millaire 2010a). As the volume of research increased on the north coast, the relationship between Virú and other societies was questioned. Virú-style ceramics, namely Castillo decorated wares, were found at sites that were primarily Moche. This led Shimada and Maguña (1994) to argue that Virú was not an expansive state but rather was a separate ethnicity that lived alongside the Moche throughout the north coast.

Jean-François Millaire has recently led the charge away from this expansive view of Virú society to one that sees a very limited Virú polity within a broad pan-north coast ethnic tradition, the tradición norcosteña (Millaire 2009a; Millaire and Morlion 2009). Essentially, the new perspective is that only Gallinazo Negative (hereafter referred to as Virú Negative) and Carmelo Negative vessel types are diagnostic of the Virú culture, and that these are corporate-produced elite vessels that were most popular as burial items and were quickly replaced by Moche vessels in the Chicama and Moche valleys, while

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5 The term “Gallinazo” is widely used to refer both to the negative-resist ceramic style of the Virú Valley and to the Castillo Modeled and Castillo Incised styles, and it is also used to refer to the Virú culture in general. Millaire (2009a) highlights this problem and argues that “Gallinazo” should be reserved solely for Castillo-style ceramics while “Virú” should be used for corporate-produced negative painted styles, as well as for the culture. I follow his terminology throughout this dissertation.
enjoying somewhat longer usage in Virú (Uceda et al. 2009: 119). Castillo-style ceramics, on the other hand, were utilitarian domestic wares that were used by commoners throughout the north coast for over a millennium and textiles and other cultural manifestations also show broad continuities, highlighting a fundamental ethnic continuity along the entire north coast during the EIP (Donnan 2009; Makowski 2009; Millaire 2009b; Millaire et al. 2013; Sidoroff 2005; Surette 2014). Given these new interpretations, Millaire (2009a) argues that corporate-produced elite ceramic styles such as Virú (Gallinazo) Negative or Moche, traditionally assumed to signify major cultural divisions, should instead be viewed as more superficial markers of political ideology. These studies highlight the importance of having solid ceramic typologies and chronologies because considerable interpretations have been made based on ceramic data.

These new ceramic interpretations highlight a major problem with the original Virú Valley chronological sequence, used by Willey (1953) to classify the sites in his settlement pattern study and subsequently widely adopted throughout the north coast. Willey’s chronological sequence was based primarily on James Ford's (1949) ceramic seriation of sherds collected from surface surveys throughout the valley. In contrast to more traditional ceramic sequences that were based solely on stylistic traits of elite ceramics, typically associated with burials (e.g. Larco 1948), Ford's seriation looked at both the style and technology of sherds and also looked at all ceramics, including plain, undecorated wares that were ignored in traditional sequences. Ford compared and cross-checked his seriation of surface-collected ceramics against the ceramics recovered in excavations conducted by other members of the Virú Valley Project (Ford 1949: 42–43). Ford’s ceramic sequence was a well-constructed and sound piece of scholarly research that ultimately contributed much to Andean scholarship, but it contained many errors in interpretation that are only now beginning to be discovered. The “Gallinazo Illusion,” discussed above, is one such error.

Early on, Bennyhoff (1952) expressed numerous concerns with Ford’s (1949) sequence, arguing that the sequence relied on small sample sizes and arbitrary distinctions between ceramic types and that the surface assemblage of any site only represented the terminal occupation of that site, whereas Ford contended that it represented an average date
representing the site’s entire history (Ford 1949: 35). Apart from a very brief rebuttal by Ford (1952), these concerns were not addressed further. Bennyhoff (1952) reordered Ford’s sequence and questioned the cultural periods used by Ford. Most notably, Bennyhoff cautioned that Ford’s typology should be critically evaluated before it became established as the accepted sequence for Virú and, in turn, the entire north coast. These warnings were not heeded, however, as Willey (1953) cemented Ford's seriation and it became the *de facto* ceramic typology and sequence for Virú and the north coast.

Ford (1949) did not publish his data for the Virú Valley and until now only summary information was available. I have obtained copies of Ford’s notes and tables (.F673, Papers of James Ford, Division of Anthropology, American Museum of Natural History) and have been able to use them to test Ford’s seriation, to address Bennyhoff’s (1952) concerns, and to search for other errors that influenced Willey’s (1953) settlement patterns for the Virú Valley. Ultimately I find that corporate and domestic ware ceramics were made for different reasons and evolved along separate timescales, that Ford often conflated these two distinct varieties of ceramic, and that additional errors exist beyond those associated with the “Gallinazo Illusion” discussed above. Furthermore, because of their rarity at Puerto Morin and Virú sites, corporate wares cannot be used for seriation in the Virú Valley. I re-seriate the Virú Valley domestic ware sequence and use this new dating scheme to update Willey’s settlement patterns.

1.2.2 Structure of this dissertation

This dissertation is divided into two theory and background chapters, three analysis chapters, and a brief concluding chapter. There are also three appendices attached to this dissertation and a kmz file of all Puerto Morin and Virú sites is provided so that the reader can explore the region for themselves. All of these are available as supplementary files that can be downloaded with the dissertation.

In chapter 2 I develop the concept of statecraft, the central paradigm of this dissertation. The main goal of this dissertation is to describe and assess the sociopolitical organization
of the Puerto Morin and Virú Periods in the Virú Valley. Rather than relying on essentialist typologies, I discuss social complexity as an ongoing process of political centralization and decentralization and I see the creation of political authority as one of the most interesting aspects of society to be studied. The archaeology of social complexity is a vast field and my focus here is on aspects of it that are best studied through a landscape or settlement pattern focus, namely political centralization, irrigation networks, monumental and civic-ceremonial architecture, and lastly warfare and the legitimate control of violence. Ultimately I argue that statecraft is a useful lens for understanding social complexity but that it requires good chronological control.

Chapter 3 is focused on understanding James Ford’s (1949) approach to seriation in Virú and ultimately critiques the cultural sequence devised by him based on Virú ceramics. I argue that Ford’s work was preliminary and that he made several errors due to his work being the first complete seriation of Virú Valley ceramics and call for a reinterpreted ceramic typology and new seriation. Where Ford saw discontinuity in the cultural sequence I see continuity, and argue that the Puerto Morin, Virú, and Huancaco Periods are all part of one long tradition, which I call Virú (Early, Middle, and Late). I also argue that corporate and domestic ceramics are fundamentally different classes of object and should not be seriated as part of a single temporal sequence.

In chapter 4 I first test whether surface ceramic assemblages are a good proxy for excavated assemblages and test whether they are useful for dating sites. I then re-seriate Ford’s ceramic typology using four independent methods: (1) frequency seriation; (2) mean ceramic date; (3) correspondence analysis; and (4) a seriation algorithm. While all of these show a fundamental continuity in the Virú Valley sequence, I ultimately choose the seriation algorithm to assign specific dates to sites of the Puerto Morin and Virú Periods. Appendix A contains data tables relevant to these analyses.

Chapter 5 is focused on updating Willey’s (1953) settlement patterns for the Puerto Morin and Virú Periods and in determining to what extent each of these societies was centralized. After a discussion of the methods used to map sites and analyze settlement patterns, I discuss the updated settlement patterns for each of the Puerto Morin and Virú
Periods, and then compare the two. Appendix B lists each site included for analysis, its primary functions, and its approximate size in hectares. Appendix C is a brief description of each site; these are based on Willey’s (1953) site descriptions, my own survey of several sites, and my interpretation of the site’s location and apparent function as visible on satellite imagery.

The final major chapter, chapter 6, takes the evidence presented in chapter 5 as well as ideas and interpretations from Willey (1953) and others to document an apparent program of infrastructure-building that took place during the Middle Virú Period and that has implications for the study of statecraft in the Virú Valley. I use various methods to describe and analyze three distinct infrastructure programs: (1) the construction of large irrigation networks; (2) the expansion of monumental architecture and civic-ceremonial space; and (3) the formalization of warfare and development of a sense of public safety. These three programs are shown to have antecedents in the Puerto Morín Period but to have taken on a distinctly different tone in the Middle Virú Period.

1.3 Geography of the Virú Valley

The Virú Valley is typical of coastal drainages in northern Peru (figure 1.1). The coast of Peru is marked by a narrow hyper-arid coastal plateau running between the Andean mountains ranges to the east, and the Pacific Ocean to the west. The extremely cold Humboldt Current runs along the coast of Peru and provides an extremely rich fishery but also creates arid conditions on the coastal plateau and rainfall in the Andean highlands (Moseley 2001; Quilter 2014). Rainfall is extremely limited on the north coast and the only significant annual precipitation falls during years when the El Niño Southern Oscillation (ENSO) causes the reversal of the Humboldt Current, often causing destructive torrential rain. ENSO events have occurred regularly for millennia and are generally thought to occur every 7-20 years; during most years there is almost no rain on the coastal plain although damp and foggy conditions are common. The Virú Valley is essentially an oasis that cuts through the sandy, barren desert—one of thirteen such valleys on the north coast—but there are several micro-regions and micro-environments
within the valley (Parsons 1968; Parsons and Psuty 1975; West 1979, 1980, 1981; Willey 1953). Irrigation and the reclamation of the desert are key features of the valley. Modern irrigation projects, specifically the Chavimochic canal system built in the early 1990s, have expanded the range of arable land far beyond that available through hand-excavated irrigation systems, but for the purposes of this study I define the valley as the maximum area that could have been irrigated in Prehispanic times, and as defined by Willey (1953), whose survey project was undertaken before large-scale modern irrigation systems were built in the valley. Archaeological sites are also found farther upstream along these tributaries and into the poorly-studied yungas zone that runs at mid-altitudes between the coastal valley and the highlands proper (T. Topic and J. Topic 1978), but these are beyond the current study limits. My intention here is to briefly guide the reader through the valley as though they were flying from the mountains towards the coast, highlighting those places where archaeological sites are most commonly found.

The Virú Valley system is marked by a contrasting landscape between steep hills and flat valley bottom land (figure 1.2). The northern tributary is the Virú River itself, also known as the Carabamba River. This runs in a wide semi-circular arc and then southward to meet the Huacapongo River, the southern tributary, at the valley neck. The Huacapongo River cuts a narrow ravine through the mountains, running northeast-southwest, and then flows through a narrow passage and turns to run more-or-less east-west for 3 km until it meets the Virú/Carabamba River. The lower Huacapongo Valley is 1-1.5 km wide with flat arable bottomlands bordered by steep, rocky, barren foothills (figure 1.3). Numerous quebradas (valleys cut by the rare torrential rains experienced on the Pacific coast) run down from the foothills on either side of the valley. The southern hills of Huacapongo, known as the Sarraque Range, cut this tributary off from the middle Virú Valley. The quebradas of Huacapongo and the Virú Valley itself are dry plains strewn with jagged angular boulders and are typically narrow and steep at their upstream ends and flatten into an alluvial fan as they reach the valley floor. The lower Huacapongo Valley was a major focus of Prehispanic settlement in Virú, and the sites of Huacapongo are typically rock-walled house structures built on the floors of these quebradas and on terraces on the slopes of the steep-sided barren hills that border the quebradas and the valley itself. Although these quebradas and the hillslopes were the focus of Early and Middle Virú
occupation, there were also some sites built on the valley bottom of Huacapongo, primarily isolated mounds built of boulders and/or adobes.

The Huacapongo and Upper Virú/Carabamba River meet at the northern entrance to the valley neck, the part of the Virú Valley where the Andean foothills constrict the valley to a width of 2.5 km. The river runs north-south through this part of the valley for approximately 3 km, bordered on either side by rocky hills and quebradas. Moving south through the valley neck, the southern margin becomes a wide, sandy expanse while the north margin remains rocky, with the large Queneto Quebrada opening westward from the valley neck. There are some isolated hills that rise from the valley bottom here, as well. Sites in the valley neck are a mix of rock-walled structures built on the rocky margins and rock-and-adobe sites built on the valley bottom. There are also six special types of site, the Castillo Fortification Complex (figure 1.4), which are adobe and stone structures built on and around several steep hills on the valley margins and bottomlands. This is a very strategic part of the valley because it is the narrowest pass though which the Virú River flows and as such irrigation systems must have their intake canals here in order to irrigate the maximum possible extent of land downstream.

Figure 1.2: Contrasting valley flats and steep hills in the Huacapongo Valley.
The river flows in a northeast-southwest direction for approximately 20 km from the valley neck to the Pacific Ocean, and the valley fans out gradually to a maximum wide of approximately 14 km. The lower valley is characterized by a sandy north margin with no significant hills other than Pur Pur, a large sand dune, and the south margin transitions from wide, sandy plains at the valley neck to the rocky Compositan Hills, a spur of the Andean foothills that runs to the ocean and separates the Virú Valley from the Chao
Valley to the south. The Compositan Hills are similar to the hills of the upper valleys in that they are steep, barren slopes of eroded stone and small quebradas. The Compositan Hills are covered in places by windblown sand that reaches as high as the tops of some of the hills. There are a few isolated hills on or near the south margin of the lower Virú Valley, most notable being the 200-250 m high Cerro Bitín (figure 1.5), but the valley itself is almost entirely flat apart from low sand dunes that dot the valley floor (figure 1.6). The valley bottom today consists almost entirely of fertile farmland, possible only because of large irrigation systems. Modifying Willey’s (1953) delineations of the valley slightly, I consider the portion of the valley between the southern entrance to the valley neck and the Panamerican Highway to be the middle valley, and the area downstream from the Panamerican to the coast to be the lower valley. This is an entirely arbitrary designation but it serves to break up this large part of the valley.

Figure 1.5: The imposing Cerro Bitín overlooking the lower valley.
Occupation in the middle and lower Virú Valley largely consists of adobe or tapia (puddled adobe) structures built on the valley floor itself or built on the sand dunes. Several of the largest, most impressive sites in this part of the valley are adobe pyramid mounds, wholly artificial structures built on the valley floor or supplementing sand dunes, but the majority of architecture consists of small adobe- or tapia-walled house structures built organically, usually on existing sand dunes or piles of salitre (saltpeter-laden soil), and sites grew through gradual accretion of residential material. Structures on the rocky southern valley margins are primarily built of stone, however. It is clear that the choice of building material bears no cultural associations, but rather people built with whatever material was most easily obtainable.

Near the Pacific shoreline the fertile fields of the lower valley transition to flat, barren beach, duneland, or salitre-laden soils. The width of this coastal plain varies from a few hundred metres up to 4 km. Several archaeological sites, including the Gallinazo Group, are located at or just outside of the downstream limits of agricultural land (or land that was until recently unirrigated) and this forms another margin of the valley. The only known archaeological sites in the barren back-beach lands are expansive but low shell middens, and these are located near the present-day limits of agriculture. There is also a single large outcrop of the Andean foothills, Cerro Guañape, that juts into the sea to form
a large peninsula, but it is possible that this hill was an island in Prehispanic times.

Interestingly, archaeological sites in this part of the valley get gradually closer and closer to the ocean from the Cerro Prieto (Preceramic) Period until the Middle Virú Period, and it is possible that the valley grew gradually—either through soil accretion or tectonic activity, or both—and new land was occupied as it became available.

This description of the valley geography and settlement patterns is rather general but it is key to highlight the main ecological regions and physiographic conditions of the valley, as these all play a major role in the occupational history of Virú. The key ecological features of this landscape are as follows: (1) the natural landscape changes from barren rocky foothills with dry, rocky quebrada floors to the wide, sandy expanses of the coastal plain. A large spur of the foothills runs from the Huacapongo Valley to the coast on the south margin of the valley; (2) without irrigation, the coastal plain would consist of a narrow strip of canes, grasses, and hearty trees (primarily algarrobo, a type of mesquite tree) immediately bordering the Virú River and around scattered springs and ponds, with sand dunes outside of this narrow strip. With irrigation, large expanses of desert can be reclaimed producing large tracts of fertile land; (3) only narrow strips of arable land are found in the upstream portions of the valley but this gradually fans out to allow a relatively large expanse of arable land downstream towards the Pacific Coast; and (4) archaeological sites are located throughout the valley and its two upstream tributaries, with an especially dense occupation in the Huacapongo Valley. During the Early and Middle Virú Periods, residential sites and areas consist largely of small house structures, arranged haphazardly, and built either of adobe or tapia walls, or with rock wall foundations and upper portions built of either adobe and/or cane. Building materials adhere closely to whatever material is available in the immediate vicinity of the site. Civic architecture follows similar patterns, but will be discussed in greater detail in chapter 6.

The valley’s aridity is beneficial for archaeological research because even very old sites are rarely covered by natural soil accumulation such that rock walls on the valley margins remain visible millennia after their construction, and house mounds and more substantial architecture stand out from the valley floor and are generally not covered by agricultural
or natural vegetation, though modern houses are commonly built on these mounds. Because of this Willey (1953; Ford and Willey 1949) used aerial photos to find and document archaeological sites, and I am able to do the same but with satellite imagery. Willey’s study forms the basis of my own and I use his study limits and sites originally identified by him.
2 Archaeological Approaches to Statecraft

Understanding the nature of social complexity and the timing and tempo of statecraft has long been central to the social sciences in general, and to archaeology more specifically. Ever since Jean-Jacques Rousseau’s 1762 *The Social Contract*, social scientists have been interested in determining when, where, and especially why people living in egalitarian societies with no permanent hierarchy and a limited degree of economic inequality began to live in stratified societies with permanent ascribed leadership classes (Flannery and Marcus 2012). A considerable amount of this project has fallen to archaeologists because of their focus on the very long-term development of social trends, their cross-cultural approach, and their ability to examine societies that did not produce written records. Archaeologists have predominantly been concerned with studying the development of the earliest states, considering the state to be a specific class or type of society that is both qualitatively and quantitatively different from complex non-state societies, typically called chiefdoms. Archaeologists consider the state to have developed independently six times throughout the world; these original, or primary, states developed in Mesopotamia ca. 3500 B.C., Egypt ca. 3400 B.C., the Indus Valley ca. 2500 B.C., North China ca. 1800 B.C., Peru ca. 150 B.C., and Mesoamerica ca. 100 B.C. (Parkinson and Galaty 2007; Price 1978; Service 1975; Spencer 2010; Trigger 2003). From these six original locations the concept of state organization spread to secondary states and to the point where today no one in the world lives entirely free from the influence of the state.

In this dissertation I build on this approach by focusing on statecraft, or the processes by which a complex society centralizes power and develops political authority. Statecraft is ultimately a non-essentialist approach that tracks and traces the development of a polity through a detailed understanding of its historical processes, and these processes are derived from an extensive anthropological literature on social complexity. I use this emerging approach to document and explain changes observed between the Early and Middle Virú periods in the Virú Valley of the north coast of Peru. The Middle Virú Period has recently been recognized as a hotbed of statecraft (Millaire 2010a; Millaire
and Eastaugh 2011), but this development cannot be fully understood without tracing long-term developments in the region. This project is non-essentialist; I am not concerned with defining whether Early and Middle Virú represent chiefdoms and states as specific social types, but rather with observing the development of centralized political authority in the Middle Virú Period. I use the general terms “polity” and “complex society” to refer to these communities and societies without reference to specific political types. This study is undertaken through settlement pattern analysis. Settlement pattern studies were applied to the Virú Valley quite early in their history (Willey 1953) lending significant insight into the development of social complexity in the region. But the time is ripe to re-examine the region using new technology and the theoretical perspective afforded by the concept of statecraft.

In this chapter I discuss some of the key approaches to documenting and understanding the development of social complexity. The concept of statecraft, as I use it, is essentially a hybrid of these approaches, drawn from a myriad of sources but not adherent to any single one. Political authority is fundamentally linked to landscapes, with landscapes being in part built by human actions, including those associated with statecraft (A.T. Smith 2003). Therefore the second part of this chapter outlines four key ways that landscape can be studied to trace the development of statecraft in Virú: (1) the centralization of authority; (2) the control of key economic resource; (3) the expansion of monumental architecture; and (4) the control of warfare and violence. The concept of statecraft is fundamentally historical and as such requires fine-tuned chronologies in order to document the long-term development of political authority.

2.1 Statecraft and its antecedents

The processes of political centralization and building of political authority that are the focus of this dissertation (statecraft) draw upon the broader study of social complexity in archaeology, an area of research that has largely focused on identifying the archaeological correlates of chiefdoms and states and the origins and development
through time of these societies. Although “the state” is a well-understood concept in the broader social sciences, its use in archaeology has been less precise. The concern with states and the development of social complexity can be traced through three main paradigms: (1) neo-evolutionary approaches, closely tied with cultural ecology; (2) a reaction to and rejection of reductionist neo-evolutionary approaches; and (3) a hybrid that draws useful concepts and methods from various approaches. Statecraft is part of this third approach. A brief treatment of each of these approaches will frame the theoretical context of the specific ones used in this dissertation, described below.

2.1.1 Neo-evolutionary approaches to social complexity

The neo-evolutionary approach became popular in anthropology in the mid-twentieth century as a general framework for explaining culture change, where it was soon adopted by anthropological archaeologists interested in the development of social complexity and remains influential today. The neo-evolutionary approach was introduced by Leslie White (1945, 1959) and Julian Steward (1949, 1955) as a response to the concept of unilineal evolution—out of favour at the time—that viewed all societies as developing along a single trajectory, with European civilization being the ultimate form of society. Instead, White and Steward argued that all societies underwent multilinear evolution in response to general cross-cultural processes, but still saw societies as general evolving towards increasing complexity (Sanders and Webster 1978). Morton Fried (1960, 1967, 1978) and Elman Service (1962, 1975, 1978) were both influenced by White’s and Steward’s approaches and each developed cultural typologies to describe the evolution of society towards increasing complexity. Fried, who was particularly concerned with the institutions of governance and saw conflict as being the primary driver of social change, developed a four-tiered hierarchy of societies based on their institutions: egalitarian, rank, stratified, and the state. Service focused more on social organization and integration and also developed a four-tiered social hierarchy: bands, tribes, chiefdoms, and states. No high-order stage (i.e. a state or chiefdom) could evolve without first passing through all the lower-orders; in other words, all states evolved from chiefdoms, which evolved from tribes, which evolved from bands (Service 1962, 1975). In both cases these hierarchies
were meant to be generalized typologies that could be applied to any society. Fried’s and especially Service’s approaches were immediately popular among archaeologists interested in social complexity (Flannery 1972; Sanders and Price 1968; Wenke 1981; Wright 1977).

Chiefdoms and states are linked in the neo-evolutionary scheme in that while both are complex and share certain characteristics such as ascribed leadership and a high degree of inequality in terms of wealth and power, any state is always more complex than any chiefdom. Each type of society is seen as a specific adaptation to local conditions and primary states are considered to be a natural evolution out of chiefdoms, although not all chiefdoms would develop into states (Carneiro 1970, 1981; Flannery 1972; Fried 1960, 1967; Parkinson and Galaty 2007; Price 1978; Service 1975; Spencer 2010; Trigger 2003). Yet apart from their inherent opposition to each other, neither chiefdoms nor states are well-defined in the neo-evolutionary scheme. In general, states are seen to be hierarchical and class-based with specialized occupations and social roles and a centralized authority that has the ability to delegate power to subordinates, control the economy and procurement of resources, sponsor craft production and the construction of monumental public architecture, and maintain social cohesion through public rituals, the codification of laws, and the use of coercive force (Adams 1966; Carneiro 1970, 1981; Cohen 1978, 1981; Flannery 1972; Fried 1960, 1967, 1978; Haas 1982; Service 1962, 1975, 1978; Spencer 1990, 2010; Spencer and Redmond 2004; Wright 1977; Wright and Johnson 1975). Chiefdoms, on the other hand, are seen to be kin-based, externally but not internally specialized, and have a less complex bureaucratic system that does not enjoy the power and legitimacy of states (Cohen 1978, 1981; Spencer 2010; Wright 1977).

Neo-evolutionary approaches to studying chiefdoms and states therefore rely on fitting societies into a limited number of generalized types. This approach is used partly for comparative purposes but primarily because these types are seen as evolutionary stages, the cultural equivalent of biological species. Although some see the development of social complexity itself as a major evolutionary stage such that states are essentially highly-complex chiefdoms (e.g. Carneiro 1981; Feinman and Neitzel 1984), most neo-evolutionary archaeologists implicitly or explicitly view chiefdoms and states as discrete
evolutionary stages, and have especially focused on the initial development of the six primary states and subsequent development in those regions as a means to explore general models of human cultural evolution (Abrutyn and Lawrence 2010; Flannery 1972; Service 1975; Spencer 2009, 2010; Wright 1977).

Fried’s (1967) conflict model has been the most popular among cultural ecologists, who largely focused on population pressure, climate change, and related ecological factors as the prime movers for the development of social complexity (Cohen 1978; Flannery 1972; Wenke 1981; Wright 1977, 1978). The conflict model essentially argues that social stratification occurs because different members of society have unequal access to resources (food, land, raw materials, etc.) and therefore certain people who are successful at gathering a greater share of the resources will gain an upper hand (Fried 1967; Haas 1982). Several ‘prime movers’ have been advanced to explain the specific processes that took place to bring about this development, some of the most prominent of which include population pressure, warfare, the management and control of irrigation, conflict over limited land and resources in circumscribed environments, and territorial expansion (Adams 1966; Carneiro 1970, 1981; Cohen 1978, 1985; Flannery 1972; Haas 1981; Lees 1994; Price 1994; Roscoe 1988; Sanders and Price 1968, 1984; Scarborough 1991; Sidky 1997; Spencer 1998, 2009, 2010; Spencer and Redmond 2004; Webster 1975; Wenke 1981; Wittfogel 1957; Wright 1978; Wright and Johnson 1975).

In recent decades, traditional neo-evolutionary approaches to social complexity have been criticized as being overly-deterministic, narrowly focused on fitting all societies into specific types, reliant on ecological models that fail to account for unique cultural circumstances, and heavily focused on the ways that a few people could seize control of key resources and thus establish themselves as leaders (Blanton 1998; Blanton and Fargher 2008, Blanton et al. 1996; Brumfiel 1983; Routledge 2014; Trigger 2003; Yoffee 2005). Furthermore, while neo-evolutionary archaeologists advanced many ‘prime movers’ and general explanatory models, none have withstood criticism and no single model has been accepted. Nevertheless, the neo-evolutionary approach has been very influential and remains so (Abrutyn and Lawrence 2010; Marcus 2008; Prentiss et al. 2009; Renfrew and Bahn 2005: 143; Spencer 2009, 2010). While many of the criticisms
of the neo-evolutionary approach are valid, it is important to recognize that these are very often the seminal sources on the archaeology of social complexity and in many cases highlighted the various ways that statecraft operated and that political authority was developed. While neo-evolutionary approaches do not portray the entire picture, they do portray an important part of it.

2.1.2 Agency and political dynamics

Neo-evolutionary thought has many strengths but it under-emphasizes or entirely overlooks several important aspects of social complexity. Among the issues most frequently overlooked are the roles that agency, non-elite members of society, and political interactions play in the developmental histories of complex societies. These have become major avenues of research since the 1980s. Agency and the related study of practice and historical processes are now recognized as fundamental to understanding culture change (Pauketat 2001) and a large body of literature now exists on the political agency of elites, including leadership strategies and the intentional actions of elites in establishing centralized authority (Earle 1997; Eerkens et al. 2009; Feinman 1995, 2005; Flannery 1999; Haas 2001; Kantner 2009). These studies have primarily focused on the ways that elites were able to develop and maintain coercive power in egalitarian societies and are particularly noteworthy because neo-evolutionary approaches tended to downplay the agency or intentional actions of elites, instead using cultural ecology models to explain the development of political hierarchies as a passive reaction to environmental conditions.

While leadership strategies and the agency of elites are important aspects in the development of complex societies, political interactions occur between all members of a society and factor into its developmental history. Gailey and Patterson (1988) argued for a greater understanding of the diversity of complex societies and recognition that the development of social complexity incorporates different members of a society—as well as non-members living on the peripheries of a polity—in different ways. Gailey and Patterson discuss several modes of production to demonstrate that the development of
social complexity is a historical process that does not proceed the same way in all societies. The conception that complex societies are fundamentally hierarchical and that hierarchies are the only important avenues of research in complex societies has also been criticized (Blanton 1998; Blanton et al. 1996; Crumley 1995, 2001, 2007; Possehl 1998; Souvatzi 2007). These studies have highlighted the roles that corporate organizations and heterarchy play in the development of social complexity, concepts that focus on non-hierarchical power relationships and on members of society who would not traditionally be considered elite. A more sophisticated version of this approach is found in collective action theory, which blends both agency-based and heterarchical or corporate approaches (Blanton and Fargher 2008; Carballo et al. 2014). Essentially, collective action proponents argue that polities develop through rational social actions by both commoners and elites, where both have some degree of power (Blanton and Fargher 2008: 252). Collective action, then, is a historical process whereby certain individuals attempt to build power while others comply with or defy their actions, based on their own agency and their own perceptions of cultural norms.

Studies of the political economy are another comprehensive approach that includes differing sectors of society. The political economy refers to the production and exchange of goods (food, raw materials, and finished crafts) at a level above the household and basic subsistence economies (Earle 1997; Johnson and Earle 2000). In complex societies, the surpluses of the political economy (e.g. tax, tribute, or corvée labour) provide wealth to the polity for the leaders to use as they see fit, and as such the control of the political economy is one power base that leaders may use to build and maintain social control (Billman 2001; Brumfiel and Earle 1987; Haas 1982; Hirth 1996; M.E. Smith 2004). Two of the most commonly-studied aspects of the political economy are craft production and the control of trade and exchange (Brumfiel and Earle 1987; Costin 1991; Schortman and Urban 2004, 2012; M.E. Smith 2004; M.E. Smith and Schreiber 2005), both of which can be used and controlled by elites to gain wealth and prestige. For example, Stanish (2004) argues that production and exchange were core economic features that elites used to host feasts and create the reciprocal relationships that led to the evolution of the first complex societies in the Titicaca Basin of Peru and Bolivia. Political economy, heterarchy, and collective action are useful approaches because they demonstrate the political
relationships between elites and commoners and the dynamic power relationships found in complex societies. However, Hirth (1996) argues that elites have access to many different resources and sources of economic power and try to maximize these advantages. These approaches build upon traditional neo-evolutionism in that they highlight the complex and nuanced relationships that must be negotiated by anyone who seeks to coalesce power and build political authority.

Another major reaction to traditional neo-evolutionary approaches has been undertaken by neo-evolutionists themselves who recognize the importance of agency and intentional action in statecraft but see these as being limited. The main focus of these approaches is on political interactions, competition, and co-operation in the development of social complexity. In 1986 Colin Renfrew and John Cherry edited a volume on peer polity interaction; this concept aimed to explore the interactions and interchanges that occurred between politically independent communities and argued that no society develops in isolation, but rather that these interactions are fundamental to the development of social complexity. For Renfrew (1986: 8), societies became more complex as a result of both their internal intensification of production and through peer-polity exchange. While peer polity interaction itself has been largely forgotten, its descendants can be seen in the concern with competition and political dynamics in early complex societies. For example, an edited volume by Elizabeth Brumfiel and John Fox (1994) focused on factional competition with Brumfiel (1994) arguing that such competition was crucial to understanding the development of complex societies. Redmond and Spencer (2012) argue that interactions between chiefdoms are key to understanding the development of states. Redmond and Spencer compare two complex chiefdoms, Cahokia and Monte Albán, and argue that greater interaction and competition among chiefdoms in the latter example led to the development of states. Wright (2006) uses the well-documented historical development of states in Madagascar to argue that the development of the state is a complex and experimental process, calling for a greater focus on political dynamics in studying the development of the earliest states. Wright’s argument built upon an earlier work (2005) that briefly described the regions of the six primary states and argued that the traditional approach to understanding these as core areas of social development that diffused to their neighbours is overly simplistic. Instead, Wright demonstrated that these
areas were polycentric, a notion of interaction similar to peer polity interaction. These studies all share a common theme in that they recognize the important role that interaction, exchange, and competition played in developing political authority, but they do not entirely abandon the ecological concerns of earlier works. In this sense, a focus on agency, resistance to top-down political authority, and the recognition that each complex society developed unique strategies and histories for negotiating political authority are an important step in increasing our understanding of the processes of statecraft. In other words, while the ecological models developed by classic neo-evolutionists are important, these cannot be used to explain the development of social complexity without understanding these more recent critiques.

2.1.3 Statecraft and sovereignty

A new trend in theorizing social complexity is emerging out of this milieu. The new approach, which I term statecraft, forgoes a focus on prime movers or on any singular aspect of social complexity and instead sees polities as a complex and complicated arrangement of social relationships and dynamic historical processes of centralization and decentralization (Chapman 2003, 2007; Dillehay 2014b; Honeychurch 2014; Peregrine 2012; Routledge 2014; A.T. Smith 2003, 2011; van der Leeuw et al. 2009). Some critics of neo-evolutionism question the ahistorical and evolutionary focus inherent to that approach and problematize the ways that social typologies have been defined and used, but otherwise accept the concept of chiefdoms and states and view these as real types that can be defined and studied (Feinman and Neitzel 1984; Marcus and Flannery 1996; Pauketat 2007; Yoffee 1979, 2005). Statecraft, on the other hand, avoids questions of social typology altogether. Routledge (2014: 9) argues that states—and all societies—are not things that can be defined by specific traits but rather are “the effects of practices, discourses, and dispositions;” in other words, the results of relationships that take place among people. In my use of statecraft I follow this view that chiefdoms and states are not inherent objects but rather that the practices that led to the development of political
authority (cf. A.T. Smith 2003) are the most interesting aspect of social complexity. Statecraft is also a historical and particularist approach; while cross-cultural analogy is valuable and there are general patterns of human behaviour that can be observed, it is necessary to document in sufficient detail the long-term development of statecraft in each region, and this documentation has not been adequately done for the Early Intermediate Period of the Andean region.

Archaeologists who study the origins and development of complex societies have long been concerned with the processes of statecraft but they have rarely framed them as such, although the term has some ancestry in the Andes. My use of statecraft is similar to Adam T. Smith’s term sovereignty, which he defines as “the establishment of a governmental apparatus as the final authority within a polity [that] therefore entails both the definition of a territorial extent…and the integration of discrete locales into a singular political community” (A.T. Smith 2003: 155). This concept is a powerful one because it is so general; the lens of statecraft can be used to study any of the traits that governing agents of a polity use to differentiate and legitimize themselves, increase their power and authority, increase their wealth, produce social cohesion, and so on, while also recognizing that these projects must deal with tensions within society and that they are not always successful. In short, statecraft allows for the nuanced investigation of the ways that political entities build and centralize power and authority.

There are several key elements to statecraft that focus a researcher’s perspective on political authority and centralization. One is that social complexity is a fundamentally historical process where political authority often iterates between greater and lesser centralization where communities coalesce into a single polity and dissolve again, and there are always tensions within society that affect these processes in different ways. Dillehay (2014a, 2014b) has recently demonstrated that these processes were at play with the long-term development of the Araucanian polity of south-central Chile. Several

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6 Routledge (2014: 16-17) goes on the argue that political authority is not the only important aspect of social complexity and cites literature on heterarchy as demonstrating the ways that political authority does not equal absolute authority.
communities variously came together to form this polity and returned to autonomous communities in reaction to the Spanish colonial presence in the region. This study and similar ones (e.g. Chapman 2003, 2007; Peregrine 2012; Routledge 2014; A.T. Smith 2003) demonstrate that there is considerable variation, interplay, and nuance seen in the development of social complexity that become apparent when the archaeological record can be supplemented in good detail by the historical record. Surely these same processes were at play in societies that did not leave written records, and the statecraft lens allows archaeologists to consider how we can observe these complex processes through the archaeological record alone.

So far I have described statecraft as a comprehensive perspective, but how can archaeologists actually investigate the processes of statecraft at play? The centralization of authority and the ways by which political authority develop have long been identified; statecraft merely weaves these various processes together and recognizes the interplay between them and the ways that all aspects of society—including the material things people make and the landscapes within which they live—simultaneously create and are created by each other, what Hodder (2012) calls “entanglement.” The statecraft approach must necessarily include a landscape focus because political authority fundamentally affects and is affected by the landscape (A.T. Smith 2003). Settlement pattern studies are therefore well-suited to studies of statecraft, and Willey’s (1953) original study of settlement patterns in the Virú Valley shares many common themes with statecraft. But beyond these generalities the field is open to diverse studies; statecraft derives its strength from a recognition that there are no singular prime movers that can explain social complexity and thus can include studies of any aspect of the archaeological record, so long as the focus is on the political histories and diverse relationships that are formed as political authority is developed (Chapman 2003, 2007). We must start somewhere, however. In the second part of this chapter I explore four aspects of statecraft that are drawn from traditional studies on social complexity: (1) political centralization; (2) the economic use of land; (3) monumental architecture; and (4) the legitimate control of violence.
2.2 Archaeological Correlates of Political Authority

A major task in archaeology over the past century has been to develop methods for investigating the type, degree, and development of social complexity in the archaeological record. Put another way, while many archaeologists have explored theoretical concepts concerning the nature and development of human sociopolitical organization, others have used these theories to study the specific ways that societies built political power and centralized their authority. These investigations typically begin with a list of traits common to many complex societies, first developed by V. Gordon Childe (1950): (1) urban centres; (2) occupational specialization; (3) goods and crafts are taxed; (4) monumental public architecture; (5) elite ruling and priestly classes; (6) official administration of goods, revenues, and taxes; (7) a script-based writing system; (8) skilled artisans and architects; (9) sponsored foreign trade; and (10) craftspeople formed an independent, non-kin based class (see also Trigger 2003: 43). More recently, Flannery (1994, 1998) dismissed some of Childe's criteria and elaborated on other aspects, highlighting settlement hierarchies, residential palaces, temples, and royal tombs as key markers of social complexity. Flannery also recognized the importance of fortifications, territorial expansion, and craft production, although he did not discuss these traits specifically. Settlement hierarchies deserve specific mention; these have emerged as a popular method to study sociopolitical organization in societies that did not record their political system in writing. The study of settlement hierarchies is based on strict definitions of chiefdoms and states and the idea that states have more elaborate and specialized administrative organization than chiefdoms, namely that states have a formalized bureaucracy and the ability to delegate power to lower-level rulers throughout the territory (Spencer 2010, 2014; Spencer and Redmond 2004; Wright 1977; Wright and Johnson 1975). States will therefore have four or more levels of administrative hierarchy with power and authority filtering from the capital to smaller and smaller administrative hubs, and this can be observed through a similar hierarchy of site sizes.

