

THESIS

THE POTOSI-COBIJA ROUTE: ARCHAEOLOGY OF COLONIAL TRANSPORTATION
IN THE SOUTH CENTRAL ANDES

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ABSTRACT

THE POTOSI-COBIJA ROUTE: ARCHAEOLOGY OF COLONIAL TRANSPORTATION IN THE SOUTH CENTRAL ANDES

In this thesis, I analyze Andean colonial transportation in archaeological and historical terms based on the Potosi-Cobija route case. Potosi was a strategic extractive region during the expansion of the world-economy. In this region, the Spanish Empire obtained large quantities of silver and produced the main international trade currency used between the 16th and 19th centuries. The Potosi-Cobija route was one of the most significant scenes of colonial commerce and smuggling in the South Central Andes. A total of 34 archaeological sites were identified on the route using a methodology constituted by remote sensing and archaeological inspection of targets. This case is used to discuss the modern European imperial economic control of peripheral regions. In the case of the Spanish Empire, the characteristics of mercantilism and expectations about imperialism suggested a centralized control over the flow of silver to Spain, an important reorganization of transportation labor, and official investment in imperial road infrastructure. However, my results contradict the idea of centralized imperial control of the peripheral flow of resources based on official road infrastructure. They indicate the continuity of native transportation labor practices along with some transformations during colonial times, suggesting transportation organized by local agents for their own economic purposes. I conclude by discussing the idea of peripheries as passive channels that ensure the flow of resources to the early modern European metropolis

and providing new methodological directions for this type of historical archaeology in the Andes.

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Chapter 1: Introduction

The world-economy was born between the end of the 15th and the beginning of the 16th century, corresponding to a global economic system that incorporated empires, city-states and other types of sociopolitical organizations (Wallerstein 1979). The extraction of raw materials in the peripheries allowed an enormous accumulation of wealth in the core regions, while the manufactured products of the core regions were traded in the early global market (Wallerstein, 1979). The Andes were an important extractive region during the expansion of the world-economy. In the Potosi region, current-day Bolivia, the Spanish Crown obtained large quantities of silver and produced a good portion of the *reales de plata*, the main international trade currency used between the 16th and 19th centuries (Muckelroy 1978). Consequently, this region represents an important case study for the analysis of the origins of the world-economy. The Spanish empire had to intervene in the economic organization of the Incas to meet the requirements of mercantilism. The main goal of this economic system was the accumulation of precious metals (Escartín 2004). This motivated an important reorganization of labor in the Andean highlands (*altiplano*). Mining labor was the focus of this economic reorganization. However, the extraction of precious metals in Potosi also required an important reorganization of transportation labor in order to secure the transport of these valued resources to the Iberian Peninsula. Market expansion throughout the Andes also accompanied Spanish imperial reorganization of transportation and colonial routes. Consequently, colonial transportation represents an

important aspect for the study of early modern imperialism and the expansion of the world-economy.

Early modern European empires have been defined as central expansive states controlling various sociopolitical peripheral entities in order to exploit their economic resources (Sinopoli 1994:161). The Spanish Empire controlled and exploited diverse regions in the Americas based on the economic ideas of Spanish mercantilism. The main goal of this economic ideology was the accumulation of precious metals in the royal coffers based on strong control over the natural resources of the colonies and its maritime commerce (Escartín 2004). In the Andes, Spanish mercantilism sought to create a dependence of the local economies on the metropolitan economy, based on the imperial monopoly over the maritime commerce of Andean precious metals and other natural resources, but also through the forced sale of Spanish manufactured products, and the prohibition of buying products from other European powers (Villalobos 2009[1968]:243-244). Consequently, imperial control over the flow of resources to Spain appears to be an important characteristic of the economic functioning of the colonial Andes.

The archaeology of imperialism has shown an important relationship between practices of imperial control and the construction of official infrastructure along regional routes (Sinopoli 1994:169, 171). In the Andes, this relationship between imperial control and official infrastructure has also been demonstrated in the case of the core regions of the Inca Empire (Julien 2012:153). However, Nielsen (2011) has stated that the Spanish empire did not construct control infrastructure along the main routes of the Potosi region, and that only the Inca Empire and the Bolivian State built official road

infrastructure in this area. This hypothesis has not been yet tested. In this research, I try to understand the relationship between Spanish imperialism, colonial transportation and control infrastructure in the case of one of the main colonial routes of the Potosi region: the Potosi-Cobija route (see Figure 1).

Specifically, this research aims to understand how the Spanish empire reorganized and controlled Andean transportation. Two of the four questions address expectations provided by the characteristics of Spanish mercantilism and imperial road infrastructure. The strong control over the flow of resources of Spanish mercantilism suggests an important reorganization of Andean transportation. Complementarily, the strong archaeological relationship between imperial control and official road infrastructure suggests an important Spanish investment in control infrastructure on Andean colonial routes. However, Nielsen's (2011) research suggests the lack of Spanish imperial infrastructure along the routes of the area. His work indirectly suggests the continuity of Andean traditional transportation during colonial times. Consequently, in the Potosi-Cobija case, my research tries to respond to the following questions: what were the main transformations and continuities in Andean transportation during the Spanish Empire? And, did the Spanish Empire build official infrastructure to control transportation in the colonial Andes? Both questions are addressed through the review of historical data in Chapter 2 and the discussion of archaeological evidence in Chapter 5. However, the problem of the location of the Potosi-Cobija route and its associated archaeological record is addressed before responding to both questions.

How the Spanish empire reorganized and controlled Andean transportation has not been researched from an archaeological point of view. The archaeology of the

Spanish imperial Andes has focused on other topics, such as native resettlement or colonial mining and smelting (Lema 2012; Van Buren 1993; Van Buren and Weaver 2012; Van Valkenburgh 2012; Wernke 2010, 2013). This thesis focuses on the historical archaeology of one of the main terrestrial routes that connected Potosi with the Pacific Ocean. The Potosi-Cobija route constitutes the case study of this research (see Figure 1). This research begins by addressing two essential questions about the Potosi-Cobija case: where was the Potosi-Cobija route located? And, what is the archaeological record of colonial transportation associated with the route? The first question is responded to using specific historical data, and historical and contemporary maps in Chapter 3, while the second question is answered by using remote sensing, archaeological inspection and *in situ* archaeological analysis which is described in Chapter 4.

