

Early Formative Societies in Ecuador

1. rise of complex society in the Andes
 - a. most clearly exemplified by Late Preceramic societies of the central Peruvian coast
 - b. but one of the most precocious sedentary society still appears to have been Ecuador's coastal Valdivia culture
 1. 4th-3rd millennia BC
2. early societies in Ecuador
 - a. some of earliest evidence for agriculture in South America
 - b. some of the earliest ceramics in South America
 - c. some indications of social differentiation: e.g., in treatment of the dead
 - d. early evidence for sedentism: permanent villages
3. unfortunately: Ecuador is relatively understudied
 - a. compared to other areas of important developments in precolumbian LAm: Peru or Mexico
 - b. poor preservation
 1. climate
 - c. few investigators
 1. although pace has picked up significantly in recent years
4. ergo: we are at the mercy of a relatively small data set and few explanatory perspectives
 - a. incompletely reported
 - b. enthusiastically interpreted
 1. early interpretations: rampant, wishful speculation
 2. e.g., dueling origins
 - a. Japan
 - b. tropical lowlands
5. major issues that we can gain some insight into
 - a. regional settlement organization: Damp, Zeidler
 - b. internal site structure: Lathrap and Real Alto
 - c. development of subsistence strategies: Pearsall, Damp
 - d. development of craft production
6. also a few bizarre issues that have drawn excessive interest
 - a. issue of origins and competitive dates
 - b. Japanese origins of Andean civilization

Early Ceramic Period in Ecuador

[Late Preceramic]

(3300-1500 BC)

1. ceramic using cultures appear here long before pottery occurs in Peru
 - a. Santa Elena Peninsula: Achallan, San Pablo, Valdivia
 - b. Puerto Hormiga: Colombia
 - c. Rancho Peludo: Venezuela
2. Achallan and San Pablo complexes occur before the more widespread Valdivia ceramic complex
 - a. Achallan (OGSE-63) faunal remains
 1. continuation of Vegas exploitation patterns: terrestrial hunting with some fishing
 - b. data on plant remains are missing from both complexes
3. with introduction of Valdivia ceramics: patterns begin to change
 - a. introduction probably from the east
 - b. faunal analysis
 1. switch to primarily aquatic protein sources at peninsular and coastal sites
 2. terrestrial hunting predominant at the inland sites and at type site (Valdivia) on Santa Elena peninsula
 3. suggests pattern of year-round subsistence specialization
 - a. similar to that suggested for the Peruvian coast in Late Pre-ceramic and Initial Periods
 - c. maize at Real Alto
 1. suggests further that the terrestrial orientation may correlate with agriculture

Valdivia: Settlement Patterns

Period A: 3300-2300 BC

Period B: 2300-1850 BC

Period C: 1850-1500 BC

Machalilla: 1500-800 BC

1. three main cultures on Ecuadorian coast
 - a. Valdivia
 - b. Machalilla
 - c. Chorrera
2. Valdivia sites: both coast and inland
 - a. settled agricultural villages
 1. some with ceremonial structures
 2. villages of 3300 BC were U-shaped
 3. configuration provided basis for subsequent construction of ceremonial mounds
 - b. agriculture present

[Late Pre-ceramic]

1. corn, achira, Canavalia plamosperma, bottle gourd, cotton
 2. Pearsall has noted various agricultural regimes
3. Damp: three Valdivia periods: 3300-1500 BC
 - a. Period A.: 3300-2300 BC
 1. ends with construction of ceremonial mounds at such sites as Real Alto
 2. includes Valdivia I and II of Hill
 - b. Period B: 2300-1850 BC
 1. includes Valdivia III, IV, and V
 2. main villages had their largest populations
 - c. Period C: 1850-1500 BC
 1. ends with transition into Machalilla
 2. establishment of satellite communities around such sites as Real Alto
 3. dispersion of population away from ceremonial centers
 4. Loma Alta
 - a. accrual of ashy refuse on west, north, and east edges: 10-15 m wide
 - b. population estimates
 1. 150-200 village inhabitants
 2. comparable to forest-dwelling villages
 - c. early village: U-shaped
 1. Valdivia I: 145 x 90 m
 2. Valdivia II: 175 x 115 m
 - d. three caches of storage or cooking pots
 1. in open area at end of U: otherwise kept clean
 2. no bowls found here: normal vessel form
 3. no ashy midden: as in other, domestic areas of site
 5. Real Alto
 - a. scale
 1. area: 400 x 300 m
 2. maximum population: 1,500 inhabitants
 - b. road cut exposed site to pothunters
 1. potted materials showed occupation
 - a. through most of Valdivia: 3550-1500 BC
 - b. into Machalilla: 1500-1000 BC
 2. greatest occupation: Valdivia III (ca. 3100 BC)
 - c. east side: broad straight ridge of midden
 1. 2' deep x 400 m long
 2. Ridge A
 - d. other sides
 1. S: destroyed by road cutting
 2. N: preserved and excavated
 3. W: narrower ridge paralleling A; called B

[Late Preceramic]

- e. Valdivia III-IV mounds: Fiesta and Charnel Houses toward center of Ridge B
 - 1. Charnel House Mound
 - a. opposite it: peninsula of refuse
 - 2. Fiesta Mound
 - 3. center open area kept largely clean

- 6. Fiesta Mound
 - a. truncated elliptical cone
 - 1. 50 x 37 m at base
13 x 9 m at top
1.4 m high
 - b. originally built in III
 - c. elliptical basin-like depression in top
 - 1. floor of first ceremonial structure
 - 2. III sherds, other artifacts and food remains: different from those in rest of site
 - a. razor clams, rock crab claws, lobster tails, scallop, chiton shells, sea turtles
 - b. nearly all pieces of each bowl found inside same pit
 - a. implies that each pit was dug after special event
 - 3. pits dug through successive floors
 - d. step-like depression mount front of mound
 - e. at least 4 intentional resurfacings with yellow clay
 - f. structure rebuilt 8 times
 - g. door opened facing Charnel House mound

- 7. Charnel House Mound
 - a. elliptical central precinct
 - 1. two semi-circular wings along ridgeline
 - b. 2 m-wide door facing plaza
 - 1. bounded by massive posts
 - c. burials in doorway and interior
 - 1. woman in stone-lined tomb under threshold of entrance
 - 2. floor lined with manos
 - 3. sides lined with metates
 - 4. entire tomb partially covered with metates
 - d. dismembered male: bones stacked to side of tomb
 - e. secondary burials of 7 males
 - 1. just west: bones stacked in common pit
 - 2. Lathrap: implies male sacrifice to high-status female buried inside the stone-lined tomb