Lists of traits are a useful starting point for studying statecraft. It is important, however, to avoid rigid definitions of social types as these can lead to very different interpretations by different archaeologists (Trigger 2003: 43). All of the traits highlighted by Childe and
updated by Flannery and others can be useful for studying statecraft because they reflect the processes of centralization. Some of these traits are best-studied through excavation at singular sites—what A.T. Smith (2011: 423) calls material culture approaches—but these are not the focus of the present study. Instead, the focus here is on the political landscape (cf. A.T. Smith 2003), the way that landscapes shaped and have been shaped by the political processes that took place within them. The traits that are best-suited to this project are: (1) settlement hierarchies and the integration of diverse settlements into a singular political community; (2) the political control of important economic resources; (3) the expansion of monumental civic architecture and civic-ceremonial space; and (4) the legitimate control of violence and force through warfare.

2.2.1 Settlement hierarchies and political integration

Settlement hierarchies have recently been touted as a key trait for determining the level of political authority in any given society (Spencer 2010). The settlement hierarchy approach was first used by Wright and Johnson (1975) to rank settlements in southern Iran by size and is based on the assumption that the ultimate authority in a state-organized society will be located in the largest settlement and will delegate power to local leaders at smaller provincial centres, who delegate power to leaders located at even smaller towns, and so on. Wright and Johnson argued that since states had multiple levels of authority, a four-tiered settlement hierarchy was indicative of a state; two- or three-tiered hierarchies were indicative of chiefdoms, and there would be no tiers if all settlements were autonomous and independent with no system of centralized authority (see also Wright 1977). This model has been popular since it was first used (Billman 1999, 2002; Spencer 1998, 2009, 2010; Spencer and Redmond 2004; Underhill et al. 2008) and Flannery (1998) considers settlement hierarchies to be one of the most important traits of early states. The settlement hierarchy approach is important for scholars interested in defining chiefdoms and states because it establishes clear and specific archaeological criteria that can be tested through regional settlement pattern studies.
The key concept of settlement hierarchy analysis—that systems of centralized political authority can be interpreted from settlement patterns—is also useful for studies of statecraft because it indicates the ways that political authority was organized. However not all forms of political authority are organized as clear settlement hierarchies with specific criteria, as recently defined by Spencer (2009, 2010, 2014). Spencer argued that all primary or first-generation states\(^7\) sought to expand their territories through conquest and consolidation of neighbouring communities; while this is true in many cases, including in the Oaxaca Valley of Mexico which is Spencer’s main focus, it cannot be seen as a general model applicable to all complex societies (Claessen and Hagesteijn 2012).\(^8\) Claessen and Hagesteijn highlight city-states,\(^9\) a common political form in early Mesopotamia and during the Maya period in Mesoamerica, among others, as a counter to Spencer’s argument that primary states seek territorial expansion and conquest over distant regions. City-states are typically considered to be centralized polities that have political authority over a specific piece of land, but their territory is small and their settlement patterns do not have a four-tier hierarchy (Charlton and Nichols 1997; Claessen and Hagesteijn 2012; Hansen 2000: 18-19; Trigger 2003). Furthermore, there is also considerable variation among the polities that are traditionally considered expansionist or territorial states, which typically form the basis of the settlement hierarchy model. Complex societies can be decentralized and have multiple semi-autonomous nodes that are loosely integrated into a single polity, can be organized along fluid networks with a complex arrangement of overlapping spheres of control with multiple political authorities and distant territories more closely integrated with the

\(^7\) Spencer (2010) considers chiefdoms and states to be separate types or levels of society. The state term is used here in reference to his work although it is not used as a definitional type in this dissertation.

\(^8\) Spencer (2014), in response to Claessen and Hagesteijn (2012), clarified that he applied the territorial expansion model only to primary states, those states that were the first to develop in a region and did so independently of any existing state-level society. Spencer argued that more complex processes were at play in the development of subsequent states. However I do not see any marked difference in the development of primary states over subsequent states in the same region and indeed do not consider states to be fundamentally different from chiefdoms or other complex non-state polities, as Spencer does.

\(^9\) The city-state is discussed here in reference to the works of the cited authors who use it as a specific type of political organization. This type is not used in this dissertation in preference of the general term “polity.”
capital than nearby ones, power can be distributed inconsistently throughout the territory, or the polity can have no specific territorial focus as with complex pastoral communities (Campbell 2009; Chabot-Hanowell and Smith 2013; Dillehay 2014a, 2014b; Feinman 1998; Glatz 2009; Honeychurch 2014; Kristiansen 2010; Osborne 2013; Renfrew 1986; Richards-Rissetto and Landau 2014; Routledge 2014; M.L. Smith 2005, 2007; Yoffee 2013).

While there is considerable variety in the ways that complex societies organize their landscapes, forms of political authority that do follow Spencer’s (2009, 2010) territorial expansion model and control a specific region are also common (Chabot-Hanowell and Smith 2013). Such societies are focused on growing their power by integrating—through military, economic, cultural, political, or other means—neighbouring communities into a unified polity with a highly centralized authority located in a capital city and delegating some authority to a ruling elite in smaller administrative centres (Billman 2001; Carneiro 1970, 1981; Flannery 1998; Millaire 2010a; Spencer 1998, 2009, 2010; Spencer and Redmond 2004; Van Valkenburgh and Osborne 2013; Wright 1977; Wright and Johnson 1975). These can be territorially massive such as with empires or they can be geographically small but tightly-controlled territories. Settlement hierarchies in these polities can inform on the development of political authority and processes of statecraft at play.

It is important to recognize that complex societies are not monolithic entities, however, and that there are varying degrees of power and control within any one (Falconer and Redman 2009; Routledge 2014; A.T. Smith 2003; Van Valkenburgh and Osborne 2013). Furthermore, the specific settlement patterns and geographical organization of a polity depend on long-term trajectories in its growth and development (Peterson and Drennan 2012) and the same polity, or culturally related ones, can follow different organizational strategies at different times (Dillehay 2014b). Most importantly, settlement hierarchy studies rely on the assumption that all of the settlements being compared belong to the same polity and are not autonomous communities. It is therefore important to study long-term settlement patterns in a region to determine if and to what extent autonomous communities were brought together into a centralized polity. Settlement hierarchies can
be very useful for understanding the nature of political authority and the processes of statecraft that took place in those polities that did integrate a diverse landscape of autonomous communities into a single political entity.

In this dissertation I examine the settlement hierarchies of the Early and Middle Virú Periods in the Virú Valley as one way to document the sociopolitical organization of each of these periods. This is done as part of a wider project in chapter 5 to document the changing nature of settlement patterns between these two periods, changes that reflect the centralization of authority into a single Middle Virú polity.

2.2.2 Economies of statecraft

Political authority necessarily includes an economic component. Centralized polities require a source of economic power in order to sponsor craft production and occupational specialists, projects of monumental architecture, warfare, and the very infrastructure that creates greater economic power in the first place. The sources of economic power that are controlled by a political authority can be described as the political economy. While there are many sources of economic power available to a political authority (Brumfiel and Earle 1987; Chabot-Hanowell and Smith 2013; Earle 1997; Flannery 1972; Schortman and Urban 2004, 2012; M.E. Smith 2004; M.E. Smith and Schreiber 2005; Wright 1977), food surpluses and food security is the most important, especially to a political authority that is only beginning to incorporate territory and centralize authority. A surplus of food allows for some individuals to work in ways that are not directly related to subsistence, and this allows for specialized occupations—from artisans and architects to priests and the ruling elite themselves—to develop, leading to an increasing diversity of social, political and economic relationships; this is a very long-term trend that began with sedentism (M.L. Smith 2012). A political authority can therefore build considerable power if actors manage key food sources and the infrastructure and labour required to secure and expand these sources. This is what Earle (1997: 70) refers to as the staple finance of economic control, as opposed to wealth finance such as currency or corporate craft goods. While a political authority may strive to control land to secure various
economic resources, agriculture and sources of staple finance are commonly a crucial resource.

There are various ways that a political authority can maintain and grow staple finance. Spencer (2009, 2010) recently argued that territorial expansion, or the incorporation of more and more land into the polity, can be seen as a general model for how polities gain political authority, particularly as they become complex enough to be considered states, to use Spencer’s classifications. However this model is overly simplistic. For one, Chabot-Hanowell and Smith (2013) argue that territory is only one type of resource that a political authority can seek to obtain and defend. Moreover, Claessen and Hagesteijn (2012) argue that Spencer’s territorial expansion model fails to account for forms of statecraft that do not incorporate large territories. Claessen and Hagesteijn argue that the intensification of resources, such as through the construction of irrigation networks, can be a powerful source of political authority. Irrigation networks are not the only way to invest in landscapes such that they become more productive through time in association with greater social complexity (e.g. Nieves et al. 2014), but they have received the most attention archaeologically.

Claessen and Hagesteijn (2012) tap into a long-term debate in the archaeology of social complexity, namely a concern with the role that the construction and management of irrigation networks play in the development of social complexity. One of the most influential irrigation-based models is Karl Wittfogel’s (1957) hydraulic hypothesis. Essentially, this hypothesis proposes that because water is a unique resource in that it can be manipulated through irrigation, early polities in arid environments evolved in complexity through the control of massive irrigation networks. While this hypothesis was initially very popular, its utility as a general model was soon questioned and largely rejected because data showed that many polities developed considerable complexity before any large-scale irrigation networks were built (Adams 1966; Earle 1978; Isaac 1993). Nevertheless, the management of irrigation networks is still considered to play a major role in the development of some polities (Earle 1997; Hastorf 1993; Lees 1994; Ortloff 2009; Scarborough 1991, 2005, 2011; Sidky 1997). Arguments about the role of irrigation and agricultural intensification in the development of centralized political
authority generally fall under one of two camps, either seeing the management of irrigation as a cause of political centralization or as a result of it. This dichotomy is unimportant for the purposes of understanding Virú statecraft; however it is enough to say that irrigation networks and political authority are closely associated in many societies. Rather than one leading to the other, irrigation and political authority are fundamentally linked and create each other;\textsuperscript{10} to again use Hodder’s (2012) terms, humans and their landscapes are entangled, simultaneously allowing and constricting their co-development while becoming more and more entangled through time.

Irrigation is one of the main considerations of chapter 6. I consider the expansion of irrigation networks to reclaim large tracts of desert land to have been a major project undertaken during the Middle Virú Period. The elaboration of Virú irrigation networks worked in tandem with other changes in Virú settlement patterns to bring about a complex system of statecraft.

2.2.3 Monumental architecture and civic-ceremonial spaces

Monumental architecture has long been considered one of the key markers of social complexity and is often seen as the most reliable indicator that some form of political authority was present. Monumental architecture typically refers to temples, palaces, and similar public buildings that are sponsored by elites as civic-ceremonial spaces, symbols of political authority, or both (Childe 1950; Flannery 1972, 1998; Wright 1977). In general, these structures are considered to be too large and too complicated to be built without some form of oversight or administration, and they are generally thought to require the sort of surplus of resources that a political authority tends to accumulate.

\textsuperscript{10} This is an emerging idea in social scientific thought. Whereas traditional thought has emphasized the importance of either the material/ecological aspect creating the human response or human agency creating a material/ecological result, recent arguments have focused on feedback loops between material/ecology, human behaviour, and social relationships as explaining the initial development of social complexity and long-term trends towards greater complexity (Andersson et al. 2014; Robb 2013).
because their construction requires a considerable labour investment and these labourers must be fed. But monumental architecture plays a much more complicated role in the processes of statecraft than this discussion implies. Polity-sponsored monumental architecture is at the same time a symbol of the power and legitimacy of the ruling elite and a tool at the disposal of the elite to promote social cohesion and to build or secure their political authority. Renfrew (2001, 2004) discusses the nature of symbols, which can include monumental architecture, and emphasizes that symbols as material objects can often exist before the concepts that give them meaning, and symbols and their concepts engage each other and are constantly open to reinterpretation. Monumental architecture, therefore, also requires the participation of the wider community to give it meaning and to bring it into being. Monumental architecture is most often associated with ideology; indeed, Earle (1997) describes ideology as one of the key sources of power available to a political authority. Ideology can refer to both religion and broader concepts of cultural belonging and identity. This is a broad topic in anthropology and archaeology and it is my intention here to briefly outline how it aids in statecraft and political centralization.

Political authority usually comes with ideology, but the role of ideology in creating political authority is not well understood. The term “ideology” is used as a broad category to refer to ritual, religion, cosmology, worldview, cultural norms, etc. in societies where we have no direct knowledge of these belief systems, although it is often used primarily to refer to religion in a very general sense (Aldenderfer 2010; Demarest 1992; Earle 1997). Religion is a potent and powerful form of ideology and it has regularly been invoked to explain the institutionalization of social inequality and permanent hierarchies (Aldenderfer 2010; Conrad and Demarest 1984; Hodder 2010). The concept most often invoked to account for the role that religion and ideology play in these developments is that of legitimation (Adams 1992; Baines and Yoffee 1998; DeMarrais et al. 1996; Claessen and Hagesteijn 2012; Demarest 1992; Dillehay 2014a;

11 Large-scale infrastructure such as irrigation networks and roads or defensive works such as fortifications are not usually included as monumental architecture but the same principles apply to them as well.
Earle 1997; Flannery 1972; Joyce and Winter 1996; Kolata 1992; Peregrine 2012; A.T. Smith 2000, 2003). Essentially, proponents of this view argue that leaders consciously manipulate religion and ideology to serve their own needs, primarily to justify their position as leaders and their right to collect wealth (e.g. Joyce and Winter 1996). In this sense, legitimacy is the recognition that political authorities have a right to their authority (Smith 2003).

The literature on ideology as a means to legitimate leadership is important, but under-emphasizes a related concept, social cohesion. Sacred and secular life are inherently intertwined in early complex polities and are not viewed as separate entities (Trigger 2003), and this is particularly true in the Andes. Legitimation assumes that leaders are always able to consciously and intentionally manipulate ideology for their own benefits, but leaders believed in the ideology as much as their subjects did and it is difficult to think that they could always manipulate ideology. Furthermore, legitimation is a fundamentally coercive act, following Fried’s (1960, 1967) concept that coercion was the driving force in the development of social complexity. Service (1962, 1975), however, argued that social cohesion was a crucial aspect in understanding the centralization of polities and the development of political authority; the ideology-as-legitimation viewpoint under-emphasizes the role that social cohesion plays in the development of social complexity. Related to this, legitimacy sees ideology as fundamentally leader-driven and does not account for the ways that ideology can be interpreted, created, re-interpreted, and manipulated by people in non-elite positions (e.g. Swenson 2007).

Social cohesion is related to legitimation. Social cohesion is more proactive—actively building political authority through community unification—whereas legitimation is more reactive as an attempt to maintain control that has already been won through other means. One common way that social cohesion is created and maintained involves the construction of public architecture: community spaces and important buildings can serve as a place for people to come together for shared rituals, meetings, and information and that people can look to as symbols of group identity. For ideological power to be expanded beyond the immediate community, and thus for it to be useful for building political authority, it must be materialized or made into a physical medium that can be
transmitted to other groups (DeMarrais et al. 1996). Monumental public architecture is one common form of ideological materialization. These spaces are the places where rituals and performances that affirm group identity and promote social cohesion are held (e.g. Blanton 1989; Inomata and Coben 2006; Kolb 2012; Moore 1996; A.T. Smith 2000, 2003). For example, Swenson (2011, 2012) argues that public spectacles and performances were carried out at monumental Moche buildings in the Jequetepeque Valley of north coastal Peru as a way of creating identity and a sense of community. Similarly, Coben (2006) argues that theatrical performances and the spaces in which they took place were a key part of Inca imperial expansion, as a way to pacify conquered groups and consolidate them into the empire. Not all rituals take place within monumental buildings and the spaces where rituals take place can be difficult to identify in smaller-scale societies that did not build dedicated civic-ceremonial architecture. Nevertheless, the construction of monumental civic-ceremonial structures for the rituals and activities that took place within them is a common aspect of statecraft.

While large meeting spaces such as plazas and temples are a common form of monumental civic-ceremonial architecture, not all such architecture is as obviously used for regular and repeated rituals. For example, Baines (2006) describes the very construction of Egyptian pyramids—monumental symbols of the dead pharaoh—and the funeral rituals that took place at them as being a form of ritual of group inclusion. Rather than being used as regular meeting places, these structures promoted social cohesion through their construction and through funerary rituals that took place there. Funerary structures become part of the sacred landscape, a built environment that at the same time promotes social cohesion among insiders, and excludes outsiders (Baines 2006; Mantha 2009; Moore 2004). While funerary structures are strongly tied to ideology in the religious sense, built environments have ideological power through other means as well. Not all monumental architecture is meant to be used exclusively or even primarily as civic-ceremonial space or meeting grounds. Public works such as major infrastructure

12 Baines also describes such events as leading to the exclusion of certain groups, highlighting the importance of recognizing the multiple meanings of civic-ceremonial architecture.
have direct economic power to provide a political authority with key resources and wealth. However fortifications, agricultural terraces and irrigation systems, extensive road networks, and similar major infrastructure projects also have ideological power because they symbolize the power and ability of the political authority to raise taxes and control labour and coordinate the construction of structures that are good for society, and the symbolic significance of these structures can develop over time as they take on meaning beyond their initial pragmatic use (Hastorf 2009; Peterson and Drennan 2012; Renfrew 2001, 2004; Schreiber 2009). In this sense infrastructure promotes social cohesion and a sense of community identity and, along with civic-ceremonial architecture and funerary structures, serves to be part of the political landscape that at the same time is built by and builds political authority (A.T. Smith 2003).

In this dissertation I examine the nature of monumental and non-monumental civic-ceremonial space in the Early and Middle Virú Periods. I explore the potential for Virú civic-ceremonial structures to be used as signalling devices to promote social cohesion, and as symbols of the power of a centralized authority. I also explore ways that civic-ceremonial structures became more accessible and community-oriented spaces in tandem with Middle Virú statecraft.

2.2.4 Warfare and control of violence

Warfare and the legitimate use and control of violence by a political authority has long been recognized as one of the principle correlates of social complexity (Carneiro 1970, 1981; Claessen 2006; Cohen 1985; Dillehay 2014b; Earle 1997; Feinman and Neitzel 1984; Flannery 1972; Haas 1982; Trigger 2003; Webster 1975; Yoffee 2005). While warfare and the development of complex society are clearly linked, there remains considerable debate as to the role that warfare played in the initial development of social complexity (Claessen 2006; Flannery 1972). Egalitarian societies engage in warfare, but it is of a different character and done for different reasons than warfare that is carried out by a centralized political authority (Wiessner 2009). However, warfare seems to be an integral part of political authority in complex societies; the production of sovereignty—
the concept that forms the basis for my statecraft approach and the discussions of political authority used throughout this chapter—is recognized to be possible only through the control of violence (Hansen and Stepputat 2006; Routledge 2014; A.T. Smith 2011). The control of violence in this sense includes both warfare and the maintenance of social order through police action, but most archaeological attention has focused on the role that warfare itself played in the development of political authority.

Warfare has often been cited as a key factor in the initial development of social complexity and in the development towards greater levels of political centralization and authority. Much of this debate is essentialist and neo-evolutionary in nature, proffering warfare as a ‘prime mover’ both for the initial development of chiefdoms and for the development of chiefdoms into states. While these specific typologies are not used in this dissertation, the neo-evolutionary discussion on warfare is very informative for highlighting some of the key ways that political authorities use the control of violence to their advantage. This discussion can be divided into two very broad camps, with some overlap.

The first camp sees the development of complex political forms—namely states, in essentialist terms—as being the outcome of centuries of warfare among less complex non-egalitarian polities, typically referred to as chiefdoms by these authors (Carneiro 1981; Cohen 1984; Earle 1997; Feinman and Neitzel 1984; Flannery and Marcus 2003; Johnson and Earle 2000; Redmond 1994; Redmond and Spencer 2012; Spencer 2003; Spencer and Redmond 2004; Turchin 2010; Turchin et al. 2013; Turchin and Korotayev 2006; Webster 1998). There is an empirical basis for these claims: warfare among autonomous polities is common in these groups and this practice eventually lead towards increased political centralization. However, increased complexity is typically seen as being an inevitable evolutionary outcome of warfare yet the exact mechanisms that led to increased centralization are rarely elucidated. It is not convincing enough to simply say that warring groups lead to the development of strong, centralized political authorities, although there is a connection between the two.
The second broad camp sees warfare in economic terms as a way that certain individuals could bolster their wealth, prestige, and power by competing for key economic resources, namely land and sources of staple wealth (see Earle 1997 for a comprehensive overview to that point). Carneiro’s (1970) provocative article set the tone of this debate. Carneiro argued that social complexity develops in circumscribed regions because land and resources will become scarce as the region’s population grows. As a result, warfare will emerge as a way to secure resources and, once powerful enough, these war leaders will conquer neighbouring lands to expand their power. Webster (1975) echoed many of Carneiro’s arguments and considered ecological and demographic conditions to lead to certain communities having greater and more profitable resources, driving competition and, ultimately, the development of social complexity as leaders seize the most productive land through warfare.

Other sources have deemphasized the role of population pressure in warfare and see the competition for land and resources as being more political in nature. Adams (1966) argued that warfare played a large role in the political economy of complex polities by increasing their revenue base. Cohen (1984, 1985) argued that competition over land and resources between core and periphery communities led to conflict and that this conflict has, gradually, incorporated autonomous communities into fewer and larger centralized polities. Earle (1987, 1997) argued that warfare developed among competing leaders in smaller-scale complex societies (chiefdoms, in Earle’s terms) and was done to accumulate prestige goods, defend against other competitive leaders, and ultimately to incorporate the villages and productive land of other communities. Earle points out that there are also means of regulating warfare through a balance of power in many instances. Billman (1999, 2001, 2002) argued that the development of increasingly powerful and centralized polities in the Moche Valley of Peru was multi-faceted, but included competition and occasional warfare over land and control of irrigation networks, crucial to life in arid coastal Peru. Finally, Spencer (2003, 2009, 2010; Spencer and Redmond 2003, 2004) has become a prominent proponent of the argument that territorial expansion to conquer neighbouring lands, primarily through warfare and coercion backed with the threat of violence, is a major driver towards larger and more complex polities. While Spencer’s arguments are somewhat overstated (Claessen and Hagesteijn 2012), conquest
and the incorporation of land through territorial expansion does describe the observed patterns of increased warfare and subsequent centralization that occurred in many, though not all, complex societies.

The models described above all share a major trait in common: they all describe warfare as being a key component of the initial development of social complexity and describe the centralization of political authority as occurring through warfare. These models are not wrong, but they seem incomplete (Nielsen and Walker 2009; Pauketat 2009). While some of the above-cited authors did recognize that not all political authorities developed in times of intense warfare and that warfare was also common in egalitarian societies (e.g. Cohen 1984; Flannery 1972), the general view is that warfare causes increased political centralization. These models are typically evolutionary, rooted in ecological or economic determinism, and do not consider the particular cultural context, history, and meanings of warfare (Pauketat 2009). This last point is important because the neo-evolutionary models of warfare discussed above fail to take into account any consideration of the dynamic social meanings and interpretations of warfare and they typically afford warfare a very central role in the development of political authority without recognizing the dynamic way that warfare interacted with other mechanisms of statecraft (Bossen 2006; Claessen 2006; Dillehay 2014a, 2014b; Neilsen 2009; Neilsen and Walker 2009; Pauketat 2009). Wars do not produce political authority in and of themselves, but rather warfare—and violence more broadly—is entangled with cultural practices and beliefs, the agency of individuals, and other forms of political power (Bossen 2006; Neilsen 2009; Pauketat 2009). Furthermore, while warfare is generally considered an external act of violence against ‘someone else,’ there are many internal consequences of warfare that play into the processes of statecraft. For instance, the construction of military infrastructure can be considered a form of monumental architecture and concerns for public safety and the avoidance of dangerous or unfriendly places play a role in decisions made about the location of irrigation networks and trade routes. Warfare is clearly important, but part of its importance is a result of how it affects other aspects of statecraft.
Warfare is thought to be a common feature of the Early Virú Period in the Virú Valley of Peru (Willey 1953). In this dissertation I use settlement pattern evidence to show that while Early Virú was indeed a time of considerable strife, there was a major reorganization in the way that warfare was organized in the Middle Virú Period. Specifically, Middle Virú Period was a time of peace and public safety, but this sense of security was brought about, in part, by the formalization of military practices in the valley by a centralized authority that developed during this period.

2.3 Conclusion

This chapter reviewed the major theoretical perspectives regarding the development of social complexity. While there are merits to all of the approaches discussed, it is important to recognize that the very concept of social complexity is itself very complex and that no singular traits or prime movers can account for the wide variability seen in sociopolitical forms through time and around the world. Therefore, I take a general approach, which I term statecraft, to explain the development of political authority. The statecraft approach recognizes that political authorities do attempt to control a specific piece of land and incorporate autonomous communities into a singular polity, but that they do so with varying levels of success and by drawing on a wide variety of culturally- and environmentally-appropriate means. Landscape is a fundamental aspect of statecraft, where cultural landscapes and political authority develop together.

Statecraft is a fundamentally historical process, however, and as such requires fine-tuned chronologies in order to accurately document the long-term trends that led to the development of political authority. The sites included for analysis in this dissertation were originally dated either through seriation of surface ceramics or through excavation during the large-scale Virú Valley Project of the 1940s (Ford 1949; Ford and Willey 1949; Willey 1953). A few sites have been investigated more recently but these original dates continue to be used for most sites in the valley. There are numerous reasons to suspect that these dates are inaccurate and it is not possible to proceed with the analysis
of Early and Middle Virú statecraft without first determining the reliability of this dating scheme. It is to this that I now turn my attention.
Chapter 3

3 Seriation and the Ford-Willey Sequence

“culture change is always a gradual process in which the new is founded on the old” (Ford 1949: 39)

The Virú Valley Project of the 1940s was the result of the combined effort of several archaeologists, each focusing on a certain task while working together in order to establish the occupational sequence for an entire north coast valley. Bennett (1950) primarily excavated burials from various mounds of the Gallinazo Group, Strong and Evans (1952) and Collier (1955) conducted deep stratigraphic excavations at several sites in order to establish chronologies and understand the role that these major sites played in the valley, and Ford (1949) collected and seriated surface ceramics from over 300 sites. Finally, Willey (1953) conducted extensive surveys throughout the valley and used Ford’s ceramic sequence to date sites in his pioneering settlement pattern study. The results of this major project had a lasting effect on north coast archaeology. Although Rafael Larco Hoyle’s (1948) contemporary work with fancy grave ceramics was establishing the sequence of major cultural developments, prior to the work in Virú nothing had been done to seriate domestic or plainware ceramics, no valley-wide surveys had been conducted, and the north coast ceramic sequence was mostly speculative. The Virú Valley Project, and especially Willey’s synthesizing study, effectively set the tone for north coast research throughout the remainder of the 20th century, and it remains foundational today.

As important and influential as Willey’s (1953) work in Virú has been, it nevertheless contained conclusions and inferences that can no longer be fully supported. However, it has never been re-examined or updated in light of advances in archaeological practice. More specifically, since its publication, north coast archaeologists have assumed that Willey’s inferences were largely accurate and have improperly applied his cultural sequence throughout the north coast, resulting in a great many errors in interpretation that
are only beginning to be sorted out (Donnan 2009; Millaire 2009a). Although Willey’s (1953) study was excellent, it was preliminary and understandably he was forced to make several assumptions, some of which are no longer tenable. While Ford (1949) studied pottery collections and established the Virú ceramic sequence, it was Willey who took this sequence and effectively used it to date sites and the occupational history of the entire valley by associating the surface ceramic assemblage of any given site with its position in Ford’s seriation, what I call the Ford-Willey sequence. Willey (1953: 10; see also O’Brien and Lyman 1998: 179) recognized this to be “the greatest single weakness in the present study.” The Virú Valley Project and its findings, on the whole, were satisfactory as an initial investigation, but I argue that the Ford-Willey cultural sequence and settlement pattern interpretations contained many small errors and the aggregate of these errors has subsequently skewed our understanding of north coast occupational history, particularly as it pertains to the Early Intermediate Period (EIP).

On the central north coast, the Early Intermediate Period (ca. 400 B.C. – 800 A.D.) is generally thought to consist of three main cultural manifestations—Salinar, Virú, and Moche—sandwiched between the Cupisnique of the Early Horizon and the Huari and Lambayeque (Sicán) of the Middle Horizon (Moseley 2001). The members of the Virú Valley Project defined a local sequence for the EIP that still followed these three main phases but called them Puerto Morin (Salinar), Gallinazo\textsuperscript{13} (hereafter referred to as Virú), and Huancaco (Moche). Willey (1953) inferred that a major change in settlement patterns occurred between the Puerto Morin and Virú periods, with a subtler change between the Virú and Huancaco periods. Given these major settlement pattern changes, Willey hypothesized that the transition from Puerto Morin to Virú marked the emergence of a state-organized society in the Virú Valley, as evidenced by the transformation of local settlement pattern systems. Willey’s hypotheses regarding the EIP settlement patterns in Virú have had a profound impact on our understanding of north coast social and cultural

\textsuperscript{13} See discussion in chapter 1 about usage of the terms “Gallinazo” and “Virú.”
development, but the Ford-Willey dating scheme upon which these hypotheses rest can no longer be assumed to be completely accurate.

In the Andean region ceramics tend to be the main material used for determining time periods and cultural affinities. In the Virú Valley, Ford (1949) and his colleagues examined over 180,000 ceramics collected from excavations and surveys and constructed a ceramic typology that defined several domestic and corporate styles spanning three millennia. Out of this long sequence I recognize four major domestic traditions: (1) Guañape Plain, (2) Huacapongo Polished Plain, (3) Castillo Plainwares, and (4) Late Plainwares. There was considerably more variety among corporate ceramics, but three main styles date to the EIP: (1) Puerto Morin/Salinar; (2) Virú Negative; and (3) Huancaco/Moche. The Virú Valley Project used this ceramic typology to develop the occupational sequence for the valley. Willey interpreted these changes in the ceramic typology to mark fundamental changes in the cultural and ethnic makeup of the valley but Ford had intended them to be used solely for dating and determining the temporal relationships between sites (Ford 1949; Makowski 2009; O’Brien and Lyman 1998).

It is now appropriate to revisit the Ford-Willey sequence and Willey’s (1953) interpretations regarding the Early Intermediate Period in Virú, postulated over sixty years ago but not closely re-examined since. The key issue here is whether or not we can trust the Ford-Willey dating sequence, as it was established with great care but nevertheless contained errors in interpretation highlighted by subsequent studies. Furthermore, it is becoming increasingly clear that the history of the EIP on the north coast is one of considerable cultural and ethnic continuity through time (Millaire 2009b; Millaire et al. 2013; Sidoroff 2005; Surette 2014). In order to revisit these interpretations I must examine the two crucial hypotheses upon which the Ford-Willey sequence rests:

1. In the absence of chronometric dates and intensive excavations, surface collections can be used to date the prehistoric occupation(s) of

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14 Willey (1953: 34, 37) reported five radiocarbon dates from Virú contexts—a very new technology at the time—and proposed a temporal scheme based on these five radiocarbon dates alongside relative dating techniques.
archaeological sites in Virú.

2. The ceramic types used by James Ford are good temporal markers of the transition between each phase of the EIP in Virú and are therefore a good proxy for chronometric dating;

I argue that rather than viewing the Virú Valley sequence as a series of three discrete time periods, each subsuming the previous one, it is more accurate to consider the entire EIP as one time period that consisted of a remarkable level of cultural continuity for some ca. 1000-1200 years. As such, rather than viewing the Virú Valley sequence as a transition of three archaeological cultures from Puerto Morin to Virú and finally to Huancaco, we should instead view this as a unified Virú culture consisting of an early (Puerto Morin), a middle (Gallinazo), and a late (Huancaco) phase, marked by the development of statecraft. These follow Willey’s (1953) original time periods, but reframe them in a context of cultural continuity (see table 3.1). It is first necessary to explain the theoretical and methodological context in which Ford was working when he developed his Virú Valley ceramic sequence.

Although chronology is a major focus of this dissertation, my concern here is with refining the regional sequence through a relative dating program; new absolute dates are not available. That said, Willey (1953: 37) did propose calendrical dates for each period and these have been most recently updated by Millaire (n.d.) I follow Millaire’s dates for the Early, Middle, and Late Virú periods. The dating of the earlier and later periods are less secure in Virú and the dates suggested here are based on earlier estimates (Willey 1953: 37; Zoubek 1997) and on recent dating schemes for the north coast (see chapter 1).

Table 3.1: Time periods used in this dissertation, their equivalent period name as used by Willey and the Virú Valley Project (VVP), and their approximate calendrical date range. Dates are based on Millaire (n.d.), Quilter (2014), Willey (1953: 37), and Zoubek (1997). The Cerro Prieto (pre-ceramic) and Guañaape periods are poorly-dated in the Virú Valley.

<table>
<thead>
<tr>
<th>Period</th>
<th>VVP Equivalent</th>
<th>Approx. Date Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late Epoch</td>
<td>Estero</td>
<td>A.D. 1470 – 1532</td>
</tr>
<tr>
<td></td>
<td>La Plata</td>
<td>A.D. 1100 – 1470</td>
</tr>
<tr>
<td></td>
<td>Tomaval</td>
<td>A.D. 750 – 1100</td>
</tr>
<tr>
<td>Late Virú</td>
<td>Huancaco</td>
<td>A.D. 600 – 750</td>
</tr>
<tr>
<td>Middle Virú</td>
<td>Gallinazo/Virú</td>
<td>200 B.C. – A.D. 600</td>
</tr>
<tr>
<td>Early Virú</td>
<td>Puerto Morin</td>
<td>400 – 200 B.C.</td>
</tr>
<tr>
<td>Guañaape</td>
<td>Guañaape</td>
<td>1200 – 400 B.C.</td>
</tr>
<tr>
<td>Cerro Prieto</td>
<td>Cerro Prieto</td>
<td>? – 1200 B.C.</td>
</tr>
</tbody>
</table>
3.1 Seriation and the dating of surface collections

Methods used to date archaeological sites and cultures have long been of concern to archaeologists. Prior to the establishment of radiocarbon and other absolute means of dating beginning in the early 1950s, archaeologists developed many sophisticated methods to determine the relative age of archaeological sites and assemblages, including seriation. Seriation involves the ordering of artifact assemblages into a logical arrangement that appears to show the progression of time (O’Brien and Lyman 1998, 1999). This method is conceptually more nuanced than this simple definition would imply, however. Individual artifacts are static but the societies that produced them were dynamic and their material culture was constantly evolving, and therefore artifact assemblages can include considerable variation. Seriation techniques must negotiate this inherent variability in artifact assemblages in order to trace the progression of time, meaning that archaeologists must define normative types—usually based on numerous physical attributes of the artifacts but not necessarily ones that would have been meaningful to the artifacts’ producers—and order the apparent evolution of one type into another. Typically, this process is based on the assumption that individual types will be introduced into the archaeological record, increase in frequency, and then decline and disappear, following a normal curve known as “battleship graphs” due to their appearance (figure 3.1). In general, stylistic characteristics of any artifact are more temporally sensitive than functional or technological characteristics, and thus seriation analyses tend to focus on artifact style over form or production technique (O’Brien and Lyman 1999: 38). Well-conceived and properly applied seriation analyses can successfully track the evolution of artifact types, but fundamentally these types remain archaeological creations and as such are open to criticism and reanalysis. In the Andean region, ceramics tend to be the primary type of archaeological material used for seriation analysis due to their abundance, resilience, and long time span.
The Virú Valley project was conducted during a time when evolutionary theory was very prominent in Americanist archaeology and the ceramic sequence developed by Ford strongly reflects this thought in its design (O’Brien and Lyman 1998, 1999, Lyman and O’Brien 2006; Strong et al. 1952). Ford followed essentially the same tactics that he and his colleagues Philip Phillips and James Griffin had used in a study in the Mississippi Valley that was conducted prior to Ford’s Virú work (Phillips et al. 1951). Phillips et al. (1951: 61) went into some detail describing the theory of ceramic classification schemes and from this discussion it is clear that they did not consider ceramic types to reflect real-world differences in ceramic manufacture and style but rather they considered types to be a heuristic construct, created by the archaeologist for the express purpose of classifying

**Figure 3.1:** Hypothetical battleship graph tracing the popularity of different transportation methods in Ohio. Redrawn from Phillips et al. 1951: fig. 15. Drawn by Flannery K. Surette and used with permission.
variation in a given ceramic assemblage. Phillips et al. recognized that considerable overlap was possible between different ceramic types such that, depending on which attributes were emphasized, ceramic types could be defined and redrawn in numerous ways.

Ford (1949) followed a similar approach in classifying sherds from the Virú Valley and argued that since the ceramic types he defined were explicitly chosen to represent the passage of time, they should not be considered representative of cultural periods. Ford (1949: 39) considered cultural change and artifact variation to be constant and gradual, “so [gradual] that the people making the artifacts and following the customs were probably under the impression that they were doing everything exactly as their fathers and grandfathers did.” Therefore, the role of the archaeologist was to classify the continual variation in artifacts in a way that made logical sense to the classifier for the express purpose of demonstrating the passage of time, but Ford was not concerned with whether these classifications would have had any intrinsic value or meaning to the people who made the artifacts in the first place. He was strictly concerned with the passage of time; cultural relationships and the explanation of culture change could wait until the actual passage of time was better understood (Ford 1949: 39; O'Brien and Lyman 1998). Nevertheless, many of his peers, including Gordon Willey (1953), considered pottery types to represent actual cultural groups. For Ford, pots equaled the progression of time, but for Willey pots equaled people.

3.1.1 The mechanics of seriation in Virú

Ford's theories of culture change are an important consideration in order to understand both how he viewed culture change and how this was misinterpreted by other archaeologists, but some discussion of the mechanics of his analysis are in order. Ford (1949: 38-39) made three key assumptions specific to the Virú ceramic material: (1) although artifacts vary through both time and space, the Virú Valley is small enough that regional variation is not an issue and any variation in artifact assemblages can be considered the result of time alone; (2) no culture is ever homogenous and several
different artifact types can be present on the same site at the same time owing to either
different vessel functions (e.g. serving jars vs. cooking vessels) or owing to separate
elements of society, while external ideas introduced into any given region may be
adopted or ignored at varying rates; and (3) culture change is always a gradual process.
Furthermore, Ford (1949: 31-32) eschewed the use of fancy burial ceramics from grave
lots for the dating archaeological cultures, which had been the primary source of
archaeological dating on the north coast of Peru prior to his work. Ford considered
domestic ware vessels collected from middens—and therefore not consciously selected
for burial and not produced by specialists—to be a more reliable indicator of the passage
of time than burial vessels (see also O'Brien and Lyman 1998: 166).