The Potosi-Cobija route was one of the most significant scenes of colonial and early Republican commerce and smuggling in the South Central Andes. It connected the highlands of Potosi (Bolivia), with the port of Cobija on the Pacific coast of the Atacama Desert (Chile). During colonial times, it was intensively used for the legal and illegal transportation of all sorts of products from and to Potosi (Lopez 2016). The Spanish authorities knew this situation and tried to control the illegal sale of goods. In consequence, this route represents an interesting case to research the relationships between Spanish imperialism, colonial transportation and control infrastructure. It is also an interesting case to analyze center-periphery relations in archaeological terms (Peregrine 2000).

The region of Potosi, called Alto Perú or Charcas during colonial times, represented a strategic source of precious metals for Spanish and European mercantilism in the context of early modern world-economy consolidation. The archaeology of one of its main routes represents a way to analyze this global process from the perspective of this strategic “periphery”, and the practices that made it possible. Historical archaeology presents an opportunity for addressing imperial control and colonial transportation from the material vestiges of its associated practices. The archaeological evidence represents the remains of the daily life practices of anonymous majorities, and can improve historical interpretations based exclusively on administrative written sources (Funari 1999:113). This research responds to the previous questions about the Potosi-Cobija route through the synthesis of archaeological and historical data. It provides unexpected archaeological data about the lack of imperial control infrastructure and suggests the continuity of native transportation labor practices throughout the colonial period.

My results contradict the idea of centralized imperial control of the peripheral flow of resources based on official road infrastructure, and instead support Nielsen’s (2011) statement about that only the Inca Empire and the Bolivian state built road infrastructure in the Potosi region. They suggest transportation organized by local agents for their own economic purposes. These results also help fill the gap in our understanding of Andean mercantilist transportation. In the Potosi region, historians have focused more on the colonial market (Platt 1995, 2016; Saignes 1995; Tandeter et al. 1995), than on colonial transportation. The only exceptions are the work of López (2016), Sanhueza (1992, 2011, 2011b), and Glave (1989). In the case of archaeology, the Inca roads of this

region have been researched for decades (Berenguer 1994, 2004, 2006; Berenguer et al. 2005; Berenguer et al. 2011; Nielsen 2011; Nielsen et al. 2006), but colonial roads are still poorly understood. The only exceptions are some archaeological studies of early Republican remains in the lower section of the Potosi-Cobija route (Borie 2013; Borie et al. 2016; Varela, Castro and Aldunate 2008a, 2008b), and on the San Pedro-Calama route (Araneda 2017). In this thesis, I synthesize all the published archaeological and historical information about colonial transportation on the Potosi-Cobija route. This systematization includes information about early Republican transportation. This thesis also includes my methodological approach to the historical archaeology of the Potosi-Cobija route and the archaeological results in Bolivia and Chile. This experience allows me to suggest new methodological directions for the archaeology of Andean colonial routes in the final chapter of the thesis.

Chapter 2 provides answers based on historical data to the questions: what are the main transformations of and continuities in Andean transportation during the Spanish Empire? And, did the Spanish Empire build official infrastructure to control transportation in the colonial Andes? This answer addresses the history of the Potosi-Cobija route, but also includes the history of colonial routes in the Andes and the Iberian Peninsula. Three main aspects are analyzed in this chapter: how was colonial transportation organized, what was the degree of official intervention and investment of Spanish imperialism in transportation and routes, and what is the documentary evidence about official control infrastructure? The research also included early Republican times in order to better interpret some of the archaeological sites found.

Chapter 3 explains the methodological steps that allowed a geographical definition of the Potosi-Cobija route, and the identification of its archaeological sites.

Despite pioneer publications about some sites in the lower route (Borie 2013; Borie et al. 2016; Varela, Castro and Aldunate 2008a, 2008b), this thesis represents the first archaeological research on the totality of the route. For this reason, the research began by solving a fundamental question: where was the route located? To do this, historical route-related toponyms were listed, identified on historic maps, and then on contemporary maps. This process allowed real locations to be assigned to the route. Chapter 3 also explains the archaeological methodology used. The first step involved the remote sensing of potential archaeological sites in the identified localities, and the second entailed archaeological inspection in Bolivia and Chile. In the remote survey, satellite imagery was systematically analyzed in search of road infrastructure. Subsequently, a sample of archaeological targets was selected to be verified in the field. The outcome of this process was the identification of a valuable set of historical archaeological sites presented in the next chapter.

Chapter 4 addresses the question what is the archaeological record of colonial transportation along the route? This chapter includes the definition of a typology of archaeological sites related to transportation and the results of the architectural and material culture *in situ* analysis. Each type of archaeological site is described in terms of its main architectural features and its surface material culture. Architectural analysis allows an initial interpretation of the function of the structures, while ceramic and glass analysis allows chronological interpretations of the sites. The archaeological results suggest that the main transformation in the Potosi-Cobija route, in terms of official

infrastructure of support and control, occurred right after the War of Independence. The results also suggest colonial native transportation based on the use of traditional campsites and pastoralist settlements.

Chapter 5 addresses the question about continuities and transformations in transportation and official infrastructure through the synthesis of archaeological and historical data. I define three eras of colonial transport in the Potosi region based on the work of historians (Glave 1989; Lopez 2016; Sanhueza 1992, 2011). The first era is characterized by the continuity of the Inca system of transport during the 16th century. The second era is characterized by the introduction of wage labor and European means of transport during the final decades of the century, and the third era is characterized by the official planning of support infrastructure during the late 18th century. In this chapter, I discuss the archaeological indicators of these eras of colonial transportation in the Potosi region, and how the archaeological record of transportation on the Potosi-Cobija case can be associated or not with one of these three eras. Both historical and archaeological data, allow me to identify continuities and transformations in terms of labor organization, infrastructure of support and control, and the degree of official investment by the Spanish Empire during colonial times. I conclude stating the importance of the traditional system of native transportation for the colonial mercantilist movement along the route. This system was controlled by the local hybrid elites, and independent from any investment in road infrastructure done by the Spanish Empire. I include a critique of the idea of semi-peripheries as passive channels that ensure the flow of resources to the metropolis, and on Andean archaeological models of imperial control based on the construction of official infrastructure.

