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THE PEOPLING OF THE ARICA COAST DURING THE PRECERAMIC: A PRELIMINARY VIEW

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In this paper Chinchorro mobility and ecology will be presented. The research was accomplished as a multidisciplinary effort using surveys of the upper and lower coasts of Arica, excavations of two shell middens, and radiocarbon dating of 21 samples from mummies and middens. The following observations can be drawn from our ongoing study: 1) the peopling of the coast moved along the smooth paths from the upper coastal cordillera rather than the lower rocky coast; 2) there was intense preceramic occupation of the coast illustrated by Macarena, Hipodromo, Chinchorro, Citroen, Maderas Enco, Colon, Morro, Playa Miller 8, and Quiani cemeteries in Arica. Also the harvesting grounds of Punta Palomo, Punta Baquedano and El Muertito toward the south could have a preceramic component. The latter three sites are located at the bottom of steep cliffs and are accessible by zigzagging paths which are still visible along the slopes of the mountains; and 3) the ancient environment was milder than it is today. Water and plants were abundant based on the geomorphology of the "chimbas" and the fossilized pollen of gramineae and compositae found in the shell middens.

Key words: Bioarchaeology, Chinchorro, peopling.

En este trabajo se presentará la movilidad y la ecología asociada a las poblaciones Chinchorro. Las investigaciones constituyeron un esfuerzo multidisciplinario que incorporó exploraciones de la costa superior e inferior de Arica, la excavación de dos conchales y la fechación por radiocarbono de 21 muestras de momias y depósitos. Se pueden hacer las siguientes observaciones generales de nuestro estudio: 1) el poblamiento de la costa avanzó a lo largo de los senderos planos de la cordillera superior costera en lugar de la costa rocosa inferior; 2) hubo una intensa ocupación precerámica de la costa ilustrada por los cementerios de Macarena, Hipódromo, Chinchorro, Citroen, Maderas Enco, Colón, Morro, Playa Miller 8 y Quiani en Arica. Las tierras de cosecha de Punta Palomo, Punta Baquedano y el Muertito hacia el sur, también podrían tener un componente precerámico; 3) el ambiente antiguo era más moderado de lo que es hoy en día. El agua y las plantas eran abundantes según lo indican la geomorfología de las "chimbas" y el polen de gramíneas y compuestas encontradas en los conchales.

Palabras claves: Bioarqueología, Chinchorro, poblamiento.

In the past many scholars have argued that the Chinchorros were semi-nomadic people. However, mobility would have been at odds with the prolonged and intensive care given to the dead ([Allison et al. 1984](#); [Arriaza 1995a](#), [1995b](#), [1995c](#); [Bittmann 1982](#); [Rivera 1991](#); [Schiappacase and](#)

[Niemeyer 1984](#); [Standen 1991, 1997](#); [Uhle 1919](#), among others). Thus, in 1996 we concentrated our research efforts attempting to decipher Chinchorro mobility, population density, and the use of natural floral and faunal (local versus external) resources. To accomplish this, we undertook several systematic surveys of the Chinchorro coast by foot, vehicle and boat. With the collaboration of the staff of the Museo Arqueológico San Miguel de Azapa (MASMA), Universidad de Tarapacá, we surveyed and recorded presence of occupational sites, walking routes, ancient water sources, and the type of available flora and fauna.

We wanted to answer some basic questions: Which were the routes that the Chinchorros used to settle the steep Arica coast? Where are the Chinchorro cemeteries if these people occupied the Arica coast for four thousand years? What was the environment like during Chinchorro times, and what kind of plants and maritime resources were available to them? The following is a preliminary review of the results.

Work Undertaken and Results

We undertook five different surveys to map site location, size, and geomorphological features. We also carried out four small excavations between June and December 1996 and July-August 1997. A general description of the work undertaken and the analyses of two shell middens is presented here.

