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Prehistoric and historic networks on the Atacama Desert coast (northern Chile)

Benjamin Ballester[1] & Francisco Gallardo[2]

Comparing the records of fishing communities made in the sixteenth to twentieth centuries to the archaeological evidence of the sixth millennium BP, the authors propose a sophisticated prehistoric network for the coastal people of northern Chile. Residential seashore settlements link both along the coast to temporary production sites for fish, and inland to oasis-based providers of products from the uplands and salt flats. Sharing values and kinsfolk, the coastal communities must have travelled extensively in boats which, like their modern counterparts, made use of floats of inflated sealskin.

Keywords: Chile, Atacama Desert coast, sixth millennium BP, historic period, maritime transport, social interaction.

Introduction

The circulation of people, goods and ideas is an activity inherent to all societies, since inhabiting a territory involves the movement of resources required for social reproduction, both within and among communities. In the north of Chile, the primary mode of circulation from the Late Archaic to the Colonial period has been attributed to herders and llama caravans (Núñez & Dillehay 1979; Martínez 1985; Berenguer 2004; Cartajena *et al.* 2007; Gallardo 2009). Likewise, people based at oases or highlands are considered to be the main agents of the economy, at both the regional and inter-regional scale. Only recently has it been recognised that circulation was also important for other communities, including those

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on the coast, which we know used pedestrian modes of transit without beasts of burden (Cases *et al*. 2008) and sailed vessels all along the desert coast (Larraín 1974; Bittmann 1986).

This article is intended to explore the mobility strategies employed by early coastal communities in Chile between 6000 and 4000 cal BP. The method employed is to infer a mobility and interaction system in the early modern period, as it appears in documents and pictures, and then to use this as an analogy for prehistoric operations in the same territory. The hypothesis is that a similar network of maritime and terrestrial links underpinned the prehistoric local economy and nourished alliances between coastal populations and those inhabiting the inland oases of the Atacama Desert.

The Colonial and Republican periods (sixteenth and early twentieth centuries)

Seafaring, fishing and maritime networks

The earliest description of the people of the Atacama Desert coast was written by Gerónimo de Bibar (1966 [1558]). It offers an extraordinarily detailed account of how marine hunter-gatherers built seagoing craft using inflated sea lion skins. These boats consisted of two long, cylindrical floats made of inflated seal skins (usually of sea lion), joined together by a wooden platform that carried the crew (Bibar 1966 [1558]: 10) (Figure 1). A double-bladed oar was used to propel the vessel. Seventeenth-century chroniclers were amazed by the technology of the craft, their carrying capacity and the navigational skills employed by the mariners: '*they sail out to sea in them, six leagues and more*' (Lizarraga 1999 [1603–9]: 122).

These vessels played a crucial role in marine hunting and fishing. Vincent Bauver (in Pernaud 1990: 45), a French merchant who landed in Cobija in the early seventeenth century (Figure 2), noted that:

> *'They use these kinds of boats for fishing; when they see the sea boiling with fish they run . . . taking with them a long line with three unbaited triangular hooks that they throw into the sea and pull in quickly, and soon they have one, two or three fish.'*

Francis Drake was one of the visitors to Morro Moreno and took on supplies there. Seeing his ship, the inhabitants approached on seal-skin boats loaded with fish, which they offered to trade for knives, beads, cups and other objects of little value, '*whereof men of 60 and 70 yeares old were as glad as if they had received some exceeding rich commodity*' (Vaux 1854: 106). In this exchange, two important aspects are clear: it was the men who acted as agents that activated the economic relationship, and they brought fish to trade. Historic documents are specific about fishing, especially the production of dried fish, a technique described in one document from 1707: '*when they finish fishing they gut the fish to expose them to the air, where they dry without rotting and without needing to be salted, so good and pure is the air*' (Bauver in Pernaud 1990: 45).

The economic importance of this product is mentioned early on by Juan Lozano Machuca (1992 [1585]: 32), who reported that: '*In the cove of Atacama, which is where the port is, there are four hundred native fishers, Uros who are neither baptised nor conquered nor anyone's*

Figure 1. Balsa made from sea lion skin from Caleta El Cobre, late nineteenth century (Philippi 1860: pl. 8).

servants, although they give fish to the Atacama chiefs as a sign of recognition'. This text provides evidence that the product played a part in the traditional relationship between coastal and oasis groups, independent of the Spanish tribute system. Around 1595 this relationship enabled the Spanish — using the inland peoples as intermediaries — to transport dried fish to Potosí in Bolivia (Martínez 1985).

