LATE PRECERAMIC AND EARLY CERAMIC CULTURES OF THE CENTRAL COAST OF PERU

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Since 1966, members of an expedition from the Peabody Museum of Archaeology and Ethnology, Harvard University have been working continuously on the archaeology of central Peru. This research has been carried out in a roughly L-shaped area that extends about 90 km. along the coast from Ancón in the north to San Bartolo in the south and inland more than 100 km. up the Lurín Valley to an elevation of 2300 m. above sea level. Counting the data collected by Edward P. Lanning and Thomas C. Patterson in Ancón and the lower Chillón Valley between 1961 and 1963, we now have information on nearly 700 archaeological sites dating from late glacial times to the end of the nineteenth century.[1] So far, much of the research has been focused in the Ancón-Ventanilla area, where extensive excavations were undertaken to establish a detailed chronology for the late preceramic and early ceramic cultures of the region and to determine how the ancient inhabitants utilized the natural resources. What we would like to do in this paper is to consider some of the things that we have learned about this period in which major changes in subsistence and settlement patterns took place.

Chronology and Distribution

The Encanto Phase represents the last intensive utilization of the lomas resources in the Ancón area. Lanning excavated the Encanto site (PV45-26) in 1961 and found rock-dwelling shellfish, fish bone, some mammal bone, grass seeds, gourd rinds, numerous grinding tools, and thick, percussion-flaked projectile points.[2] M. Edward Moseley made a second excavation at the site in 1966 and recovered twined sedge mats and squash seeds in addition to what Lanning found.[3] A nearby site on the Loma Encanto with Encanto stone tools has yielded a radiocarbon date of 2770 B.C. ± 80 radiocarbon years (UCLA-967);[4] this date is probably applicable to the occupation at Encanto.

Village 1 in the Chilca Quebrada, which is sometimes referred to as Chilca Monument 1, has a component that is broadly contemporary with that of the Encanto site.[5] In addition, there is at least one later component which contains pottery with incised decoration. Although the excavation has not been reported in detail, and the archaeological associations are not entirely clear, a large series of radiocarbon measurements has been obtained from the site, and these have served as the basis for a variety of statements about the early occupation of the Peruvian coast.[6] At present, it is impossible to interpret the significance of these determinations, but it is clear that many of the measurements are out of stratigraphic order and that they can be used in only the most general way at this time. The only reliable published data from the site come from a house with associated artifacts and burials that was excavated by Christopher B. Donnan and that is dated at 3420 B.C. ± 120 radiocarbon years (UCLA-664).[7] There are also thirteen

Encanto projectile points from Chilca Village 1 which are virtually identical to those from the Encanto Phase sites in the Ancón region.[8] Since no Encanto projectile points have ever been found associated with pottery and only one has been found in association with twined cotton textiles, it seems reasonable to conclude that the Encanto projectile points at Chilca Village 1 belong to the earlier component of the site. The radiocarbon measurements from the site suggest that this component dates between about 3700 and 2500 B.C.

Chilca Village 1 is situated on the north bank of the Chilca erosion channel about four kilometers from the ocean and about the same distance from areas of extensive lomas vegetation. The refuse at the site consists mainly of marine molluscs, fish bone, and some sea lion, although plant remains are also present. Frédéric Engel has claimed that lima beans (Phaseolus lunatus) were associated with the earlier component;[9] however, they were not associated with the house that Donnan excavated and do not occur at Encanto.[10] This situation suggests that the lima beans said to be associated with the earlier component at Chilca may, in fact, be intrusive from the ceramic stage refuse.

Encanto projectile points and/or stone implements have been found at Lomas Lachay north of the Ancón area,[11] at fourteen sites in the Ancón-Chillón area,[12] at one site in the lower Lurín Valley, at two sites at least in the Chilca Quebrada,[13] and at one site on the Paracas Peninsula.[14] So far, no Encanto stone tools or projectile points have been reported from the western slopes of the Andes or from the highlands.

The interpretation of preceramic subsistence patterns in the Ancón-Chillón area has been greatly influenced by the earliest of three components at the Pampa site (PV45-136).[15] The site is located on a rocky point overlooking the north end of the old bay at Ventanilla and was discovered and excavated by Lanning in 1962 and 1963. The earliest component lacked twined cotton textiles and has been interpreted in various ways by Lanning. Two of his interpretations were based in part on statements made about the archaeological associations at Chilca Village 1 and implied great antiquity for the early Pampa component;[16] however, the age of this component has been down-graded considerably because of recent excavations made by Moseley and a critical re-evaluation of the statements made about Chilca. Lanning now views this component as dating immediately before the introduction of twined cotton textiles on the central coast of Peru, while we see it as immediately post-dating the appearance of cotton. A radiocarbon measurement dates the lowest stratum in the earliest component at 2500 B.C. $\pm$ 110 radiocarbon years (GX-1134).[17]

The earliest component at Pampa contains an abundance of marine resources, including rock-dwelling molluscs, shore birds, fish, and sea lion. Both wild and cultivated plants occur in the refuse; these include gourds, jack beans (Canavalia sp.), guava, kelp-seaweed, cotton, unidentified legumes, and squash seeds that have

tentatively been identified by Thomas W. Whitaker as belonging to two cultivated and one wild species (Cucurbita moschata, C. ficifolia, and C. andreana). There is little evidence suggesting that the earliest inhabitants of Pampa were exploiting the nearby lomas resources.

