

New evidence of human habitation and hunting activity at the fog oasis of Alto Patache, south of Iquique, Chile.*

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Abstract:

At a coastal fog oasis located at Alto Patache, Northern Chile (20°49' S; 70° 09' W), at altitudes between 300-850 m, several hundreds of archaeological artifacts have been recovered from the surface from early 1997 on, revealing a frequent human occupation of the site, since very ancient times, probably 6-7 millennia. We will present here different kinds of proofs: 1. *Archaeological*: consisting in a display of different types of lithic artifacts found at place; 2. *Geographical*: showing landscape traits effected by game (guanaco), and connected with human activities; 3. *botanical*: showing artifact concentration in evident relationship with old vegetation parches, once present in the area, and today practically absent; and finally, 4: *Ethnohistorical*, affording several evidences of guanaco hunting activity at coastal fog oasis in the past centuries, as shown by travellers, botanists and other scientists having witnessed their presence since the XVII Century onwards. The picture obtained is that these small and restricted fog areas in terms of surface, and spatially strongly isolated one from another along the Chilean Northern Coast, offered in the past, nevertheless, an incredible amount of resources in terms of potable water collecting, game hunting, and plant and fuel gathering for marine fishers and foragers, having their residential units at the foot of the mega-cliff, exactly under the influence area of dense fog masses, cumulated in the hill heights, close nearby.

Keywords: fog oasis; Pacific Coastal desert; Atacama Desert; Arid coasts; Hunters & gatherers; ancient maritime economy; game hunting.

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INTRODUCTION

This paper strongly focuses on cultural ecology in the sense given by anthropologists like A. Kroeber, K. Flannery, W. Sanders or Julian Steward, or geographers like J. J. Parsons, and should be considered therefore as a basic ecoarchaeological type of analysis. Environmental sciences are here not simply “helpers” in the task of interpreting archaeological items, but co-researchers who contribute with most valuable insights into the global explanation of human settlement at given ecosystems. In this direction, we state that some North Chilean undisturbed ancient human campsites lying inside fog-oasis, until recently fully unknown, should be considered, perhaps, one of the best laboratories where to thoroughly study not only ancient man-nature relationships, but also climatic and environmental changes and oscillations through time. No archaeological survey has ever been undertaken at place before our arrival (in 1996), nor any kind of mining or historical human activity has been identified there, except for occasional crossing through, along distinct paths following old dry streambeds. The spot, consequently, has remained fully undisturbed, since very remote arcaic times. Evident proofs thereof are the presence of many discarded arcaic lithic artifacts and flint parts, specially spear and arrow points, used in guanaco hunting, firepits and other related hunting devices. We will present here, field evidence affording proofs taken from different disciplines, and proving intense use of fog systems all the year around, by ancient coastal populations. (See Fig. 1).

“Lomas” studies and Archaeology.

The peculiar floristic formations called “lomas”, were already well known, and have been clearly described by some of the old Spanish chroniclers. One of the best descriptions belongs to the Mercedarian Friar Vázquez de Espinoza (1969, N° 10380-10382; see also Cosme Bueno, [1765] 1951). Very well known to the botanists (Weberbauer, 1942; Follmann 1966; Dillon and Rundel (1990), among others) the “lomas” plant formations were practically unknown or unvisited by archaeologists. Until archaeologists working in Peru like F. Engel (1973, 1983, 1979/90) and E. Lanning, from the sixties (1963, 1965, 1977), began paying special attention to their cultural significance from arcaic times on, for human populations living on them and from them. They proved that coastal peoples occupied and exploited through millennia, the manifold resources offered by the “lomas” area. Many small towns and hamlets, with water reservoir and distribution systems, flourished once here, proving its potential for sustaining life, well up in the hills. Later on, in Colonial times, active transhumance movements of cattle flocks took place every year, from July to November. Domestic cattle, brought from the *sierra*, fed there on Gramineae, Malvaceae, Nolanaceae and several other grass species. The effect of such annual exploitation cycle, being prolonged through several months (from July to December), produced, in the long run, a severe

impact on the delicate lomas “ecosystem” balance. (Lanning, 1965, 1977). Not only guanacos visited regularly the South Peruvian “lomas” (Hoffstetter, 1986; Engel, 1973, 1983, 1989/90, also deer (*Odocoileus virginianus*), as Gremwood (1969) refers for Punta Corio (17° 20’ S) and Morosaza (18° 00’ S); at both places of “lomas “, close to Tacna, deer was seen in the recent past.

Northern Chile fog-oasis, however, show a very different reality. In a few places like Paposo, Chango families used to maintain small flocks of goat and sheep (Philippi, 1860, Mellet, (1942 [1840], or Cobija, where Frézier (1732), [1714] and O’Connor (1928, [1826] testified the frequent sending of pack animals to graze in the heights, during the winter and spring months. But in all the other northern coastal fog locations (most of the Coastal Tarapacá and Antofagasta), fog oasis remained unvisited, untouched and consequently, undisturbed. The six or seven fog-oasis located along the Tarapacá coast, (see Sielfield, 1995; Cereceda et al., 2004; Egaña et al., 2004 and Larrain, 1998, 2001, 2004b, 2005), experienced practically no contact with the industrial outside world (guano and nitrate exploitations), except at the rare spots where old trails crossed the pampas, leading west, towards the Coast to reach the littoral export ports.