- 8. Damp: overall spatial interpretation
 - a. U-shape: structured social relationships within community
 - 1. duality: separation of two wings
 - 2. central ceremonial area

[Late Preceramic]

- b. set apart domestic and ceremonial areas
- c. presaged later ceremonial structures

[Late Preceramic]

Late Preceramic on Peruvian Coast

[sources: Moseley 1975, 1992; Wilson 1981; Quilter 1990, 1991; Burger 1992; Benfer 1990; Weir and Dering, Benfer 1984]

Introduction

1. between 3500 and 1800 BC: major changes occurred in Peru
 - a. shift from foraging to agriculture
 - b. emergence of elites
 - c. construction of first significant monumental architecture
 - d. development of first important residential settlements
2. we know considerably more about this area than we do about the coast of Ecuador during the period 3500-1500 BC
 - a. but data base requires cautious interpretation
 - b. settlement data selective
 1. emphasis on a few areas
 2. not clear if those are representative of the period
 3. population estimates are poorly founded
3. important changes recorded for
 - a. central and north Peruvian coasts: focus of transformations
 - b. western valleys: central and north Peru
 - c. eastern slopes: central Peru
4. key questions for the Cotton Preceramic era
 - a. subsistence base: matter of contention
 1. do people need to control their food production to sustain a complex society?
 2. or can they rely on a productive natural habitat for adequate foraged resources?
 - b. how complex were the societies of the era?
 1. in what ways were they complex?
 2. e.g., social differentiation
 3. political or economic complexity
 4. separation of ideological from other sorts of leadership
 - c. what is the significance of the monumental architecture?
 1. what were the social forms that underlay their construction

Chronology: the beginnings

1. major sites for era first recorded in 1941
 - a. Willey and Corbett failed to find pottery at Aspero
 1. assumed that corporate architecture could occur only in ceramic and agricultural societies
 2. so dated site on the basis of ceramics from nearby cemetery

[Late Preceramic]

- b. gradually became apparent that Aspero was not an anomaly
 - 1. much larger pattern
 - 2. El Paraíso: Chillón Valley
 - 3. Río Seco: Chancay
 - 4. Bandurria: Huaura V.
 - 5. Piedra Parada: Supe
 - 6. Salinas de Chao: Chao V.
 - c. highland developments: Kotosh
2. chronology becoming better resolved in recent years
 - a. increasing # of C-14 dates
 - b. Aspero: stone platforms
 1. oldest C-14 dates from Huaca de los Sacrificios
 - a. 2772 BC, 2903 BC
 - b. architecture at least 200 yrs older
 2. Huaca de los Idolos
 - a. 3001 BC, 2483 BC
 3. contemporaneous with
 - a. royal pyramids of Old Kingdom in Egypt
 - b. Early Dynastic Sumerian ziggurats
 4. oldest monumental architecture in the New World
 - a. 1,000 years before Olmec
 5. Quilter (1991) suggests 3 basic phases for Peruvian Preceramic
 - a. Early Preceramic: 13,000?-8,000 BP
 1. foraging economy
 - b. Middle Preceramic: 8,000-4,500 BP
 1. modern environmental conditions
 2. broad-based economies: focused on specific local resources
 - c. Late Preceramic: 4,450-3,800 BP
 1. beginning of widespread use of cultigens
 2. construction of monumental architecture in many parts of Peru

Overview of Major Changes

1. change in subsistence
 - a. stage 1: shift from a terrestrial adaptation for procurement of protein in Lithic or Archaic
 1. to an increasingly marine-based adaptation by coastal littoral peoples by about 3500 BC
 - b. stage #2: shift to emphasis on agriculture by 1800 BC
 1. adoption of cultigens was slow and selective

[Late Preceramic]

- a. no evidence yet found for an early reliance on staple crops
- 2. irrigation-based agriculture became important quite early: i.e., about 1800 BC
- 3. controversy exists over certain features of early agriculture
 - a. dates of inception
 - b. importance in early subsistence systems
 - c. strategies of cultivation
 - 1. e.g., floodwater vs. dry farming
 - 2. or initially irrigation
- 2. demographics and settlement patterns
 - a. significant population growth
 - b. development of settled village life
 - a. settlement diversification
 - 1. ceremonial centers
 - 2. population centers
 - 3. small villages
 - b. articulation among settlements
- 3. political: some centralization of authority or integration of multiple settlements is probable
 - a. evidence present for incipient settlement hierarchies
 - b. at least some monumental construction
 - 1. some of which may have been centrally directed
 - c. the degree or nature of territoriality is unclear
 - 1. no good evidence for stylistic boundaries in material culture that would demarcate cultural or social territories
- 4. ideology: clear evidence for exchange or sharing of ideas over long distances
 - a. standardization of large-scale architecture
 - b. long-distance exchange of commodities that were valued over a wide area
 - 1. e.g., Spondylus
- 5. key to remember is that the changes were all Preceramic: i.e., occurred before ceramics were used as pottery
 - a. many important changes occurred before shift to agriculture
 - 1. at least as the dominant source of subsistence for most of the population
 - b. implication: processes of sociopolitical change do not coincide well with changes in other areas of society and culture that are traditionally associated in explanations
 - 1. e.g., economic change: social differentiation without staple agriculture
 - 2. e.g., social complexity without pottery
 - c. may be comparable to some early developments in the Near East
 - 1. e.g., Jericho in 8000 BC
 - 2. social differentiation based on a preceramic, H&G economy

[Late Preceramic]

Subsistence

Environmental setting

1. climate
 - a. rainfall occurs only a couple of times per decade
 1. destructive when it comes
 - b. juxtaposition of desert and sea
 - c. lomas vegetation
 1. about 6 mo/yr
 2. Lanning: part of seasonal round of H&G
2. rich maritime environment
 - a. upwelling brings up phosphates, nitrates, and other nutrients
 - b. feed plants: diatoms and photoplanktons
 - b. moves up to shellfish on littoral
 - c. through anchovies to larger fish offshore
3. coastal microenvironments
 - a. Moseley describes 9 basic resource zones
 1. reducible to fewer
 2. littoral most productive
 - b. beach littoral
 1. fish, invertebrates, algae, birds, sea mammals
 2. technology: some watercraft necessary
 - c. rocky littoral
 1. rich environment
 2. sea fowl and sea mammals roost
 3. invertebrate and molluskan fauna
 4. aquatic flora
 5. technology: simple collecting
 - d. coastal lagoon and river delta
 1. grasses, reeds, small fish and crustaceans
 2. technology: nets for fishing, collecting tools
 - e. river floodplain
 1. intermittent flow: max flow Feb-March
 2. fiber, wood
 3. crustaceans, reptiles, small mammals, deer
 4. arable soil for floodwater farming
 - f. desert: Tillandsia
 - g. lomas
 1. diverse flora: June-Oct