This study represents a first necessary step for the anthropological understanding of colonial routes in the Andes and their profound relationship with European colonial economies and the early modern origin of the world-economy. Economic objectives motivated a large part of the functioning of early modern European colonialism. In the Andes, to achieve these objectives, the Spanish colonists reorganized, but also maintained, important aspects of the Inca's labor organization. This was especially important in the highlands of Potosi, one of the most important economic regions for the early world-economy. This economic transition in labor organization can be analyzed from the written point of view of Spanish functionaries but also from the concrete remains of labor practices performed by anonymous native workers. Both sources of information, although incomplete and difficult to access, can provide a new synthetic approach to the understanding of how the economic functioning of this region was made possible. This research uses this approach to analyze how native labor made possible the economic connection of this region to the Iberian Peninsula.

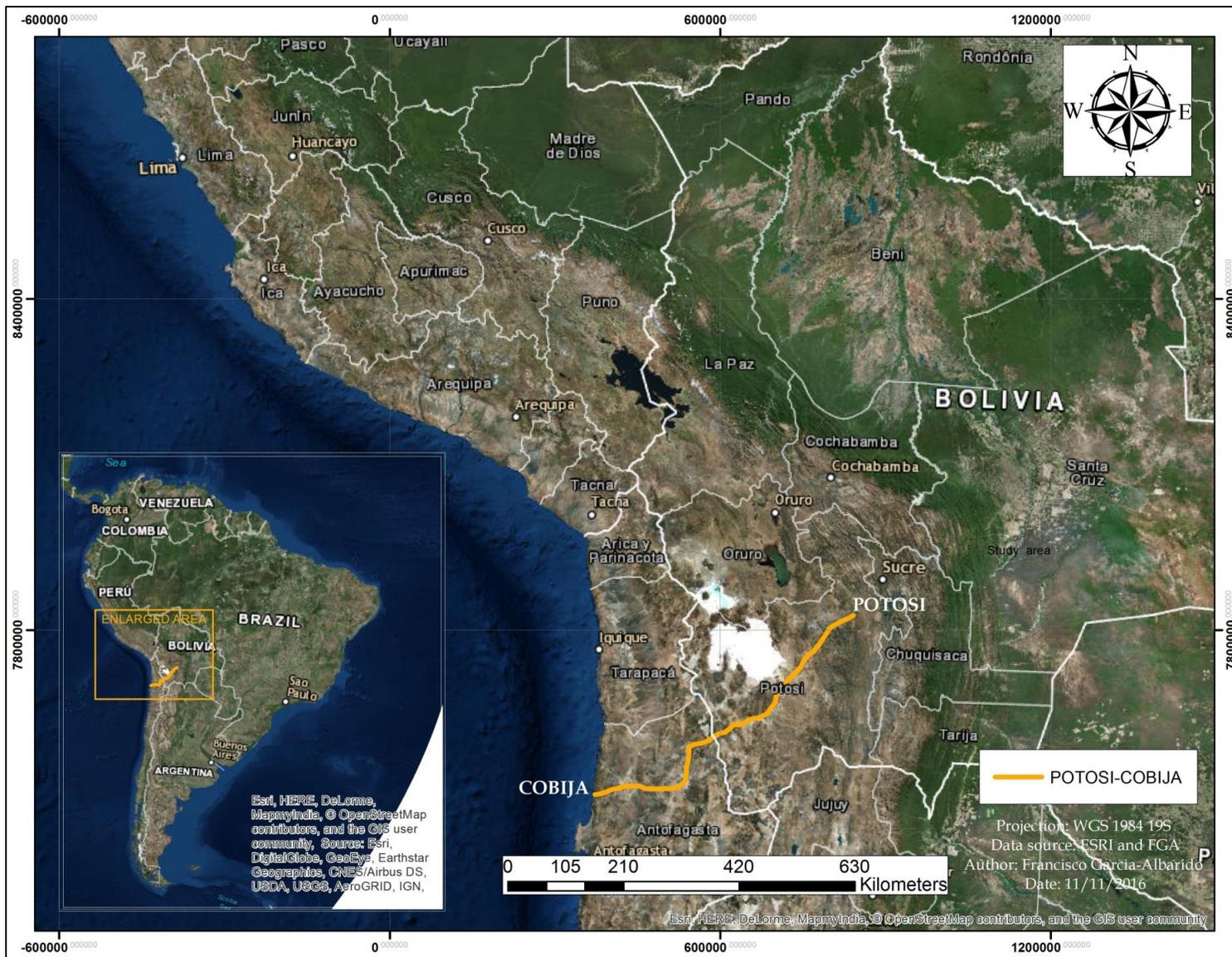


Figure 1: Map of South America with the general location of the Potosi-Cobija route in yellow.

Chapter 2: Spanish imperialism, Andean colonial roads, and the Potosi-Cobija route.

2.1. - Early modern Spanish imperialism, infrastructure and regional elites

Imperialism is a complex social, political, and economic phenomenon. In general terms, empires can be defined as expansive states based on control over various sociopolitical entities and the exploitation of their economic resources (Sinopoli 1994:160). Empires go through cycles of expansion, consolidation, and collapse that do not always follow a single, linear, and homogeneous process. Imperial expansion is based both on military conquest and obtaining social and economic privileges, as well as the creation of new relationships of kinship between new and old elites (Sinopoli 1994:163). The existence of organized military forces guarantees physical coercion. However, the analysis of imperial expansion cannot be limited to military conquest. Empires consolidate their domains through legitimating ideologies and hierarchical administrative structures (Sinopoli 1994:163-167). These structures are anchored in local leaders in order to administer social, political, and economic relationships, initially taking advantage of pre-existing local structures. The administration of work, production, and taxes are some of the main objectives of the imperial administration (Sinopoli 1994:165). The collapse of empires is caused by various factors including diminished margins of return, internal political conflicts, and the interference of competing empires (Sinopoli 1994:169). All of these characteristics demonstrate the importance of political and economic variables in the life cycle of empires.