In the mid twentieth century, fishermen in Chañaral de Aceituno could transport 200 sea urchins per trip, and even carry goats from the coast to nearby islands using a traditional seal-skin raft (Páez 1985). The same kind of boat was still being used in daily productive activities by a coastal fishing family living south of the Huasco River (Niemeyer 1965–6; Páez 1985; Alvarez 2003). The boats were manned by one or two crew members, always adult males. The knowledge required to build, use and maintain these vessels was passed down through the males of the paternal line (Álvarez 2003). This knowledge was acquired through a labour process that reproduced social inequalities, as the select few who learned the boat-building techniques accumulated cultural capital that gave them a distinct political, economic and symbolic role in the community.

The seal-skin boats were also used to fish and hunt species on the open sea, as Vásquez de Espinosa's (1948 [1630]: 619) description of a whale-hunting expedition illustrates:

> *'then, the Indian . . . arrives in his seal-skin raft . . . and comes close to where the whale sleeps: and he harpoons the whale under his fin, where the heart is,* [and] *the whale . . . feeling itself injured, becomes enraged, bellowing loudly and thrashing about in the water, rising high out of the water with fury and anger at the pain he has been caused, and then he heaves himself, bellowing, out to sea, until he tires and nears death.'*

Lizarraga (1999 [1603–9]: 378) also describes the use of the boats for hunting tuna and other large prey, noting that off the coast of Coquimbo in the early seventeenth century the fishermen '*do not work in groups as they do in Spain, but work singly; the native fisherman goes to find* [the fish]*, two or more leagues into the open sea with his sealskin raft*'. This information is highly important, as it confirms that economic activity was not a collective task but a more individual effort carried out by men in a vessel.

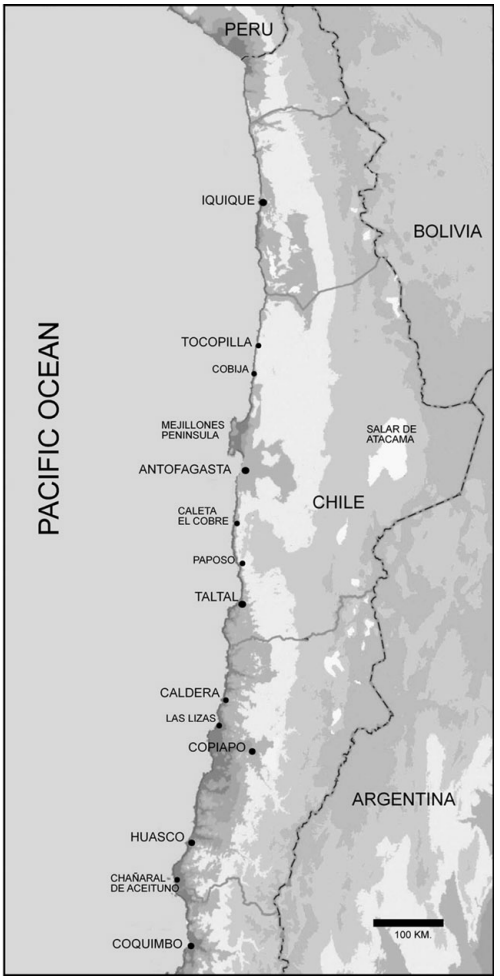

Figure 2. Localities on the Atacama Desert coast mentioned in historical documents.

Fishing from the shore was also important in the seventeenth century. Lizarraga (1999 [1603–9]: 378) writes: '*the Indians fish gracefully: some with fishing lines, to which they attach large hooks, with bait from conch shells, tied on with a string; they throw them as far as they can into the sea, standing knee-deep in the retreating waves*'. Meanwhile, the gathering of shellfish and seaweed could be performed by all members of the group — men, women, children and elders — and required no special expertise (Lindberg 1967).