Following the Encanto Phase sites in the Ancón-Chillón area and Pampa is a group of permanently occupied preceramic settlements containing twined cotton textiles. These date between about 2500 and 1750 B.C. according to available radiocarbon evidence and can be separated into three chronologically distinct phases on the basis of stratigraphic evidence and seriational arguments based on changes in textile technology, artifact content, and marine mollusc faunal assemblages.[18] From earliest to most recent, the three phases are called Playa Hermosa, Conchas, and Gaviota. It is clear that the Gaviota Phase is the most recent of the three, because it was found overlying Conchas Phase refuse at Punta Grande (PV45-100B) and Playa Hermosa Phase refuse at the Yacht Club (PV45-5). The placement of the Playa Hermosa Phase before the Conchas Phase is based on seriational considerations. [19]

The Playa Hermosa Phase is represented by components at three sites besides Pampa--the Yacht Club, Camino (PV45-100A), and Banco Verde (PV45-135)--and dates between about 2500 and 2275 B.C.[20] All three components contain twined cotton textiles with single warps, single twining direction, and continuous wefts. The refuse of the Playa Hermosa Phase component at the Yacht Club contains large quantities of both sand- and rock-dwelling molluscs, shore birds, sea lion, crab, and tunicates. Plant remains were not particularly abundant but included sedges, reeds, rushes, achupalla (Tillandsia sp.), cotton, gourds, Capsicum peppers, guava, beans, and a few unidentified tubers that were probably wild.[21] The Camino component contained the remains of fish and shore birds, as well as large quantities of the sand-dwelling marine mollusc, Semele corrugata. The plant remains from this site included cotton, gourd, guava, kelp-seaweed, milkweed pods (Asclepia sp.), unidentified tubers, and possible achira (Canna sp.). Perhaps the most recent of the Playa Hermosa Phase components is that of Banco Verde. The refuse at this site contained both sand- and rock-dwelling marine molluscs, fish, shore birds, and sea lion; the plant remains included cotton, gourds, kelp-seaweed, guava, unidentified legumes and an unidentified tuber.[22]

The Conchas Phase has been isolated in components at Punta Grande (PV45-100B) and the Tank Site (PV45-2) by Moseley.[23] These contain mixtures of twined cotton textiles with single warps and split-paired warps and date between about 2275 and 1900 B.C.[24] The refuse deposit at Punta Grande contained cotton, gourds, chili peppers, guava, kelp-seaweed, unidentified tubers, and unidentified legumes, as well as sand-dwelling marine molluscs (principally Mesodesma donacium), shore birds, and sea lion. Conchas Phase refuse was found in two excavations at Ancón: Cut 2 and Cut 3. The refuse in Cut 2 contained both rock- and sand-dwelling shellfish, sea lion, fish, and shore birds, as well as cotton, guava, kelp-seaweed, gourd, milkweed, unidentified tubers, and possibly Capsicum peppers. Preservation conditions were poor in Cut 3,

but sand- and rock-dwelling marine molluscs, fish, sea lion, shore birds, kelp-seaweed, gourd, cotton, and two unidentified tubers were recovered.

Gaviota Phase habitation refuse has been isolated in components at Punta Grande, Pampa, the Yacht Club, and the Tank Site, which date between about 1900 and 1750 B.C.[25] This phase is characterized by twined cotton textiles with paired or split-paired warps. Sand-dwelling molluscs (M. donacium), fish, sea mammals, shore birds, kelp-seaweed, gourd, cotton, and unidentified legumes and tubers were found in the Gaviota Phase component at Punta Grande. Pampa Cut 1 yielded a large quantity of M. donacium as well as cotton and gourd rinds. The Gaviota Phase component isolated in the lower levels of Cut 1 at the Tank Site contained both sand- and rock-dwelling shellfish, shore birds, fish, and sea mammals; the plant remains included cotton, gourd, guava, squash, lucuma, unidentified tubers, unidentified legumes, and possibly Capsicum pepper and lima beans.

