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Approach to the Grist Milling Activity in Northern Calchaqui Valley (Salta) during the 19th and 20th Centuries

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Abstract:

The research presented is located in the center-west of the province of Salta, in Argentina's North Western region. We present a first revision of the grinding process in the 19th and 20th Centuries, focusing on the distribution and characteristics of gristmills. This information supplemented by oral accounts, obtained from informal interviews to the inhabitants of the towns of Cachi, Payogasta and the Department of Molinos. The first result show the importance of product grinding on a supra domestic scale for the 19th Century and the localizations of mills near roads allowing for the integration of the region, both at a national and international level.

Keywords: Salta - Calchaqui valley - grinding process - 19th Century - gristmills

1. Introduction

The presence of postcolonial gristmills in different areas of the Calchaquí Valley provides evidence for the significant economic dynamics in the region and the surroundings of such structures. The mills in the area have a typical hydraulic structure associated to watersheds. Man, as a social being, is constantly interacting with nature and transforming the ecosystems according to his interests and needs, manipulating the soil, vegetation and water. It is important to depart, then, from a concept of landscape as a conjunction of environmental, economic and social processes (Tello 1999).

In this sense, Lina Sanmartin (2013) in "Industrial Heritage Sites, Mills and Hangars" holds that productive activities seek nature's peculiarities. Then for hydraulic mills to work, water needs to flow down a slope (normally near hydrographic sources, either in the riverbed or on the upper-middle or low course and its waterfalls) so that hydraulic power can make the heavy grinding stones turn, thus converting it into mechanical energy. Water kept in a reservoir or taken directly from the torrent is pushed through a channel with a lot of pressure. The architecture of the hydraulic mills with which the author works in Uruguay includes thick stone or masonry walls and both water flow and intensity are controlled through gates.

Caggiano and Dubarbier (2013) analyse in detail the function of the mills and describe both stones (a stationary and a turning runner one), which always have incised lines or grooves on their grinding surface. These are generally deeper in the central area of the stones and as they move towards the periphery these lines decrease. The bedstone (base) and the turning runner stone (on top of the other one) work together and have the same line design due to the fact that the incision pattern of one of the stones runs opposite the other during the process. The grinding surfaces face but do not graze one another. The distance between the stones is thus conditioned by the type of product desired as well as by stone weight and rotation speed, among other characteristics. It is important to note that the stones have a grooved area (described above) and a flat area, which is fundamental for the levelling and proper functioning of the grind. The mills described by these authors are in the Pampas region, to be more precise in Chivilcoy, Province of Buenos Aires (Argentina).

Based on this general background, in this paper we will present a first revision of the grinding process in the 19th Century, focusing on the distribution of gristmills near route 40 (see Figure 1) in the Calchaquí Valley (Cachi, Salta). We will work with the accounts that have been collected and with material traces open to the public in the region. A general description will also be provided of the main characteristics of the grinding sites which could be accessed.



Figure 1: Course of National Route 40. Edited from: <http://www.ruta40.gov.ar/>

2. Description of the Area

The Calchaquí Valley, located in Argentina's North Western region, includes parts of the Province of Salta, more precisely the Western region, forming an area called *valliserrana* (Tarragó y Díaz 1973; Tarragó y De Lorenzi 1976). The Valley is of tectonic origin, formed by the Calchaquí River and its tributaries. This river during its course, which is over 200 kilometres long, runs through the Departments of Cachi, La Poma, Molinos, San Carlos and Cafayate (Lanza, 1996). This valley is formed by large areas of rocky layers, foothill deposits, alluvial fans, slopes and various levels of river-made terraces. These deposits, which date from the quaternary period, are shaped by fine and medium-size river sediments formed during periods of heavy rain and distributed on the sides of the rivers that drain the region (Zelarayán, Ana y Fernández Daniel R, 2015).