A. Surveys

1. Survey of the northern Arica coast and Camarones to study the actual flora to create a botanical reference. The northern Arica coast is locally known as the Chimbas (meadows). The Chimbas, which cover an area of about ten kilometers in length by about 600 meters in width, are the result of the Lluta and San Jose rivers draining into the Pacific Ocean. We surveyed the Chimbas by foot and were able to collect and map eighteen different species of plants. The most common species found at the Chimbas were *Distichlis spicata* (gramma salada), *Thessaria absinthioides* (brea or sorona) and *Scyrrpus sp.* (round reeds or junquillo). Overall, the co-existence of plant species was low, except at the river mouth. Most of the area was covered by grass (*Distichlis spicata*). At the Lluta River totora reeds and larger bushes, 2-3 meter in height, such as *Pluchea chingoyo* and *Bacharis petiolata*, were the predominant species. The San Jose River drainage was practically dry; thus less vegetation was present there.

Next, we surveyed the Camarones delta. The flora found at this river delta was similar to the Lluta River. The only obvious difference was that Camarones has more fresh water available. Thus, more plants associated with a swampy environment, such as totora reeds, were noted.

Archaeological implications: The presence of modern flora, that is bushes like *Bacharis petiolata*, *Pluchea chingoyo*, and *Tessaria absinthioides*, would have provided the necessary wood for manufacturing harpoon heads and sticks to reinforce the mummies. For example, the stems of these plants reach about 2 meters in length with diameters of about two centimeters— a good length for the inner reinforcement of the black and red Chinchorro mummies. Also, for the Chinchorros, the presence of totora reed (*Typha angustifolia*) would have permitted the construction of mats, cords and fishing lines.

Today, the Arica Chimbas are drying out. Irrigation of the inner valleys consumes much of the fresh water that would normally end at the Chimbas.

Despite this fact, the water table at the Chimbass is still rather superficial, about a meter, as evidenced by some artificial trenches existing in the area. Thus, it seems that water availability was not a problem during Chinchorro times. In fact, it was just the opposite, the abundance of water created swampy areas and likely attracted mosquitos and sand flies; perhaps this was the reason why most Chinchorro sites in Arica (cemeteries and camps) are found in the higher plateau and not at the coastal edge.

2. Survey of the high southern Arica coast by foot and vehicle to understand Chinchorro mobility. We divided into three groups and covered a distance of 25 kilometers by foot and vehicle. Today the area is absolutely dry and the edges of the coastal cordillera cut sharply to the Pacific Ocean.

Archaeological implications: a) There are numerous modern trails along the mountain ridges. Many faint trails, presumably ancient, were also noted. This evidence clearly suggests that prehistoric people used the mountains as corridors to move between fishing/gathering places. From the top of the mountain a desired route can easily be followed as long as one stays close to the coast; b) some ravine paths go directly to the Azapa valley. This is interesting because during colonial times the coast was exploited for guano. Likewise, prehistoric times people could have easily used these ravine paths to reach the valley either to trade or acquire new resources; c) in the past some ravines could have been sources of fresh vegetation due to condensation of coastal fog. This is exemplified by a forest of cacti that we suddenly found at 450 meters of elevation at GPS E359760/N7943011. All cacti were dried and covered an area of about 150 x 50 meters. Some cacti still remained erect and were about two meters in height and 18 centimeters in diameter, d) we found numerous temporary sites (shell middens) along the ridges of the upper coast. The presence of lithic remains, shellfish, guano and ceramics indicates the long archaeological and historical trajectory of these sites. They were located at the edges of the ravine and associated with downhill paths that went directly to the coast. Most paths were steep and zigzagged and partially destroyed, perhaps as a consequence of earthquakes.

