

Assessing Conflict and Exchange: The Defensive and Access Layout of La Alumbraera (c. AD 1000–1480, North-west Argentina)

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The Regional Development Period (c. AD 1000–1480) in north-west Argentina is characterized, among other important features, by the coexistence of two phenomena seemingly opposed, a constant situation of violent conflict between communities and the maintenance or even intensification of inter-regional goods exchange networks. Although recent studies recognize the simultaneity of these processes, only a few scholars asked how communities dealt with the necessity of protecting themselves as well as obtaining distant resources. In this paper we present the analysis of the defensive and access layout of La Alumbraera archeological site which has the peculiarity of condensing features that may illustrate an example on how conflict and exchange coexisted at a local scale.

KEYWORDS pre-Hispanic conflict, exchange networks, defensive architecture, access layout, North-west Argentina

Introduction

The time span previous to the Inca occupation known as Regional Development Period (RDP c. AD 1000–1480) in north-west Argentina (NWA), has been traditionally posited as an age of political fragmentation and intense conflict manifested in the widespread appearance of defensive settlements, war-related paraphernalia, associated motifs in art, and violent trauma in bones (Férrandez Distel, 2007; Gheggi and

1 Seldes, 2011; González and Perez, 1976; Hernández Llosas, 2006; Nielsen, 2003a; 2007; Raffino, 1988; Tarragó, 2000). However, as several scholars discuss, trade networks continued to function in spite of conflict and in some areas even intensified during the RDP. A range of archaeological data, such as the presence of foreign materials, iconography about llama caravans, and stop posts in caravan routes, provides the evidence for this statement (Aschero, 2000; Nielsen, 1997; 2003a; 2007; Tarragó, 2000).

As Nielsen (2007) posits, although the temporal coexistence between these two phenomena has been recognized, the relation between them has been poorly considered perhaps because of the enormous influence of the ecological complementarity model proposed by Murra (1975) for Andean communities, in which reciprocity, alliances, and cooperation seemed to function in a peaceful context, free of warfare. Nonetheless, the growing amount of evidence for conflict suggests a need for other explanations.

As part of this research trajectory, this study seeks to assess the role of conflict and goods exchange in NWA pre-Hispanic societies by presenting a thorough analysis of the defensive and access layout of an archaeological settlement called La Alumbra in order to locate it within current archaeological studies. This site is located in Antofagasta de la Sierra region, in the southern extreme of the desert high plateau called Puna de Atacama, and represents an interesting case study due to its isolation compared to neighbouring densely populated regions and to the good preservation of its architectural remains which enabled the recognition of a complex defensive layout and a highly controlled access system.

The article starts with a brief introduction into the general knowledge of the RDP in NWA, detailing evidence in relation to conflict and exchange networks. It continues by explaining the particularities of the period in Antofagasta de la Sierra. This is followed by the case study and the spatial and architectural analysis of La Alumbra, and finally a discussion of the data collected in relation to other studies in the area.

The Regional Development Period (RDP) in north-west Argentina (NWA)

2 As an archaeological zone, NWA covers the high terrains of the Andean plateau and several valleys located between mountain ranges generally oriented N–S, reaching the eastern forests (*yungas*; Figure 1). The agro-ceramic period started c. 1000 BC and continued within the time frame illustrated in Table 1. Towards the end of the Regional Integration or Middle Period, several major characteristics of daily life started to change.

Dispersed settlements located on the valley bottoms close to agricultural lands started to be abandoned and population tended to concentrate in nucleated settlements, many of them located on landforms with difficult access such as the slopes or top of hills and small plateaus. Agriculture intensified through the use of irrigation systems that enabled the exploitation of new areas (Nielsen and Berberían, 2001; Tarragó, 1999; 2000), while different ceramic styles emerged within specific geographical areas, like the *Santamariano* style distributed across the Calchaquí and Yocavil

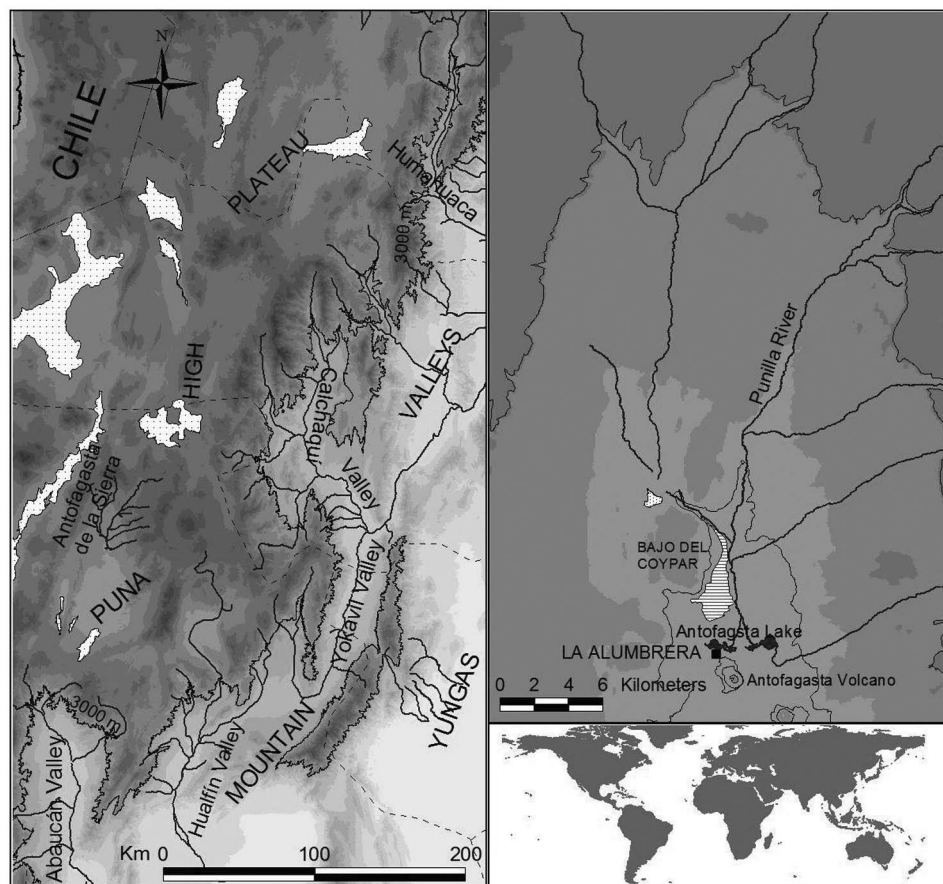


FIGURE 1 Map of the study area showing the sites mentioned in the text.

valleys and the *Belén* style found in the Hualfín and Abaucán valleys (Nielsen, 2007; Tarragó, 2000).