Modern European imperialism has been analyzed primarily in terms of overarching political and economic structures (Hall et al. 2011:236). These empires have been understood as political mechanisms that enabled a center to accumulate capital generated in peripheral areas (Sinopoli 1994:161). The peripheral regions have been considered passive sources of raw materials extracted by European metropolises through semi-peripheries: cities or ports in peripheral regions that are responsible for ensuring the flow of resources to Europe (Hall et al. 2011:236). Following the ideas of Wallerstein, Hall et al. (2011:239) pointed out that the obedience to rules and institutions would consolidate the imperial system as an integrated whole, constituted by diverse political and cultural units. This perspective on modern imperialism emphasizes the importance of the political and economic structures imposed by the metropolis to obtain economic benefits. However, the authors themselves recognize that they have ignored the role of individual actors and the importance of understanding local conditions, amongst other factors (Hall et al. 2011:236, 240).

The anthropological analysis of modern imperialism in Latin America has questioned the idea of passive peripheries completely controlled by colonizing centers through semi-peripheries. This vision has been criticized as being too general, ahistorical, and dichotomous, and it does not account for the marked agency of regional societies that end up questioning the power of the metropolis. Based upon the Spanish and Portuguese cases, Senatore and Funari (2015) have pointed out that imperialism can be seen as a process of emergence of multiple regional societies constituted by new actors, identities and opportunities for action (Senatore and Funari 2015:6). More than a process of breakdown, control, and obedience, imperialism can be understood

as a set of specific processes of cultural, social, economic, and political hybridization, highly heterogeneous in chronological and spatial terms (Senatore and Funari 2015:1-2). These processes would have generated synthesis (hybridization) and breaks, including new actors and possibilities, but would have also allowed strong continuities in local practices (Senatore and Funari 2015:6). The great narrative of Iberian imperialism in Latin America based on the dichotomy colonizer/colonized has been criticized as inaccurate and ahistorical (Senatore and Funari 2015:2). Consequently, these scholars have suggested that modern imperialism in Latin America must be analyzed on the basis of “fine-grained” cases, or cases with a limited and well-known temporal and spatial scale (Senatore and Funari 2015:2). This perspective must also include a detailed analysis of the powerful regional players and the multiple local interests that gave life to the provinces. This “fine-grained” analysis can help overcome the static models of passive and obedient peripheries that do not explain political change and the cycles of modern imperialism.

The historical archaeology of modern imperialism in Latin America must develop these “fine-grained” analyses based on the synthesis of documentary sources and archeological evidence. This approach is not possible in the case of pre-Columbian Andean imperialism before the Incas. In general, archaeological analysis of these cases is based exclusively on archaeological remains, and especially on the remains of official infrastructure. This traditional archaeological approach to imperialism has paid particular attention to the relationship between imperial control and infrastructure, both in the Andes and in other regions.

The official infrastructure has been understood as a key tool to achieving regional political and economic control. For example, the emergence of a new settlement pattern constituted by new urban centers and official routes has been interpreted as evidence of direct territorial control (Sinopoli 1994:171). In this context, the construction of new temples would be the tangible product of imperial efforts to legitimize ideologies. In other regions, indirect control would be achieved through the construction of official road infrastructure, represented by official investment in roads, bridges, lodges, and warehouses that ensure the flow of resources to the imperial core regions (Sinopoli 1994:171). In the Andes, the archaeology of pre-modern imperialism has also focused on the relationship between political control and official infrastructure (Julien 2012:153). For example, the Inca roads have been interpreted as the basis for the control, management, and order of the empire in the provinces (Julien 2012:157, 164-165). However, the construction of infrastructure is only one of the possible mechanisms of control (Sinopoli 1994:160).

Regional elites that controlled each one of the Spanish Empire's provinces used a wide range of mechanisms to achieve their objectives. These mechanisms did not necessarily have to do with the construction of official infrastructure nor with radical economic transformations. Often, the power of regional elites was based on their access to and control of traditional labor practices. This control was not associated with strong transformations of material culture in many cases. The archaeological remains of native everyday action do not respond exclusively to the needs of the metropolis nor do they present official characteristics: it is the novel product of hybrid practices, organized by the new elites at the regional level. For this reason, the archaeology of Spanish

imperialism in Latin America should not base its interpretations exclusively on the search for official archaeological evidence of imperialism. This point is particularly sensitive in the case of transportation and routes.

Archaeology has traditionally interpreted official routes as symbols of imperial authority, order, and control (Snead 2012:107) and also as the means of resource extraction from passive peripheries (Sinopoli 1994:160). In contrast, paths and dirt roads are considered as ephemeral products of natural activities with little relevance (Snead 2012:109). However, these unofficial roads are a significant result of local communities' action and linked entire regions for centuries (Snead 2012:109). The movement, or actions, performed on this type of roads, should be considered more important than the degree of formality and official investment (Snead 2012:109). This movement was not natural or neutral: it included opportunities and barriers, generating belonging and exclusion among the people involved (Snead 2012:109). In the colonial Andes, this movement was actively used by local elites to achieve their goals. It was not necessarily based on official road infrastructure (as we will see in the next pages). Consequently, the archaeology of the routes in the colonial Andes should consider the unofficial remains of this movement and its detailed analysis based on written sources.

Andean colonial movement was not controlled by a distant central power in Madrid. Regional elites organized and controlled the activities that created the Andean dirt roads. In some cases, empires sought to benefit from the movement developed on the trails more than invest in infrastructure to create or control the regional traffic. This is clear in the case of the Andean routes of the Spanish Empire, as will be seen in the following pages, but it has also been observed in the southern routes of the Inca

Empire. Garrido (2016:107) has also criticized the idea of total imperial control over movement in the Inca case, stressing the importance of local agency. The Inca routes were open circuits that generated growth by presenting new economic opportunities for local populations as well as serving official purposes (Garrido 2016:106). These populations were not economically passive and actively took advantage of the opportunities generated by the connection of their regions with broader social systems (Garrido 2016: 94, 106). In the Atacama Desert, local actors gave life to the Inca routes with their own economic actions, and these actions were frequently unrelated to the political economy of the Inca Empire (Garrido 2016:106, 107). The Inca Empire did not invest an enormous effort in the official construction of roads in southern regions of the empire. Inca roads are just straight paths cleared of stones, associated in spatial terms with local informal routes. However, the southern Inca case suggests imperial control based on the construction of official infrastructure in the main populated nodes along the valleys (Garrido 2016:107). In consequence, Andean roads should not be considered the result of imperial investment based on the planning of a highly centralized imperial political economy. The Inca and Spanish cases suggest the importance of economically active local populations along informal roads.

