

= Norte Chico civilization =

The Norte Chico civilization (also Caral or Caral @-@ Supe civilization) was a complex pre @-@ Columbian society around that included as many as 30 major population centers in what is now the Norte Chico region of north @-@ central coastal Peru . The civilization flourished between the 4th and 2nd millennia BC , with the formation of the first city generally dated to around 3500 BC , at Huaricanga , in the Fortaleza area . It is from 3200 BC onward that large @-@ scale human settlement and communal construction become clearly apparent , which lasted until a period of decline around 1800 BC . Since the early 21st century , it has been established as the oldest known civilization in the Americas .

This civilization flourished at the confluence of three rivers , the Fortaleza , the Pativilca , and the Supe . These river valleys each have large clusters of sites . Further south , there are several associated sites along the Huaura River .

The alternative name , Caral @-@ Supe , is derived from the Sacred City of Caral in the Supe Valley , a large and well @-@ studied Norte Chico site . Complex society in Norte Chico arose a millennium after Sumer in Mesopotamia , was contemporaneous with the Egyptian pyramids , and predated the Mesoamerican Olmec by nearly two millennia .

In archaeological nomenclature , Norte Chico is a pre @-@ ceramic culture of the pre @-@ Columbian Late Archaic ; it completely lacked ceramics and apparently had almost no visual art . The most impressive achievement of the civilization was its monumental architecture , including large earthwork platform mounds and sunken circular plazas . Archaeological evidence suggests use of textile technology and , possibly , the worship of common god symbols , both of which recur in pre @-@ Columbian Andean cultures . Sophisticated government is assumed to have been required to manage the ancient Norte Chico . Questions remain over its organization , particularly the influence of food resources on politics . Some scholars have suggested that Norte Chico was founded on seafood and maritime resources , rather than development of an agricultural cereal and crop surpluses , as has been considered essential to the rise of other ancient civilizations .

Archaeologists have been aware of ancient sites in the area since at least the 1940s ; early work occurred at Aspero on the coast , a site identified as early as 1905 , and later at Caral further inland .

In the late 1990s Peruvian archaeologists , led by Dr. Ruth Shady Solís , provided the first extensive documentation of the civilization with work at Caral . A 2001 paper in Science , providing a survey of the Caral research , and a 2004 article in Nature , describing fieldwork and radiocarbon dating across a wider area , revealed Norte Chico 's full significance and led to widespread interest .

= = History and geography = =

Norte Chico has pushed back the horizon for complex societies in the Peruvian region by more than one thousand years . The Chavín culture , circa 900 BC , had long been considered the first civilization of the area . It is still regularly cited as such in general works .

The discovery of Norte Chico has also shifted the focus of research away from the highland areas of the Andes and lowlands adjacent to the mountains (where the Chavín , and later Inca , had their major centers) to the Peruvian littoral , or coastal regions . Norte Chico is located in a north @-@ central area of the coast , approximately 150 to 200 km north of Lima , roughly bounded by the Lurín Valley on the south and the Casma Valley on the north . It comprises four coastal valleys : the Huaura , Supe , Pativilca , and Fortaleza ; known sites are concentrated in the latter three , which share a common coastal plain . The three principal valleys cover only 1 @,@ 800 km ² , and research has emphasized the density of the population centers .

The Peruvian littoral appears an " improbable , even aberrant " candidate for the " pristine " development of civilization , compared to other world centers . It is extremely arid , bounded by two rain shadows (caused by the Andes to the east , and the Pacific trade winds to the west) . The region is punctuated by more than 50 rivers that carry Andean snowmelt . The development of

widespread irrigation from these water sources is seen as decisive in the emergence of Norte Chico ; since all of the monumental architecture at various sites has been found close to irrigation channels .