[Late Preceramic]

Early adaptations in foraging societies

1. best evidence for stable hunting and gathering societies comes from site of Paloma: 7,800-5,100 BP (corrected)
 - a. site located just north of Chilca Valley
 1. covers about 15 ha (Engel)
 2. some remains of dwellings and human occupation debris
 - b. resource zones nearby: within 50 km
 1. littoral
 2. river valley
 3. lomas
 4. western flanks of Andes
 - c. each m³ of shell-midden deposits weighs about 1,000 kg
 1. 300 kg: shell
 2. remainder: various plant, animal, cultural, and sediment materials
2. general trends
 - a. population growth during Middle and Late Preceramic Periods
 - b. population growth at La Paloma during the same time
 1. excess survival of children surviving to adulthood
 2. agglutination of local populations
 3. maybe both
 - c. increasing use of lomas degraded them
 1. reduction of food
 2. and water sources
 - d. may have forced diversification in use of resources
 1. including marine: especially toward end of sequence
 2. terrestrial foods
 - a. beans, cucurbits, tuberous begonia
 - b. emphasis on littoral and riverine resources
 - c. over lomas and arid floodplain settings
 - e. life expectancies increased over time
 1. i.e., decreasing proportions of dead in younger age groups were observed
 - f. health improved over time
 1. i.e., skeletal indicators of stress declined
2. appearance of cultigens
 - a. Cohen's model
 1. lag-time between domestication of crops in highlands
 2. and their appearance on the coast
 - b. Paloma preliminary evidence: support this perception of coastal lag
 1. see chart on p. 25
 - c. but: a couple of surprisingly early dates in Chilca Valley
 1. 5,300 BP: lima bean (Phaseolus lunatus)

[Late Preceramic]

- 2. 10,000 BP: potato (Solanum tuberosum) at high elevations Tres Ventanas (Engel)
- d. Paloma: some experimentation with tuberous begonia
- e. macrobotanical remains
 - 1. Paloma inhabitants were exploiting several different ecological and resource zones
 - 2. apparently at different times of the year
- 4. general trends at Paloma
 - a. increasing adaptation to coastal habitat
 - 1. change of sources of protein
 - a. shellfish, anchovies, sea mammals
 - 2. not toward a more protein-rich diet
 - b. decrease in Harris lines implies improved resistance to periodic disruptions
 - c. possible cultural control of birth rate
 - d. degradation of environment
 - 1. while population was becoming better adapted to it
 - e. eventual abandonment of lomas
 - 1. shift to other sets of plants
 - f. cultivation or semi-cultivation of plants
 - 1. probably sought as source of carbohydrates
 - 2. in wetter areas

Cotton Preceramic Subsistence Base: 2500-1800 BC

- 1. principal argument concerning subsistence base
 - a. Moseley: stable, productive resource base suffices to support rise of social complexity
 - 1. Peru: maritime resource base was adequate
 - 2. abundant marine species sufficed to nourish the builders of the early mound architecture
 - a. esp. mollusks and small fish
 - 3. immense shell middens mostly lack cultivated, staple crops
 - a. some over 3 meters deep
 - b. covering several hectares
 - b. Cohen, Wilson, Osborn, etc.
 - 1. maritime base was inadequate
 - a. too unreliable
 - b. low in calories
 - 2. necessary reliance on agriculture
 - a. intensified foraging failed to keep pace with population growth

[Late Preceramic]

3. limitations of marine diet accentuated during unpredictable El Niño climatic episodes

Maritime argument: Moseley

1. marine resources provided abundant resources
 - a. localized and perennially available
 - b. supported development of complex societies of Late Preceramic
 - c. pre-adapted populations to complexities of agriculturally-based economies
 1. with the central authorities needed for large-scale constructions
 2. e.g., irrigation systems, monumental architecture
2. Cotton Preceramic Stage
 - a. exploitation of lomas ceased at or just before start of Cotton Preceramic
 1. marine resources assumed primacy
 2. fish, sea fowl, and algae other principal foods
 3. pinnipeds sometimes eaten
 - b. distribution of anchovy schools reflects distribution of preceramic sites
 1. i.e., food that people ate relied on same conditions as anchovies
 - c. main food resources not subject to seasonal fluctuations
 1. mollusks not seriously affected by Niños
 2. archaeological record reveals no obvious impact from Niños
 3. resources rejuvenate easily from Niños
 - d. land resources limited spatially
 - e. population juxtaposed with primary subsistence resources
 1. abundant, localized, perennial marine resources
 2. easily exploited with simple collecting and fishing technology
 - f. so marine resources fostered
 1. sedentary way of life
 2. underwrote population growth
 3. development of permanently occupied settlements
 - a. housing large numbers of people
 - g. cultivation most important where it could be combined with fishing
 1. e.g., El Paraiso
 2. jump from 2 to 6 cultivated species at beginning of Cotton Preceramic
 3. correlates with shift from mobile to sedentary life

Terrestrial subsistence base argument

1. maritime resources were unreliable
 - a. not sufficiently abundant
 - b. insufficiently nutritious
 - c. Wilson: inadequate technology

[Late Preceramic]

- 1. could not exploit many marine foods available to modern inhabitants
- d. so land-based resources must have played a key role
- e. Cohen: population pressure forced the development of agriculture
 - 1. prior to the development of social differentiation
- 2. widespread evidence for cultigens at coastal Preceramic sites
 - a. see tables
 - 1. Quilter 1991:398
 - 2. Burger 1992:30
 - b. potatoes, oca, ulluco at Ancón and Alto Salaverry
 - 1. suggests highland links