Socio-political change is generally accepted, but there is still no agreement in relation to the complexity of these societies; while some scholars argue a hierarchical chiefdom organization (Nuñez Regueiro, 1975; Raffino, 1988; Sempé et al., 2005; Tarragó, 2000), others suggest the development of segmentary or corporative structures with flattened or no social hierarchies at all (Acuto, 2007; Nielsen, 2007).

Regionalization of ceramic styles and material culture points to a political fragmentation that can also be seen in the replacement of previously dispersed hamlets by key nucleated settlements that were located in defensive locations. This scenario possibly resulted from the presence of interregional conflict but did not prevent the circulation of goods, as the next section demonstrates.

Settlement layout and other evidence of conflict

Settlement data provides an important indicator of conflict, such as the presence of a defensive layout, defensible location, distribution in the landscape (clustering or

TABLE 1
CHRONOLOGICAL FRAME FOR THE AREA

Phase	Chronology (c)	Associated ceramic styles Hualfin and Belén Valleys	Associated ceramic styles Antofagasta de la Sierra	Associated ceramic styles Calchaquí Valley	Associated ceramic styles Quebrada de Humahuaca
Middle Period or Integration Period	AD 500–900	Condorhuasi Ciénaga Aguada	Saujil Aguada	Aguada	Peñas Coloradas Alfarcito Polícromo Isla Polícromo
Late Period or Regional Development Period	AD 900–1450	Hualfin Belén	Hualfin Belén	Santamariano San José Famabalasto	Sarahuaico Tilcara N/R Juella Polícromo Poma N/R Angosto Chico Inciso
Inca Period	AD 1450–1536	Inca	Inca	Inca Provincial Inca-Imperial	Humahuaca-Inca Inca-Imperial Inca-Provincial

Note. Dates are approximate and represent general phases, as in some contexts there are differences in the chronological appearance and duration of ceramic styles. The chart was developed following Raffino (1988) and Nielsen (2007). It is worth noting that Nielsen (2003, 2007) has proposed a subdivision of the Regional Development Period in two phases for the Quebrada de Humahuaca area. We do not present them here as this is only a general outline.

buffer zones), and lines-of-sight between settlements (possible reflecting alliances) among the most important (LeBlanc, 1999). Andean archaeologists have frequently dismissed warfare as an explanation for the observed settlement pattern because they have applied a common sense logic based on a Western vision of war for interpreting the characteristics of pre-Hispanic fortifications (Arkush and Stanish, 2005; Nielsen, 2009).

Following this line of thought, features like partially encircling walls and multiple doorways have been seen as insufficient to provide protection against enemies because they left many access routes to the interior. Similarly, fortifications located away from houses, fields, or goods and lack of internal sources of water were described as inadequate defensive strategies, because the former enables the potential destruction of resources and the latter would be incapable of resisting sieges for more than a day or two. Finally, large walls were considered difficult to man due to the considerable numbers of people required to defend them (Arkush and Stanish, 2005).

Arkush and Stanish (2005) have refuted these non-war arguments and have asserted their bellicose purpose, considering them in the social context of Andean stateless societies. Pre-Hispanic conflict lacked professional standing armies (except for the Incas and Moche empires), draft animals, and heavy-wheeled armaments, and was more likely characterized by small war parties, raiding, harassment, ambushing, and the capturing of prisoners and trophies rather than the conquest of a territory.¹ Viewed in this context, it can be observed that incomplete walls often reinforce the most vulnerable sectors of a general defensive pattern given by the relief. Multiple entries were not only useful to enable a constant flow of people and goods in peaceful times, but had a tactical purpose in battle. Different kinds of baffled gates

constitute defensive devices that provide advantages to the defenders allowing unexpected counterattacks (Keeley et al., 2007).

Fortifications located away from settlements may have constituted useful refuges to protect people and livestock and to concentrate a dispersed rural population in cases of danger. The lack of internal sources of water must be explained in relation to pre-Hispanic military tactics and the almost certain absence of prolonged sieges. Large walls are difficult to defend simultaneously but pose the same restriction to attackers. These long defensive systems must be operated through watch posts and signals to coordinate a successful defence (Arkush and Stanish, 2005).

Many of these features are found in settlements from a range of NWA regions and, as shall become apparent, in La Alumbreira. In the Quebrada de Humahuaca area, from c. AD 900–1000, people moved to the main valley to live in conglomerate settlements located in places with difficult access (e.g. Pukará de Volcán, Huichairas, Campo Morado, Perchel, Yakoraite, and Calete), intervisibility (e.g. Agua Bendita, Calete, Ucumazo, and Hornaditas) and defensive architecture (e.g. walls in Los Amarillos or parapets in Huichairas) and the creation of buffer zones (Nielsen and Bérberian, 2001; Nielsen, 2007; Nielsen and Boschi, 2007; Raffino, 1988).