3. Survey of the low southern Arica coast by boat. There are no natural paths along the southern Arica coast. To explore this region we rented a small fishing boat with a crew of three. Two of the three sites found were surveyed.

a. Punta Palomo site. Location: E359806/N7942787. Intensive human occupation was obvious when we disembarked. The current exposed surface of the shell midden is about 50 meters in length by 20 meters in width, and about 12-15 meters in height. The terrain is irregular and the ocean has eroded the central part of the midden, making it too dangerous to attempt a future dig. There are many layers of hearths and mollusks, plus scattered large marine fauna (sea lions), and utilitarian ceramics. Superficially, many lanceolate lithic points made of chert were visible. No clear ancient freshwater sources or vegetation were observed. A preceramic component could have been present at this midden given its dimensions. A nearby uphill zigzagged path is evident from a distance out in the ocean as observed from the boat. The GPS location of Punta Palomo matched some temporary sites located along its upper coast.

b. Punta Baquedano site. Location: E357901/N7937898. Human occupation has been extensive at Punta Baquedano. The shell midden surface covers about 100 meters in length by 15 meters in width. The height is approximately six meters. The modern component is evident by cans and by a small shelter made of shell midden blocks. The blocks are hard and have much cultural debris attached to it; even lithic points. There is a noticeable absence of water

and vegetation. Paths toward the mountain are clearly visible. Similar to the previous case, the GPS matched the temporary sites along the upper coast.

c. Muertito site. Location: E358577/N7931012 (reading taken from the boat). It was not possible to disembark due to the rough ocean. But deep black layers of hearth are evident from the boat at a distance of 10-15 meters.

4. Survey of Chinchorro sites with Guillermo Focacci to map their exact location. The following ancient cemeteries were surveyed by foot to map location, size, and geomorphology: a) Macarena Mine (E361888/N7963868), b) Citroen (E363567/N7958551), c) Maderas Enco (E363134/N7958482), d) Chinchorro beach (E363179/N7958794), e) Intersection of Colon and Yungay Streets (E360772/N7956779), f) Morro 1 (E360708/N7956419) and g) Playa Miller site (PLM8) (E360202/N7955370).

Archaeological implications of Points 3 and 4. The presence of many preceramic cemeteries point toward intensive or continuous human occupation of the coast. This contrasts with the present aridity of the region and the difficult access to some of the more isolated harvesting locations along the steep coastal plane). Population density is still unclear, but at least two cemeteries, Morro and Playa Miller 8 revealed intense occupation. They total about 200 preceramic inhumations.

B. Excavations

1. Shell midden at Camarones Cove

Here we tested a shell midden located at E367055/N7876879. [Rivera \(1984\)](#) previously excavated part of this site. We cleaned and sifted the west profile with the objective of taking samples for pollen analyses. The profile revealed at least 15 strata with mixed layers of shells and hearths and had a depth of 3.9 meters. We took six charcoal samples to be radiocarbon dated from strata 3, 5, 10, 10.1, 14 and 15. All samples were sent to Desert Research Institute (University of Nevada, Las Vegas).

Malacological Analyses: The analyses of the strata revealed evidence of intensive harvesting of edible mollusks: *Choromytilus chorus* and *Concholepas concholepas*. A detailed study of the species collected is being undertaken.

Botanical Analyses: Botanist Oriana Nuñez analyzed about 200 grams of soil samples taken from strata 3, 5, 10, 10.1, 13 and 15 to search for seeds, and micro-residual of plants using five types of sieves (1.7 mm, 1.40 mm, 1.0 mm, 710 um and 500 um). In all the samples a continuous use of reeds and shells was found. However, stratum 3 was the only one to show evidence of sea urchins. Animal osseous fragments were also common to these strata. No evidence of seeds was found.

Pollen Analyses: Botanist Eugenia Rosello analyzed about 100 grams of soil taken from Strata 3, 5, 10, 10.1, 13, and 15 to search for fossil pollen following standard pollen procedures ([Fonnegra, 1989](#)). The identification was done using a binocular microscope LEITZ HM-LUX 3A. Rosello found a total of 16 types of pollen and was able to identify *Gramineae aff. Distichlis*, *Compositae (brea)*, *Chenopodiaceae aff. Atriplex*, and *Anacardiaceae aff. Schinus molle*.