In sum, the investigation of colonial transportation and routes has much to contribute to the discussion of the early development of modern colonialism (Orser 2005:77) and to the anthropological discussion of imperialism. The case of the Andes calls into question the vision of passive peripheries that unilaterally benefited the metropolis with their economic resources. It also raises questions about total control of colonizers over colonized local people, and especially the idea of total obedience of

passive peripheries to the rules of distant centers. The early modern Andes suggests that imperialism can also be understood as a process of creation of new competing hybrid nodes. The so-called semiperipheries should be considered local political powers rather than simple administrative channels by which to impose rules on the regions (*sensu* Hall et al. 2011). These local elites organized regional movement on the routes for their own benefit, more than a one-way resource extraction based completely on the economic interests of the Crown. Their privileged position within Andean colonial society allowed them to access native labor and resources through political negotiation. Individual local elite agents, including natives, Spaniards, and mestizos, were key to organizing movement on colonial Andean roads. In the following pages, historical data is provided to demonstrate the importance of local elites in organizing regional movement that functioned based on native practices and without official road infrastructure in the colonial Andes.

2.2. - Routes and transportation in the Spanish Empire and South America

The royal roads in the Americas were not an official investment. The Crown's decision to only regulate the roads rather than invest in them was transferred from Spain to America in the 16th century (Pérez 2001:36). Vassals with economic interest had to open new routes and consolidate traffic and then ask the Crown to give it the name of *camino real* (Pérez 2001:52). Only the routes with significant public interest and economic importance were officially named *caminos reales* (Pérez 2001:39). The benefit of this official status was that the Crown would then be responsible for organizing the work of local people to run accommodations and maintain the roads. A colonial law, promulgated by Felipe II in 1563, dictated that the construction and

maintenance of roads and bridges was the responsibility of individuals who potentially benefited from the traffic (Pérez 2001:57), and in 1595 another law ordered local authorities or *corregidores* to be in charge of the local labor organization for their maintenance (Pérez 2001:57). The Crown also legislated to protect the traffic on these roads (Pérez 2001:47). This protection included the regulation of prices in privately operated inns or *ventas* (1538), freedom of transit through the most convenient route (1568), and the organization and supervision of *ventas* in indigenous towns by local governors, *corregidores*, and mayors (1568) (Pérez 2001:57-58). In the Americas, this lack of official investment produced only informal dirt roads or *caminos de herradura* (Sanjurjo 2012). These roads did not follow optimal or fixed routes and were supported by a series of private inns as in the peninsula (Pérez 2001:49; Uriol 1985).

The *caminos reales* were simple dirt roads both in the Americas and in the Iberian Peninsula until the mid-eighteenth century (Pérez 2001; Diago and Ladero 2009). The Spanish officials influenced by the ideas of the Enlightenment sought to change the official regulations about transportation and roads and solve the problem of the lack of formal road infrastructure (Pérez 2001:44). During the second half of the 18th century, the royal engineers designed a territorial re-articulation of the empire that included a strong official investment in improving the existent network of roads (Pérez 2001:50). This system included an officially planned sequence of inns operated by private individuals (*postas*). These places included a resident employee who was responsible for attending to and providing food for the travelers. These inns were used in Spain since at least the 1720s, but the Crown worried increasingly about its official reorganization beginning in the 1760s (Diago and Ladero 2009:281). The official

construction of a complete *posta* system was ordered through a royal decree only in 1794 (Danvila and Collado 1886:282; Diago and Ladero 2009:281). The official network of paved roads followed a similar trajectory: it was still under construction during the 1830's (Diago and Ladero 2009:380). This system was applied only along some late colonial routes in South America, such as the road between Potosí and the port of Buenos Aires. Interestingly, it also served as a model for reviving old colonial routes during the first decades after independence (as we will see in the next pages). How can we characterize the early situation of colonial roads in the Americas?

There were two types of *caminos reales* in America during the colonial era. Long-distance roads ensured the connection between distant regions, connecting major cities with fortified ports at both ends of the route (Pérez 2001:48; Sanjurjo 2012:267). Short-distance roads were dedicated to some significant economic traffic within a given region (Pérez 2001:48). The main South American long-distance *camino real* connected the port of El Callao (Lima), on the Pacific Ocean, with the port of Buenos Aires on the Atlantic, going through Potosí, the economic engine of the empire (López 2016). Other long-distance *caminos reales* connected Lima with Bogotá and Cartagena, Buenos Aires with Santiago de Chile, and the latter with Potosí (López 2016; Villalobos 2009[1968]). Some short-distance *caminos reales* connected the Andean cities with small ports of high economic importance. The route from Potosí to the port of Arica was a short distance *camino real* of high economic importance (López 2016). The silver from Potosí was shipped to Lima from this port, and then to Panama, where it was transported to the Atlantic coast to be shipped to Spain via Havana (López 2016;

Villalobos 2009[1968]). In consequence, maritime routes were also an important part of the Spanish imperial transportation system.

Analysis of the colonial road infrastructure should also consider the maritime routes that gave economic importance to a given camino real. The Andes were connected with the Iberian Peninsula via two major sea routes. The route between El Callao (Lima) and Panama was the most important in the Pacific Ocean. The port of Arica was also connected with this main maritime route thanks to a short-distance sea route. Diverse European and Asian goods were transported from Panama to Lima, some of which were forwarded to Santiago de Chile, while the precious metals from Potosi were transported to Panama from El Callao (Villalobos 2009[1968]). Maritime transport was controlled by the Crown and carried out in convoys protected by the local Spanish armada (Villalobos 2009[1968]). This maritime traffic was particularly intense during the 16th and 17th centuries. Two main terrestrial routes supported this traffic: the road between Potosi and Lima, and the road from Potosi to Arica (López 2016). The second main maritime route between the Andes and Spain was the route through the Strait of Magellan. Some of the ports along this route included Buenos Aires, Chiloé, Valdivia, Valparaíso, Cobija, Arica, and Lima (Villalobos 2009[1968]). The harsh conditions encountered during the crossing of the strait and the dramatic failure of the initial Spanish settlement on the Strait of Magellan made this route less traveled. Nevertheless, the port of Buenos Aires was named the capital of the Vice-royalty of the Río de La Plata in 1776, and Potosí was incorporated within its administrative domain (Villalobos 2009[1968]). After that date, the silver from Potosi was transported via terrestrial route to Buenos Aires, and most of the maritime trade with Europe was

through that port, though not always in a legal manner (Villalobos 2009[1968]). In this context, the ports of the Pacific and their routes to the interior lost economic importance.