The area of study

Alto Patache fog oasis (20° 49’ S and 70° 09’ W) lies at the top of one of the several points which protrude to west from the nearly straight northern coastal line of Chile. Atop of some of these points, fog oasis develop, as it happens in Punta Pichalo (Junín), Punta Gruesa, Punta de Lobos y Punta Chipana, all in the I Region of Chile. Here topography, geomorphology and westerlies winds permanent orientation confabulate in creating these peculiar “life oasis”, responsible for *in situ* plant and game development, and consequently, human presence. Here, since 1997 almost 400 archaeological artifacts have been found, whose exact position has been determined by GPS. Figures 1, 2, and 3, have been plotted by means of Arcview system, showing the preferred areas occupied by ancient men. Aerial view presented in Fig. 4 shows the immediate hinterland in the back of our fog oasis, with numerous paleo-drainages leading east.

Materials and methods

We have done intensive surveys on foot, going over the whole area submitted to fog action (ca. 1.800 has). All the archaeological items found have got exact coordinates taken by a GPS instrument *in situ*. The information so recovered, has been transferred to the GIS Maps shown in Fig. 1, 2, and 3. We have payed particular attention to those geographical

landscape traits showing clear or possible relationship to guanaco presence in the area (particularly defecating and wallowing places, and guanaco trails). Most of the recovered instruments showed a clear connection in terms of vicinity to some of the cited traits.. As it is clear from Fig. 1, most of the artifacts concentrate in a very tiny surface, called by us the “lithic workshop” due precisely to the abundance of flint and basalt flakes, as a result of intensive lithic activity at place.

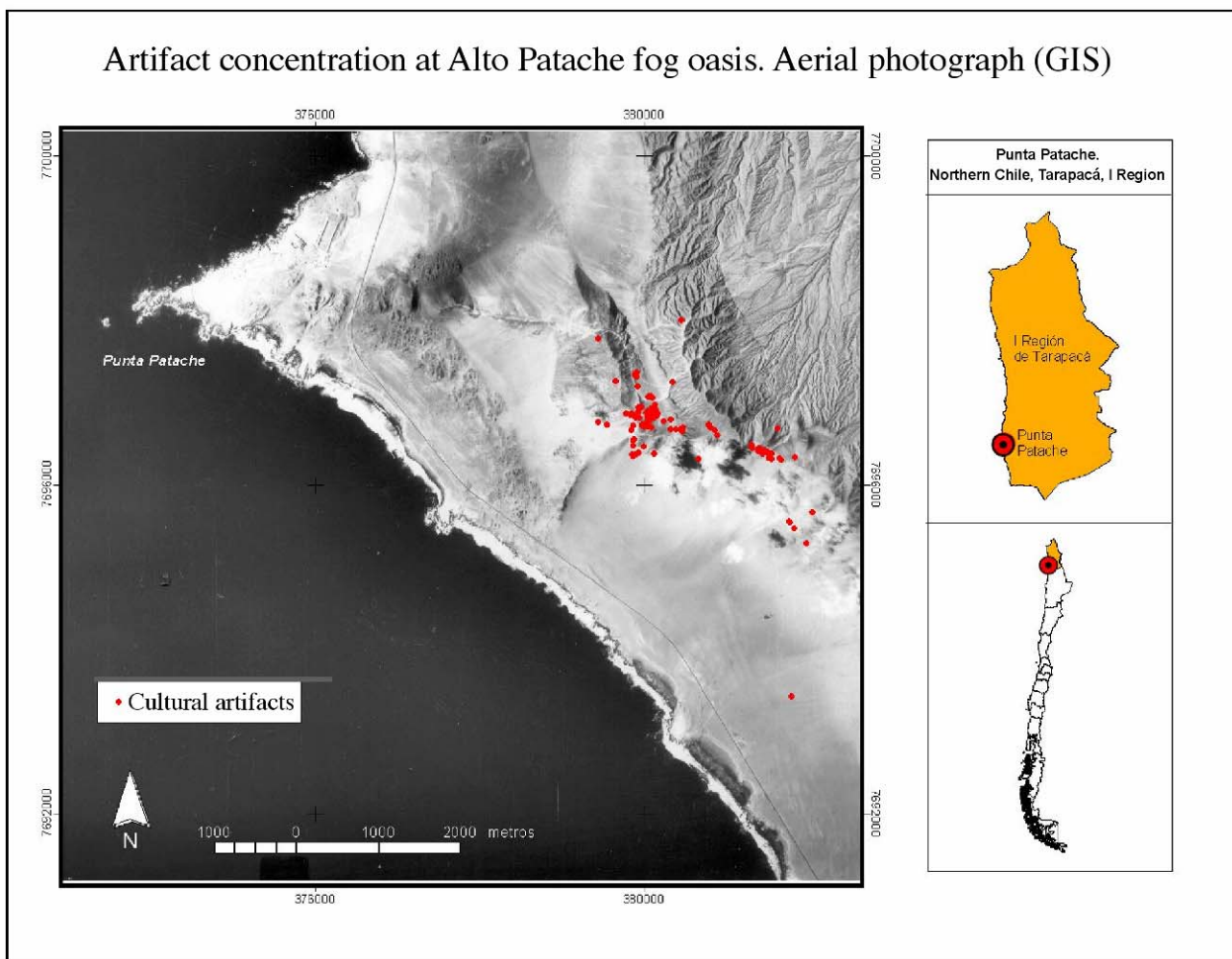


Fig. 1

Northern Chile fog-oasis, however, are somewhat different from Peruvian “lomas”, particularly in fog intensity and in number of plant species represented. Peruvian “lomas “ are clearly richer than Chilean “lomas”, and this fact has been always recognised by botanists (See Follman and Weisser, 1966; Dillon and Rundel 1990). In Coastal Chile, in very few places like Paposo, Chango families used to maintain small flocks of goat and sheep (Philippi, 1860, Mellet, (1942 [1840], or Cobija, where Frézier (1732), [1714] and O’Connor (1928, [1826] testified the frequent sending of pack animals to graze

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The cultural traits examined in situ.

