

## **Collaborative Research: Preceramic Chronology in the Norte Chico Region of Peru**

Andean Peru has long been identified as one of the six major world areas where "civilization" developed under largely endogenous or "pristine" conditions (Fried 1967). The last quarter of the 20th century saw a great deal of research and writing focused on questions of how and why civilization first developed in the Andes (Moseley 1975, 1992; Haas 1982; Haas, Pozorski and Pozorski 1987; Wilson 1988; Shady 1993, 1995; Billman 1999, 2001; Stanish 2001; Pozorski and Pozorski 1990). Continuing research has steadily pushed back the very beginnings of the origins of what can be identified as emergent Andean civilization. For many years, Chavín with its ceremonial capital at Chavín de Huantar in the central highlands, was considered the "Mother Culture" of the Andean civilization. More recent research, however, has shifted the focus of attention away from the highland-based culture of Chavín, and moved it to a stretch of the central Peruvian coast. In this area, roughly located between the Lurin Valley on the south and the Casma Valley on the north, archaeological research is revealing a pattern of large ceremonial centers with monumental architecture and elaborate art (Burger 1987, Burger and Salazar-Burger 1991; Quilter 1985, 1991; Quilter et. al. 1991; Feldman 1983, 1987, 1992, Pozorski and Pozorski 1992, 2000). Dating of the sites in these early coastal developments is still being worked out, but there are radiocarbon dates for some of these sites ranging from 4900 B.P. to 3200 B.P., well before the founding of Chavín de Huantar and the Chavín expansion in the Early Horizon.

Moseley (1975) was one of the first to recognize the precocious nature of cultural development on the Peruvian coast. He pointed out that there were a number of large maritime-based sites up and down the coast that dated to the 3rd millennium or even before. He also was one of the first to highlight the fact that a number of these sites, such as Aspero in the Supe Valley and El Paraiso in the Chillón Valley had large communal architecture yet lacked ceramics in their cultural assemblages. This lack of ceramics would indicate that the sites antedated the introduction of ceramics in Peru at around 1800 B.C. Subsequently as radiocarbon dates began to be obtained for these preceramic sites they were confirmed to extend back into the 3rd millennium B.C. (Engel (1957) coined the term "Cotton Preceramic Stage" to delineate coastal sites such as these that had cotton but lacked ceramics and were occupied between ~3000 and 1800 B.C. That term is applied here as a general marker to place these sites in a wider comparative context in the Peruvian Andes.) Moseley then went on to argue that it was the organization required for maritime-dependent subsistence was conducive to the emergence of political centralization. Centralization, in turn, "preadapted" these cultural groups to the subsequent development of even more complex, hierarchical and centralized forms of organization based on irrigation agriculture.

Moseley's "maritime foundations of Andean civilization" theory has been refined and debated now for past quarter century. It remains today a powerful explanation for how and why the Andean region started on the road that eventually led to much more complex states and empires. More recent research on the coast, however, is raising questions about whether coastal maritime sites did indeed develop independently of an agriculturally based subsistence economy. Research in the Supe Valley by Shady and her

colleagues (Shady 1997, 1999b, 2000a, 2000b, 2000c Shady, et al. 2001; see also Williams and Merino 1979) has shown that the maritime community of Aspero in the Supe Valley was not alone; rather, it appears to have been an integral part of a much larger cultural system that included large agriculturally based urban centers.

In addition to Aspero at the mouth of the river, there are nine large centers inland in the Supe Valley, as well as eight secondary centers and numerous small residential sites that all appear to be "preceramic." Excavations as well as close examination of erosional cuts, farming disturbance, and looters holes have consistently shown that there are no ceramics associated with the occupation of these sites. (There are occasional intrusive ceramics from later periods in surface contexts on most of these sites.) It must be emphasized at this point that dating of these sites is only tentative. Ceramics are introduced in both the north and south coasts of Peru by 1800 B.C., but there are at least some sites occupied after 1800 B.C. that also lack ceramics. The Pozorskis have called these sites 'aceramic' and caution must be used when the absence of ceramics is the sole means of identifying the date of site occupation (Pozorski and Pozorski 1990).

The nine largest centers in the Supe Valley all have major platform mounds, (ranging from 10,000 to 200,000 cu m in volume), large public ceremonial structures in the form of sunken circular plazas 20-40 m in diameter and 1-3 m deep (Williams 1972, 1978-80, 1985), and areas of residential architecture and trash that extend over 10 to 200 ha. The largest and most complex of the Supe sites, Caral, for example, extends over 110 ha, has 6 major platform mounds ranging from 20,000 to 200,000 cu m, and three separate sunken circular plazas. There are eight smaller preceramic sites in the Supe Valley with less residential architecture, smaller mounds and fewer ceremonial features. Aspero, on the coast, is consistent with these smaller sites, in that it occupies 15 ha, the largest mound at the site is 3200 cu m, and there is no sunken circular plaza (Moseley 1975; Feldman 1980, 1987, 1992; Haas and Creamer 2001; cf. Sandweiss and Moseley 2001). Small preceramic/aceramic residential and special-use sites of less than 1 ha have also been located through incidental surveys in Supe.