Consequently, the shifting political economy of the Spanish empire created major changes that impacted the caminos reales. The functioning of the terrestrial routes should not be considered homogenous or continuous through time. The analysis of a given camino real must include a detailed historical assessment of the different stages of its existence, including the Republican age. After independence, free trade with the northern hemisphere revived the ancient ports of the Pacific (Cajías 1975). After the 1820's, these ports shipped precious metals from the Andes to Europe again, receiving European industrial commodities destined for the interior markets. In the mid-nineteenth century, the maritime route through the Strait of Magellan was consolidated as a result of British steam navigation and the California gold rush (Delgado 2006; Tornero 1872). The ports of Arica and Cobija were stopovers on that route. Consequently, its old colonial terrestrial routes to the Andean cities were reorganized and returned to being considered key connections to the European economy (Cajías 1975). A detailed analysis of the Andean routes is presented in the following pages.

2.3. - Routes and transportation in the colonial Andes.

The Andean region between Lima and Potosi was connected by various caminos reales of the two types described above, long and short distance. An extensive network of roads connected the main Spanish cities in the region, including Lima, Arequipa, Cuzco, La Paz, La Plata, and especially Potosí (Glave 1989:27, 32). These cities were the protagonists of trade and dominated the regional market beginning in the 16th century (Glave 1989:32). The route that connected Cuzco and Potosi, called Camino

Real del Collao, was the main road within the region (Glave 1989:41). Its function was ensured through the foundation of resettlement towns at strategic points along the road (Glave 1989:42). As described above, the Spaniards also created routes that connected these cities with ports on the Pacific Ocean, ensuring their connection with mercantile maritime routes (López 2016:9). The ports of Cobija and Arica connected Potosi with the imperial economy (López 2016). The route to Arica received the official name of “camino real”, placing it under official protection of the Crown (López 2016:9). The route to Cobija did not receive this status (Lopez 2016:10). Both routes were significant scenes of legal and illegal transport of precious metals, serving also to introduce to Potosi goods from various regions of the world, including Asia and Europe. However, the transport of precious metals from the Andes to the Iberian Peninsula was not an easy job.

The organization of transportation in this important region of the empire went through different historical stages. Land transport was a key economic activity for Spanish mercantilism. This activity was called *trajín* in the colonial Andes during the 16th and 17th century (Lopez 2016), and was an important source of wealth for Andean colonial elites (Hidalgo 2012). According to Glave (1989), this activity went through two main historic stages: the “*época de las cargas*” or the “porters’ epoch”, and the “*época de tratos y contratos*” or “the epoch of deals and contracts”. The following pages will present the main characteristics of both stages.

The “*época de las cargas*” corresponded to transportation controlled by Spanish encomenderos between the early conquest and the mid-1560’s (Glave 1989:120). The activity was based on the unpaid personal service of indigenous porters, called *apires*

(Glave 1989:92). These porters were given by the native leaders (*curacas*) as a tribute to the *encomenderos* (Glave 1989:95, 120), who also used the communities' llamas as cargo animals (Glave 1989:45). Transportation during this time was carried out using the Inca roads and without investing in the improvement of infrastructure (Glave 1989:124). The porters traveled the routes on foot, carrying goods and their own food on their backs and sleeping in open fields or indigenous hamlets (Glave 1989:77, 124). The Inca inns (*tambos*) were severely damaged, depopulated, and without any supplies (Glave 1989:124). As a result, early *cargas* were based on the exploitation of personal service, without any kind of remuneration for the work, and without investing in any kind of infrastructure support. However, beginning in the 1540's the Spanish authorities began regulating this transportation system. Vaca de Castro (1543) ordered the Qhapaq Ñan to be restored to the state it was under the Inca Guayna Qhapaq (Glave 1989:125). The *encomenderos* mobilized their communities to repair and to populate the existing *tambos*, although natives served for free in these places (Glave 1989:126). While these and other regulations sought to limit the use of indigenous porters, this practice persisted during part of the second half of the 16th century (Glave 1989:120, 126).

The Crown sought to eradicate this type of transportation in the 1560s; specifically, its complete prohibition was ordered in the Potosi region (Charcas) in 1563 (Glave 1989:128). The officials also sought to remove control over transport by the *encomenderos* and give it instead to urban merchants and local Spanish authorities (*corregidores*). The *tambos* were staffed, supplied, defined as places of sale and purchase, and monitored by *corregidores* (Glave 1989:128-129). The travelers had to pay for food, firewood, fodder, and other products sold by natives in these inns (Glave

1989:129). In this way, the government sought to put an end to free services in tambos and to ensure native access to the necessary money for paying taxes to the Crown (Glave 1989:131). The encomenderos were out of business by the end of the 1560s because of the new official regulations (Glave 1989:140). At the same time, officials of the Crown inspected and reorganized transportation and routes in Charcas based on the Inca model (Glave 1989:139). The maintenance of the routes and the services provided in the tambos were distributed to native communities by the royal functionaries de la Bandera and de Lima (Glave 1989:137). Francisco de Lima, commissioned by the Audiencia de la Plata, measured distances, calculated travel times and counted native population in the routes of the highlands (Glave 1989:135). This allowed the functioning of the Inca tambo system for a short period. However, this system was criticized by viceroy Toledo because labor practices were still based on the “tyrannical Inca order” (Glave 1989:141), including the banned free personal service at tambos and the work of native porters.