The radiocarbon work of Jonathan Haas et al . , found that 10 of 95 samples taken in the Pativilca and Fortaleza areas dated from before 3500 BC ; the oldest , dating from 9210 BC , provides " limited indication " of human settlement during the Pre @-@ Columbian Early Archaic era . Two dates of 3700 BC are associated with communal architecture , but are likely to be anomalous . It is from 3200 BC onward that large @-@ scale human settlement and communal construction are clearly apparent . Mann , in a survey of the literature in 2005 , suggests " sometime before 3200 BC , and possibly before 3500 BC " as the beginning date of the Norte Chico formative period . He notes that the earliest date securely associated with a city is 3500 BC , at Huaricanga , in the Fortaleza area of the north , based on Haas ' dates .

Haas ' early third millennium dates suggest that the development of coastal and inland sites occurred in parallel . But , from 2500 to 2000 BC , during the period of greatest expansion , the population and development decisively shifted toward the inland sites . All development apparently occurred at large interior sites such as Caral , though they remained dependent on fish and shellfish from the coast . The peak in dates is in keeping with Shady 's dates at Caral , which show habitation from 2627 BC to 2020 BC . That coastal and inland sites developed in tandem remains disputed , however (see next section) .

Circa 1800 BC , the Norte Chico civilization began to decline , with more powerful centers appearing to the south and north along the coast , and to the east inside the belt of the Andes . Norte Chico 's success at irrigation @-@ based agriculture may have contributed to its being eclipsed . One researcher notes that " when this civilization is in decline , we begin to find extensive canals farther north . People were moving to more fertile ground and taking their knowledge of irrigation with them . " It would be a thousand years before the rise of the next great Peruvian culture , the Chavín .

= = Geographical links = =

Cultural links with the highland areas have been noted by archaeologists . In particular , the links with the Kotosh Religious Tradition have been suggested .

" Numerous architectural features found among the settlements of Supe , including subterranean circular courts , stepped pyramids and sequential platforms , as well as material remains and their cultural implications , excavated at Aspero and the valley sites we are digging (Caral , Chupacigarro , Lurihuasi , Miraya) , are shared with other settlements of the area that participated in what is known as the Kotosh Religious Tradition . Most specific among these features are rooms with benches and hearths with subterranean ventilation ducts , wall niches , biconvex beads , musical flutes , etc . "

= = Maritime coast and agricultural interior = =

Research into Norte Chico continues , with many unsettled questions . Debate is ongoing over two related questions : the degree to which the flourishing of the Norte Chico was based on maritime food resources , and the exact relationship this implies between the coastal and inland sites .

= = = Confirmed diet = = =

A broad outline of the Norte Chico diet has been suggested . At Caral , the edible domesticated plants noted by Shady are squash , beans , lucuma , guava , pacay , and camote . Haas et al. noted the same foods in their survey further north , while adding avocado and achira . In 2013 , good evidence for maize was also documented by Haas et al . (see below) .

There was also a significant seafood component at both coastal and inland sites . Shady notes that " animal remains are almost exclusively marine " at Caral , including clams and mussels , and large

amounts of anchovies and sardines . That the anchovy fish reached inland is clear , although Haas suggests that " shellfish [which would include clams and mussels] , sea mammals , and seaweed do not appear to have been significant portions of the diet in the inland , non @-@ maritime sites " .

= = = Theory of a maritime foundations of Andean civilization = = =

The role of seafood in the Norte Chico diet has aroused debate . Much early fieldwork was done in the region of Aspero on the coast , before the full scope and inter @-@ connectedness of the several sites of the civilization were realized . In a 1973 paper , Michael E. Moseley contended that a maritime subsistence (seafood) economy had been the basis of the society and its remarkably early flourishing , a theory later elaborated as a " maritime foundation of Andean civilization " (MFAC) . He also confirmed a previously observed lack of ceramics at Aspero , and deduced that " hummocks " on the site constituted the remains of artificial platform mounds .

This thesis of a maritime foundation was contrary to the general scholarly consensus that the rise of civilization was based on intensive agriculture , particularly of at least one cereal . The production of agricultural surpluses had long been seen as essential in promoting population density and the emergence of complex society . Moseley 's ideas would be debated and challenged (that maritime remains and their caloric contribution were overestimated , for example) but have been treated as plausible as late as Mann 's summary of the literature in 2005 .