In setting up the Virú Valley Project, Ford was responsible for dating the surface ceramic
collections from the entire valley while Strong and Evans (1952) and Collier (1955)
excavated stratigraphic trenches at several sites. Since most of the vessel forms had not
previously been described and no domestic ware ceramic typologies existed, all four
archaeologists worked together to establish a unified valley typology and shared data or
worked on each others’ collections in order to reduce inter-observer error (Ford 1949: 42-
43). Unlike his colleagues, Ford was relatively unconcerned with vessel form and instead
derived types by focusing on the technological aspects of vessels including paste colour
and composition, firing techniques, and vessel thickness, as well as decoration style when
present. This focus is likely because he was dealing with surface material, which tends to
be highly fragmentary, and therefore he needed to devise a technique that was versatile
enough to classify small body sherds alongside sherds that were diagnostic of vessel
form, but could also be integrated with the work of his colleagues who were more likely
to find complete vessels.

15 Bennett (1950) excavated burials at the Gallinazo Group site but his analysis did not factor heavily into
Ford’s. Strong and Evans also excavated a deep stratigraphic trench at Huaca Gallinazo, the main mound of
the Gallinazo Group, and Ford did use these data in his analysis. Although Bennett recognized the same
pottery types as his colleagues he tabulated his finds by form and/or by decorative motif, making it difficult
to correlate his results with those of Ford. Because of this I was unable to use Bennett’s data.
Ford (1949) very briefly described all of the ceramic types that he encountered in surface assemblages and relied on Strong et al. (1952) for detailed descriptions of all pottery types dating from the Early Horizon through the EIP and for ideas regarding the evolution of one type into another, although it is evident that Ford and Strong worked closely together to establish these in the first place. Bennett (1950) and Collier (1955) also provided detailed descriptions of pottery types from their excavations but these are less relevant to the present investigation. Ford lumped together and split asunder the various ceramic types until he settled on a master typology that he felt reliably represented the passage of time and could be rigidly-defined, and this typology was then used to seriate the remainder of the collections. As a result, many types were defined by entirely arbitrary criteria. For example, Castillo Plain and Valle Plain were identical in paste, colour, and firing technique, but the former was thinner than 12 mm while the latter was thicker (Ford 1949: 42-43). Because of its arbitrary nature I argue that Ford's typology need not be seen as a rigid and inflexible scheme but rather can be rearranged as necessary.

It is commonly thought that Ford used frequency seriation to order the surface assemblages of all sites by plotting the relative frequencies of ceramic types on strips of paper and rearranging them to display a logical distribution for each time, a technique he described elsewhere (Ford 1962). Ford rarely used this technique, however, preferring instead percentage seriation based on interdigitated excavation levels (Lyman et al. 1998). This is true of his work in Virú. Although Ford (1949) had originally planned to use frequency seriation, the excellent results from deep midden excavations provided better chronological control and were used instead to establish the overall sequence. Ford took the proportion of ceramic types from each of fourteen strata cuts at ten sites excavated by Strong and Evans (1952), Collier (1955), and himself, interdigitated the results of these to produce smoothed graphs showing the waxing and waning popularity of all ceramic types throughout the valley\(^\text{16}\), and then dated the surface assemblages by

\(^{16}\) Recall that Ford considered the Virú Valley small enough to warrant a single sequence for the entire valley, and thus he felt it was appropriate to interdigitate the individual sequences from sites in separate parts of the valley.
cross-referencing them against this master sequence (Ford 1949: 44-45). However, Ford played around quite a bit with the stratigraphic levels in order to create this master graph. All excavations followed arbitrary levels, rather than natural or cultural ones and rates of accumulation differed in each of the cuts, requiring some finessing—indeed, Ford “felt at complete liberty either to expand or compress parts or the whole of an excavation graph to make it fit the others” (Ford 1949: 45). No excavations contained the complete valley sequence and no excavation covered the entire period from terminal Guañape to early Virú, leaving a gap of unknown length between these two periods. Ford bridged this gap, the Puerto Morin Period, by including 18 surface sites in his master sequence, a sequence that was otherwise based entirely on excavations; O’Brien and Lyman (1998: 174) consider this decision to be “[perhaps] the weakest portion of his analysis, as there is a clear discontinuity between the eighteen collections and related excavation samples...and the collections arranged on the basis of percentage stratigraphy.” These are potential sources of error that make it necessary to reappraise Ford’s sequence in light of current understandings of north coast culture history.

Although Ford (1949) considered culture change to be gradual and constant and saw the work of the archaeologist as identifying the passage of time rather than a sequence of cultures, he defined several discrete time periods and tied these to wider cultural associations. Ford labeled time periods by letter (e.g. F-I referred to various phases of the Virú period, I-K referred to the Puerto Morin period, etc.) and assigned a time period(s) to the ceramic assemblage from each site, in many cases concluding that a single ceramic assemblage represented multiple time periods and therefore came from a multicomponent site. Ford (1949, 1952) argued that the assemblage from any site represented the mean cultural date from that site, except in the few cases where sites contained deep stratigraphic deposits in which cases the surface assemblage represented the top layers of the site. Bennyhoff (1952), in his sweeping criticism of Ford’s work, argued that Ford was incorrect to assume that the surface collection of any site represented the mean average date for that site. Ford (1952) responded by emphasizing that the vast majority of sites were so shallow that there was essentially no post-occupational deposition, and therefore all ceramics deposited on that site were represented on its surface. However,
Ford dismissed Bennyhoff’s concerns without adequately testing the assumption that a site’s surface assemblage represents its mean ceramic date.

Despite Ford's theoretical rigour and the warm reception that his work received, I argue that his actual analysis betrayed to some extent his theoretical underpinnings, and at any rate our better understanding of north coast culture history warrants a reinterpretation of Ford's ceramic sequence and seriation methods. Furthermore, Willey (1953: 10) took Ford's time periods and used them as the basis of his various cultural periods and as a result any errors on the part of Ford were amplified by Willey in his larger settlement pattern study. In chapter 4 I will discuss some of the key problems with the Ford-Willey sequence in greater detail, test Ford’s assumption that surface collections represent the mean age of the site, and update Ford’s seriation. In the remainder of this chapter I briefly trace the development of the domestic ware and corporate ware traditions through time. I emphasize that these are two separate traditions that developed along separate timescales and should not be considered together when developing a seriation of Virú Valley ceramics.

3.2 The Virú Valley ceramic sequences

With this background in mind, it is now possible to test the central hypothesis of this chapter: does the Virú Valley ceramic sequence devised by Ford (1949) accurately represent the passage of time? In order to evaluate this hypothesis it is necessary to deconstruct the ceramic typologies used by Ford and his colleagues (Bennett 1939, 1950; Collier 1955; Ford 1949; Strong and Evans 1952; Willey 1953) and to reevaluate the sequence in light of current understandings of north coast prehistory. As discussed above and in greater detail in chapter 4, Ford’s approach contained several methodological problems but his volume glossed over or ignored many of these concerns. It is my intention here to understand the Ford-Willey sequence in greater detail so that I can reinterpret it in chapter 4. For reasons that will be discussed below, I find it useful to separate this sequence in two: domestic and corporate ware traditions.
3.2.1 Domestic ware traditions

Domestic ware styles are by far the most widespread and abundant ceramic type recovered from sites in Virú and throughout the north coast but aside from the Ford-Willey sequence they have played a minor role in our understanding of north coast culture history because archaeologists typically focus on the fancy styling of corporate wares. Important information can be read from domestic wares and their sheer abundance requires a focus on them for understanding valley-wide settlement patterns. This is especially true because corporate ware ceramics are very rare prior to the Late Virú Period and most sites lack any Early or Middle Virú corporate wares whatsoever. Domestic pottery made its first appearance in Virú at the beginning of the Guanape Period and then evolved gradually throughout the entirety of the Prehispanic sequence with no clear or sharp breaks in tradition, suggesting that there was overall cultural and ethnic continuity despite the major political upheavals that took place in the valley (Collier 1955; Strong and Evans 1952). This point, one of overall cultural continuity, seems to have been largely forgotten in the decades since the Virú Valley Project as archaeologists favoured Willey’s (1953) model of abrupt cultural changes, but the cultural continuity view has begun to regain a foothold in the last decade (Millaire 2009b; Millaire et al. 2013; Sidoroff 2005; Surette 2014).

Because there were no clear intrinsic categories of domestic ceramics—categories that would reflect conceptual distinctions used by the potters themselves—Ford (1949) and Strong et al. (1952) arbitrarily created types based on attributes that they considered important for establishing the chronological trends in ceramic technology and style. For Ford, pottery types (both domestic and corporate wares) were merely arbitrary categories that the archaeologist established purely to track the progress of change—and thus time—in the continual evolution of pottery styles (O'Brien and Lyman 1998). Bennyoff (1952) criticized this approach, and in particular pointed to these arbitrary distinctions that he

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17 Willey was using the same data as his colleagues, but interpreted it in rather a different manner than they did. Following a similar vein, I am essentially reviewing this same data but from my own perspective preferring cultural continuity to abrupt change.
felt made each type impossible to separate from other types, thus invalidating the typology. Ford (1952) dismissed Bennyhoff’s reasoning by stating that the pottery types used were highly distinctive and could be easily distinguished by all project members. In this we see a glimpse of Ford’s reasoning: although domestic pottery types are created by the archaeologist and blend into one another, they were carefully chosen based on inherently recognizable characteristics expressly for the purpose of dating ceramic assemblages.

Nevertheless, Ford made some errors in reasoning by equating domestic pottery styles with corporate ones. Several of Ford’s time periods appear to have been defined on the basis of corporate wares, even though these made up a very small fraction of the overall ceramic assemblages and Ford (1949) stated that they were less useful for dating than domestic wares. Furthermore, Ford created numerous categories of domestic wares and treated these independently from one another, whereas they appear to essentially be variations around a central stylistic theme. I find it useful to condense these styles into four main categories that track the evolution of domestic pottery throughout the entire occupational history of the Virú Valley: (1) Guañape; (2) Huacapongo Polished Plain; (3) Castillo; and (4) Late Plainwares¹⁸ (Ford’s types are condensed in table 3.2). I must emphasize that these are heuristic categories meant to manage what was a very gradual transition from one tradition into another, and there were always multiple types made and used during any period, although one type was most common.

The ceramic types that make up these four traditions are summarized here. These descriptions are drawn from Strong et al. (1952). The earliest tradition, Guañape, is marked by relatively coarse, poorly-fired jars and bowls. These vessels are either black or red, with black being the earlier. This indicates that vessels were initially fired in a reducing atmosphere to produce black pottery but that a preference for red oxidized

¹⁸ Two polished plain wares, Gloria and Queneto, were also used during the Castillo and Late traditions, respectively. These are well-made ceramics that are polished, undecorated versions of the larger tradition. These are included as part of their major tradition for most analyses in chapter 4 but it is useful to list and describe them separately. There is also a polished, well-made ceramic associated with the Guañape Period, Ancón Polished Black, but for my purposes this is included as part of the wider Guañape tradition.
vessels emerged. The change to oxidized technology can be seen as a major technological development. The preference for oxidized wares remained dominant through both the Huacapongo Polished Plain (HPP) and Castillo traditions. The HPP style developed directly out of the red oxidized Guanápe style and is characterized by an orange-red to brownish-red paste and visible polishing tracks on the exterior of the vessel (figure 3.2), which may have been seen as a form of decoration (Ford 1949: 76). Firing clouds are often visible on the vessels, and this type is known locally as “sandwich” sherds because in cross section they have a black core in the otherwise red paste due to incomplete oxidization while firing, but this feature was not mentioned by Ford (1949) or Strong et al. (1952). Bennyhoff (1952) was particularly critical of HPP and saw it as just a polished form of the wider Castillo tradition but Ford (1952) refuted this assertion, arguing that the polishing marks are distinctive enough to warrant considering this a separate type. HPP also appears earlier than Castillo and forms over 95% of the sherds on some sites (see chapter 4), neither of which would be expected if it were a variant of Castillo. Nevertheless, HPP clearly developed into Castillo, which is a well-fired oxidized ware with an orange-red to brownish-red paste made into a variety of forms of jars, bowls, and bottles (Strong et al. 1952: 265). Some Castillo vessels contain basic decoration, either in the form of a thin white wash (called Sarraque Cream by the Virú Valley Project).

Table 3.2: Condensed domestic ware ceramic types used in the present analysis and their corresponding original types as defined by Collier (1955), Ford (1949), and Strong et al. (1952).

<table>
<thead>
<tr>
<th>Current Type</th>
<th>Original Type</th>
<th>Current Type</th>
<th>Original Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guanápe Plain</td>
<td>Guanápe Black Plain</td>
<td>Castillo Plain</td>
<td>Castillo Plain</td>
</tr>
<tr>
<td></td>
<td>Guanápe Red Plain</td>
<td></td>
<td>Valle Plain</td>
</tr>
<tr>
<td></td>
<td>Guanápe Coarse Ware</td>
<td></td>
<td>Sarraque Cream</td>
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<tr>
<td></td>
<td>Guanápe Plain</td>
<td></td>
<td>Rubia Plain</td>
</tr>
<tr>
<td></td>
<td>Ancón Polished</td>
<td>Late Plainwares</td>
<td>Tomaval Plain</td>
</tr>
<tr>
<td>Huacapongo Polished Plain (HPP)</td>
<td>Huacapongo Polished Plain</td>
<td></td>
<td>Virú Plain</td>
</tr>
<tr>
<td>Gloria Polished Plain</td>
<td>Gloria Polished Plain</td>
<td></td>
<td>Estero Plain</td>
</tr>
<tr>
<td>Queneto Polished Plain</td>
<td>Queneto Polished Plain</td>
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</table>
The Castillo tradition was remarkably continuous and was used throughout the north coast for approximately 1000 years with little spatial or temporal variation (Donnan 2009). Gloria Polished Plain is a hard, well-fired orange oxidized ware that was in use for much of the EIP. While this type formed the basis for Virú corporate wares it was also frequently left undecorated and as such serves as a domestic ware. Essentially it is a polished version of Castillo Plain and is included as part of the wider Castillo tradition for most analyses in chapter 4. Finally, the Late Plainware tradition is marked by several grey or black reduction-fired styles but I condense these into a single tradition because their peak popularity occurred after the

19 Sarraque Cream is included as part of the Castillo tradition in chapter 4. Castillo Modelled and Castillo Incised cannot be included for analysis. See discussion in Appendix A.
periods that are the focus of this analysis. Queneto Polished Plain is a well-fired plain domestic style that is analogous to Gloria Polished Plain of the earlier Castillo tradition. Late Plainwares and Queneto Polished Plain are similar to and developed from Castillo and Gloria but are marked primarily by reduction firing techniques rather than the oxidization firing of the earlier traditions. That said, Late Plainwares were present as early as the earliest Castillo wares but they were used in only minor quantities until the end of the EIP (Strong and Evans 1952). Late Plainwares were used into the early colonial period and represent the last of the four major traditions of the Virú Valley domestic ware ceramic sequence.

Domestic pottery developed gradually in Virú without any breaks that could signal a major ethnic upheaval. The Virú Valley Project members were very clear that they were establishing normative types on a continuum of gradual change in domestic pottery, where each type clearly developed out of an earlier type (Ford 1949; Strong et al. 1952). Potters continued to make pottery for daily use in the style(s) that they were familiar with, with very little change, until new techniques or ideas became popular and the old ones were gradually abandoned. Some of these traditions, such as Castillo, were very conservative and changed little over 1000 years (Donnan 2009). Because of the gradual nature of this change there were always several different types of pottery in use during any given time, but one type was predominant.

Interestingly, the major developments in the utilitarian ceramic sequence are technological: the earliest pottery, Guañaape, was fired in a reducing environment to produce black pottery. Late Guañaape potters experimented with oxidization firing and created red vessels, but demonstrating a poor control of firing. Oxidization firing is the hallmark of the Early Intermediate Period segment of the Virú sequence. The EIP oxidized tradition consists of two related types, Huacapongo Polished Plain and Castillo, both of which demonstrate a better control of oxidized firing than the experiments of the Guañaape Period. Reduced firing was apparently forgotten when HPP was the most popular type during the Early Virú Period but reduction-fired Late Plainwares began to be made as a very minor type as Castillo grew in popularity during Middle and Late Virú, eventually replacing Castillo as the dominant type to mark the end of the EIP segment of
the Virú sequence. Thus there are three major firing traditions, early reduced, oxidized, and late reduced, and the oxidized tradition can be subdivided into two types, HPP and Castillo. The socio-economic and cultural implications of these major technological developments remain unclear, but they are useful for dating ceramic assemblages. These types form the basis of the new Virú seriation described in the next chapter.

### 3.2.2 Early Intermediate Period Corporate Wares

The Virú Valley Project members identified several types of corporate ware ceramic associated with the Middle Virú time period, namely Gallinazo (Virú) Negative, Carmelo Negative, and various imported Recuay or highland styles (collectively called Callejon). However, it was two uncommon domestic ware styles, the Castillo Modeled and Castillo Incised styles, that were considered diagnostic of the Middle Virú Period and subsequently used to date sites of that time period (Bennett 1950; Ford 1949; Strong et al. 1952; Willey 1953). In the decades since the Virú Valley Project, these two common pot styles—termed Gallinazo—have been considered markers both of Middle Virú as a time period and of Middle Virú as a distinct cultural or ethnic entity, partially contemporary with Moche and centered in the Virú Valley but spread throughout the region (Billman 1996; Donnan 2009; Fogel 1993; Makowski 2009; Millaire 2009a; Shimada and Maguña 1994; Wilson 1988). Recent evidence has shown these interpretations to be incorrect, leading Christopher Donnan (2009: 17) to open a recent paper with the lines “archaeologists working on the north coast of Peru have made a serious mistake in identifying Gallinazo [Virú] ceramics. This has misled us to believe that Gallinazo [Virú] culture was extremely widespread…This, however, is an illusion.”

The Gallinazo Problem centers on a mistaken identity of ceramic types and a confusion of corporate and domestic wares. While Virú Negativo corporate ware is diagnostic of the Middle Virú Period, this style is not widespread outside of the Virú Valley (Millaire 2009a, 2010a). The claims that Middle Virú was widespread is based on the distribution of the Gallinazo styles but these are actually modelled and/or incised variants of the wider Castillo tradition or, more rarely, HPP. As described above, this is a domestic ware
that was made and used locally throughout the entire north coast for a very long time and cannot be considered diagnostic of the Middle Virú Period and is not a marker of any specific ethnicity (Donnan 2009). Rather it is now apparent that Gallinazo-style domestic wares represent a pan-north coast tradition, the *Tradición Norcosteña* (cf. Millaire 2009a), upon which significant cultural diversity developed, as seen in the variety of corporate-style ceramics, as well as textiles (Millaire 2009b, Millaire et al. 2013; Sidoroff 2005; Surette 2014). The Gallinazo problem highlights the need to separate domestic and corporate wares. These are fundamentally two different types of material, made by different people for different reasons and developing along distinct, but intersecting, timelines.

The bulk of ceramic studies on the north coast have focused on fancy corporate ware styles, such as the well-known and intricately-made Moche stirrup-spout bottles (figure 3.3). Peruvian archaeologist Rafael Larco Hoyle (1948) is credited with defining many of the north coast styles and establishing the general sequence of corporate ware ceramics based on his excavations of cemeteries throughout the north coast, most notably in the Chicama, Moche, and Virú valleys. Larco had been conducting excavations and curating artifacts in his personal museum in the town of Chiclín in the decade or so before the Virú Valley Project began and between his and Bennett’s (1939) early work in Virú, the project members had a good framework that they used as a basis for their own ceramic classifications. Larco considered ceramic styles as ethnic markers (Makowski 2009) whereas Ford (1949) viewed them primarily as temporal markers and identified several individual styles dating to each time period. In general, most corporate ware styles have a smaller spatial and temporal range than the domestic types described above, and their detailed and specific designs make them diagnostic in a way that domestic ceramics are not. Since my focus is the Early Intermediate Period I will here briefly discuss the corporate styles associated with this period. These types are summarized here and are drawn from Collier (1955), Ford (1949), and Strong et al. (1952).

There are three main corporate ware traditions that date to the EIP on the north coast: Salinar, Virú Negative, and Moche. The Salinar style is represented in Virú by the Salinar Burial/Effigy Vessel and by Puerto Morin white-on-red, both of which are considered
diagnostic of the Salinar Period, or Early Virú in the Virú Valley (Donnan and Mackey 1978; Kroeber 1944; Larco 1944, 1966). Salinar burial vessels are well-made, brick red, stirrup spout or bridge-and-spout vessels with modeled human, animal, or architectural forms. Some are unpainted while others are painted with a thin white wash, sometimes with incising. The Salinar style is essentially considered to be a transitional form between Cupisnique and Moche (Donnan and Mackey 1978; Donnan and McClelland 1999; Figure 3.3: Corporate ware vessels typical of the Early Intermediate Period in the Virú Valley. a: Moche; b: Salinar Burial Ware; c: Puerto Morin white-on-red; d: Virú Negative. All photos from Museo Larco, Catálogo en línea.

Sawyer 1966; Sidoroff 2005). Ford (1949: 63) discussed this style but never mentioned finding any, and Strong and Evans (1952: 300) recovered two vessels of this style at V-66 or Puerto Morin, the Early Virú type site, and classified these as Puerto Morin white-on-red. It is likely that any sherds recovered by the Virú Valley Project were identified as Puerto Morin white-on-red. Puerto Morin w/r is similar in that it is typically brick red with some variation and is frequently well-polished and painted with a thin white wash.
However, Puerto Morin w/r vessels are typically made into jars or vessels rather than modeled forms. I consider Puerto Morin w/r to be a separate type from Salinar Burial Ware and it should not be considered diagnostic as an Early Virú corporate ware since it is similar to both the Huacapongo Polished Plain and Castillo domestic wares. This style may be underrepresented in Ford’s (1949) seriation analysis because fragmentary sherd material may have been classified as either of these domestic ware types if the sherd lacked painted decoration.

There are three main local Virú corporate wares associated with the Middle Virú Period, Virú Negative, Carmelo Negative, and Gallinazo Broad-Line Incised (Bennett 1939, 1950; Larco 1945b; Millaire 2009a; Strong et al. 1952). Both Virú and Carmelo Negative are negative-painted vessels consisting primarily of geometric paint designs made on a wide variety of vessel forms, including stirrup spout bottles, bridge-and-spout bottles, cancheros or dippers, or bowls, often with modeled into human, animal, plant, or architectural forms. Virú Negative vessels are orange with black paint while the rarer Carmelo Negative design typically have a white slip that covers the entire vessel with black or black and red negative-painted designs on top of this slip (Bennett 1939, 1950; Ford 1949; Larco 1945b; Strong et al. 1952). Interestingly, various highland or callejón styles are also considered diagnostic of the Middle Virú Period. In some cases these styles, which Ford (1949) and Strong et al. (1952) referred to as “Callejón Unclassified,” are associated with the contemporary Recuay20 society centered in the highland regions southeast of Virú (see Lau 2011 for a general overview of Recuay), while in other cases they are local Virú styles made on kaolin clay, a clay that can only be sourced in the highlands. Negative-painted designs are common to both of these callejón styles, but is otherwise rare on the north coast. Castillo Red, White, Orange,21 called Epigonal by Bennett (1939), a style that Strong et al. (1952) considered intrusive in Virú, is associated with the highlands to the east of Virú and may have its source in the yungas, the poorly-understood intermediary zone between the coast and highland zones (Theresa Topic,

20 This style was called “Santa” by Larco Hoyle (1963).
21 Note that despite being called “Castillo” this style is not related to Castillo domestic wares.
personal communication, May 2012). Interestingly, the white slip of Carmelo Negative resembles the white kaolin clay typical of Recuay styles (Donnan 1992) and both Virú and Carmelo Negative styles appear as a sort of hybrid between typical coastal and highland styles. I suggest that Carmelo Negative is essentially an attempt to replicate or emulate kaolin-clay Recuay styles using local materials, and that Middle Virú corporate ware styles show a considerable amount of interaction between the Virú Valley and the highlands or the yungas region. Interestingly, these highland influences do not appear in the domestic ware ceramic styles.

Finally, the Moche and Huancaco styles represent the last corporate wares of the EIP in Virú and are both associated with the Late Virú Period. These two styles are perhaps the most problematic in Virú because they were considered to be a singular style by the Virú Valley Project and therefore the available ceramic data for most sites simply lists “Huancaco Decorated,” Ford’s (1949) general term for all ceramics that he considered to be variants of the wider Moche phenomenon of the north coast. Willey (1953) considered the sudden appearance of Moche or Huancaco style ceramics in Virú to indicate a rapid military conquest of the valley by the Moche, a conclusion that seemed all but certain until research in the last fifteen years upended this paradigm (Bourget 2004, 2010; Millaire 2004, 2009b, 2010). Moche and Huancaco are now considered two separate styles in Virú. Most importantly, Bourget (2004, 2010) has shown that Huancaco is a distinct style that developed out of Virú Negative and is essentially an emulation by Late Virú potters of the Moche style that was becoming widespread throughout the north coast. In addition to Huancaco-style vessels, true Moche-style vessels are also common in Virú, most spectacularly represented by the Tomb of the Warrior Prince, a richly-adorned burial excavated by Strong and Evans (1952; Strong 1947) at Huaca de la Cruz (V-162) in the middle Virú Valley. Bourget (2004) hypothesized that Moche-style vessels, and presumably people aligned with the Moche Valley to the north, were common on the north side of the Virú Valley during the Late Virú Period while Huancaco vessels and people were centered in the lower south valley with their capital at the site of Huancaco. Unfortunately this hypothesis cannot be tested at this time. Ford (1949) identified a large number of Huancaco Decorated sherds at sites throughout the entire Virú Valley but these will eventually need to be reclassified into separate Moche and Huancaco styles.
Unfortunately, only a portion of Ford’s ceramic collections are stored and available for analysis at the American Museum of Natural History (an undefined portion of Ford’s ceramic collections were curated by Peruvian authorities in 1946 and it is not known where these collections are stored, according to a note written by Junius Bird and kept with Ford’s archives at the museum.)\textsuperscript{22} For my purposes, however, it is sufficient to note that both Moche and Huancaco corporate ware styles are considered diagnostic of the Late Virú Period in the Virú Valley.

In sum, there were three major corporate ware ceramic traditions of the EIP. First, the Salinar Burial Ware complex developed in the Chicama Valley to the north and was an evolution of the earlier Cupisnique style, known as Ancón in Virú (Larco 1944). The Salinar Burial Ware was apparently common in cemeteries in Virú, but was not otherwise found by members of the Virú Valley Project. Puerto Morin white-on-red developed alongside the Salinar Burial style, but the former was essentially a painted version of Huacapongo Polished Plain and was used well into the Virú Period, and cannot be considered diagnostic of the Puerto Morin Period. Towards the end of the Puerto Morin Period, the Salinar Burial Ware style apparently diverged and developed directly into the Moche style in the Moche and Chicama Valleys, whereas in Virú it apparently hybridized with highland design motifs\textsuperscript{23}, namely negative-resist painting, to form the Gallinazo and Carmelo Negative styles. True highland wares of the Recuay/Santa style, as well as Virú-style vessels made of highland kaolin clay, were also present in Virú at the same time as Gallinazo and Carmelo Negative. At a later point in time, the Moche style became popular in the Moche and Chicama Valleys and began to assert its influence on Virú, at which time the Huancaco style developed, showing a clear evolution of Virú Negative design elements but also incorporating Moche-style painting techniques and colour schemes. At the same time that Huancaco was used, true Moche was also present in Virú. Thus there are three major corporate ware traditions of the EIP in Virú: the

\textsuperscript{22} F673, Papers of James Ford, Division of Anthropology, American Museum of Natural History.
\textsuperscript{23} Larco’s (1945b; see also Museo Larco 2010) illustrations for the Virú Negative style show a clear relationship between Salinar and Virú Negative modelling styles.
Salinar Burial Ware complex, diagnostic of the Puerto Morin Period, followed by negative-resist painted and highland wares diagnostic of the Virú Period, and finally Moche and Huancaco wares, diagnostic of either Moche or Huancaco habitation of the valley.24

3.3 Discussion and conclusions

Ultimately I argue that the Ford-Willey sequence is a valid way to mark the passage of time in Virú but that it cannot be accepted without revision. Ford (1949) divided ceramic types by a wide variety of arbitrary criteria that was then used by Willey (1953) to create a very detailed and nuanced history of the valley’s occupational history but this introduced significant error. Furthermore, this sequence subdivided periods into two or three subperiods but there is no external evidence to support these subperiods (Millaire n.d.). To mitigate these concerns I reduced the Ford-Willey sequence into a smaller number of meaningful types to allow for a more accurate, but less detailed history, but problems remain. As a stronger approach, I argue that the Ford-Willey sequence should not be understood as a single sequence that accounts for all ceramics but rather is best understood as two complementary sequences that operated on separate timescales, one consisting of domestic wares and one of corporate wares (figure 3.4). The domestic ware sequence shows an overall pattern of continuity and gradual, evolutionary change rather than the abrupt, sudden changes that were implied by Willey (1953). This is contrasted to the corporate ware sequence, as corporate ceramics, while still evolutionary in nature, were produced to convey a specific message and to represent cultural ideas and as such were open to regular reinterpretation and rapid changes. These two timescales intersected

24 Because Ford (1949) recognized Moche and Huancaco as a unified type it is not possible to separate the sites that used these two styles apart from each other and Ford’s Huancaco Decorated style cannot be considered diagnostic of either culture, but the presence of Huancaco Decorated at a site nevertheless is temporally diagnostic, and marks a post-Virú time when present with large quantities of Castillo Plain utilitarian wares.
at times but ultimately domestic and corporate ceramics were different things produced for different reasons and they are best studied independently.

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**Figure 3.4:** Intersecting corporate and domestic ceramic timelines in the Virú Valley. Dates for each type are approximate.

The Virú Valley Project members all described decorated and plain ceramics as separate classes of ceramic, but they treated them as part of a single sequence and this influenced the way that they subdivided the sequence into time periods based on the

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25 In all cases the project members identified a base plainware style and considered decorated vessels to be produced on one of these base styles. While this works for complete vessels, it is problematic for sherds—the majority of all ceramic assemblages—since a sherd that lacks decoration but that originally came from a decorated vessel would be classified as a plainware (Makowski 2009). Because of this, decorated wares are likely underrepresented in ceramic assemblages. There is no solution for this problem other than to make note of it. As a related problem, several types, such as Castillo Modeled and Castillo Incised, have since been reinterpreted as utilitarian ceramics with simple decoration, not as corporate wares (Millaire 2009a), but the basic decorated vs. plain system of the Virú Valley Project classifies all decorated sherds as separate from plain ones, regardless of the nature of the decoration.
changing frequencies of ceramic types. For example, although no major or abrupt changes occurred in the frequency of utilitarian wares throughout the latter part of the EIP, Ford (1949) and Strong and Evans (1952) subdivided this portion of the sequence into two separate parts, Virú and Huancaco, based on the sudden appearance of Moche/Huancaco style ceramics in the sequence. While the rapid appearance of a new corporate style in the sequence surely marks important sociopolitical developments in the valley it obscures the fact that everyday, domestic ceramics witnessed very little change for over a millennium (Donnan 2009). The continuity of domestic ceramics, along with textiles (Millaire et al. 2013; Surette 2014), suggests that there was overall ethnic and cultural continuity during this period and this continuity should also be reflected in any model of the valley’s settlement patterns. In short, I argue that corporate ceramics are an excellent temporal marker when present—although their rarity at smaller residential sites limits their utility for dating purposes—but that the corporate sequence is primarily reflective of sociopolitical developments in the valley and is particularly useful for understanding the development and evolution of civic-ceremonial centres. The utilitarian ceramic sequence, on the other hand, is reflective of deep, gradual ethnic trends and is better for dating developments among the larger valley population, most of whom lived at small residential sites lacking corporate ceramics. The complementary overlap of these two sequences should not be ignored, but in order to gain a fuller understanding the settlement patterns throughout the entire Virú Valley it is necessary to treat them separately.

The Ford-Willey culture sequence for the Virú Valley was an important piece of research when it was first proposed but it is now time to replace this sequence. In this chapter I have revisited Ford’s (1949) seriation and explored the ideas that he used to devise it. Ford made a number of defendable but ultimately problematic interpretations when constructing this sequence. Chief among these was Ford’s decision to include surface sites in an interdigitated master sequence that otherwise contained only excavated contexts, Ford’s period definitions that were based on corporate ware styles despite his eschewing of the utility of these styles, and the manner by which Ford frequently subdivided a single assemblage into multiple components based on unclear criteria. In light of the Gallinazo debate (see chapter 1; Millaire and Morlion 2009), it became
necessary to revisit Ford’s ceramic typology, and to re-seriate the Virú Valley ceramics (chapter 4). This has major implications for settlement patterns in Virú since Willey (1953) based his original study almost entirely on Ford’s dating scheme.

I choose to view considerable continuity in the Virú Valley sequence, where Ford, Willey, and others since saw a discontinuous series of cultural replacements. The EIP throughout the north coast is now considered to have had fundamental ethnic continuity that underlay a series of political upheavals (Millaire 2009a), a tradición norcosteña, and the Virú Valley sequence, which lacks clear breaks in the domestic tradition, reflects this. I therefore consider the entire EIP segment to be one long period and refer to its three phases as the Early, Middle, and Late Virú periods, rather than as the traditional Puerto Morin, Gallinazo, and Huancaco periods.
Chapter 4

4 Re-dating the Virú Valley Sequence

In the previous chapter I discussed the theoretical background of Ford’s seriation, developed a simplified ceramic typology based on Ford’s (1949) original, and argued that corporate and domestic ceramics developed independently along separate timescales and cannot be used together as a single seriation. I argued that the way that Ford (1949) actually assigned time periods—and by extension Willey’s (1953) cultural affiliations—to the sites included in his study betrayed his own theoretical views regarding the gradual, evolutionary nature of cultural change. In essence, despite the evolutionary ceramic sequence that Ford devised, when it came to dating specific sites he apparently ignored the possibility that a site could be occupied continually as the popularity of different ceramic types changed over the course of centuries and instead defined discrete, static time periods, and frequently divided a single site into multiple non-consecutive components. Most problematic for my purposes, Ford argued that nearly every Early Virú site was abandoned at the end of that period as new Middle Virú sites were founded, and many of these abandoned Early Virú sites were then re-occupied during the Late Virú Period. In contrast, I argue that it is more appropriate to see continual long-term occupation of these sites where Ford saw multiple temporally discrete components. Here I will address specific problems with Ford’s seriation using his own data\(^{26}\) and a new perspective drawn from both modern statistical techniques commonly used in archaeology and a more complete understanding of the north coast cultural sequence than was available when Ford conducted his survey.

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\(^{26}\) Ford (1949) only published summary graphs without the raw data needed for reanalysis. Ford’s archives at the American Museum of Natural History (F673, Papers of James Ford, Division of Anthropology) and contain this raw data. I have obtained copies of these archives and these provide the data used in this chapter. Archives are used with the permission of the American Museum of Natural History, Division of Anthropology. Data used in this analysis from Collier (1955) and Strong and Evans (1952) are taken from their published works and cited appropriately.
The main goal of this chapter is to re-seriate Virú sites using techniques considered more reliable than those used to date sites in Ford’s (1949; Willey 1953) original study. In this chapter I will discuss some specific problems with the way that Ford conducted his seriation and will test his hypothesis that surface ceramic assemblages represent the mean date of a site. I will then re-seriate the Virú Valley sequence using four independent methods: (1) frequency seriation; (2) mean cultural date; (3) correspondence analysis; and (4) a seriation algorithm devised for Virú. Data tables for domestic and corporate wares and for various seriation methods are presented in appendix A. Because corporate and domestic ware trends developed along separate timescales and changed at different rates, and because diagnostic Early and Middle Virú corporate wares are very rare at residential sites, I only use domestic wares for all seriations.

![Figure 4.1: Sites discussed in chapters 3 and 4.](image)

### 4.1 Revisiting Ford’s seriation

Although Ford (1949, 1952) held that ceramic types evolved along a continuum without any sharp breaks, a careful reading of his seriation notes and tabulations reveals that when it came to actually assigning period(s) to a specific site, he frequently assigned discontinuous time periods rather than continuous, consecutive ones. It is not always
clear how Ford arrived at his choice of time periods for each site. When a surface assemblage contained significant amounts of ceramic types that dated to different time periods, he apparently split that site into two components and argued that the site had been abandoned during the earlier period and re-occupied at a later date. Certainly this is a justifiable conclusion in many cases, but he also frequently split sites that contained significant quantities of ceramic types that were known to be adjacent types in the master sequence and that co-occurred in the same level of a stratigraphic trench, which could instead indicate a long-term occupation during which ceramic trends changed. Ford used one of two methods to define a site as having multiple components. In some cases he took multiple collections from a site and analyzed each collection separately, sometimes assigning different dates for each and defining the site as multicomponent. Much more commonly, he divided a single collection into two components based on unclear criteria. Ford never published the ceramic data from each site making it difficult to discern how he divided a site into multiple components. While the tally sheets that Ford used for each site, on file at the American Museum of Natural History, provide some insight into how he divided a site into multiple components, he never made clear which ceramic types he allocated to each component, making it difficult to sense his criteria for assigning multiple components to a site. Some specific examples will help illustrate this problem.

In some cases, Ford’s dates make perfect sense. For example, Ford divided a single collection of 450 sherds at the V-78 site into two components, an earlier Early Virú component and a later Tomaval component (Late Epoch, in my terminology). In this case, there is a large quantity of Huacapongo Polished Plain and of Late Plainware types, but relatively little Castillo, the major intermediary ceramic type (figure 4.2). It is only logical to conclude that this site contained an Early Virú occupation, was abandoned for a considerable period of time, and was then re-occupied during the Late Epoch.

