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Springs, “Donkeys” and Pumps. Entanglements of discourses and materialities in hegemonic waterscapes of the Atacama Desert, northern Chile (19th and early 20th centuries)

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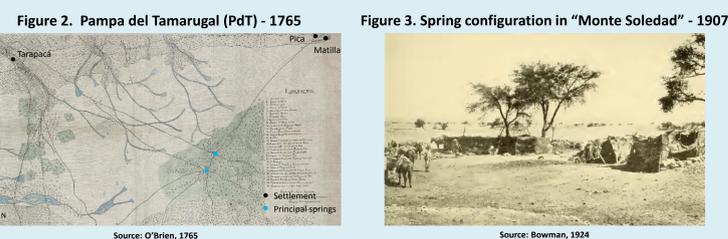
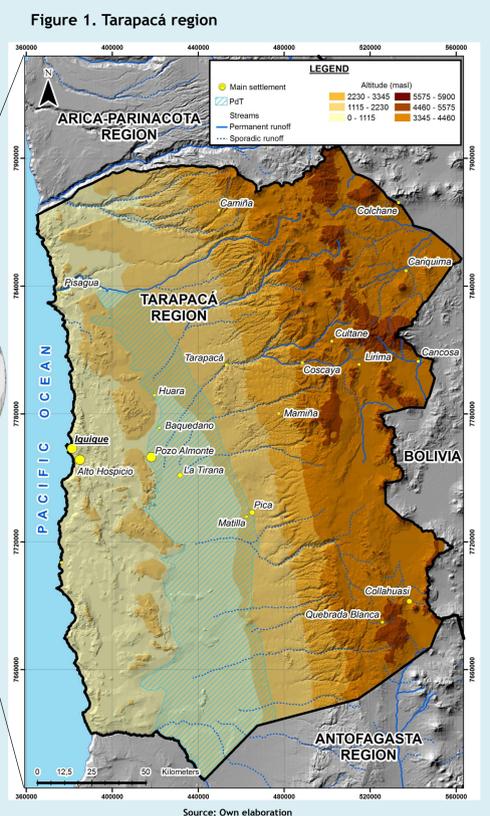
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1.- Introduction

By analyzing historical sources, official documents and terrain, we examine the dynamics of discourses and technologies in the production of water as a resource in Tarapacá region (northern Chile) for the nitrate mining period (1850-1930). Tarapacá region is situated in the middle of the Atacama Desert (Figure 1). The region is categorized as a hyper-arid zone and the only sources of fresh water are in the mountains above 3000 masl. An alternative source of this element is the aquifer situated under the “Pampa del Tamarugal” (PdT), considered as fossil water. Historically, the presence of springs was closely linked to the occupation and the production of local and regional territory (Figure 2 and 3). In PdT, since 3000 years BP, perennial and sporadic settlements, as well as historical trails, were placed/traced following the presence of water. Springs areas were complex socio-environmental territories (co-production of climatic, hydrologic, geologic, social, cultural, economic, cosmologic, etc. elements).



2.- Results

I.- Genealogy of nature in Tarapacá region

The first writings that mention the exploitation and use of nitrate in Tarapacá, were associated with pre-Hispanic agriculture. Under the colonial administration (1542-1824), local exploitations were carried out in order to produce powder. The production of nitrate gain economic importance in the decade of 1810. The introduction of Tarapacá's nitrates in European and North American markets beginning in 1830s gave the definitive boost for the industrialization of production. The nitrate mining reached his peak after the arrival of English capital and Shanks technology in the 1880s. The mining boom of nitrate ends abruptly with the introduction of synthetic nitrate after WWI (Figure 4). This economic boom not only attracted European capitalists, but also the young states of Peru and Chile (Tarapacá region became Chilean territory after the "Pacific Ocean War" 1879-1883), as well as several scientists and explorers. Between 1827 and 1930, a considerable number of studies (public and private funded) were organized to recognize commodities in PdT (Table 1). The new born republics and the nascent scientific elite were co-produced through the creation of a new conception of nature, as an element totally outside the social sphere. Under this new scientific discourse, PdT, its nitrate and its water (nature), were transformed into exploitable resources for the “common” profit (strengthening of economy and state). As the geologist Francisco San Roman proposed in 1896 “*the evangelical charity was satisfied, in other times, only with the cistern and the pitcher of the Samaritan woman; in present days, it is the drainage of the lakes and the iron pipes what the charity of the national capital needs to put at the service of the peoples*” (San Roman, 1896: Vol. I, p.305). Once this new conception was introduced to the laws on mining (1874-1888) and water (1892), nature as commodity becomes the hegemonic perspective, which was hardly to contest by other visions existing on regional and local communities.