Concomitant to the maritime subsistence hypothesis was an implied dominance of sites immediately adjacent to the coast over other centers . This idea was shaken by the realization of the magnitude of Caral , an inland site . Supplemental to Shady 's 1997 article dating Caral , a 2001 Science news article emphasized the dominance of agriculture and also suggested that Caral was the oldest urban center in Peru (and the entire Americas) . It deprecated the idea that civilization might have begun adjacent to the coast and then moved inland . One archaeologist was quoted as suggesting that " rather than coastal antecedents to monumental inland sites , what we have now are coastal satellite villages to monumental inland sites . "

These assertions were quickly challenged by Sandweiss and Moseley , who observed that Caral , though the largest and most complex Preceramic site , is not the oldest . They admitted the importance of agriculture to industry and to augment diet , while broadly affirming " the formative role of marine resources in early Andean civilization . " Scholars now agree that the inland sites did have significantly greater populations , and that there were " so many more people along the four rivers than on the shore that they had to have been dominant . "

The remaining question is which of the areas developed first and created a template for subsequent development . Haas rejects suggestions that maritime development at sites immediately adjacent to the coast was initial , pointing to contemporaneous development based on his dating . Moseley remains convinced that coastal Aspero is the oldest site , and that its maritime subsistence served as a basis for the civilization .

= = = Cotton and politics = = =

Cotton (of the species *Gossypium barbadense*) likely provided the basis of the dominance of inland over coast (whether development was earlier , later , or contemporaneous) . Though not edible , it was the most important product of irrigation in the Norte Chico , vital to the production of fishing nets (that in turn provided maritime resources) as well as to textiles and textile technology . Haas notes that " control over cotton allows a ruling elite to provide the benefit of cloth for clothing , bags , wraps , and adornment . " He is willing to admit to a mutual dependency dilemma : " The prehistoric residents of the Norte Chico needed the fish resources for their protein and the fishermen needed the cotton to make the nets to catch the fish . " Thus , identifying cotton as a vital resource produced in the inland does not by itself resolve the issue of whether the inland centers were a progenitor for the coast or vice versa ? Moseley argues , for instance , that successful maritime centers would have moved inland to find cotton . The exact relationship between food resources and political organization remains unresolved .

Regardless of the status of maritime food resources , Norte Chico 's development is still remarkable for the apparent absence of a staple cereal . However , recent studies increasingly dispute this and point to maize as a dietary backbone of this and later pre @-@ Columbian American civilizations . Moseley found a small number of maize cobs in 1973 at Aspero (also seen in site work in the 1940s and 50s) but has since called the find " problematic " .

Increasing evidence has emerged about the importance of maize in this period .

" Archaeological testing at a number of sites in the Norte Chico region of the north central coast provides a broad range of empirical data on the production , processing , and consumption of maize . New data drawn from coprolites , pollen records , and stone tool residues , combined with 126 radiocarbon dates , demonstrate that maize was widely grown , intensively processed , and constituted a primary component of the diet throughout the period from 3000 to 1800 B.C. "

= = Social organization = =

= = = Government = = =

The Norte Chico chiefdoms were " almost certainly theocratic , though not brutally so , " according to Mann . Construction areas show possible evidence of feasting , which would have included music and likely alcohol , suggesting an elite able to both mobilize and reward the population . The degree of centralized authority is difficult to ascertain , but architectural construction patterns are indicative of an elite that , at least in certain places at certain times , wielded considerable power : while some of the monumental architecture was constructed incrementally , other buildings , such as the two main platform mounds at Caral , appear to have been constructed in one or two intense construction phases . As further evidence of centralized control , Haas points to remains of large stone warehouses found at Upaca , on the Pativilca , as emblematic of authorities able to control vital resources such as cotton .

Haas suggests that the labour mobilization patterns revealed by the archaeological evidence point to a unique emergence of human government , one of two alongside Sumer (or three , if Mesoamerica is included as a separate case) . While in other cases , the idea of government would have been borrowed or copied , in this small group , government was invented . Other archaeologists have rejected such claims as hyperbolic .

In exploring the basis of possible government , Haas suggests three broad bases of power for early complex societies :

economic ,
ideology , and
physical .

He finds the first two present in ancient Norte Chico .