Evaluation of subsistence arguments

- 1. data base: significant problems with maritime and agricultural positions
 - a. Moseley
 - 1. subsistence capacity: assertions
 - a. no real calculations of productivity
 - b. no reliable estimates for population size
 - 2. significant problems with sample
 - 3. recovery techniques are questionable
 - a. no screening
 - b. no column samples
 - c. no flotation
 - d. no random elements in sampling strategy
 - 4. ergo: problems with extrapolation of sample to entire subsistence strategy
 - 5. differential preservation
 - a. does preservation of marine resources necessarily imply reliance on them?
 - 6. analysis based on loose version of catchment analysis
 - 7. are we really seeing the whole settlement pattern?
 - b. Wilson, Cohen, Raymond, Stocker, Osborn
 - 1. where are the botanical remains?
 - a. not provided in their publications
 - 2. where are the quantitative estimates of proportional consumption?
 - a. e.g., through ubiquity
 - 3. where are the evaluations of tools that would be associated with different subsistence strategies?
 - a. or just a part of it?
- 2. settlement pattern study possibly significantly skewed toward coastal sites
 - a. Burger: many Late Preceramic coastal sites in Supe Valley with monumental architecture
 - 1. Chupacigarro Chico
 - 2. Chupacigarro Centro

[Late Preceramic]

3. Alpacoto

3. most balanced analysis so far: Quilter's 1990, 1991 syntheses and study of El Paraiso
 - a. key point #1: societies practiced a wide variety of subsistence adaptations
 1. each probably mixed foraging and some exploitation of cultivated or managed plants
 - b. #2: a wide variety of cultigens was present in Late Preceramic
 1. both industrial and food
 - c. #3: even where cultigens were important, they probably did not constitute the dominant portion of the diet until close to the inception of the Initial Period
 1. either in protein or in carbohydrates
 - d. #4: domesticates were introduced over the long haul
 1. i.e., agriculture was adopted incrementally
 2. not as a package brought in from the outside in a major upheaval

Sociopolitical Transformations

1. several areas show evidence of gradual, apparently home-grown, development of practices tied to social differentiation and integration
 - a. most researchers assign group ceremony and ritual leadership pivotal roles in forming the character of the increasingly complex Andean societies
 - b. typically, the problem is addressed through study of patterns of ceremonial/public space and architecture
2. Feldman (1992) suggests that three basic patterns arose
 - a. one along coastal Ecuador
 - b. one in the central Peruvian highlands
 - c. one along the central-to-north Peruvian coast
 -
 - d. broadly speaking: ceremonies appear to have moved
 1. from exclusive rituals practiced in the interior of structures
 2. to more public, open-air affairs
 3. suggests that the scale and nature of social integration was gradually changing

Architectural data from the coast

1. beginning with Cotton Preceramic
 - a. Andean prehistory characterized by
 1. big settlements with monumental architecture
 2. increase in numbers and scale through time
 - b. in a given region: often one especially large site
 1. product of far greater labor expenditures than those underlying contemporary settlements
 - c. reflected at El Paraiso

[Late Preceramic]

1. more than 3x the size of largest contemporaries
 2. monumental masonry
 - d. many preceramic sites: mostly midden, as described above
2. largest known concentration of early settlement with corporate construction projects lies on coast between Rimac and Chicama Valleys
 - a. date to Cotton Preceramic: 2500-1800 BC
 - b. building activity included masonry terracing and walling for residential purposes
 - c. 20+ preceramic complexes: Supe-Patavilca-Fortaleza area alone
 3. complexes do not appear south of Mala or north of Supe
 - a. Mala: only La Salitre
 1. late stylistically
 - b. Supe: La Empedrada in mid-valley
 1. style between Lurin and Huaura
 - c. Casma
 1. those related to the prototype belong to a different tradition
 2. more significant examples: Sechín Alto, Las Haldas
 - a. sequence of pyramid
sunken rectangular court
sunken circular patio
 - b. major constructions date to Initial Period
 - d. Moche: northern tradition seen at Huaca de los Reyes
 1. much more intimate and internally directed than the other complexes
 2. with their vast proportions and external character
 4. form: enclosure with volumes or adornments on three side
 - a. fourth side: no structure
 - b. shows up over long time period
 1. early pyramids
 2. temples: Huaca de los Reyes
 3. audiencias of Chan Chan
 5. rendition of form
 - a. central pyramid
 1. nucleus with an atrium: central focus
 - a. mounted by a stairway
 - b. opens onto a vestibule in the central field
 - b. flanked by two arms
 1. asymmetrical
 2. built of various truncated pyramids
 - c. levelled field: large proportions
 1. 30 ha in San Jacinto, Huando
 - d. U is broken in one corner: in all cases

[Late Preceramic]

1. between the central pyramid and at least one of the arms
6. Aspero: in Río Supe drainage
 - a. covers more than 13 ha
 - b. houses at least 6 platforms
 1. major excavations undertaken at two mounds
 2. Huaca de los Idolos: 30x50m at base
 3. Huaca de los Sacrificios: similar size
 - c. largest mound stands over 10m high
 1. built in multiple stages
 - a. each interspersed with periods of use
 2. basalt walls: plastered over and occasionally painted
 3. use centered on summit rooms and courts
 - a. occasionally ornamented with wall niches or geometric adobe friezes
 - d. artifactual evidence: three key types of goods show social complexity (Feldman)
 1. dedicatory caches
 - a. found in all mounds excavated
 - b. typically pit with sterile sand
 - c. textiles, featherwork, burnt wooden objects, human figurines
 2. high-status burial: infant at H. de los Sacrificios
 - a. buried with adult: poorly furnished
 - b. head: over 500 beads of shell, bone, plant stem, clay or silt stone
 - c. wrapped in textiles
 - d. accompanied by bundle and painted stone
 - e. treatment may reflect ascribed status
 3. trade goods
 - a. e.g., Spondylus
 - b. feathers that may be local or imported
 1. show high status
 - c. fine quality beads: show craft specialization (Feldman)
 - e. architectural evidence for complexity (Feldman)
 1. built with corporate labor
 2. concentration of ornamentation and cached artifacts in central rooms
 - a. indicates higher status for some rooms than others
 3. pattern of graded access: doorways became increasingly restricted
 4. concentration of friezes in internal rooms
 5. use of bagged fill in architecture
 - a. not found in domestic architecture
 6. general lack of domestic refuse in structures
 - a. on floors and in fill
6. Las Haldas and Huaynuná
 - a. major settlements
 - b. coastal setting

[Late Preceramic]