The two largest preceramic sites on the central coast of Peru--Río Seco and Chuquitanta, or El Paraiso if you prefer, since the two names refer in part to the same site--both contain Gaviota Phase components and may have been occupied almost exclusively during this period. Río Seco is located in the Quebrada Seca de León, some twenty kilometers from arable land and the nearest known source of potable water. It is a large site with public architecture and undoubtedly housed a substantial population. At least two kinds of structures can be recognized at the site. One consists of small flimsy wattle-and-daub or cane structures that presumably represent domestic residences. The second kind consists of artificial mounds, some of which have carefully constructed stone-walled rooms that were subsequently filled with local materials and built over. The large stones used in these structures were carried more than a kilometer to the site. The apparent paucity of cultivated plants in the refuse at Río Seco and its desert location near the sea suggest that agriculture was not of great importance and that subsistence was based mainly on the exploitation of marine resources.[26]

This situation contrasts markedly with that of Chuquitanta which is located on the south bank of the Chillón River about two kilometers from the ocean and a kilometer or more downstream from a wide meander in the river. There are nine to thirteen structures at the site, depending upon how they are counted.[27] All of these consist of small contiguous rooms and passageways; several building stages can be recognized in nearly all of the buildings. The structures appear to be basically domestic, although communal labor was undoubtedly involved in the construction of nearly all of them. The site lacks structures that appear to have served only specialized or "ceremonial" functions. Engel reports that rock- and sand-dwelling marine molluscs, fish, sea lion, and possibly terrestrial mammals were found in refuse deposits at Chuquitanta; the plants that he lists from the site include cotton, gourds, achira, lima beans, guava, lucuma, pacay, and jícama.[28] Only jícama and pacay have not been reported from other

preceramic sties on the central Peruvian coast that date to this period.

Other preceramic sites that probably date between 2500 and 1750 B.C. have been found in our survey area. Two of these are small inland sites located on alluvial fans in the lower part of the Chillón Valley near the modern town of Puente Piedra,[29] and another is the earlier component at the Chira-Villa site which is situated near the coast in the southern part of the Rimac Valley.[30] Three preceramic sites dating to this period were found in the Lurín Valley. One is a shell-mound located on a hill-slope overlooking the lower part of the valley and the ocean. There are at least two inland sites--one located about a half day's walk from the ocean and the other about a day and a half's walk from the sea, and, judging by their architecture, they probably date to the Gaviota Phase and represent inland farming and/or trading sites.

Pottery appeared in the Ancón area about 1750 B.C., and seven chronologically distinct phases which precede the appearance of Chavin influence in Early Horizon Epoch 1 have already been recognized at the Tank Site.[31] Radiocarbon measurements suggest that the pre-Chavin pottery phases on the central Peruvian coast date from 1750 to about 1000 B.C.. The earliest ceramic phase at Ancón was found overlying Conchas Phase refuse in the western part of the site. The pottery assemblage contains neckless ollas and large incurved bowls with thickened and/or flattened rims and rounded bottoms, which are made from an undecorated ware with tan-colored paste, abundant sand temper, and dark brown surfaces. The rims and cross-sections of these vessels are typically very uneven, and interior surfaces are often crackled. Three radiocarbon measurements, two of which are clearly associated with this pottery, can be interpreted as dating this phase between 1750 and 1650 B.C.[32]

Vessels similar to those from the earliest phase at Ancón have also been found at Site PV48-235 in the lower part of the Lurín Valley. This site is located on the west edge of the Tablada de Lurín, a few hundred meters above a broad sandy beach. It consists of shallow patches of shell refuse, mainly M. donacium, which are scattered over an area about 200 m. long and 50 m. wide.

A second early ceramic phase has been isolated in refuse deposits at the southwest corner of the Huaca La Florida (PV47-18), a large pyramid located on the north side of the Rimac Valley about a kilometer and a half from the river and eleven kilometers from its mouth.[33] This phase dates between about 1700 and 1600 B.C. and is characterized by neckless ollas and large incurved bowls with base angles and slightly flattened bottoms, single spout bottles with incised, appliqué or modelled decoration, and a few plates.[34] The coarse ware ollas and large incurved bowls are typically thinner than those of the earliest phase at Ancón. Associated with the La Florida pottery were fish, small land animals, rock-dwelling marine molluscs, a few sand-dwelling clams, and charred vegetable remains. The only plant that has been tentatively identifies is cotton.

Site PV46-122 has produced a few sherds that are identical to those found at the Huaca La Florida. This is a small inland site situated on an alluvial fan in the lower part of the Chillón Valley; it covers an area about 50 m. by 75 m. and probably represents the refuse accumulation of no more than a few houses.

No sherds exactly identical to those of the La Florida style have yet been recognized at Ancón. The second phase in the Ancón sequence dates between about 1650 and 1400 B.C. and will undoubtedly be sub-divided into several chronologically distinct units once it is analyzed in more detail. It has been called the Chira style by Lanning and partially described by him.[35] The pottery assemblage consists of thin neckless ollas and large incurved bowls with base angles, flattened bottoms, and "pebble polished" surfaces, made from a dark brown ware, and of single spout bottles with everted rims and black-pointed geometric designs; the bottles are made from a polished orange-tan ware. Sand- and rock-dwelling molluscs, fish, small land mammals, lucuma, cotton, gourds, peanuts (Arachis hypogaea), and achupalla are associated with this pottery in the eastern part of the Tank Site.