The Supe Valley complex of sites has been recognized as unusual since the mid-1960's. Much more recent reconnaissance and salvage surveys in the adjacent Fortaleza and Pativilca valleys, immediately north of Supe, have located an additional 11 preceramic centers, all with monumental architecture and circular plazas equivalent in size and composition to the nine large inland centers in Supe (Vega-Centeno et al. 1998). More sites have been tentatively identified on aerial photographs in both valleys, but these have not yet been ground checked and verified. A large settlement at the mouth of the Fortaleza River may have a preceramic maritime component similar to that at Aspero, but it has been obscured with structures of a later occupation. Reconnaissance in the fourth of the Norte Chico valleys, Huaura, has not yet turned up any preceramic centers, large or small.

The remarkable assemblage of major preceramic centers in the Norte Chico region, all with monumental and ceremonial architecture, presents an unparalleled opportunity for

archaeological research. The area offers the possibility of opening a window into the prehistoric beginnings of the earliest complex society to emerge in South America.

### **Previous Research in the Norte Chico**

The Norte Chico region on the Peruvian coast includes the valleys (S to N) of Huaura, Supe, Pativilca, and Fortaleza. This is an area that has received intermittent attention from archaeologists. Informal and limited surveys in the area (Williams and Merino 1979; Vega Centeno, et al. 1998) have shown that settlement in the area was both long and dense. The Norte Chico is at a biological, geographical and cultural crossroads between the north and south coastal regions (Dillon et. al.1999; Billman 2001). Biologically, the southernmost occurrence of equatorial biotic communities extend into this area, as do the northernmost examples of drier desert communities. This part of the coast has valleys that are midway in size between the large valleys of the north and the smaller valleys of the south. The area also witnesses El Niño events more frequently than the south coast but less frequently than the north coast. The four valley system is geographically integrated by physical proximity and topographic features. The three northern valleys, Fortaleza, Pativilca and Supe, all exit into the Pacific over a stretch of only 22 km. There are, in turn, inland passes linking the upper reaches of all the valleys. In addition, the middle reaches of Huaura are separated from Supe by only 15 km through either of two inland passes. The Norte Chico spans a total of only 50 km of coastline. Culturally, at least in late prehistoric times, the Norte Chico was a frontier zone between the northern sphere of the Chimu and the southern sphere of Chancay. Although there has been some research in the region over the past 100 years, the archaeological record of the Norte Chico is comparatively unknown.

Max Uhle (1925) was the first professional archaeologist to record sites and conduct excavations in the Norte Chico region. Uhle was specifically after ceramic vessels that could be used to help develop a broad ceramic chronology for the Peruvian Coast. He excavated at sites around the mouth of the Supe Valley, including Chimu Capac (Middle Horizon), San Nicolas (Middle Horizon, Late Intermediate and Late Horizon), around Aspero (Initial Period/Early Horizon) and others. The ceramics recovered by Uhle were published by Kroeber (1925). Subsequent to Uhle, Kosok and Schaedel (Kosok 1965) visited the region in the 1940s and used aerial photographs to locate and record a number of sites in all 4 valleys. Kosok made some grab sample collections while in the area, but other than a few drawings and photographs, none of this material has been published. Kosok also published the first accounts of a complex of sites that were seen at the time as enigmatic because they lacked surface ceramics. At the largest of these sites, Chupa Cigarro Grande (now known as Caral), Kosok noted: "The virtual absence of potsherds at this site made any accurate calculations as to its relative age impossible" (1965: 223, emphasis in original).

The first scientific excavations in the region were conducted by Willey and Corbett (1954) in the 1940s at several small villages on the coast at the mouth of the Supe Valley. One of these is the large community of Aspero, where excavations were undertaken in a preceramic midden and a somewhat later, ceramic-bearing cemetery. At the time, the site

was recognized as an early maritime settlement, but absolute dates were not available. Willey revisited Aspero in the 1970s with Moseley (Moseley and Willey 1973; Moseley 1975), when they recognized that a series of mounds at the site (identified as "hillocks" in Willey and Corbett's earlier publication) were in fact constructed platform mounds. It was also recognized that the paucity of ceramics at the site was due to the fact the site dated to a preceramic period. Further work was conducted at Aspero in the 1970s by Feldman (1980, 1983, 1987, 1992), who obtained radiocarbon dates ranging from 4900 $\pm$ 160 B.P. to 3950 $\pm$ 150 B.P. The earliest of these dates was rejected at the time as too old, and the earliest occupation of Aspero still needs to be defined. Feldman tested a second preceramic site in the area, As8, which yielded a single radiocarbon date of 6914 $\pm$ 190 B.P. Salvage excavations at the small maritime/coastal community of Bandurria at the mouth of the Huaura Valley have provided radiocarbon dates ranging from 4530 $\pm$ 80 B.P. to 4300 $\pm$ 90 B.P. (Fung 1988). Additional work was done in the 1970s at other preceramic sites in the Norte Chico (Fung 1988) but no dates have been reported. Some excavation was also undertaken at the Initial Period site of Bermejo in the Fortaleza Valley by Silva (1975, 1978), but again no dates have been published. A Middle Horizon site in the Huaura Valley was tested by Shady and Ruiz (1979) in 1978.