Writings by chroniclers and officials of those times suggest that the boats were generally operated from permanent settlements. A settlement at Morro Moreno on the Mejillones Peninsula, mentioned by sixteenth-century travellers, seems to have consisted of dwellings of sticks and boughs (Cavendish in Pretty 1904: 307; Larraín 1978). Such fishing villages housed from 5–15 extended families of up to three generations (Moerenhout 1837; Bollaert 1860; Larraín 1974; Hidalgo *et al.* 1992). According to information collected by Niemeyer (1965–66) exploitation of coastal resources was limited to an area no more than 50km in total, with the residential base at its centre; in other words, this activity occurred along the coast within a radius of approximately

25km from the base settlement. Within this sphere of circulation were a series of other camps set up for the collection and processing of resources. Bollaert (1851: 106) provided a clear description of this network of settlements on his journey along the northern Chilean coast in the nineteenth century:

> *'Iquique is the only village on the coast of the province* [Tarapacá]; *the other places named in the charts are merely headlands, beaches, islands, etc., visited by the fishermen from Iquique in search of congrio and seals . . . in their ingeniously-constructed balsas, or floats made of seal-skins, inflated with air. During their stay at such places they live in caves or wretched cabins built of whales' ribs covered with seal-skins, and subsist on water, maize, and fish which they take with them'.*

This use of temporary residential camps for activities such as marine fishing and hunting defines the settlement system of coastal populations during the Colonial period (Figure 3). Indeed, a similar system was still operational in the twentieth century in places such as Caleta Chañaral de Aceituno, where fishermen made long journeys that lasted from 20 days to more than a month, fishing, hunting and collecting marine resources. While they sailed close to the coast on these journeys, they did range far from their more permanent residential camps, and even visited islands 9km offshore (Niemeyer 1965–66; Páez 1985; Álvarez 2003). The fishermen spent the night in their temporary camps and dried fish, molluscs and the meat of marine mammals there (Vásquez de Espinoza 1948 [1630]; Mellet 1959 [1824]; Páez 1985). They then transported these products from the temporary camps to their regular fishing villages, making rest stops along the way as they could journey only 10km each day by sea (Páez 1985).

Eighteenth-century parish records from Cobija mention fishermen from Tocopilla, Cobija, Morro Moreno, Caldera and Copiapó coast related in marriage and through baptism (as godparents) (Bittmann 1979). Such records imply displacement over a range of 600km, a distance that was apparently no hindrance to inhabitants of the coast who owned boats. Undoubtedly, such kinship relationships served as a medium of social interaction — for circulating goods, contracting marriage, holding funeral services — and could have reduced the risks associated with the exploitation of marine resources, especially fish, as the availability of fish stocks was subject to oceanic and climatic variations.

This kind of mobility must have introduced more than a few obligations among groups, intercommunity tensions that appear to have been regulated through public economic activities with social and symbolic significance. Vázquez de Espinosa (1948 [1630]: 619) refers to this in his description of whale hunting, which brought together the members of more than one community,

> *'meanwhile the Indian . . . comes to the coast to watch and wait to see where on the coast the whale will come to die, and there they maintain a lookout until they see it stop. Then the entire group and their families, who have been keeping careful watch, go to the cadaver along with their friends and neighbours; they open it on one side, and some eat the inside and others the outside until after eight days they cannot remain there because of the stench.'*