Radiocarbon dates: The following ^{14}C corrected dates were obtained from the strata: 1674 \pm 64 B.C. (stratum 3); 2200 \pm 73 B.C. (stratum 5); 2743 \pm 123 B.C. (stratum 10) 2332 \pm 95 B.C. stratum (10.1), 2132 B.C. \pm 144

(stratum 13) and $2560 \pm$ B.C. 67 (stratum 15). All the above dates are uncalibrated.

Archaeological implications: Human occupation at this Camarones midden was continuous for at least 900 years (2560 to 1674 B.C.). Rivera (1984) reported even an earlier date of 3690 ± 160 B.C. for the same site. The vast amount of shellfish indicates a gathering economy and the presence of numerous hearths suggests they were probably cooking or smoking their food. Nearby this shell midden, there are numerous small terraces that may correspond to ancient huts, but their antiquity needs to be ascertained. All these dates obtained fit perfectly within the range of the Chinchorro mummies with artificial mummification (black to mud-coated, circa 5050 B.C. to 1700 B.C.) as described by Arriaza (1995b). Lastly, the microscopic remains of grasses in many strata, and the pollen found in the lower stratum (e.g. No 13) dated to 2132 B.C. was associated with grasses and shrubs, indicating availability of fresh water in this location in ancient times.

2. Excavation at Punta Baquedano

We returned to Punta Baquedano, by boat, to dig the shell midden. To get to this remote site with all the excavation material was an adventure in itself. At this site we dug up and sifted a 3x1-meter unit following the natural strata. There were at least 21 strata of alternating layers of hearths and maritime fauna given a total height of 3.2 meters. Seven charcoal samples were collected to be radiocarbon dated.

Main Analyses: The ^{14}C corrected dates obtained were as follows: A.D. 255 ± 73 (stratum 2), A.D. 264 ± 73 (stratum 4), A.D. 231 ± 69 (stratum 9), 478 ± 53 B.C. (stratum 16), 429 ± 57 B.C. (stratum 17), $200 \pm$ B.C. 121 (stratum 18), and 560 ± 176 B.C. (stratum 21). Contrary to our expectations, these dates fall within the Arica ceramic period.

Cultural Material: The ceramic occupation covered strata 1 to 16. Based on cultural materials (triangular lithic points, chert knives, bone harpoons tips, utilitarian ceramic 10 mm in thickness) and faunal remains (sea lion bones and shark teeth), it is clear that the ceramic people intensively engaged in hunting large sea mammals and fishing, unlike the Camarones Cove situation. Reed mats and cactus needles were also present in many strata, suggesting utilization of distant resources, since no evidence of ancient water springs were noted. Strata 17 to 21 (200-500 B.C.), in contrast, lacks ceramics and other cultural objects, and indicates, instead, a gathering subsistence of *Choromytilus* and *Concholepas* with occasional hunting of birds and sea lions. Unfortunately, the dates obtained for strata 16, 17, and 18 do not follow a sequence, strata 16 is older than strata 18. This mixing of layers was most likely due to the steep slope of the terrain. The earliest occupation (strata 21) was dated to 560 B.C. The latter date falls within the Arica Formative Period. A preceramic occupation is highly possible considering the site dimensions.

Botanical Analyses: Rosello found a total of 35 types of pollen in the first eight strata associated with a ceramic occupation and fishing and shellfishing subsistence. Of these 35 types, seven were identified as corresponding to *Gramineae*, *Compositae*, *Chenopodiaceae*, and *Anacardiaceae*. Of the identifiable taxa the most abundant were the *Gramineae* and *Compositae*. The greatest number of pollen types were found in stratum 2 (16 types) dated to A.D. 264, and in stratum 8 with 17 different types of pollen dating around to A.D. 231. Rosello suggested that this pollen increment indicates moments of greater humidity and likely the existence of local underwater springs in Punta Baquedano which may have subsequently dried out. This was the case for the Quiani site in Arica, which had water until historical times. Also, geologist Fred

Nials, affirms that there was rain during ancient times based on the geomorphology of Camarones mudflows. However, the exact time frame needs to be determined. This view, of humidity fluctuations, is also consistent with the dry cacti forest found in the high coast at Punta Palomo. The abundance of ancient pollen certainly contrasts with the actual aridity of the area.