A survey of large sites with standing in the Supe, Pativilca and Fortaleza valleys was undertaken by Williams, though only the Supe Valley results have been reported (Williams Leon and Merino 1979). Williams visited nearly 100 sites in the Supe Valley and a similar number were apparently visited in Fortaleza and Pativilca (Moseley 2001). These sites run the temporal spectrum from Cotton Preceramic through Late Horizon Incan sites. Shady (personal communication 1999) resurveyed the Supe Valley sites in the 1990s, in an effort to distinguish early preceramic occupations from later Initial Period and Early Horizon occupations. A large-scale, systematic survey of the valley bottom was conducted in the lower portion of the Fortaleza Valley in conjunction with a power line construction project (Vega-Centeno, et al. 1998). More than 100 sites were recorded in the course of this survey.

Zechenter (1988) tested a number of sites in the Supe Valley in the 1980s in an effort to reconstruct subsistence strategies during the Preceramic and Initial periods. In addition to extensive biological data, she reports individual radiocarbon dates from 9 sites yielding dates from 7330 $\pm$ 110 B.P. to 3110 $\pm$ 80 B.P. Also in the Supe Valley, Shady initiated extensive excavations at the site of Caral (formerly Chupacigarro Grande) in the middle reaches of the Supe Valley in the mid-1990s (Shady Solis 1997, 1999a, 1999b, 1999c, 1999d, 2000a, 2000b, 2000c). This work has focused on the description of architectural features of the site and retrieving ethnobotanical and ethnozoological specimens for analysis. Shady's research is providing the first detailed account of a major inland Preceramic urban center in the Andes. Recent publication of radiocarbon dates from Caral range from 4090 $\pm$ 90 B.P. to 3640 $\pm$ 50 B.P. (Shady Solis, et al. 2001).

### **Preceramic Chronology**

Preliminary data from the Norte Chico region demonstrate that this was a center of intense cultural development during the period from roughly 3000 to 1800 B.C. Kosok

(1965), Burger (1992), Moseley (2001) and others have all recognized and emphasized the extraordinary density of preceramic/aceramic Norte Chico centers with major communal architecture. Furthermore, the region is also notable for its early dates. Aspero, with dates extending back at least to 4360 B.P., and possibly as early as 4900 B.P. (Feldman [1980: 246] rejected the 4900 date as too early, but in light of other dates now available in Peru, it may need to be reconsidered), has the earliest communal architecture yet recorded in South America. The new suite of dates from Caral (Shady, et al. 2001) also establish it as the earliest agriculturally-based urban center with monumental architecture on the continent. (There is a single date of 4110+/-50 from a platform mound at La Galgada that would indicate an older range than the current dates from Caral, but this single sample comes from a disturbed stratigraphic context associated with newspaper clippings and a mango pit [Grieder, et al. 1988:68]. The other very early dates from La Galgada are not from the monumental construction).

While the combination of many sites with monumental architecture and early dates offers great opportunities to investigate the beginnings of complex society in Peru, it also presents some unique challenges. One of the most immediate and pressing is the question of when the various sites were occupied. While dating is always important in archaeological research, the need for dates is particularly acute in the present situation. A number of key questions relate to the chronological relationships both between and within sites:

**1. Did it all start with Aspero?** One of the key issues in the study of the origins of complex society concerns the role of maritime exploitation in the emergence of political centralization. As noted above, Moseley (1975, 1978, 2001; Moseley and Feldman 1977) has argued that the complex demands of efficient marine fishing and harvesting led to the emergence of centralized decision making at Aspero and elsewhere on the Peruvian coast. In this model, centralization in the maritime context precedes and really sets-the-stage-for the subsequent rise of agriculturally-based complex societies. It then becomes critical to be able to ascertain in absolute terms whether the primary Norte Chico maritime community of Aspero, does indeed predate the numerous inland agricultural centers (see Sandweiss and Moseley 2001). Based on the dates currently available for Aspero, Caral and other sites in Supe (Table 1) Aspero does appear to predate the inland sites by 200-300 (or more) years. However, there are several important sites in Supe that have not yet been dated and there are no dates yet available from any of the sites in Pativilca or Fortaleza. A broad sample of dates from these other two valleys will provide substantially greater insights into the chronological relationship between the maritime community of Aspero and the numerous agricultural centers.

