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Chapter 9

# Natural and Cultural Landscapes in Atacama Desert: Between Tradition and Innovation

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Additional information is available at the end of the chapter

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**Abstract**

Climatic conditions modeling the landscape of the Chilean northern region are examined, along with how they could model different strategies to be inhabited by various demographic contingents in time. These experiences have persisted in the different geographic spaces of Atacama Desert, from the Andes at an elevation higher than 2000 m.a.s.l., going through the intermediate depression between 2000 and 500 m.a.s.l., to the coastline panorama. In the various shades of the desert climate and the experiences of several populations, life styles and spatial conceptions were posed in terms of their cosmic dimension from a deterministic view and pragmatic apprehension to a contemplation-like view. These conceptions between man and the landscape have assumed different relations of technology use, natural and energy resources, and a constructive-architectonic design in Atacama Desert, which have remained as monuments in the Chilean southern space.

**Keywords:** landscape, desert, nitrate, Antofagasta, Andean

## 1. Introduction

The large extension of Atacama Desert in Antofagasta region includes different geographic areas with desert climate variants that define various landscapes. According to Köppen's classification, on the coast, we find a coastal desert climate with plenty of clouds and high humidity but without rain. A characteristic of this presence are the *camanchacas* (fogs) enclosed by the hills of the Coast Cordillera. If we go up to the east, between 1000 and 2000 m.a.s.l., we find an intermediate depression and a regular desert climate with other characteristics such as high thermal fluctuation between day and night, clear sky, and absence of rain. Farther to the east, and higher toward the Andes, we find a marginal high desert climate, present at the

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Andes foothills over 3000 m.a.s.l., with rainfall that fosters steppe growth. Finally, we find a high steppe climate with rainfall in summer that reflects vegetation and certain surface water currents ([15], pp. 214–221).

These climatic features, added to a rugged topography, have defined natural landscapes with distinctive characteristics. Every human action must have faced the desert. The difficulty to transform a natural scenario into an inhabitable space has been subjected by two factors: one of them, water supply, either through groundwater or the access to the main surface water current (Loa River) and the second one, the necessary road connectivity with the Pacific Ocean or transboundary Mediterranean cities (Bolivia and Argentina). Closeness or distance to port settlements in the moorland posed different views about space, nature, and landscape.

We must indicate that Atacama Desert became part of the Chilean landscape during the second half of the nineteenth century, when nitrate exploitation began in this territory. It was a dissonant landscape compared to the one that characterized Chile, with forests, rivers, and lakes [33]. From being a *boundary* between Chile and Bolivia, the desert arose as a *frontier* region where the whole desert landscape showed the known and what remained as unknown. In this sense, the desert landscape caused tension on what John Agnew called "landscape ideals" inside the national territory, thus opening other "sites of memory" for the country's modern times [2].

We must keep in mind that the concept of nature is an abstraction about which different cultures have had distinct views. Whiston Spirn ([64], p. 251) pointed out something that is proven in the desert, "There is always tension between the autonomy of nonhuman features and phenomena and the meanings we ascribed to them".

The knowledge about its relief, with the attribution of names to its geographic features, from the language of its pre-Columbian inhabitants (in Quechua language, Lascar and Llullaillaco volcanoes; in Kunza language, Licancabur and Panitri volcanoes; etc.), and in modern times, by Chilean geologists, mainly Francisco San Román [53], named them as Cordillera Darwin, Sierra Vicuña Mackenna, Sierra de Almeyda, Volcan Lastarria, etc., to honor these great men of science and Chilean liberalism. This action of the word on the nature gave shape to Atacama Desert toponymy. And this meant man's o*rientation,* the second step for perceiving the landscape. The designation, by means of language, began to fill the void of space with content, distinguishing what nature exhibited itself before their eyes. It was the step from "feeling lost, a shipwrecked in things", *otherness*, to forming "an idea about things", *self-absorption*, even acting in the world, Orteguian *action*, where the ultimate meaning is the need to think to survive ([49], pp. 30–31). Heidegger reminded us that it is our speech that leads to man and, in the archeology of the old locution in his language, indicated us that to construct means to inhabit: "we inhabit, as we are the inhabitants" ([25], p. 203). Inhabitants of the Earth, where everything is nature: the material world where "human beings are included and excluded" ([66], p. 233).

At present, it is considered the so-called "affordance theory", developed by James Gibson, links the environment to human behavior, or as Heft (cited by Ward Thompson [61]) describes "perceptible properties of the environment that have a functional significance for an individual", which makes it possible for certain mental constructs—certain prototypes—to approach us to understand landscapes.

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## 2. Landscape in time and space in Atacama Desert

Anna Whiston Spirn has argued that an appropriate reading of nature and its landscapes—both native and cultural—requires considering the interconnections of air, water, earth, life, and culture to understand these contexts [65]. Pre-Socratic thinkers such as Empedocles affirmed: "of all things, four are the roots. Fire, Water, and Earth, and ether's boundless height" ([18], p. 67). For the Greeks, ether was the pure air on the mountains. The essential elements that make us understand landscapes, as highlighted by Gaston Bachelard with air and water, make imagination flow over our environment.

In this context, it is where the different views developed with time struggle, regarding the space we are concerned about. Visions not only contain the man-nature relationship, but also certain paradigms that still survive [13, 20, 24]. Landscape will not only reveal to us as different approaches to the world as it is, but also as we would like it to be, because the landscape "is both the phenomenon itself and our perception of it" (Wylie, cited by van den Brink et al. [59]).

(a) The cosmic-sacred dimension linked to the belief systems of the region's native peoples, to the world view. There is an inflection from an ecological optics considering the construction of a smaller place, which is nature, inserted in a cosmic framing. This hieratic dimension means to of assume the space in connection with tutelary gods, is animated by a symbolic rationality. The passage of man through steppes and ravines opens paths that melt with the earth itself. In the landscape of the Andes foothills, they become high altitude shrines located on the top of high peaks. It is a space where resources are not an absolute dominion to humans. The balance between river beds, agriculture and herds, and the sustainability of human presence, is the primordial axis of the cosmogony that animates this view about nature and landscape.

The priest Gustavo Le Paige was a passionate scholar who studied the archeological sites on the high peaks of great "Salar de Atacama" and reached some conclusions:

> *"(…) despite the scarce cultural evidence about Inca settlements in this region, we are impressed by the fact that Incas imposed their religion of high peaks, showing that, along with the administration of Atacameña zone, they were concerned about establishing their own religion. / We believe that only priests went up to the summits accompanied by a few assistants to offer ceremonies to the sun, which included burials of offerings under the platforms (…)* ([29], pp. 38–39)*."*

(b) The naturalistic-deterministic dimension brings together a view that lies exclusively on the earth's surface. It is to prove that the dominant landscape—the desert—is the synthesis of adversity for man. It is possible to oppose nature to a technique that can exceed negativity for a civilized life. Searching the entrails, in the deepest part of the barren land, mineral resources that may compensate life inconveniences and investment risks. It is the deliberate construction of an artificial landscape precarious for man. A disruption against nature. Looking at the desert and its flat, dry, and luminous landscape from an instrumental rationality. The primordial, the virginal nature is not respected. The native is altered by what is strange to the landscape: industrial plants and machines. The determinism of every mining cycle, that is, abandonment, *desertus*, when human presence ends, changed the landscape into a heterotopic space [14]. A sample is ghost towns such as Pampa Union or the large number of abandoned nitrate cities in different cantons, or geographic areas, in the whole region.

San Román masterfully described the convergence between the common sense of desert man and the technical knowledge about space. On this elasticity of space he stated:

> *"The long stretch of Chilean territory running from the rough Huayco valley to the nitrate pampas where Loa River flows, including between both extreme boundaries the whole Chilean breadth extending from the Pacific coast to the Andes crest, makes up what was properly considered as Atacama Desert until the beginning of the present century. This designation has been restricted more and farther to the north as the general progress and mining discoveries populated or made exploration accessible to those territories, founding towns and creating industries in them; but, as a mere geographic title and above all, as an the meaning of an arid zone and production exclusively due to the mineral kingdom, tradition and customs still preserve that name for the whole region that embraces two Chilean provinces nowadays, Atacama and Antofagasta"* [53].