The existence of game (guanaco) which was easily ambushed, hunted and eaten in the heights of the Coastal Cordillera, explains the great diversity of lithic artifacts and related cultural traits found at place. Fig. 2 shows the area where such traits concentrate. Archaeological items are always found in or close to existent elements where guanacos used to defecate, wallow or simply wander around, or such places like fire pits, game spying spots or the like, all of them used in strong connection to guanaco hunting and butchering. The landscape traits, *primo visu* only of geographical character, are in fact also cultural, due to their intimate significance in game hunting, and, therefore, cannot be isolated from the recovered artifacts as such. Both necessarily correlate and mutually explain. Such landscape features, consequently, are so important for us as the artifacts themselves. Therefore, future typological analysis of instruments – a task to be undertaken soon – should always be connected with the precise *locus* where they were collected. Hence the significance of such eco-archaeological perspective in fieldwork.

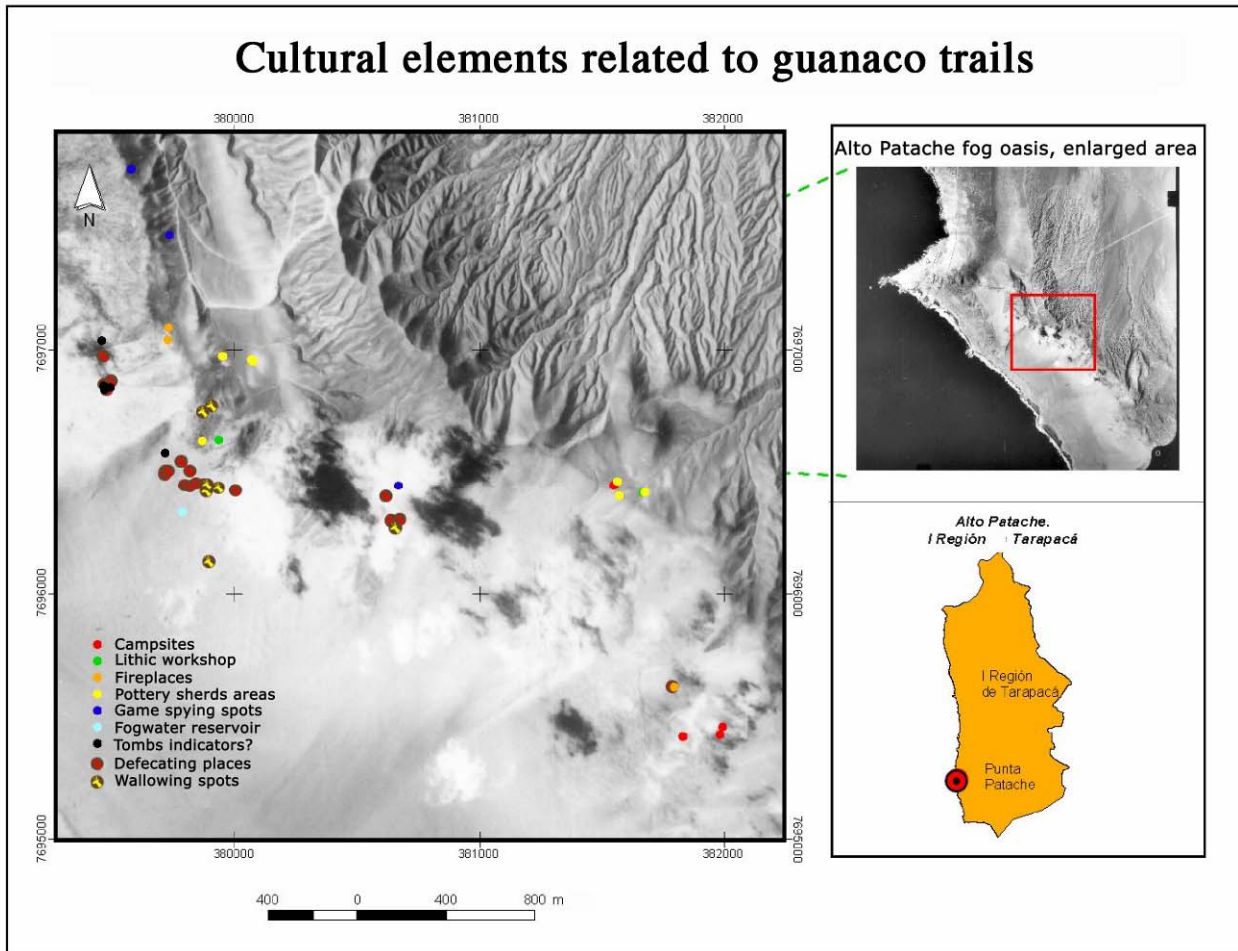


Fig. 2

Our present hypothesis

Similar to African Kalahari desert tribes, small Indian colonies inhabiting the north Chilean Coast since millennia, used to exploit and take advantage of several interconnected geographical ecosystems located in a E-W direction. All were important links in their chainlike ancestral territory. These not so distant eco-links (let us use this term) offered them, as a whole, all the necessary for life. From inland, they secured pods and seeds of carob trees at the Pampa del Tamarugal and adjacent gorges to the East; reeds and *tatora* fibers (*Juncus*, *Typha* and *Scirpus* spp.) from riversides or saline ponds. (Núñez, 1965, Bittmann, 1977, 1986). Flint, quartzite, rock crystal and basalt nuclei, from the inner pampas (Salar del Soronal, Salar de Pintados); cactus wood and bundles of Bromeliaceae (*Tillandsia landbecki*) for fuel. Guanaco (*Lama guanicoe*) and fox (*Pseudalopex griseus domeykoanus*) for hunting and butchering (Weischet, 1966). From the closeby seashore: algae, mussels, shellfish, seafood and fish at the nearby beaches or exposed rocky points; sea lions for meat, bone