- c. substantial refuse
 - d. monumental architecture: Las Haldas questionable here
 - e. dominant cultigens: cotton and gourd
 - 1. in keeping with marine emphasis
 - 2. probable use of floodplains
 - 3. high frequency of nonusable parts: implies agriculture
7. El Paraiso
- a. largest preceramic site on the coast: 50+ ha
 - 1. 2 km inland
 - b. 90 ha suitable for floodwater farming
 - 1. 150 ha easily irrigable by river diversion
 - c. excavated by Engel in 1967
 - d. series of masonry room complexes
 - 1. agglutinated rectangular rooms
 - a. growth by accretion
 - b. 8 or 9 distinct structural units
 - c. up to 5m high
 - 2. largest two complexes are mounds: 250+m long x 50m wide
 - a. parallel one another
 - 3. complexes required 10,000 tons of rock
 - 4. housed 1500-3000 inhabitants
 - e. midden surprisingly small
 - 1. much of the architecture must have been nonresidential
 - f. Engel's work not described in detail
 - 1. textiles: late Preceramic in date by style
 - 2. woven fabrics, mats, looped bags, nets
 - 3. wood and bone artifacts
 - 4. grinding stones, stone beads or spindle whorls, crude bifaces, polished stone mirror
 - 5. figurine fragments and other objects of baked clay
 - 6. shellfish main constituent
 - a. bone not common
 - 7. plants: cotton, gourd, guava, lúcuma, legumes, tubers, rhizomes
 - 8. exploitation of sandy beach resources indicated

Highlands

- 1. apparently regional and local traditions occurred at the same time (Burger)
 - a. suggests melding of local concepts and practices
 - b. with more general concepts
- 2. Huaricoto Tradition: in Callejón de Huaylas
 - a. part of standardized ceremonial construction pattern

[Late Preceramic]

- b. used for 2 millennia as ritual center
 - 1. focus on burnt offerings
 - c. mostly small chambers
 - 1. with ventilated sunken interior hearths
 - 2. floors repeatedly refinished with clay surfaces
 - 3. walls were perishable
 - d. several chambers could have been in use simultaneously
 - e. midden remains
 - 1. fauna: deer, large camelids, sea shell, marine fish bone
 - f. Burger: site was probably a gathering point for ceremonies conducted in a ritual cycle
 - 1. not a residential settlement on a permanent basis
3. Kotosh: 2000 BC
- a. several moderate-sized courts built by group labor
 - 1. enclosures built and used successively
 - b. niches ornamented the interiors of plastered masonry walls
 - 1. friezes depicting crossed human forearms on one wall
 - c. structures were not domestic nor residential
 - 1. specific kinds of behaviors pursued are not clear
 - 2. nor is the nature of the authority that commissioned their construction
 - d. building activity
 - 1. suggests inequality in benefits between and elites
 - 2. fewer benefits than equivalent labor invested in subsistence activity
 - e. courts denote corporate organization
 - 1. imply economy productive enough to free labor from subsistence concerns
 - f. presumably not isolated phenomena
 - 1. but not well-documented elsewhere
4. La Galgada area: Bueno and Grieder
- a. 11 preceramic settlements in Tablachaca Valley
 - b. all in area where valley widens: offers agricultural possibilities
 - 1. 10-km long strip
 - 2. many occupied into Initial Period
 - 3. population estimates not provided
 - c. main site called La Galgada
 - 1. complex of monumental architecture
 - 2. numerous interior chambers
 - d. site refurbished numerous times
 - 1. shift from asymmetric architectural construction
 - 2. to axial symmetry: rectangular structure at center
 - e. elaborate burials inside chambers: see below

[Late Preceramic]

Domestic architecture

1. scope of research dedicated to more quotidian architecture has been overshadowed by efforts committed to public construction
 - a. imbalance partially redressed by Malpass and Stothert's (1992) review of the evidence for Preceramic households from Ecuador to Chile
 - b. they document a general transition toward changing family composition and greater sedentarism: in part implied by
 1. larger dwelling sizes
 2. subfloor burials
 3. greater investment of labor in more permanent constructions
 - c. such changes were precocious in Ecuador
 1. more fully elaborated in Peru
 2. later and less complex in northern Chile
 - d. they follow Flannery's notion that the construction of rectangular structures implies
 1. greater permanence
 2. development of hereditary resource ownership
- 3. intriguing: since rectangular houses appear for the first time on coastal Peru in association
 - a. with dependence on marine resources
 - b. and incipient horticulture

Mortuary evidence

1. between Middle and Late Preceramic, burials became
 - a. more formalized
 - b. more diversified
2. general features
 - a. dead usually wrapped in textiles in flexed position
 - b. dedicatory burials of children continue
3. best coastal data set from the site of Asia
 - a. 49 funeral bundles found
 - b. more artifacts than normally found in Middle Preceramic sites
 - c. a few burials had disproportionately more and finer grave goods than the majority of interments
 1. found in same structure as some with fewer goods
 2. implication: perhaps higher- and lower-ranking members of same kin group
 - d. trophy heads found
 1. earliest evidence

[Late Preceramic]

2. perhaps indicative of raiding or warfare
4. La Galgada: best highland material
 - a. spectacular burials
 - b. burials placed in former ritual chambers
 - c. 3-5 bodies placed in flexed or extended positions
 - d. accompaniments
 1. fancy twined textiles: bird, snake or geometrical designs
 2. shell pendants and bone hairpins: common
 3. beads of turquoise-like stone
5. overall mortuary pattern
 - a. reinforces the notion that non-egalitarian societies were developing
 1. dedicatory burials
 2. significant variations in the array of associated burial furniture
 3. interment of individuals in monumental architecture at numerous sites
 - b. collectively underscore view that individuals were treated differentially for their passage to the next world

Summary

1. Late Preceramic Period characterized by several features
2. subsistence diversification
 - a. great increase in importance of use of marine resources
 - b. slow adoption of cultigens
 1. both industrial plants: e.g., cotton, gourd
 2. and foods
3. beginnings of elaborated social differences
 - a. expressed in burial treatment
4. first significant monumental constructions
 - a. multiple traditions developed
 1. e.g., Peruvian coastal
 2. Peruvian highland
 - b. shared patterns of construction within traditions
 - c. long-term trend from
 1. interior to exterior rituals
 2. small-scale to large-scale
5. apparently widespread sharing of ideologies central to organization of society

[Late Preceramic]