The third phase in the Ancón ceramic sequence was also isolated in the eastern part of the Tank Site and dates between about 1400 and 1300 B.C.[36] It is being called the Late Chira style, because its neckless ollas and large bowls resemble those of the preceding phase, both in shape and ware characteristics. The single spout bottles and the few bowls in the Late Chira Phase have incised designs or occasionally punctate designs that may be outlined with incised lines. In one excavation where Late Chira pottery was isolated, rock- and sand-dwelling shellfish, shore birds, fish, sea lion, lucuma, pacay, gourds, peanuts, cotton, squash, guava, kelp-seaweed, probably Capsicum peppers, and unidentified tubers that may be sweet potatoes were also found.

Chira pottery has been reported from two other archaeological sites on the central Peruvian coast and on the western slopes of the Andes in the Chillón Valley. An incised bottle fragment is the only decorated sherd associated with the Chira style utilitarian ware at the site of Chira-Villa in the southern part of the Rimac Valley. Associated with the ceramic refuse at this site are sand-dwelling clams, fish, sea lion, cormorant, gourds, cotton, lúcuma, peanuts, and maize.[37] The other site that has yielded Chira utilitarian ware is located near Santa Rosa de Quives at an elevation of about 1300 m. in the middle part of the Chillón Valley; it is apparently associated with a public structure of modest size.[38]

The next three phases in the Ancón ceramic sequence are distinguished from each other on the basis of stratigraphic evidence that was obtained in recent excavations in the northeast part of the Tank Site. They have tentatively been called the Colinas style, in spite of the fact that the earliest phase is clearly derived from the Late Chira pottery which immediately preceded it in time.[39] The

three Colinas phases are now dated between about 1300 and 1175 B.C.[40] The pottery of the Colinas style is charactized by zones of punctation outlined with incised lines and by undecorated neckless ollas which have various rim forms; the kind of punctation and the olla rim shapes are among the stylistic features that allowed us to distinguish the three chronological units in the Colinas style. The latest Colinas phase at Ancón was found in habitation refuse containing the remains of rock- and sand-dwelling molluscs, fish, shore birds, sea lion, lucuma, pacay, cotton, guava, gourds, peanuts, sweet potatoes, squash, and possibly Capsicum peppers and lima beans. The remains of what appear to be maize tassels were also found in association with the latest Colinas pottery in one recent excavation at the Tank Site.

Colinas pottery has also been found in a small habitation site, about 50 m. by 20 m. located on the seaward side of the Cerros de Oquendo in the lower part of the Chillón Valley. The site consists primarily of a few sherds and a thin deposit of habitation refuse containing rock- and sand-dwelling shellfish, fish, and a few unidentified plants.

The final phase in the Ancón ceramic sequence immediately preceded the appearance of Chavin influence on the central Peruvian coast in Early Horizon Epoch 1.[41] This phase, as it is now defined, spanned a substantial period of time and is currently dated between about 1175 and 1000 B.C.[42] Some of the decorated pottery is tan-colored and bears red-painted zones outlined with incised lines. So far, pottery belonging to this phase has been found only at the Tank Site in Ancón.

The Curayacu A and B styles are closely related to the four latest phases in the Initial Period ceramic sequence at Ancón.[43] Curayacu A and B pottery has been found at the type site in San Bartolo and at three sites in the upper part of the Lurín Valley. Curayacu is a deeply stratified shellmound, about 300 m. in diameter, which is situated on a rocky prominence overlooking the ocean. The deepest levels contain Curayacu A and B pottery as well as the remains of a variety of rock- and sand-dwelling molluscs, sea lion, camelids, and probably fish and shore birds; the plant remains associated with this pottery include maize, gourds, pacay, lucuma, lima beans, peanuts, cotton, achupalla, and various sedges, reeds, and rushes.

The earliest of the Lurín Valley sites is PV48-349, which is located between Sisicaya and Antioquía at an elevation of approximately 1700 m. It is situated on an alluvial fan at the edge of the valley and consists of a scattering of Curayacu A sherds and a few marine molluscs in the vicinity of about forty pits. Curayacu B pottery was found at Sites PV48-168 and PV48-98. The former also consists of a thin scattering of sherds at the edge of an alluvial fan located about 1100 m. above sea level. The latter is a multicomponent site situated on a large alluvial fan at an elevation of about 600 m. It consists of a pyramidal public structure that was built in several stages and a series of dwellings that extend up the

valley for nearly a kilometer. It is clear that Site PV48-98 was in use throughout much of the Early Horizon, but it is not clear whether the public building and the residential area date entirely to the Early Horizon or whether certain sections and building stages of the pyramid date entirely to the latest part of the Initial period.

The Utilization of Natural Resources

There are at least eleven distinct economic zones in the immediate vicinity of the coastal part of the survey area. As one moves inland up the coastal valleys, the number of economic zones increases progressively with changes in altitude. The value of these economic zones as resource areas changed markedly through time, depending upon the technology and the economic orientation of the people exploiting them. These zones can be grouped into three major resource areas: the lomas with their plant and animal resources, the coastal littoral, and the river valleys.