The main perennial rivers come from Nevado de Cachi on its right bank. The rivers on the left bank are seasonal. The weather is characterised by dryness and low temperatures (Ruiz Huidobro 1960). Cabrera (1971) describes the vegetation of the area as follows: bushy and xerophilous with thistle steppes, dwarf forests and bromeliacea cushions.

The Department of Molinos is in the centre of the Calchaquí Valley (66° 01' and 66° 58' of West Longitude and the 25° 8' and 25° 58' of South Latitude), with an approximate surface of 3600 km². It has a total of 5625 inhabitants divided into the two municipalities that form the Department: on the one hand, the head of the Department is the abovementioned town of Molinos and, on the other, Seclantas, with smaller surface (898 km²). The town of Molinos is an enclave between Andean foothill and sub-Andean mountain ranges. The Calchaquí River runs through all the Department and it is the main water source.

The Department of Cachi (2280 metres above sea level) is located in the North of the Calchaquí Valley (25° 07' 10' ' South and 66° 09' 43' ' West) at the foot of Nevado de Cachi, to the South the Department of Molinos. The total surface is 4178 km², with 7223 inhabitants.

3. Methodology

To tackle the issue, we worked with two sources: material traces and oral accounts which were obtained from informal interviews to the inhabitants of the towns of Cachi, Payogasta and the Department of Molinos, located in the North of the Calchaquí Valley. These were the main source of relevant information to look into this grinding issue on a supra domestic level.

It should be pointed out that when collecting bibliography related to the topic, few papers were found which were related to the study of hydraulic mills in the Argentinean Northwest. As suggested by Lera (2005), this situation may be due to the direction that the country's economic development was taking, which privileged the expansion of crop-livestock farming in the Pampas since the end of the 19th Century and which, for the same reason, focused on historical economic and social studies of this region. Such a marked preponderance of the Pampas made the crop-livestock farming in the rest of the country to be overlooked. It is important to note that this does not imply a lack of research, writings and discussions about the farming situation in inland areas of Argentina during the 19th Century, but rather that these are sparse if compared with the abovementioned region.

The material records which we worked with include the mill of the town of Molinos and various grinding stones distributed in several public points of the towns of Molinos and Cachi, as well as brief descriptions of the mill of Payogasta, and references to another

structure on the section of the route connecting Cachi with Payogasta¹ (see Figure 2). Given that the last two structures are located in private property, data gathering is left for future research².

4. Gristmills

The oral accounts provided by the local people make reference to various grinding sites in the region. Three mills were located precisely, though not all them were described due to the fact that were part of private property. One of them is on the way to Payogasta (from the town of Cachi), another in Payogasta itself, and the last one in the Department of Molinos, a few metres away from the bridge of Route 40, and approximately 3 kilometres away from the town entrance (25° 26' 20.76''S; 66° 17' 36.52''W)