(c) The pragmatic-utilitarian dimension helped strengthen instrumental rationality in all its dimension. The landscape does not only make up an object for its purposes, but the look about it extends as a reading of total lordship. Everything must be at the service of man's economist view: its mining resources, the flora—the *llareta*—as an energy source, and water use, exceeding the quotas and turns of the tributaries destined to the agriculture of the native peoples. The space is transformed into its nature. Each human settlement has the purpose of getting the greatest amount of resources from the space in the shortest time. It is a predatory view about the environment. There is no an esthetic view but usefulness regarding the landscape. The metaphor of man's transitoriness materializes in places—where man builds—in the middle of the desert. The railroad, telegraph posts, train stations, and asphalt roads, emerge as the new nature superposed on the wasteland. The ruins from the abandonment of these constructions, by depopulation, reflect the visual contamination of this rationality.

Oscar Bermúdez, the great nitrate historian, drew a synthesis of the human passage and the unalterable of natural space. He could not forget his own pampa experience:

> *"The geographic environment of this region, at first gave rise to the life forms of primitive cultures able to adapt there and, even, prevail in the environment. There the Spaniards spent centuries trying to unwillingly endure their solitude and the difficulties imposed by the large distances. Later, an industry was established, the soda nitrate industry […] but, neither the old populations, nor modern nitrate and copper industrialization have changed the desert landscape at all"* ([7], p. 19).

(d) The contemplative-ethical dimension constitutes a combination between ecological awareness and the sense of native beauty. Damage to the landscape entails, as a reaction, an ethical, and esthetical reflection about human action. It is a view that intends to enquire about unknown landscapes and look for corners in nature that allow to measure eutopian places, assigning indigenous ethnic groups and their locations as "good places", where happiness can still be found ([26], p. 16). Places and corners of the landscape, where the contemporary tourist believes to live in the plenitude of its authenticity. In this sense, the writings of native essayist and poets suggest a view about the nitrous pampa, associated with nitrate human epic, highlighting the manly quality of the indomitable desert.

In 1945, it was Montandón who was dazzled by the landscape that connected the pampa with the oases of the Andean foothills, highlighting what could be perceived by every eye alert to the beauty of the natural and the potentialities of a heritage that began to be unveiled:

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> *"The traveler who goes through known routes or heads towards the mountain ranges in Chile's northern region stops to observe relics and historical sites that awaken his curiosity and sensitivity. Open doors over the past, the emotional state that intends to appear there has different origins. It is the mute presence of Tiahuanaco-Atacameño adobe masses burnt out by the desert sun. It is in the oases of the 'unknown pampa', the humility of those little churches, genuine product of this rustic colonial art. Parallel 22° 30': two places lost in Salado River valley, tributary of the river Loa: Aiquina and Caspana. At the edge of rocky paths carved by nature, strange stone rooms emerge, defended by themselves in their inaccessible heights… the Pucara de Lasana, an important town and also a fortress… houses have windows and doors, the first shown in the American architecture… A road connect Calama and Chiu-Chiu, a sleepy town receiving desert winds from four sides; the construction of its delicious and old church dates back to 1557"* ([36], p. 48).

The writer and poet Andrés Sabella conjugated the meaning of the desert as an inalterable space observed by man, unperceivable in the infinite nature:

> *"Open pampa… It is not possible for anything to hide to the eyes of death. On the grounds are the traces of the hardest time. And in the firmament, the sun breaks down into a furious laughter full of fire… The clouds slide, far away, timidly. The sky opens into a beautiful blue-lost smile. The sky of the pampa is the lovely cap of a pond that is not convenient to show in excess. At night, the stars swell with light and stay low… The earth is dry. A grey of forgetfulness escapes through the cracks. And the desert remains flat, smooth, macabre"* ([52], pp. 19–20).

Faced with this multiform desert landscape, human action has been manifested in the paradigms mentioned. Some of the demographic segments have left imprints in the wasteland: since the Hispanic indigenous syncretism of the foothills settlements, combining the indigenous *talatur* ceremony singing, the airphonic instrument of the *sicuri*, the Marian procession and the sound of the bells [31]. Both invoking the perpetuity of time must impregnate inhabited places.

Since the mid-nineteenth century, we can observe the dual effort of the pioneering inventiveness with that of man stocked with technology. The intuition of dreaminess that surrounds man and landscape into only one. A dialectic relation is appreciated, manifested in giving ore discovery the utopia looked for and at the same time trying to transform aridity by means of a creative designation. Benjamín Subercaseaux was able to capture this last connection:

> *"In the pampa, and also on the mountains, geographic names indicate the thought and stages of the efforts made in struggling for life… some names reveal the anguish of explorers and adventurers: Misleading Pampa… and the permanent concern about water for these hoarse throats: White Waters, Good Waters"* ([57], pp. 100–101).

The landscape of the nitrous pampa was populated with places, in a Heideggerian sense. The relief was disrupted by shovels and iron bars until the nitrate crust (*caliche*) appeared. Mining camps broke up the continuity of soils. Later, mechanic tools arrived together with constructions to shelter machinery and housing for pampa men. Despite this, the desert kept its demarcations, yielding men portions of the coast. On the coastline, places were built, which would remain with man and where nature and culture would live together.

From the ports, man extended his material culture to the hinterland. He did not always run over nature. He reflected, as Ortega and Gasset asked, to operate in its construction. He posed himself the dilemma of adapting human inhabitability to the proper materials (mud, adobe,

cattail, and straw) or introducing a rupture in construction elements (Oregon pine for housing and railroad ties, cement, steel structures, etc.). In the same way, he offered an innovative answer for the climate such as the control of solar radiation, thermal oscillation, scarcity of water resources, and energy. Architect Glenda Kapstein examined transversality of architecture in the deserts of the region, from 3000 m of altitude to sea level and identified "intermediate spaces" as a strategy and operation of human adaptability to these contexts [27]. Man started changing the means of transport and their adaptability to the natural environment: caravans used colonial paths; stops in pre-Columbian tambos or infrequent oases in the pampa; later, he introduced techniques invading nature: asphalt roads, highways, railroad networks, and airports. The technological innovation claimed by J. Schumpeter became the destructive creation, beneficial for mining production, but devastating for nature and human life.

The landscape, even in its natural and cultural contents, encloses a historical construction, that is, a social construction collecting the sensitivities of each epoch: a "way of seeing" that makes it possible the fair appreciation of the landscape in its twofold connotation. On the one hand, what is sterile, uninhabited, the desert, can be "rediscovered" as a space for "existential re-encountering" between solitude and the universe [23]. Or, on the other hand, the introduction of varied elements in urban construction has been able to direct the search of its own imaginaries: the need of parks, avenues crowded with trees, squares, gardens, orchards, and the farms known as "quintas", would be evoking not only immigrants' landscape, but also the link with life in the water/green equation. Lewis Mumford once pointed out the pretension of naturalizing the urban. This relation of crossed landscapes is also related to the inhabitant of the space. Lynch [30] referred to the image of the city mediated by paths, edges, landmarks, nodes, and districts revealed from the experience of the body in a space, involving that each inhabitant establishes an orientation compass in the cultural organization, in the settlement order. The recognition of order bases the image of the urban landscape, gives meaning to space and finally relates its identification with the city.

Natural landscape was the most appreciated image by literature to build the nitrate epics: the nitrate pampa or the categorical desert. The struggle between man and nature was built as a metaphor not only of the magnitude of this adversity—quite in the perspective of an answer to the challenges of adversity in the historiography of Arnold Toynbee—but also in the history itself between the subject of the gear of the technique and its fight for redemption before nitrate capitalism. Sabella represented the culmination of both allegories [22].

The places were those that gave a greater meaning to the spaces. The link of natural landscapes to places shows the distinction in the desert geography. Foothills cemeteries were erected according to the world view, the ancestral belief of Atacameños impelled them to create *gentilares*, sacred places in the infinite desert, while those Christianized used the lands around to colonial churches, as in Chiu-Chiu.