The lomas formations consist of vegetation that is produced by the winter fogs on the Peruvian coast. The vegetation consists mainly of annuals interspersed with small shrubs and other plants that have tubers, bulbs, or rhyzomes. These provide rich pasture during the winter months, and animals--such as deer and camelids--once grazed in the lomas areas of the central coast. In addition to the large herbivores, birds, rodents, foxes, lizards, and snails also inhabit the lomas.

In central Peru, the lomas formations are produced mainly between August and September at the present time; they appear about a month earlier in the north and a month or two later in the south. A variety of factors controls the distribution and size of the lomas. One of these is precipitation, because the plants are particularly sensitive to the amount of moisture that is available in the air. Some lomas areas receive little or no precipitation, and vegetation is not produced every year. In other areas, if precipitation is particularly abundant for several years in a row, the lomas will expand in size, most noticeably along their lower edges.[44] Local topographic features influence the amount of precipitation that particular lomas areas receive. The presence of high land in fairly close proximity to the coast appears to be an important feature in the formation of lomas; the lomas located close to the ocean appear to extend to lower elevations than those situated inland. Large quantities of land snails are found below the present limits of several lomas areas on the central coast and indicate that the plant communities were more extensive in the past than they are now.

The pattern of camping in or near lomas and exploiting their resources during the winter months is an ancient one on the central coast of Peru, beginning with the earliest known occupation of the area in late glacial times. Site PV48-184, which yielded

Tortuga stone tools, is situated below the present lower limit of the Atocongo lomas, about four kilometers from both the ocean and the nearest part of the Lurín River. The refuse at the site contains sand-dwelling clams (M. donacium) and a few lomas snails. The inhabitants of this site were exploiting at least two different food resource areas--the sandy beach littoral and the lomas--and may have exploited the plant and animal resources of the valley bottom and river as well. All of the later lomas campsites on the central Peruvian coast contain marine molluscs as well as lomas products.

Since the lomas are not economically important during the summer months, the inhabitants of the central Peruvian coast had to rely on other food resources during this season. This situation led to at least two distinct settlement patterns, which are dependent upon the distribution of food resources. Where the lomas, river valley, and marine resources are situated in close proximity to each other, they could have been exploited from a single camp, and seasonal changes in residence would not be necessary. Chilca Village 1 of the Encanto Phase provides an excellent example of this residence pattern. Where the resource areas are not in close proximity--such as in the Ancón-Chillón region--seasonal shifts in residence took place. Three resource areas could have been exploited during this season. One is the marine littoral, but coastal summer camps dating before 2500 B.C. have not yet been found in the Ancón-Chillón region. A second alternative would involve following the lomas game back into the highlands where rich pasture and plant foods were available during the summer months; however, no highland Encanto sites have been reported. The other possibility is that the inhabitants of the Ancón-Chillón lomas moved into the Chillón Valley, where they subsisted partly on plant and animal products of the valley and partly on marine products. Judging by the occurrence of inland Canario and Encanto Phase sites in the Chilca Quebrada, this alternative seems most likely; however, centuries of intensive agriculture in the Chillón Valley would have buried or destroyed any traces of such occupations.[45]

Marine resources became progressively more important on the central Peruvian coast, and, by the time of the Encanto Phase, the inhabitants of at least the Ancón-Chillón area were obtaining most of their meat protein from marine molluscs and fish; these were supplemented with shore birds and an occasional land mammal, with cultivated plants that were presumably grown in the valley bottoms.

The inhabitants of the Ancón-Chillón area virtually stopped exploiting the lomas after 2500 B.C., and marine resources became an even more important item in their diet. This change in subsistence patterns was rapid, and Lanning originally suggested that it took place because of progressive desiccation of the lomas to the point where they ceased to be economically productive; however, it is unlikely that any single-factor explanation of the lomas abandonment is entirely accurate, and other alternatives

should also be considered. It seems likely that over-exploitation of the lomas resources may have played a prominent role in their abandonment. A brief survey of the lomas on the central Peruvian coast in 1966 and 1967 showed that, at least in modern times, edible wild tubers--such as papas silvestres (Solanum tuberosum) or amancaes (Hymenocallis amancaes)-- are not so abundant that several consecutive seasons of intense collecting would not have depleted these resources. The progressive increase in reliance on protein-rich marine resources could have fostered a population increase in the Ancón-Chillón area which in turn led to over-exploitation of the plant resources in the lomas.

After the abandonment of the lomas and the increased reliance on marine resources, permanent settlements were established in the coastal region of the survey area. There were some differences between the subsistence patterns and technologies of people living near sandy beaches and those living along the rocky coast. The Bay of Ventanilla provided a long expanse of beach, as did other areas to the south, and the residents of coastal sites--such as Pampa and, to a lesser extent, the Tank Site. The inhabitants of both kinds of settlement supplemented their diet with marine algae and with wild and cultivated plants that presumably grew in the valley bottoms. Plant foods then became more important, particularly during the Gaviota Phase when both the variety and quantity of cultivated plants increased.[46]