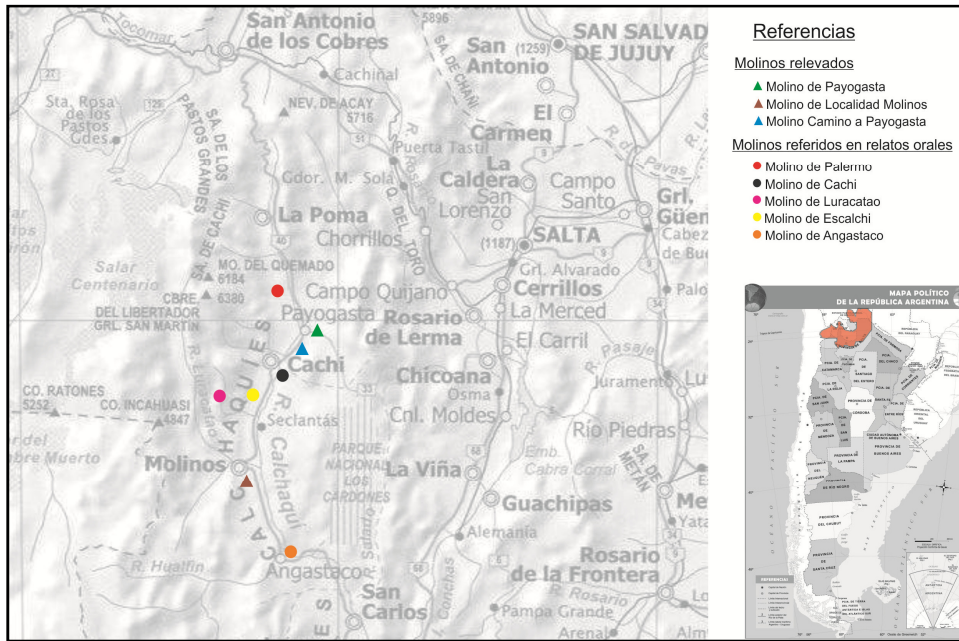


Figure 2: Distribution of gristmills

Local people mention sites in Laxi and in the Bodega “El Molino” located on the way to Algarrobal, a few kilometres away from Cachi. Hydraulic mills would also exist in El Churcal (Department of Molinos), Colomé, Luracatao and Angastaco (see Figure 2). However, during this first stage it was impossible for us to confirm the existence of the sites mentioned in the oral accounts.



Figure 3: General structure of the gristmill of the Department of Molino

The mill that could be analysed in greater detail is in the entrance of Department of Molinos and it is used by the Town Hall as a tourist attraction (see Figure 3). It consists of one room with the grinding structure inside.



Figure 4: Grinding stones disassembled inside the structure

While the grinding room and the general structure are in excellent conditions (see Figure 4), certain current renovations could be observed, particularly on the stone and adobe walls, to which cement had been added to make them more stable. Moreover, although both grinding stones are present, they are disassembled and they show great tear and wear due to intense use. The grinding surface of the bedstone can be clearly observed, with five shallow curved grooves extending from the center of the axis towards the periphery (see Figure 5). The lines or grooves of the grinding surface from the turning runner stone could not be seen, hidden by the effects of erosion. The absence of the hopper, the inverted quadrangular pyramid structure with openings on both ends usually made of wood or leather, is surprising. During the grinding process, the hopper must be provided with grains which are later on grinded by the stones (Caggiano & Dubarbier 2013).



Figure 5: Grinding surface of the bedstone

Furthermore, a clear connection can be appreciated between the gristmill and a body of water, more precisely the Calchaquí River, which runs near the narrow bridge located in the entrance of the Department of Molinos (Route 40). The constructions connected with this watershed could not be defined with precision, though. We believe that further research in the area will be necessary in order to have a more detailed vision of the gristmill structural components. We could only identify the remains of the water inlet channel running towards the grinding structure (see Figure 6).



Figure 6: Water transport channel to grinding structure

The mill in Payogasta (25° 03' 01.4" South 66° 06' 17.5" West), as mentioned before, is located in private lands, so we will only describe the structures which could be observed from the vicinity of the site (see Figure 7). In comparison, this mill's dimensions are greater than those of the mill described above, especially because of its connection with other rooms, which were certainly related to the economic activity of the mill (for example, housing for employees and/or owners of the mill and storage rooms). We also believe that there are more modern constructions or renovations of the old structures. The preservation of the water circulation channel connected with the grinding structure can be clearly seen.



Figure 7: Private mill in the town of Payogasta

We cannot help mentioning the great number of stones identified in different areas of the Department of Molinos, whether this be at the Museum (Figure 8), at a hotel, in the square, as an exhibit or ornament (Figure 9) or even in local houses (figure 10). Not only could we observe the different designs (lines and grooves) of the grinding surfaces most likely with their builders, but also the cases in which the lines and grooves were practically undistinguishable because of the wear and tear. According to the accounts, the stones were built in the Lerma Valley and then carried on donkey back to the places that required them.