In Calchaquí valley, a similar process seems to have occurred as people tended to concentrate along the main river after AD 900–1000. However, the settlement pattern is not homogeneous. Along the main river, a typical pattern combines a dense residential area in the slopes of low hills and in the alluvial fans, with a fort on the summit such as Tolombón, Quilmes, Las Mojarras, and Rincón Chico (Raffino, 1988; Tarragó, 2000; Williams, 2003; 2002–05). These sites allow easy access to water, agricultural fields, and have high visibility of the surrounding areas from their forts; in case of attack, people would have abandoned their settlements and taken refuge in the forts after alarm signals. A different pattern emerges on the right-hand side of Santa María River, where conglomerate sites are located on the top of high plateaus and have few entrances — sometimes only one — like the Loma Rica de Shiquimil and Loma de Jujuil sites (Raffino, 1988). This kind of settlement would have required long daily journeys to fields and other extra-domestic activities, but may have improved the chances of a successful defence.

Recent research in the mid-Calchaquí valley (Angastaco and Molinos basins) shows the presence of seven fortifications along the western *quebradas* and not in the main valley, consisting of residential settlements located at high altitude (between 2000 and 3000 m.a.s.l.) with high visibility of their associated agricultural fields and routes. Some of them are located close enough (6 km) to have been allies in violent times (e.g. Pueblo Viejo and El Alto). Discontinuous defensive walls were built in areas where access was easier, such as at Pueblo Viejo, El Alto, and Fuerte Tacuil, but their main defence was their location on landforms up to 20 m above the valley floor with cliffs and acute slopes. Some of these fortifications constitute refuges (*sensu* Arkush and Stanish, 2005) because they do not have residential structures or other facilities. This pattern seemed to have functioned to prevent unexpected attacks and to organize a defence strategy that may have involved the protection within fortifications of the most vulnerable part of the population and the mustering of warriors for counterattacks. On the other hand, this pattern seems to be guarding and controlling the traffic through natural passes to and from the *Puna* area (Williams et al., 2010).

Closer to the study area, the Hualfin valley also shows examples of settlements with defensive characteristics. All of them are located in hills with difficult access and show clear signs of fortifications, such as El Eje, Loma de Los Antiguos, Cerrito Colorado, and Cerro Colorado (Raffino, 1988; Wynveldt and Balesta, 2009). Also, there are dispersed structures among the agricultural fields as Carrizal, Azampay, and Agua Linda which lack defensive characteristics (Balesta and Wynveldt, 2010). Defensive architectural features include three rows of walls and a complex circulation system in Loma de Los Antiguos; discontinuous walls in accessible areas, altitude level differences, and multiple but small entrances in Cerro Colorado, and high inter-visibility of the area in all settlements. Thus, it is possible to outline a defensive settlement pattern associated with conflict for the Hualfin area as well, although it is not possible to ascertain whether it was related to inter-ethnic or intra-ethnic confrontations (Wynveldt and Balesta, 2009). That material culture was shared by the entire valley points to the existence of conflict with outsiders, possible with groups from *altiplano* and eastern areas (González, 1979; Núñez et al., 1975; Núñez Regueiro, 1974), although the circulation of goods in the RDP in spite of conflict is seen in other areas as well.

Another line of evidence is rock art, where scenes show individuals in confrontations wearing shield-like designs such as those at Kollpayoc in Jujuy (Nielsen, 2007), Carahuasi in Salta (Podestá et al., 2005), Cueva Cacao 1, Peñas Coloradas, and Casas Viejas in Antofagasta de la Sierra (Aschero, 2000); this motif is also represented in engraved gourds (Ambrosetti, 1902), bone trumpets, ceramic, and metal plates (González, 1992; Nastri, 2008; Nielsen, 2007; see Figure 2a). Another commonly represented motif is the trophy head, which was recorded mainly in ceramic vessels, metal discs, and bells from the Santamariano area (González, 1992; Nastri, 2008; see Figure 2b). Weapons are also represented in rock art drawings, such as axes or bows and arrows (Aschero, 2000; Fernández Distel, 2007; Hernández Llosas, 2006; Nielsen, 2007; Podestá et al., 2005; Ruiz, 2002) and a series of captives can be seen in the 'Boman panel', located close to the Pukará de Rinconada in Jujuy (Ruiz 2002; see Figure 2c).

Knowing about the weapons used is essential to understand better pre-Hispanic tactics of defence and attack. Although the evidence is scarce, it is possible to recover some information from the archaeological remains and from historical accounts. Weapons found in archaeological sites are a good indication of violent conflict (Keeley, 1997), although some instruments could also be used for hunting or managing livestock, as in the case of arrows and sling stones (Brown Vega and Craig, 2009; Nielsen, 2007). Possible weapons have also been found on NWA archaeological sites: for instance, Nielsen (2003a) mentions the abundant presence of triangular concave projectile points in Quebrada de Humahuaca settlements dated after AD 1200 associated with evidence in the faunal remains of a decrease in hunting activities; similar conclusions were reached for the Calchaquí area (Chaparro, 2009; see Figure 2d). It is worth noting that Spanish chroniclers described the Calchaquies as '[...] never without their bows, nor were their quivers loaded with more than fifty arrows, and they are reknowned as very brave and skilful in archery' (Boman, 1908: 44).²

Bronze knuckles have also been mentioned as possible weapons, although their function is still debated (Nielsen, 2007: 23). What these objects reveal is that individuals possessed a wide range of weapons for violent encounters that may have been