**2. Were all these sites occupied at the same time?** To date 30 substantial sites have been located in the three adjoining valleys, Supe, Pativilca and Fortaleza, and all of them lack ceramics. Although the lack of ceramics indicates these sites are all "relatively early" in the Peruvian sequence, it doesn't tell us about the chronological and social relationships among these sites. The Cotton Preceramic period, the temporal "home" of all these sites, stretches for some 1200 years from 3000 to 1800 B.C. (or perhaps even later, if some of the sites are "aceramic" rather than "preceramic"). Obviously 1200 years

is a lot of time, and it is very important to determine how many sites may have been occupied at any given time, for example, to address regional demography and its relation to labor mobilization. Was there, for example, one site (say Aspero) occupied for 400 years, then four sites occupied for another 400 years, and then 25 sites occupied for the last 400 years? Or, alternatively, only 5 sites may have been occupied at any one time, and each one occupied for 200 years? It seems likely that the chronology of occupation in the Norte Chico was more complex than either of these simple examples, but they nevertheless illustrate the potential range of variation that may exist in the region. They also highlight why it is important to greatly refine the chronological relationship among these sites.

**3. Why so many radiocarbon dates?** In later time periods and other areas, archaeologists working on the origins and development of complex, centralized forms of political organization have an accurate and inexpensive tool for dating sites and occupations: ceramics. Highly refined ceramic chronologies, anchored by a variety of absolute dates, have proven to be extremely useful tools in dating sites. Ceramics can be used to assess contemporaneity between sites, the range of dates sites were occupied, and phase differences among different parts or levels of a site's occupation. Unfortunately, this cheap, reliable chronological tool is not available for research on the Norte Chico Preceramic. Although it may be possible through future research to develop some alternative dating strategies (e.g. patterns of architectural variation, nature and size of marine shell assemblages, etc.) these strategies will themselves depend on a foundation of absolute dates. At this point, radiocarbon dating is the only viable, proven technique available with sufficient accuracy to clarify the preceramic chronology of the Norte Chico.

**4. How were all those mounds built?** In efforts to understand the nature of the relationship between leaders and followers, rulers and ruled, archaeologists have looked for clues in the construction of monuments. In South America specifically, Burger (1992) has argued that the accretional construction of monuments in the Lurin valley is indicative of a relatively low level of power exercised by local leaders. In other areas, it has been argued that larger monuments and large single-phase constructions are indicative of more powerful rulers who are able to extract much more labor out of respondent populations (Haas 1982, 1987; Billman 2001). In the Norte Chico, there is some very preliminary evidence of both patterns. At Caral, although not yet confirmed by excavation, it appears that the primary platform mound, the Piramide Mayor, was constructed in only two phases (Shady, et al. 2001). In contrast, at other sites, such as San Jose in the Pativilca Valley, the profiles of looters' pits indicates multiple construction phases akin to those in Lurin. In order to determine whether there are patterns in the construction of mounds, radiocarbon samples from different levels and/or construction phases of the mounds are badly needed. We believe it will be most effective to clean the profiles of looters' pits (some more than 3 m deep) and obtain radiocarbon samples from stratified sequences. Samples taken from different mounds at the same site will also help to clarify the intrasite construction sequence and chronology.

**Table 1. Radiocarbon dates from Supe Valley sites.**

Site	Radiocarbon Age B.P	Reference
A3-1	7330+/-110	Zechenter 1988
As8	6085+/-180	Feldman 1980
A2-3	5860+/-100	Zechenter 1988
Aspero	4900+/-150	Feldman 1980
Aspero	4360+/-150	Feldman 1980
Aspero	4260+/-150	Feldman 1980
Aspero	4150+/-150	Feldman 1980
Caral	4090+/-90	Shady, et al. 2001
Caral	4060+/-70	Shady, et al. 2001
E1-14 (Lurihuasi)	4060+/-140	Zechenter 1988
Aspero	4060+/-150	Feldman 1980
Caral	4020+/-40	Shady, et al. 2001
Caral	3990+/-70	Shady, et al. 2001
Caral	3990+/-70	Shady, et al. 2001
E1-12 (Chupacigarro)	3980+/-90	Zechenter 1988
Caral	3970+/-40	Shady, et al. 2001
Caral	3970+/-90	Shady, et al. 2001
Aspero	3970+/-145	Feldman 1980
Caral	3960+/-80	Shady, et al. 2001
Caral	3960+/-110	Shady, et al. 2001
Aspero	3950+/-150	Feldman 1980
Caral	3900+/-70	Shady, et al. 2001
Caral	3840+/-70	Shady, et al. 2001
Chupacigarro	3830+/-60	Shady, et al. 2001
Caral	3820+/-60	Shady, et al. 2001
Caral	3810+/-70	Shady, et al. 2001
Caral	3740+/-80	Shady, et al. 2001
Caral	3740+/-90	Shady, et al. 2001
E1-10 (Alpacoto)	3740+/-125	Zechenter 1988
Caral	3730+/-70	Shady, et al. 2001
Caral	3640+/-50	Shady, et al. 2001
B4-5 (Piedra Parada)	3430+/-80	Zechenter 1988
E1-15 (Pueblo Nuevo)	3340+/-235	Zechenter 1988
E1-3 (La Empedrada)	3260+/-90	Zechenter 1988
E1-11 (Cerro Colorado)	3110+/-80	Zechenter 1988





## **Recent Reconnaissance**

In 2000 and 2001, the Co-PIs conducted informal reconnaissance in all four valleys in the Norte Chico region to assess intervalley variability, locate major settlement systems, and evaluate the general condition of sites in the region. Based on this reconnaissance, a number of very preliminary observations can be made:

1. There are considerable differences among the four valleys in the nature and context of the prehistoric occupation. There is, for example, a substantial Chancay-related fortification complex, Acaray, in the Huaura Valley on the south, countered by an equally substantial Chimu-related fortification complex, Paramonga, in the Fortaleza Valley on the north. The Cotton Preceramic occupation of the region appears to be confined largely to Supe, Pativilca, and Fortaleza. All three valleys also have substantial Initial Period/Early Horizon occupations that largely do not overlap with the preceding Preceramic occupations. (As yet we have been unable to distinguish the Initial Period from Early Horizon sites based only on surface ceramics.) In marked contrast, no major Preceramic or Initial Period/Early Horizon centers have yet been located in Huaura. For subsequent time periods, Early Intermediate through Late Horizon, all four valleys appear to have significant occupations based on informal surface observations.
2. The Preceramic occupation located in the Supe, Pativilca and Fortaleza valleys appears to be one of the densest occupations for any time period anywhere in the Andes. To date, more than 30 centers have been located, all lacking ceramics in subsurface deposits. (Post-occupation ceramics are found on all of these sites, but construction fill, erosional cuts and looting holes demonstrate an absence of any ceramics in subsurface deposits.) These sites range in size from 10 to 200 ha, all with corporate/monumental platform mounds, and most (~2/3) have from one to three large sunken circular plaza features (see Williams and Merino 1979; Williams 1985; Fung 1988; and Moseley 2001). All 30 sites have been found in an area of only 1200 sq km and most of this area is taken up by arid, unoccupied foothills.
3. Almost all the ceramic-bearing sites in the Norte Chico have been subjected to the extensive looting characteristic of Peru. Looted cemetery areas containing 100s to 1000s of individuals are scattered through all four valleys. Although much of the contextual data has been destroyed, surface ceramics and associated human remains, along with areas of residential architecture and domestic trash remain undisturbed at sites outside the cultivated valley bottom. In contrast, Preceramic sites are generally the best preserved sites in the Norte Chico, in that most of the known sites are at the valley edges, beyond the current field (and plow) areas. Also, because of the lack of ceramics, elaborate textiles or metal, these sites have not been targets of appreciable looting. In isolated cases, large scale looting, apparently sponsored by *hacendados*, the large-scale land owners of earlier decades, resulted in trenches or deep holes through a small number of Preceramic monumental constructions. While highly destructive, these looters pits have exposed deep profiles and subsurface deposits that would be inaccessible otherwise.

Current development initiatives in the Norte Chico tend to focus on areas of uncultivated land between irrigation systems and the foothills. Though such areas include archaeological sites spanning more than 4,500 years and most of the Preceramic sites now identified, the area is generally considered to be unused, vacant land, needing to be put into production. Drip irrigation, chicken farms (on the site of Piedra Parada), and landfills (on the site of Aspero) are some of the recent initiatives that threaten sites and make the proposed research timely. All but one of the sites with monumental construction identified in aerial photos (taken in 1969-70) were still in existence during ground checks during summer 2001 reconnaissance though several sunken circular plazas have been filled and planted. Many of these sites will not survive another 30 years of rural development.

### **Field Methodology**

The project divides naturally into two seasons of archaeological testing, one each in the Pativilca and Fortaleza valleys. The Supe Valley has not been directly targeted for the chronological analysis on this project because much of the data is either already available or will be available soon (Ruth Shady, personal communication 2001). The Supe Valley is the best known and best surveyed of all the valleys in the Norte Chico. There is also an existing body of radiocarbon dates available for Supe, with a total of 36 dates on 12 different sites. Ongoing work in the valley directed by Shady of the Universidad Nacional Mayor de San Marcos promises to yield additional dates for other sites. Huaura is also not targeted for immediate testing due to the fact that no Cotton Preceramic sites have yet been identified in the Valley.

With complementary work on-going in Supe, sample excavations in Fortaleza and Pativilca will provide a comprehensive database for assessing the chronological relationships among the known Cotton Preceramic centers in the Norte Chico region. The 2002 season will be devoted to Pativilca and 2003 to Fortaleza. The same field strategy will be followed for both valleys.