![V-78 Ceramic Type Distribution](image-url)

**Figure 4.2**: Ceramic type distribution for V-78. Note the large proportion of early and late wares with relatively little of the intermediate type. This site was split into two separate components.
More often than not, however, Ford’s splitting of a site into two components based on a single assemblage is questionable. This generalization is especially true for sites that contain both a large number of Huacapongo Polished Plain (HPP) and a large number of Castillo wares. Ford (1949: 79-87) did not see direct continuity at any site that contained both a large quantity of HPP and a large quantity of Castillo. Instead, he argued that every single site with substantial quantities of both of these contiguous ceramic types was abandoned at the end of the Early Virú Period and re-occupied during the Late Virú Period, despite the fact that Castillo wares were the dominant ceramic type for both the Middle and Late Virú periods. As Ford (1949: 50) puts it:

A site that had been occupied continuously from Puerto Morin [Early Virú] times to the Tomaval period [Late Epoch] should contain substantial percentages of the types popular during the intervening Gallinazo [Middle Virú] and Huancaco [Late Virú] periods. As none of the collections included these types, they were all considered as proof of simple re-occupation.

However, viewing Ford’s own data, it is unclear how he arrived at this conclusion. For example, at V-150, a small rock-walled site in the Tomaval Quebrada, Ford split a single collection of 276 ceramic sherds into two components, one Early Virú and one Late Virú (figure 4.3). Willey (1953: 198) felt that the rock walls at the site dated to the Late Virú Period, although he made no indication of why he felt this was so. Of the 276 sherds at the site, 274 were domestic wares with large quantities of both HPP and Castillo. Alongside the domestic wares there was one each of Puerto Morin White-on-Red and Huancaco Decorated.27 Dating of the Early Virú component is supported by the large quantity of HPP alongside one sherd of Puerto Morin w/r. However, Ford essentially ignored the fact that there was a large quantity of Castillo and Gloria Polished Plain, types that were common throughout both Middle and Late Virú. The abundance of these wares strongly suggests that the site was not, in fact, abandoned at the end of the Early Virú Period, but Ford must have dated the Late Virú component based on the presence of

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27 Huancaco Decorated is used here as a general term for all Moche-like corporate wares because it is the only term that Ford (1949) used to classify any ceramics that had Moche designs. It is now clear that both Moche and Huancaco, an indigenous style that developed out of Virú Negative and that emulates Moche, are present throughout the valley (Bourget 2004, 2010). Both styles are encapsulated by the Huancaco Decorated term, following Ford (see discussion in chapter 3).
a single Huancaco Decorated sherd. Interestingly, in deep stratigraphic cuts excavated by Strong and Evans (1952: fig. 34) Huancaco Decorated sherds are always associated with a large presence of Castillo Plain and a significant presence of Late Plain wares; based on this evidence, simply having Huancaco Decorated alongside Castillo Plain is not evidence enough of a Late Virú occupation (see discussion below). That Late Plainwares are virtually absent from V-150 supports the argument that the site was occupied continuously throughout the Early and Middle Virú periods. The occupation may have continued into the Late Virú Period but there is no indication that the site was abandoned and then reoccupied.

![Figure 4.3](V-150_Ceramic_Type_Distribution.png)

**Figure 4.3:** Domestic ware ceramic type distribution for V-150. Two corporate ware sherds, one Puerto Morin White-on-Red and one Huancaco Decorated, were also recovered from the site. Note that when viewing the domestic wares there is a clear continuity demonstrating no obvious abandonment of the site.

Despite having stratigraphic evidence that clearly showed that both Huacapongo Polished Plain and Castillo wares could be found in large quantities in the same excavation level (e.g. Strong and Evan’s 1952: fig. 34, Cut 1 at V-59), and having established that Castillo Plain developed directly out of Huacapongo Polished Plain, Ford preferred to see discontinuity between these two periods. Furthermore, although he had argued that fancy corporate ceramic styles—long considered diagnostic and a marker of a specific culture or time period—were not ideal for seriating surface assemblages and that ceramic assemblages should instead focus on domestic ware types (Bennyhoff 1952; Ford 1949), he apparently continued to define periods and components by their corporate ware styles. Upon closer examination of Ford’s data, this conclusion is untenable. While it is certainly possible that any given site was abandoned and re-occupied centuries later, there is no reason to prefer this scenario over one that assumes that site was occupied for centuries as a new ceramic type became popular, and surface data alone is not sufficient to
establish this. To be conservative, I prefer to see continuity at sites that contain large quantities of contiguous ceramic types where Ford saw discontinuity. In this way I see considerable continuity in the Virú Valley settlement pattern where Ford, and especially Willey’s (1953) interpretation of Ford’s dates, saw major discontinuity.

Another major problem with Ford’s (1949) seriation deals with how he used excavation data to seriate surface sites. The evidence from deep, stratigraphic trenches is invaluable for determining the evolution of ceramic types and for exploring the relationship between domestic and corporate ceramic timelines. However, this evidence cannot be relied upon to provide a precise picture of the entire Virú Valley ceramic sequence, as Ford (1949) attempted to do. In his brief rebuttal to Bennyhoff’s (1952) extensive critique, Ford (1952) makes it clear that he relied on data from stratigraphic excavations to actually produce his master seriation, and it seems as though he felt that this put his seriation above any criticism. Members of the Virú Valley Project excavated in arbitrary levels at several sites in various parts of the valley, each site with its own cultural and geographic setting and distinct rates of accumulation of cultural debris and natural sediment. As this project largely pre-dated absolute dating techniques, there was no independent method to correlate any given strata at one site to that at another and so Ford stitched most of the excavation trenches together into a single chart using his own unstated criteria, presumably based on the percentages of different ceramic types. Furthermore, Ford used surface data to fill in gaps in this master sequence that otherwise was based entirely on excavation data, a major heuristic problem (see chapter 3). Ford then used this interdigitated master graph to seriate all surface sites by matching them to this master sequence.

I argue instead that stratigraphic information can only be used to show major trends and to determine the relative ordering of ceramic types and that it is crucial that any seriation of surface ceramic assemblages be based solely on surface data. A ceramic assemblage collected from the surface of a site is not equivalent to the ceramic assemblage that came from a single level of excavation but Ford treated them as such, as though the surface was just another level of excavation. In the following section I will discuss some of the
problems inherent in using surface data to date sites, and test the reliability of surface ceramic data to date archaeological sites in Virú.

4.2 Using surface data for seriation

The Ford-Willey hypothesis relied on the dating of a very large number of sites, something that can only be feasibly accomplished by dating sites based on their surface ceramic assemblages. However, this rests on the implicit assumption that, in the absence of chronometric dates and intensive excavation, surface collections can be used to date the Prehispanic occupation(s) of archaeological sites in Virú. Dating sites based on their surface assemblages is always a tricky task because surface assemblages are dynamic and have the potential to represent the entire sequence of both major and minor occupations at any given site, whereas undisturbed excavation contexts are static and represent a specific time in a site’s occupational history. While a single buried layer at a site could represent as little an amount of time as a single event—but more likely represents a few decades or centuries—the surface of a site in Virú\(^{28}\) always has the potential to represent several millennia, including any events that took place in that space since the site was abandoned. By its very nature, the surface level of a site built during one period is open to contamination from later time periods and later occupations may obscure earlier ones. At the same time it is entirely possible that later occupations do not disturb earlier ones or that any given site was not reoccupied after its initial abandonment. Without excavation data these problems cannot be resolved. However, Ford (1949, 1952) argued that except in the few cases where deeper stratigraphy occurred the surface ceramic assemblages of

\(^{28}\) The Virú Valley is situated in the hyper-arid coastal deserts of Peru, and sites are primarily located on mounds raised above the valley floor or on rocky hillsides in the barren foothills of the Andean mountains. Soil formation is not prominent in either location, although wind-blown sand can accumulate to great depths in the lower valley. Therefore, sites are commonly not buried by natural taphonomic processes or are only partly buried, and sites can be identified by surface artifact scatters without the need to excavate. Furthermore, most sites have been affected by extensive looting and/or development in recent decades, both of which deposit buried artifacts on the surface.
Virú always represented the mean cultural date of a site, or an accretion representing the entire occupation period of a site.

Ford (1949) established the hypothesis that ceramic collections from the surface of any site that had only shallow deposits\(^{29}\) represented the mean or average date of that site’s entire occupational history, rather than the date that that site was settled or abandoned. Bennyhoff (1952: 232) took exception to this hypothesis and argued that, contrary to Ford’s claims, surface ceramics from a site generally date the last time period of that site, not an average date for the entire settlement history. Bennyhoff noted that despite Ford’s claims that excavations were conducted at 28 sites, he only published data from 9 of these sites making it difficult to test these claims. Bennyhoff highlighted several cases where Ford’s own assessment of a site’s date range did not coincide with the excavations made at that site and other cases where the surface assemblage dated that site’s terminal period rather than the mean date.

Ford (1952) very briefly rebutted Bennyhoff’s detailed critique by emphasizing that the evidence used to date surface assemblages was chosen very carefully by project members, and by reiterating that most sites are shallow and therefore the surface assemblages date the mean age of the site. Ford never published data to support these claims. While he relied on Collier’s (1955) and Strong and Evans’ (1952) data from stratigraphic excavations—publications that were not yet available to Bennyhoff—in order to bolster his assertions regarding surface assemblages, Ford also conducted his own test excavations but he never published these results. This is problematic. For one, I question Ford’s assurance that most Virú Valley sites are shallow. While sites on the valley margins typically sit on bedrock, cultural and natural deposits 1-2 m deep are often found in places. Sites on the valley floor are typically built on mounds that vary from one to several meters high and without excavation it is not possible to determine whether the

\(^{29}\) Ford was not concerned with sites containing deeper cultural deposits because, he argued, the majority of Virú sites containing such deposits were excavated by other members of the Virú Valley Project.
cultural deposits at these sites are shallow or deep. Furthermore, Ford’s assertions cannot simply be accepted without data to support them.

Using data from Ford and his colleagues in the Virú Valley Project, as well as from recent excavations at Huaca Santa Clara, I am able to test Ford’s (1949) claims that surface assemblages represent the mean date of a site and in turn the hypothesis that surface ceramic assemblages are reliable for dating the Prehispanic occupation(s) of sites in the absence of chronometric dating or intensive excavations. In total, I am able to compare surface and excavation data from seven sites representing four earth mound sites in the lower and middle valley and three rock-walled site on the hillsides of the Queneto Quebrada. Ford (1949) excavated small test trenches at several sites where he also collected surface ceramics but only three of these can be used here because most of these excavations were either very limited or were conducted at sites with very small surface assemblages that are not statistically meaningful; I test here Ford’s excavations at V-39, V-44, and V-46. Ford also compared his surface collections against the deep stratigraphic excavations conducted by Collier (1955). Collier’s stratigraphic cuts at several deep midden sites provided good data on long-term ceramic trends and most of these sites also had a surface collection performed, but various problems related to both the surface and excavated data from several of Collier’s sites allow me to only include three: V-108, V-167, and V-171. Although the deep excavations by Strong and Evans (1952) at several important sites provided a wealth of high-quality data on ceramic sequences, surface collections were apparently never conducted at these sites or were of a very limited scope and these sites cannot be included. Finally excavations by Jean-François Millaire (personal communication, 2012) at the site of Huaca Santa Clara (V-67), a site where Ford collected a large surface assemblage, provide an additional data source to test the association between surface assemblages and excavated materials.

There are several ways to compare the surface and subsurface ceramic remains from any given site; I use a visual comparison of the frequency of ceramic types as well as the g-test of independence, a statistical method for comparing the independence of two samples that is essentially a more-robust form of the chi-square statistic (McDonald 2009: 64-69; Sokal and Rohlf 1981). In all cases I compare the surface ceramic assemblages to the
entire subsurface assemblage (i.e. all levels added together from a single stratigraphic cut), with the null hypothesis that if the surface assemblage represents the mean cultural date of the entire site, as Ford (1949) argued, then there will be no statistically-significant differences between the two. In cases where data is available for multiple excavation levels, I test the surface assemblage against both upper and lower levels with the hypothesis that, if the surface assemblage is skewed towards a later date in time, then it will be more similar to upper levels than to lower. These tests are performed for each site individually below. As with other ceramic analyses discussed in this chapter, I use a simplified ceramic typology for Virú (see table 3.1). As will be seen below, the results from the g-test are inconsistent, resulting in varying acceptance and rejection of the null hypothesis.\(^{30}\) However, comparison of the frequency of each type between surface and excavated contexts indicates that the surface assemblages generally serve as a good proxy for excavated ones, except at sites with very deep stratigraphy where the surface is resembles the upper levels of excavation.

### 4.2.1  V 39

V-39 is a small rock-walled village in the Queneto Quebrada that Willey (1953) dated to the Middle and Late Virú periods. See table 4.1 for the domestic ware types present at the site and figure 4.4 for their distribution. The subsurface and surface assemblages are significantly different (\(G=80.604, \text{d.f.}=3, p < .001\); Guañaope and HPP eliminated due to small numbers); in this case the surface distribution actually skews towards the earlier Castillo type, rather than the Late Plainware that is abundant in excavations, contrary to what is expected. It is not clear why this result is so. Ford’s hypothesis that the surface

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\(^{30}\) Charles Spencer (personal communication, January 2015) indicated that the G-test, as well as the chi-square test, are not ideal statistics to use to address this problem due to problems with sample sizes. Instead, Spencer suggested using a nonparametric K-sample test. I have decided to continue to use the G-test in this situation because it and the chi-square test are widely-used to address problems of this nature. Additional statistical approaches will be explored in future publications on the data and problems presented here.
assemblage of a site represents its mean cultural date cannot be supported at V-39 since earlier types are actually over-represented on the surface.

Table 4.1: Surface and excavated ceramic type distribution for V-39. Data taken from Papers of James A. Ford (F673), Department of Anthropology, American Museum of Natural History.

<table>
<thead>
<tr>
<th>V-39</th>
<th>Guanape</th>
<th>HPP</th>
<th>Castillo</th>
<th>Gloria</th>
<th>Late</th>
<th>Queneto</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface</td>
<td>0</td>
<td>0</td>
<td>159</td>
<td>5</td>
<td>33</td>
<td>0</td>
<td>197</td>
</tr>
<tr>
<td>Room 1 (0-20 cm)</td>
<td>0</td>
<td>1</td>
<td>428</td>
<td>30</td>
<td>403</td>
<td>29</td>
<td>891</td>
</tr>
</tbody>
</table>

Note: The excavation depth or levels of Room 1 are not specified, but can be considered as the aggregate total for excavations at this site.

Figure 4.4: Surface and excavated ceramic distribution, site V-39. Graph is 100% stacked bar graph, with the percentage of each ceramic type represented by the size of its respective bar.

4.2.2 V-44

V-44 is a rock-walled site at the base of the Queneto Quebrada with cyclopean stone masonry. Willey (1953: 317) dated this site to the La Plata (Late Epoch, in my terminology) and interpreted it as having a community function rather than a purely residential one. See table 4.2 for the domestic ware types present at the site and figure 4.5 for their distribution. For V-44, the surface and subsurface distributions are quite similar; indeed, there is no significant difference between them (G=4.027, d.f.=3, p=0.259). In this case, Ford’s hypothesis is supported, and surface ceramics are a good proxy for subsurface ceramics; however, the excavated artifact quantity is quite small and may be from only one level.
**Table 4.2:** Surface and excavated ceramic distribution for V-44. Data taken from Papers of James A. Ford (F673), Department of Anthropology, American Museum of Natural History.

<table>
<thead>
<tr>
<th>V-44</th>
<th>Guanape</th>
<th>HPP</th>
<th>Castillo</th>
<th>Gloria</th>
<th>Late</th>
<th>Queneto</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface</td>
<td>0</td>
<td>0</td>
<td>37</td>
<td>8</td>
<td>41</td>
<td>9</td>
<td>95</td>
</tr>
<tr>
<td>Cut 1</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>4</td>
<td>30</td>
<td>2</td>
<td>51</td>
</tr>
</tbody>
</table>

Note: The excavation depth or levels of Cut 1 are not specified, but can be considered as the aggregate total for excavations at this site.

**Figure 4.5:** Surface and excavated ceramic distribution for V-44.

### 4.2.3 V-46

This small site in the Queneto Quebrada consists of rock-walled enclosures built on terraces. Willey (1953: 300) dated this site to the La Plata Period (Late Epoch) and Ford conducted a small test excavation (table 4.3). I compare the surface assemblage to the entire excavated assemblage, to the top 20 cm of excavation, and to the lower 30 cm of excavation. The surface assemblage should be similar to the entire excavated assemblage to support Ford’s hypothesis.

The surface is significantly different from the aggregate total of all excavation units (G=63.632, d.f.=3, p < .001; Guanape and HPP eliminated due to small numbers). This indicates that Ford’s hypothesis that surface ceramics represent the mean cultural date of the site cannot be supported. The surface ceramic assemblage is also significantly different from the upper levels (Levels 1-2 combined; G=61.261, d.f.=3, p < .001), and from the lower levels (Levels 3-5 combined; G=134.198; d.f.=3, p < .001). That these differences are significant is a little surprising, however, considering the distribution of
ceramic types (figure 4.6). In overall distribution the surface appears to be quite similar to the total excavation distribution; this likely led Ford to conclude that the surface was a good proxy for the excavated levels. The statistically-significant differences cannot be overlooked, however they are likely the result of the minor types Gloria and Queneto appearing in higher numbers than expected; when these types are added to their parent-type (Castillo and Late Plainware, respectively), the distribution between the surface and the aggregate total of all excavations is not significant (G=1.215, d.f.=1, p=0.27). This result indicates that Ford’s hypothesis can be supported for V-46 when ceramics are condensed to the four major traditions defined in chapter 3.

**Table 4.3:** Surface and excavated ceramic distribution for V-46. Data taken from Papers of James A. Ford (.F673), Department of Anthropology, American Museum of Natural History.

<table>
<thead>
<tr>
<th>V-46</th>
<th>Guanape</th>
<th>HPP</th>
<th>Castillo</th>
<th>Gloria</th>
<th>Late</th>
<th>Queneto</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface</td>
<td>0</td>
<td>0</td>
<td>254</td>
<td>31</td>
<td>405</td>
<td>85</td>
<td>775</td>
</tr>
<tr>
<td>Level 1 (0-10 cm)</td>
<td>0</td>
<td>0</td>
<td>19</td>
<td>5</td>
<td>219</td>
<td>21</td>
<td>264</td>
</tr>
<tr>
<td>Level 2 (10-20 cm)</td>
<td>2</td>
<td>4</td>
<td>491</td>
<td>41</td>
<td>1285</td>
<td>134</td>
<td>1957</td>
</tr>
<tr>
<td>Level 3 (20-30 cm)</td>
<td>0</td>
<td>0</td>
<td>347</td>
<td>7</td>
<td>838</td>
<td>41</td>
<td>1233</td>
</tr>
<tr>
<td>Level 4 (30-40 cm)</td>
<td>0</td>
<td>1</td>
<td>524</td>
<td>4</td>
<td>141</td>
<td>4</td>
<td>674</td>
</tr>
<tr>
<td>Level 5 (40-50 cm)</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>35</td>
<td>0</td>
<td>42</td>
</tr>
<tr>
<td><strong>Excavation Total</strong></td>
<td><strong>2</strong></td>
<td><strong>5</strong></td>
<td><strong>1388</strong></td>
<td><strong>57</strong></td>
<td><strong>2518</strong></td>
<td><strong>200</strong></td>
<td><strong>4170</strong></td>
</tr>
</tbody>
</table>

**Figure 4.6:** Surface, level, and total excavation distributions for V-46.
4.2.4 V-67 (Huaca Santa Clara)

Huaca Santa Clara is one of six castillos, natural hills topped with large ceremonial, administrative, and military structures located in the middle valley (see chapter 6). Huaca Santa Clara lies on a large isolated hill on the valley floor in a strategic location. Willey (1953: 225-226) dated the site to the Late Virú Period based on Ford’s surface collection and this site was thought to be a key location of the supposed Moche takeover of the Virú Valley. Millaire (2004, 2009b; personal communication, October 2012) conducted extensive excavations at the site and found that it was actually a large Middle Virú administrative center and town with minor occupations in the Late Virú and Late Epoch. Millaire did not find evidence of a violent Moche conquest at this site, rather a more gradual transition from Middle to Late Virú. Huaca Santa Clara is an ideal location to test Ford’s hypothesis because it has large ceramic samples from both surface and excavated contexts.

There is a much larger proportion of Late Plainwares on the surface of Huaca Santa Clara compared to the aggregate total of all excavated contexts (table 4.4 and figure 4.7). The two contexts are significantly different (G=597.76, d.f.=4, p < .001). This result indicates that, in the case of Huaca Santa Clara, the surface ceramic assemblage is not a good proxy for the subsurface ceramics. Instead, Late Plainwares are over-represented on the surface; this is logical, as later ceramics should be more common than earlier ones on the surface of an undisturbed site, but this pattern is not observed at all sites. Ford’s hypothesis is not upheld for Huaca Santa Clara since the surface assemblage represents Late Epoch types in far greater quantity than excavated frequencies predict.

<table>
<thead>
<tr>
<th>V-67</th>
<th>Guanape</th>
<th>HPP</th>
<th>Castillo</th>
<th>Gloria</th>
<th>Late</th>
<th>Queneto</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface</td>
<td>0</td>
<td>3</td>
<td>778</td>
<td>38</td>
<td>237</td>
<td>6</td>
<td>1062</td>
</tr>
<tr>
<td>Excavation</td>
<td>0</td>
<td>97</td>
<td>5899</td>
<td>115</td>
<td>106</td>
<td>51</td>
<td>6268</td>
</tr>
</tbody>
</table>

Note: Excavation data the aggregate total of all excavations conducted at this site.
Figure 4.7: Ceramic type distribution for the surface and total excavated ceramic assemblages at V-67.

4.2.5 V-108

V-108 is a rectangular adobe-brick structure located in the sandy flats of the lower Virú Valley, one kilometer from the coast, that Collier (1955: 30) dated to the Late Epoch. Collier excavated two cuts (A and B) at this site; I only consider Cut A, a 3 m x 1.5 m trench (table 4.5), because Cut B was an excavation of three rooms rather than a stratigraphic trench. Based on the distribution graph (figure 4.8) it appears that the surface of V-108 is not very similar to any level of the excavation. Indeed, the surface is significantly different from the excavation total (G=69.282, d.f.=3, p < .001). The surface is also significantly different from levels 1-2 combined (G=52.362, d.f.=3, p < .001), and from levels 3-5 combined (G=35.413, d.f.=2, p < .001). Although the earlier ceramic Castillo type is present at this site in much lower quantities than Late Plainwares, it is more abundant on the surface than it is in any excavation level, an unexpected pattern and the opposite of sites such as Huaca Santa Clara, discussed above. It is possible that there is a slightly earlier component at this site that was detected in surface collections but was not detected by the single excavation trench compared here; Ford (1949) made two surface collections at this site—which I have combined here—and presumably covered its full extent. Nevertheless, while the differences observed here are statistically-significant, they are minor and the site primarily contains Late Plainwares and the surface and all excavation levels date securely to the Late Epoch.
Table 4.5: Surface and excavated ceramic type frequencies for V-108, Cut A. Surface data is from the Papers of James A. Ford (F673), Department of Anthropology, American Museum of Natural History. Excavation data is calculated from Collier (1955: Table 1).

<table>
<thead>
<tr>
<th>V-108</th>
<th>Guanape</th>
<th>HPP</th>
<th>Castillo</th>
<th>Gloria</th>
<th>Late</th>
<th>Queneto</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface</td>
<td>0</td>
<td>0</td>
<td>133</td>
<td>10</td>
<td>686</td>
<td>65</td>
<td>894</td>
</tr>
<tr>
<td>Cut A Level 1</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>3</td>
<td>197</td>
<td>5</td>
<td>212</td>
</tr>
<tr>
<td>Cut A Level 2</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>78</td>
<td>2</td>
<td>84</td>
</tr>
<tr>
<td>Cut A Level 3</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>110</td>
<td>6</td>
<td>123</td>
</tr>
<tr>
<td>Cut A Level 4</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>166</td>
<td>4</td>
<td>177</td>
</tr>
<tr>
<td>Cut A Level 5</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>34</td>
<td>1</td>
<td>39</td>
</tr>
<tr>
<td><strong>Excavation Total</strong></td>
<td><strong>0</strong></td>
<td><strong>0</strong></td>
<td><strong>28</strong></td>
<td><strong>4</strong></td>
<td><strong>585</strong></td>
<td><strong>18</strong></td>
<td><strong>635</strong></td>
</tr>
</tbody>
</table>

Note: Collier does not specify the depth of levels in this cut but his standard practice was to excavate in arbitrary 25 cm levels.

Figure 4.8: Ceramic type distributions for the surface, each level, and the excavated total at V-108.

4.2.6 V-167

V-167 is a large, low earthen mound located in the lower valley on the south side of the river, near the large site of Huancaco. Collier (1955: 55) described the site as consisting of two small pyramid mounds and one refuse mound. Collier excavated one 3 m x 4 m trench (Cut A) in the refuse mound and dated all but the lowest layer to the Late Epoch.

---

31 The lowest levels of Cut A contained three sherds of HPP and 13 of Castillo. While this is the only HPP at the site these quantities are too low to assign a time period to this layer.
While the surface distribution appears to be similar to the aggregate total of all excavated contexts (figure 4.9) they are statistically-significant ($G=16.576$, d.f.$=3$, $p=0.000864$) and Ford’s hypothesis is not supported. This site is ideal for comparing the surface distribution against the distribution from specific excavation levels to test whether the surface is more similar to upper levels and less similar to lower ones (table 4.7); indeed this is the case but the surface is significantly different from all excavated levels, although the difference is not large between the surface and the uppermost levels.

In the case of V-167, the surface assemblage is a relatively good proxy for the upper levels of the site but is not a good proxy for the lower levels. Once again, although the surface and excavated distributions are significantly different when measured statistically, they are broadly similar; Castillo sherds dominate both the surface and subsurface assemblages.

### Table 4.6: Surface and excavated ceramic type frequencies for V-167

<table>
<thead>
<tr>
<th>V-167</th>
<th>Guanape</th>
<th>HPP</th>
<th>Castillo</th>
<th>Gloria</th>
<th>Late</th>
<th>Queneto</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface</td>
<td>0</td>
<td>0</td>
<td>205</td>
<td>11</td>
<td>46</td>
<td>17</td>
<td>279</td>
</tr>
<tr>
<td>Level 1 (0-25 cm)</td>
<td>0</td>
<td>0</td>
<td>433</td>
<td>8</td>
<td>121</td>
<td>15</td>
<td>577</td>
</tr>
<tr>
<td>Level 2 (25-50 cm)</td>
<td>0</td>
<td>0</td>
<td>81</td>
<td>0</td>
<td>10</td>
<td>11</td>
<td>102</td>
</tr>
<tr>
<td>Level 3 (50-75 cm)</td>
<td>0</td>
<td>0</td>
<td>124</td>
<td>7</td>
<td>9</td>
<td>13</td>
<td>153</td>
</tr>
<tr>
<td>Level 4 (75-100 cm)</td>
<td>0</td>
<td>0</td>
<td>43</td>
<td>4</td>
<td>3</td>
<td>9</td>
<td>59</td>
</tr>
<tr>
<td>Level 5 (100-125 cm)</td>
<td>0</td>
<td>0</td>
<td>141</td>
<td>9</td>
<td>7</td>
<td>14</td>
<td>171</td>
</tr>
<tr>
<td>Level 6 (125-150 cm)</td>
<td>0</td>
<td>0</td>
<td>177</td>
<td>14</td>
<td>10</td>
<td>19</td>
<td>220</td>
</tr>
<tr>
<td>Level 7 (150-175 cm)</td>
<td>0</td>
<td>0</td>
<td>175</td>
<td>29</td>
<td>9</td>
<td>14</td>
<td>227</td>
</tr>
<tr>
<td>Level 8 (175-200 cm)</td>
<td>0</td>
<td>0</td>
<td>220</td>
<td>16</td>
<td>31</td>
<td>27</td>
<td>294</td>
</tr>
<tr>
<td>Level 9 (200-225 cm)</td>
<td>0</td>
<td>0</td>
<td>176</td>
<td>24</td>
<td>20</td>
<td>21</td>
<td>241</td>
</tr>
<tr>
<td>Level 10 (225-250 cm)</td>
<td>0</td>
<td>0</td>
<td>72</td>
<td>11</td>
<td>10</td>
<td>5</td>
<td>98</td>
</tr>
<tr>
<td>Level 11 (250-275 cm)</td>
<td>0</td>
<td>0</td>
<td>472</td>
<td>67</td>
<td>49</td>
<td>87</td>
<td>675</td>
</tr>
<tr>
<td>Level 12 (275-300 cm)</td>
<td>0</td>
<td>0</td>
<td>273</td>
<td>15</td>
<td>21</td>
<td>38</td>
<td>347</td>
</tr>
<tr>
<td>Level 13 (300-325 cm)</td>
<td>0</td>
<td>0</td>
<td>37</td>
<td>5</td>
<td>1</td>
<td>6</td>
<td>49</td>
</tr>
<tr>
<td>Level 14 (325-350 cm)</td>
<td>0</td>
<td>3</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td><strong>Excavation Total</strong></td>
<td><strong>0</strong></td>
<td><strong>3</strong></td>
<td><strong>2437</strong></td>
<td><strong>209</strong></td>
<td><strong>301</strong></td>
<td><strong>279</strong></td>
<td><strong>3229</strong></td>
</tr>
</tbody>
</table>
4.2.7 V-171

V-171 is a large rectangular compound in the lower valley, south of the river. Collier (1955) excavated three trenches here and found evidence that the site had been in continual use from Guanape times through to the end of the Late Epoch. Following Ford (1949), Collier considered the surface ceramic assemblage at the site to date toward the end of the Late Epoch (specifically the Estero Period in the original valley sequence). Collier’s three stratigraphic excavation cuts (table 4.8) offer perhaps the best opportunity...
in Virú to examine the relationship between surface and subsurface ceramic assemblages because they follow the pattern that is expected for an undisturbed, long-term occupation, where earlier types become gradually more prominent in the lower levels of excavation. Still, it is necessary to test this pattern against Ford’s surface collection from the site. I test the surface assemblage against each of Collier’s three cuts separately because there is no reliable way to merge them into one.

Collier’s Cut A at V-171 is, at first appearance, the most similar to Ford’s surface collection (figure 4.10), but the surface is significantly different from the subsurface total for Cut A (see table 4.9 for all statistics). The surface is also significantly different from each of the levels of Cut A. Cut B shows a considerably different ceramic distribution in the lower levels than in the upper levels (figure 4.11), and it is therefore not surprising that the surface is significantly different from the excavation total for the cut (G=90.100, d.f.=4, p < .001). Viewing the frequency distribution, the surface appears most similar to the upper levels of the cut; indeed, the surface distribution is not significantly different from the level 1 distribution (G=2.808, d.f.=2, p=0.246; Guañape, HPP, and Gloria excluded due to low numbers), but is significantly different from levels 2-3 combined (G=13.023, d.f.=2, p=0.001486), and from levels 4-6 combined (G=140.897, d.f.=2, p < .001). The surface distribution could not be tested against the lower excavation levels due to small sample numbers but it is readily apparent that the ceramic distribution in the lower levels of Cut B is remarkably different from the surface distribution, namely with a much higher percentage of earlier types in the lower levels. The distribution of Cut C is similar to Cut B (figure 4.12). The aggregate total for Cut C is significantly different from the surface collection for the site (G=257.399, d.f.=5, p < .001), from levels 1-3 combined (G=40.259, d.f.=2, p < .001; Guañape, HPP, and Gloria excluded), and from levels 4-6 combined (G=53.294, d.f.=3, p < .001; Guañape and HPP excluded). As with Cut B, the lower levels of Cut C cannot be tested using the G-test or the Chi-Square test but these levels contain much higher proportions of earlier ceramics than the surface does.

In summary, in nearly all cases the surface distribution of V-171 is significantly different from the entire subsurface distribution of any excavation cut therefore refuting Ford’s
hypothesis that the surface assemblage represents a mean measure of the subsurface assemblage. However, the surface assemblage is also significantly different from nearly any level of excavation. While this would suggest that the surface assemblage is not a good proxy for the subsurface assemblage at this site, when considering the actual distribution of each cut, the surface assemblage dates to roughly the same time as the upper levels of excavation. Despite the statistically-significant differences, I argue that the surface is a reasonably good proxy for the upper ~100 cm of subsurface remains. A large site like V-171 is complex and was surely built and occupied in stages; Cut A is excavated in a different mound from Cuts B and C, and the former appears to date much later and have been used for a shorter period of time than the latter two (Collier 1955). The surface assemblage cannot detect these nuances in the occupational history of a site, nor does it appear to detect in any way the fact that there were much earlier (Guañape and Early Virú) occupations at the site.

Table 4.8: Surface and excavated ceramic type frequencies for V-171, Cuts A, B, and C. Surface data is from the Papers of James A. Ford (F673), Department of Anthropology, American Museum of Natural History. Excavation data is calculated from Collier (1955: Tables 5-7).

<table>
<thead>
<tr>
<th>V-171</th>
<th>Guanape</th>
<th>HPP</th>
<th>Castillo</th>
<th>Gloria</th>
<th>Late</th>
<th>Queneto</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface</td>
<td>0</td>
<td>0</td>
<td>106</td>
<td>1</td>
<td>425</td>
<td>47</td>
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<td>Cut A Level 01 (0-25 cm)</td>
<td>0</td>
<td>0</td>
<td>33</td>
<td>0</td>
<td>136</td>
<td>58</td>
<td>227</td>
</tr>
<tr>
<td>Cut A Level 02 (25-50 cm)</td>
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<td>0</td>
<td>33</td>
<td>0</td>
<td>170</td>
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<td>242</td>
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<tr>
<td>Cut A Level 03 (50-75 cm)</td>
<td>0</td>
<td>0</td>
<td>38</td>
<td>0</td>
<td>122</td>
<td>52</td>
<td>212</td>
</tr>
<tr>
<td>Cut A Level 04 (75-100 cm)</td>
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<td>0</td>
<td>23</td>
<td>0</td>
<td>155</td>
<td>62</td>
<td>240</td>
</tr>
<tr>
<td>Cut A Level 05 (100-125 cm)</td>
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<td>25</td>
<td>0</td>
<td>141</td>
<td>41</td>
<td>207</td>
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<td>Cut A Level 06 (125-150 cm)</td>
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<td>25</td>
<td>0</td>
<td>99</td>
<td>37</td>
<td>161</td>
</tr>
<tr>
<td>Cut A Level 07 (150-175 cm)</td>
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<td>0</td>
<td>40</td>
<td>0</td>
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<td>13</td>
<td>107</td>
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<td>118</td>
<td>0</td>
<td>30</td>
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<td>150</td>
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<tr>
<td>Cut A Level 09 (200-225 cm)</td>
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<td>40</td>
<td>0</td>
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<td>0</td>
<td>52</td>
</tr>
<tr>
<td>Cut A Level 10 (225-250 cm)</td>
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<td>15</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>Cut A Total</td>
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<td>0</td>
<td>390</td>
<td>0</td>
<td>920</td>
<td>304</td>
<td>1614</td>
</tr>
<tr>
<td>Cut B Level 01 (0-40 cm)</td>
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<td>182</td>
<td>7</td>
<td>791</td>
<td>114</td>
<td>1094</td>
</tr>
<tr>
<td>Cut B Level 02 (40-65 cm)</td>
<td>0</td>
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<td>56</td>
<td>2</td>
<td>452</td>
<td>69</td>
<td>579</td>
</tr>
<tr>
<td>Cut B Level 03 (65-90 cm)</td>
<td>0</td>
<td>0</td>
<td>57</td>
<td>0</td>
<td>273</td>
<td>33</td>
<td>363</td>
</tr>
<tr>
<td>V-171</td>
<td>Guanape</td>
<td>HPP</td>
<td>Castillo</td>
<td>Gloria</td>
<td>Late</td>
<td>Queneto</td>
<td>Total</td>
</tr>
<tr>
<td>------------</td>
<td>---------</td>
<td>-----</td>
<td>----------</td>
<td>--------</td>
<td>------</td>
<td>---------</td>
<td>-------</td>
</tr>
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<td>Cut B Level 04 (90-115 cm)</td>
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<td>1</td>
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<td>7</td>
<td>196</td>
</tr>
<tr>
<td>Cut B Level 05 (115-140 cm)</td>
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<td>1</td>
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<td>5</td>
<td>247</td>
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<td>0</td>
<td>45</td>
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<td>Cut B Level 07 (165-190 cm)</td>
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<td>119</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>120</td>
</tr>
<tr>
<td>Cut B Level 08 (190-215 cm)</td>
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<td>37</td>
<td>38</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>79</td>
</tr>
<tr>
<td>Cut B Level 09 (215-240 cm)</td>
<td>0</td>
<td>1</td>
<td>0</td>
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<td>1</td>
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<tr>
<td>Cut B Level 10 (240-265 cm)</td>
<td>46</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>54</td>
</tr>
<tr>
<td>Cut B Level 11 (265-290 cm)</td>
<td>62</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>62</td>
</tr>
<tr>
<td>Cut B Level 12 (290-315 cm)</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td>Cut B Level 13 (315-340 cm)</td>
<td>No Data</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cut B Level 14 (340-365 cm)</td>
<td>3</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Cut B Level 15 (365-390 cm)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cut B Level 16 (390-415 cm)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Cut B Total</td>
<td>143</td>
<td>46</td>
<td>704</td>
<td>12</td>
<td>1738</td>
<td>228</td>
<td>2871</td>
</tr>
<tr>
<td>Cut C Level 01 (0-50 cm)</td>
<td>0</td>
<td>0</td>
<td>63</td>
<td>0</td>
<td>627</td>
<td>63</td>
<td>753</td>
</tr>
<tr>
<td>Cut C Level 02 (50-75 cm)</td>
<td>0</td>
<td>0</td>
<td>66</td>
<td>1</td>
<td>629</td>
<td>61</td>
<td>757</td>
</tr>
<tr>
<td>Cut C Level 03 (75-100 cm)</td>
<td>0</td>
<td>0</td>
<td>60</td>
<td>2</td>
<td>537</td>
<td>83</td>
<td>682</td>
</tr>
<tr>
<td>Cut C Level 04 (100-125 cm)</td>
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<td>0</td>
<td>97</td>
<td>8</td>
<td>230</td>
<td>37</td>
<td>372</td>
</tr>
<tr>
<td>Cut C Level 05 (125-150 cm)</td>
<td>0</td>
<td>0</td>
<td>24</td>
<td>2</td>
<td>55</td>
<td>5</td>
<td>86</td>
</tr>
<tr>
<td>Cut C Level 06 (150-175 cm)</td>
<td>0</td>
<td>5</td>
<td>7</td>
<td>19</td>
<td>5</td>
<td>1</td>
<td>37</td>
</tr>
<tr>
<td>Cut C Level 07 (175-200 cm)</td>
<td>35</td>
<td>68</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>108</td>
</tr>
<tr>
<td>Cut C Level 08 (200-225 cm)</td>
<td>228</td>
<td>120</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>353</td>
</tr>
<tr>
<td>Cut C Level 09 (225-250 cm)</td>
<td>54</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>61</td>
</tr>
<tr>
<td>Cut C Level 10 (250-275 cm)</td>
<td>96</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Cut C Level 11 (275-300 cm)</td>
<td>32</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>32</td>
</tr>
<tr>
<td>Cut C Level 12 (300-325 cm)</td>
<td>14</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>Cut C Total</td>
<td>459</td>
<td>204</td>
<td>321</td>
<td>38</td>
<td>2083</td>
<td>250</td>
<td>3355</td>
</tr>
</tbody>
</table>
Figure 4.10: Ceramic type distribution for the surface and subsurface ceramic assemblages from Cut A, V-171.