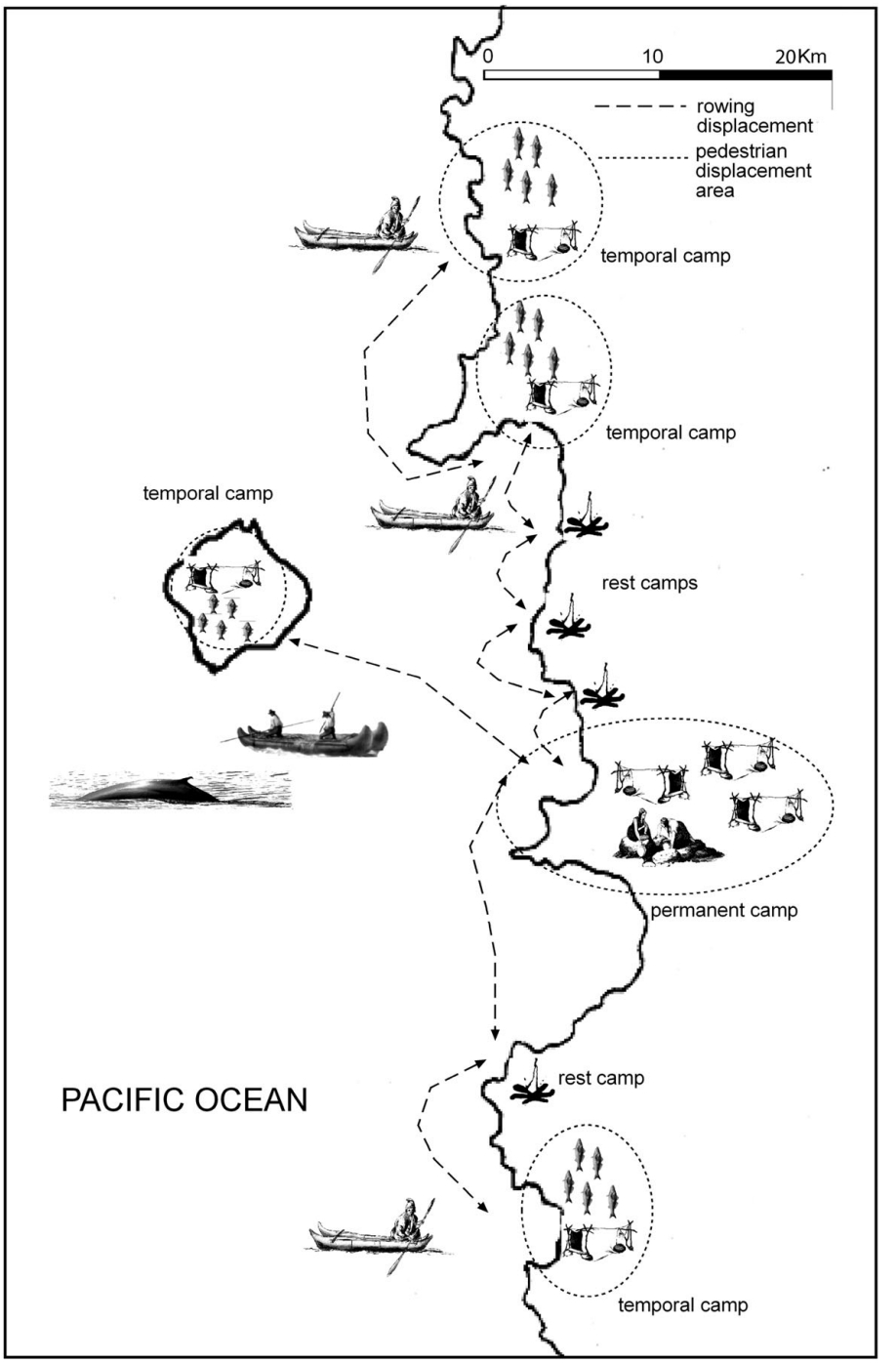

Figure 3. Historic settlement system of marine hunter-gatherers.

Thus we have a simple redistributive activity at the community and supra-community level, which mobilises different contingents to strengthen ties of solidarity that do not terminate when the feast is over. The same chronicler indicates as much by describing how during this social ceremony, participants take the opportunity to collect whale oil individually (Vázquez de Espinosa 1948 [1630]: 619).

The movement of these groups along the coast allowed them to redistribute different types of surplus goods, some of which were traded with groups inhabiting the Atacama Desert oases. In mid nineteenth-century Paposo, for example, they may have traded fish for coca leaves brought by cattle drivers from the Atacama salt flat or obtained them directly from inland towns (Bollaret 1851; Phillipi 1860; Bresson 1875; Bauver in Pernaud 1990) — a long journey of over 300km that, according to Phillipi (1860: 37–51), took around nine days with pack animals.

The prehistoric period: (6000–4000 cal BP)

Permanent sites emerged along the desert coast around 6000 cal BP, as indicated by shell middens that in many cases were in use right up to the inland ceramic period (Bird 1943; Boisset *et al.* 1969; Núñez 1982; Bittmann 1984; Llagostera 2005; Castelletti 2007) (Figure 4). These middens are directly associated with the appearance of technologies used to exploit marine resources, including shellfish extractors (*chopes*), seashell hooks, compound hooks, fishing weights, harpoons and plant fibre fishing lines. Seagoing water-craft must also have been brought into use at this time: evidence includes a miniature raft recovered from a village burial context, lines with multiple hooks (*espinel*) and the remains of large marine prey (Núñez *et al.* 1975; Contreras *et al.* 2007; Contreras & Núñez 2008; Núñez & Contreras 2009). These in turn imply an intensification of production serving a settlement system.