During the 1570's, Toledo tried to eradicate the system of tambos and to finally implement the Spanish system of “*ventas y mesones*” (Glave 1989:142). This system was based on privately operated inns (*ventas*), and defined as places to buy/sell food, firewood and fodder, and to lease mules (Glave 1989:142). These inns were “leased” to local elite individuals, including Spaniards and curacas or native leaders (Glave 1989:142). In the altiplano, numerous curacas managed to become tenants of inns and participate in the economy of the main mercantile route (Glave 1989:148, 169). Theoretically, the Toledan plan also included a Spanish marshal controlling transportation at each inn (Glave 1989:145). However, in practice these were replaced

by the local corregidores (Glave 1989:145). The new system sought to break the logic of personal service; Toledo tried to establish a daily wage for the native transportation workers (Glave 1989:142). He once again distributed the workload required for the maintenance of roads and functioning of inns among native communities, including the altiplano (Glave 1989:43). The communities staffed, supplied and served in the inns. This included the service of young shepherds (*abatires*) and the provision of pack animals (Glave 1989:45,127). During the 1580's, this redistribution of labor become known as the "*mita de tambos y servicio de trajines*" (Glave 1989: 142, 172). Theoretically, it functioned owing to a salary paid by the corregidores (Glave 1989: 142, 172). Consequently, during the final decades of the 16th century, transportation support infrastructure and services were based on the allocation of compulsory work for indigenous communities (*mita*) and low wages. Something similar happened with transportation itself.

The prohibition of native porters generated the era of "tratos y contratos" during the end of the 16th and the 17th centuries (Glave 1989:120,176). During this time, transport was dominated by the new Andean merchant class (Glave 1989:97), constituted by Spanish traders, officials of the Crown, corregidores and indigenous leaders (Glave, 1989:13,75). These people, called *trajinantes*, owned companies of various sizes, many of them specializing in long distance traffic (Glave 1989:63). The most powerful *trajinantes* produced or owned the transported goods, being also traders (Glave 1989:57). Other *trajinantes* only provided transportation services, with the condition that they could sell the goods if the freight was not paid on time (Glave 1989:63). The *trajinantes* leased, collectively and at low-cost, the labor of indigenous

workers through dealings with the native leaders (Glave 1989:97). The lease included a minimum wage for native workers for the journey there, but did not include their journey back (Glave 1989:73). This money was used by the native leaders to pay tribute to the Spanish empire (Glave 1989:49, 68). The corregidores amassed large fortunes with this type of transport or by mediating the negotiations between big businessmen and curacas (Glave 1989:152). The Crown had to regulate the total number of native tributaries enrolled in transportation in an attempt to stop the abuses made by the corregidores in this important colonial industry.

Access to community labor made transportation in the Potosi region possible during the 16th and 17th centuries. The era of “tratos y contratos” was initially based on access to specialized transportation labor that included native workers and their large caravans of cargo llamas (Glave 1989:54). Along the routes, many communities had social sectors of specialized transportation laborers called *chacaneadores* (Glave 1989:72). These sectors and others were forced to work in transportation during the end of the 16th century. Each native transporter was responsible for 25 llamas and the loads they carried, while the entire caravan was directed by a leader called a *majordomo* (Glave 1989:54). Ceramic amphora-like containers, called *botijas*, were one of the main containers used to transport all sorts of products. If a botija was broken along the journey, the native transporter had to show the neck and marked fragments of the container upon his arrival to the destination point (Glave 1989:54). These indigenous workers had to provide their own llamas and make their own tools, including baskets, whips, and pots among other things (Glave 1989:73).

Mules replaced the llamas during the first decades of the 17th century (Glave 1989:12; Sanhueza 1992), increasing speed and carrying capacity. During the conquest, mule-driving was an activity performed only by Spaniards and mestizos (Glave 1989:127), but at the end of the 16th century the corregidores began using their own mules for commercial transportation and also sold them to native communities at high prices (Glave 1989:75; Moreno 1977). This produced an increasing, but incomplete, replacement of cargo llamas by mules. This process ended with mule driving as the main activity for long-distance commercial transportation at the beginning of the 17th century. However, both means of transportation coexisted during colonial and republican times.

The colonial transporters moved diverse goods, including regional agricultural products, to the Andean mining centers. They also transported precious metals from the Andes to the ports of the Pacific Ocean (Glave 1989:34). The main Andean products transported between Lima and Potosi were silver from Potosi, mercury from Huancavelica, textiles from the Titicaca region, coca from Cuzco, and wines from Arequipa (Glave 1989; López 2016). However, the contracts included the transport of various imports, including, textiles, glass, paper, and iron (López 2016; Moreno 1977). This commerce fed another big business controlled by the corregidores: the forced sale of regional and imported goods to native communities (Moreno 1977). The economic demands of mines and major cities, along with the forced sale of goods, enormously enriched elite *trajinantes* during the 17th and 18th century. They constituted a thriving urban merchant class, composed of Spaniards, *criollos*, *mestizos* and members of the

indigenous nobility. In Cuzco, this class included descendants of the Inca nobility, such as Túpac Amaru II (Walker 2014).

These Andean trajinantes were deeply affected by the creation of the Viceroyalty of the Río de la Plata in 1776, the inclusion of Potosi in the new administrative unit, and the official redirection of commercial traffic to Buenos Aires (Hidalgo 2012). This port was the new official imperial destination of the silver from Potosi and all the trade transported from the Iberian Peninsula, in addition to a significant contraband with Europe (Villalobos 2009[1968]). The crown decided to invest in the camino real between Buenos Aires and Potosi, constructing a system of postas during this period. In contrast, this produced an enormous crisis for transportation along the routes from Potosi to the Pacific Ocean. These routes were reactivated after the independence of Peru and Bolivia in the 19th century. The following pages present historical evidence about these various stages for the specific case of the route between Potosi and Cobija.

2.4.- The Potosi-Cobija route.

The route between Potosi and Cobija has a significant colonial and republican history of trade and smuggling of Potosi silver and European goods, as well as the transportation of Chilean agricultural products and local marine products (López 2016; Sanhueza 1992, 2011b). This traffic began in the middle of the 16th century and went through the same stages described previously for the other Andean regions. The native communities of the Atacama Desert oases, called Atacamas in the colonial documentation, provided the transportation labor at least along the lower segment of the road. The “época de las cargas” lasted until the end of the 16th century and was controlled by the Atacama encomenderos in the lower segment of the route (Glave

1989; Sanhueza 2011). The “época de tratos y contratos” occurred during the 17th and 18th centuries and favored the corregidores and curacas of Atacama (Glave 1989; Hidalgo 2012; Sanhueza 2011). During the 18th century, smuggling was particularly intense, and the corregidores were active participants (Bittmann 1977). After the independence of Bolivia (1825), the route was reorganized by the government, endowed with infrastructure and used for legal and illegal transportation of silver (D’Orbigny 1847; Letelier 2016; Sanhueza 2011). Transportation, infrastructure, and the intervention of political power associated with this route are analyzed below.