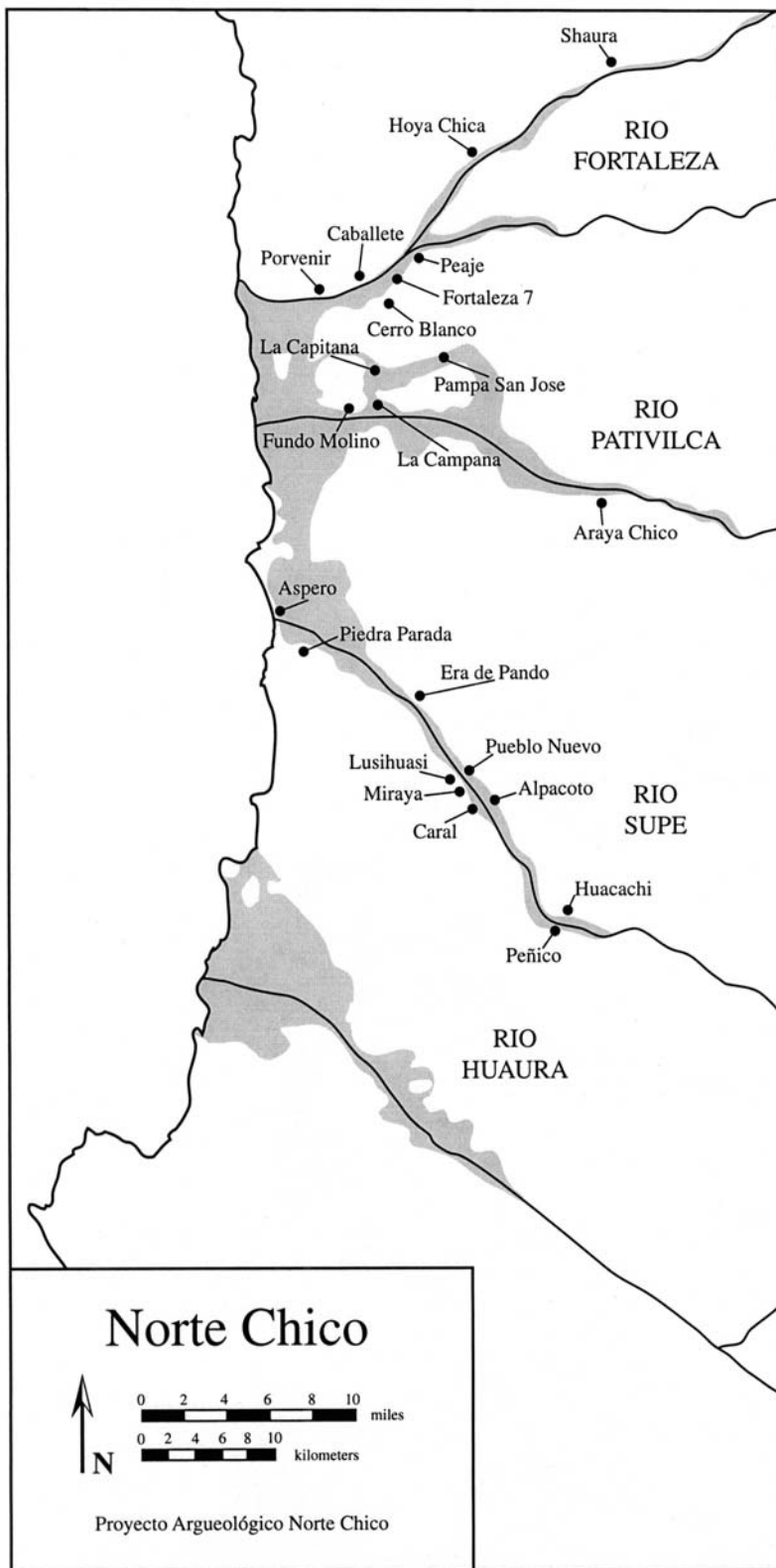
The primary objective of field work on this portion of the project will be to obtain suitable organic materials for radiocarbon dating. Samples will be taken from a variety of in-situ contexts in an effort to broadly bracket the span of occupation at each site tested. We recognize that this initial sampling is unlikely to turn up the very first and last dates of a site's occupation, but it should be possible to assess the general range of occupation and construction. In the course of seeking datable materials, we will also be recovering stratified residential trash materials. Although this is a secondary objective for the project at this stage, these materials will also be analyzed for their possible chronological value and for subsistence information.

Two different strategies will be applied to extract radiocarbon samples from a range of contexts in all the targeted sites.

1. Six to eight 1 X 2 meter test pits will be excavated in all the identified preceramic/aceramic centers in each valley. These test pits will be located in

areas of stratified midden deposits. These deposits will be identified through surface examination of erosional channels, looters pits, other disturbed areas and the use of a soil auger. Reconnaissance has confirmed that there are numerous suitable midden deposits at all the identified Cotton Preceramic sites located to date in both valleys. For each test pit, the contents will be excavated in a combination of natural layers and artificial levels depending on the immediate context. When natural layers are readily apparent in the excavation, they will be used as the primary horizontal provenience units. When natural layers cannot be detected, or if the natural layers are more than 15 cm thick, the deposits will be divided into arbitrary 15 cm artificial levels to maintain minimal horizontal provenience. All material will be screened through 1/4 in mesh screen with a 10 percent sample of each excavation unit screened through 1/8 mesh screen. Pollen and flotation samples will be taken from each horizontal provenience unit.

2. Additional samples will be obtained by exposing fresh faces in existing cuts and holes in monumental architecture. In almost every site targeted for testing, looters, local land owners or past construction activities have opened up deep holes or cut wide transects in one or more of the platform mounds. These cuts/holes provide an important opportunity to determine the construction sequence of the mound and to extract radiocarbon samples from different construction events within the body of the mound. All the mounds in this area were constructed with the use of *chicra*, woven fiber bags that were filled with stone and then laid in the mound like sandbags (Quilter 1985). Because of the arid environment, these *chicra* bags have been well preserved and provide an excellent source of organic material for radiocarbon dating (Shady, et al. 2001).