and grease, and finally marine birds: for eggs, feathers, leather, tendons and meat (Larrain, 2004a, 2004b). Different but discontinuous ecosystems were considered by the Indian parties as group “property”, or partly shared with inland groups (nomadic or agricultural). All these items have been found by us in tombs deposited at the marine terrace, at the foot of the fog oasis (Larrain, 2004a). Let us pinpoint here that the ancestral conception of a **multi-sectorial territory** was surely very far from our present, restricted, “political” idea of territory as a limited and uninterrupted fringe of soil surface. Among all here cited ecosystems, fog oasis contributed with several significant life expenditures, (edible flora, game, water and cactus wood. Only the littoral offered a still broader set of life resources. Fog oasis, we claim, came second in their supply source. This new perspective thoroughly changes the vision normally sustained by most archaeologists, in relationship to hyper arid Coast habitability, not everywhere, but at very well defined spots along the Chilean Northern littoral.

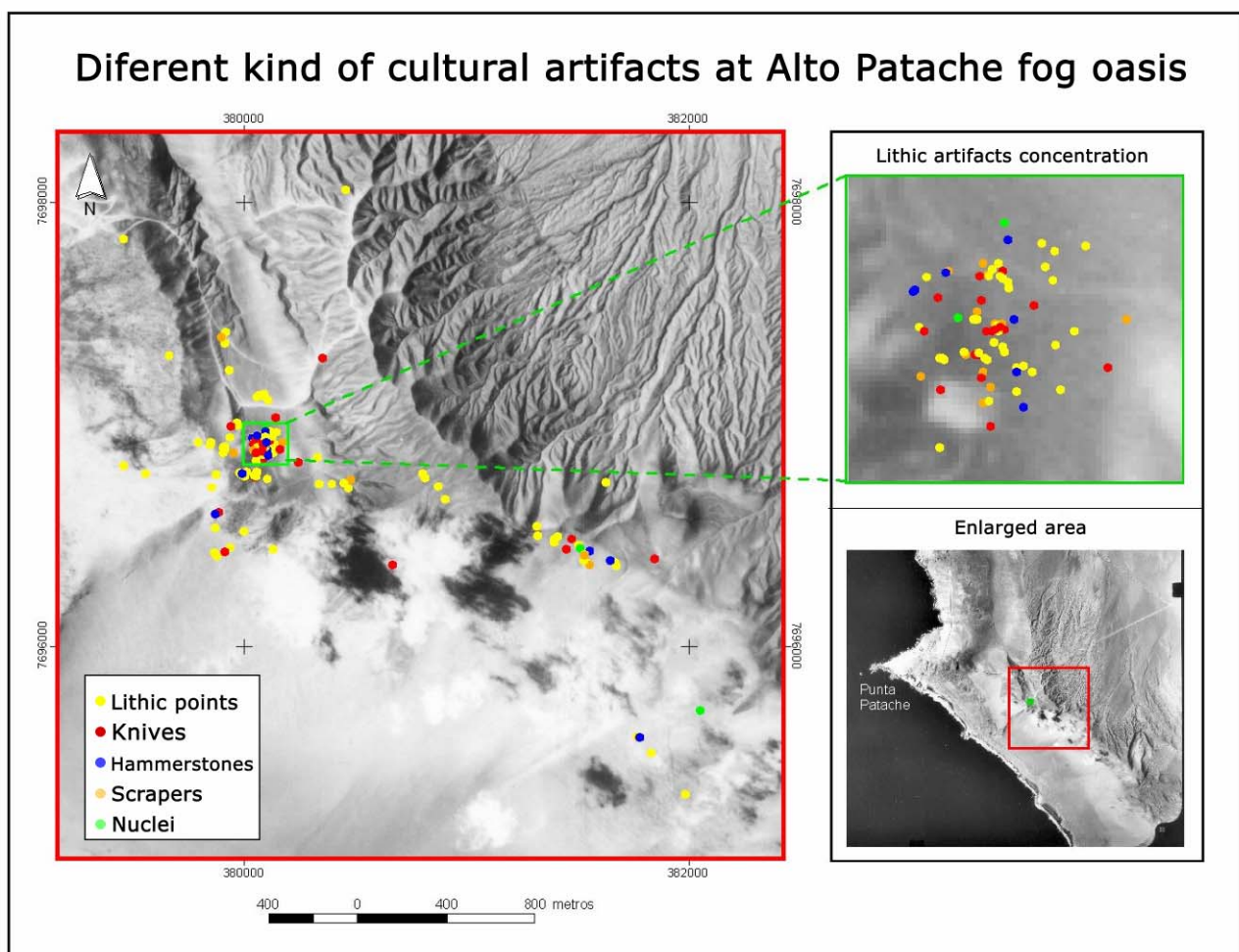


Fig. 3

Archaeological evidence from Alto Patache

a) Surface collections made by us shows many lithic instruments, of different kinds, all worked at place (Larrain, 1998, 2004a, 2004b). Since 1997, nearly 400 items, mostly lithic, have been found in the site, whose 85% concentrates in a surface of no more than 2 has (see Figs. 2-3). Basalt, flint, rock crystal and quartzite are the most frequently raw materials used. Fig. 4 shows the area of findings.