Toward the intermediate depression, the pampa and nitrate mines shared a dichotomous western vision: death spaces distant from those of life. However, the coffins and wooden crosses fused with the pampa, while corpses kept their structure intact due to the salts and the nitrate of the soils. The need of "perpetuate" the memory of those who "traveled to the beyond" made *pampinos* keep their cemeteries visible by means of paper or metal flowers. The

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desert makes possible coffins and memory equity. It is a panorama that can be appreciated before that much luminosity of the wasteland plain.

In the cities, death rounded up in cemeteries where the stratification of civil life continued: family pantheons, mausoleums of foreign colonies; individual niches stacked on thick cement walls whose tombstones evoke his life; individual graves in the soil, whose signs disappeared with time; common graves for anonymous men and women. A Latin tradition that has accommodated to "Memory Parks" where death dissipates in the frenzy of present life, under trees, and grass. Again, the heterotopia of spaces makes itself present.

And, it is precisely the absence of the symbol of life—the water and the greenery of the landscape—what is emphasized in those places established in the rural spaces of the pampa and coastal cities. This non-native landscape, artificial but real, has reflected certain aversion to what the desert means. The landscape design—as written by Whiston Spirn [62]—does not only express our conception of nature, but also the place of human beings within nature.

The landscape of the oases, centennial villages, transhumance and Andean volcanoes, agriculture and water tributaries, has constituted space and places that have been re-signified in time. A peaceful life in them, mysterious and exotic, could be glimpsed by explorers in the nineteenth century: places that were out of history, where time had stopped in their town arteries; later, it was discovered as a magnet offering urban man an existence far from noise, the desired rest, another way of trying a life style [31]. At present, it offers a landscape esthetics, where the authenticity of the natural co-exists with the artificial of its urban life. It can be say that it is a landscape thoroughly open to a polyphony of interpretations, where the native ancestral shows itself with the Spanish colonial seal and the accents of republican modernity. Norms from old times about property and water converge with foreign preceptive ideas that speak of how to build in order to respect inherited heritage. Whiston Spirn [63] referred to a movement esthetics and change of multiple visions: "This aesthetics engages all the senses, not just sight, but sound, smell, touch, and taste, as well. This aesthetics includes both the making of things and places and the sensing, using, and contemplating of them".

It is relevant how, in the case of San Pedro de Atacama and its surroundings, at the Andes foothills itself, natural and cultural landscapes have been able to reconcile an esthetics that speaks of a certain cultural hybridism, where native people have been able to retake the dominance of their space (places of great archeological and monumental importance such as Tulor village, *Pucara de Quitor*, and Moon Valley natural sanctuary, among others) and how the foreigner has encouraged changes in his habitat (hotels that recover the traditional architecture with designs of high sophistication as well as restaurants of gourmet gastronomy) and the State has built a mixture in the whole landscape (authorizing the construction of the great radio telescope ALMA—Atacama Large Millimeter Array—in Chajnantor plain, surrounded by the ceremonial centers of Atacameño people). Again, we are in the presence of the value that words have for creating new realities, altering the impressions about the original landscape.

The town of San Pedro de Atacama was declared national monument (typical zone) in 1980 because "it represents the valuation and rich expression of an oasis village of pre-Columbian

and Hispanic roots, making up an archaeological center internationally well-known" [9]. The State has recognized the existing biodiversity, creating *Los Flamencos* National Reserve and creating *Nature Sanctuaries*, where the prototypes of the Andes geography are considered: the "Cordillera de la Sal" and its "Valley of the Moon" highlighted by its geomorphology [9, 35]. In this way, the most contemporary orientations about landscape have been understood, such as the one from the European Convention, posing that this is a fundamental part of individual and collective well-being and a cultural identity component ([61], p. 45).

The latter was also observed in the nitrate landscape. To change the stereotype of desert landscape, the one on the surface, tangible and real, unveiling had to operate, exposing the occult, revealing the other truth—as Heidegger teaches—the one with soda nitrate and copper resources. It was a space where utopian community ideas practiced were embodied in their plans that delineated the camps of workers and employees, following the impulse of the settlements of the Industrial Revolution ([16], p. 19). The new landscape did not only change nature, but also man's behavior. "A life style in the desert" was forged, assuming the adaptability/innovation with space elements. It was intended to change space aridity by introducing water supply technology: solar plants in 1872 and, later, at the brink of the twentieth century, Sloman dam to control Loa River course. To distinguish these points in the space, each place or nitrate mine had a reference meaningful for companies, their inhabitants, and the whole region [10]. It might be said that nitrate towns—the same as Chuquicamata mining camp—were the greatest and pioneering efforts in the pampa to conduct an urbanization process in the desert space. Paraphrasing Doreen Massey (cited by [56], p. 162), men and women generations in these camps did not only construct the social forms of these places, but also gave them a special meaning. All this built a unique landscape worldwide, connected to what Oscar Bermúdez named as "Shanks Civilization".

Changes in exploitation techniques and the new realities of the world commerce derived that globalization have been reflected on the pampa landscape. The new copper era meant the alteration of human landscape. The miners no longer belong to the region. C*ommuters* have disrupted the landscape because their lack of roots in the space has meant the provisory of mining settlements, what architect Eugenio Garcés has called "copper hotels" or "dwelling machines" [17].

Artists have reflected the world that vanished with time, as most nitrate industrial cities, describing the most visible of them in the landscape: their high chimneys or the utopia of the green in its squares, as appreciated in the paintings of Chela Lira, Carlos Contreras, and Waldo Valenzuela. Paintings rescued the last vital shreds of the meaning of cultural landscape in the desert space.

## 3. Vernacular and pre-Columbian landscapes: conservation and perception

Bodini, in his study on the population of northern Chile in 1968, distinguished three large areas: the Andean zone including the foothill and high plateau areas; a pampa zone including

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the different pampas of the central plain and part of the Coast Cordillera; and a coastal zone characterized by seaports ([8], p. 49). In addition, he pointed out studies on "plenty of groups around Andes salt lakes and foothills oases".

The architecture historian Ramón Alfonso Méndez in his composition of the Chilean historical process of architecture, began his journey with the manifestations of northern Chile deserts. Following the conquerors' route, from Cuzco to Mapocho, "as the Inca horizon vanishes in the vast aridity of Atacama", more rustic constructions were identified: *pucarás*, sanctuaries, and terraced fields. Human groups associated with these principles occupied the desert edges, Changos on the coast, and Atacameños in Atacama puna and foothills valleys. He defined the former as "expert fishermen" who lived in constructions made of seal fur supported by cactus trunks or whale ribs. The latter were "farmers, cattle breeders, good traders, miners, and textile manufacturers" who had inherited an "interesting architecture of rough stones roofed with herbs", using a technology that collected "forms and techniques from Andean millenary cultures". They had also developed "terrace fields and artificial irrigation" and also the pucarás, big complexes defined as defensive cities such as Lasana, Quitor, and Turi, built with an organic design and strategic localizations allowing them the domain of the environment and their own agricultural areas ([34], p. 2).

Despite the large desert pampa, both borders developed at the same time and with certain connections. Lautaro Núñez, in his study on the pre-historic agriculture of the southern Andes, from Atacama Desert coast, establishes links with the foothill oases. Identified evidence (quinoa, vicuña furs, spear-thrower, and throwing darts) reveal that coastal populations must have temporarily moved to Andean environments for collecting and hunting. About the correspondence between the coast and the Andean world, he manifests:

> *"(…) it was a serious mistake to consider the non-ceramic occupations of the coast without relating to similar populations located on the interior of the coast. These concepts of coast and Andean region are not valid for a narrow country where mobility for early micro-environmental advantages was a distinctive feature (…)"* ([43], p. 123).

This mark of landscapes with their inhabitants, natural environment, remained inalterable for a long time, we could say, unknown for most people. In 1907, caravans or expeditions were organized in Antofagasta to visit these sites and villages.