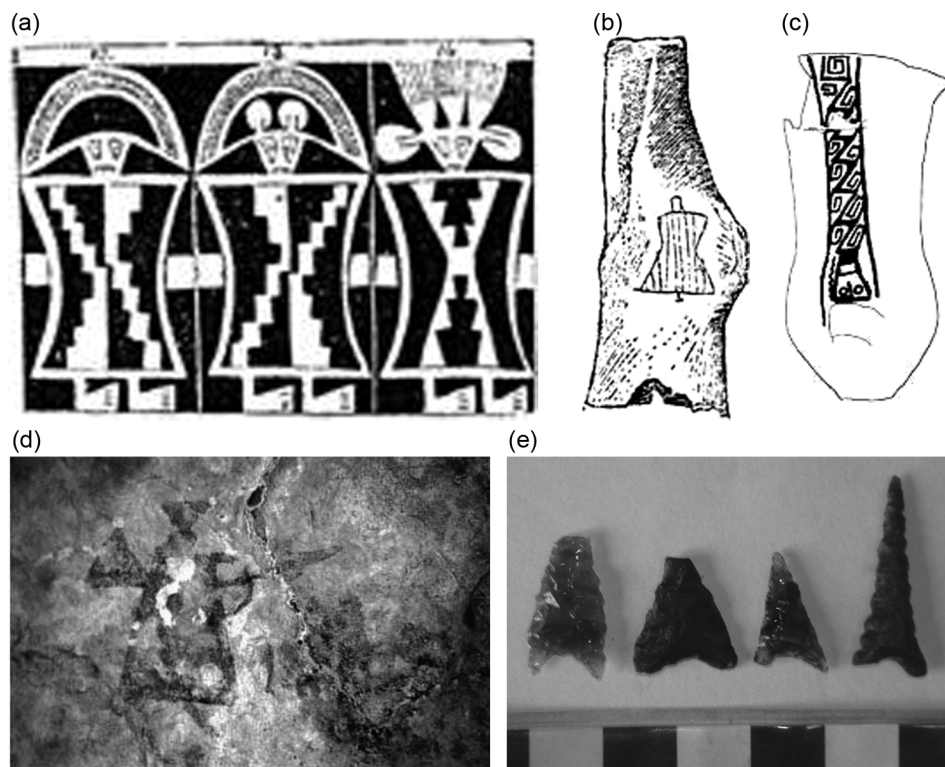


FIGURE 2 a) shield-like motives in an engraved gourd from Pucarilla, Salta (from Ambrosetti, 1902) and a bone trumpet from Los Amarillos, Jujuy (from Nielsen, 2007). b) trophy head in a Santamariana urn (from Nastri, 2008). c) weapons and war-scenes represented in art rock from Kollpayoc, Jujuy (from Nielsen, 2007). d) projectile point from the Calchaquí Valley (from Chaparro, 2009).

used in hand-to-hand combat (e.g. knuckles, axes, maces), as well as projectiles for use in long-distance combat (e.g. arrows, sling stones, simple stones), but also that these weapons may have functioned as power insignia (e.g. axes) and also have been used in a domestic realm (e.g. slings).

Another direct source to document the presence and intensity of conflict or warfare in a population is violent trauma on human osseous remains. Recently, Gheggi and Seldes (2011) reported that 13.95 per cent of 423 crania analysed from Quebrada de Humahuaca and Calchaquí Valley indicated violent lesions. The location of injuries suggest that several sources of violence may have acted to produce the trauma pattern observed in both regions (e.g. ritual violence, conflict resolution, domestic violence, or armed conflict) and that individuals from both geographical regions seem to have been involved in real violence events that affected their daily life (Figure 3).

In conclusion, there is ample evidence for the existence of conflict in NWA during the RPD, as testified by defensive settlement patterns in several valleys and Puna areas, rock art scenes, and weapons found in the material record. In addition, evidence also points to the sharing of material culture within and between regions in spite of conflict.

(a)



(b)



FIGURE 3 Traumatic lesions on human skulls. a) *perimortem* lesion on the right parietal bone, Pukará de Volcán (Quebrada de Humahuaca) and b) *premortem* lesion to the right side of the face, La Poma (Valle Calchaquí). M. Gheggi's own pictures.

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Exchange networks and llama caravan traffic

The diverse ecological zones that characterize the Andean region gave its inhabitants the opportunity to gain access to a varied set of resources by establishing social and economic relationships across these areas. Since the seminal work of John Murra (1975), several researchers have considered how Andean households and communities obtained resources from different ecological areas. Browman (1974) argued that the ‘vertical archipelago’ model proposed by Murra for the mountains of Peru did not work in the Altiplano zone, and posited instead an ‘Altiplano model’ which explained llama caravans as one of the ways in which ancient people gained access to non-local resources. Nuñez and Dillehay (1995) proposed a model called ‘circuit mobility’ that implies the existence of some fixed routes that unite two or more axial settlements located in two different ecological zones, similar in size and political and economical hierarchy, as well as in the equivalence of the resources exchanged. It is a condition of this model that axial settlements are stable and act as: 1) transference sites where resources are exchanged and *caravans* may continue their route to another site, and 2) logistical posts for *caravans* to continue in the circuit mobility system (Nuñez and Dillehay, 1995: 27, 156). In this way, long-distance circuit mobility between different ecological zones (puna, coast, and forest) would probably only exist between the most important settlements. Shorter circuits may have existed that implied exchange between local settlements (Nuñez and Dillehay, 1995: 156).

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In this sense, Aschero (2000) posited that for the period between AD 1000–1450 in the Argentinian Puna area, two different interaction modalities would exist, judging from the motifs appearing in rock art: 1) a short distance one (50 to 150 km) in which information exchange was particularly precise and the art rock motifs were executed by people with direct knowledge; and 2) longer distance interactions (more than 150 km) that would explain certain repeated patterns and canons in sites more than 470 km away (like Santa Bárbara in northern Chile and Antofagasta de la Sierra in Argentina). The repetition of motifs and themes in rock art suggest that, although the mobility circuits may have changed after the Tiwanaku collapse, the Puna area would have continued to function as a major interaction and exchange area (Aschero, 2000). The discovery of significant quantities of wooden hooks for tying llama burdens in the Puna in contexts dated to the RDP gives a similar interpretation (Olivera et al., 2008; Raviña et al., 2007; see Figure 4).