Table 4.9: G-test comparison of surface assemblage against successive excavation levels of V-171, Cut A. Guanape, HPP, and Gloria all excluded from test due to absence/small numbers.

<table>
<thead>
<tr>
<th></th>
<th>G</th>
<th>d.f.</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cut A Total</td>
<td>59.907</td>
<td>2</td>
<td>&gt;.001</td>
</tr>
<tr>
<td>Levels 1-3</td>
<td>47.376</td>
<td>2</td>
<td>&gt;.001</td>
</tr>
<tr>
<td>Levels 4-6</td>
<td>54.834</td>
<td>2</td>
<td>&gt;.001</td>
</tr>
<tr>
<td>Levels 7-10</td>
<td>204.504</td>
<td>2</td>
<td>&gt;.001</td>
</tr>
</tbody>
</table>

Figure 4.11: Ceramic type distribution for the surface and subsurface ceramic assemblages from Cut B, V-171.
4.2.8 Summary

Unfortunately these sites do not provide an adequate cross-section of the entire valley to allow for the establishment of general trends, but some interesting patterns emerge nonetheless. In almost all cases the surface of any site was significantly different from both the average subsurface distribution (calculated by summing together all excavated levels) and from any individual level of excavation. Despite the statistically-significant differences, however, the distribution of surface assemblages is generally similar to the distribution of all excavated contexts at shallow sites and to the uppermost levels of sites with deeper stratigraphy. In most cases the surface assemblage would be dated to the same period as the subsurface assemblage even though the actual distribution is different. Interestingly, at shallow rock-walled sites in the Queneto Quebrada (V-39, V-44, V-46) the surface distribution actually dates slightly earlier than the subsurface distribution, and the surface of V-108 and V-171—both deeply-stratified sites—dates somewhat earlier than the upper levels of excavation. The surface distribution at V-167 is roughly similar to all subsurface levels, while the lower levels of V-171 contain large quantities of earlier wares that do not appear on the surface of that site. The Huaca Santa Clara (V-67) surface assemblage is skewed towards later periods; this pattern is logical because the ceramics
from later periods should be more common on the surface than the ceramics from earlier periods, which should be buried below the surface and later occupations.

Ford (1949) developed the hypothesis that surface ceramic assemblages represent the mean ceramic date of the site. This hypothesis is not entirely supported. Still, the null hypothesis that there is no correlation between surface and subsurface artifacts is also not supported, as there are correlations in many cases. I contend that surface ceramic assemblages are a reasonable proxy for subsurface contexts in the Virú Valley because the approximate date indicated by surface ceramics is generally similar to the approximate date indicated by excavated contexts. Nevertheless, this is a fundamental assumption of the dating method. Unfortunately, there is no consistent skew in the dates indicated by ceramic types and there is no way to account for the variability. As long as these concerns are kept in mind it is possible to determine the approximate period(s) of occupation for sites in the Virú Valley using surface-collected assemblages.

4.3 Redating the Virú Valley sequence

Given the limitations of the cultural sequence that Ford (1949) developed for the Virú Valley, it is now necessary to re-date this sequence using new criteria. Seriation was a major focus of archaeology during the period when Ford and his colleagues were working in Virú and seriations were conducted by hand or using fairly simple percentage-based models (e.g. “battleship curves” of popularity of a single type). These methods have their utility but the advent of computing and the development of sophisticated statistical techniques in recent decades provide the modern archaeologist with several powerful tools for seriation. That said, a combination of methods providing multiple lines of evidence always provides the strongest approach; in this case, I use frequency seriation, mean ceramic dates, correspondence analysis, and an algorithm to assign periods to specific sites. As mentioned earlier, one of the major drawbacks of Ford’s original seriation was that surface sites were fitted into a master sequence developed from excavation data across multiple sites, but this was done somewhat arbitrarily (chapter 3).
My approaches avoid this issue by focusing specifically on surface assemblages, informed by excavation data but not reliant on them.

### 4.3.1 Sites used in this analysis

A total of 284 individual assemblages from 254 sites were included for analysis. Ford (1949) typically only made one collection from each site but made an additional one or two collections at several sites either to obtain samples from separate, apparently non-contemporary parts of the site, or to gather more data. I maintain these as separate collections and analyze each individually. Ford frequently subdivided a single collection into two components based on unclear criteria and then seriated each of these as though they were entirely separate collections (see discussion above and in chapter 3). I do not maintain these divisions and instead seriate each collection as a whole, except in a few cases where it is entirely logical to subdivide a single site into multiple non-contiguous components.

A single assemblage was only divided into two components when clearly warranted. The four major categories of domestic ceramics used in this study—Guañape, Huacapongo Polished, Castillo (contemporary with Gloria Polished Plain), and Late Plainwares (contemporary with Queneto Polished Plain)—represent the gradual evolution of a single tradition of domestic ceramic production within the valley but cannot be tied to specific cultures and do not represent sharp breaks in the overall ceramic sequence (see chapter 3). Where a ceramic assemblage is made up of approximately 50% early wares (Guañape and HPP) and approximately 50% middle to late wares (Castillo, Late, and Queneto), such as at V-95 (see figure 4.13), it is impossible to tell whether the site was continually occupied during the gradual transition from one time period to another or whether it was occupied while HPP was popular, abandoned for several centuries, and reoccupied when Castillo was popular. Ford (1949) preferred the latter interpretation for such assemblages, seeing discontinuity among sites, but I argue that it is more appropriate to view long-term continuity at these sites (see discussion above). However, in cases where a site contained a large percentage of an earlier ware, a small percentage of a middle ware, and a large
percentage of a later ware, such as at site V-234 (refer again to figure 4.13), there is a clear discontinuity between periods that suggests that the site was abandoned for some time and later reoccupied. In these cases I split the site into two separate components and include each as a separate assemblage for the purposes of analysis.  

Sample size is always an issue with statistics. Many seriation techniques rely on frequency or percentage data but percentages can be misleading with very small samples; for this reason any site or subdivided assemblage with fewer than 25 sherds in total was removed from my analysis. While the majority of sites in the Virú Valley have adequate surface collections and are dated here through seriation, there are no surface data available for many sites and they are not included. Some sites without adequate surface collections have been securely dated through excavation, such as at most sites of the Gallinazo Group (Bennett 1950; Millaire n.d.), while excavations at others have refined the surface seriation, such as at Huaca Santa Clara (Millaire 2004, 2009b). This seriation includes most of the valley’s sites, however (see appendix A for all sites seriated here).

![Domestic ceramic type distribution](image)

**Figure 4.13**: Frequency of ceramic types at sites V-95 and V-234. Site V-95 shows a gradual continuity of ceramic types and is considered one long-term occupation. Site V-234, however, has both significant HPP and Late components with relatively little of the intervening ceramic period (Castillo), suggesting that the site was abandoned and later reoccupied. This site was split into two components, each treated as a separate assemblage, whereas V-95 was left as a single component representing a continuous occupation.

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32 When Ford (1949) made separate collections or subdivided a single collection into two parts he labeled each as A, B, or C (e.g. V-16A and V-16B). I maintain this naming convention for sites with separate collections. In cases where I subdivide a single collection into two separate assemblages I label them as C1 and C2. For example, at site V-143 I analyze V143AC1 and V143AC2 as separate assemblages; in this case, Ford’s collection A is subdivided into components C1 and C2. Note that all Virú Valley sites were given the designation of “V-” by Ford and Willey (1949; Ford 1949; Willey 1953). While I maintain this naming convention in Chapters 5 and 6, in most graphs in this chapter the hyphen is eliminated and “0” is used as a placeholder, where necessary. This naming system is used in order to properly sort entries in statistical programs.
K-means cluster analysis was performed on all Virú assemblages. Cluster analysis was used in part as an exploratory technique but also for the purposes of defining ceramic components for use in correspondence analysis (see below). Ceramic components, broader categories of contemporaneous ceramic types that tend to be associated together, are well-defined for many parts of the world but are not defined for Virú. K-means cluster analysis is an appropriate method for defining clusters—or components—within a dataset when none are readily apparent. Cluster analysis reveals that there are no clear natural clusters for Virú (figure 4.14; see also appendix A, table A.4). Some apparent outliers notwithstanding, there is considerable overlap between clusters. Cluster analysis is, of course, a statistical technique and as such it must create clusters based on the distribution of numbers in a table, regardless of whether or not there are any true clusters within the dataset. This procedure can lead to a false sense of clustering when in fact the distribution is essentially random. Furthermore, K-means cluster analysis requires the analyst to choose the number of clusters into which the statistics program will divide assemblages, further complicating the process (five clusters were used for Virú).

While the Virú distribution is not random, there are no clear, well-defined clusters. This result is actually an interesting one; the clustering shows that there is gradual change but no apparent breaks in the Virú domestic ware ceramic sequence. Ceramic assemblages do change (otherwise there would be one large cluster with nearly every site in virtually the same spot on the graph), but the change is gradual and constant where each cluster—or ceramic period—blends into the next. This supports the conclusion reached in chapter 3 that culture change for the majority of Virueños was constant and gradual despite the transformative political changes that developed over the centuries, and that there were no sharp breaks in the sequence that would be expected if there were major migrations, wars, or other disruptive events in Virú. Nevertheless, the ceramic components defined by k-means cluster analysis do show broad chronological change when used in correspondence analysis, discussed below.
Figure 4.14: K-Means cluster analysis for Virú ceramic assemblages, defining five clusters labelled A-E. Analysis was performed using an automated script written for the R statistical package by Peeples (2011a).

4.3.2 Frequency seriation

Frequency seriation is what most archaeologists likely think of when they think of seriation. At its most basic, frequency seriation involves dividing any assemblage into types and then ordering the relative frequency of the types based on the idea that any type will be rare when first introduced (and thus make up a small percentage of the total assemblage), will steadily grow in popularity until it reaches its maximum frequency, and then gradually decrease in frequency again until it disappears altogether, being replaced
by new types (Ford 1962; O’Brien and Lyman 1999: 121; Phillips et al. 1951). This method of seriation is relatively straightforward and intuitive but requires a considerable amount of time and a keen eye for patterns. This method also requires subjective interpretation, unlike the statistical methods of seriation described below, because frequency patterns rarely follow the theoretical battleship curve predicted by the method (O’Brien and Lyman 1999). Nevertheless, frequency seriation was very commonly used by Americanist archaeologists to seriate sites and to develop regional material culture sequences for pottery, projectile points, and other classes of material culture throughout much of the 20th century (Lyman and O’Brien 2006; O’Brien and Lyman 1999).

It is often assumed that Ford (1949; Phillips et al. 1951) used this method to seriate sites in Virú and elsewhere likely because he described and illustrated this method in a later work (Ford 1962). Ford did not actually conduct a frequency seriation in Virú and only rarely used this method (Lyman and O’Brien 2006: 144; Lyman et al. 1998). A frequency seriation must focus solely on the frequency of types in any one assemblage and order these in a logical sequence, but in Virú Ford (1949) instead used interdigitation to create a master sequence based on excavation data—not the surface data that he was seriating—and then slotted surface ceramic assemblages into this somewhat idealized master sequence. Ford’s Virú seriation was not a frequency seriation and there were several issues with the way that Ford used excavation data.

Because of these problems, I decided that it was useful to conduct a frequency seriation of surface ceramic assemblages in Virú following the general concept that an earlier type will gradually fade in popularity as a later type grows. While excavation data cannot be used to determine the ordering of sites, the general order of the four major classes of domestic ware pottery has been well-determined through excavation. Therefore, I determined that Guañape-style ceramics were the earliest and therefore the earliest sites should have 100% Guañape. Similarly, Late Plainware ceramics were popular in the centuries leading up to the Spanish arrival, and therefore the latest sites in the Virú sequence should have 100% Late styles. The intervening centuries are covered by first the Huacapongo Polished Plain and then the Castillo traditions (Ford 1949; Strong and Evans 1952). Virú is a relatively small valley and it is therefore assumed that any changes
in preference for ceramic styles occurred simultaneously throughout the valley and do not show spatial variation, assumptions that Ford (1949) also made. It is also assumed that the Guañape style was the first major domestic ware ceramic style in Virú and that this style gradually declined in popularity and disappeared as HPP became more popular. Similarly, HPP was gradually replaced by Castillo, which was in turn replaced by Late Plainwares, marking the end of the Prehispanic pottery tradition. Given these assumptions, the approximate relative ordering of Virú ceramic assemblages, and therefore sites, can be determined by arranging each assemblage by the relative percentage of types within it, following these assumptions.

Frequency seriation was done manually by rearranging strips of paper. First, the percentage of each ceramic type was calculated for each assemblage and illustrated on a 100% stacked bar graph (see appendix A, table A.5 for type percentages at each site), which then cut into strips for each assemblage (figure 4.15). These strips were then rearranged in such a way as to best demonstrate changing ceramic frequencies through time, following the assumptions outlined above. The frequency seriation demonstrates a clear trend through time (figure 4.16). In part this fits with Ford’s (1949) relative ordering of sites but avoids several major issues with his seriation, namely in that it does not rely on incomplete excavation data and it focuses solely on a refined domestic ware typology without the confounding issues of corporate ware styles, which tended to change more regularly and abruptly than domestic wares.

The new seriation shows a broad, overall continuity in domestic ware styles. There are no clear breaks in the sequence, as would be expected if there was a major migration of people or an invasion of a foreign polity, as Willey (1953) had suggested took place. If anything, the seriation shows that domestic wares were used for very long periods of time and new styles were very gradually adopted while older styles lingered. Furthermore, roughly one-quarter of all assemblages show a significant presence of three different types of ceramics, indicating most likely that these sites were in continual use for a long time. Because the majority of assemblages contain ceramics from two of the major domestic ware traditions it is relatively straightforward to order these based on the declining proportion of one style and the increasing proportion of another. This seriation
is not able to determine when any individual site was settled or abandoned, but rather its strength is in showing the estimate relative order of sites through time. If all sites were dated independently (e.g. through radiocarbon dating) younger sites would tend to be found at the top of the seriation and older sites towards the bottom.

![Figure 4.15: Strips of paper used for frequency seriation. Each strip contains a single assemblage.](image)

Still, while this seriation does show an attractive pattern, it has several faults that make it unreliable. First and foremost, frequency seriation is fundamentally subjective; except when there are only two types, the archaeologist must necessarily prioritize certain types and ignore others in order to obtain the best fit. If a certain type appears in only small quantities the archaeologist must decide whether or not it is important. For instance, at site V-209, HPP appears at 8% while Castillo and Late Plainwares appear at 39% and
Figure 4.16: Frequency seriation of domestic ware ceramic types from all sites. Younger assemblages are at the top of the graph. See appendix A, table A.5, for this data in tabular form.
48%, respectively. Does the small amount of HPP mean that the site was first occupied when HPP was the dominant ceramic type, or was the site first occupied when Castillo was most popular but a few potters continued to make HPP? The placement of such a site within the overall sequence relies on subjective judgment of the importance of one type over another. Another related problem of frequency seriation regards where to place assemblages with three or more popular types. Having an earlier and/or a later type requires the site to be placed higher or lower on the sequence in order to average out the difference; this can give the appearance that the site was first occupied relatively late in the sequence although the large presence of an early ware suggests otherwise, when in all likelihood the site was first occupied in the earlier period and used continually for a very long time. Finally, the relative ordering of sites makes it appear as though some styles declined in popularity and then increased again at a later time before being discarded altogether. This result is unlikely, but in essence frequency seriation shows the average ceramic date of sites that were occupied for varying lengths of time and does not necessarily indicate when sites were first occupied or finally abandoned. However frequency seriation is always subjective; other methods of seriation can arrive at similar conclusions through objective statistical means.

4.3.3 Mean Ceramic Date

The Mean Ceramic Date (MCD) method of seriation calculates the average, or mean, age of a ceramic assemblage using both the frequency of ceramic types present and the range of dates (in calendar years) that those ceramics were produced. MCD was first developed by South (1977) who used it to date British ceramic types from colonial sites. South (1977: 218) described MCD as “a tool expressing the frequency relationship of ceramic types of known manufacture period in terms of a mean ceramic date” (emphasis added). Key here is the fact that MCD was designed for use in historical archaeology where the precise dates that a certain ceramic manufacturer was in operation are likely to be known. In non-historical contexts such as Prehispanic Virú the production dates of ceramic types are considerably less precise, if known at all, and domestic ceramic production was much less formalized than in a historical context. Indeed, the types themselves are defined by
the archaeologist who must arbitrarily define the attributes that make a certain sherd one type or another, essentially pigeon-holing a sequence of constant change, unlike with historic ceramics where a unique company manufactured their own ceramics. Nevertheless, Christenson (1994) has shown that in the U.S. Southwest, MCD can very accurately date Precontact ceramics and, at least for the period from A.D. 1100-1300, calculates dates that are as accurate as, or more accurate than, absolute dating methods.

In essence, MCD is similar to frequency seriation in that it is based on the frequency of types present in a certain assemblage. One advantage that MCD has over frequency seriation is that it is performed using explicit criteria and a mathematical formula and this mitigates the subjectivity of frequency seriation. That said, MCD retains many of the same problems as frequency seriation, most notably being that it orders sites based only on their average date, not the dates that a site was founded or abandoned. While this is not a large problem in regions or time periods where most sites were short-term occupations, this can complicate the ceramic sequence considerably when some sites were in continual use for over a millennium while others were occupied for much shorter periods of time. Nevertheless, since MCD has broad applicability in non-historical contexts and is easy to calculate I use it here as another line of evidence to seriate Virú ceramic assemblages.

Because the Virú Valley sequence was largely developed prior to the introduction of radiocarbon dating to archaeology and because domestic wares have been relatively understudied since, precise beginning and end dates for each specific domestic ware type in Virú are not known. These dates must be defined for an MCD calculation, however, and so I estimate the approximate manufacturing dates for each domestic ware type (table 4.10; see also chapter 3). The MCD for Virú shows a broad pattern similar to that seen for frequency seriation (see figure 4.17 for the relative ordering of sites by MCD. The date calculated for each site is presented in appendix A, table A.6). The MCD-based seriation is not particularly informative in and of itself, but its utility lies in reaffirming the patterns shown by frequency seriation and correspondence analysis, another statistical technique that has become popular for its utility in seriation.
Table 4.10: Estimated approximate production start and end dates for Virú ceramic types. Dates derived from known periods of north coast Peruvian culture history compared to ceramic sequences developed from deep excavation trenches by Collier (1955), Ford (1949), and Strong and Evans (1952). Note that these are the maximum dates of production so there is overlap between the types.

<table>
<thead>
<tr>
<th>Ceramic Type</th>
<th>Begin Date</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guañape</td>
<td>1800 B.C.</td>
<td>400 B.C.</td>
</tr>
<tr>
<td>Huacapongo Polished Plain</td>
<td>500 B.C.</td>
<td>A.D. 100</td>
</tr>
<tr>
<td>Castillo Plain</td>
<td>200 B.C.</td>
<td>A.D. 1550</td>
</tr>
<tr>
<td>Gloria Polished Plain</td>
<td>A.D. 100</td>
<td>A.D. 700</td>
</tr>
<tr>
<td>Late Plainwares</td>
<td>A.D. 200</td>
<td>A.D. 1550</td>
</tr>
<tr>
<td>Queneto Polished Plain</td>
<td>A.D. 300</td>
<td>A.D. 1550</td>
</tr>
</tbody>
</table>

4.3.4 Correspondence Analysis

Correspondence analysis is a statistical method of visualizing patterns within any given set of categorical or count data. The technique was first developed in Europe and was used by French and Scandinavian archaeologists for some time until it began to be adopted by English-speaking archaeologists in the 1980s, and it has since become a very common technique for performing seriation (Baxter 2003: 137; Shennan 1997: 308), although it also has other uses in archaeology (e.g. Millaire 2002). Correspondence analysis (CA) is conceptually similar to principal components analysis (PCA), except the latter is used for ratio or measurement datasets, whereas CA is appropriate for count data. Correspondence analysis has been shown to seriate certain surface ceramic assemblages quite well, and for this reason I chose to include it as one method for seriating sites in Virú. Powerful but computationally-advanced statistical methods such as CA were not available to Ford (1949) or his colleagues in the 1940s, and it is useful to revisit their data and test them against these modern techniques. In short, CA works well to seriate sites in Virú, and these results correspond with the other seriation methods used in this chapter. A detailed discussion of CA is beyond the scope of this paper, but a brief description of the statistic and its utility for seriation is warranted.

Correspondence analysis is based on the chi-square ($X^2$) statistic and is essentially a graphical way to examine the relationship between the rows and columns of a table or scattergram in multiple dimensions (Baxter 2003: 137). Correspondence analysis is useful for ceramic seriation because it can be used to show the relationship between sites (entered as rows in a table) and the types of ceramic found at each site (in columns).
**Figure 4.17:** Mean ceramic date seriation of domestic ware types from all sites. Younger assemblages are at the top of the graph. See appendix A, table A.6, for this data in tabular form. MCD dates were calculated using a script written for the R statistical by Peeples (2011b).
According to Michael Greenacre (1994: 3)—responsible for introducing CA to the English-speaking world—the main goal of CA is as a descriptive statistic useful for exploring large datasets by reducing these to easy-to-read graphical displays. CA results are open to considerable interpretation, but they provide useful information that can help shape a researcher’s interpretations of a data set.

Correspondence analysis is a multidimensional technique that calculates a number (N) of axes, these being equal to one less than the number of rows or columns in a two-dimensional table, whichever is less (Peeples and Schachner 2012). For example, in a table with five columns and ten rows, CA would calculate four axes. However, different variables contribute different values to their axes and CA deals with this by calculating the mass or weighted average of each row or column in a table, the Chi-square distance between points in the table, and a measure of dispersion within the data known as the inertia or eigenvalue (Greenacre 1994). Because of these calculations CA is not dependent on sample size, unlike other statistics that use the \( X^2 \) distribution. The measurement of inertia is also useful because it expresses how much of the variability within the CA is accounted for by each axis; the maximum inertia is expressed on the first axis, second-highest inertia on the second axis, etc., but each axis is not correlated with the previous axes (Peeples and Schachner 2012: 2820). To use the earlier example of a five by ten table with four axes, the first axis might account for 60% of the variation within the table and the second axis accounts for another 35%, leaving the last two axes accounting for only 5% of the variation. For this reason, the measurement of inertia is useful for directing the researcher to focus on certain elements and axes of the CA as being particularly important; in this example, the final two axes can be dismissed as explanatory mechanisms because they account for very little of the variation seen within the sample.

In order to use CA for seriation, the archaeologist must first determine types or attributes for study, classify artifacts based on these, and count them. These counts are recorded in a table with the types or variables recorded in columns and one assemblage or context recorded per row. The CA is calculated from this table and two plots are produced; these plots are typically superimposed on a single graph. The first plot graphs the rows
(assemblages) and the second plot graphs the columns (types). Points that are closer together on each plot show a similar profile or distribution, and points that are farther apart show greater differences in their distributions (Baxter and Cool 2010: 212).

Superimposed, these plots show which types account for the assemblage distributions. A CA-based seriation is generally considered successful if it demonstrates an ordering pattern that can be interpreted chronologically using independent criteria. Archaeologists typically consider a correspondence analysis to demonstrate a chronological ordering, and therefore a successful seriation, if the CA displays a horseshoe shape along the first axis (Baxter 2003).

Several factors can also complicate a seriation conducted using CA. Shennan (1997: 342-345) points out, for instance, that the types or attributes chosen for seriation must be chronologically-sensitive; CA will always demonstrate an ordering of some form, but if the types do not change regularly through time then this ordering will not be a seriation. The archaeologist must choose types or attributes that can be shown through independent means—such as stratigraphy or absolute dating—to change through time, rather than types that primarily demonstrate static variation. The types chosen must also follow a normal popularity curve (i.e. a battleship curve), with an initial appearance followed by a rise to a peak popularity and then a decline and disappearance of the type. Duff (1996) demonstrated that CA can be used to seriate artifacts that are classified either by attributes (e.g. pot dimensions or specific decorative motifs), or by types (i.e. a collection of attributes that are classified together by the archaeologist, such as Guañape or Castillo in the case of Virú), but cautioned that attribute-based seriations were more appropriate if there are only one or two types or if the types are defined based on attributes that do not vary with time. Duff also noted that, in the latter case, CA could be used to identify attributes that do vary through time, if none have been previously identified.

CA is a complicated statistical technique and requires a statistical program to run. For my purposes I chose to use an automated script for the R statistical package developed by Matthew Peeples (2011c) for the specific purpose of using CA for archaeological seriation. The CA for Virú is roughly horseshoe-shaped, suggestive of an ordering that represents the passage of time, or a successful seriation (figure 4.18). This conclusion is
supported by the second CA plot (figure 4.19), which graphs sites using the same coordinates as the previous graph but rather than labelling them by their site name it labels them by the clusters or components defined above using K-means cluster analysis. All Cluster B sites (Guañape-dominated assemblages, the earliest ceramics in Virú) lie entirely discrete from the other clusters toward the top right quadrant of the graph.33

![Correspondance Plot](image)

**Figure 4.18:** Correspondence analysis plot of dimensions 1 and 2 for all Virú assemblages. Note roughly horseshoe-shaped pattern. Such a pattern is typically considered indicative of a dataset that seriates well. Graph calculated using a script written for the R statistical package by Peeples (2011c).

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33 Peeples cautions that although it is tempting to view a discrete cluster as being somehow separate from the remainder of the assemblages, this is not necessarily the case (Matthew Peeples, personal communication, April 2013). Still, Strong and Evans (1952) described a break in the ceramic sequence between the Guañape and Early Virú periods, and it is possible that CA captures this break.
Figure 4.19: Correspondence analysis plot of dimensions 1 and 2. This is the same plot as figure 4.18 but at a different scale and each assemblage is labelled by clusters that were defined above using k-means cluster analysis. Note that clusters B (Guanape) and E (HPP) are discrete while cluster C (Castillo with HPP present) is also largely discrete. This indicates that sites dating to these clusters seriate well. Graph produced using a script written for the R statistical program by Peeples (2011c).

Clusters E (Huacapongo Polished Plain) and C (Castillo Plain) are both relatively discrete and also show considerable continuity between the clusters; this continuity is consistent with the passage of time. Finally, clusters D (sites with large amounts of both Castillo Plain and Late Plainwares) and A (Late Plainwares) are not discrete but still show a trend towards later ceramics being leftmost on the graph. This graph supports the conclusion that CA produces a successful seriation for Virú because it shows a clear trend where sites with ceramics known to date later in the sequence tend to be located towards the left...
of the graph, and those known to be earlier to the right. Most importantly for the purposes of my analysis, the transition from sites with primarily Huacapongo Polished Plain ceramics to those with primarily Castillo Plain is quite clear; this is thought to demonstrate the transition from Early to Middle Virú.

Although the CA plots do seriate sites in Virú it is impossible to read these graphs to show which sites are earliest in the sequence and which are latest. However, the first dimension of the correspondence analysis describes 39.8% of the variability within the sample, a relatively high value, and this result suggests that this axis explains the temporal variation within the sample, or the actual seriation (Matthew Peeples, personal communication, April 2013). Dimensions two (29.1%) and three (24.5%) account for most of the remaining variation. Because the first dimension describes the temporal variation of the sample, it is possible to seriate sites by their order along the first axis and to graph them in similar ways to above seriation methods (figure 4.20; see also appendix A, table A.7). The Virú assemblages seriate well using CA and show an ordering that is, on the whole, in line with other methods of seriation described above.

Despite its many benefits, correspondence analysis shares in common with the above-described seriation methods the problem of long-term use or multi-component sites, or any assemblage that is statistically “average.” These sites appear in the middle of the graph and muddle it somewhat. Furthermore, while the CA seriation demonstrates the overall trend in domestic ware ceramic style through time, it is not very useful for assigning specific time periods to sites; it shows a continuous trend, but discrete periods must still be defined in order to pursue further analyses. For these reasons I chose to seriate sites using one further means, which I refer to as an algorithm for assigning time periods to individual assemblages.
Figure 4.20: Correspondence analysis seriation of domestic ware ceramic types from all sites. Graph orders the first dimension of the correspondence analysis, representing 39.8% of the variation within the sample. In this case the variation seen on this axis appears to seriate assemblages well. Younger assemblages are at the top of the graph. See appendix A, table A.7 for CA data for each site.
4.3.5 Seriation Algorithm

All of the above-described seriation methods are good for placing the large number of Virú sites into an approximate order based on their frequency of key ceramic types, and they demonstrate that the Virú ceramic sequence is a continuum without any sharp breaks. But they all fail to address one key problem: how do you ascribe a discrete period (or periods) to specific sites for further study? What percentage of a ceramic type indicates an actual occupation during the period when that type was popular versus noise caused by legacy types still in use, very small occupations from an earlier time, etc? There is no clear or obvious way to subdivide the overall ceramic sequence into discrete periods such that all sites within a certain range of the sequence could be called the Early Virú Period, for example.

However, each site was, of course, occupied for a specific range of time, and the ceramic types found on the site can be expected to date primarily from the site’s main occupation period(s). Excavation data, specifically from Strong and Evans (1952) and Collier (1955), can be used to define the frequency of types that indicate an occupation.34 By carefully examining which ceramic types tend to co-occur in each level of individual deep stratigraphic cuts (i.e. not using a compiled master sequence developed from all stratigraphic cuts, as Ford had done), I developed definitions for the minimum percentage of a ceramic type that could reasonably be considered to represent an actual occupation during that period, versus noise resulting from rare types, earlier or later occupations, etc. Although I earlier argued that corporate ware ceramics should not factor into a seriation of surface ceramic assemblages, especially those collected from small hamlet and village sites with little to no corporate wares, in this case I actually found it useful to consider corporate wares precisely because they change on a much tighter timeline than domestic wares. For example, in the stratigraphic cuts excavated by Strong and Evans (1952: Fig.

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34 Earlier I eschewed the use of excavation data in developing a ceramic seriation based on surface-collected assemblages but I was primarily arguing that Ford’s (1949) methods were flawed. Ford interdigitated all excavation levels, developed an idealized curve for the popularity of each type, and then uncritically fitted surface assemblages onto this idealized curve as though each surface assemblage was equivalent to a single layer in a stratigraphic cut. This method is not reliable, but excavation data can still offer insight into the time period(s) represented by a surface ceramic assemblage.
34), deeper levels at V-51 (Castillo Tomaval) and V-162 (Huaca de la Cruz) show Castillo Plain in excess of 95% of the level, but once Moche- or Huancaco-style corporate wares appear in higher levels, Castillo drops to 75-90% as Late Plainwares begin to appear at around 10-20% of the level. 35 Considering these domestic ware frequencies in tandem with corporate wares, I argue that sites dating from the Late Virú Period are defined by a large percentage of Castillo along with 10-20% Late Plainwares, whereas a large percentage of Castillo and less than 10% Late Plainwares can be considered the Middle Virú Period. This same process was done to define percentage limits for each of the five periods used in this study: Guañape, Early Virú, Middle Virú, Late Virú, and the Late Epoch. These definitions are outlined in table 4.11.

Table 4.11: Time period definitions for seriation algorithm. Any site could have multiple periods present and as long as these conditions were met that site was considered to have that period represented. For example, a site with >15% Castillo and >20% Late Plainwares would be classified as both Late Virú and Late Epoch. Determining Middle vs. Late Virú was more complicated because Castillo is the most popular style during both periods, but these can be separated well using the definitions presented here.

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Ceramic Percentage Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late Epoch</td>
<td>&gt;20% Late Plainwares</td>
</tr>
<tr>
<td>Late Virú</td>
<td>&gt;15% Castillo Plain and 10-20% Late Plainwares</td>
</tr>
<tr>
<td>Middle and Late Virú</td>
<td>&gt;15% Castillo Plain, &gt;0% Huacapongo Polished Plain, and &gt;10% Late Plainwares</td>
</tr>
<tr>
<td>Middle Virú</td>
<td>&gt;15% Castillo Plain and &lt;10% Late Plainwares.</td>
</tr>
<tr>
<td>Early Virú</td>
<td>&gt;15% Huacapongo Polished Plain</td>
</tr>
<tr>
<td>Guañape</td>
<td>&gt;15% Guañape Plainwares</td>
</tr>
</tbody>
</table>

These definitions are used for each site to determine the period(s) during which that site was occupied (appendix A, table 8). I refer to this process as a seriation algorithm. This method is subjective and relies on considerable personal judgment when determining the period(s) by which to define a site, especially compared to statistical techniques such as correspondence analysis, but I argue that it is reliable as long as the analyst is familiar

35 Recall that I have combined the numerous types used by the original Virú Valley Project members into a small number of simplified types, as defined in Chapter 3.
with the ceramic sequence. One strength of this approach is that it does not assume that a site was occupied during only one period of time. Although this method resists the sort of graphical ordering used for other seriation methods, sites can still be ordered from latest to earliest and this shows considerable agreement with other seriation methods discussed in this chapter (figure 4.21). Because this method agrees with other seriation techniques but also assigns specific periods to each assemblage, I use these results to identify the time period(s) that are present at each site; these sites are listed in appendix A, table A.9.

4.4 A new settlement pattern for Virú

The new seriation for Virú is more than just a technical debate on the merits of various methods of seriation and the problems that have come to light in the decades since Ford (1949) published his classic study. Whether archaeologists like to acknowledge it or not, pots have long been used as a stand-in for people. While not describing them as separate cultures, Willey (1953) subdivided Ford’s continuous ceramic sequence into eight distinct time periods and several sub-periods, and discussed each as a discrete entity. It is unlikely that Willey considered these periods to represent actual cultures or ethnic groups, but later Andean archaeologists have done just this. For example, Shimada and Maguña (1994) interpreted the spatial arrangement of ceramic types to argue that different ethnic groups lived in distinct barrios or neighbourhoods at the site of Pampa Grande, implicitly assuming that each ceramic type was an ethnic marker. This has had the effect of describing the long-term development of the north coast of Peru as a series of cultural groups developing, fighting wars, migrating, replacing other groups, and eventually being replaced themselves. I argue that such views are no longer tenable, and the new seriation of Virú sites supports this perspective.

\[36\text{ Note that, as with other seriation methods described in this chapter, sites with obvious non-contiguous periods were split into separate assemblages and analyzed uniquely, as described above.}\]
Figure 4.21: Seriation of domestic ware ceramic types from all sites using algorithm. Younger sites are at the top of the graph. This method was used to assign time periods to sites because it shows a similar seriation to other methods but also assigns specific periods. See appendix A for time periods for each site.
There likely were different culture groups, or ethnicities, throughout the north coast, both contemporaneously and through time. This area is a large one with many sub-regions that would have been isolated at times and with adjacent areas (particularly the yungas and highlands to the east) that almost certainly did view themselves as ethnically different and spoke different languages, and these communities would have changed over the millennia-long Virú Valley sequence. But pots do not equal people, and the utility of ceramic seriation lies only in saying that archaeological sites were occupied by someone at a specific time. Discussing the long-term chronology of a region as a series of discrete periods runs the risk of removing the inherent variability of the past and viewing it as a series of static cultures or ethnicities. I do not mean to argue that time periods have no utility, but we must constantly be aware that they are archaeological constructs, made for heuristic purposes, and do not necessarily reflect any real differences in how people defined their ethnicity.

The new seriation for Virú strongly suggests that, rather than a series of cultural replacements, the development of the Virú Valley occurred as a long, mostly unbroken sequence. The valley’s population grew through time but there was no period when a large number of sites were rapidly abandoned with new ones settled, as would be expected with a major cultural upheaval such war or mass migration. Sites were abandoned and new ones were occupied, but this happened as a gradual and organic process of long-term development.

This critique and re-seriation of the Ford-Willey hypothesis and of Ford’s (1949, 1952) methods of seriation has focused on the entire Virú Valley ceramic sequence. This focus has been necessary because the entire sequence must be deconstructed and reanalyzed in order to establish a more secure dating scheme, but my focus in the remainder of this dissertation is on the Early Intermediate Period segment of the Virú Valley sequence, a time period that I refer to collectively as the Virú Period (divided into Early, Middle, and Late). I am particularly interested in processes of statecraft and it has become clear that the Virú Valley was a hotbed of statecraft in the Middle Virú Period (Millaire 2009a, 2010; Millaire and Eastaugh 2012). But statecraft is a long-term process that began in the Early Virú Period in the Virú Valley, and any understanding of these processes is not
complete without examining the changing sociopolitical landscape of the valley. In chapter 5 I will update the Virú Valley settlement patterns for both the Early and Middle Virú Periods by relocating sites that have been dated to either of these periods using the methods described here or, in a few cases, that have been shown to date to these periods through excavation. The updated settlement patterns for Virú demonstrate processes of statecraft and the centralization of authority in the Middle Virú Period.
Chapter 5

5 Virú Settlement Patterns and Political Centralization

The development of political authority involves long-term processes that both shape and are shaped by the landscape of the regions where these developments took place (A.T. Smith 2003). Studies of archaeological settlement patterns are key to understanding these processes and these studies are most informative when fine-tuned spatial and chronological data are available for the region where statecraft is thought to have taken place. Beginning with Willey’s (1953) classic study of the valley’s archaeological settlement patterns, the Virú Valley has been recognized as a key location for understanding the development of statecraft on the north coast of Peru. Willey’s study was innovative and ground-breaking when it was published. Nevertheless, it has been some sixty years since it was published; methods of archaeological analysis and ideas regarding the timing and development of the Prehispanic north coast of Peru have developed considerably in that time, yet Willey’s original study has not been extensively updated or revisited. Rather than understanding Willey’s study as a complete record of the Virú Valley, I prefer to view his conclusions as a series of hypotheses to be tested. As will be seen through this and the next chapter, many of Willey’s original hypotheses are upheld but can be complemented with new research to better fit a view of culture change and of statecraft as continual and ongoing processes.