A journey in the first half of the twentieth century, from Antofagasta to Toconao, indicated the contrast between modern life, industrial, noisy, and feverish in its economic activities, and an ancestral life, with motionless constructions, peace and silence, centered on its activities of old times. Foothill towns description fused with a landscape calling contemplation. The visitor narrated in 1936:

> *"We have arrived there through lonely roads; we have not even been accompanied by the infinite rows of posts supporting vibrant lines, link of life to distance… Nothing discovers life for us. Life is hidden in the ravine. Around three hundred inhabitants live there. There is peace, much peace above all. Because Toconao inhabitants are only concerned about their orchards, that are their life. These inhabitants identify themselves with their trees; they know the age and history of each of them. Thus, when an engine vibration or the sound of a horn is heard, a shake of suspicion runs through the modest population"* (cited by González-Pizarro [19], p. 18).

In 1944, Luis Armando Sepúlveda tried to register these sensations by stamping: "But this desert, distressing for people from the south (…) is a yellow grey stark desert, where not even a blade of grass, neither a bird show, in many leagues around, any sign of life" [55].

In the mid-twentieth century, Roberto Montandón permanently published about northern Chile, addressing settlements, ruins, and landscapes, but he particularly dedicated to the constructions of the eastern Atacama Desert margin. In May 1945, he published the first of many papers about northern architecture in the journal "En Viaje". In "Reliquias históricas de Chile" he gave evidence of the colonial and pre-Columbian legacy of sites on both ends of the country. In the north, he addresses towns such as Ayquina and Caspana, from the ruins still existing in their perimeters, Chiu Chiu and its colonial church, Lasana Pucará, and San Pedro de Atacama, and the presence of Incas and conquerors, their church and town hall. Surrounding the Great Atacama Salt Lake the under snowy summits we find Toconao with its old bell tower, its characteristic orchards, and maize plantations, defined as "Atacama Puna Garden" ([36], pp. 48–49).

The syncretic forms of Andes architecture, emerging from the encounter of the Spanish with the Andes native man are revealed in colonial churches. Lautaro Núñez, a remarkable archeologist on the area says, "Missionaries had to struggle against strange cosmic visions and so many unexpected ritual practices…the cult to the nature of waters, soil fertility, objects with powers such as those of 'old saints' and those small idols of the protecting world of birds and animals…The first rectangular chapels with a door and a half-arc altar rather looked like Inca 'Kallancas'…with their typical slanted roofs and seats shaped as 'poyos' or lateral stone benches, following the only model that remains in Old Peine Town" ([45], pp. 11–12).

Montandón deeply examined the relations between society, desert landscape, and architecture in long writings published in chapters. The first one was "Oasis en el desierto de Atacama" (May, June, and August 1948). In this case, the historical dimension becomes relevant. Oases were vital for colonial routes and the Great Atacama Salt Lake was a huge geographic framework with life orbiting around it, "as if this dead extension had wanted to be surrounded by mankind". The three main axes of the Atacameño world were Calama, Chiu-Chiu, and San Pedro de Atacama. Their presence at the center of the Andes made them become a node that established links with Tiahuanaco and other bordering cultures. Evidently, the presence of water creates places, "The oases marking out the eastern desert from north to south, from old Lasana Pucara near Chuquicamata, to Tilomonte, on the southernmost end of the Great Atacama Salt Lake, occupy river bank grounds, the most irrigated by Loa, Salado, and San Pedro rivers, their villages corresponding to the names of Chiu-Chiu, San Bartolo, Vilama, and San Pedro de Atacama. Calama is also benefited by the waters of Loa and Frontera rivers. But this desert capital has swapped its condition as an indigenous old town due to its important function as a strategic crossroad with its road network and international railroad" ([37], p. 50).

Due to the water in the creeks at the foot of great hills and volcanoes, settlements were also established on the east margin of the Great Salt Lake: Toconao, Socaire, Peine, and Tilomonte. To the interior of Chiu-Chiu, in what is called Alto Loa, we find Ayquina, Toconce, and Turi, among others, also with their Pre-Hispanic remnants.

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About the architecture of Chiu-Chiu and most of these settlements, he explains: "From the stray currents of the river running at the foot of the hillside and the clay of its margins comes the mud that covers its roofs and the adobe bricks of the walls. House walls are made of cut stone from neighboring cliffs and strong frames made of carob trees sustain the heavy roofing. The narrow shadow of some pepper trees projects over the dusty street and lengthens beneficially over the naked soil of inner patios" ([37], p. 50).

A longer writing on the architectonic historical understanding of Christian temples in the Andes area was published by Montandón in 1951, with the title "Iglesias y capillas coloniales en el Desierto de Atacama". Chiu Chiu building is still the most appealing and original for the researcher, but he also studies the constructions of Toconce, Ayquina, Caspana, Conchi, San Pedro de Atacama, Toconao, Socaire, and Peine in depth. As a synthesis, he manifests, "In Atacama Desert, we find again that sober architecture distinguishing the highland chapels of northern Argentina and the Highlands: simplicity, austerity, farm tastes of highlands and we would like to look for architectural continuity between the functional structure of cunza constructions and the simplicity of these chapels erected at a few steps from the pucara. Their modelling incorporates them to the tutoring and disturbing desert landscape, as no other construction could. It is as if their builders had intuitively penetrated the infinite greatness of harmony laws, which also transfigures humility" ([41], p. 22).

A Pre-Hispanic construction that particularly conquered Montandón's attention was Lasana Pucara. On the road from Chiu Chiu to Lasana along Loa River canyon "stone ranches and cultivated land" with maize and alfalfa were observed. Pucara architecture did not have to be compared with big Inca works, rather the particularities of its modest architecture had to be identified. He says, "The strategic sense of Atacameños manifests itself in the location of their pucaras. They choose easily defendable places and take care of water supply, an essential element. So, it is in this way how the fortress-towns of Lasana and San Pedro de Atacama [Quitor] erect on elevated places, whose rocky side walls look over the river. (…)" ([38], p. 43).

The pucara was characterized by its organic expression, in profound harmony with nature, by its scarce symbolism and monumentality. For Montandón "these ruins reveal a thorough concept of town, with its organization and its functional and defensive demands". The researcher also made a careful description of their "primitive architecture".

> *"We could speak about Lasana, of constructive rationalism due to the functional use of space and the subordination of the whole structure to a determined goal that we could call defensive housing; a tight set of houses supporting each other, accommodating their construction maps to the uneven terrain; it is the terrace-town where rooftops, watchtowers, and steps hang as stone waterfalls. Narrow passages for internal circulation, wall remnants at the outer perimeter of the pucara, and its access previously through just one narrow entrance contribute to give more importance to this defensive function whose construction is perfect (…)"* ([39], p. 17).

In defining a Pre-Hispanic Atacameño architectonic panorama, three types of housing groups are defined: A. The open town, non-defensive, and without a perimeter wall; B. The pucara or fortress-town with houses built close to each other, densified, mostly located "on a land elevation and surrounded by a wall"; and C. The tambo or inn on the road, used for trips, with pens, houses, and vigilance venues ([40], p. 55).

The main mountains and volcanoes, the high summits around the Great Atacama Salt Lake hold ceremonial structures on their tops, called high sanctuaries. For the inhabitants of these great spots and for other Andes cultures, the big tutoring mountains watched their lives and determined nature cycles. Mountains talked with each other and determined the fate of human beings. One of the first to investigate these constructions on the summit and their goals was the Belgian priest Gustavo Le Paige, who lived in San Pedro de Atacama since 1954 till his death.

According to the priest's studies, the summits had been occupied by Incas, although he also affirmed that there could have been previously occupied by other cultures and later by Incas. Le Paige could prove that constructions for cult in the sanctuaries were called "huacas". These were mainly stone walls on the summit floor.

His explorations led him to ascend several of these summits, as he explains in a series of drawings and descriptions published in a paper in 1978, the main one being Licancabur Volcano, together with Pili, Pular, Yariques, Colorado, Miniques, and Quimal Hill. Apart from huacas, offerings such as small dressed statues, firewood, and fireplaces were found on most of these archeological sites ([29], pp. 36–52).

> *"(…) This region is the space where Atacameño culture developed, the summits mentioned above being worshiped by the new religious customs of the Inca Empire. These summits were used for worshipping the sun, but the firewood remnants found allow supposing that they made signals as a means of communication (…)"* ([29], p. 38).