Site Descriptions (Figure 1)

### **PATIVILCA VALLEY (2002 sampling)**

Fondo Molino: The site consists of a single large platform mound (90X80X15 m) and associated SCP, and several smaller mounds. The site has been heavily disturbed by farming activities. While the main mound is intact, several of the smaller mounds have been partially bulldozed. The sunken circular plaza, visible in 1969 air photos, is now a cornfield, and not visible on the ground. The exposed profiles will be cleared and sampled. Areas of undisturbed residential trash can be tested.

La Capitana: From older aerial photographs, this site was at one time one of the largest preceramic sites in the Norte Chico. It has, unfortunately, been almost destroyed by construction of a power transmission station and local housing. One large central mound (120X65X14 m) and associate SCP remain and two smaller mounds. The long axis of the structure flanking the central mound has been transected with a bulldozer and offers a complete vertical cut through the structure. Patches of residential trash remain intact and can be tested.

Araya Chico: There are three large platform mounds (largest 80X80X18 m) lined up side by side at this site. While most of the site is intact, construction of a nearby canal destroyed a SCP that can be seen in aerial photographs. One mound has been cut with a trench and can be profiled. There is abundant residential trash to sample.

Pampa San Jose: This may eventually prove to be the largest or second largest (next to Caral) preceramic site in the Norte Chico. At present, much of the site is covered by fields, but a central mound (200X120X25 m) with SCP are intact, along with five or six additional platform mounds.

La Campana: This site includes the largest structure in the Norte Chico - a mound 200X100X50 m. However, this is not all artificial construction as the builders made use of a natural hill to augment the mound. There are some Initial Period ceramics on the top of this mound, but there are also exposed cuts in adjacent trash that lack ceramics. This site offers an excellent opportunity to examine the transition from the Cotton Preceramic to the Initial Period.

### **FORTALEZA VALLEY (2003 sampling)**

El Porvenir: The site consists of five large platform mounds and two SCPs surrounding a huge open plaza area and surrounded by 150 hectares of residential architecture and trash. A huge hole, dug right in the middle of a major mound, offers a profile of the structure from top to bottom. Deep, stratified trash is abundant over much of the site.

Caballote: The site consists of three large platform mounds and two SCPs around a plaza that is by itself over 35 ha in area. There is residential trash and architecture covering an area of an additional 75-100 ha.

Cerro Blanco: This is actually a very large complex of sites that have preceramic and later components. The preceramic component consists of two large platform mounds, a "modified mountain" (a natural hill was modified into a terraced mound), and a SCP. Exposed cuts in the area demonstrate that there are areas with only preceramic trash and other areas where ceramic-bearing trash overlies earlier preceramic occupations.

Fortaleza 7: This is a complex of adjoining mounds that forms a dense concentration of communal architecture. No SCP has been found at this site, but there is residential architecture and associated trash.

Peaje: Located immediately adjacent to a highway toll booth, the site has been heavily disturbed by recent construction. There is a complex of 4-5 mounds, all covered with modern residences and/or trash. The determination that this is a preceramic site is based on numerous exposed trash profiles.

Hoya Chica: This is one of the most interesting and complex sites in the Norte Chico. At one side of the site is a very large Initial Period/Early Horizon 'U'-shaped construction surrounded by associated buildings and trash. Nearby is a large preceramic mound with a circular plaza ringed by stones, but not sunken into the ground. Beyond this mound is a single mound complex that extends over 500 m in length and up to 15 m high, all artificial construction. Cuts in this long structure reveal confirm that it is preceramic.

Shaura: This site effectively no longer exists. Located on aerial photographs as a mound complex with associated SCP, the site has been almost completely destroyed by a bulldozer in recent years. Work at this site will consist solely of an effort to obtain in situ radiocarbon samples from remnants of the original mound.

### **Artifact Analysis**

Lithic Analysis. The primary focus of the laboratory analysis of materials from the test pits will be on the stone tools and debitage. Though ceramics are scarce in preceramic sites, there appears to be a lithic tool tradition among Preceramic settlements. Ground stone tools such as axes were carefully shaped and well polished, but are uncommon as surface finds. Chipped stone tools are largely expedient, sharp-edged flakes, but as mentioned, there has been no systematic analysis of stone tools from any excavations in the Norte Chico, and indeed, most researchers in the region have not recognized or saved any stone tools or debitage. These lithics will be the focus of a workshop to be held in Peru in August, 2002. The purpose of the workshop is to provide a framework for the analysis of this very challenging stone tool/debitage assemblage from sites in the region. A combination of outside funding sources are being used to support this workshop. This workshop and a close attention to lithic analysis on the project are important for two reasons:

First, the preceramic sites in the Norte Chico are significantly larger and more complex than any other known a-ceramic cultural group in the world, with an agricultural system based on irrigation, a highly diverse subsistence economy and a definite status hierarchy of residences. The sheer size of the 30 major sites recorded so far demonstrates both a very large resident population and possible seasonal residence for people who came from distant locations to build each site. These sites also manifest a clear rank order based on size, configuration and monumental architecture. Given this level of complexity and the absence of ceramics and many other kinds of material culture often associated with cultural complexity, the lithics stand as the primary type of material culture that can be used to elucidate day-to-day activities at the sites, social relationships, economic activities, possible specialization and many other cultural characteristics of the Preceramic population.