= = = = Economic = = = =

Economic authority would have rested on the control of cotton and edible plants and associated trade relationships , with power centered on the inland sites . Haas tentatively suggests that the scope of this economic power base may have extended widely : there are only two confirmed shore sites in the Norte Chico (Aspero and Bandurria) and possibly two more , but cotton fishing nets and domesticated plants have been found up and down the Peruvian coast . It is possible that the major inland centers of Norte Chico were at the center of a broad regional trade network centered on these resources .

Discover magazine , citing Shady , suggests a rich and varied trade life : " [Caral] exported its own products and those of Aspero to distant communities in exchange for exotic imports : Spondylus shells from the coast of Ecuador , rich dyes from the Andean highlands , hallucinogenic snuff from the Amazon . " (Given the still limited extent of Norte Chico research , such claims should be treated circumspectly .) Other reports on Shady 's work indicate Caral traded with communities in

the jungle farther inland and , possibly , with people from the mountains .

=== Ideology ===

Leaders ' ideological power was based on apparent access to deities and the supernatural . Evidence regarding Norte Chico religion is limited : an image of the Staff God , a leering figure with a hood and fangs , has been found on a gourd dated to 2250 BC . The Staff God is a major deity of later Andean cultures , and Winifred Creamer suggests the find points to worship of common symbols of gods . As with much other research at Norte Chico , the nature and significance of the find has been disputed by other researchers .

The act of architectural construction and maintenance may also have been a spiritual or religious experience : a process of communal exaltation and ceremony . Shady has called Caral " the sacred city " (La ciudad sagrada) : socio-economic and political focus was on the temples , which were periodically remodeled , with major burnt offerings associated with the remodeling .

=== Physical ===

Haas notes the absence of any suggestion of physical bases of power , that is , defensive construction . There is no evidence of warfare " of any kind or at any level during the Preceramic Period . " Mutilated bodies , burned buildings , and other tell-tale signs of violence are absent , and settlement patterns are completely non-defensive . The evidence of the development of complex government in the absence of warfare is in marked contrast to archaeological theory , which suggests that human beings move away from kin-based groups to larger units resembling " states " for mutual defense of often scarce resources . A vital resource was present : arable land generally , and the cotton crop specifically , but the move to greater complexity was apparently not driven by the need for defense or warfare .

== Sites and architecture ==

Norte Chico sites are notable for exceptional collective density , as well as individual size . Haas argues that the density of sites in such a small area is globally unique for a nascent civilization . During the third millennium BC , Norte Chico may have been the most densely populated area of the world (excepting , possibly , northern China) . The Supe , Pativilca , Fortaleza , and Huaura River valleys each have several related sites .

Evidence from the ground-breaking work of 1973 at Aspero , at the mouth of the Supe Valley , suggested a site of approximately 13 hectares (32 acres) . Surveying of the midden suggested extensive prehistoric construction activity . Small-scale terracing is noted , along with more sophisticated platform mound masonry . As many as eleven artificial mounds " could be " present . Moseley calls these " Corporate Labor Platforms " , given that their size , layout , and construction materials and techniques would have required an organized workforce .

The survey of the northern rivers found sites between 10 and 100 ha (25 and 247 acres) ; between one and seven large platform mounds ? rectangular , terraced pyramids ? were discovered , ranging in size from 3 @, @ 000 m³ (110 @, @ 000 cu ft) to over 100 @, @ 000 m³ (3 @, @ 500 @, @ 000 cu ft) . Shady notes that the central zone of Caral , with monumental architecture , covers an area of just over 65 ha . Six platform mounds , numerous smaller mounds , two sunken circular plazas , and a variety of residential architecture were also discovered at this site .