At present, explorations on Andes summits have concluded that there are sanctuaries in most of them, which are part of network extending throughout Collasuyo, for example, the high Llullaillaco (6739 m.a.s.l.) on the southern end of the Great Salt Lake.

In living together between tradition and modernity, the domestic architecture of San Pedro de Atacama, Lautaro Núñez has made the balance between the convergence of the natural and cultural. "Patrimonial housing that must be taken care of and studied thus captures the calling of the inner life of San Pedro neighbors within the walls. Then, when opening the front door, this 'disembarking' is picked by the hallway. Here ends the open space of the sun or the luminous streets and you enter the reign of neutral light; then, the inner patio inside after the solemn passage under the adobe half-arc that gives hierarchy to the 'tunnel' of the hallway. Inside the house, you finally gain the elements by playing with the sunset and the shadows, at the service of the acts of sleeping, eating, looking, loving, doing, keeping, and waiting. Acts always willing, where customs have prefixed them and where housing-truth has indicated" ([44], p. 249).

However, time gave rise to the arrival of new changes. Some villages realized that their isolation, customs, and architecture offer moments of "authenticity" to the foreigner. All this has made patrimonial and cultural tourism flourish, altering daily life, while the natural impenetrable landscape opens before other eyes. These changes resulting from the globalization process have affected the relation of man to the landscapes observed.

The Spanish anthropologist, José Luis Anta Félez, points out about this alteration of the landscape, "In this way, all the elements get together to create a reality where the 'foreigner'

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and 'adventurer' tourist finds a symbolic space to project all his interpretations of exotism and continued primitivism…that has not existed and neither can actually happen in an Atacameño life adjusted to a vital reality limited to a desert and a planned country like Chile" ([3], p. 20).

## 4. A brief image of northern towns: between nature on the maps and the rediscovery of indigenous traces

In pre-Columbian and colonial times, the presence of water determined human settlements. In this way, rather Atacama Desert borders were inhabited (except for the winding course of Loa River), the eastern one to a greater extent; then, the foothills due to the water coming from the high summits of the Andes; and in the western border, the encounter of Coast Cordillera with the Pacific Coast, thanks to the scarce springs produced in the geography facing the coast clouds.

The neighbors of old Antofagasta, from the nitrate period, used to walk along the coast. Sometimes, a mound of seashells called their attention. Later, archeology determined a Chango fishermen settlement. Some coastal towns emerged between the coastal fogs with the legend/reality of the construction of coves that gathered the native people from the coast. Changos and some Camanchacos, as José M. Casassas Cantó, a Spanish historian exiled as a republican, named them, called the attention to regional ethnic history in the 1970s.

The first inhabitants of Cobija, Tocopilla, Antofagasta, and Taltal were indigenous or native people from the coast. Settlements were drawn on desert spaces located between the mountains and the rocky sea [11]. In the case of Cobija, indigenous presence dates back to 1581. It is documented that 400 indigenous dedicated only to fishing lived on this site. So, "the cove was a permanent dwelling for fishermen tribes" ([6], p. 3). The document indicated that the presence of tap water springs around enabled them to settle in this place, even since some pre-Columbian times. Then, a chapel to indoctrinate indigenous people was built during the Hispanic domination.

> *"(…) Cobija served as an entrance port to sub-Andean valleys during the colony, being visited, particularly in the 18th century, by French merchants who imported their goods to sell them in Chiu Chiu and San Pedro de Atacama. The road from Cobija to the hinterland reached the margins of Loa River and continued edging the river until arriving at the indigenous villages of Calama and Chiu Chiu; from here, it went straight north to Santa Bárbara to then go into Alto Perú"* ([6], p. 3).

Later, founded by Bolivia as Puerto Lamar in 1825, it had two configurations. The first one was recognized on a French map in 1852. It consists of one street of about 550 m on the east-northeast axis, with houses on both sides, parallel and quite close to the coastal border. These images of one street with houses on both sides can be observed in a well-known Mauricio Rugendas's drawing, as a register of his passage through Cobija on December 1, 1842 ([28], p. 62). It shows a street going up and, on the background, the high hills of the Coast Cordillera. After the 1868 and 1877 tidal waves that swept away the linear town by the coastal border ([6], p. 5), the city gradually occupied the highest part of that coast with a chessboard-like design slightly rotated

(to the east-northeast axis), with a central space for the town common and a new temple. The ruins of the constructions, foundations, and basements, still remain and allow understanding the urban structure of practically three vertical and four horizontal blocks.

Cobija was an articulating enclave for exploration operations on the Atacama Desert coast; in some way, a nineteenth century equivalent to San Pedro de Atacama strategic mission on the foothills settlements and routes.

In the early twentieth century, Isaac Arce could collect several utensils from a series of indigenous cemeteries on Morro Moreno, which was populated by Changos ([1], p. 13). The isolated peninsular character of this mountain, and also its height, let it exposed to sea fogs, allowing flora and fauna development (it is currently a National Park) and the emergence of tap water springs known due to navigation routes. Its singular shape of a lying body with permanent clouds on its summit, an important part of the sea horizon of Antofagasta city, inscribed it in the urban imaginary of this port city.

Some of the expeditions that explored the archeological sites of the hinterland and the coast were conducted by the French Eugéne Sénéchal de la Grange and Georges de Créqui Montfort in 1902 and 1911, and also Germans such as Max Uhle and Otto Aischel. The landscape of the desert and the coast fed European and North American museums with archeological pieces [21].

On February 13, 1924, an article published in *El Mercurio de Antofagasta,* written by an author whose pseudonym was Ognirg, argued that before Antofagasta, around the bay, there was an indigenous village, particularly on the site occupied at that time by Nitrate Agencies (currently occupied by Antofagasta Hotel). It indicated that the remnants found there gave evidence of primitive constructions (whale bones buried vertically) and vestiges of utensils domestically used. So, it may not have been a cemetery, but an indigenous settlement ([48]: s.p.).

At present, together with local vestiges from nineteenth century miners, pre-Columbian settlement data have been found in Antofagasta City, at El Trocadero sector, as a big seashell deposit and cemetery of sea collector groups.

The northern writer Salvador Reyes liked to emphasize that, "Antofagasta, like all northern towns, was not founded by a conqueror. There was no ceremony, the wind did not make royal flags wave, neither the sun crashed 'on the hard edges of weapons'. These towns were born from the impulse of miners who walked through pampas, beaches, salt lakes, and creeks without ever surrendering to fatigue" ([50], p. 79).

The relation between coves (an aquatic form of the coastal border), the coastline (the limit between the border and the water) and the border topology (the border shape) is essential for understanding the decision of a chessboard-like design. From the first designs of coastal cities in Antofagasta Region, a common generality is observed in all urban structures that are, in one way or another, facing north. This configuration is favorable mainly because they face bays protected from the southeast currents by some kind of geographic element. The chessboard-like design by the border will be oriented, in some cases, to configure a network parallel to the water borde, with the necessary foundational docks extending over the sea. In other cases, they rather responded to territorial geometric congruences.

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In the initial case of Cobija, we have seen that its second design was chessboard-like, slightly inclined to the east-northeast, rather following the form of the border topology and the coastline. In Tocopilla, the design implementation on the topography was more rational, a decision not following the topography, not aligning with the coastline, rather placed practically in 45°. This inclination has several positive aspects: the prevailing wind enters streets and blows to the southeast axis and, blocks received sunlight on all its sides all the year through.

In Mejillones, the initial design and then the re-foundation were oriented north, toward the bay, conditioned by the coastline shape and border topology.

In Taltal, the map responds to the narrowness naturally produced between the topography and the protected bay; the initial grid faced the sea and the docks extended over it.

The case of Antofagasta is singular; it is a 45° design in front of the southern border of a small bay, design decisions being not casual. This can be observed in "Plano Jeneral del Puerto de La Chimba" or Antofagasta from January 20, 1873, drawn by Adolfo Palacios. It expresses the encounter of the organic nature of the border with the rationalist geometry of the chessboard-like design. On the other hand, in this Cartesian structure, the first design of the railroad route along settlement streets appears, drawn by the influential British engineer Josiah Harding.

The map contains, in its caption, an explanation of the 41 main urbanization entities. Due to water scarcity, 10 of the remarkable sites were machines to absorb water, located along the sea border since they were supplied with sea water.