The artifacts found, scattered around or concentrated at definite spots, were instruments mainly used in meat preparation or game hunting: like knives, arrow, harpoon and spear points, scrapers and chopping tools of different types and materials. Figs. 5, 6, 7, 8, 9 and 10 show the types and size of such hunting and butchering items worked in different techniques.

The main human activity at this fog oasis was the elaboration of artifacts and game hunting and butchering. Flint and basalt blocks were brought in from distant Pampa and worked out here into different kinds of points and artifacts. Flint flakes were found at the main workshop by the thousands. Instead, at lower altitudes, there were different types of campsites or residential units. We have found no traces of Indian dwellings around in the upper sections of the cliff (see Fig. 1, 2 and 3.) They were located below, at the marine terrace, some 110 m over sea level. For this reason, at place were worked all kinds of hunting gear, also those for sea lion hunting and fishing. This is the reason why a high percentage of instruments found were used at the coast, for killing marine mammals, fishes or birds. No wonder, then, if we have found here all types of hunting devices: those for terrestrial hunting and those for marine hunting and fishing. (see Fig. 8).

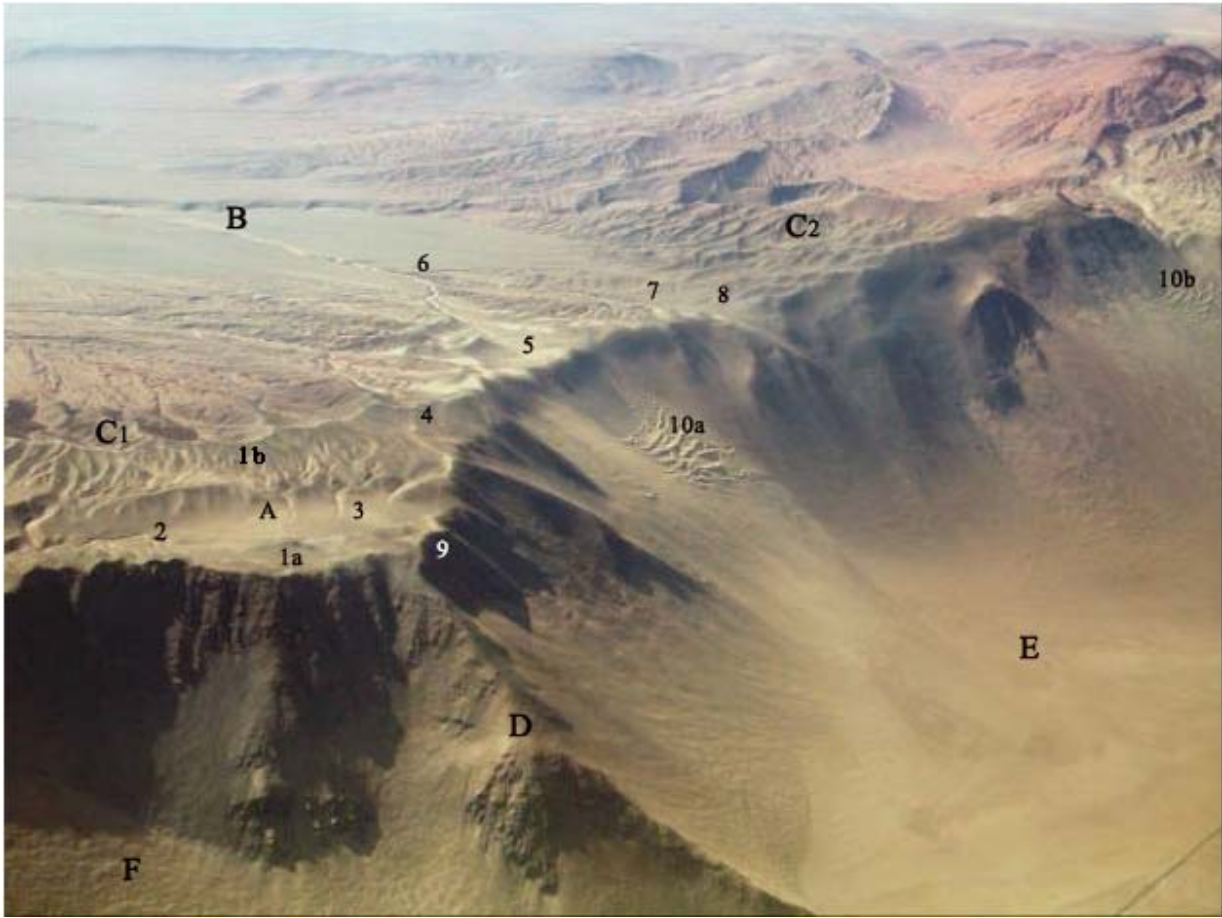


Fig. 4. Aerial photograph of our Study Area. The geographic macro-areas are signed with capital letters and micro-areas, instead, with numbers: A. Alto Patache High Plateau; B. Inner Mesa; C1. North Paleo-Drainages; C2. South Paleo-Drainages; D. Patache Point; E. Bajo Patache Coastal Terrace; F. "Luis Covarrubias" Coastal Terrace; 1a and 1b. Central Hilly Areas; 2. Northern Pampa; 3. Lithic Workshop; 4. Southern Hilly Area; 5. Southern Campsites; 6. Old penetration routes towards inland; 7. Southern Pampa; 8. Southernmost Plain. 9. Camanchaca water reservoir; 10a and 10b. Seif type Dunes. (Photo courtesy of A. Kirberg).