6. set stage for enormous changes of subsequent Initial Period

[Late Preceramic]

Supplemental Information

Late Preceramic: 7000-5000 BC

1. El Inga Cave (Strata II and III), Las Casitas and middle strata of the El Abra Rock shelters
 - a. date to this period
 - b. plant remains are entirely lacking
2. El Abra faunal remains
 - a. deer and guinea pig in equal proportions: most common types
 - b. location in mid-altitude sierran basins (2600 m)
 1. rich plant resources accessible in zone were probably also used
 - c. probably analogous to gathering and cultivation patterns at Guitarrero Cave
3. no sites from this period appear to be base camps or long-term occupation sites
4. Ecuadorian coast: Vegas culture
 - a. 6550-5300 BC
 - b. sites occur in western area of Santa Elena Peninsula
 1. 1-5 km from the sea
 2. along fossil drainage systems, near beaches, close to dry lagoons
 3. access to swamp, riverine, littoral, and forest areas
 - c. faunal remains from OGSE-80: large Vegas site 3.5 km from sea
 1. predominance of terrestrial protein
 2. variety of fish also present
 3. Stothert: year-round settlement
 - a. lack of plant remains makes it difficult to evaluate Stothert's suggestion of root crop agriculture
 - d. at least some sites were in long-term multiple use
 1. evidence
 - a. location of Vegas sites
 - b. varied faunal assemblage
 2. perhaps seasonal, more specialized camps made up another component of settlement system
 - e. first cultivars in a setting of rich marine and hunting resources: industrial plants
 1. bottle gourd, cotton
 2. other crops are very minor component
 3. not really a staple in the diet
 4. similar to pattern on Peruvian coast
5. small cave sites in southern Guayas coast of Ecuador
 - a. Spath: sporadic use of shelters as camps
 1. before 7000 BC until Late Preceramic
 - b. located between two extensive mangrove swamps
 - c. may have been resting place for populations traveling between swamps

[Late Preceramic]

- d. plant remains do not include food plants
 - 1. are from taxa that occur today in area of the shelters

Preceramic V: 5000-3000 BC

1. first half of MesoIndian period of Rouse and Crucent
 - a. Cubagua complex on eastern coast of Venezuela and El Heneal on western coast
 - b. strong marine orientation for Cubagua and later complexes
 1. site locations: coast and islands
 2. shell remains
2. information lacking from coast of Colombia
 - a. Reichel-Dolmatoff: proposes gradual adaptation to sea resources in response to disappearance of big game animals
 - b. by 3000 BC: well-defined pattern of shell-mound dwelling emerges
3. sierra
 - a. seasonal occupation continues at El Abra rock shelters
 - b. shift from deer-guinea pig to dominantly guinea pig
 1. zone 3 (7000-2500 BC): 5x guinea pig than deer
 2. reminiscent of camelid-deer shift
 - a. 5500-4200 BC in Peru
 - c. Wing: guinea pig domestication occurred in 4200-2500 BC
 1. perhaps started earlier
 2. wild form of domesticated form found in NW South America
 - a. Cavia porcellus
4. coast of Ecuador
 - a. Vegas complex lasts until about 5300 BC
 - b. no sites on Santa Elena Peninsula until Achallan complex site OGSE-63
 1. just before 3000 BC
 - c. may result from abandonment of peninsula
 - d. or from lack of adequate survey

Ecuadorian Maize

1. basic issues concerning maize cultivation
 - a. early subsistence systems
 - b. settlement patterns
 - c. demographic trajectories
2. phytoliths: Pearsall and Piperno
 - a. phytoliths: silica bodies present in the epidermal cells of some plant groups

[Late Preceramic]

- b. used to indicate presence of grasses in sites with poor botanical preservation
 - c. phytolith recovery used at sites in Santa Elena Peninsula
 - 1. Las Vegas culture: 5000 BC
 - 2. Real Alto: Valdivia culture (3000 - 1500 BC)
 - 3. OGCh-20: Machalilla culture (1500-1000 BC)
3. comparative materials
 - a. Ecuador
 - 1. 10 maize races
 - 2. 35 grasses
 - b. Panamanian
 - 1. 21 maize races
 - 2. 46 grass species
 4. means of distinguishing maize from wild variants
 - a. 8 types of 3D structures: called Variants
 - b. characteristics
 - 1. cross-shape size: maize is larger
 - 2. Variant type
 - 3. ratio of dumbbell to cross-shaped phytoliths: maize has more cross-shapes
 - c. some degree of controversy over the degree to which domesticated maize is separated from other grasses
 - 1. a lot of overlap
 5. empirical results
 - a. Real Alto
 - 1. clear separation of 3 samples as maize
 - 2. at least as early as 2500 BC: Valdivia II
 - 3. I-II samples: tend to fall between grasses and maize
 - b. Las Vegas
 - 1. OGSE-80: 3 maize-type samples fall into 6,000-5,000 BC range
 6. implications of maize data
 - a. Early Formative Valdivia sites had larger kernels
 - 1. than later Middle/Late Formative sites
 - b. implies considerably complexity in development of local maize varieties
 - 1. and subsistence strategies
 - c. implies early introduction of maize into South America
 - 1. much experimentation
 - 2. 5000 BC: maize pollen from Calima Valley, Colombia
 - 3. same date for maize pollen from Panamanian archaeological sediments
 7. Pearsall and Piperno: conclusion
 - a. primitive forms of maize dispersed by at least 5000 BC
 - 1. through lower Central America

[Late Preceramic]

- 2. and northern South America
 - b. probably joined part of tropical forest subsistence pattern
8. critiques
- a. Bonavia and Grobman: question of presence of maize as species should be separated from
 - 1. question of domestication
 - 2. probable that diffusion occurred naturally
 - 3. multiple occurrences of domestication
 - b. Bird: introduction by 3,000 BC
 - 1. widespread dissemination by 1,000 BC
9. in any event: maize not important in diet till about 1,000 BC