The first urbanization designs emerged due to closeness to mines, not because of Indian Law precepts. However, despite of the fact that everything occurred more intensively in the nineteenth century, its indications were followed, with rational chessboard-like designs emerging from the docks and industrial areas.

In the beginning, the urban landscape of coastal towns revolved around their ports. Although these relations supported by transportation could be cataloged as functional, they also made up an urban image since several of the main buildings were connected to this space of docks that received travelers and immigrants through the entrance to the city and the desert. In this sense, the density of docks, cranes, quays, boats, and large iron boats, their sea facade crowded with horizontal constructions, were its welcome face. There was a city at sea.

These port cities forged commercial networks mainly organized around the railway; so, hinterlands of mining cities, known as cantons, were structured, for example, and, from north to south: El Toco, Central, Aguas Blancas, and Taltal. As Bodini pointed out, they formed isolated networks which were later connected by the longitudinal railway.

The only way of operating in these desert sites was through technology and knowledge from the Industrial Revolution. Cruz Larenas indicated that one of the first operations for beginning the foundation of Antofagasta was the installation of a water-distilling machine ([12], p. 83). A few years later, water supply had improved, from Quebrada La Negra and La Chimba, water was carried in mules, while from Morro Moreno, water not apt for human consumption was carried in big boats. The water consumed by the population came from condensation machines on the coast and innovative solar evaporation plants in certain settlements in the desert.

About technological development deriving from global interests in mining exploitation in Chile, Astaburuaga pointed out, "Nitrate richness also contributed to do programs elaborated or dreamt of for a long time: the railway itself, the introduction of new cultivating systems, the inauguration of hydraulic and industrial engineering works, the presence of scientists and technicians who made plans, described and sized the country due, not insignificantly, to the country's economic transformation in the second half of the past century, thanks to that fountain of richness. It allowed objectively establishing a good number of coordinates that had not settled in the Chilean land yet" ([4], p. 11).

In general, nineteenth-century foundations continued using the chessboard-like design in Tocopilla, Mejillones, Antofagasta, and later in Cobija and even Taltal. The urban configuration based on the chessboard-line design network reveals a rationalist sense of settlement organization. On the one hand, Indian laws, in this case referring to the logics of urban configuration ([51], p. 18) and, on the other hand, Paris urban changes led by Haussmann from 1852 to 1870 were a model to follow around the world, at least in their hygiene criteria.

In this way, foundation using chessboard-like geometry in in the context of colonies has, on the one hand, a functional orientation, from both the viewpoint of the regulating design and the implementation of basic services. But, what was the meaning of continuing founding with the orthogonal grid in the second half of the nineteenth century, in the context of independence from new American republics? Richard Sennett identified a nature-linking strategy in using the chessboard-like design, "(…) in the modern age, the framework design seems to have been a plan for neutralizing the environment" ([54], p. 282).

## 5. Monuments of a disappeared cultural landscape

From 1903 to 1913, around Baquedano and Sierra Gorda villages, in the area called central or Bolivian canton of the nitrate mines, 21 of them were built using Shanks technological development. It was the period of the greatest industrial activity in the region with the biggest demographic concentration in Atacama Desert. At the end of the 1920s, most nitrate mines had disappeared and their remnants stayed as mute testimonies of the landscape history and culture. Andrés Sabella, in the most formidable novel about nitrate, **Norte Grande**, described the situation of ghost nitrate mines, "The smoke of that nitrate mine was a ghost lost beyond the sky. There was now, in its venues, a heavy tree grid of loneliness: loneliness of sun absorbed in itself and stubborn, of winds that seemed to escape from a certain devilish industry, of the strong smell of an abandoned house, of years of urine, of invasive iodine. What a small city without a heart!" ([52], p. 137).

A piece that gave meaning to the landscape of these port cities was a big steel construction resulting from the development of Industrial Revolution engineering in the second half of the nineteenth century, the viaduct built over the sharpened gorge of Loa River, in parallel 22 of the Atacama Desert, near Conchi village, at the old 298 km of the Antofagasta-Bolivia Railway.

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Conchi viaduct crossed 244-m long and rose over 102.6-m high at its greatest elevation. Its construction started in May 1887 and began operations in February 1888 for *The Antofagasta (Chili) and Bolivia Railway Company Limited* (**The Engineer** 1889c). It must be clarified that this work was part of the constructions made jointly by Compañía Huanchaca and Compañía de Salitres and it would connect the mines in the south of Bolivia with Playa Blanca smelter in Antofagasta port.

Once erected, it was recognized by *The Engineer* as the world's highest viaduct in 1889.

In brief, the American-type viaduct typology would be a continuous upper vortex of beams supported by a series of horizontal triangular prisms.

Some regional guides early recognized the value of this engineering piece and included descriptions of its construction. The pioneering **Guía de Antofagasta** from 1893, created by Mandiola and Castillo, indicated that the bridge was "one of the world's most remarkable" and showed it as a grand construction and unique experience travelers had to be attentive to.

> *"(…) This bridge also is particular for being a magnificent modern engineering work. It is built on smelted iron columns resting on the bottom of the creek, whose base licks Loa River waters. Several years of train traffic without undergoing a big loss of balance warrant their safety, after repeated tests for inauguration. Travelers stop to contemplate this truly marvelous construction; and not just a few tourists have paid it special visits, despite its distance from the coast, greater than 300 km away"* ([32], p. 7).

The journey from Antofagasta, going through the viaduct, became a fundamental route for communicating the Pacific coast with Bolivia. The circuit was potentiated by the construction of Northern Longitudinal Railway from 1910 to 1913, which connected all these isolated networks. During this process, in 1910, Antofagasta-Bolivia Railway published a guide to inform travelers. There they referred to the viaduct, "(…) At km 298 – immediately on the eastern side of Conchi railway station – we arrive at Loa viaduct, one of the world's most interesting engineering structures; the elevation of the viaduct rails is almost 10,000 feet above sea level, while its height over Loa River water surface running under it is 336 feet or greater than twice the height at which the train crosses Forth bridge over Forth fjord. The viaduct is a quite elegant steel structure with six entangled beams over an 80-feet span each, clearly sustained by steel trestle towers" [58].

The viaduct, as a technological expression, is a sound representation of the spirit of that time. It conjugates several factors: the challenge of technology in terms of calculations and simulation, construction development as to pre-making and assembly, and the urgency of communications in connection with economic interests, but undoubtedly, one of its main contributions is its rigorous hook with the desert geography, as if it were a prosthesis which, with its categorical artificiality conceived a new form of consonance with the sublime expression of Atacama Desert geography.

The town of Pampa Unión was appointed a sanatorium in the plain desert in 1911. It became the great emporium of nitrate mines, challenging *pulperia* monopoly. Its fate stayed linked to the disappearance of nitrate mines using Shanks system. Its wall remnants, nostalgic publicity, and desert streets speak to us about the efforts of a town. The amount of people sheltered

by the mines and towns, now ghost towns, was registered in their cemeteries, "In the inmensity of the pampa, modest crosses interrupt the view of the horizon. Tombs ordered in rows and framed with wooden fences burnt out by the sun or made of metal to make them more lasting, remind the traveler of the life that existed in all those towns…The present view of a pampa cemetery is a window to the past. The amount of tombs allows us having an impression of the town magnitude" ([46], p. 101).

## 6. Chuquicamata and a piece of modern life in the desert

In its 92-year, Chuquicamata comprised ephemeral villages that smelted with its beginnings, such as Punta de Rieles, "where all railway branches ended", and Banco Drummond, a town of stone houses where metal was bought. Possibly, the only Chilean mine whose operations were decided from a distance of more than 1500 km: the government headquarters in Santiago on May 18, 1915 [42].

The industrial city or company town displayed in Atacama Desert. It seems that the challenge posed by the adversity of the environment made the construction and experimentation of formal ideologies as a modern city more rewarding. Although there are detailed and well-known studies on nitrate network cities, the main one being the study of Eugenio Garcés, in terms of the rationality of urban form and desert landscape, the icon has been Chuquicamata copper-mining camp. A copper city contemporary to nitrate industrial cities such as Chacabuco, in this case impulsed by North Americans, the Guggenheim.