The settlements of the Playa Hermosa Phase--Pampa, Camino, Banco Verde, and the Yacht Club--are all relatively small. Those of the Conchas Phase--Punta Grande and the Tank Site--are substantially larger than their predecessors, although not so numerous in the sample; this fact may indicate not only an increase in population but also the centralization of people around important resource areas. By the time of the Gaviota Phase, settlements of substantial size existed at a number of places. The most outstanding of the Gaviota Phase settlements are Chuquitanta and Río Seco on the central Peruvian coast; the preceramic occupation at Las Haldas to the north probably dates largely to this period as well.[47]

Eight of the nine preceramic sites on the central Peruvian coast assigned to the Gaviota Phase or tentatively placed in it were abandoned shortly before the appearance of pottery in this area.[48] These include not only the small inland settlements in the Lurín Valley but also the large ones at Chuquitanta, Punta Grande, and Río Seco. Of these, only the two inland sites in the Lurín and Chuquitanta are not, strictly speaking, coastal settlements. The abandonment of late preceramic sites apparently occured in other areas as well; the preceramic sites of Asia, Culebras, Huarmey, and perhaps Huaca Prieta were abandoned for awhile and then reoccupied. The abandonment of preceramic settlements did not occur simultaneously in all areas of the coast;[49] these changes in residence patterns may reflect important economic re-orientations.

After the appearance of pottery, the variety and particularly the quantity of cultivated plants increased markedly at the Tank Site. This site is marginal to the river valleys and suggests an even greater reliance on cultivated plants in these areas. By the last phase of the Colinas style, there appears to have been an almost equal reliance on marine and plant resources.

The lower parts of the Rimac and Chillón valleys coalesce and form an expanse of land that extends forty kilometers along the coast. Two large sites were constructed between the two rivers after the appearance of pottery in this area. The earlier of these is the Huaca La Florida which is located near the Rimac River and about eleven kilometers from the ocean. There is evidence of domestic habitation in the immediate vicinity of the large pyramidal structure. This site was abandoned before the beginning of the Colinas style. About this time, another large pyramidal structure was erected at Garagay, which is situated midway between the two rivers on a broad expanse of flat arable land located some six kilometers from the ocean.[50] In addition, there were several small inland sites in the coastal valleys of central Peru, as well as a small pyramidal structure at Santa Rosa de Quives in the middle of the Chillón Valley. The small sites may represent refuse accumulations from nothing more than several households, while the pyramid at Santa Rosa may indicate a small village.

The appearance of inland sites following the abandonment of the coastal settlements of the Gaviota Phase, as well as the increased importance of agricultural produce, probably represents a shift to full-time farming by a majority of the population on the central coast. Presumably, before this change in residence patterns occurred, plants were cultivated in the flood plains of the coastal rivers. Chuquitanta is located near a wide expanse of the Chillón River which floods during the summer months at the present time, providing optimal conditions for "flood-water" farming. The proximity of this farm land to the coastal littoral may account for the location and size of the settlement. It may be that canal irrigation was introduced about the time that the Huaca La Florida was occupied. Presumably, the earliest canals were located in the middle or upper parts of the valley where the gradient is steeper, providing easier water-management and shorter lead-off canals. La Florida is situated at the edge of the Rimac Valley overlooking a narrow expanse of arable land and the Rimac River. In this region, a combination of both flood-water and irrigation farming could have been used, since the river has not entered a deeply cut erosion channel. If only irrigation were used, a canal about six kilometers long would be needed to water this arable land. The abandonment of Chuquitanta may have resulted from the opening of larger expanses of arable land in the middle and/or upper portions of the coastal valleys through the application of canal irrigation. The new quantities of available land may have made farming a more productive activity than fishing, and this shift may account for the abandonment of a number of preceramic sites.

Three general types of subsistence patterns can be recognized on the central coast. The earliest is the pattern of seasonal exploitation of the lomas resources with heavy reliance on marine products and produce from other areas, such as the river valleys. This pattern was followed by a pattern of primary utilization of marine resources with a gradually increasing reliance on cultivated plants from the river valleys. This pattern resulted in the establishment of large sites and the construction of public buildings. The third pattern consists of inland farming by a majority of the population. This apparently provided a basis for economic specialization and probably social differentiation.

Whereas collecting and agriculture are largely seasonal activities on the central Peruvian coast, the marine resources can be exploited throughout the year. Extensive utilization of marine products persists from the earliest occupation of the area to the present and has always provided a most reliable source of food. The existence of this resource permitted a gradual experimentation with cultivated plants that were being introduced from other areas and the gradual build-up of a highly productive repertory of cultivated plants. Undoubtedly, some of the plants that were already cultivated in other areas were not accepted on the central Peruvian coast, because the existing marine-based economy was already highly productive.

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NOTES

[1]Lanning, 1963, 1965, 1967a, 1967b; Lanning and Patterson, 1967; Moseley, ms.; Patterson, 1966, 1967a, 1967b; Patterson and Lanning, 1964.

[2]Lanning, 1963, pp. 367-368; 1967a, pp. 20-23.

[3]Moseley, ms.

[4]Berger and Libby 1966, p. 476.

[5]Donnan, 1964; Engel, 1964a, 1964b, 1966.