Similar results were obtained from the analysis of NWA obsidian sources revised by Escola (2007). She concluded that there were two main areas of circulation in NWA for the period between 200 BC and AD 1550: a northern zone with obsidian from the Bolivian Zapaleri source that reached sites in Jujuy’s Puna, Quebrada de Humahuaca valleys, and even the eastern *yungas*; and a southern zone with obsidian from the Ona-Las Cuevas source from Catamarca involving sites in the Southern Puna and several valleys (Santa María, Calchaquí, and Cajón). These sites are located roughly 350 km away from each main source location; each zone shows great stability over time, with the exception of 200 BC–AD 100 and AD 1400–1600 where they overlap in some areas (Escola, 2007: 79–80). Apart from those long-distance zones, other minor sources were used in limited circuits. Alto Tocomar and Quirón sources, which offered a translucent obsidian, would have functioned in a limited zone among the two main sources. Caldera Vilama 1 was used in from AD 800–1400



FIGURE 4 Wooden hook for tying llamas' burdens (*tarabitas*) found in La Alumbraera (from Olivera et al., 2008).

with the Zapaleri source, while Cueros de Purulla was used for the entire sequence along the Ona source. This indicates a degree of stability in both long- and short-distance exchange between the different ecological regions of NWA in spite of the political and economical changes that occurred (Escola, 2007: 82).

The Regional Development Period in Antofagasta de la Sierra

Present-day Antofagasta de la Sierra corresponds to a small village which is the political head of a district in Catamarca Province. As an archaeological region it only correlates to the Punilla River Basin (Aschero, 2000; Olivera, 1991). Antofagasta de la Sierra is located in the southern extreme of the Andean high plateau called Puna de Atacama. It is a desert environment with high solar irradiation, elevated seasonal and daily thermal fluctuations where rainfall is lower than transpiration rates (Tchilinguirian and Olivera, 2010).

6

Nonetheless, orographic precipitation generates springs which provide a flow of water all year, making the region an oasis in the desert and enabling the development of agriculture. During the RDP, the introduction of irrigation systems allowed an intensification of agriculture in exploiting nearly 600 ha in Bajo del Coypar site (Olivera and Tchilinguirian, 2000; Tchilinguirian and Olivera, in press; see Figure 1). These fields may have provided a great portion of the families' food income, but which crops were grown has not yet been accurately determined. Crops could have been used as food for humans, fodder, or a mix of both. This is important since there was also a great emphasis on llama stockbreeding, an activity that preceded agriculture for millennia and lasted after the Hispanic conquest until modern times. Faunal remains, numerous corrals recently identified (Olivera et al., 2008) and iconographic designs on rock art (Aschero, 2000) reveal the central role of llama herding during the RDP.

The RDP in the region is characterized by the abandonment of a scattered residential base called Casa Chávez Montículos located in the Punilla River valley bottom

and the occupation of a new space on the sharp volcanic basalt formation near the shores of Antofagasta Lake in La Alumbreira site (Figure 5). The main architectural features of La Alumbreira consist of a concentration of sunken stone buildings extending along the different floor levels formed by basaltic floods, and two compounds formed by large walls surrounding these structures. Taking into account both natural and anthropic limits, two main sectors were delimited (Salminci et al., 2009). The central sector (*c.* 4.7 ha) has a higher density of structures and is delimited by the lake on its north side and by the internal wall to the west, east, and south. The intermediate sector (16 ha) is larger, but has fewer buildings and is delimited by the internal and external wall. Large spaces enclosed by outcrops and walls were identified in this sector (Figure 6). The spatial configuration of La Alumbreira adds information concerning the RDP social structure as the dual and symmetrical configuration of external spaces, such as paths of circulation, might be associated with a segmentary structure (Salminci, 2010; see Figure 6).

Different radiocarbon dates indicate its occupation between *c.* 1000–500 BP (*c.* AD 950–1450; see Table 2). The Material culture recovered, especially Belén style ceramic sherds, suggests close cultural relations with societies that inhabited Hualfín valley during RDP (Olivera, 1991; Olivera et al., 2008; Raffino and Cigliano, 1973).

Raffino and Cigliano (1973) proposed a model of ecological complementarity assessing the relation between Antofagasta de la Sierra and Hualfín valleys societies, where La Alumbreira would have initiated its occupation as a colony of Belén-using groups and would have acted as concentration node of Puna goods — especially minerals and llama wool — to be exchanged for goods coming from lower ecological sectors (e.g. Calchaquí and Yocavil valley). Given this scenario, the authors suggested



FIGURE 5 Aerial photograph showing La Alumbreira in its topographic context.

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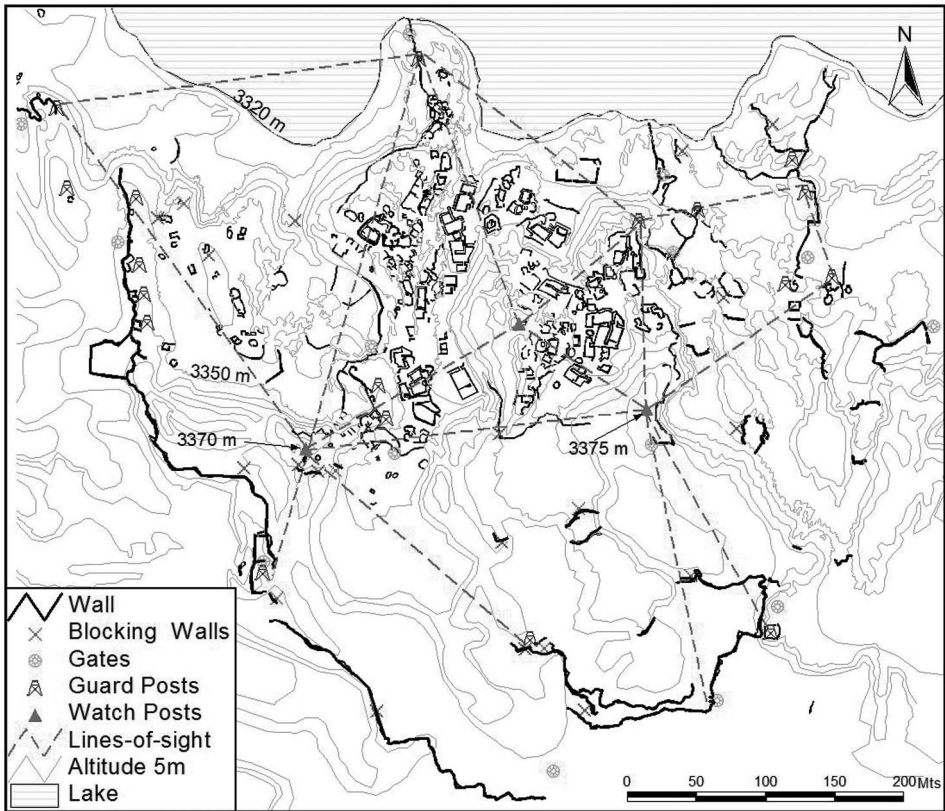