Willey (1953) made several conclusions for the Early and Middle Virú Periods (his Puerto Morin and Gallinazo Periods), the two periods that are most important for tracing the initial development of statecraft in Virú. Ultimately, Willey (1953: 396) concluded that a state-organized society first developed by the end of the Middle Virú Period. Willey’s conclusions were based primarily on the overall distribution of all site types and on the distribution of important infrastructure, namely irrigation canals, civic-

37 Following the general north coast chronology presented in chapter 1 and the Virú Valley chronology developed in chapters 3 and 4, I date the Early Virú Period to ca. 400 – 200 B.C. and the Middle Virú Period to ca. 200 B.C. – A.D. 600.
ceremonial buildings, and fortifications. Regarding the overall settlement patterns, Willey (1953: 391-393) documented a large population in the Huacapongo Valley, a major tributary of Virú, during the Early Virú Period, with a small and scattered population in the lower Virú Valley at this time (figure 5.1). Early Virú settlement was primarily on the barren slopes and rugged quebrada floors of the Andean foothills and in middens of the lower valley. Willey considered this period to be a violent one with only limited irrigation and public works. He contended that there was a massive population shift at the end of the Early Virú Period where the Huacapongo Valley was entirely abandoned and settlement moved closer to the coast and onto the valley floor instead of the hillsides (figure 5.2). Willey hypothesized that this massive shift was related to new irrigation systems in the lower valley or was done for defensive reasons, though he preferred the former hypothesis. This development was advantageous, according to Willey, as it allowed the valley’s largest Prehispanic population to develop during the Middle Virú Period. The Middle Virú Period was a more peaceful period that witnessed the integration of the lower and middle valley into a single polity with a massive expansion of irrigated land, the construction of many civic-ceremonial centres, and the settling of the Gallinazo Group, a large urban centre near the coast on the western edge of the valley (figure 5.3). Willey’s conclusions regarding these two periods were accepted at face value and were little questioned by later north coast scholars; Fogel (1993) went so far as to expand Willey’s conclusions well beyond the limits of Virú without confirming their accuracy in the first place.

Several projects in the last 15 years began to test and, in some cases, call into question these conclusions. The Middle Virú Period is still seen as a time of statecraft (Millaire 2010a, 2010b), but no project has comprehensively re-examined Willey’s settlement pattern data until now. This reanalysis project benefits from the recent work in Virú but also from settlement pattern studies conducted in neighbouring valleys (Billman 1996, 1999; Wilson 1988). Billman’s work the Moche Valley 40 km north of Virú is particularly relevant. In documenting the long-term settlement pattern changes that led to the development of the Moche polity in that valley, Billman showed that eight clusters of sites operated as autonomous communities in the late Salinar Period (equivalent to Early Virú), including at Cerro Arena, a large settlement and one of the earliest urbanizations in
Figure 5.1: Willey’s (1953) original settlement pattern maps for Early and Late Puerto Morin Period.
the Andes (Brennan 1978, 1980, 1982). Billman showed how these clusters became fewer and more concentrated through the Gallinazo Period (equivalent to Middle Virú) until coalescing into a single polity in the Moche Period. Political centralization in the Moche Valley was accompanied by an increase in civic and ceremonial infrastructure. Interestingly, West (1971) proposed a similar arrangement in Virú as part of his work on the Early Virú Period, work that sadly could not be fully published. West considered the concentration of Early Virú settlement that Willey (1953) had documented in the Huacapongo Valley to be evidence of a centralized polity and the more scattered settlement of the lower Virú Valley to be autonomous communities.

The goal of this chapter is twofold: (1) to update and document Virú Valley settlement patterns by dating sites using the updated seriation for Virú, described in chapter 4, and (2) to test the hypotheses that independent Early Virú communities or polities were brought under the auspices of a centralized political authority during the Middle Virú Period. First, I will define my parameters for Virú Valley settlement patterns, the methods used to update and analyse these patterns, and some issues that may affect the accuracy of this study. Then I will describe the settlement patterns of Early and Middle Virú and finally will compare these periods. This analysis documents long-term trends in Virú and explores the way that political authority was organized at the valley level but this approach does not address the methods used to build this authority in the first place. This chapter therefore feeds into chapter 6, which will focus on an infrastructure-building program undertaken by the Middle Virú Polity. It is through this infrastructure-building program that this polity was able to materialize its hold on the valley.

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38 All sites used here and in chapter 6 are listed in appendix B, table B.1.
Figure 5.2: Willey’s (1953) original settlement pattern maps for Early, Middle, and Late Virú.
5.1 Updating the Virú Valley settlement patterns

Settlement patterns are key to the study of Virú statecraft and these patterns are derived from the original large-scale survey project conducted by Ford and Willey (1949; Willey 1953). The current project updates Ford’s and Willey’s original survey using satellite imagery, Geographic Information Systems (GIS), site descriptions by Willey and Ford,\(^{39}\) and notes from a three month long survey in 2010. In keeping with the focus of this dissertation, only sites that date to the Early or Middle Virú periods, as defined in chapter 4, are included for analysis. Only sites that were originally described by Willey and his colleagues in Virú can be included.

In total, 181 sites were mapped using GIS. In contrast to Willey (1953), who split sites into multiple categories based on site function, architecture, and setting, I classify sites into five main functional categories and keep sub-types to a minimum. While

\(^{39}\) Ford surveyed sites in tandem with Willey and took brief notes but did not publish them. In some cases these notes complement and clarify Willey’s (1953) site descriptions. Ford’s notes are stored on file at the Division of Anthropology, American Museum of Natural History (.F673, Papers of James Ford).
architectural elements inform these categories, unlike with Willey they are not based on architectural features such as construction materials used. Any single site can have multiple functions. These types were chosen for their usefulness in understanding the settlement patterns of early state-organized societies. The five main categories, with sub-types, are:

(1) Civic: Sites with evidence of civic or community space, such as pyramid mounds or plazas, constructed for ritual and/or administrative purposes.
   a. Civic-Ceremonial Centre: Large pyramid mounds with extensive public or community space and clearly intended to host large crowds for ritual and/or administrative purposes. These typically also have large residential sectors.
   b. Civic: Small civic or community spaces (pyramid mounds or plazas) typically located within a residential or fortified site, although some are found with no attached residential component.
   c. Castillo Fortification Complex: A specific type of fortified civic-ceremonial centre unique to the Middle Virú Period (described in detail in chapter 6).

(2) Residential: Sites with observable or assumed residential structures or sectors. Most sites in Virú are either entirely residential or have a residential sector alongside civic or fortified structures.

(3) Fortification: Sites with obvious defensive or fortified features (e.g. perimeter walls), sites built in a strategic location that can be interpreted as defensive (e.g. on the summit of a steep-sided hill), or sites in defendable locations that have evidence of stored weaponry (e.g. porras [clubs] or bolas [slingstones]).
   a. Castillo Fortification Complex: As described above, a specialized type of fortified civic-ceremonial centre built in strategic and imposing hilltop locations and, in some cases, surrounded by perimeter walls.

(4) Midden: Sites with domestic refuse but no apparent residential structures or sectors. Some of these sites may have had residential structures but lack evidence of them but others were activity areas presumably used by residents of nearby sites. I typically include middens as a form of residential site, but caution that these are often extensive but shallow occupations and can therefore significantly over-estimate the size of residential populations associated with them. For this reason I do not include middens in demographic estimates of valley populations (see discussion below).

(5) Funerary: Sites that are exclusively cemeteries or have cemetery sectors that clearly date to Early or Middle Virú. Most Virú Valley sites have Late Virú and Late Epoch burials and this makes it difficult to determine which period looted burials at sites with Early and Middle Virú components date to. Compounding these problems, Early and Middle Virú corporate ware ceramic sherds—typically associated with burials—are very rare in surface assemblages.
Most of the analyses described here and in chapter 6 only account for the major site types but subtypes are useful for certain analyses. Sites that are classified solely as funerary (accounting for eight sites) are not a focus of this study and are eliminated from all analyses but are mapped initially to show their presence.

5.1.1 Methods of mapping and analysis

This survey was conducted through a mixture of remote sensing using satellite imagery to accurately map all Early and Middle Virú sites originally identified by Ford and Willey (1949) as well as on-the-ground survey to revisit many of these sites in order to update Willey’s (1953) interpretation of each site and to explore the Virú Valley system as a whole to gain a better understanding of its geography and the nuances of living and being in the valley. Satellite remote sensing has become a major focus of archaeology in recent decades (Myers 2010; Parcak 2009) and has recent precedent in coastal Peru (Vega et al. 2011). While complicated multispectral satellite imagery is of great value to archaeology, the methods used in this study were relatively straightforward and used visible-light satellite imagery that is freely-available through software platforms such as Google Earth, or is available to users of the ArcGIS suite of software. In this sense, my survey carried on the tradition established by Ford and Willey (1949; Willey 1953) of using aerial photography in Virú to discover and map archaeological sites and key landscape features.

Ford and Willey (1949: fig. 2) located all 315 identified sites on a master map of the Virú Valley system. All sites were labelled with the prefix “V-” and a number (e.g. V-1, V-2, V-3, etc.) and Willey (1953) also gave the local name for any site that had one. Only a handful of these sites have been revisited by subsequent projects in the valley or are large and well-known enough to be easily relocated during survey. Therefore, the first step to revisiting these sites was to georeference the master valley map in a GIS and to pinpoint each site, effectively assigning real-world coordinates to what were previously numbers on a paper map; this process was originally done by Jean-François Millaire who provided these coordinates to me, initially for the purposes of resurveying several sites (personal communication, May 2009). These data proved to be relatively inaccurate, however,
because sites were not located on the original paper map with complete accuracy. Fortunately, most sites can be seen clearly in satellite imagery of the valley. The first step of this analysis was thus to accurately relocate Ford’s and Willey’s original sites using a combination of satellite imagery and Willey’s (1953) and Ford’s (AMNH) site descriptions and site-specific maps, when provided. Fifty-eight sites were also surveyed over the course of three months in 2010 in order to ground-truth the satellite imagery and, in some cases, update Willey’s original survey details.

Since vegetation is sparse in coastal Peruvian valleys such as Virú, most archaeological remains can be seen clearly on satellite imagery. This visibility is especially true for the rocky hillslopes and quebradas of the valley margins, where rock-walled structures often remain exposed despite a minimum of several centuries passing since their last occupation. Archaeological sites in the lower valley tend to be partially or wholly covered with windblown sand but can often be relocated and mapped accurately because these sites tend to be uncultivated mounds that contrast sharply with the surrounding fields in satellite imagery. Where sites are not mounds or are not surrounded by cultivated fields, such as with middens and cemeteries on the margins of lower Virú, evidence of looting activity can often be seen distinctively on satellite imagery and this points to the existence of the archaeological site (Contreras 2010).

Once a site was relocated it was mapped in a GIS database. In keeping with the focus of this study, only sites that could be dated to the Early or Middle Virú periods, as determined in chapter 4, were mapped. Simple maps for each site were drawn directly in ArcGIS with the primary goal of establishing the approximate size and precise location of each site; each map consists of a polygon surrounding the extent of that site that is visible in satellite imagery (figure 5.4). Where a site could not be relocated or its location and/or extent was uncertain, polygons or circles were drawn to the approximate dimensions that Willey (1953) described for that site and in the approximate location as depicted by Ford and Willey (1949: fig. 2). I maintained continuity with Willey’s original

40 In many cases these maps contradict Willey’s (1953) dimensions for a site since he regularly described only the core sector of a site and did not describe or account for other parts of the site.
site designations for the purposes of site dating and mapping. There were, however, approximately ten instances where Willey identified between two and five sites that were either adjacent to each other or, although slightly separated by topography or unoccupied terrain, clearly operated together as a single site. In these instances Willey mapped and described these as being separate sites. These have the potential to skew spatial analysis, however, because they give the impression of clusters of sites when in reality they are a single large site. In such instances I felt it was appropriate to merge these sites into a single site in order to avoid the potential confusion caused by splitting a single site into several smaller ones. The Gallinazo Group forms a special case here; although Bennett (1939, 1950) considered the entire Gallinazo Group to be essentially one site I felt that only the central major civic-ceremonial and residential mounds should be merged together since the majority of smaller residential mounds and one civic-ceremonial mound (V-279) lie at some distance from the central mounds.

Figure 5.4: Outlines were drawn over each site used in this analysis. Inset: outlines drawn around the principal mounds of the Gallinazo Group.
The purpose of the current survey is essentially to update Ford and Willey’s (1949; Willey 1953) comprehensive survey and seriation of the entire Virú Valley sequence and to compare the settlement patterns of Early and Middle Virú in order to document the development of statecraft in Virú. As such, this project relies heavily on Willey (1953) and contemporary researchers (Bennett 1939, 1950; Collier 1955; Strong and Evans 1952), and on published and archival data from Ford (1949), but is also informed by several recent archaeological studies in the valley (Bourget 2004, 2010; Fogel 1993; Millaire 2004, 2009a, 2009b, 2010a, 2010b; Millaire and Eastaugh 2011; Zoubek 1997). However, this reliance on Willey’s and Ford’s data means that issues or gaps with their studies cannot be corrected. These issues do not invalidate this research, but do highlight the need to be cautious.

The largest issue with Willey’s and Ford’s data is one of coverage: Ford and Willey (1949: 20) estimated that the 315 sites documented by them and included in Willey’s (1953) larger study represented approximately one-quarter of the total number of archaeological sites in the valley. Ford and Willey used aerial photography and on-the-ground survey to find, map, describe, and record sites and to make ceramic collections for seriation. They were somewhat limited by the amount of time they spent in the field—four months—which forced them to survey a sample of smaller residential sites, in addition to the valley’s major sites. As far as I can tell, Ford and Willey sampled sites for survey judgementally, rather than through any random or systematic sampling method or a total survey. Technically, this affects the statistical analyses that can be applied to survey data but similar sampling issues are common to all forms of regional archaeological study. More problematic, however, is that apparent site clusters appear in several parts of Virú while other areas appear uninhabited; this is especially true of the Huacapongo Valley. These clusters and gaps are, in many cases, artificial and archaeological sites can be seen on satellite imagery in places where Willey (1953) did not document any, but without survey data it is not possible to date these sites or include them in the present analysis. Several sites, again primarily in the Huacapongo Valley, are also much larger than what Willey documented since he often documented one site and ignored adjacent or nearby sites, and in other cases Willey’s site maps and measurements only included part of a site and left off areas that were clearly part of the same site. I have
been conservative in following Willey’s original data relatively closely but do map several sites as being larger than what Willey described, where appropriate. Despite these issues, a large enough sample of sites is found throughout all parts of the valley to warrant some general conclusions regarding Early and Middle Virú settlement patterns.

Several of the analyses used in this chapter are based on site size, rather than location or function. Human settlements are, of course, dynamic and their size, composition, and purpose can change through time at varying rates. Intensive archaeological investigations of a single site—such as excavation projects—can elucidate the settlement history of that site but a regional survey such as Willey’s (1953) original and the current one are based on a site’s surface, which is static. In most cases, the site as it was originally described by Willey and mapped here represents the maximum size of that site and only records functions that can be identified through surface survey. It is entirely possible that a site first occupied during the Early Virú Period grew considerably in size during the Middle Virú Period—or vice versa—or civic space at an Early Virú residential site, such as a small mound or plaza, was not used during the Middle Virú occupation of that site. In a few cases these issues can be partially resolved because Ford and Willey (1949; Willey 1953) described a single site as being two or three separate sites and made separate ceramic collections at each, allowing for a more-nuanced dating of the site. It is also possible that the site size and function, as I have mapped and described them, is due to later (Late Virú and Late Epoch) occupations at some sites, but this cannot be overcome. Although single-component Early and Middle Virú sites, or sites only occupied during those two periods, are more secure in their size and function, in this analysis I include all sites that have evidence of dating to either Early or Middle Virú (or both). While this includes some potential for error, this potential is acceptable and unavoidable without considerable excavation.

Mapping in GIS established two key pieces of data for each site: a site’s size and its precise location within the valley. Site location is necessary to describe settlement patterns through a series of analyses, described below and in chapter 6. Site size is useful for various analyses, particularly for documenting population growth throughout the valley and for exploring the way that these populations were organized by examining
settlement hierarchies. In addition to documenting the absolute change in average and total site size, population growth can be shown through estimates of population size and demographics. There are various methods to estimate population size and demographics in the archaeological record such as through burial data, ethnohistorical records, and settlement sizes; all contain a considerable degree of uncertainty (Chamberlain 2006; Hassan 1981). Population estimates based on settlement size rely on assumptions of population density, family arrangement, the lifecycle of buildings, and other factors and as such are typically published as a range. Moreover, regional estimates can be problematic because an urban centre may be arranged very differently from a contemporary village.

In order to account for these problems it is ideal to estimate population sizes using locally-derived data and indexes. Wilson (1988: 78) derived population estimates for his extensive survey in the Santa Valley 65 km south of Virú—a cultural and geographic context very similar to Virú—by counting the number of housing units visible at a site, assuming five persons per unit, and then developing an estimated population per hectare. Wilson’s index described four categories of site density: (1) low (15 p/ha); (2) low-to-moderate (50 p/ha); (3) moderate (100 p/ha); and (4) high (250 p/ha). In Virú specifically, Millaire and Eastaugh (2011: 295-296) developed population estimates for the Gallinazo Group, one of the sites included in the present analysis. Millaire and Eastaugh estimated a population of 10,000-14,400 at the 40 ha Gallinazo Group, or between 250-360 people per hectare. This estimate, developed as part of an extensive multi-year excavation and mapping project at the Gallinazo Group, sets precedent for housing patterns during the Middle Virú Period and I use this index. I also include Wilson’s (1988: 78) moderate index although I discard his low and low-to-moderate indexes as being too low to account for the agglutinated nature of Early and Middle Virú settlements. The index used in this dissertation is thus 100-360 people per hectare.

Willey (1953) felt that house size and arrangement was similar for both Early and Middle Virú—whereas houses grew larger and settlements less dense in later periods—and I apply the same index for both periods. Population estimates are made only for sites that have an identified residential component. While people may have lived at some middens,
in many cases these very large sites likely served as activity areas or refuse piles for people living at nearby residential sites with few or no people living on the midden itself; including these sites in population estimates risks counting the same people twice. Populations at residential sites that also have community or fortified space will be over-estimated since the non-residential space at the site is still included in the overall size calculation for that site but this problem is unavoidable at present. Finally, housing patterns at large urban centres like the Gallinazo Group were likely more densely-arranged than at small villages or hamlets; for this reason I prefer population estimates towards the lower end of the index used here because this use will average out the varying densities across the valley.

The political organization of archaeologically-documented polities can be explored through settlement hierarchy studies. This method, first used by Wright and Johnson (1975), has most often been used as a general model to determine whether any given society was organized as a state or not (Flannery 1998; Spencer 2010; Spencer and Redmond 2003, 2004; see also chapter 2). The non-essentialist study of statecraft employed here can also benefit from settlement hierarchy studies because they provide insight into the sociopolitical organization of a polity and the ways that centralized political authority developed through time. The analysis of settlement hierarchies is rather straightforward. Essentially, large sites are thought to be major cities, mid-sized sites regional towns or provincial capitals, and small sites villages or hamlets, with administrative control moving up the hierarchy with the polity’s capital being located at the largest site. The distribution of site size cannot be continuous; there must be evidence of tiers such that one site or a group of sites are of a categorically different size than other sites (a continuous distribution with no tiers would indicate natural variation in site size). A lack of any settlement hierarchy is characteristic of egalitarian societies, but as few as two tiers is considered representative of any form of political authority and more tiers indicate a more complex society.

Wright and Johnson (1975: 270), whose paper on state formation in Iran popularized the use of settlement hierarchies to identify the sociopolitical organization of early states, caution that a hierarchy in site size alone is not sufficient evidence of administrative
control of one site over another. Instead, there must be additional evidence that sites were built in locations that are consistent with a pattern of control. Specifically, Wright and Johnson argue that “[they] take as evidence for this the condition in which a smaller settlement can most easily gain access to a larger site by going through an intermediate-sized or otherwise differentiated center. This intermediate-sized centre has what we term ‘spatial dominance’ over the small center. The paramount center in an area has dominance over all others.” In this way, Wright and Johnson outline a specific pattern of both settlement hierarchy and site location. To this I will add that additional evidence of the importance of certain locations—such as the presence of civic structures or community space at a site—can serve as additional supporting evidence for administrative control. Of course, the social, cultural, and geographic context of the north coast of Peru must also be considered.

The actual method of studying settlement hierarchies is straightforward once the area of each site known. Wright and Johnson (1975) used histograms of site area in hectares to show hierarchical settlement tiers while Spencer and Redmond (2003, 2004) used histograms of the natural logarithm of site area to identify tiers. Histograms are a type of bar graph that are used to show the distribution of a set of data. The data is divided into a number of regular intervals (known as bins) that can be defined or manipulated by the analyst to show the distribution in varying ways, or can be calculated automatically by a statistical program; the number of bins automatically generated is a product of the number of data points being graphed. The intervals are typically displayed on the x-axis and the number of cases that fall within each interval are counted and added to the graph as discrete bars with a height displayed on the y-axis. Histograms of different but comparable data sets (such as site sizes from different regions or periods) do not need to have a standardized number of bins to be compared. Site area can be displayed on a histogram as-is without the need for data standardization; this method is the one that Wright and Johnson (1975) used. Site area data can also be standardized prior to graphing such as through natural logarithms and these standardized data are then graphed; this procedure is the one followed by Spencer and Redmond (2003, 2004). For Virú I produced histograms using both of these methods but I find the histograms of site area to be more useful (see discussion below for each period). All histograms were originally
produced within ArcGIS with the default number of bins that the program produced for each dataset.

5.2 New patterns for Virú

Some marked differences emerge in the settlement patterns between the Early and Middle Virú periods, and yet these differences speak to overall continuity and evolutionary change in the social, political, and economic organization in the Virú Valley system. Although Willey (1953) arrived at some similar conclusions, the present study reimagines and goes beyond Willey’s original survey and is especially informed by an updated understanding of the Virú Valley occupational sequence (described in chapters 3 and 4) and the aggregated knowledge of north coast culture history gained since Willey conducted his survey.

5.2.1 Early Virú settlement patterns

Early Virú sites are distributed throughout most parts of the Virú Valley but they are not distributed evenly. Instead, Early Virú sites are clustered into two major regions, one centered in the Huacapongo Valley and the Virú Valley neck, and the other centered in the middle and lower Virú Valley, almost entirely south of the river—I call these the Huacapongo and Lower Virú South clusters (figure 5.5). In addition to these two major clusters there is one small cluster of three sites located near the coast on the north margin of the valley at the present-day village of Puerto Morin as well as four outlying sites on

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41 Note that although there appears to be two separate clusters in the Huacapongo Valley this is likely a sampling issue. The hills in this part of the valley are very steep with only a few small quebradas, limiting the areas typically occupied by Early Virú settlements in other parts of Huacapongo, but there are nevertheless several sites visible on satellite imagery between these two apparent clusters. Most of these were not surveyed by Willey (1953) and cannot be dated or included in the present analysis. Based on similarities with other nearby sites it seems likely that at least some of these unsurveyed sites date to the Early Virú Period. Quarrying activity in the area is impacting several of these sites and they should be documented in the near future.
the north margin of the middle and lower valley. These clusters are not defined statistically but they are significant based on their relation to important geographic features in the valley. Sites in the Huacapongo cluster are located primarily on the rocky quebrada floors and on terraced hillsides lining the Huacapongo and Virú valleys but some are also located on mounds on the valley floor. The Lower Virú South cluster primarily consists of mounds built on the valley floor but some sites were built either at the base of or on the summit of the steep-sided Compositan Hills located on the south margin of the valley. Two outlying sites, V-11 and V-104, are mounds and cemeteries located immediately below the valley neck. These may be a small isolated community in their own right or may be associated with unidentified Early Virú components at nearby sites. Closer to the coast, V-95 is more difficult to explain. This site is a small pyramid mound or community structure and dates solidly to both the Early and Middle Virú periods but is entirely isolated from any other Early Virú sites except for a nearby cemetery, V-94, and likely other undocumented cemeteries. It is possible that nearby sites dating to later periods are built over unidentified Early Virú occupations but based on available evidence I suggest that this isolated community structure is related to the cemeteries located along the north margin of the valley. Finally, the Puerto Morin cluster was likely a small, isolated fishing village during the Early Virú Period. The three sites are large middens, residential sites, and cemeteries and include V-66, the Puerto Morin type-site excavated by Strong and Evans (1952).

42 Cemeteries are not a part of the current study on statecraft in the Virú Valley and they are removed from all further analyses.

43 The Early Virú Period was called the Puerto Morin Period by the Virú Valley Project members.
Figure 5.5: All Early Virú sites.

There are various ways to visualize the distribution of Early Virú settlement throughout the valley; I use the fishnet mapping technique (figure 5.6). The fishnet technique draws a regular grid of squares, each being $1\text{km}^2$ in this case, that are then used to display summary information about the sites that fall within each square; this map displays the sum of the area of all Early Virú sites providing an estimate of the density of settlements throughout the valley. The mean geographic centre of the Huacapongo cluster, Lower Virú South cluster, and of all Early Virú sites is also shown on this map. This measurement is useful because it shows the centre of occupation in the valley weighted by site size and thus can be seen as the averaged centre of the valley’s population. The Early Virú mean centre is located approximately midway between the Huacapongo and Lower Virú South clusters. The total area of all sites in the Lower Virú South cluster, at 27.6 ha, is somewhat smaller than the Huacapongo cluster at 38 ha (table 5.1; see also figure 5.7 for the distribution of settlement site size). The total area of all Early Virú sites is 77.3 ha when all outlying sites and the small Puerto Morin cluster are included, and the average site was 1.19 ha in size. In other words, the Huacapongo cluster accounts for almost half of all occupied space during the Early Virú Period and the mean geographic
centre lies part way between Huacapongo and the lower valley as a result. Settlement was not overwhelmingly dominant in either the Huacapongo Valley or the lower Virú Valley, but settlement was more fragmented in the lower valley.

**Table 5.1:** Total area in hectares of each site type by period and by Early Virú cluster (funerary sites not included). Note that, taken together, the area and number of sites for each type are greater than the total area and number of sites. This is because any one site can have more than one site type attributed to it.

<table>
<thead>
<tr>
<th>Period</th>
<th>Total</th>
<th>Civic</th>
<th>Residential</th>
<th>Midden</th>
<th>Fortified</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ha</td>
<td>n</td>
<td>ha</td>
<td>n</td>
<td>ha</td>
</tr>
<tr>
<td>Early Virú (Huacapongo)</td>
<td>38.00</td>
<td>40</td>
<td>15.87</td>
<td>18</td>
<td>36.32</td>
</tr>
<tr>
<td>Early Virú (Lower Virú South)</td>
<td>27.57</td>
<td>19</td>
<td>12.34</td>
<td>4</td>
<td>20.82</td>
</tr>
<tr>
<td>Early Virú (total)</td>
<td>77.27</td>
<td>65</td>
<td>28.39</td>
<td>23</td>
<td>57.14</td>
</tr>
<tr>
<td>Middle Virú</td>
<td>155.18</td>
<td>125</td>
<td>60.64</td>
<td>43</td>
<td>118.63</td>
</tr>
</tbody>
</table>

**Table 5.2:** Demographic estimates for all Early and Middle Virú sites with identified residential occupations. Middens and sites with no identified residential occupation are not included in these estimates.

<table>
<thead>
<tr>
<th>Period</th>
<th>Total Residential Area (ha.)</th>
<th>Estimated Population (people/hectare)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>100/ha.</td>
</tr>
<tr>
<td>Early Virú (Huacapongo)</td>
<td>36.32</td>
<td>3632</td>
</tr>
<tr>
<td>Early Virú (Lower South)</td>
<td>20.82</td>
<td>2082</td>
</tr>
<tr>
<td>Early Virú (total)</td>
<td>57.14</td>
<td>5714</td>
</tr>
<tr>
<td>Middle Virú</td>
<td>118.63</td>
<td>11863</td>
</tr>
</tbody>
</table>
Figure 5.6: Number of Early Virú sites per km². Circle represents the mean geographic centre of all Early Virú sites and triangles represent the mean geographic centre of Huacapongo and Lower Virú South clusters. World Shaded Relief basemap used in this dissertation is copyright of ESRI, 2014.

Figure 5.7: Distribution of Early Virú sites. Graduated symbols represent site size in hectares.
Of the 65 Early Virú sites, the majority were either residential sites or middens (47 and 8, respectively). There were no middens in the Huacapongo cluster and 33 of its 40 sites were residential (a combined total of 36.32 ha). The Lower Virú South cluster had 14 residential sites (20.82 ha) and 3 middens (4.41 ha). Bolstered by the three large middens of the Puerto Morin cluster and the other outlying sites, described above, there was a total of 57.14 ha of residential space and 15.94 ha of midden space in the Early Virú Period. Fully one-third of all Early Virú sites, 23, had community space or a civic-ceremonial function and 7 were fortified; in some cases these community buildings and fortified sites were standalone structures but in most cases they were part of a residential or fortified site (refer to figure 5.7). The implications of civic and fortified space for Virú statecraft will be discussed in chapter 6. Based on the demographic estimates discussed above of 100-360 people per hectare, I estimate that the total population of the Early Virú Period was 5700-20,500 people\(^4\) (table 5.2).

Individual sites are the most visible part of the archaeological record but the space between sites—and the landscape as a whole—is also important for understanding the sociopolitical and economic development of the Virú Valley. Irrigation networks and field systems are particularly important in the coastal Peruvian desert but most of these networks are difficult to study from an archaeological perspective because they have been continually used and modified to the present. As a result, intensive investigation is required to determine if a canal or field was in use in during any specific period in the past, and this may be difficult or impossible to determine conclusively. There are, however, indirect ways to estimate the amount of land that was irrigated or under control by communities in the past. One of the simplest methods is to draw the smallest possible polygon that surrounds all sites of any given context, based on the assumption that the areas falling outside of this polygon were not occupied. The convex hull method is ideal for this strategy. A convex hull polygon is the minimum convex polygon that can be drawn around all points in a set; this polygon is ideal for this task because it is more precise than drawing other forms of geometry—such as a rectangle—to include all sites

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\(^4\) Only settlements with residential space are included in these estimates. See method discussion above.
belonging to the same period but still includes all associated sites within the polygon and accounts for the land surrounding these sites, which would not necessarily happen if a polygon were drawn simply to include all external sites in a cluster without the requirement for all sides to be convex. Nevertheless, in the case of the Virú Valley, maximum pre-modern limits of land use are known as described by Willey (1953) and as visible in satellite imagery. Much of the land included by the convex hull polygon in Virú falls beyond the known margins of the valley and could not have been used for agricultural purposes, and thus the convex hulls for Virú overestimate the amount of land used. To account for this, I calculated the clipped convex hull polygon, that being the area of each polygon that falls within the known Prehispanic margins of the valley. While this method provides a closer estimate to the actual amount of land that was occupied during each period, it under-estimates the area because some sites lie outside of the valley margins; the true amount of land used during each period would fall somewhere between these two estimates, but I prefer an estimate closer to the clipped or low-end of this range.

The convex hull maps for the Early Virú Period show that large areas of the valley were unoccupied during this period while the clusters were relatively well-contained (figure 5.8). Calculating the amount of land within each polygon, it is estimated that between 48 km$^2$ and 84 km$^2$ of land was in use during the period (table 5.3)$^{45}$. The Lower Virú South cluster is much more open and less densely-populated than the Huacapongo cluster and included a large amount of potentially arable land, with a total of 33-54 km$^2$ of occupied land compared to 15-28 km$^2$ of occupied land in the Huacapongo cluster. The Lower Virú South cluster contained scattered sites with ample space between them with a high potential for large agricultural yields. The Huacapongo cluster, on the other hand, was constrained by the steep, barren foothills that line the Huacapongo and middle Virú valleys, creating narrow valleys with less arable land. Sites were more densely-concentrated in this cluster and were primarily built on the hills and quebradas lining the valleys, presumably to free up the limited arable land. To compare the Huacapongo and Lower Virú South clusters, it is interesting that while the amount of residential space and

$^{45}$ No Convex-Hull polygon was drawn for the isolated sites along the north margin of the Virú Valley.
populations were higher in the Huacapongo cluster, the Lower Virú South cluster occupied a larger territory overall.

**Table 5.3:** Estimated area of occupation for each period and for each Early Virú cluster based on Convex-Hull polygons, and on the area of each polygon clipped to the area that lies within the limits of the valley margins.

<table>
<thead>
<tr>
<th>Period</th>
<th>Convex-Hull Area</th>
<th>Clipped Convex-Hull</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ha</td>
<td>km²</td>
</tr>
<tr>
<td>Early Virú (Huacapongo)</td>
<td>2828.54</td>
<td>28.29</td>
</tr>
<tr>
<td>Early Virú (Lower South)</td>
<td>5403.53</td>
<td>54.06</td>
</tr>
<tr>
<td>Early Virú (total)</td>
<td>8247.97</td>
<td>82.48</td>
</tr>
<tr>
<td>Middle Virú</td>
<td>27150.08</td>
<td>271.50</td>
</tr>
</tbody>
</table>

**Note:** Total area for Early Virú is calculated from separate convex-hull polygons for the Huacapongo, Lower South, and Puerto Morin clusters. There are three additional sites on the north margin of the lower valley that do not fall into any cluster and are not part of this estimate. The small Puerto Morin cluster falls entirely outside of the valley margins and is not included in the clipped Early Virú estimate.

**Figure 5.8:** Early Virú convex hull polygons.

This brings the discussion to one of the central points of this chapter: the use of settlement hierarchies to explore the nature of political authority in Virú. The histogram of site area for all Early Virú sites is shown in figure 5.9. This histogram shows that the
distribution of site size is continuous and one-tailed, with a large number of small sites tapering off to a small number of large sites, and with no true tiers. This pattern is to be expected if there are no sites with unfettered control during the Early Virú Period. When the period is subdivided into the two clusters defined above, however, the size distribution is more telling. The Lower Virú South histogram shows a continuous one-tailed distribution (figure 5.10). The largest two sites, Taitacantin (V-235) and V-64A—a large residential site and a midden-cemetery, respectively—show no evidence of a community function or of administrative control. Although these sites are centrally-located within the cluster they do not appear to have been settled for the purposes of controlling trade or movement throughout the cluster, contrary to what would be expected for centralized administrative control of the cluster. The next largest two sites, the Compositan Group (V-83, V-85, V-86, V87) and V-127, are large residential sites each with a small amount of civic space that is shared among between the residential sectors. Neither of these sites are central to the Lower Virú South polity, however, but rather are tucked into the quebradas and hill spurs of the Compositan Range and do not seem to have evidence of administrative control over other sites. Civic space at these sites was likely meant for the residents living at them and they did not have administrative authority throughout the cluster. Based on the available settlement pattern and hierarchy evidence I suggest that the Lower Virú South cluster was in effect a decentralized polity that consisted of autonomous communities that were friendly to each other and worked closely together, but were not ruled by any single political authority. The discussions in chapter 6 will support this claim.

The settlement size distribution in the Huacapongo cluster indicates two clear tiers (figure 5.11). The top tier has three sites, V-21, V-176/V-177, and V-212, and these are

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46 There is a small increase in the number of sites towards the large end of the distribution; this is not a true tier, however, as three of these four sites between 6.38 ha and 7.14 ha are either midden-cemeteries or large residential sites that do not have evidence of civic structures or administrative control, while the fourth, V-176/V-177, is a large town with a raised platform with wall niches, an indication of civic space. The largest Early Virú site is V-212, a terraced hillside site residential site with a fortified hilltop retreat on the opposite side of the Huacapongo Valley from V-176/V-177. The size of this site is somewhat overestimated, however, due to large unoccupied hill slopes between the ruins.
Figure 5.9: Settlement hierarchy histograms for all Early Virú sites. Site size in hectares is on the left, the natural logarithm of site size is on the right. Note the lack of clear tiers in hierarchy.

Figure 5.10: Settlement hierarchy histograms for Lower Virú South cluster of the Early Virú Period. Site size in hectares is on the left, the natural logarithm of site size is on the right. Note the lack of clear tiers in hierarchy.

Figure 5.11: Settlement hierarchy histograms for Huacapongo cluster of the Early Virú Period. Site size in hectares is on the left, the natural logarithm of site size is on the right. Note the two-tiered hierarchy.
considerably larger than all other sites in the cluster. V-21 is a large town but without evidence of civic or fortified space and V-212 is a large residential site built on a steep slope with a fortified hilltop retreat. Although both are large, neither of these sites have clear evidence of administrative control over their neighbours. V-176/V-177 is a large residential site built on a hillslope—possibly with defensive terraces, although these are not truly fortified—and contains a small plaza and platform with niched walls, one of very few clearly civic-ceremonial centres at any Early Virú site. This plaza is not conspicuous or easily accessed and it may have primarily served the local population. V-176/V-177 would be an ideal site for future study into the nature of political authority in the Early Virú Period.