On the Atacama Desert coast, the shell middens are located beside fishing coves and fresh springwater. The earliest dates are from Cobija 13 and Caleta Huelén 42 (near the mouth of the Loa River) and Morro Colorado, Punta Morada and Los Bronces-1 (in the coast near Taltal). These sites were established around 6000 cal BP as villages with simple architecture and they remained active until 4000 cal BP. Enclosures in these residential complexes have circular floor plans with low walls built of a single row of flat stones (Figure 5). The inhabitants finished the floors of most dwellings with seaweed ash and waste from around the site, under which they buried their dead. Analysis of waste from these early communities has shown that they exploited a wide variety of open ocean fish and marine mammals such as eel, tuna, swordfish and whales, offering indirect evidence that they used ocean-going vessels as a means of production (Núñez *et al.* 1975; Arnold 2007; Contreras & Núñez 2008).

At Punta Morada, for example, which contains an extensive shell midden associated with a residential complex with architecture, whose initial occupations have been dated at 6840–6500 cal BP, a wide range of artefacts and food waste alludes to the production and repair of hunting and fishing implements and the consumption of prey obtained through the use of those instruments (Bird 1943; Mostny 1964; Casteletti 2007). The site has points, knives, scrapers, shell hooks, compound hooks, fishing weights and harpoon barbs in direct

Figure 4. General site distribution on the Atacama Desert coast (6000–4000 cal BP) and hinterland ravines.

Figure 5. Cobija 13 – a dwelling site.

association with instruments such as hammerstones, retouchers and filing stones used to manufacture these tools. The hunting and fishing remains found here include bones of guanaco and sea lion, mackerel, vieja, sea bass, sierra, black-backed eel, tomillo, flounder and shark. Gathered species include abalone, limpet, sea urchin, chiton and barnacle. Some of these sites display the presence of whale and swordfish (Núñez *et al*. 1975; Velásquez 2003), which may have been caught for collective celebrations. Permanent residential sites have been found on the Atacama Desert coast from the mouth of the Loa River to Cobija, Morro Moreno and both north and south of Taltal, where the largest number are concentrated (Capdeville 1921; Mostny 1964; Núñez 1971; Núñez *et al*. 1975; Bittmann 1984; Llagostera 1989, 2005; Contreras & Núñez 2008).

Coastal production sites

At Taltal, along with permanent residential encampments such as Morro Colorado, Punta Morada and Los Bronces-1, there is a network of temporary camps that were set up for specific productive activities (Capdeville 1921; Mostny 1964; Castelleti 2007; Contreras & Núñez 2008). Punta Cascabeles, for example, some 10km north of Punta Morada and dated at 5450–4690 cal BP contains a waste pile not associated with residential structures but containing abundant bifaces, flint knapping and projectile point waste. This evidence of hunting instrument production and sharpening of blades used to slaughter animals and prepare their skins is supported by the finds which include knives, scrapers, planers, awls and other cutting instruments (Casteletti 2007). There is little doubt that this site was used as a

work camp for processing animals such as guanacos and sea lions, with workers sustaining themselves with food obtained from fishing and gathering at the water's edge.

Inland links

In addition to the coastal network, temporary camps were installed in the Atacama Desert itself, where more than 60km away outcrops of silica provided a supply of stone for toolmaking (Urrejola & Orellana 2000). Technologically speaking, there is a clear common tradition, and it is likely that more sophisticated objects such as the large 'Taltaloid' knives found most frequently in the Taltal locality, small volcanic stone mortars and bone and shell beads, could be obtained through exchange (Capdeville n.d.; Mostny 1964; Silva & Bahamondes 1969; Núñez *et al.* 1975; Bittmann & Munizaga 1984) (Figure 6). The most notable products obtained by coastal populations included a large repertory of spun hair from wild animals such as vicuña, mountain bird feathers, stone beads and obsidian (Capdeville n.d.; Mostny 1964; Núñez *et al.* 1975). These goods were obtained in exchange for shells used as recipients, for decoration and as raw material, as well as shell beads and dried fish at the oasis of Chiu Chiu (Druss 1978; Núñez 1981; Mena 1984; Aldunate *et al.* 1986; Jackson & Benavente 1994; Núñez *et al.* 2007). Although such trading activities were probably conducted on a small scale, the production of shell beads offered the greatest economic and social benefits. These dividends would have especially favoured the inland groups that used llamas as pack animals and were active participants in the trade network that extended to the eastern side of the Andes (Gallardo 2009).