Second, the stone tools and lithic raw materials in the region are particularly challenging. As mentioned, archaeologists working in the area on earlier projects did not recognize

and/or save collections of stone tools or debitage (Willey and Corbett 1954; Feldman 1980; Shady 1997). An initial perusal of surface materials on Preceramic sites reveals large quantities of broken rocks and many river cobbles of various sizes and shapes. At first glance much of this material looks like naturally occurring fractured rock and unutilized cobbles. Upon closer examination, and with some experimentation on local raw materials, it is clear that the stone flakes and pieces found at these sites are in fact chipped stone tools and debitage. There are also distinct types of worked, pecked and polished cobble tools. The problem is that there are only slight differences between cultural material and naturally occurring broken rocks and cobbles. At one end of the spectrum are trimmed flakes and occasional cutting and scraping tools, while at the other end are miscellaneous bits and scraps of broken stone. Similar to the cobble assemblage, there are some clear examples of mortars and axes but far more cases of cobbles with patches of use-wear or localized pecking.

Botanical/Faunal Remains. Initial consultation in the field by paleoethnobotanist Dr. Linda Scott Cummings will assure that samples are properly collected and processed for storage. She will also instruct project members on initial sorting procedures. Separate funding is being sought for additional analyses of faunal and floral samples.

Laboratory Facilities. Analysis of all the recovered materials will be conducted at the project laboratory facilities located in the town of Pativilca at the Museo Bolivariano and at the project headquarters in Barranca. Laboratory space is being equipped with suitable lighting, microscopes, measuring devices, and supplies needed for detailed lithic analysis, flotation, and basic sorting of plant and animal remains.

Publication and Dissemination of Results. The results of testing and analysis of materials from each valley will be written up and submitted for publication as two separate volumes in The Field Museum's publication series, Fieldiana. These publications will describe excavation and analytical results in detail and are intended to be of immediate use to scholars who want to work in the Norte Chico area or to compare Norte Chico chronology to other parts of the Peruvian coast and highlands. Because project reports are required by the Peruvian Instituto Nacional de Cultura prior to the annual renewal of permits, each valley report will be completed within a year and submitted to Fieldiana. Student work resulting from the project is expected to include two M.A. thesis projects per season. These will either be included as individually-authored chapters in the Fieldiana reports, or will be the basis for separately published articles. Undergraduate and high school students' research will also be included in the field reports, when appropriate. A symposium on this research will be presented at the annual meeting of the Society for American Archaeology in March, 2002, to present results of two seasons of field reconnaissance and planning.

A broader audience for the present research will be reached by a television documentary produced by BBC Horizon, which was filmed in Peru during July and October 2001, and will be released in the US in the spring of 2002. The rapid production of this

documentary indicates the widespread public interest in the development of ancient civilization around the world.

## **IMPACT**

The proposed research will provide new data to resolve several questions: whether inland monumental centers or extensive coastal villages characterize the 3rd millennium BC along the coast of Peru and whether monumental centers predate coastal settlements. The research will also address whether there were many contemporaneous inland centers during the preceramic, or a sequence of monumental construction that lasted from approximately 3000 to 1800 BC, which would be a scenario unique in the development of ancient civilization.

Further, this research will add to the dialogue over the basis for the development of ancient civilization. The proposed work addresses whether complex society can develop from a basis of maritime resources, or whether in Peru, as elsewhere around the world, cultivated crops provided the impetus for the earliest amassing of wealth and mobilization of labor.

The project will also have a positive impact on the region surrounding the Pativilca and Fortaleza Valleys. The Museo Bolivariano, in Pativilca, will host a lithic workshop in August 2002, and will store project materials. This is expected to yield both employment and training opportunities for Peruvian students. The museum will receive technical assistance from the project PIs and Peruvian project director Alvaro Ruiz in developing an archaeology exhibit and educational materials to enhance appreciation of regional history, and promote site preservation.

The proposed research will continue to incorporate high school, undergraduate, and graduate students, both Peruvian and American. To date three high school students, and three M.A. level graduate students have participated in the field reconnaissance. Two other students have conducted project-related research through the mentorship program of the Illinois Math and Science Academy (Creamer 1 student 1999-2001; Haas 1 student 1999-2000). Both the present proposal and the planned lithics workshop include additional participation by undergraduate and graduate students, who will receive valuable field experience, along with thesis and publication opportunities. Further, the project base in Barranca and Pativilca, Peru, provides an opportunity for intensive language interaction in Spanish among project members, museum personnel, and members of the surrounding communities.



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