FIGURE 6 Plan of La Alumbraera showing the characteristics of the defensive and access layout.

TABLE 2

RADIOCARBON DATINGS FROM LA ALUMBRERA. AA: NSF-ARIZONA AMS LABORATORY
(REFERENCE: TCHILINGUIRIAN AND OLIVERA, 2010)

N° Lab.	Sample description	Date (AP)	¹³ C (0/00)
AA 78543	M11, Charred material, Sector 1B-R1, PS 1, Level II	981±39	-21.0
AA 82550	M2, Wood, Grave A Sector 1b	534±59	-22.3
AA 78542	M10, Charred material, Sector 1B-R2, bottom of level III	536±42	-20.6
AA 82551	M3, Charred material, Sector 1B Room 2, Level 2	1,007±50	-18.5
AA 82552	M4, Charred material, East Central Sector 2c, Room 1, Level 3	916±50	-22.3

that La Alumbraera must have included a physical space where these exchanges would have taken place, although they did not identify any such location. This hypothesis is supported by the finding of several wooden hooks for tying llama cargoes (*tarabitas*; Olivera et al., 2008; Raviña et al., 2007); as previously mentioned, rock art scenes in Antofagasta de la Sierra support the importance of llama caravans in the past, and particularly during the RDP (Aschero, 2000; Podestá and Olivera, 2006).

Following up on this research, Elias and Escola (2010) showed that not only were the same sources of obsidian used in Antofagasta de La Sierra from *c.* 2000 BP to 600 BP (100 BC–AD 1350), but also that obsidian tools from later sites in the sequence (Real Grande and Bajo del Coypar II) came from more than eight sources, some of which were not represented in previous periods. This information suggests that, in spite of the conflict situation posited for the PRD, Antofagasta inhabitants maintained their access to the same obsidian sources and even extended them, questioning the idea that mobility was undermined by endemic conflict.

Nevertheless, there is an almost unanimous consensus regarding the defensive nature of La Alumbra's architecture and location (Ambrosetti, 1902; Olivera, 1991; Olivera and Vigliani, 2000–02; Salminci et al., 2009; Salminci, 2010); the exception to this was the work of Raffino and Cigliano, which defined the settlement as a 'conglomerate without fortification' (1973: 248). In spite of this consensus, neither a detailed description of La Alumbra's defensive features exists nor a debate on how potential events of defence or attack might have occurred.

La Alumbra defensive and access layout

The La Alumbra defensive system includes a strategic location in rugged terrain, two surrounding walls, walls constricting access, baffled gates, watch posts and guard posts (Figure 6). These features were built and used for repelling attacks and controlling access in and out of the settlement.

The site was located on Pleistocene black basalt rock running from the Antofagasta Volcano right to the shores of Antofagasta Lake (Figure 5). Lava flow created differences in level, with acute slopes and cliffs that rise up more than 35 m. Depressed areas protected from wind and covered by Holocene sand deposits open out between basalt elevations. Several cracks produced during lava cooling score the top of basalt elevations creating narrow natural passages. So, the landscape itself constitutes a winding labyrinth in which it is difficult to find one's way, where the cracks and depressions block visibility.

The inhabitants of La Alumbra took advantage of terrain, choosing the most elevated and rugged formations nearby the lake to construct the residential buildings. However, not only do the elevation and steep slopes constitute defensive features, but also the intricate arrangement of passages and ways up, down, and across the basalt outcrops might have been crucial to set out defensive and counterattack tactics. Elevation could have increased the range of projectiles and allowed rocks to be pushed over the edge of cliffs and slopes. Domestic buildings were placed within this uneven landscape, but there is substantial evidence of levelling works in residential space both by carving the outcrops, embanking, terracing, and building rudimentary steps.

Two systems of stone-built walls (internal and external) surround the settlement up to the lake shore. These were built to reinforce the defensive nature of the topography. The walls are not continuous; several stretches are constructed on the most vulnerable parts of the site, leaving sheer steps without fortification. The internal wall is nearly 700 m long, and was made employing a double-walled construction 1.2 m high and 0.6 m wide (Figure 7b).

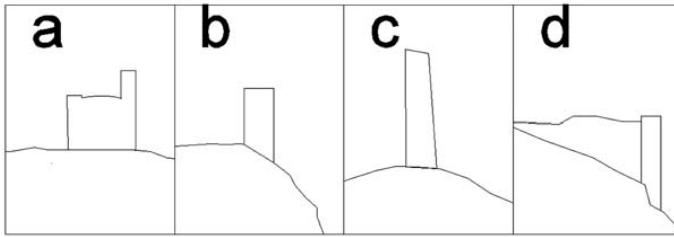


FIGURE 7 Different wall types.