Beans

1. Real Alto: Canavalia beans
 - a. Damp et al.: probably domesticated
 1. cultivated from onset of Valdivia occupation
 - b. three carbonized fragments of sufficient size that gross morphology could be used to make an ID at the family level
 - c. comparisons
 1. to modern wild Leguminosae seeds
 - a. collected from coastal plain of Ecuador
 2. cultivated Phaseolus vulgaris (common bean)
 3. Phaseolus lunatus (lima bean)
 - c. archaeological specimens were larger than wild species
 - d. did not conform in size and proportion to either the wild or cultivated common or lima bean
2. electron microscopy provided ID of Canavalia sp.
 - a. conservatively: wild coastally distributed Canavalia maritima
 - b. probably: domesticate C. plagiosperma
3. carbon samples: 3 of 7 found in situ in refuse zone of a Valdivia I household cluster
 - a. dense shell (10 cm thick) surrounding remnant structure
 - b. mangrove-specific plants are most conspicuous elements of refuse zone
 - c. Valdivia I ceramic sherds found in definite association with this refuse zone and house floor
 1. 3300-2700 BC
 - d. context of seeds in certain
 1. cemented in place
5. search through Real Alto carbonized material produced the following

[Late Preceramic]

- a. 14 fragments from Valdivia I, III, IV/V, and VI
 - b. 9 from undated features
 - c. suggests that Canavalia was used during Valdivia I times
 1. and throughout occupation of Real Alto
6. other findings suggestive of early agriculture during Valdivia E. Formative
- a. achira: phytoliths as early as Valdivia III
 1. not native on coast
 2. probably introduced
7. prehistoric occurrence of domesticated C. plagiosperma known for coastal Peru: 2500-1800 BC
- a. recovered by Bird at Huaca Prieta: Chillón Valley, N. coast Peru
 - b. several wild and possibly ancestral forms of Canavalia species
 1. in Western Ecuador
 2. extending into extreme northern Peru
 3. area was probably site of early Canavalia domestication
 - d. Damp: Real Alto data give chronological priority to northern Ecuadorian origin
8. additionally: Canavalia species are confined to humid areas
- a. irrigation necessary for growing domesticated species in areas with short rainy seasons
 - b. since SE Ecuador is area of marginal rainfall
 1. presence of Canavalia at Real Alto implies wetter area of origin for Valdivia
 2. possibly Colonche Hills
 3. and Guayas Basin of Ecuador

Japanese origins

1. Early Formative Valdivia appeared on Ecuadorian coast: ca. 3500 BC
 - a. Lathrap et al.: Valdivia culture developed in NW South America in tropical-forest, riverine agriculture
2. Meggers et al.: Neolithic Japanese fishermen encountered shellfish gatherers and fishermen on seashore
 - a. introduced Jomon culture
 - b. strongest evidence: stylistic affinities in incised ceramics
3. Lathrap's critique
 - a. if Jomon produced Valdivia pottery: Valdivia pottery should be the earliest in South America
 1. but Puerto Hormiga pottery is perhaps 200 years earlier
 - b. Middle Jomon decorative techniques are wide
 1. but the range of vessel types is not
 2. none is a prototype for Valdivia A

[Late Preceramic]

- c. choice of Valdivia sherds for comparison with Jomon is daisy picking
 - 1. most are not from Valdivia A: i.e., earliest Valdivia levels
 - 2. majority of decorative techniques are unique to B, C, and D
 - 3. question: how can specific decorative configurations confined to the end of A, end of B, and D can be used as evidence for the Japanese origins of the beginnings of A?
- d. general conclusion: Japanese origin for South American civilization is not a sustainable argument

Supplemental information on Paloma

- 1. human biological evidence
 - a. 200+ burials excavated
 - 1. 175 well-preserved individuals
 - b. Table 3.1 (Quilter 1990:50): demographic data from burials
 - 1. significant increase in survivorship rates over time
 - 2. potential sources of error
 - a. underrepresentation of newborns
 - b. underestimation of age at death for adults
 - c. change in use of site over time: favoring adults
 - 3. data indicate increasingly well-adapted use of resources
 - c. coprolite remains: 276 recovered
 - 1. 88% have shellfish
 - 2. 77%: bone fragments of fish, mammal, bird, reptile, etc.
 - 3. 74%: charcoal
 - 4. 63%: plant fibers
 - 5. 44%: grass fragments
 - 6. 26%: insects, arthropods
 - 7. 23%: seeds
 - 8. 2%: hair
 - d. health
 - 1. Patterson predicts increase in nutritional levels over time
 - a. as population became adapted to environment
 - 2. Harris lines: used to measure stress resulting from dietary interruptions or disease
 - a. Paloma evidence indicates reduction of Harris stress lines over time
 - b. consonant with improvement in diet and in consistency of diet
 - 3. possible population control
 - a. delay in marriage implied by late female deaths
 - 1. i.e., high incidence in 30s, not 20s
 - b. infanticide?: apparently high rate of female infant deaths
 - 4. increase in stature over time
 - a. estimated from length of long-bones
 - b. implies better diet
 - 5. cranial lesions
 - a. decreased over time

[Late Preceramic]

- b. disappeared among adults in highest level of occupation
- 6. dental wear decreased over time
- e. increase in muscle mass over time
 - 1. change in activities
 - 2. perhaps toward fishing

Moseley's data base for Middle Preceramic sites

1. many sites lacking pottery have cotton artifacts
 - a. particularly twined textiles and fishing nets
 - b. Engel suggested cotton as a time marker
 - c. all cotton in area: Gossypium barbadense
 1. early materials: like wild species
 2. later: greater similarity to (modern) domesticates
 - d. three sites with cotton, but not in textiles
 1. Padre Aban (Moche)
 2. As-8 (Supe)
 3. Pampa (Ventanilla Bay)
 - e. remaining sites have cotton in form of textiles
 - f. NB (Quilter): cotton was not integrated into the material culture of all the key sites at the same time
 1. long-term process
2. Pampa: basal stratum 2500±110 BC
 - a. 140x20 m
 - b. three components: last is Ceramic
 - c. materials recovered
 1. twined textiles, net fragments, cotton yard or cordage
 2. mollusks most abundant food resources
 - a. e.g., Cut 2: 20,520 pelecypods and gastropods
6,761 chiton shells
 3. no projectile points, grinding stones, lomas flora or fauna
 - a. earlier H&G economy is gone
 4. vegetable matter: cotton, tillandsia, junco, sedges, kelp, jack beans (Canavalia), legumes, guava squash
 - d. Moseley concludes: evidence implies sedentary, permanent settlements
 1. TND: not clear how that conclusion is supported
 2. evidence for multi-seasonal occupations ought to be presented
3. six sites in Ancon-Chillón have twined cotton textiles
4. three small settlements

[Late Preceramic]