[6]A number of radiocarbon measurements from Chilca Village 1 have been published by Engel (1964a, 1966) and by Trautman and Willis (1966, pp.193-195). There are several discrepancies among the different reports concerning the stratigraphic positions of the samples from which the radiocarbon measurements were obtained; however, the following stratigraphic placements are likely to be reasonably accurate:

Level 2: 3075 B.C. ± 200 radiocarbon years (I-815)
Level 2A 470 B.C. ± 175 radiocarbon years (I-812)
2575 B.C. ± 220 radiocarbon years (I-818)
3350 B.C. ± 220 radiocarbon years (I-811)
Level 2B: 2900 B.C. ± 170 radiocarbon years (I-746)
Level 2C: 3700 B.C. ± 190 radiocarbon years (I-813)
Level 3A: 2550 B.C. ± 190 radiocarbon years (I-816)
Level 3B: 3300 B.C. ± 220 radiocarbon years (I-817)
3420 B.C. ± 120 radiocarbon years (UCLA-664) probably
Level 4: 3000 B.C. ± 220 radiocarbon years (I-814) probably
Level 6: 3460 B.C. ± 275 radiocarbon years (I-892)
3700 B.C. ± 220 radiocarbon years (I-835)
3750 B.C. ± 136 radiocarbon years (NZ-450; R.1035).

[7]Donnan, 1964; Fergusson and Libby, 1964, p. 335.

[8]Lanning identified the Encanto projectile points from Chilca Village 1 at a public lecture given by Engel at the Anthropology Museum of the University of San Marcos in 1963; Engel kindly showed the artifacts from the site to Richard S. MacNeish and Patterson in 1966.

[9]Engel, 1964b, p. 149.

[10]Donnan and Lanning, personal communications.

[11]Lanning, 1963.

[12]Lanning, 1967a, pp. 20-23

[13]MacNeish and Patterson accompanied Engel to Chilca Village 1 and to a multi-component site in the lomas north of Chilca, where an Encanto projectile point was found (Patterson 1967b).

[14]Engel, personal communication to MacNeish and Patterson, who later had the opportunity to examine the Paracas specimens at the Institute of Pre-Columbian Agriculture in Lima.

[15]Patterson and Lanning, 1964, p. 114; Lanning, 1965, pp. 72-74; 1967a, pp. 23-25; 1967b, pp. 53-54.

[16]Lanning, 1965, pp. 72-74; 1967a, pp. 23-25; 1967b, pp. 53-54.

[17]A large series of samples from the Pampa site is currently being analyzed by the Lamont Geological Observatory (Lanning, personal communication).

[18]Moseley, ms.

[19]Moseley, ms.

[20]Excluding the date for the lowest level of the Pampa site, three radiocarbon measurements are available for the Playa Hermosa Phase. Two separate measurements of charred vegetable material from Banco Verde yielded ages of 2175 B.C. ± 105 radiocarbon years (GX-1132a) and 1935 B.C. ± 95 radiocarbon years (GX-1132b). Vegetable matter from Camino gave a date of 2490 B.C. ± 110 radiocarbon years (GX-1141); an earlier measurement from Camino gave a date of 1930 B.C. ± 105 radiocarbon years (GX-1133) but was rejected on the advice of Harold W. Krueger of Geochron Laboratories, Inc., because of electronic difficulties with the counting apparatus.

[21]Moseley, ms.

[22]Moseley, ms.

[23]Moseley, ms.

[24]Two radiocarbon measurements are available for the Conchas Phase components. Wood charcoal from the Tank Site yielded an age of 2250 B.C. ± 80 radiocarbon years (UCLA-968; Berger and Libby 1966, p. 476), and charred vegetable matter from Punta Grande gave a date of 1810 B.C. ± 95 radiocarbon years (GX-1130).

[25]The Gaviota Phase is dated by four radiocarbon measurements, three of which were collected by Moseley. All of the samples were collected in Cut 1 at the Tank Site. Cut 1, Level 7 yielded two measurements of 1830 B.C. ± 100 radiocarbon years (GX-1230) and 1860 B.C. ± 150 radiocarbon years (N-86; Yamasaki, Hamada, and Fujiyama, 1966, p. 337). Cut 1, Level 4 also yielded two measurements: 1670 B.C. ± 100 radiocarbon years (GX-1232) and 1505 B.C. ± 105 radiocarbon years (GX-1231).

[26]The comments on Río Seco are based partly on our own observations, those of Lanning, and the discussion of the site by Wendt (1964). Two radiocarbon measurements have been obtained from Río Seco: 1850 B.C. ± 100 radiocarbon years (NZ-210, R.308; Fergusson and Rafter, 1959, p. 233) and 1790 B.C. ± 100 radiocarbon years (NZ-209, R.285; Fergusson and Rafter, 1959, p. 233).

[27]Patterson and Lanning, 1964, pp. 114-115, 120; Engel, 1967. A radiocarbon measurement of 1620 B.C. ± 150 radiocarbon years (I-1676) was obtained from charcoal in refuse overlying a staircase at Unit 1. It apparently dates the refuse rather than the structure and, therefore, provides a terminus post quem for the abandonment of the structure.