The external wall extends for more than 2000 m and three construction types were found in different sectors. The first is located in the north-west portion of the settlement using double-walled, rubble fill walls of 1 m height internally and up to 1.4 m externally, creating a small parapet wide enough at 1.2 m to allow easy movement on top of the wall (Figure 7a).

The second type is located in the north-east sector. It is also double-walled, this time up to 2 m high (Figure 7c). Small windows were built to overcome the lack of visibility, and may have been used to throw projectiles. Finally, the southern portion of the wall was constructed by heaping stones toward the edges of the outcrop, forming terrace-like structures filled with sand and stones. This type of wall created or augmented level differences between the internal and external sides (Figure 7d).

Other important features of the site's design that prevent access and direct circulation are path-blocking walls (Figure 6), which are located in natural paths in the basalt flow cracks. In some cases, they complete tracks of the enclosure wall, while in other cases are located in isolation or in combination with natural cliffs. In the latter case, they form real labyrinths and dead ends surrounded by elevated zones that may have functioned as bastions.

There are eight gates that link the intermediate sector to the exterior of the site, while six gates link the intermediate sector to the central one. These gates are morphologically and technically different (Figure 8). Even though these gates are not standardized, they can be classified on the basis of how they direct movements (Keeley et al., 2007). There are direct gates (Figure 8a) that at first glance do not seem to be particularly effective for defence. Nevertheless, their small size allows only one person walking at a time and they could be easily sealed using rocks or organic materials. In addition, most entrances are protected by guard posts. Screened gates constitute another type of entrance; these structures could have stopped and

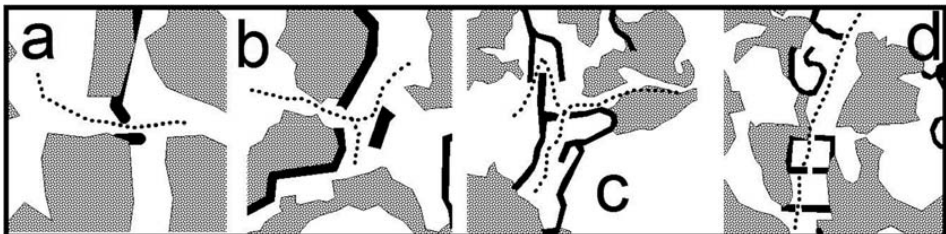


FIGURE 8 Different gates types found in La Alumbreira.

bifurcated movement by means of a wall located right in front of the access (Figure 8b). These walls not only restrained movement but may have served as parapets. There are also baffled gates consisting of several walls designed both to deceive and to direct movement to bastioned dead ends (Figure 8c). Finally, there are chambered gates that controlled access and stopped circulation, allowing recognition of visitors and a secure retreat by blocking the chambers (Figure 8d).

Several small buildings placed against or close to walls served as guard posts, with two different types. The first type specialized in observation and surveillance, being located in high places with low accessibility (Figures 6 and 9). To reach them, several paths had to be used, while the high location allowed both the observation of great portions of the site as well as visible to other posts to coordinate defence or attack.

Other posts seem to have been exclusively built to control access, as they do not have great visibility and are generally located close to the gates of the external wall, although some are situated in the internal wall. Finally, other posts seem to have fulfilled both functions (observation and control), and in view of their size may have served to place a small garrison (Figure 6).

All the features described above seem to have been useful only when handled in a coordinated way and by trained people. For instance, the extensive wall could not have been simultaneously defended along its entire length because of the large quantity of people required. Also, the location of posts in low-visibility sectors would make them vulnerable without the correct support. Probably the best strategy consisted of locating a few persons in important places to watch and warn about defensive or attack manoeuvres, directing more people where necessary. At least twenty people would need to be dedicated to observation, surveillance, and control. Accordingly, the defence and the access layout of the site carefully protected its



FIGURE 9 Watch posts lines-of-sight, image taken from the western post.

inhabitants from attacks but also allowed a fluid traffic of people in a controlled way.

Assessing conflict and goods exchange in La Alumbra

To gain insight into the nature of warfare and defensive features it is important to consider the socio-political context under study. There is a wide range of evidence which reveals that the stateless societies of the RDP in NWA lacked standard armies, and that war parties were smaller, not designed to destroy, occupy, or dominate territories or populations, but more probably to capture trophies and prisoners or to take resources and revenge, as Arkush and Stanish (2005) have proposed.

The absence of power centralization together with the amount and location of defensive settlements speaks of constant conflict and political instability that may have confronted neighbouring communities, even those that shared common cultural patterns like pottery decoration. However, there are groups of settlements that appear to have worked in coordination by forming multi-site defensive complexes linked by lines-of-sight, as was recently suggested for the mid-Calchaquí valley (Williams et al., 2010) and the Central Hualfín areas (Wynveldt and Ballesta, 2009; Ballesta and Wynveldt, 2010). These visually communicated arrangements reveal that unexpected attacks like raiding or ambushing were probably the main forms of warfare practised, and that defensive tactics and settlement patterns may have evolved to prevent them.

La Alumbra is a different and curious case due to its isolated location, more than 100 km away — about four travel days — from any of the densely populated valleys areas. Thus, arranging war parties from the valleys would have required substantial efforts to overcome distance and other travel constraints like food and water supply. For this reason, other scholars have argued that La Alumbra was not a defensive settlement and that its inhabitants were free from warfare or its threat (Raffino and Cigliano, 1973).

Nonetheless, based on the defensive features described above, the present authors argue that not only the threat of violence but also real events of conflict stalked the La Alumbra community. As has been suggested elsewhere, ‘Since fortifications are costly to build people tend to do the minimum needed to protect themselves [. . .]’ (Arkush and Stanish, 2005: 7). Following this statement, it is hard to believe that La Alumbra’s complex defensive layout was constructed just in case of attack. The complexity of the defensive system suggests that warfare was perhaps constant, as the layout observed at present is the result of more than four hundred years of occupation and testifies that successive improvements were designed probably after repeated attacks. Certainly, the most antique occupation area was the central sector, which may have been chosen for its naturally defended relief. Later, construction works improved defensibility by adding the internal wall and then the baffled and chambered gates, path-blocking walls, east and west stretches of the external wall and its associated watch post, and finally the southern stretches of the external wall.