Figure 8: Stone in the museum entrance

In the Museum of Molinos and in the yard of a local homeowner, we studied two grinding stones with multiple grooves on the grinding surface, which were different from the stones near the bridge on route 40 and the stone in the square. It should be pointed out this last one (Figure 9) has a larger number of curved grooves ($n=10$), to which a new incised line is added to the periphery (except to one of the main grooves).



Figure 9: Grinding stone exhibit in the square of Molinos

As mentioned before, the designs of the stones in local houses and in the museum are different from the designs described above. For example, the first one shows a deep groove departing from the centre and circling it, with various small incisions which soften as they move towards the periphery (see Figure 10). As regards the stone in the Museum, its grooves are deeper and thicker with almost straight lines departing from the centre (approximately 6) to which a new thick incision is added near the periphery (very much like the stone in the square, but the grooves do not reach the edge of the stone but end before that). This is characterised by many fine lines on almost the whole surface, circling the deep grooves which depart from the centre as well as small circular incisions (see Figure 8)



Figure 10: Grinding surface of stone in the yard of a neighbour of the Department of Molinos

4.1. Oral Accounts

Information about the grinding dynamics of the region could be obtained from the interviews performed. All the interviewees stressed the key role played by the grist milling activity both inside and outside the Calchaquí Valley in the 19th Century. According to their accounts, corn flour and chuño (freeze-dried potato) production came first. Soon after wheat flour gained commercial importance owing to the quick adaptation of this crop to the Salta region. In such context, the arrival of European hydraulic mills brought a radical change in the amount of flour production, in comparison with the old-fashioned grinding process using a mortar.

Practically all the farms in the region had their own gristmill, as is the case of Palermo, Escalchi, Laxi, Payogasta, and so on. In fact, all their production went south. The commercial activity on the road which today is Route 40 (see Figure1) was unprecedented, particularly during the 19th Century, structuring a great deal of the commercial activities in the region. As a consequence of the competition with the port of Buenos Aires, closely linked with the expansion of the railroad, there would have been a gradual decrease in wheat production, and more so in corn and potato production (Lera 2005).

As the author suggests, the flour coming from the Pampas was of much better quality, which caused a decrease in the crops from Cachi and, consequently, in the activity of the mills that processed them. At the same time, the boom of livestock commerce with Chile made alfalfa production for forage much more profitable. *“Hence, both factors would explain the decrease in grain production and the increase in forage production. According to the first agricultural census of 1895, 15% of the land was destined to the production of grains whereas 54.66% was used for the production of alfalfa.”* (Lera 2005:22).

5. Discussion and conclusions

The oral accounts and material remains from old grinding structures both show the importance of grain grinding for the economy of the region during the 19th Century. It is important to emphasize that all of the mills were located near roads allowing for the integration of the region, both at a national and international level, and that as from the 20th Century it became National Route 40. This location also relates to water availability, since the Calchaquí River – main tributary of the region- runs parallel to this route, as this is key for the structure to function.

The diversity of designs on the grinding stones observed during the collection of data is a hint of the investment of labour in their construction and the skills of the artisans. Some technical elements, such as the thickness of the lines engraved on the grinding surfaces or the separation between them, can be thought to account for the peculiarities of the grinding process and the processed products. However, the variety and uniqueness of the designs may also have an aesthetic purpose related to the artisan’s signature mark.

Finally, the data presented here allow us to uphold the significance of product grinding on a supra domestic scale for the 19th Century in the region. The existence of the mills which we visited or of the structures referred to in the oral accounts – but in need of corroboration through future field work- provides an agenda for the analysis of the production dynamics of a region, for which agriculture was and still is the main activity around which locals structure the majority of their social life.

6. Notes

¹ Data gathering was carried out under the supervision and responsibility of Dr. María Cecilia Páez, from the Universidad Nacional de la Plata (Argentina), during field work in 2014 and 2015.

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