*F. San Roman was one of the framer of the new law on water concessions in northern Chile

Figure 4. Dynamic of nitrate mining in Tarapacá region (1810-1925)

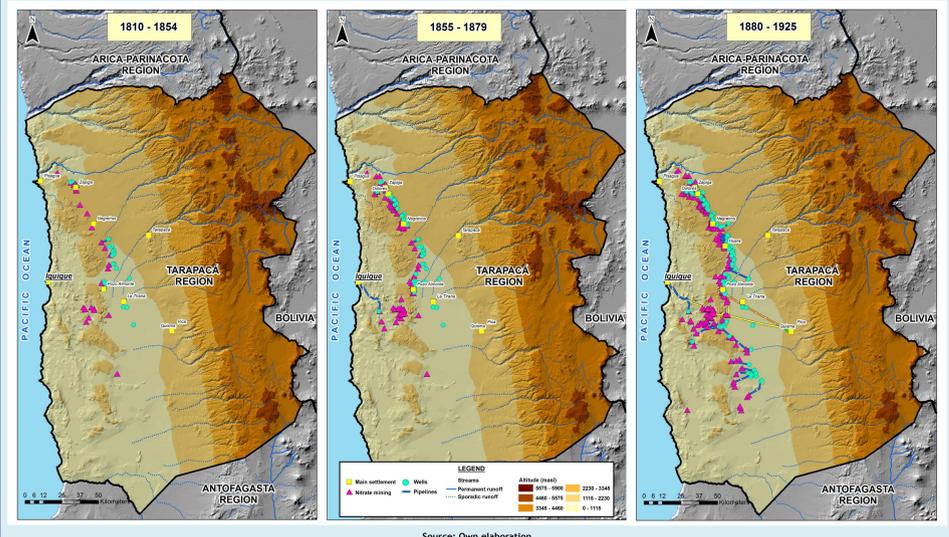


Table 1. Studies on PdT (1827-1900)

Scholar	Year of study	Sponsor	Central element of research
W. Bollaert and G. Smith	1827	Peruvian state	Geography
A. Raimondi	1853	Peruvian state	Nitrate mining and water
M.S. Church	1862	Peruvian state	Water
F. Torrico	1871	Peruvian state	Water
G. Fitzroy Cole	1874	Town Hall of Iquique	Water
A. Bertrand	1880	Chilean state	Geography
F. San Roman	1883-1891	Chilean state	Mining and water
V. Martínez	1897	Town Hall of Iquique	Water

II.- Water materialities

Technologically, the nitrate production was carried out under three different methods: Haenke (started in 1810), Gamboni (introduction of steam in 1853) and Shanks (beginning in 1878). The introduction of each of them did not imply the stopping of others. However, the improves of Shanks method boosted the production, being adopted by mostly of the nitrate mines since the 1880s. Each of these methods it was associated with a specific form of water extraction and use. In the Haenke method, water extraction was handmade (Figure 3); use of ropes and containers with human traction (Spring configuration). The introduction of steam (Gamboni method) was associated with water extraction made by animal traction, windmills (Figures 5.1 and 5.2) and the first steam engines (Donkey configuration). Besides, the Shanks technology needed a greater volume of water (around 1 gallon per 22 pounds of nitrate refined), a constant supply and the use of “cleaner water” (less amount of diluted salts). The Shanks production involved the installation of cutting-edge technology of extraction and transport of water (Pump configuration). Wells were dug farther along the production sites and the overcrowding use of piping systems was needed. The new “water points” were transformed into isolated spots in the desert (disconnected from transport routes and inhabitants), whose only function was the production of water resources and some agricultural products for the mine that they served (Figure 6).