Considering the location of the site at a larger spatial scale, including landscape topography and long-distance visibility, it is clear that unanticipated attacks could not have come from the north, east, or west. The open relief of the Punilla basin

makes movements from these directions visible at least from 5 km away, giving enough time to prepare a defence strategy. Also, the eastern paths that were frequently used as communication routes (like those descending from Galán volcano and entering both Las Pitás and Miriguaca ravines) would not represent unforeseen threats. Only the southern paths allow entry to the volcanic flows of Antofagasta volcano where, although with great difficulty, it would have been possible to reach La Alumbreira's external wall without being seen. No post has yet been identified that may have served to watch these southern routes, although other posts located close to this area could keep watch over this entrance.

The defensive configuration seems to protect carefully the central sector of the site, which was the residential place and where the most deemed resources that might have been the focus for dispute (minerals, captives, goods, etc.). Another important implication of the defensive configuration is the need of simultaneous coordination of several individuals located at different points of the settlement and a visual or sound system of communication to give alerts and lead defenders were it was needed. Elevated watch posts visually surround the entire site and were probably the base for establishing defence and counter-offensive tactics in coordination with the rest of guard posts.

However, the number of gates in both the external and internal walls differentiates La Alumbreira from other RPD settlements of NWA. The relatively high number of entrances testifies of the need to allow movements into and out of the settlement, although in a highly controlled way. These would have served to control the flow of people and animals for exchange activities which would have continued even in times of conflict. Goods exchange between Antofagasta de la Sierra and distant regions is an ancient and durable practice recorded from at least 3000 years BP (1000 BC; Olivera et al., 2003) which intensified during the RDP (Podestá and Olivera, 2006).

La Alumbreira may have functioned as a Puna exchange enclave destined to distribute Puna goods to coeval Puna and valley communities and may also have served as a logistical stop in the caravan routes that passed through it. Thus, it is valid to envision La Alumbreira as a place where busy caravans converged and where specific spaces existed for exchange activities. In this sense, the spatial configuration of the site would seem to indicate that it was built not only in response to attacks but also in response to the growing and intensifying of exchange activities, as the external wall has several wide spaces flanked by the basaltic flows that could have been used as refuges for the llama flocks in case of attack, but are also consistent with spaces destined to exchange activities.

Conclusions

This paper has examined a way in which a Puna community from north-western Argentina dealt with the necessity of exchanging goods at a time of intercommunity conflict during the RDP. It also took into account different lines of evidence presented by scholars for the NWA area concerning warfare tactics and goods exchange, and put them in relation to the study of the defensive and access layout of La Alumbreira at a site scale. The study indicates that this system was a response to a temporally specific conflict situation as the inhabitants choose to settle on the

most inaccessible landforms since the beginning of the occupation of the site and subsequently sophisticated the defences in response to repeated events of attack.

This study also suggests that some aspects of the spatial configuration, such as the access system and the layout of certain spaces located in the intermediate sector, support the idea of La Alumbreira as a node where multiple networks of caravan converged and where a growing and intense caravan activity must have posited the need for a permeable and controlled system at the same time.

Nevertheless, the kind of data here analysed does not allow speculation about key questions such as the way in which trade and conflict would have coexisted at an interregional level. In this sense, the logic that guides this paper cannot reconcile the idea of exchange relationships being established with a community against which war had been declared. Some scholars have posited that caravans might have been commanded by independent Puna communities (Aschero, 2000; Nielsen, 1997; 2003b; 2007), implying that, as they were not associated to any particular community, they would have enjoyed a certain immunity from being attacked. Although this is a possibility, the mere fact of being independent would not have precluded the chance of being attacked, killed, or assaulted. Accordingly, it is also possible that caravan groups were composed of armed people prepared to defend themselves or to attack if the possibility arose. Although there is no direct evidence of armed caravan traders, the coexistence of camelids and shield-like human figures in rock art, two motifs commonly linked to caravan trade and war respectively (Aschero, 2000), is very striking.

The complex logistics required for attacking isolated sites like La Alumbreira and the food transport that the long journey to the site required would have been easier if carried out by using beasts of burden. This suggests the possibility that attacks might have been camouflaged as llama caravans.

On the other hand, data from obsidian sources analysis indicate that, during the RDP, Puna societies diversified the quantity of sources exploited, which can be interpreted as a result of the necessity of diversifying access to this resource in light of temporary or permanent disruption of the traditional routes. This scenario would be the result of the presence of fragmentary independent communities in a politically unstable context that established relationships both of alliance and aggression, and where exchange was carried out with an allied community in peace at a given time. This independence and fragmentation would allow an alternating pattern of war between nodes, with the concomitant blocking of exchange interactions, and times of peace, with the re-establishment of networks; this characteristic seems to dominate the Regional Development Period in north-western Argentina. This topic deserves further research as well as the integration of diverse lines of thought in order to gain insight into the complex interactions that took place in past Andean communities.

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Notes

- ¹ We do not deny that the conquest of territories may have taken place, and it is possible that a first period of instability was related to the consolidation of territories when communities changed their residential places and erected defensive settlements. An example of this situation may be the high rates of trauma that Torres-Rouff and Costa Junqueira (2006) recorded for the initial phase of the Late Intermediate Period in San Pedro de Atacama (northern Chile), which later decreased.
- ² The original quotation in Spanish is 'En ningún momento dejan el arco, ni el carcaj cargado de más de cincuenta flechas, y tienen un gran renombre de ser valientes y diestros para tirar con el arco' (Boman, 1908: 44).

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