[28]Engel, 1967.

[29]Lanning, 1967a, p. 27.

[30]Lanning, ms., pp. 47-48

[31]This statement is based on recent excavations carried out at the Tank Site by members of the Peabody Museum, Harvard University Expedition to Peru and on an extensive series of radiocarbon measurements.

[32]Two radiocarbon measurements date the earliest pottery at Ancón: 1765 B.C. ± 110 radiocarbon years (GX-1240) and 1730 B.C. ± 130 radiocarbon years (GX-1241). A third measurement of 1825 B.C. ± 220 radiocarbon years (I-810; Trautman and Willis, 1966, pp. 197-198) may also date the earliest ceramic unit at Ancón; however, the exact archaeological associations of the sample from which it was obtained are not clear because of the complex stratigraphy in the western part of the site. Matos (1966) discusses the excavations from which this sample was obtained.

[33]Patterson, ms.

[34]Patterson (ms.) discusses the Huaca La Florida and the ceramic assemblage from the quarry area. Three radiocarbon measurements date the ceramic assemblage at 1730 B.C. ± 120 radiocarbon years (GX-1210), 1710 B.C. ± 170 radiocarbon years (N-87; Yamasaki, Hamada, and Fujiyama, 1966, p. 337), and 1695 B.C. ± 85 radiocarbon years (GX-0456).

[35]Lanning, 1967b, fig. 5i-1 and personal communication.

[36]Moseley, ms. Three radiocarbon measurements from the Tank Site date the Late Chira Phase. Cut 1, Level 3 yielded a measurement of 1285 B.C. ± 120 radiocarbon years (GX-1129); Cut 1, Level 2 gave dates of 1200 B.C. ± 110 radiocarbon years (GX-1135a) and 1220 B.C. ± 95 radiocarbon years (GX-1135b).

[37]Lanning, 1960, pp. 52-54.

[38]Bonavía and Rosas, personal communications.

[39]The name Colinas was applied to this ceramic style by Lanning (1960) ane Ernesto E. Tabío (1965, pp. 69-88). It was originally thought that the style dated to the later part of the Early Horizon because of the presence of two Tambo Colorado type Paracas sherds in the excavation made by Tabío and Lanning. It now appears, however, that these sherds must have been intrusive into their excavation and that the style dates to the later part of the Initial Period.

[40]The latest Colinas Phase is dated at 1325 B.C. ± 95 radiocarbon years (GX-1234) and 1120 B.C. ± 95 radiocarbon years (GX-1233). Both samples were obtained from Cut 1, Level 1 at the Tank Site.

[41]Chavin influence appeared for the first time on the central coast of Peru during the last phase of the Initial Period. Chavin designs were not incorporated into the local ceramic style until Early Horizon Epoch 1.

[42]The latest Initial Period pottery at Ancón is dated at 1500 B.C. ± 210 radiocarbon years (GX-1237) and 1290 B.C. ± 140 radiocarbon years (GX-1238). The earliest Chavin-influenced pottery at the Tank Site was associated with charcoal fragments that yielded a date of 1345 B.C. ± 140 radiocarbon years (GX-1235).

[43]Lanning, ms., pp. 55-210.

[44]Ferreyra, 1953, pp. 1-6.

[45]Patterson, 1967b.

[46]We have used the term "cultivated" to refer to plants that require only slight tending as well as those requiring intensive care.

[47]The site of Las Haldas, located in the coastal desert between the Casma and Culebras valleys, contains at least two, and probably three or more, components. The earliest contains twined cotton textiles and lacks pottery. The second contains pre-Chavin pottery, and there is also some Early Horizon pottery at the site. Lanning's population estimate of 500 to 1000 persons during the preceramic occupation seems more reasonable to us than earlier, higher estimates. At present, there is no firm evidence supporting the idea that the large public structures at Las Haldas were built before the introduction of pottery in that area. The preceramic subsistence pattern of Las Haldas appears to duplicate that of Río Seco, although large quantities of edible <u>lomas</u> snails are found in the refuse.

[48]The six preceramic sites that definitely have Gaviota Phase components are Punta Grande, Pampa, Chuquitanta, Río Seco, the Yacht

Club, and the Tank Site; those that are tentatively identified as Gaviota phase sites are the preceramic component at Chira-Villa and the two inland sites in the Lurín Valley.

[49]The date at which preceramic sites in other parts of the Peruvian coast were abandoned is often calculated in terms of the date at which pottery is thought to have appeared in the particular region. The date at which pottery appeared in most areas of the Peruvian coast is exceedingly difficult to calculate because of insufficient archaeological exploration in those regions and estimates that are based on single or small series of radiocarbon measurements.

[50]In 1962-1963, Patterson found "Early Ancón" sherds in the fill materials at Garagay (PV47-19); this suggests that several parts of the pyramidal structure could be contemporary with the Colinas style or slightly later.

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