3. Excavation of a Chinchorro cemetery

"Maestranza Chinchorro"

On August 20-23, 1997, we rescued 11 bodies from "Maestranza Chinchorro" a train depot in Arica. The train workers were digging trenches and fortuitously found the bodies. The site in question is located on the area known as Chinchorro beach. The eleven bodies were distributed in three groups, which may indicate different, but collective times of death, or interment. The bodies were buried about 80 cm below the surface, lying on their backs. Group one consisted of five bodies: one subadult with natural mummification and four infants with a black style of artificial mummification. All were extremely fragmented. The second group corresponded to three bodies: one adult woman (natural mummification) and two infants mummified with the black style. The infants were partially lying on her chest. Cultural remains included fragments of whalebones and a "doughnut" of reeds, which was used as pillow for the infants. The third group consisted of three bodies: an adult male with partial treatment (a clay helmet), a young adult male (natural mummification), and a subadult (natural mummification). The latter naturally mummified bodies were wrapped in a mat shroud. Cultural remains included two net bags with fish bones, one harpoon head made of bone, a lithic point, and a stick. This cache of mummies was an exciting discovery because natural mummified bodies were lying next to artificially prepared bodies of the black style. Two bodies were dated from group one, specifically Maestranza Chinchorro Cuerpo 1 and Cuerpo 4. The first was a naturally mummified body while the second had the black mummification style. A human bone of Cuerpo 1 gave a date of 3220 ± 70 B.C. and a wooden stick of Cuerpo 4 gave a date of 3503 ± 170 B.C. (uncalibrated dates). Contrary to our expectation, the bodies could be contemporaneous. Using two sigmas for each date, there is an overlap of 197 years. This would be the first body found with natural mummification dating to the black period.

Final Remarks

First several problems were encountered during this project. Due to the absence of leaf and seed samples, and the wealth of pollen from the excavations, only the pollen analysis proved to be useful. Also due to disintegration of the ancient wood samples during the thin sectioning a permanent archaeological reference set of wood could not be established. However, of the few samples successfully made into thin sections, professor Eliana Belmonte was able to tell that the same type of wood was used in the construction of two mummies coming from different sites: Maderos Enco C3 and Morro 1 C6. Both mummies come from Arica, but the first has a date of 2800 B.C. while the second is from 3210 B.C. The microscopic features of the wood resemble that of the *Compositae* family.

This project permitted the archaeological exploration of the coast and mapping of ancient paths and new sites. The abundance of coastal sites is at odds with the present dry environment. However, the coastal geomorphology and pollen analyses of Arica and Camarones indicate there were plenty of water resources to support human occupation along the coast during preceramic and even subsequent periods. Abundance of water, especially at the river delta,

provided the Chinchorros with raw materials on one hand, while it also forced them to live and bury their dead on a higher plateau.

It is also possible that the rich river deltas of Arica and Camarones allowed for permanent habitational sites, while sites as Punta Palomo, Punta Baquedano, and El Muertito could have been temporary harvesting grounds even during preceramic times. The uneven geography at some sites (e.g. Punta Baquedano) would have precluded the development of larger villages or cemeteries in these localities.

With this new environmental and ecological data we have documented a friendlier preceramic environment for the peopling of the coast. This would have allowed more movement between shellfish harvesting stations using the paths along the coastal mountains. Despite the more hospitable environment, it appears that population density was low, since most burial places contain few contemporaneous corpses.

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