The presence of a two-tiered settlement hierarchy in the Huacapongo cluster is tantalizing evidence of an emerging political authority, but as per Wright and Johnson (1975), a hierarchy alone is not sufficient evidence of political authority; there must also be evidence that major settlements served to control trade and movement through the region. V-176/V-177 is located midway along the Huacapongo Valley and as such could serve as a central location, albeit built on one margin of the cluster. It would not be possible to pass through the Huacapongo Valley without being seen by this site, but the same can be said for V-212 and several other sites in the valley. Travellers to and from the highlands could also bypass the Huacapongo Valley altogether and travel via the Upper Virú or Carabamba River. Interestingly, there are two moderate-to-large Early Virú civic-ceremonial mounds, Huacas San Juan No. 1 and 2 (V-77 and V-103), both located in the Virú Valley neck. These were part of the Huacapongo cluster and although they are not central to the cluster, their location in the valley neck requires travellers to pass close by them in order to go from lower Virú to either the Huacapongo or Carabamba branch of the valley system, or through the Queneto Quebrada, a known route to the Moche Valley to the north. It is unlikely that either of these sites had an administrative role but they were clearly important in a civic-ceremonial capacity and will be discussed further in

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47 Visible construction sequences suggest that the larger of these, V-77, was smaller than V-103 during its Early Virú phase.
chapter 6. The layout of the Huacapongo cluster makes strict control of movement difficult but if there is evidence that sites such as V-103 and V-176/V-177 worked closely together then it would be reasonable to suggest that the Huacapongo cluster was an integrated polity with a weakly-centralized political authority. The presence of a clear second settlement tier with a major site with civic space at V-176/V-177 does suggest that processes of statecraft and the development of centralized political authority were incipient during the Early Virú Period. This evidence provides a hypothesis to be tested by future research, but the discussion in chapter 6 will shed light on the nature of the Huacapongo polity.

The Early Virú Period was marked by two main clusters—Huacapongo and Lower Virú South—one small fishing community at Puerto Morin, and four isolated sites. Large parts of the valley were unoccupied during this period and valley populations were relatively low. There is no evidence that any single community or polity had hegemonic control over the entire Virú Valley system but each of the two major clusters do demonstrate some degree of political authority within them and both should be considered independent polities. The Lower Virú South polity did not have a strong centralized authority and no clearly dominant sites, but the close proximity of all sites within the polity suggest some sense of community identity and cohesion. There is a minor program of infrastructure-building in the Lower Virú South community, as will be explored in chapter 6. The Huacapongo polity shows better evidence of an emerging, though weak, centralized political authority with a possible capital at V-176/V-177. Again, the infrastructure program of this polity, discussed in chapter 6, supports this interpretation. These interpretations partly reflect West (1971) who considered the Huacapongo region to have been the location of a unified polity during the Early Virú Period, but who thought that the communities of lower Virú were all autonomous. I consider the lower Virú communities to have been semi-autonomous, but otherwise agree with West’s conclusions.
5.2.2 Middle Virú settlement patterns

Settlement is dispersed throughout the valley during the Middle Virú Period and there are no visible clusters (figure 5.12).\(^{48}\) New areas of the valley were settled for the first time during the Middle Virú Period and settlement spread along the Virú. Large population centres were located throughout the lower valley on the valley floor and these settlements were always built of adobe blocks and/or tapia; approximately two-thirds of the sites fit this description. Settlement was also extensive along the southern margin of the lower valley, in the narrow valley neck, and throughout the Huacapongo Valley. Sites in these areas are typically built on and around rocky, barren hillsides and hill spurs or on rock-strewn quebrada floors, and typically have rock-walled foundations. As with the Early Virú Period, the fishnet technique was used to show the distribution of Middle Virú settlement (figure 5.13). Sites are distributed throughout the Huacapongo and Virú valleys and loosely follow the contours of the Virú River in the lower valley. Although there are no clusters during this period, there are two major concentrations of sites: one at the Gallinazo Group on the western edge of the valley and another at the confluence of the Huacapongo and Virú rivers on the northeastern edge. Settlements are distributed evenly between these two concentrations. The mean geographic centre of Middle Virú settlement is located approximately in the centre of the system, indicating that neither concentration is overly dominant in terms of absolute size of settled space.

The average Middle Virú site was 1.24 ha and all sites comprised a total of 155.2 ha (see figure 5.14 for the distribution of site size by graduated symbol). In total there were 125 sites; 83 sites had residential occupations for a total of 118.63 ha of residential space (table 5.1). Eighteen sites (29.26 ha) were middens, 43 (60.64 ha) had evidence of a civic function, and 12 (37.60 ha) were fortified. Using the demographic indexes described

\(^{48}\) One Middle Virú site is clearly an outlier and has been removed from this analysis. V-117 is a midden site located on the beach at the extreme southern edge of the Virú Valley, far from any other contemporary sites. This site was likely a small, independent fishing community. A similar site, V-281, was occupied on the beach at the extreme north margin of the valley during the Middle Virú Period. This may also have been a small, independent fishing community but I include it as part of the larger Middle Virú polity because it is less isolated than V-117.
Figure 5.12: All Middle Virú sites.

Figure 5.13: Number of Middle Virú sites per km². Circle represents the mean geographic centre of all Middle Virú sites.
above, the Middle Virú population can be estimated at between 11,800-42,700 inhabitants (table 5.2). Millaire and Eastaugh (2011: 296) approximated that the Gallinazo Group alone, the largest Middle Virú site and spread over 40 ha, had a population of between 10,000-14,400 inhabitants, and it is therefore reasonable to suggest that the true Middle Virú population lies closer to the higher-end of my estimate. Using the convex hull polygon method (described above for the Early Virú Period), I estimate that between 130-271 km² of land was in use in the valley during the Middle Virú Period (figure 5.15; table 5.3). As with the Early Virú land estimates I suggest that the true area of land used lies closer to the low-end of this estimated range because the high end, based on the total convex hull polygon, includes large tracts of desert land that could not have been irrigated. The Middle Virú convex hull polygon demonstrates that nearly the entire valley, as defined by its modern limits, was in use during this period.

Figure 5.14: Distribution of Middle Virú sites. Graduated symbols represent site size in hectares.
A three-tiered settlement hierarchy developed in the Middle Virú Period (figure 5.16). The Gallinazo Group is by far the largest settlement during this period. The Gallinazo Group has been excavated and studied extensively by multiple projects and from these studies it is clear that the site was a large urban centre and the capital city of the Middle Virú polity (Bennett 1939, 1950; Fogel 1993; Millaire 2010a; Millaire and Eastaugh 2011, 2014). Its place as the largest site in a three-tiered settlement hierarchy also strongly suggests the city’s role as capital. Geographically, the city is not central but rather is located near the coast on the west end of the Middle Virú polity. The second size tier in the settlement hierarchy consisted of 10 sites. Several of these (V-21, V-64A, V-162, V-235, and V-283) were entirely residential or were midden-cemeteries and another

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49 Millaire and Eastaugh (2011: 295) estimated the entire Gallinazo Group to measure ~40 ha spread over dozens of discrete mounds. For the purposes of my analysis I mapped each mound as an independent site, following Willey (1953), but merged the core mounds of the Gallinazo Group. The core area of the site, used for this analysis, is 17.54 ha. While this represents only some 40% of the site’s entire size it is still far larger than any other site in the valley.
two sites (V-194 and V-212) were primarily residential but also contained fortified space; it is unlikely that any of these sites had administrative control over other sites. There are three major civic-ceremonial centres in the second tier including the two largest castillos (described in chapter 6), Tomaval and Sarraque (V-51 and V-75), and these likely did have some level of administrative control. The third site, Huaca de la Vela (V-279), is essentially an outlying sector of the Gallinazo Group but may have served as an entry point to the city from the east and northeast. The settlement hierarchy model does not account for all Middle Virú administrative settlements, however. Millaire (2004; 2009b; 2010b) has conclusively shown that Huaca Santa Clara (V-67), one of six castillos located in the Virú Valley neck, operated as an administrative town and outpost of the elite leadership based at the Gallinazo Group. While the site is large, it falls into the lowest tier of the settlement hierarchy. This demonstrates the limitations of relying on settlement hierarchies alone to document sociopolitical organization.

![Figure 5.16](image)

**Figure 5.16:** Settlement hierarchy histograms for all Middle Virú sites. Site size in hectares is on the left, the natural logarithm of site size is on the right. Note the development of a clear three-tiered settlement hierarchy. The Gallinazo Group is the only site in the largest tier.

The Middle Virú Period witnessed the incorporation of most of the valley system into a single large polity. This contrasts somewhat with Willey’s (1953: 105, 391-392) interpretation that, while there was some population growth in Middle Virú, the period represented a movement of people due to shifting irrigation practices rather than a sharp increase in population. Willey concluded that the Huacapongo and Upper Virú portions
of the valley were entirely abandoned during the end of the Early Virú Period and remained so through the beginning of the Middle Virú Period, although occupation returned to these regions later in this period. These views are not supported at present. Nevertheless, Willey felt that the largest Prehispanic population in the Virú Valley was during this period and the current analysis does not contradict this conclusion, although the valley population for later periods is not tested here. There is clear evidence that political authority was centralized during this period with the development of a major urban centre at the Gallinazo Group, several smaller administrative centres, and a large number of villages and hamlets that farmed much of the valley. The nature of Middle Virú political authority will be explored more fully in chapter 6.

5.2.3 Settlement pattern changes between Early and Middle Virú

These updated settlement patterns for the Early and Middle Virú periods stand in contrast to those that Willey (1953) described. Willey (1953: 105, 391-392) considered there to have been a shift during the later part of the Early Virú Period where the Huacapongo, Upper Virú, and Queneto regions—nearly every site in what I have called the Huacapongo polity—were abandoned as populations moved towards the coast and especially to the Gallinazo Group. While settlement began to trickle back into these areas later in the Middle Virú Period, they were still largely abandoned. Willey’s settlement patterns are no longer supported for these periods. To be sure, there are major changes between the Early and Middle Virú Periods but they are ones of long-term growth and show considerable continuity.

Some Early Virú sites were abandoned in the Middle Virú Period but many continued to be occupied and many more new sites were settled during several centuries of growth and development. The average size of settlement did not change between the two periods, but

50 Willey (1953) subdivided the Early Virú Period into two subperiods or phases (Early and Late) and the Middle Virú Period into three subperiods (Early, Middle, and Late). These subperiods are no longer accepted for Virú (see Chapter 3).
the number of sites increased sharply and the total area of occupied space doubled.\textsuperscript{51} Sixty-five Early Virú sites occupied a total of 77.27 ha whereas 124 sites and a total of 155.18 ha of space were occupied in the Middle Virú Period. The total population of the valley also doubled in this period, from an estimated 5700-20,500 people in the Early Virú Period to 11,800-42,700 people in the Middle Virú Period. The mean geographic centre of the valley was located in roughly the same spot during both periods, however, being located in the middle Virú Valley for both periods, though shifted somewhat closer to the coast in the Middle Virú Period. This is because the change in settlement patterns between the two periods were not major upheavals but rather populations filled in unoccupied areas of the middle and lower valley while remaining relatively stable in the Huacapongo Valley. That said, this population shift signalled a major change in the way that land was used. The total area of land used during the Early Virú Period is estimated at 48-84 km\textsuperscript{2} and increased dramatically to 130-271 km\textsuperscript{2} in Middle Virú. This increase of 170-229\% far outpaces the 100\% increase in total area of all sites and 108\% increase in estimated population size between the two periods. Not only were more people living in Virú during the latter period, they were also occupying and using more of the valley’s land.

The proliferation of settlement into unoccupied parts of the valley offers tantalizing evidence that statecraft was at play in the Virú Valley as political authority was centralized into a single polity. Early Virú settlement was somewhat fragmented, with two large clusters that I refer to as polities, and at least three outlying communities. Evidence from settlement hierarchies suggests that the Lower Virú South polity was not centralized but the close proximity of these sites to each other does suggest a level of cooperation between these apparently independent communities. The Huacapongo polity was weakly centralized with a two-tiered settlement hierarchy and it was more densely-occupied than the Lower Virú South polity, although it had considerably less land available for agricultural purposes. The Middle Virú polity incorporated both of these

\textsuperscript{51} Early Virú sites averaged 1.19 ha in size and Middle Virú sites averaged 1.24 ha. This difference is not statistically significant (Kolmogorov-Smirnov [KS] test, $D=0.0892$, $p=0.87$).
polities into a single hierarchically-organized one that was distributed evenly throughout the valley. In many ways, the Middle Virú Period grew out of both Early Virú polities and incorporated elements of both in building a centralized political authority with a capital located at the Gallinazo Group and a strong administrative presence in the Virú Valley neck at the site of Huaca Santa Clara, among others.

5.3 Conclusions

This chapter has explored Early and Middle Virú settlement patterns in the Virú Valley in order to document the development of centralized political authority in the Middle Virú Period. Using GIS analyses, site maps drawn from satellite images, and an updated cultural sequence for Virú, this chapter also stands as an innovative example of the ways that old sources of data on coastal Peru can be updated according to current knowledge of the region’s culture history, and presents settlement patterns that will be of use to future studies.

Settlement pattern evidence, while tantalizing, is not sufficient evidence that processes of statecraft were at play in Virú. These patterns provide a top-down view of what changes took place between the Early and Middle Virú Periods but does not address how these changes were brought about. In the next chapter I explore the development of political authority in the Middle Virú Period by addressing three key pieces of infrastructure that the Middle Virú polity built in order to centralize their authority: (1) the expansion of irrigation networks and arable land; (2) a program to build accessible and conspicuous monuments and increase access to civic-ceremonial space; and (3) a drastic change in the nature of warfare brought about by the construction of a formal network of fortifications and an increased sense of public safety. The Middle Virú polity surely engaged in other aspects of statecraft beyond these, but these key infrastructure projects brought considerable power to the polity.
Chapter 6

6 The Infrastructure of Statecraft

There is evidence that a single polity established considerable political power and authority in Virú during the Middle Virú Period, developing out of two autonomous communities in the Early Virú Period. This evidence comes from settlement patterns, discussed in chapter 5, that show the coalescence of a single, centralized polity in the Middle Virú Period, a development that is suggestive of statecraft. This evidence, while compelling, is not sufficient to demonstrate the nature or degree of political authority in the Middle Virú Period or to demonstrate how or even if this political authority changed from the Early Virú Period. There is good evidence, however, that the Middle Virú polity embarked on an ambitious program of infrastructure-building, a program that demonstrates that the Middle Virú polity wielded a high degree of political authority. Conversely, this program highlights the drastic changes that took place in the Virú Valley between the Early and Middle Virú Periods. The Middle Virú polity sponsored three key infrastructure projects: (1) the expansion of irrigation networks and arable land; (2) an increase in the quantity and accessibility of civic space; and (3) drastic changes in the nature of defense and public safety between the Early and Middle Virú periods. These projects materialized power in the Middle Virú polity and allowed it to centralize the valley into a single political system.

6.1 Irrigation networks

Irrigation is of central importance to coastal Andean societies. In their unaltered state, coastal river valleys feed small basins and rainfall is essentially non-existent, making arable land very limited. While water from sources such as aquifers or sunken wells known as *mahames* is available in Virú, these sources are sporadic and the extent of arable land that they can support is relatively small (Parsons 1968; Parsons and Psuty 1975; West 1971, 1979, 1981). In this environment, any group that could build extensive
irrigation networks could reclaim large tracts of desert land and increase crop yields and food security considerably. Irrigation networks do not need to be large-scale public works that require a centralized authority to construct. However, a centralized authority would be able to build and maintain larger and more complex irrigation networks, and therefore reclaim and farm more land.

Figure 6.1: All sites discussed in chapter 6. Inset shows sites in the densely-occupied valley neck.

GIS analyses can be useful for describing and predicting the location of Prehispanic irrigation networks in Virú. Unfortunately, these analyses suffer from inadequate elevation data for the region as well as from the considerable extent of modern irrigation, which was likely built over ancient canals in many places, obliterating them in the process. T. Pozorski and S. Pozorski (2006) briefly discuss some of the complications related to studying Prehispanic irrigation networks on the north coast with reference to their work in the Moche and Chicama Valleys north of Virú, including problems relocating canals, dating their initial construction, and determining how long the canals were in use. While there are solutions to determining how canals were used—namely two forms of soil analysis, the lamination of silt and the reddening of soil through oxidization, that can indicate the intensity or duration of use of a canal or can show that some canals
rarely or never carried water—dating their age and relocating canals and establishing irrigation networks remain problematic. Pozorski and Pozorski (2006) point out that because irrigation canals become smaller and smaller as a stream moves from the main trunk canal to smaller distribution canals and finally to individual fields, the exact extent of irrigation networks is difficult to map because main trunk canals are more likely to be preserved than distribution canals. Related to this, Prehispanic irrigation networks and fields can only be reliably described when they extend beyond the modern limits of irrigation, as modern irrigation networks and field systems reuse or rebuild ancient canals and obscure the evidence of ancient networks. Pozorski and Pozorski (2006), whose focus is on Chimú irrigation networks, note that few preserved irrigation canals or ancient fields have been dated to before AD 1 in the Moche Valley, although indirect evidence indicates that irrigation agriculture must have been practiced much earlier than this time.

Willey (1953: 361, fig. 4) described Virú irrigation networks in general and mapped known major canals and the probable maximum extents of Prehispanic agriculture, but he noted the difficulty in determining the age of irrigation canals. Willey primarily dated irrigation canals by their association with nearby sites; many of these dates will have changed based on the updated settlement patterns described in chapter 5. More recently, Parsons (1968) located a number of mahames or sunken garden plots in Virú and West (1971, 1979, 1981) described modern irrigation networks and the ecology and economy of the valley and made several inferences about Prehispanic agricultural practices in the valley. Most notably, West identified several methods that people who do not have access to irrigation canals—primarily because they live in marginal lands far from the canals—use to obtain water for farming, including accessing groundwater and creating mahames. Willey (1953: 369) dated the initial use of mahames in Virú to the Late Epoch, but Parsons (1968) questioned this late date and West (1979) argued that watertable farming was used in Virú as early as the Guanape Period. These features are only found close to the coast but the Huacapongo Valley also has fairly abundant water sources. Many deep wells are dug in Huacapongo today and no land in the valley is farther than 1500 m from the river, but Prehispanic irrigation was practiced in the valley. While it is important to keep in mind that irrigation is not the only source of water in Virú it remains the most reliable and secure source of water.
Mapping and dating irrigation canals is beyond the scope of this study but some inferences can be made regarding irrigation networks. Some out-of-use canals are visible in places throughout the valley, such as along the west side of the valley neck in the vicinity of the Castillo de Tomaval (V-51), along the north margin of the Huacapongo Valley leading up to and around the Huacas El Gallo/La Gallina (V-148 and V-149; see Zoubek 1997) and along the south margin of Virú in the sandy quebradas above Huancaco (V-88/V-89); presumably these are Prehispanic but they have not been dated to any specific time or period at present. West (1981: fig. 4) shows a number of modern canals running throughout the Virú and Huacapongo Valleys but it is not clear how closely these match Prehispanic irrigation networks. Large areas of the valley must have been irrigated and yet no Prehispanic canals have been identified in these areas. At present it is not possible to determine the nature of Prehispanic irrigation networks in Virú with any degree of precision.

Given the nature of preservation in irrigation networks I find it likely that Early and Middle Virú irrigation networks and field systems have largely been altered or obscured by later Prehispanic and modern agriculture. General patterns of irrigation can be discerned by examining the overall settlement patterns, however, and can be aided by digital elevation models and hydrological models for Virú. There are four main watersheds in Virú; (1) Huacapongo; (2) North Virú; (3) Central Virú; and (4) South Virú (figure 6.2). Only the Huacapongo and Central Virú watersheds regularly carry water because of the hyper-arid desert environment where rain only falls during El Niño events, but all four watersheds are useful for understanding irrigation patterns since any irrigation network has the benefit of being done prior to the construction of the Chavimochic irrigation project, running from the Santa Valley south of Virú and north to the Moche Valley. This modern engineering feat permanently altered the irrigation network in Virú. The irrigation networks West documented can be presumed to be a better approximation for pre-modern irrigation networks in Virú than the present-day network is.

Watersheds were constructed in ArcGIS using a process described by the Trent University Library, Maps Data and Government Information Centre (2012). Drains are also shown on this figure; these are the point of central water accumulation in a watershed, or the main stream or river that collects all water from the watershed and drains into the next watershed or to the ocean. The drain features of the Central Virú and Huacapongo watersheds correspond closely to the actual position of the Virú and Huacapongo Rivers. The North and South Virú drains correspond to major drainage canals of the modern irrigation network.
canal could not cross from one watershed into another without significant engineering work. Irrigation networks in the Huacapongo River valley and the Virú Valley neck would be easier to build because these areas are close to the Huacapongo and Virú rivers and are bounded by steep hills, requiring canals to be built at the base of the hills and to cut across the quebradas that separate each hill spur. Irrigation networks in the lower Virú Valley are more difficult to discern, however, because the lower valley expands far from the Virú River, the river lacks a significant delta or distributaries, and the valley is bounded primarily by gradual, sandy slopes rather than steep hills. In order to bring water to the maximum amount of land, irrigation canals would have to run along the uphill side of each watershed at an elevation that could be fed by an intake canal at a point upriver, or would have to run along the cusp between two watersheds. It is not clear whether there were one or multiple major canals, but Willey (1953) documents evidence of major canals preserved in places along the north and south margins of the valley, and he considered these to be Prehispanic although they could not be dated to specific period.

Given the layout of the watersheds, I propose that separate major canals would be located along either margin of the lower valley and at the uphill part of each major watershed. The Huacapongo and Central Virú watersheds would be relatively easy to irrigate with small canals running from their respective rivers, but the North and South Virú watersheds required a more complex irrigation network and the administrative capability to build and maintain it. Clues to the timing of the construction of irrigation networks emerge when Early and Middle Virú sites, and the watersheds in which they are located, are overlaid on a satellite image of the valley (figures 6.3 and 6.4). The Huacapongo Valley and the middle Virú Valley are constrained by steep hills and rocky quebradas such that the entirety of the valley floor is close to these rivers, and groundwater is especially abundant in the Huacapongo Valley. There is no major change in the settlement patterns in these areas of the valley between the two periods, although it is worth noting that sites tend to be located on hill spurs and above irrigation canals on quebrada floors, freeing up the limited arable land for agriculture rather than settlement; this is especially true for the Early Virú Period.
Figure 6.2: Watersheds of the Virú Valley system with drainages shown in blue. Drainages through Virú Central and Huacapongo watersheds correspond closely to the location of the rivers through these valleys. Other watersheds are hypothetical and do not regularly carry water since rainfall is very scarce in the region. Early and Middle Virú sites are shown for reference.

There are major changes in the settlement patterns of the lower Virú Valley, however. To return to the Convex-Hull polygons drawn for the valley discussed in chapter 5, the total area of land in use increased by over 170% in the Middle Virú Period over the Early Virú Period, and this increase was primarily seen in the lower valley. This evidence alone suggests that the irrigation network expanded tremendously in the Middle Virú Period by reclaiming desert land through irrigation networks. Early Virú settlement is located almost entirely south of the river. The southern valley remains occupied in the Middle Virú Period but the area north of the river is settled for the first time during this period, with a particularly large concentration of settlement at the Gallinazo Group. It is likely that the southern part of the valley was easier to irrigate than the northern part and was therefore irrigated and settled first. The watershed data appears to support this, with the large South Virú watershed running alongside the Central Virú watershed and close to the

\[54\] Given the layout of Early Virú sites I consider it possible that the Virú River flowed farther to the south of its present-day location during this period, flowing between the sites rather than north of them, and that it shifted to its present-day location—more or less—during the Middle Virú Period. This hypothesis can be tested by future studies.
river. In contrast to this, the main concentration of settlement in the northern part—the Gallinazo Group—sits largely outside of any major watershed and far from other sites. It must have taken a major irrigation canal with complicated engineering to bring water to the Gallinazo Group. West’s (1981: fig. 4) work seems to confirm this inference because the area south of the river in lower Virú was fed by several small canals whereas the middle valley and entire north side of the valley were fed by longer and presumably more-complex canals.

![Figure 6.3: Early Virú site distribution with respect to watersheds.](image)

Interestingly, the rapid growth of land in the Middle Virú Period corresponds closely to the construction of six major fortified civic-ceremonial centres, known as castillos. These important structures will be discussed in more detail below, but it is worth noting here that four of these castillos—Tomaval, San Jose, Sarraque, and Napo—are located on the valley’s margins at its neck, which is the point where irrigation canals would have to be drawn in order to irrigate the widest possible area downstream (figure 6.5). Given their strategic location, it is likely that one function of the castillos was to protect the intake canals of the irrigation networks that brought crucial water to the populous lower valley.
All of these structures were built in the Middle Virú Period, further suggesting that the lower Virú irrigation network was widely expanded during this period.

Figure 6.4: Middle Virú site distribution with respect to watersheds.

Present data available on Virú irrigation networks is not entirely satisfactory and it is not possible to hypothesize from watershed or elevation data where actual canals might have been located. Indirect evidence shows that the irrigation network must have been expanded greatly in the Middle Virú Period when the north part of the valley was intensively occupied for the first time. Presumably the south half of the valley was easier to irrigate than the north and was chosen for settlement by autonomous communities that worked together to build small-scale irrigation networks and bring water far south of the river, but never north. One aspect of Middle Virú statecraft was the construction and maintenance of a major irrigation network in the north half of the lower valley, which tremendously increased the amount of arable land, allowing the agents responsible for this monumental construction to increase their crop yields, and allowing for the construction of a major settlement in an area that was previously desert.
Figure 6.5: The Virú Valley neck showing the six Middle Virú castillos. Note that each Castillo is intervisible with all other castillos (except in the case of Huaca Santa Clara at the south end and Castillo San Juan at the northwest), making it impossible to move through this part of the valley unseen.

6.2 Civic Works

The construction of civic works and non-residential public structures such as temples, plazas, and palaces is recognized as one of the key processes of statecraft around the world (Flannery 1998, Moore 1996; see discussion in chapter 2). Civic space and civic-ceremonial structures are common in Virú during both the Early and Middle Virú Periods, but the nature of civic space changed between the periods. While the absolute number of settlements with civic-ceremonial structures increased considerably in the Middle Virú Period, the total number of settlements also increased and the proportion of sites with civic-ceremonial or community space remained constant; of 65 Early Virú sites, 23 (35%) contained civic-ceremonial space and 43 of the 125 Middle Virú sites (34%) had such space. However sites with civic-ceremonial structures were larger, more public, and more accessible in Middle Virú. Specifically, there are three key developments from Early to Middle Virú: (1) valley inhabitants had less distance to travel to visit their local civic-ceremonial centre during the Middle Virú Period; (2) the nature
of civic-ceremonial structures changed to become more public and accessible; and (3) existing civic-ceremonial structures were modified and new structures were built to be highly conspicuous symbols of political authority. These changes indicate that processes of statecraft were underway in Virú.

One useful way to visualize the distribution of civic space in each period is through the use of Thiessen Polygons. Thiessen Polygons divide a given region into a number of smaller sub-regions that each contain a single point (in this case, a site with a civic-ceremonial structure) as well as all of the space that is closer to that point than to any other point. In this way, Thiessen Polygons can be used to show a sort of catchment area for each site with a civic-ceremonial structure. Conolly and Lake (2006: 211) caution that the archaeological reality is more complicated than this method implies and that this mapping technique does not account for the relative importance of sites, the ease of travelling between any two points, etc, but for my purposes these serve as a useful way to show how settlements with civic-ceremonial structures were distributed throughout the valley.

Thiessen Polygons are smaller in the Middle Virú Period than in the Early Virú Period, indicating that civic-ceremonial space was more accessible in the Middle Virú Period (figures 6.6 and 6.7). This shift reflects the overall growth in the overall number of settlements with civic space in the Middle Virú Period. In the lower Virú Valley, Middle Virú civic space is distributed more centrally, roughly following the course of the river, whereas Early Virú civic space was concentrated south of the river in keeping with the location of settlements in the Lower Virú South cluster of sites. The Middle Virú polity that incorporated and expanded into the lower valley (see chapter 5) built a number of centralized and accessible civic-ceremonial structures to serve the new population. Residential settlements with civic-ceremonial space or standalone civic-ceremonial
Figure 6.6: Thiessen polygons of Early Virú civic-ceremonial sites.

Figure 6.7: Thiessen polygons of Middle Virú civic-ceremonial sites.
centres spread throughout the lower valley, but so too did overall populations. This spread marks a sharp change from the Early Virú Period where there were only five sites with civic space in the lower valley—four in the Lower Virú South cluster and one standalone civic-ceremonial structure on the north margin—representing one-fifth of all sites in the lower valley. Early Virú civic space was considerably more concentrated in the Huacapongo cluster where nearly half—18 of the 40 sites—had some form of civic-ceremonial structure. The relative abundance of civic space in this region continued into the Middle Virú Period. Although the Huacapongo Valley witnessed a modest decline in the total number of sites, there was actually an increase in the number of sites with civic space, primarily in the form of small standalone civic-ceremonial structures. In addition to this there was a major influx of civic-ceremonial space in the middle Virú Valley and the valley neck. Here six large castillos—both fortifications and civic-ceremonial structures, and, at least in the case of Huaca Santa Clara (V-67), a large town and administrative centre—were built during the Middle Virú Period, and the site of Huaca San Juan No. 1 (V-77) was renovated from a small Early Virú mound to a massive rock-walled structure with four platforms. Thiessen Polygons for the Huacapongo and middle Virú valleys are smaller in the Middle Virú Period reflecting the greater abundance of sites with identified civic space, but because civic space was also common in this area during the Early Virú Period this change is less dramatic than in the lower valley. Valley inhabitants would have had less distance to cover in order to visit their closest huaca or civic-ceremonial centre in the Middle Virú Period and such structures were built to serve new lands as large parts of the valley system were occupied for the first time.

Civic space became more accessible in the Middle Virú Period compared to Early Virú, as is evident in two main ways. For one, sites with civic-ceremonial structures were easier to get to during the Middle Virú Period. Early Virú sites were more commonly located on hills and rocky quebradas in areas that were difficult to access. In order to demonstrate this quantitatively, the location of each site with defined civic space was compared against a slope raster derived from a 15 m digital elevation model (DEM) of
A 50 m buffer was generated around each site in order to identify the topography of the site’s general vicinity; sites with a higher average slope value within the 50 m buffer are located in steeper terrain while sites with a lower average slope value are located in flatter terrain. Larger buffers of 100 m and 200 m were also tested but these run the problem of overlapping neighbouring sites and skewing the analysis, and a 50 m buffer is sufficient to capture the general terrain in the immediate vicinity of the site. The mean slope for Early Virú civic-ceremonial sites is 78.03% (n=23) and 71.25% (n=43) for the Middle Virú Period. Although this difference is small it is statistically significant (KS-test, $D=0.364$, $p=0.028$) and indicates that Middle Virú sites with civic space were located in flatter terrain on average and thus were more accessible than Early Virú sites. The relatively small difference is attributable to the continual occupation of many sites between the two periods and to the construction of six large castillos in the Middle Virú Period, fortified civic-ceremonial centres located on very steep terrain. Nevertheless, several new civic-ceremonial centres were built in accessible locations on the valley floor during the Middle Virú Period and this change is reflected in the lower average slope of Middle Virú sites with civic space.

Secondly, there was a change in the way that civic space was organized between the two periods. The majority of Early Virú civic space was located within and/or enclosed by residential or fortified sites, and this evidence suggests that the civic space at these sites was intended primarily for the people living at those sites rather than pilgrims or outside visitors. Middle Virú civic space, on the other hand, consists primarily of large mounds and open plazas at major settlements or as standalone civic-ceremonial centres that were clearly meant to be visited by people who did not live at that site. All four sites with civic space.

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55 “Slope” is a spatial analysis tool available in GIS platforms that calculates the rate of change between each raster cell and its eight neighbours to determine the rate of maximum change between the cells, and thereby identify the steepest downhill slope. This calculation is repeated for all cells in the raster. Lower values indicate flatter terrain and higher values indicate steeper terrain (Burrough and McDonnell 1998: 190). For this analysis slope was calculated by percentage rather than degree; a flat slope is 0%, 45° slope is 100%, and the slope percentage approaches infinity as slope gets closer to 90°.

56 The average slope of Middle Virú civic-ceremonial sites is 69.58% when castillos are excluded from calculation.
space in the Lower Virú South cluster of the Early Virú Period were residential (and in some cases fortified) sites with small pyramid mounds. One standalone Early Virú civic-ceremonial structure, V-95, was located on the north margin of the Virú Valley, outside of any of the Early Virú site clusters; presumably this site was associated with nearby contemporary cemeteries. Seven of the 18 sites with identified civic space in the Huacapongo Cluster of the Early Virú Period were standalone civic-ceremonial structures, while the remaining 11 sites were residential and/or fortified sites with small pyramid mounds or plazas. This distribution contrasts with the Middle Virú Period, where 21 sites, nearly half of the 43 sites with civic space, were standalone civic-ceremonial or community structures whose sole purpose was to be visited by non-residents. Many of the remaining sites were large, conspicuous civic-ceremonial centres, also clearly functioning as places where residents and non-residents could come together for public ceremonies. Some specific examples will illustrate these trends.

All four sites with civic space in the Lower Virú South cluster of the Early Virú Period are different but three of them show similarities in layout. The Compositan Group (V-83, V-85, V-86, V-87) is a group of scattered house structures spread across three hill spurs and quebradas on the southern margin of the lower Virú Valley. Two small platforms were built on one hill spur with steep sides, restricting access somewhat. Willey (1953: 49) was not sure if these were defensive or ceremonial in nature, but they likely served both functions. House structures surround the hill spur and anyone visiting the mounds would have had to first travel through outer structures of the site and would then have to climb the hill by passing immediately by houses. Overall, this gives the impression that these platforms were meant to be used by community members rather than visited by pilgrims from other sites or used as regional civic-ceremonial centres. An even more striking example of this pattern is at the Bitín Fortress (V-80). Cerro Bitín is an isolated hill rising 200-250 m above the valley floor with steep, boulder-strewn sides and absolutely no access to water on its summit. The Bitín Fortress site was built on the crest of this hill and was fortified with a large, well-preserved perimeter wall (figure 6.8). The

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57 The site of V-127 shows a similar pattern but is not discussed here.
area within the perimeter wall dates entirely to the Early Virú Period, although other parts of the hillcrest were used as a residential site in the Late Epoch. The Bitín Fortress has four distinct clusters of rooms, three of which include one or two small pyramid mounds made of stone (figure 6.9; see also Willey 1953: 92-95, fig. 18). Domestic refuse is light throughout the site, suggesting that this was used as a defensive location in times of duress and was not regularly occupied. The site is very difficult to access and the civic-ceremonial structures are not conspicuous from the valley floor; civic space at this site is essentially hidden. Each group of structures is distinct from the others but all are surrounded by a single perimeter wall, strongly suggesting that the site was used as a retreat for three or four distinct communities, each with their own civic-ceremonial mound, who would come together for mutual protection but who still resided and conducted ceremonies with their own communities while at the site. Civic space at the Bitín Fortress was not meant to be conspicuous space used by the wider Virú Valley community but instead was closed off and private. Finally, the site of V-290 shows a different pattern in the Lower Virú South cluster. This was a relatively small civic-ceremonial centre with both a residential sector and a pyramid mound; Willey (1953: 90) considered this site to be a prototype of the civic-ceremonial centre that would become common during the Middle Virú Period, although it is not clear whether the pyramid mound at this site was constructed during the Early Virú component of the site. Its location on the valley floor was open and accessible unlike the other sites with civic space in the cluster but it is somewhat isolated by being located on the western edge of the cluster far from other sites. Overall, civic space in the Lower Virú South cluster of the Early Virú Period gives the impression of small structures used by the communities that lived at or in the immediate vicinity of those sites, not large centres administered by a central authority.

The Huacapongo cluster of the Early Virú Period shows a mix of restricted and publically-accessible civic space. On the one hand are sites like V-31, V-176/V-177, V-203, and V-223 which are built on steep hillsides or rocky quebrada floors and which are primarily residential but contain small community plazas, the size and placement of which indicate that they were most likely used by inhabitants of the site rather than by the
Figure 6.8: The Bitín Fortress. Note the clear perimeter wall and clusters of structures within the wall. Inset: Cerro Bitín.

Figure 6.9: Double civic-ceremonial mounds within the Bitín Fortress.

larger community (figure 6.10). In a similar vein to these small plazas is the site of Corral Hill (V-205), which consists of a series of levelled terraces without walls running in a sinuous manner from southeast to northwest along the crest of a steep hill spur. These terraces are clearly defensive and served as a retreat for inhabitants of the large residential sites that surround the site. A small stone pyramid mound was built at the far
The northwestern extremity of the line of terraces in a location that was entirely hidden from the Huacapongo Valley floor, although it was visible from sites in the adjacent quebradas (figure 6.11). This mound was clearly located in an inconspicuous location and was built to serve as a local civic-ceremonial centre for the inhabitants of nearby sites who knew of its presence.

Figure 6.10: Small plaza with raised platform and wall niches at the site of V-176/V-177.

Figure 6.11: Small secluded civic-ceremonial mound at V-205 (Corral Hill).
On the other hand there are several mid-sized civic-ceremonial centres in the Huacapongo cluster. These centres are small when compared to their Middle Virú counterparts (and most of these centres continued to be used in the Middle Virú Period), but they nevertheless demonstrate a level of centralized authority over civic space that is rare in the Early Virú Period. By far the largest of these centres are the twin mounds, Huacas San Juan No. 1 and 2 (V-77 and V-103, respectively).\(^{58}\) The two mounds are located on the floor of the Virú Valley neck in a location that, while on the outskirts of the Huacapongo cluster, is very central to the valley system as a whole and would have been bypassed by anyone travelling from the coast to the highlands through the Upper Virú and Huacapongo valleys. The larger mound, San Juan No. 1 (V-77) is very large with multiple platforms; based on exposed architecture Willey (1953: 136) suggested that the smallest, easternmost platform was constructed first, during the Early Virú Period, and the larger platforms west of it were constructed during the Middle Virú occupation of the site. After San Juan No. 1, San Juan No. 2 is the largest civic-ceremonial centre with an Early Virú component (figure 6.12). This mound has a ramp leading from the summit of the mound towards the Virú River suggesting an association with the river or a road that ran alongside the river. These two mounds, separated by 300 m, would have been a similar size during the Early Virú Period and their central location, relatively large size, and design as open civic-ceremonial centres all indicate a level of public accessibility that is uncommon in Early Virú. Similar, though smaller, mounds and one mid-sized plaza (V-28) are also found on the floor of the Huacapongo Valley (e.g. V-206, the Corral Gate Mound), close to sites with more restricted space. The location and open nature of such mounds indicates that they were meant to be more publically accessible than the plazas.