Figure 6. 'Taltaloide' knife manufactured in chalcedony (Museo Chileno de Arte Precolombino Collection). Length = 180mm; thickness = 9mm.

At Caleta Huelen 42 at the mouth of the Loa River, near Cobija (Figure 2) there was a residential hub with evidence of intensive production of shell beads in direct association with material that could have been obtained from inland groups — obsidian, taruca deer antlers, mountain parakeet feathers, and camledid hair wool and woven items (Núñez *et al.* 1975; Zlatar 1983, 1989). The most significant piece of evidence is an engraving in the Kalina-Puripica rock art style, previously only found at 3000m asl (Núñez 1981; Berenguer *et al.* 1985; Berenguer 1995, 2004; Núñez *et al.* 2006, 2009; Gallardo 2009) (Figure 7).

Figure 7. Kalina-Puripica-style camelid from the coastal village of Caleta Huelen 42 (170 × 110mm).

Cemeteries at coastal Taltal include inland materials such as copper ore beads, obsidian and a tubular pipe for consuming hallucinogens, similar to those found in north-west Argentina (Mostny 1964; Fernández 1980). Similarly, the villages of Tumbre 2 and Tulan 52 in the salt flat, contain abundant parallel incisions on rocks used as walls of residential enclosures, on mortars and on small boulders, resembling those found at the coastal site of Las Lizas, 100km south of Taltal and at Los Bronces-1, also close to Taltal (6000–4000 cal BP), where a rock with red pigment is etched with two fine parallel incisions (Serracino & Pereyra 1977; Niemeyer 1985; Contreras *et al.* 2007; De Souza *et al.* 2007) (Figure 8).

This can be described as a specialised settlement system, as it was based on interrelations among residential sites where consumption occurred, and temporary camps where production took place, economic functions that together sustained the simple reproduction practised by these communities. These links could also have served to uphold the production of surplus goods required for trade and for forging social alliances between groups from the coast and the inland oases.

Discussion

The architecture, burial practices and artefacts associated with the prehistoric coastal residential sites display close technological and stylistic similarities, suggesting a regular circulation network among them. In analogy with the situation in historic times, this implies social alliances, which could have been based on kinship ties and shared interests, the circulation of goods and technical knowledge, and redistributive activities associated

Figure 8. Fish rock engraving and incisions from Las Lizas.

with the consumption of large game. We do not yet have sufficient physical anthropological evidence to determine the initial social connections, but the consistency of burial patterns indicates that this was a single population that maintained the same kind of relationship with deceased family members.

It can also be deduced that seagoing water-craft appear around 6000 cal BP and were employed to distribute surplus production and make local and regional social alliances (Llagostera 1989, 2005). Jean Arnold (1995) has suggested that the adoption of seagoing vessels allowed coastal hunters to access distant resources and obtain more biomass per increment in travel time, a technological change that would have enhanced production, social interaction, the exchange of information and the circulation of goods (see also Ames 2002; Arnold & Bernard 2005). All of these activities would have contributed directly to the prestige and authority of those who owned this means of production.

For the historic maritime hunter-gatherers of the Atacama Desert coast, there is no doubt that seal-skin floats were a key technological device in the mode of production, enabling the intensification of production and contributing to social reproduction. Their economic agency could introduce social differences between those who possessed the boat-building technology and other members of the group.

In terms of inland mobility, it is clear that the circulation of goods could have been activated by salt flat hunters who possessed the first herds of pack llamas; however, given the close cultural connection expressed by the rock art, we cannot rule out the possibility that coastal inhabitants travelled to the inland oases, where they could also have obtained wood

products, as well as algarrobo and chañar fruit. The low nutritional value of the products obtained suggests that they were participating in an expanded reproduction process relating more to political and symbolic aspects.

The complexity of coastal life recorded in historic times is likely to echo a productive framework active from 6000 cal BP. However, although archaeological settlement patterns display a strong continuity, documentation is still lacking on labour specialisation, the differential distribution of goods and ritual consumption strategies. Evidence for social difference is indirect and may be related to the exchange of goods among groups of marine hunter-gatherers and those inhabiting inland ravines and oases, as the latter made use of coastal goods to enhance their own political economies.

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