Fig. 5. Basalt knife



Fig. 6. Early arcaic period flint and basalt points.



Fig. 7. Basalt spear points



Fig. 8. Flint harpoon heads



Fig. 9. Flint scrapers



Fig. 10. Andesite hammerstones and retouchers

b) Fireplaces: Close to guanaco defecating places, we have found the evidence of guanaco meat consumption (carbonized bones). Few stones mark in situ the position of firepits. (See Fig.11). Inside them, bones, and wood carbon was present. Such places, at least in two cases, were found very close to guanaco defecating places.

c) Game spying spots: Here local rocks were piled up in such a way as to form a rough “refuge”, where the hunters used to hide and spy the passing game (visible trails still closeby); (See Fig. 12). We can assume that animal hides were used to cover the small walls made of stone. Such places, moreover, were located very close to guanaco trails, preferably along the crests of the chains, so as to have perfect vision to all sides



Fig. 11. Fireplace in Northern Pampa at Alto Patache High Plateau



Fig 12. Game spying spots near guanaco trails on Southern Hilly Area.

d) Fogwater reservoir: It lies at around 720 m. high, among vertical huge granitic rocks, where oncoming fog masses condense in a kind of steep natural wall, from where distilling water goes down and concentrates at its bottom. Huge amounts of pottery sherds were found scattered at the basis. In our opinion, the spot was used for water collection, by means of clay vessels deposited to this effect (see Fig. 13). At the moment, no other explanation seems us acceptable due to the incredible abundance of pottery fragments thereby. L. Nuñez (1965), describes a very similar situation for Punta Gruesa fog oasis, finding a similar sherd fragmentation, and affirming the presence of an “aguada” (water spring)



Fig. 13: Old water reservoir. The scale points to the lined stones forming a small circle at the base of the huge vertical rock. Possibly, pottery vessels were here disposed for catching water pouring down along the stonewall, filled up with lichens.

Geographical evidence

Among the many field evidences detected inside our fogsite, we highlight the following:

a) Presence of thousands of guanaco trails, perfectly visible along the eastern and western slopes of coastal chains. They intermingle at low angles forming a strange net of interconnecting paths, going up and down the hills, and descending to the terrace below. Evidently, they followed old plant expansion, reaching as low as 200 m high. Fig. 14 shows these trail tissues, as preserved today in the desert arid surface. Trails are no more distinguishable around a couple of kilometers further inland.



Fig. 14: Complex nets of guanaco trails in Northern Pampa on Alto Patache High Plateau.

b) Defecating places. Are always found very close or in the guanaco trails. Unlike llama and alpaca, guanaco uses to defecate always exactly in the same spots. (Miller S. y J. Rottmann, 1975, Cunazza, 1991). At Alto Patache, we have found more than twenty of such places, frequently located at trail intersections (Fig. 15-16). These places were favourite spots for hunters to surprise the game.



Fig. 15: Defecating place.

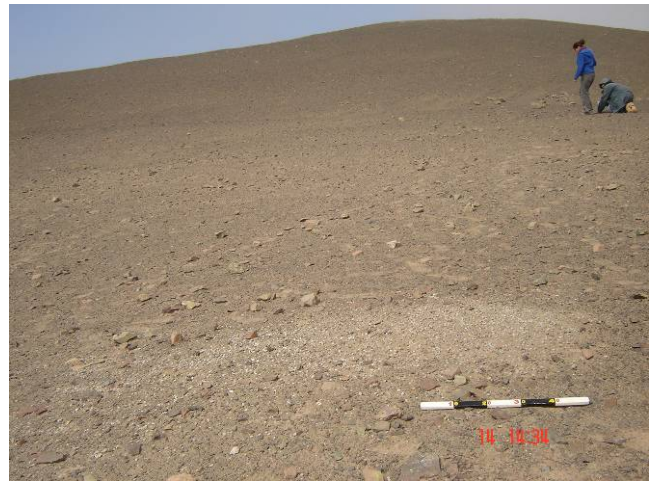


Fig. 16. The largest defecating place (2.5 dm.)

c) Wallowing places. We found five such places at the fogsite. Connected with a main path or trail, these spots are about 1.5 m in diameter, and some 15 to 20 cm. deep. Perfectly circular in form, have been excavated by guanacos, in soft or sandy soils. Human artifacts have been found by us at its surroundings, and even small workshops.

Botanical and faunistic evidence.

a) Guanaco have not been described in the last few decades at place. Guanaco trail concentrations, however, abounds exactly close to the places where bushes and cactus once used to grow and seed. Apparently, trail presence and relative abundance seems to correspond well to areas once covered with vegetation, especially of *Nolana* and *Cristaria* species. The last vestiges of living specimens may have disappeared long time ago, perhaps, by the middle of XX Century. Dried stems of ancient *Ephedra* (see Fig. 17) and *Stipa* (see Fig. 18) exemplars can still be seen at place, with trunks and roots well preserved. Since there has been no human or cattle traffic herethrough, we can assume that its presence constitute an evident witness of past more humid periods, when the flora, mainly bushes, grasses and annuals could disseminate and expand further inland.