The monumental architecture was constructed with quarried stone and river cobbles . Using reed " shicra @-@ bags " , some of which have been preserved , laborers would have hauled the material to sites by hand . Roger Atwood of Archaeology magazine describes the process :

" Armies of workers would gather a long , durable grass known as shicra in the highlands above the city , tie the grass strands into loosely meshed bags , fill the bags with boulders , and then pack the trenches behind each successive retaining wall of the step pyramids with the stone @-@ filled bags . "

In this way , the people of Norte Chico achieved formidable architectural success . The largest of the platforms mounds at Caral , the Piramide Mayor , measures 160 by 150 m (520 by 490 ft) and rises 18 m (59 ft) high . In its summation of the 2001 Shady paper , the BBC suggests workers would have been " paid or compelled " to work on centralized projects of this sort , with dried anchovies possibly serving as a form of currency . Mann points to " ideology , charisma , and skilfully timed reinforcement " from leaders .

= = Development and absent technologies = =

When compared to the common Eurasian models of the development of civilization , Norte Chico 's differences are striking . A total lack of ceramics persists across the period . The BBC observes that Norte Chico 's people would have roasted their various crops , with no pots to boil them . The lack of pottery was accompanied by a lack of archaeologically apparent art . In conversation with Mann , Alvaro Ruiz observes : " In the Norte Chico we see almost no visual arts . No sculpture , no carving or bas @-@ relief , almost no painting or drawing ? the interiors are completely bare . What we do see are these huge mounds ? and textiles . "

While the absence of ceramics appears anomalous , the presence of textiles is intriguing . Quipu (or khipu) , string @-@ based recording devices , have been found at Caral , suggesting a writing , or " proto @-@ writing " , system at Norte Chico . (The discovery was reported by Mann in Science in 2005 , but has not been formally published or described by Shady .) The exact use of quipu in this and later Andean cultures has been widely debated . Originally it was believed to be simply a mnemonic used to record numeric information , such as a count of items bought and sold . Evidence has emerged that the quipu may also have recorded logographic information in the same way writing does . Research has focused on the much larger sample of a few hundred quipu dating to Inca times ; the Norte Chico discovery remains singular and undeciphered .

Other finds at Norte Chico have proved suggestive . While visual arts appear absent , the people may have played instrumental music : thirty @-@ two flutes , crafted from pelican bone , have been discovered . The leering face of the Staff God is another artifact that awaits explanation . While still fragmentary , such archaeological evidence corresponds to the patterns of later Andean civilization and may indicate that Norte Chico served as a template . Along with the specific finds , Mann highlights " the primacy of exchange over a wide area , the penchant for collective , festive civic work projects , [and] the high valuation of textiles and textile technology " within Norte Chico as patterns that would recur later in the Peruvian cradle of civilization .

= = Research controversies = =

The magnitude of the Norte Chico discovery has brought academic controversy in its wake . The " monumental feud " , as described by Archaeology , has included " public insults , a charge of plagiarism , ethics inquiries in both Peru and the United States , and complaints by Peruvian officials to the U.S. government . " The lead author of the seminal paper of April 2001 was Peruvian Ruth Shady , with co @-@ authors Jonathan Haas and Winifred Creamer , a married United States team ; the coauthoring was reportedly suggested by Haas , in the hopes that the involvement of United States researchers would help secure funds for carbon dating as well as future research funding . Later , Shady charged the couple with plagiarism and insufficient attribution , suggesting the pair had received credit for her research , which had been going on since 1994 .

At issue is credit for the discovery of the civilization , naming it , and developing the theoretical models to explain it . That Shady was describing a civilization is clear in 1997 : (" los albores de la civilización en el Perú . ") . While locating it on the Supe River , with Caral at its center , she suggested a larger geographic base for the society :

In 2004 , Haas et al. wrote : " Our recent work in the neighboring Pativilca and Fortaleza has revealed that Caral and Aspero were but two of a much larger number of major Late Archaic sites in the Norte Chico , " while only noting Shady in footnotes . Attribution of this type is what has angered Shady and her supporters . Shady 's position has been hampered by a lack of funding for

archeological research in her native Peru , as well as the media advantages of North American researchers in disputes of this type .

Haas and Creamer were cleared of the plagiarism charge by their institutions . The Chicago Field Museum ' s science advisory council rebuked Haas for press releases and web pages that gave too little credit to Shady and inflated the couple ' s role as discoverers . The dispute remains heated . Scholars have concerns that it could make it more difficult for United States archaeologists to gain permission to work in Peru .