- a. Yacht Club: Lanning
 - 1. two preceramic components
 - a. both with twined textiles
 - b. both sand- and rock-dwelling mollusks
 - b. Camino: SE flank of hill above Ventanilla Bay
 - 1. 10x20 m
 - 2. one cut: 2 x 2 m: 1.35m average depth
 - 3. shellfish primary constituent
 - 4. fish and fowl not common
 - 5. kelp common; other plants not
 - 6. cotton textiles, 10 net fragments, stone net sinkers, digging stick, percussion struck flakes
 - 7. focus on resources of sandy littoral zones
 - c. Banco Verde: N end of old bay; 500m east of Pampa
 - 1. 80 x 30 m
 - 2. one cut: 2.25 x 3.5 m
 - 3. textiles, mats, fish nets, stone fishing weights, shell fishhooks
 - 4. tunicates, bird, fish, sea mammal bone
 - 5. wild forms, gourd, cotton, guava, unidentified rhizome
4. Punta Grande
- a. biggest preceramic site at Ventanilla
 - b. dominant feature: four artificial terraces at the base of the hill slope
 - 1. average 75x7x3 m
 - 2. Moseley: living surfaces for large numbers of people [evidence?]
 - c. site occupied for long time
 - 1. subsistence activities relatively constant
 - e. 29 fishnet fragments, weights, gourd floats
 - 1. sand beach orientation
 - f. shellfish bulk of organic matter in refuse
 - 1. Mesodesma donacium most important
 - 2. tunicates common
 - 3. sea fowl and fish: most osseous material
 - 4. sea lion rare
 - g. cotton, gourd, guava, capsicum peppers legumes, rhizomes (maybe Lupines)
8. Tank Site
- a. immense occupation on shore of Ancon Bay
 - 1. arbitrarily divided up
 - 2. Tank Site is the biggest
 - 3. up to 5m deep
 - b. three cuts in areas of modern bulldozing
 - 1. 2 and 3: 2.5-5.5 x 1.6x2.0 m deep
 - a. nets, hooks: sandy and rocky littoral zone exploitation

[Late Preceramic]

- b. vegetable matter not common: kelp, cotton, gourd, squash seeds, guava, capsicum peppers, milkweed pods, tillandsia, junco, slat grass
 - 2. 1: 1 x 2.1 x 3.9 m
 - a. 5 lower strata belong to close of Preceramic
 - b. list of plants given
- c. exploitation of rocky and sandy littoral
 - 1. small lagoons or marsh areas for some wild plants

Cohen: population pressure and origins of agriculture

1. underlying assumptions
 - a. population has inherent capacity to grow
 - b. adoption of agriculture is not a result of an increase in food availability
 - c. the availability is always there to be exploited
 1. people are aware of the foods
 - d. there must be a trigger to stimulate use
 1. population pressure
 - e. Boserup: general trend towards increasingly intensive use of resources
2. myths concerning agriculture and its origins
 - a. agriculture is not a difficult concept
 1. actually discovered several times in different places
 2. H&G promote growth of preferred species: e.g., through use of fire
 - b. health benefits of agriculture
 1. H&G are typically well-nourished
 - c. agriculture is less costly in labor
 1. not true: H&G put in little time in food quest
3. so why shift to agriculture?
 - a. must have been pressure
4. options under increasing pressure
 - a. decline in quality and quantity of food available
 - b. increased work load
 - c. limit population: infanticide, abortion, contraception
 - d. increase radius exploited
 - e. settle for less desirable foods
 - f. budding-off of settlements
5. major alternative: artificial increase of desirable crops within gathering radius
 - a. remove competing plants
 - b. protect them from predators
 - c. improve environment: e.g., weeding

[Late Preceramic]

- d. plant in other areas
 - e. selectively aid more productive plots
 - f. results in agriculture
6. why agriculture?
 - a. some groups may have done it, others not
 - b. those that did were able to compete successfully
 7. general trends of Late Preceramic: consonant with model
 - a. initial occupation of coast along valley littoral and river
 - b. subsequent expansion into other areas
 1. e.g., coast between valleys
 2. lomas
 3. implies expanded use of resources
 - c. progressive decline in land mammals
 1. increased reliance on shellfish
 - d. increase use of grinding tools: grasses
 1. implies more intensive use of resources
 - e. increased use of imported cultigens
 1. response to pressure
 2. occurred after population crisis
 3. significant delays in importation of crops
 - a. despite known cultural contacts
 4. maize, beans, and irrigation arrived when the potential of relatively easy floodwater farming had been exhausted

Wilson

1. Moseley misrepresents environmental potential
 - a. distribution of marine biomass does not favor the central coast
 1. as Moseley asserts
 - b. ergo: there must be other reasons for the developments at Las Haldas, Aspero, and El Paraiso
2. El Niño probably critical as population dampener
 - a. no cyclic predictability
 - b. slow recovery time for the biomass critical to human population
 1. caused the human populations to adapt to non-maritime resources
3. maize: assumed to be the primary cultigen
 - a. based on modern traditional agriculture
 1. TND: poor reason
 - b. variety of cultigens obviously used
 2. TND: evidence not provided in article, although he is right

[Late Preceramic]

- c. maize productivity: good gauge of population
 - 1. once the proper crop mix has been established
 - 2. citation of Sanders and Price: about maize being used as a gauge of potential population density
 - 3. TND: essentially a story based on unsubstantiated assumptions
 - d. earliest coastal maize: 2000 BC in Cotton Preceramic
 - 1. 70 km stretch: Las Haldas, Culebras I, Huarmey North I
 - e. estimates productivity of 200 kg/ha
 - 1. based on cob size of 60 cm
4. carrying capacity argument
- a. compare best-case maritime model
 - 1. 8 persons/km of shoreline
 - b. with worst-case agricultural model
 - 1. 48 persons/km
 - c. argument based on calories
 - 1. note that Moseley's argument is based on protein
 - d. average maritime carrying capacity
 - 1. 50 persons/km of coast
 - 2. Ancon-Chillón calculated out to 400 persons
 - a. Moseley's estimate: 2,400-5,450 persons
 - b. alternative source of food must be found for 2,000 people
 - c. i.e., 83-93% of people
 - 3. Las Haldas shell beds: could support about 78 people/yr
 - a. far too little for population
 - e. maize carrying capacity arguments
 - 1. worst case: 50 persons/km/yr (see 48 above)
 - 2. Ancon-Chillón: 2000 people would have required 40 km² of cultivated land

[Late Preceramic]