Fig. 17: Dry stems of *Ephedra breana*, colonised by lichens.



Fig. 18: Dry spikes of *Stipa sp.*, barely appearing in sandy soil

b) The present largest lithic workshop lies exactly within the area once populated by bushes, grasses and cactus, belonging respectively to the genera *Ephedra*, *Stipa* and *Opuntia*. The area covered today by dry plant remains, corresponds exactly to the human lithic activity places. What means that the area was once vegetated and could, therefore, offer cover, enough shade and even hiding places to hunters spying for their preys.

c) Moreover, this same spot is literally covered today with miriads of empty snail shells belonging to terrestrial species which feed on plant leaves and flowers. The three snail species already identified are: *Plectostylus broderipi* Sowerby 1832 (see Fig. 19) (Fam. Bilimulidae), *Bostrix derelictus* Broderip (see Fig.20), and *Bostrix sp.* (not yet identified); (A. Elizalde descriptor, August 2005). The incredible abundance of such dead shells, specially the second, -totally absent today- can only be explained by the prior existence *in situ* of patches of dense plant cover, formed by annuals, tuber plants like Liliaceae and Amarillidaceae, bushes, like *Ephedra sp.* and *Lycium sp.*, and cactus (*Eulichnia sp.*, *Opuntia sp.*, see Fig. 21-22). Very possibly, fog episodes were more frequent and more intense than today, as some researchers have, with solid arguments, postulated (Lanning, 1977, Lavallée et al., 1999). They were probably responsible for a huge plant stock development and expansion, in ancient times (some millennia B.C.), a phenomenon totally unknown today.



Fig. 19: Empty shells of the terrestrial snail *Plectostylus broderipi*, found at the rocky border.



Fig. 20: *Bostrix derelictus* the most abundant snail at the lithic workshop.



Fig. 21: Decaying exemplar of *Opuntia sp*



Fig. 22: Exemplar of *Eulychnia iquiquensis*

Ethnohistorical evidence.

We have collected several testimonies of travellers and scientists having observed guanaco and even deer stocks grazing in the “lomas” in Coastal Northern Chile. Among the oldest, A. Frézier (1732); [1714]),V. Bauver (1942); [1706-08]), F. O’Connor (1928); [1826]) R. A. Philippi (1860); [1854]). Later on, F. Vidal Gormaz (1884); [1883]. Among recent testimonies of guanaco hunting parties close to Iquique (Punta Guesa area) we recall L. Núñez (1965) quoting an anonymous writer of 1880. Guanaco small bands have been described by G. Mann et al. (1953) in the heights of Cerro Moreno, and by German geographer W. Weischet, (1966: 4). Personally we saw a group of four guanacos grazing at 700 m

at the western slopes of Cerro Moreno ([1964]; in Larrain 1975, 1984). There, and at the hyper arid coastal heights close to Cobija, and finally, at the top of cliffs, located 600 m. high, N of Antofagasta city, guanaco trails ad faeces can still be observed and studied. At such places, we found arrow points of the same type observed at Alto Patache, most probably for guanaco hunting. (Fig.21-22). And these modern observations only reaffirm older witnesses dicta. One fact is clear: in the places where such evidences were observed, except at Cerro Moreno heights, vegetation and cactus are today only skeletons and shades of the vigorous plants of the past. Climate change, increasing aridity and dissection process, shows here strongly at work. For this very reason, our hyper arid Northern coast seems to be one of the best laboratories where to study these ongoing and unceasing processes.



Fig.21: Flint arrow points from nearby Antofagasta fog oasis



Fig. 22: Flint arrow points from Alto Patache fog oasis, possibly used in guanaco hunting. All found close to guanaco trails.

Guanaco distribution and dispersals in Northern Chile.

According to Miller and Rottmann et al., (1973, 1977), Rosemann et al., (1963), and Cunazza (1991), guanaco (*Lama guanicoe*) shows a very different distribution pattern from its close relative, vicuña (*Lama vicugna*). Vicuña herds maintain themselves only in the heights of the Andean Cordillera, preferring the pasture areas located from 3.800 m to 5.000 m. where enough rain usually pours down every year, from Januar to March. Here vicuña flocks, use to intermingle and graze in the same lands, with domesticated llama herds, belonging to Indian highland communities. Vicuña has been never observed at the desert Coast of Peru and Chile. Guanacos, on the contrary, clearly prefer drier areas, with less precipitation, where, nevertheless, he can find enough grasses and bushes to feed on. Very resistant to heat and drought, guanacos can wander for many miles, without intaking water (Herre, 1952, *passim*). This fact explains why guanacos in the past used to cross through the arid Pampas, searching for the Coast, following certain gorges where scraps of plants could be grazed and where small saline water outcrops could be eventually found. Whereas vicuña never abandons

the heights where plenty of excellent water and grasses could always be found in the “bofedales” or humid pasture grounds (“humedales” type), small guanaco families in Northern Chilean desert, have been frequently observed to grasp to fog areas where they will have access, most of the year round, to fog water, grasses and herbs (annuals), produced by Coastal fog, as in the case of Paposo, Taltal and Cerro Moreno area (cf. Schlatter et al, 1987). This was exactly, we believe, the case for our Tarapacá fog oasis, at a not so distant period of time; this guanaco “transhumance” (if the word is here allowed), perhaps, lasted until some 50 to 80 years back, leaving back the landscape traits we still observe surprised today. The evident signs of guanaco presence and activity we still observe at Alto Patache fog site (see photos 14, 15 and 16), constitute a solid proof of their presence at the spot during long periods of time, possibly millennia. Assuming the persistence of succeeding more humid periods in the past, as it has been proven by paleo-climatologists, (Dollfus, 1964; Lavallée et al., 1999), we can also assume that bigger guanaco populations may have been roaming around these now rapidly retracting fog oasis.