From 1912, a new industrial city began to be built on the north of Calama. The first design was an organic structure for foreigners, but the workers' city had a 45° complex chessboard-like design giving evidence of the knowledge and rationality of the first decades of the twentieth century, with the maturity and experience of the nineteenth century. The camp grew and one of the biggest investments made by the Company was the modern Roy Glover Hospital. This building was a reference in terms of organic architecture oriented to health, designed by New York architects with Chilean specialists as consultants, Fernando Devilat and Frank Fones. It was a building located on an elevated site between the workers' new camp and the gringos' old camp, which defined sensitive experiences from the middle of Atacama Desert.

An interesting account revealing a corporeal view was that of nurse Graciela Toro (well-known as a writer and poetess) who points out that after graduating as a nurse, she worked at the hospital for 10 years, the first moments being "puzzling": "(…)Day shifts used to continue at night. Work was excessive and overwhelming; personnel was not enough. Jumping from sleep to wakefulness was an order, an exercise that had to be done" ([60], pp. 18–19).

Graciela Toro said that a nurse's work was generally a dignifying job, but working in Chuquicamata was "twice as beautiful" and also "heroic". She had to live in the nurses' residence. Her account is extremely corporeal. She does not refer only to her wakefulness state, but also to dressing, sounds, and air which, even in the new location of the hospital, was contaminated by the industrial area.

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She learned how to use anesthesia machines and bought books for improving her knowledge. "One night, during an operation, I passed out. I was hospitalized for anemia. I had several transfusions. I was very thin and seriously ill. (…)". When she returned to work, she could feel the hospital with greater sensitivity.

> *"I returned to work. As it became more intense during night shifts, I used to go down to my apartment which was in the same building, at different hours; two, three or five o'clock in the morning. In this way, I began to discover the overwhelming grandeur of the desert and its amazing beauty. There was something strange in its geological quietness of caressing and lonely muteness. Roaming around the hospital nestled between mountains, the wind seemed to drag a message from the bottom of time. It was a magic world that wrapped me! The curious form of the hills had different color shades every day, which suddenly illuminated with fantastic irradiations. Then, silent, astonished but alert, in the same way I entered – on tiptoes – the operating room, I entered the world of poetry (….)"* ([60], pp. 22–23).

## 7. Preliminary conclusions

The desert landscape can be contemplated from the senses. You can hear the silence of its pampa and the wind revolving in its creeks, but also the noisy brokenness of its urban development. It can fill our smell with the mild wind of the sea and the products of its fertile ocean and feel the advance of contamination. The sight can be crowded with distances that betray man's loneliness and vicinities that do not always accommodate to nature adversity. To the eye view, the technique of photography was superposed. Initial curiosity was followed by the scientific representation of the landscape. Company towns changed their environment, first by prospecting, then by exploiting. Magnanimous companies such as Chuquicamata erected mountains of residues; the nitrate companies also did it, but at the level of human work. A great part of the first nitrate cities have disappeared, dismantled; the most modern are partially preserved, but many are ghost towns, traces of sunsets. Port cities still suffer from the conflict with mining around their ports. Some foothills towns have been scorched by tourism. Culture has changed. The desert is resistant, but also conserving; mankind traces remain and will remain. The desert Philippi [31] visited is radically not the same. Le Paige's San Pedro de Atacama is another one. Montadón's observations are still on-going. The borders are not such any more, they have blurred, and Atacama Desert vanishes with the unmeasurable human whirlpool [47].

As far as man continues his adventure for trying ways of adapting to the desert—as it continues in the Andes foothills—and nature keeps on showing itself tough and untamable, never a full stop will be put to this dialectic relation between culture and nature.

Mario Bahamonde, one of the main narrators of the north, already said so, "The soil came slowly and entered trhough his eyes, meanwhile steps resonated in the head…But he had to continue walking because the only imperative in his life was arriving. Where? Arriving… arriving. If there were a road, at least, maybe an old trace. But, what! In the end, all the pampa was only one way…Arriving!" ([5], p. 7).

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## References

[1] Arce I. Narraciones históricas de Antofagasta. Antofagasta: W. T. Uriarte, Impresor; 1930

[2] Agnew J. Landscape and national identity in Europe: England Versus Italy in the role of landscape in identity formation. en Roca Z, Clavel P, Agnew J, editors. Landscapes, Identities and Development. New York: Routledge; 2016

[3] Anta Félez JL. Atacama fin de siglo. Jaén: Universidad de Jaén; 1998

[4] Astaburuaga R. Una semblanza geográfico-histórica de Chile. Hogar y Arquitectura: revista bimestral de la obra sindical del hogar. 1970;**87**(marzo abril):9-11

[5] Bahamonde M. De cuán lejos viene el tiempo. Antofagasta: Ediciones Grupo Letras; 1951

[6] Bermúdez Miral O. Perfil histórico de Cobija. Apartado del Boletín de la Asociación de Geógrafos de Chile. 1967;**3**:1-5

[7] Bermúdez O. Historia del salitre, desde sus orígenes hasta la guerra del Pacífico. Santiago de Chile: Universidad de Chile; 1963

[8] Bodini Cruz-Carrera H. Poblamientoy redes urbanas en el norte de Chile. Anales de la Facultad de Filosofía y Ciencias de la Educación, Universidad Católica de Chile; 1968. pp. 47-66

[9] Consejo de Monumentos Nacionales de Chile. Nómina de monumentos nacionales desde 1925 al 05 de septiembre de 2016. Disponible en www.monumentos.cl/consejo/606/w3-article-53680.html. Consulta el 20 de septiembre de 2016. Bajo C. Monumentos, seguido de un número se localiza la página web (www.monumentos.cl/catalogo/625/articles-36614_documento.pdf alude al Valle de la Luna) que refiere de santuarios de la naturaleza, zonas típicas y monumentos nacionales en la región de Antofagasta; 2016

[10] Cresswell T. Place: Encountering geography as philosophy. Geography. 2008;**93**(3, Autumn):132-139

[11] Cruz J, Llagostera A. Prehistoria de Antofagasta: en la ruta de los primeros antofagastinos. Antofagasta: CORE/Agrupación Cultural Naturaleza y Patrimonio; 2011

http://dx.doi.org/10.5772/intechopen.72091

[12] Cruz Larenas J. Fundación de Antofagasta y su primera década. Antofagasta: Ilustre Municipalidad de Antofagasta; 1966

[13] Eder K. Construction of Nature: A Sociology of Ecological Enlightenment. London: Sage Publications; 1996

[14] Foucault M. Of other spaces. Diacritics. 1986;**16**(1, Spring):22-27

[15] Fuenzalida Villegas H. Capitulo IV, Clima. en Corporación de Fomento a la Producción, Fundación "Pedro Aguirre Cerda. Geografía Económica de Chile. Santiago de Chile: Imprenta Universitaria, Tomo I; 1950. pp. 158-257

[16] Garcés Feliú E. Las ciudades del salitre. Un estudio de las oficinas salitreras en la región de Antofagasta. Santiago de Chile: Orígenes; 1999

[17] Garcés Feliú E. Las ciudades del cobre: del campamento de montaña al hotel minero como variaciones de la company town. EURE. 2003;**29**(88):131-148

[18] García Bacca JD. Los Presocráticos. México: Fondo de Cultura Económica; 1979

[19] González-Pizarro JA. El catolicismo en el desierto de Atacama, Iglesia Sociedad Cultura 1557-1987. Antofagasta: Universidad Católica del Norte; 2002

[20] González-Pizarro JA. La conquista de una frontera. Mentalidades y tecnologías en las vías de comunicación en el desierto de Atacama. Revista de Geografía Norte Grande. 2008;**40**:23-46

[21] González-Pizarro JA. Patrimonio, museos y arqueología: de la visibilidad de los pueblos indígenas a la institucionalización de los estudios arqueológicos en el Norte Grande de Chile. Diálogo Andino. 2010;**36**:15-32

[22] González-Pizarro JA. Andrés Sabella: itinerario biográfico y obra literaria de un hombre del desierto de Atacama. Antofagasta: Universidad Católica del Norte; 2012