\(^{58}\) Zoubek (1997) hypothesized that these sites dated to the Initial (Guañape) Period based on similarities to the Huacas El Gallo and La Gallina (V-148, V-149) in the Huacapongo Valley. Ceramic evidence in both cases points to later dates but extensive excavations by Zoubek at El Gallo and La Gallina determined that the sites were much older than their dates derived from ceramic seriation indicated. While Zoubek’s hypothesis needs to be tested, I think it is premature to date Huacas San Juan to the Initial Period based on architectural analogy to Huacas El Gallo and La Gallina. Ceramic evidence at San Juan indicates initial construction during the Early Virú Period at both sites and exposed architectural evidence at these sites supports this date.
and small mounds located within sites on the valley margins. Thus civic space in the Huacapongo cluster was of a mixed nature during the Early Virú Period with some sites showing small, inconspicuous civic spaces within the site itself and likely intended for the local community while other buildings show a more open, public, and conspicuous setting, suggesting some form of centralized authority responsible for building and administering them.

**Figure 6.12:** Huaca San Juan No. 2, the largest Early Virú civic-ceremonial centre, seen from a distance.

Civic space in the Middle Virú Period was more accessible than in the Early Virú Period. While some less-accessible Early Virú sites with civic space continued to be occupied, the Middle Virú component at these sites was smaller than in the earlier period and it is not clear if the civic space continued to be used for community gathering purposes. Several small civic-ceremonial mounds on the floor of the Huacapongo Valley continued to be occupied and new ones were built, but this area was no longer a core area of occupation during the Middle Virú Period. There was, however, a proliferation of civic-ceremonial structures built on the floor of the Virú Valley, and most of these centres were located centrally within the valley, strung along the route of the Virú River. One prime example is the site of Mochan (V-240), also known as Huaca Amarilla (figure 6.13). This impressive multi-level pyramid mound rose over 20 m above the surrounding fields at its
highest point (Willey 1953: 148). It was only occupied during the Middle Virú Period. While the mound is badly eroded and destroyed in places, remnants of a staircase and plastered, painted walls are located on the northwestern end of the site, suggesting this was the main access point to the mound’s highest platform. No associated residential occupations have been identified surrounding the site indicating that the mound served as a local civic-ceremonial centre for people living at the numerous residential sites in the vicinity of Mochan. This site is easily accessible; it is located on the valley floor with no natural or built obstacles to restrict access to it, and its height and placement makes it highly visible from nearby sites. These features make Mochan typical of Middle Virú civic-ceremonial sites, which were clearly meant to be seen and visited by a large community, unlike most Early Virú civic-ceremonial sites. Keeping in mind that Mochan was just one of several similar sites, this evidence suggests a level of communal organization indicative of a centralized authority promoting social cohesion through the proliferation of civic-ceremonial space.

Figure 6.13: Mochan or Huaca Amarilla (V-240).

The change from more limited and restricted civic-ceremonial spaces in Early Virú to public and accessible ones in Middle Virú also highlights the final major change between these two periods: Middle Virú civic-ceremonial centres were built to be highly
conspicuous and monumental structures symbolizing the power and social cohesion brought about by a centralized authority. Most civic-ceremonial structures at Early Virú sites were small, enclosed by the settlement in which they were built, and relatively inconspicuous. The Early Virú Period was a time of strife (see discussion below) and most civic-ceremonial structures reflect this fact. Some civic-ceremonial structures were hidden within fortified sites and others were undefended but were small and located entirely within settlements and were not built to be open or highly visible. To be sure, there were some civic-ceremonial structures that were open and public, primarily in the Huacapongo cluster, but these were still relatively small and not particularly conspicuous.

The overall impression of civic space in the Early Virú Period is primarily one of small centres that were meant to serve the local community, as well as some mid-sized centres that likely served a regional population. There is little evidence to suggest that these sites were pilgrimage centres for people from the highlands or other coastal valleys and little to indicate that they were constructed by a centralized authority intent on establishing social cohesion or legitimating their authority.

In contrast, Middle Virú civic-ceremonial structures were large and highly conspicuous structures. The site of Mochan, discussed above, is one example. Another example is Huaca San Juan No. 1. Although excavation of the site is required in order to confirm the exact building sequence, this site appears to have been expanded during the Middle Virú Period from a mid-sized mound to a truly monumental stone-walled structure located in the middle of the valley neck that could not be missed by travellers between the highlands or Huacapono Valley and coast (figure 6.14). The Gallinazo Group, built during the Middle Virú Period, represents the clearest example of highly conspicuous architecture (figure 6.15). The city consists of several pyramid mounds spread over six discrete civic-ceremonial structures, including the 25 m high principal mound of Huaca Gallinazo (V-59), which fronted a plaza surrounded by smaller mounds. Huaca Gallinazo, like Mochan, Huaca San Juan No. 1, and numerous smaller mounds, was built to be a highly conspicuous civic-ceremonial centre, located either at a large settlement or in close proximity to large populations, and visible for several kilometers in every direction on the flat valley floor. These monumental structures, all built within a
relatively short span of time, must have had the co-ordination of a powerful centralized authority.

The most conspicuous Middle Virú structures, however, were six castillos built on the valley margins and on isolated hills in the valley neck. The castillos—named as such for

![Figure 6.14: Foreground: Huaca San Juan No. 1. Background: Cerro Napo, with the Castillo de Napo on its summit. Photo taken from Castillo San Juan.](image)

![Figure 6.15: Huaca Gallinazo (V-59), the principal mound of the Gallinazo Group.](image)
their resemblance to European castles—were impressive fortified civic-ceremonial centres and, at least in the case of Huca Santa Clara (V-67), administrative towns (Millaire 2010b). These structures have traditionally been identified as prominent fortifications (Willey 1953). While the castillos surely had a military function (see discussion below) and played a strategic role in securing the intake canals for the lower Virú irrigation system (discussed above), their overall function is more complicated. Four castillos line the valley neck, two on each side of the valley, and two are built on isolated hills on the valley floor (figure 6.5). Castillos San Juan (V-16/V-62) and Castillo Napo (V-68), on opposite sides of the valley, are the smallest castillos. Napo is built on the crown of a steep, isolated hill. The most prominent part of the site is a small pyramid mound that would have been highly conspicuous, especially if it was painted in a vibrant colour. There is also a small residential sector at the site. The steep hilltop location is very difficult to access and walls block potential access points to the summit. Castillo San Juan consists of two mounds and residential sectors surrounded by perimeter walls on the crest of a large hill lining the Quenet Quebrada on the north side of the valley at the entrance to the lower valley when coming from the east (see Willey 1953: 158-160, 224-225 for a full description of the site). Although Willey dated each mound to separate periods, the updated seriation shows that both were built during the Middle Virú Period, but the V-62 sector of the site continued to be used through Late Virú. The perimeter walls and dual mounds of San Juan were prominent, conspicuous structures to anyone travelling through the valley neck from Upper Virú or Huacapongo, but also to anyone passing through the Quenet Quebrada which is commonly thought to contain the road to the Moche Valley to the north. Both Napo and San Juan clearly had multiple functions but they were primarily fortified pyramid mounds and likely did not contain large populations or garrisons.

The Castillos Tomaval and Sarraque are more complicated. Tomaval (V-51) consists of an impressive structure on top of a low hill spur on the north margin of the valley. The main structure is only accessible from one side and has a small platform with commanding views of the valley at the top. In addition to the main stepped structure and smaller platform mounds, a sizeable town with a large residential population was identified at the site and was excavated by Strong and Evans (1952). The main structure
itself has been partially restored, showing it to be a commanding and conspicuous structure visible from throughout the valley neck. The Castillo de Sarraque (V-73, V-74, V-75) is a similarly complicated site complete with monumental architecture and a large residential population. Sarraque is built on the western end of the range of hills that separate the Huacapongo Valley from the Virú Valley. The castillo itself (V-73 and V-74) is a monumental pyramid mound, similar in form to the other castillos, built on the crest of the hill. This hill served as a defensive retreat in the Early Virú Period and perhaps into Middle Virú (V-72) but these defensive platforms were rebuilt and expanded to form impressive fortified structures that were highly conspicuous to both the Virú Valley and the Huacapongo Valley. Extensive residential terraces run down both sides of the hill but are concentrated on the Virú side with a large structure,\textsuperscript{59} dubbed the Palacio de Sarraque (V-75), at the base of the hill. This little-studied site has been extensively damaged by looting, limiting its interpretive potential, but it clearly served as a complex fortified civic-ceremonial centre and large town, similar to Tomaval. Both were very highly conspicuous to anyone passing through the area, both had commanding views of the entire Virú Valley neck, and a major Prehispanic canal runs at the base of each.

The final two castillos stand apart somewhat from the other four, particularly in their location on isolated hills in the middle of the valley neck rather than on the margins. Huaca Santa Clara, the westernmost of the castillos, is built on the apex of a prominent isolated hill in the middle of the valley neck. Its location made it highly conspicuous to anyone passing through the valley neck from the highlands or from the Huacapongo Valley but it also overlooked the core of Middle Virú settlement in the lower valley. Santa Clara was a large town with civic-ceremonial space and evidence of centralized storage facilities, leading Jean-François Millaire (2004, 2009b; 2010a), who conducted excavations at the site, to determine that it served as an administrative town during the Middle Virú Period and was closely associated with the Gallinazo Group. Virú Viejo (V-59 House platforms on the Huacapongo side of the hill were not surveyed by Ford and Willey (1949) and no ceramic collections were made there. Without further work it is not possible to determine the time period(s) when these platforms were used. For the purposes of this analysis they are considered a separate site from Sarraque and are not mapped or included in this analysis.

\textsuperscript{59} House platforms on the Huacapongo side of the hill were not surveyed by Ford and Willey (1949) and no ceramic collections were made there. Without further work it is not possible to determine the time period(s) when these platforms were used. For the purposes of this analysis they are considered a separate site from Sarraque and are not mapped or included in this analysis.
231) is located on a small isolated hill two kilometers northeast of Santa Clara but is in a similar setting to the larger castillo Willey (1953: 175) argued that Virú Viejo, which was built during the Middle Virú Period and used into Late Virú, was the oldest of the castillos based on unclear criteria. At present it is not possible to determine whether Virú Viejo pre-dated Santa Clara or the other castillos, but Estuardo La Torre, who worked extensively at Huaca Santa Clara, noted that Virú Viejo was architecturally very similar to Santa Clara suggesting some relationship between the two (La Torre, personal communication, 2010).

The six castillos were all impressive structures built on hilltops in order to increase their monumentality and this made them highly conspicuous symbols of power and authority. Beyond their specific function as forts, administrative towns, and civic-ceremonial centres, they all served as a sort of border marker or sign that one was now in land controlled by a centralized Middle Virú authority. In this function they fit well with their contemporary civic-ceremonial structures in Virú, where new structures were built and others modified to be highly conspicuous and monumental. Civic-ceremonial space was important in the Early Virú Period and was relatively common, especially in the Huacapongo cluster, but it primarily served small, local populations and most structures were not intended to be highly-visible or easily accessible. Middle Virú civic-ceremonial structures were more open, accessible, and visible, all of which suggest that they were intended to be seen and visited by a larger community. In this way, Middle Virú civic-ceremonial structures served to promote social cohesion in a way that Early Virú structures did not. I consider this shift to be evidence that a centralized Middle Virú authority coordinated the building of such structures as part of the process of statecraft.

6.3 Public Safety

Statecraft is always associated with the legitimate control of violence through military and police forces (Routledge 2014; Spencer 2003; Spencer and Redmond 2003; see also chapter 2). The proliferation of violence can be demonstrated archaeologically through the building of fortified or defensive sites, the construction of walls and other defensive
structures, the development of intermediary zones or “no man’s lands” between hostile territories, and through increased evidence of violence in mortuary remains (Arkush and Tung 2013; Proulx 1973; T. Topic and J. Topic 2009). The Salinar Period of the north coast, including its expression in Virú (what I term the Early Virú Period) is generally acknowledged to be a time of strife and warfare on the north coast. This assertion is derived from Willey (1953), who identified the Early Virú Period as a violent time where skirmishes and raids were common, leading to sites being built on defensive hillsides or close to hilltop retreats. Willey considered this violence to be largely between communities within the valley. John and Theresa Topic (1978; T. Topic and J. Topic 1982) confirmed Willey’s observations and found that defensive and fortified features were even more common than Willey had described and were also abundant in the yungas zone, east of the limits of Willey’s study area. In contrast to this period, Willey (1953: 396) noted a decline in the level of violence in the Middle Virú Period. Willey saw the construction of the Castillo Fortification Complexes as evidence of a greater emphasis on inter-valley warfare versus intra-valley warfare and he argued that there was an emergent military leadership class in the Middle Virú Period. This view has been echoed by subsequent studies who see a trend through the Early Intermediate Period on the north coast and adjacent highlands from a violent period marked by skirmishes and informal warfare to one of more formalized warfare carried out by legitimate authorities and with a high cultural value placed on warriors (Arkush and Tung 2013; Billman 1999; Lau 2010; J. Topic and T. Topic 1978; T. Topic and J. Topic 2009).

At face value, the settlement patterns show a decreased concern with building sites in defensible locations between the Early and Middle Virú periods. This shift stands in contrast to theories of statecraft that argue that political authority is constructed through warfare. There is another way to look at the association of statecraft with warfare, however: through the lens of increased public safety in Virú. By public safety I mean a general sense of security and a feeling of being safe from warfare; the concept of public safety can, of course, extend beyond concerns of warfare, but this is the focus here. If a single powerful centralized authority had control over Virú then we can expect to see an increase in public safety because this authority controls the use of force, centralizes the expression of that force at a small number of formalized fortifications, and maintains
peace throughout their region by controlling strategic resources and the movement of foreigners who might pose a threat and by protecting their citizens from war. In other words, a centralized authority ensures public safety. That a sense of public safety prevailed during the Middle Virú Period is evident by a movement away from defensive settlements on and near the hills bordering the valley to open and accessible locations on the valley floor. This move was surely economic as it allowed for the massive expansion of irrigation networks and led to a large population growth, as discussed above, but my point here is that this was done in tandem with an increasing sense of security in Virú. The establishment of formalized military infrastructure to protect the valley is evidence that this was an intentional act carried out by a centralized authority with a goal of maintaining public safety in the valley.

The first part of this argument seems self-evident, given the above discussions regarding changes in settlement patterns between the Early and Middle Virú periods. However, the actual number of sites that are identified as being fortified increased in absolute number in the Middle Virú Period, although remained constant as a percentage of all sites (7 sites, or 10.5% in Early Virú versus 12 sites, or 10%, in Middle Virú). In part this is because some Early Virú hilltop fortified sites, such as Cerro del Piño (V-132) and Corral Hill (V-205), continued to be used into the Middle Virú Period, but also because new fortified sites were built in Middle Virú—the six Castillo Fortification Complexes, one hilltop retreat platform (V-138) built above the Late Virú capital of Huancaco, and a fortified village (V-192/V-194) settled in a small quebrada in the Upper Virú Valley. However it is also partly due to the way that sites were classified. Sites were only classified as “fortified” if they had clear defensive structures (i.e. perimeter walls) or were built in a

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60 V-192/V-194 is a village built on the hillside of a small quebrada that opens onto the main branch of the Upper Virú Valley. A wall runs across the quebrada such that the site is cut off from the main valley, and a citadel-like structure is built on the hill at the entrance to the quebrada, essentially fortifying the entire village. Willey (1953) did not survey the Upper Virú branch of the valley system save for a few sites located near the confluence of Virú and Huacapongo. T. Topic and J. Topic (1982) surveyed this area; although they do not describe this site specifically they note a proliferation of fortified sites in the upper Virú Valley, upstream of V-192/V-194. This site is somewhat peripheral and at this time it is not clear whether V-192/V-194 is an entirely autonomous community, is part of the Middle Virú polity, or is part of an unidentified polity in the upper Virú Valley. I consider it part of the Middle Virú polity but this should be tested through excavation.
location that is clearly strategic and defensive (i.e. hilltop platforms and the castillos). Some of these sites contain features such as bastions and baffled entrances that are considered diagnostic of fortifications in general (e.g. Keeley et al. 2007) while others consist of simple cleared or constructed platforms without perimeter walls built on inaccessible hilltops, a common form on the north coast (Vega et al. 2011). But these classifications do not account for residential sites that were built in places that were difficult to access and could be easily defended if needed, but were not fortified per se, and Theresa and John Topic (1982) found fortified features to be far more common than Willey (1953) had indicated. Defendable hillside sites are common in the Huacapongo Valley and, to a lesser extent, the south margin of lower Virú, and a greater proportion of Early Virú sites fit the description of defendable, but not fortified, settlements. Furthermore, the proximity to hills and fortified hilltop retreats can also be considered a defensive feature as residents of an undefended site could flee to safety within an hour or two if necessary. The Middle Virú Period, by contrast, saw a large-scale expansion onto the flat valley floor, with large populations living in open sites far from any hills that could serve as defensive retreats.

Although this trend seems self-evident it is difficult to quantify. An attempt can be made, however, by interpreting the average slope of the area surrounding any given site. This is the same method described above to approximate the accessibility of civic-ceremonial centres. In this case, all sites types were included, and the average slope within a 50 m buffer of each site was calculated. Sites with a higher average slope are located in an area that has steeper terrain whereas sites with a lower average slope are located in areas that are flatter. The mean slope of Early Virú sites is 75.24%, a value that is significantly higher than the mean slope of Middle Virú sites at 67.20% (KS-test, $D=0.2292$, $p=0.018$). This change indicates that Early Virú sites are, on average, located in considerably more rugged terrain and this trend is illustrated in figures 6.16 and 6.17. In order to produce these maps, all Early and Middle Virú sites were plotted by their mean slope within a 50 m buffer. The percent slope method of calculating slope was used rather than degrees, and all units are expressed as a percentage slope. In the percentage slope calculation method a $0^\circ$ angle is $0\%$, $45^\circ$ angle is $100\%$ slope, and angles approach an infinite slope percentage as they approach $90^\circ$.  

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61 The percent slope method of calculating slope was used rather than degrees, and all units are expressed as a percentage slope. In the percentage slope calculation method a $0^\circ$ angle is $0\%$, $45^\circ$ angle is $100\%$ slope, and angles approach an infinite slope percentage as they approach $90^\circ$. 
m buffer of the site and were classified as being located in an area of either low or high relief; a somewhat arbitrary classification of 70% average local slope was used to demarcate low versus high relief. Sites that are classified as fortified were also plotted on these maps, and all are in areas of high relief. The trend towards greater settlement in areas of low relief or low slope—in short, places that are more accessible and less easily defended—is clear. To be sure, the Middle Virú Period saw an overall expansion in the number of sites located in areas of high relief, in keeping with the large increase in the number of sites in this period, but there was considerably greater growth into areas of low relief. The Middle Virú Period saw the expansion of occupation throughout the open, accessible, non-defensive areas of the valley, particularly in the flat North Virú watershed, and this reflects the sense of public safety and security that occupants must have felt.

Figure 6.16: Early Virú sites classified by the average slope within a 50 m buffer of each site. Sites with an average slope greater than 70% are classified as high relief. Sites with an identified fortified function are also shown; all are in high relief.
The two main Early Virú clusters are also significantly different from each other, with the Lower Virú South cluster sites being located, on average, in flatter terrain (Lower South mean = 59.83%, Huacapongo mean = 83.60%, KS-test, $D=0.625$, $p=0.00$). Most archaeological sites in the Huacapongo area are built on the steep hillsides of the valley where sites are difficult to access, and several hilltop platforms were built to serve as places of refuge. Most sites in the Lower Virú South cluster are located on the valley floor or on small isolated hills and sand dunes scattered throughout the valley, locations that are difficult to defend. However, several sites are built as hilltop retreats, including at least two walled fortifications, the Bitín Fortress (V-80) and Cerro del Piño (V-132). Since the lower Virú Valley is much wider and more difficult to irrigate than the Huacapongo Valley, Lower Virú South residents likely lived on the valley floor to be close to their fields but built defensive sites where they could retreat to in times of duress. Residents of the Huacapongo cluster, on the other hand, lived on the hillsides and quebrada floors in part to free up the limited amount of arable valley land but also because residential sites were defendable and residents could retreat farther into the hill summits if the situation were dire. While much of this inference comes from the locations of these sites, there is also artifactual evidence to support these claims (see also T. Topic.
For instance, at the large village of V-176/V-177, several broken *porras*, or stone maces, were encountered during surveys in 2010 (figure 6.18). These were likely being produced at the site and I am not suggesting them to be evidence of a raid on the site, but it is clear that the residents were prepared for violent encounters. Similarly, a collection of small, carefully selected river cobbles at the site of Corral Hill (V-205), a hilltop platform used as a defensive retreat, indicated that residents were prepared for violence (figure 6.18). These river cobbles contrast with the jagged rocks that make up the Andean foothills and they are clearly not natural to the area. Given their location I interpret them to be an unused slingstone cache, again pointing to defensive concerns among the Huacapongo residents. While both the Huacapongo and Lower Virú South clusters of the Early Virú Period were prepared for defense, at this point there is no indication of whom they were fighting or if they were fighting each other. The settlement patterns of the Lower Virú South cluster suggests that they were not fighting each other, however, because there are no defensive structures at the east end of this cluster, closest to the Huacapongo cluster, which would leave the intake canals for the Lower Virú South cluster vulnerable to sabotage and would leave some residents vulnerable to attack. These should be seen as hypotheses to be tested through excavation at Early Virú defensive settlements, however.

Figure 6.18: A pile of river cobbles at Corral Hill (V-205), likely gathered as slingstones, stand in contrast to the angular rock typical of the Andean foothills. Inset: possible ground stone *porra* or mace head at V-176/V-177.
Fortified or defensive structures were more formalized in the Middle Virú Period. Early Virú fortifications were, for the most part, informal platforms built on hilltops in areas that were difficult to access or else were ordinary residential settlements built in defendable locations but without any formal fortified features. Only two Early Virú fortified sites (V-80 and V-132) had perimeter walls and formalized defensive structures. Contrast this to the Middle Virú Period where six Castillo Fortification Complexes were built sharing a similar template in both their form and setting. These have been discussed above in the context of conspicuous civic-ceremonial centres—a role that they also played—but these were also fortifications, built to exert real or symbolic military might. The strategic role of the castillos cannot be overstated; all six castillos were intervisible with each other such that no one could pass through the valley neck without seeing and being seen by the castillos (Millaire 2008; figure 6.19, see also figure 6.5). The castillos played multiple roles. They were strategically located to protect the intake canals of the lower Virú irrigation system. Their hilltop locations added to their monumentality as conspicuous power symbols. And they were also military installations that projected the dominance of a central Middle Virú authority over the entire valley, creating a sense of public safety for the inhabitants of the lower valley. It is not clear who the Middle Virú polity was in conflict with—or even if the conflict was real, perceived, or symbolic—but the location of the castillos at the narrowest part of the main valley, the lack of military infrastructure between lower Virú and the coastal valleys to the north and south, and their similarity with contemporary structures in other valleys all suggest that the Middle Virú polity was concerned about the people living in the highlands or intermediary yungas zone to the east of Virú (Millaire 2008)\textsuperscript{62}. There are no walls that span across the valley neck and no sign that access from the east was totally restricted, but it was likely

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\textsuperscript{62} Assuming this model, inhabitants of the Huacapongo Valley and Upper Virú in the Middle Virú Period were not protected by the castillos. Residential sites in Huacapongo and Upper Virú largely continued to be located in defendable locations with a few fortified hilltop locations, similar to the Early Virú Period. This suggests that Middle Virú residents living upstream of the valley neck and Castillo Fortification Complexes continued to protect themselves rather than rely on a centralized authority for public safety. It is not clear to what extent these areas were integrated into the larger Middle Virú polity.
controlled and people travelling from the east would have been reminded of the power of the Middle Virú polity the moment they viewed the castillos.

Figure 6.19: Castillo de Tomaval (V-51) as seen from Castillo San Juan.

The best example of the public safety enforced during the Middle Virú polity is the Gallinazo Group itself, capital city and home to a population in excess of 10,000 people (Millaire and Eastaugh 2011). Considering the level of preparedness for violence seen during the Early Virú Period—when the area around the Gallinazo Group was unoccupied—what is most striking about the Gallinazo Group is what is lacking: the city is built entirely in the open flats of the lower valley, several kilometers from the hills that offered protection to residents of the Early Virú Period, and with no perimeter walls or defensive structures of any sort (figure 6.20). The Gallinazo Group is located far from the Virú River and would have been entirely dependent on the irrigation network—protected by the Castillo Fortification Complexes—in order to provide water both for drinking and for agriculture. The city could not have survived as it did for five centuries if Virú did not benefit from a sense of public safety. That the movement away from defensive settlements occurred during the same time period that a series of conspicuous fortifications built to protect the valley and its most important resource—water—strongly suggests that processes of statecraft were underway during the Middle Virú Period.
6.4 Discussion and conclusions

The three major infrastructure projects discussed here, irrigation works, civic-ceremonial centres, and a sense of security brought about by a formalized defense network, are three key sources of power through which the Middle Virú Polity materialized its authority. To be sure, these are not the only sources of power available to a polity and Middle Virú likely did use others as well, but that is a future project. I also do not mean to explore the actual ways that these structures were used or their social meaning, but their relatively rapid appearance on the landscape of the Virú Valley speaks volumes about the sort of power available to Middle Virú. This power did not come out of nowhere. The Middle Virú polity was a clear evolution from the less-centralized Early Virú polities. For instance, Willey (1953: 359) saw the castillos, military structures with a clear civic-ceremonial component, as being a direct development out of the two hilltop redoubts (Bitín Fortress and Cerro del Piño) of the Early Virú Period, both fortified hilltop structures with civic-ceremonial space within, although their specific purpose was quite different. It is also significant that all of these infrastructure projects were built at around the same time. While the seriation used in this dissertation cannot date structures to anything other than their broader period, all three of these infrastructure projects first

Figure 6.20: View south across the Gallinazo Group from Huaca Gallinazo. Note the open access to the city and lack of geographic or constructed barriers.
appeared during the Middle Virú Period and while some continued to be used after this period, there was no similar explosion in infrastructure after this period. This suggests that the Middle Virú polity must have enjoyed a great deal of wealth and authority to be able to undertake so many projects in a relatively short amount of time. This alone indicates that statecraft was being practiced by the Middle Virú polity and opens up fruitful avenues for future research. One important research goal should be to narrow down the temporal window within which these projects were constructed by conducting excavations at more castillos, at major civic-ceremonial mounds like Mochan and the Huacas San Juan, and at residential sites, as Millaire (2009b, 2010b, n.d.; Millaire and Eastaugh 2011) has done at Huaca Santa Clara and at the Gallinazo Group.

The expansion of the irrigation network in Middle Virú was a clear source of power for the polity. It cannot currently be determined if this was the first major project and funded the polity and allowed it to build other projects, or if other projects were built first and allowed the expansion of irrigation, or some mixture of these scenarios. Most likely this was an iterative process whereby the polity built a canal and settled a new area (the lower valley north of the river), enjoyed some success and expanded their program of civic-ceremonial architecture, brought other parts of the valley under their control and expanded irrigation even further, etc. At any rate these processes were gradual and intertwined; no single project had the power to make the Middle Virú polity what it became, but they all worked together to build a powerful and centralized political authority.

That power was in part won by the Middle Virú program of building civic-ceremonial architecture that served to promote political messages and social cohesion. Key to their power is the monumentality of such structures. Monumental structures are generally recognized as those whose size and architectural elements exceed the requirements of the building, in a practical sense (Trigger 1990: 119). Monumental architecture may serve various purposes but I prefer to see it primarily as a means for a centralized political authority to promote social cohesion (see discussion in Blanton 1989; Moore 1996). Not all civic-ceremonial structures in Virú were truly monumental, however; in fact many were relatively small and hidden, but were still clearly built to promote social cohesion.
by gathering community members together. Cross-culturally, people are drawn to and imbue significance in prominent natural and built landscape features such as mountains or large structures (Bernardini et al. 2013), and truly monumental civic-ceremonial structures convey more meaning and are stronger signals for social cohesion because of their prominence (Moore 1996). A structure’s size does not alone convey its monumentality, however. Moore discusses several factors that can make a structure appear more or less monumental based on its placement within the landscape and based on human visual acuity; for example a large structure built mid-way up a slope but behind a small dune will be less visible to someone walking up the hill than would be a smaller structure built on flat ground. This viewpoint is an important consideration because civic-ceremonial structures are located throughout the highly-varied terrain of the Virú Valley, and in some cases these structures were built in more secluded locations while in others they were clearly meant to be monumental. Visibility was clearly not the only important trait of civic-ceremonial structures on the north coast of Peru and many places that are known to have been sacred or ritually important were intentionally hidden (Moore 1996). However in the context of the Virú Valley, where few sites have been excavated, it is necessary to first identify those examples of important civic-ceremonial that are more obvious to the modern observer.

The examples of civic-ceremonial structures built within defensive hilltop structures such as the Bitín Fortress in Lower Virú South and the Corral Hill in Huacapongo are part of a larger trend within the terminal Early Horizon and early part of the Early Intermediate Period (T. Topic and J. Topic 2009). Hilltops and peaks have considerable sacred power in the Andes with some mountains being considered apus, or mountain lords, and this concept can explain to some degree the presence of civic-ceremonial structures on top of certain peaks. While Topic and Topic relate some early hilltop fortresses, such as Chankillo in the Casma Valley, to the concept of tinku warfare—a form of warfare known from the Inca Period and the ethnographic record that Topic and Topic note is often considered to be a sort of ritual warfare, although they do not consider a ritual/secular dichotomy to be useful—they are hesitant to ascribe this same status to Virú Valley fortresses. However, they suggest that the presence of civic-ceremonial structures within defensive sites in Virú is similar to contemporary sites in other valleys where the
line between purely defensive and *tinku* warfare is less clear. Following on their reasoning, I do not see a necessary division between ritual and secular uses for civic-ceremonial structures within fortified sites in Virú. These sites do serve a clear defensive purpose but they also are ritually-important places. I am hesitant to infer too much about the nature of these settlements at this time, as none have been excavated.

However by Middle Virú the nature of both warfare and civic-ceremonial architecture changed. There were few forts and these, the castillos, were all impressive structures built on hilltops in order to increase their monumentality and these characteristics made them highly conspicuous symbols of power and authority. Most other Middle Virú civic-ceremonial architecture was also conspicuous, but was not fortified and was not on hilltops. I do not mean to downplay the clear importance of hilltop locations for ceremonial purposes, but in the case of Virú it seems that hilltop locations were more clearly defensive and strategic. In the Early Virú Period, small and non-conspicuous civic-ceremonial structures were built at some defensive sites because these fortified sites were important places of retreat, where people could come together for ceremonies under times of duress. While their hilltop setting and the integration of fortified structures and civic-ceremonial space bear some superficial resemblance to Early Virú fortifications, Middle Virú castillos were fundamentally different structures. These were forts that protected the valley residents and infrastructure, administrative towns, and places for people to come together, but they were also symbols of power and authority and were a clear sign that someone travelling from the highlands was now in Middle Virú territory.

The history of the Virú Valley is to be one of small autonomous communities or uncentralized polities (the Guañape and Early Virú periods), larger polities in competition with powerful neighbouring states (Late Virú), or a marginal area of a large territorial state (Late Epoch). In all of these cases, settlement patterns show a preference for settlements built in or near to defendable locations in the hills bordering and scattered throughout the valley, and passive defensive structures in the form of hilltop redoubts and extensive walls spanning across quebradas. The only period that stands in contrast to this trend is the Middle Virú Period; during this period most people lived in unwalled settlements far from the hills and a complex of actively controlled and engaged civic-
military settlements—the Castillo Fortification Complexes—ensured the safety of valley inhabitants. The capital city at the Gallinazo Group worked together with Huaca Santa Clara and the other castillos, a series of civic-ceremonial centres, and a large population to expand irrigation networks and settle lands that were previously unoccupied. In this way Middle Virú was made over into a powerful society with a centralized authority that ensured public safety in a way that could not be done in the Early Virú Period.
Chapter 7

7 Conclusion

The Virú Valley on the north coast of Peru received considerable scholarly attention in the mid-twentieth century and the results of a major research project (Willey 1953) set the tone for north coast research for decades after its initial publication. Bit by bit, research in the last 20 years has begun to upend several of the conclusions reached by this project and has shown the history of Virú and of the north coast to be far more nuanced than previously imagined. This research has been largely piecemeal, however, upending one conclusion or another while largely leaving the original work, and the chronology upon which it was based (Ford 1949), intact. The central goal of this dissertation was to re-examine Willey’s settlement pattern study of the Virú Valley, focused on the Early and Middle Virú Periods (Puerto Morin and Gallinazo in older terminology), and to test several of Willey’s major conclusions. In order to do this, however, it became obvious that the ceramic seriation upon which it rested was in need of refinement.

In chapter 2 I developed an approach to understanding the processes at play in the Early and Middle Virú Period through the lens of statecraft, and emerging concept in the archaeology of social complexity that prefers to see complexity as a process of increasing and decreasing political centralization and of long-term developments in political authority. This approach is a non-essentialist one that views sociopolitical developments as occurring due to a complex interplay of agency, social resistance, geography, political economy, and many other factors, factors that work together in different ways in different places and at different times, making this approach fundamentally particularist. This broad approach has received book-length treatments (A.T. Smith 2003; Routledge 2014) and could receive many more, but my focus here was on the ways that statecraft could be seen in settlement patterns and in topics that have known relevance in the Virú Valley.

In chapter 3 I explored the original seriation of Virú Valley ceramics (Ford 1949), upon which Willey’s (1953) settlement pattern studies rested. Using both published and unpublished data I found numerous small errors and ultimately concluded that it was time
for a new seriation. In preparing for this seriation, I condensed Ford’s original typology and traced the development of four major domestic ware ceramic traditions: (1) Guañape; (2) Huacapongo Polished Plain; (3) Castillo; and (4) Late Plain. Ultimately, I argued that domestic and corporate ware ceramics were fundamentally different objects made for different reasons that developed along separate timelines, and that it was a mistake to seriate all of these objects together as Ford had done. The rarity of corporate wares from earlier periods of the Virú sequence compounded this problem. Furthermore, I saw the Virú Valley as being a fundamental continuity where Ford had seen it as discontinuous, and I argued that the entire Early Intermediate Period (ca. 400 B.C. – A.D. 800) sequence of the valley should be understood as one long sequence—Virú—that clearly witnessed many major developments but remained fundamentally intact.

In chapter 4 I tested Ford’s (1949) assertion that surface ceramic artifacts represent the mean cultural date of a site and found that this conclusion is rather complicated in the Virú Valley, as different sites display different patterns in regards to how well their surface assemblage represents the site’s history. Unfortunately, there is little to be done about this problem and I move on recognizing it as such. I then re-seriated Virú Valley ceramics using the typology and ideas developed in chapter 3, and found that different methods all demonstrated broad agreement and a continuity of domestic ware ceramic traditions in Virú. I used a seriation algorithm to define specific time periods.

In chapter 5 I set out to update Willey’s (1953) settlement patterns for Virú using new dates for all of his sites, derived from the seriation described above and, in a few cases, excavation data. I was able to demonstrate that one of Willey’s major conclusions, that the Huacapongo region of Virú was abandoned during the Early Virú Period and later re-occupied, is no longer tenable. I also demonstrated that the Early Virú Period was clustered into two major polities and several outlying sites. I determined that the Huacapongo polity was weakly centralized while the Lower Virú South polity was decentralized. The Middle Virú Period, by contrast, was a marked by the development of a large and highly-centralized polity, centered at the Gallinazo Group, and that this polity enjoyed a large degree of political authority.
I then set out in chapter 6 to document a program of infrastructure-building that the Middle Virú polity undertook. This program, with clear roots in the Early Virú Period, involved the construction of large-scale irrigation networks, the promotion of social cohesion through the expansion of civic-ceremonial space, and the promotion of a sense of security and public safety throughout the polity that was made possible by a strong military presence in the Virú Valley neck that protected irrigation canals and served as conspicuous symbols of power and authority. That these developments took place in the Middle Virú Period demonstrates that processes of statecraft were at play in the valley and that the Early and Middle Virú Periods fit within a tradition on the north coast of Peru of increasing political centralization and authority that were at their strongest half a millennium after the Middle Virú Period ended, when the Chimú empire expanded throughout the north coast.

Finally, what would a dissertation be without a plea for future research? Willey’s (1953) study was a good start but it has remained the key piece of research on the Virú Valley for too long. While this dissertation has focused on the transition from Early to Middle Virú and thus dealt with both periods, the only new fieldwork involved some basic survey and I found the lack of excavation data to be particularly difficult. While some newer excavation projects have contributed to our knowledge of Guañape (Zoubek 1997), Middle Virú (Millaire 2004, 2009a, 2009b, 2010a, 2010b; Millaire and Eastaugh 2011, 2014), and Late Virú (Bourget 2004, 2010) periods, the Early Virú Period remains little studied and little known. The only excavation project specifically focused on this period in Virú was conducted by West (1971, 1979, 1980, 1981), who unfortunately passed away before the site could be fully published.

Through my review of Willey (1953) and survey throughout the valley I have identified several sites that were clearly important Early Virú centres, but whose interpretation must stop there. While the entire Huacapongo region is sorely in need of comprehensive research, particularly because there are clearly many undocumented sites there, the sites of V-21, V-176/V-177, V-33/V-205, and V-212 are in particular need of research. All appear to be towns or large settlements and all would shed light on the nature of warfare, residence, administration, and ceremony during this period. In the lower valley, the site
of the Bitín Fortress (V-80) was clearly a very important site that appears to be an ideal location for understanding the nature of warfare, ideology, and sociopolitical organization in the Lower Virú South polity. The massive Huacas San Juan Nos. 1 and 2 (V-77 and V-103) were clearly important civic-ceremonial centres that witnessed the transition from Early to Middle Virú and promise fruitful research. And within the Middle Virú Period, research at smaller civic-ceremonial centres like Mochan (V-240) could help to better understand ideology in the Middle Virú Period. And finally, all excavation projects in Virú to date, as well as my suggestions for further research here, have been focused on massive and clearly important sites, but life in the Virú Valley will never be fully understood until smaller residential sites of all periods are excavated.
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Appendices

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