Results and conclusions

1. Our research in place, using only surface archaeology, has demonstrated the constant use of Fog oasis by human ancestors having lived once close to the seashore. After many years of *in situ* observations, it becomes clear for us that this site was almost so important for those ancient inhabitants as the sea itself as a manifold food and resource quarry. Chilean archaeologists, except for B. Bittmann and L. Núñez (Bittmann, 1977, 1986; Núñez, 1962, 1965) were not yet fully aware of the fog-oasis resource potentialities, simply because these oases were still almost completely unknown, or because they had never had the opportunity of thoroughly studying them. Most archaeologists contented themselves by excavating at or close to the coastline, in a sort of urgent “rescue archaeology”; the riddles and problems emerging therein, could not be easily answered by them. The complete answer was, as it seems us, elsewhere. The question as to what extent this hyper arid Coast was permanently inhabited or only sporadically or seasonally - as today discussion still echoes- can now be, with new ecological facts, strongly enlightened and, if not perfectly, much better understood than before. Climatic changes and oscillations influencing fauna and flora in their in- and outmigration, in our opinion, will be always at the root of any deep explanation of slow but ongoing human abandonment of the Coast during the last 600- 800 years at least (Lanning, 1963, 1965, 1977; Dollfus, 1964; Lavallée, 1999).

Summarizing, based on facts, we can now make following statements:

- a) In very specific spots, there were permanent populations at the Coast; not only nomadic peoples wandering around;
- b) These few places were located either at the river embouchures (Lluta, Camarones, Vítor, and Loa), or close to the fog oasis;
- c) These populations were residents (not only visitors) in those spots since very early times (¿6.000 B.P – 8.000 B.P.?). Chinchorro groups seem to have been part of the first permanent residents in the area;
- d) The succeeding climatic changes may have altered more than once their sedentarian way of life, possibly obliging certain groups to migrate for periods, inland;
- e) But these migratory sequences, occurred after very long permanent settlement activity at the coast;
- f) Fog oasis offered these residents much more resources than has been previously suspected, specially in terms of game hunting, potable water and plant and fuel collection;
- g) The observable climatic trend, in the last few centuries, is certainly leading to an accelerated general dissecation process with increasing mean temperatures; therefore, fog oasis tend to retract more and more;
- g) Fog, consequently, has experienced also variations through time, in frequency and in density;
- h) Fog oasis, consequently, have suffered periodical expansions and reductions in their surface, according to the general atmospheric circulation changes;
- i) Presently, Northern Chilean fog oasis experience a strong dissecation process, proved by the massive presence of dead plants (cactus, bushes and grasses), along the western slopes of the mega-cliff, specially under the 600 m. high. Clear proof thereof are the hundreds of big cactus relics, now dead, covering hundreds of hectares of western slopes at Cobija, Mamilla, North of Antofagasta, and Punta Chipana, between Pisagua and Caleta El Cobre;
- j) Indian presence at Alto Patache and other Tarapacá Coastal fog oasis may have ceased shortly after the arrival of the Spaniards, since we know that they were hired soon as ship sailors (for fishing purposes) or miners (copper ores);
- k) And finally, according to artifact typology observed among our Alto Patache archaeological findings, the occupation of the site may have begun in very early arcaic times (6.000- 8.000 B.P?), and ceased entirely by the end of the XVI Century. Since then, fog oasis have not been frequented by Coastal Indians. Caravan traffic from the inner gorges (Tarapacá, Guatacondo) towards the sea certainly did not cease in colonial times, but followed well-established routes; apparently these routes did not touch the best known fog ecosystems, except, perhaps, in their exterior margins.

Comments

We believe we are now at the eve of a new focus and orientation for future coastal archeological works in Northern Chile. The introduction of the geographical and ecological focus of analysis, due to the peculiar type of climate present at the fog-oasis, affords new and indispensable tools for the full interpretation and understanding of old coastal settlements. This focus, we know well, may be eventually labelled as an expression of a “mild geographical determinism” by certain archaeologists, exactly as E. Lanning’s interpretations were labelled and criticized at his time. (Lanning, 1977: 160). But this approach, in order to be consistent, will need the constant discussion between archaeologists, geographers and experienced ecologists who, consequently, have to share fieldwork, sources, information and results. The time for lonely archaeologists, or group of archaeologists alone, a frequent case in the past, is rapidly approaching to an end. Only interdisciplinary team works will succeed in giving full explanation to those fuzzy questions arising from human presence and habitability at the edge of the Atacama Desert, as R. Lanning with full reason has predicted (1977). Following Bird’s steps (1943) dealing with the food sources secured by ancient fishermen at the Coast, L. Núñez (1965) and D. True (1975) also glimpsed the resource potentiality of fog oasis at the Tarapacá coast, without having had, nevertheless, any direct knowledge of them. D. Lavallée *et al.*, working in the extreme south of Coastal Peru, are also solidly working in the same ecological direction. She and her colleagues clearly viewed the Coastal fog as a powerful source of resources for ancestral foragers living at the Coast. Personally, from 1970 on, we have been pleading for the necessary complementation of the social and earth sciences (particularly ecology) in our anthropological studies of the ancient populations living at the North Chilean Coast (Larrain, 1970, 1984, 1987/88, 2001, 2004).

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