[23] González-Pizarro JA. Geografía del desierto y turismo de la naturaleza. La revista *En Viaje* y la mirada sobre el paisaje nortino: 1945-1966. Revista de Geografía Norte Grande. 2013;**54**:219-239

[24] González-Pizarro JA. Las identidades y los imaginarios antofagastinos; soportes simbólicos del desarrollo sustentable regional. en Rodríguez C et al. Sistemas, Coaliciones, Actores y Desarrollo Económico Territorial en Regiones Mineras. Innovación Territorial Aplicada. Universidad Católica del Norte, Consejo Regional Región de Antofagasta, Gobierno Regional de Antofagasta, BID. 2016. pp. 76-96

[25] Heidegger M. Construir Habitar Pensar. en Heidegger M. Filosofía, Ciencia y Técnica. Prólogos de Francisco Soler y Jorge Acevedo. Santiago: Editorial Universitaria; 1997. pp. 199-219

[26] Hiernaux-Nicolás D. Turismo e imaginarios. En Hiernaux-Nicolás D, Cordero A, Van Duynen Montijo L. Imaginarios sociales y turismo sostenible. Costa Rica: Cuadernos de Ciencias Sociales 123. Flacso; 2002

[27] Kapstein G. Espacios intermedios: Respuesta arquitectónica al medio ambiente: II región. Santiago de Chile: Universidad del Norte; 1988

[28] Lago T. Rugendas, pintor romántico de Chile. Santiago: Sudamericana; 1998

[29] Le Paige G. Vestigios arqueológicos incaicos en las cumbres de la zona atacameña. Estudios Atacameños. 1978;**6**:36-52

[30] Lynch K. La imagen de la ciudad. Editorial Infinito: Buenos Aires; 1959

[31] Llagostera M, Agustín-Hubert RSJ, González-Pizarro JA. Vida y muerte en el Desierto de Atacama. Antofagasta: Ediciones Universitarias; 2013

[32] Mandiola JL, Castillo P. Guía de Antofagasta, 1894. Antofagasta: Imprenta de El Industrial; 1894

[33] Martínez JM. El paisaje chileno. Itinerario de una mirada. Colección de Dibujos y Estampas del Museo Histórico Nacional. Santiago de Chile: Dirección de Bibliotecas, Archivos y Museos; 2011

[34] Méndez RA. La construcción de la arquitectura: Chile 1500-1970. Santiago: Industria Metálica Chile; 1983

[35] Ministerio de Medio Ambiente. Ley N° 19.300, Sobre Bases Generales del Medio Ambiente. Santiago de Chile: Diseño y Producción Gráfica Metropolitana; 2011

[36] Montandón R. Reliquias Históricas de Chile. En Viaje. Revista de los Ferrocarriles del Estado. 1945;**139**:48-50

[37] Montandón R. Oasis en el desierto de Atacama [parte 2]. En Viaje. Revista de los Ferrocarriles del Estado. 1948;**176**:50-51

[38] Montandón R. Oasis en el desierto de Atacama [parte 3]. En Viaje. Revista de los Ferrocarriles del Estado. 1948;**178**(agosto):42-43

[39] Montandón R. Apuntes sobre el Pukara de Lasana. Presentación de Eugenio Pereira Salas. Introducción de Leopoldo Pizarro. Santiago: Imprenta Universitaria; 1950

[40] Montandón R. Ruinas y fortalezas preincaicos en el desierto de Atacama (parte 3). En Viaje. Revista de los Ferrocarriles del Estado. 1950;**195**(noviembre):55-55

[41] Montandón R. Iglesias y capillas coloniales en el Desierto de Atacama. Introducción de Eugenio Pereira Salas. Santiago: Imprenta Universitaria; 1951

[42] Monterrey N. Chuquicamata. Otras voces te recuerdan. Antofagasta: Sergraf Ltda; 2009

[43] Núñez L. La agricultura prehistórica en los Andes Meridionales. Santiago: Editorial Orbe/Universidad del Norte; 1974

[44] Núñez L. Cultura y conflicto en los oasis de San Pedro de Atacama. Santiago: Editorial Universitaria; 1992

[45] Núñez L. Prólogo. In: Games L, Games C. Iglesias Atacameñas del Altiplano Chileno/ Atacama Churches of the Chilean Altiplano. Antofagasta: Universidad Católica del Norte; 2009

[46] Panadés J, Obilinovic A. Pampa Unión: un pueblo entre el mito y la realidad. Antofagasta: Talleres de Servicios Gráficos Ltda, Universidad de Antofagasta; 1988

[47] Philippi RA. Viaje al Desierto de Atacama, hecho por orden del gobierno de Chile en el verano 1853-54. Librería de Eduardo Anton: Halle en Sajonia; 1860

[48] Ognirg. Reminiscencias históricas de Antofagasta. El Mercurio de Antofagasta, 13 de febrero de 1924

[49] Ortega, Gasset J. El hombre y la gente. Madrid: Alianza Editorial; 1994

[50] Reyes S. Andanzas por el desierto de Atacama. Santiago de Chile: Editorial Zig-Zag; 1969

[51] Rubio Hernández A. La ley en el archivo. Representaciones de poder en los cabildos coloniales de Nueva Granada. Historia Crítica. 2010;**42**:10-35

[52] Sabella A. Norte Grande. Santiago: Ediar-Conosur; 1989

[53] San Román F. Desierto y Cordilleras de Atacama. Estudio preliminar de José Antonio González Pizarro. Santiago de Chile: Biblioteca Fundamentos de la Construcción de Chile, Cámara Chilena de la Construcción-Pontificia Universidad Católica de Chile, Biblioteca Nacional; 2012 [1896]

[54] Sennett R. Las ciudades norteamericanas: planta ortogonal y ética protestante. RICS, Revista Internacional de Ciencias Sociales. 1990;**125**:281-299

[55] Sepúlveda LA. Estructura del paisaje. En Viaje, Revista de los Ferrocarriles del Estado. 1944;**128**:58-59

[56] Staehel LA. Place. In: Agnew J, Mitchell K, Toal G, editors. A Companion to Political Geography. Malden, Mass.: Blackwell Publisher; 2003. pp. 158-170

[57] Subercaseaux B. Chile, o una loca geografía. Editorial Ercilla: Santiago; 1949

[58] The Antofagasta (Chili) and Bolivia Railway Co. Ltd. The Antofagasta (Chili) and Bolivia Railway Co. Ltd.: views and facts concerning the line. London: Waterlow and Sons Ltd.; 1910

[59] Van den Brink A, Bruns D, Tobi H, Bell S, editors. Research in Landscape Architecture. Methods and Methodology. New York: Routledge; 2017

[60] Toro G. Graciela Toro: ¿Quién soy?. Santiago de Chile: Nascimento; 1983

[61] Ward Thompson CJ. The experience of landscape-understanding responses to landscape design and exploring demands for the future. Presented for the Degree of PhD. The University of Edinburgh: Research Publications. Disponible en https://www.era.lib.ed.ac.uk/bitstream/…/WardThompson2010.pd. Consulta 8 de junio de 2017; 2010

[62] Whiston Spirn A. Introduction. Landscape Journal. Design, Planning and Management of the Land. 1988a;**7**(2, Fall):i-ii

[63] Whiston Spirn A. The poetics of city and nature: Towards a new aesthetic for urban design. Landscape Journal. Design, Planning and Management of the Land. 1988b;**7**(2, Fall):108-126

[64] Whiston Spirn A. The authority of nature: Conflict and confusion in landscape architecture. In Wolschke-Bulmahn J, editor. Nature and Ideology. Natural Garden Design in the Twentieth Century. Vol. 18. Washington, DC: Dumbarton Oaks Research Library and Collection; 1997. pp. 249-261

[65] Whiston Spirn A. Urban nature and human design: Renewing the great tradition. In: Stein JM, editor. Classic Reading in Urban Planning. Washington: Island Press; 2001. pp. 475-496

[66] Williams R. Palabras clave. Un vocabulario de la cultura y la sociedad. Buenos Aires, Nueva Visión: Edición revisada y ampliada; 2000

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