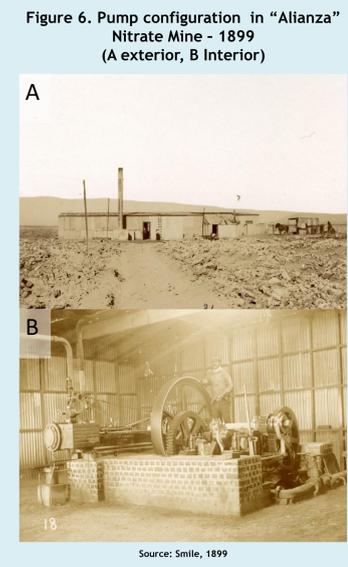
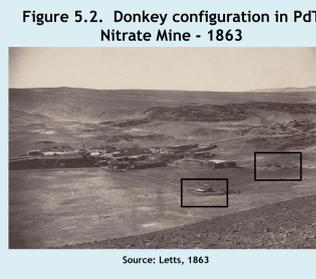
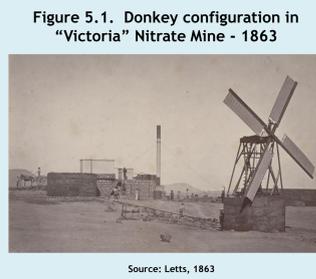
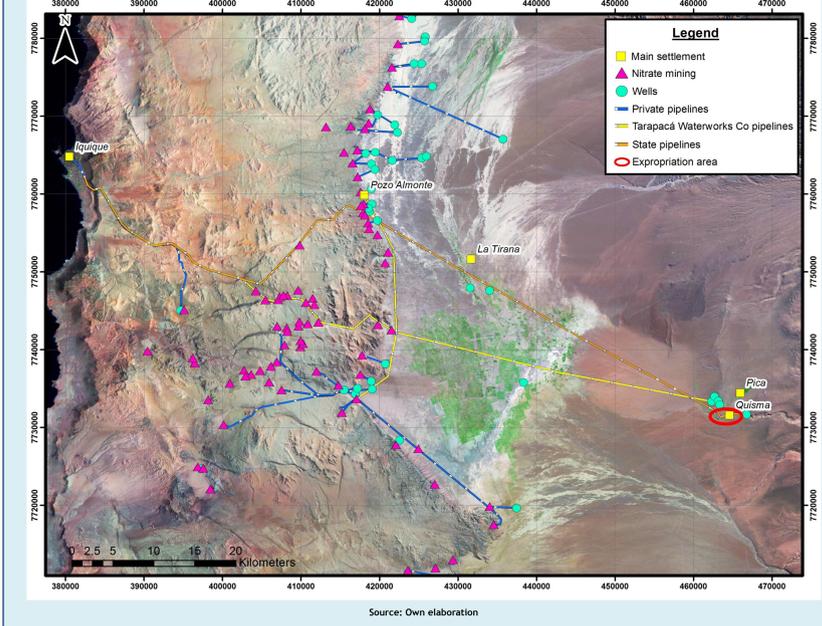


Figure 7. Quisma Valley in regional context (1925)



III.- Dispossession of water in the Nitrate era

The growth of nitrate industry triggered a demographic explosion in Tarapacá. Having no natural sources of water, the importation by sea transport and desalination were the main private sources of fresh water for Iquique (main city of Tarapacá) during the first half of XIX century. In the 1850's, population began to contest the different administrations in order to find a public solution to fresh water supply. After several studies funded by the Peruvian state, in 1873 it is proposed that the water of Pica would be the best option to provide larger amounts of water to the city. In 1889 the English firm Tarapacá Waterworks Company begins to transport the water of Pica, but the high prices left this option out of reach of the Iquique's population. Under Chilean administration, a study funded by the Town Hall of Iquique, in 1897, declared that the waters of Quisma Valley were the better option to supply the city. Since the first Spanish writings mentioning Tarapacá region (1537), Quisma Valley was described as a fertile agricultural settlement. The production of different fruits and vegetables was maintained until the nitrate boom period. After almost 15 years of resistance, between 1912 and 1924 70% of the agricultural lands and 100% of the valley's waters were expropriated, causing the expulsion of the indigenous communities of the valley (Figure 7). Even though the official discourse to support the dispossession was centered in the imperative need to provide fresh water to the urban population of Tarapacá, the extracted water was used to supply the nitrate trains and mining.

3.- Discussions and Conclusions

The study of the production of Tarapacá's water and mining landscapes bring out a myriad of complex connections between science, technology, capital, law, nature and state. In this sense, we agree Braun (2000) in order to look beyond the capital as the unique force that mediates nature. The nascent states, science, capital and nature were co-produced in Tarapacá region. As a result, new landscapes (discursively and materially) were produced. Geological and hydrogeological studies on PdT produced a conception of external nature, making visible and economically valuable the “natural resources” (nitrate and water) that the state needed for its development. At the same time, this new conception of nature make invisible (coercively) other perspectives. In this sense, once the technical and speculative language on nature was enshrined in Chilean legislation, this understanding became the hegemonic perspective in the productions of water and mining landscapes

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