In the mid-16th century, transportation labor in the Atacama was reorganized to meet the demands of the important new mining centers of the highlands (Sanhueza, 2011:314). In Cobija, the encomenderos organized the port activity, the production of dried fish, and the long distance transport of European goods and seafood (Núñez et al. 2010:377; Sanhueza, 2011:316). These products were mainly transported to Porco, Potosi and La Plata (Sanhueza, 2011:318). The encomenderos participated in the early mercantile circuits controlling the production, transport, and sale of large quantities of dried fish from the Atacama coast (Sanhueza 1992:178, 180). The fish was obtained through the unpaid personal service of the native fisherman of Cobija and surrounding areas (Sanhueza 1992:181). Native porters from Atacama transported this product to the town of Atacama la Baja (Chiu Chiu), where the dry fish was stored and then transported to the inland cities. The encomenderos obtained the workers from the Atacama curacas, and the transport was performed by “cargas”. The Atacamas carried on their backs large quantities of dried fish, transporting it by foot to Atacama la Baja and sometimes all the way to Potosí (Sanhueza 1992:179). At the end of the century,

the encomenderos and the Atacamas also made deals to transport commodities to Potosi using cargo animals, mainly llama caravans (Sanhueza 1992:181). Traffic was controlled by the families of the encomenderos, who lived in the villages along the routes, such as Cobija and Chiu-Chiu (Sanhueza 1992:179). The Atacamas also carried their own products for sale and exchange in Porco, Potosí and La Plata (Sanhueza 1992:182). All this economic activity also generated the enrichment of a small Atacama native elite, who resided in Potosí and La Plata (Hidalgo 2012:118).

The published literature does not reference any infrastructure of support for transportation during this time. Although it is clear that the Spanish towns along the route were closely linked to transport, there are no published references to inns or the early colonial reutilization of tambos.

During the 17th century, transportation on the Potosi-Cobija route was done mainly through deals and contracts and was based on long-distance mule driving. However, native porters (*cargas*) did not disappear entirely in Atacama (Sanhueza 2011b). During the 1590's, the corregidores arrived in Atacama, observing and denouncing the "cargas" imposed by the encomenderos on the Indians (Sanhueza 1992:179). After several legal disputes, these new officials remained in control of the transport and commercialization of dried fish and other products on the route (Sanhueza 1992:178). This movement represented the main economic activity of the route and a large source of wealth for many Spanish according to Vásquez de Espinoza (1948[1628]) (cited in Sanhueza 1992:178). The priests of Atacama also participated in the business (Hidalgo 2012:127). Commercialization of dry fish in Potosi was a complex business that included different associated costs. The priests of Atacama had to pay for

freight, wrapping materials (burlaps and skins), taxes (*alcabala*), warehousing and the salary of the sales agent in Potosi (Sanhueza 2011b). Initially, this transportation was done using large caravans of cargo llamas (Sanhueza, 2011:320). However, during the first decades of the 17th century, mules were introduced by corregidores and priests as one of the main commodities of their business of forced sales to the indigenous residents of Atacama (Sanhueza, 2011:321). The native mule-drivers had to pay the inflated price of the mules used for transporting goods to Potosí (Sanhueza, 2011:321).

The port of Cobija also received many ships transporting legal and illegal commodities. The freight of these products to Potosi was another important movement along the route during this period. Again, this economic activity was controlled by both the Spanish and Atacama native elites (Casassas 1974:100). This freight included both legal and illegal products. Its transport and sale was a significant business controlled by the local elite. Many authorized ships transported agricultural products and leatherwork (*cordobanes*) from colonial Chile (Sanhueza 2011b). Chilean leatherwork was used for various purposes, constituting a product in high demand in Potosi (Sanhueza 2011b). During the 17th century, there was also an intense contraband trade in European goods and Andean silver carried out through the port of Cobija (Casassas 1974:104). Viceroy Duque de la Palata tried to stop the smuggling during the 1680's, ordering a total ban on ships coming from the south stopping in the port (Casassas 1974:104). However, local corregidores continued trading and smuggling during the following century (Martínez 1985). Additionally, the route served also for transporting wine from Pica (Tarapacá) to Potosi during the second half of the century (Casassas 1974:102). Despite this intense long-distance traffic, the published written sources do not provide

any reference to inns or other infrastructure on the route. Only the towns along the route are mentioned.

The 17th century was a period of economic boom for the trajines who worked between Cobija and Potosi. In Atacama, elite Spaniards, natives, and criollos were enriched thanks to their control over long-distance commercial mule driving (Sanhueza 2011b). Additionally, at least since the 1640's some native Atacama mule drivers (arrieros) had their own mules and worked more or less independently from the elite's requirements (Sanhueza 2011b). The mercantile boom transformed Cobija into a small but attractive node on the route. Its population was multiethnic and complex, including native fishing communities, possibly subdivided into three different ethnic groups (Proanches, Changos and Camanchacas) and with internal social hierarchies (Bittmann 1984:109; Casassas 1974:40-44); African slaves; mestizos; criollos and Spaniards (Casassas 1974:40-44). The port was also temporarily inhabited by Spaniards, criollos and *mulatos* from Santiago de Chile on their way to Atacama la Baja and Potosi (Casassas 1974:45, 47). The economic boom also benefited the priests of Atacama. The church of Cobija received significant quantities of dried fish as alms from the Indian fishermen (for example, 360 kilos in 1674), benefiting directly from its commercialization in Potosí (Sanhueza 2011b). A similar situation happened in Atacama La Baja (Casassas 1974:47), where church-owned pastures were leased to mule drivers and travelers (Casassas 1974:99). As a consequence of the mercantilist boom, both churches went so far as to import-expensive adornments, including doors made of cedar and fine European tablecloths (Casassas 1974:101-102). At the end of the

century, the indigenous people of Atacama La Baja devoted themselves exclusively to the transportation of goods to Potosi (Sanhueza 2011b).

The Potosi-Cobija route continued to have strong economic activity during the first half of the 18th century. As in the previous century, this activity was not always legal. The route enabled the movement of a large amount of contraband Andean silver and European goods (Bittmann 1977:333; Casassas 1974:104). The local corregidores of Atacama and French ships dominated this illegal business (Bittmann 1977:333). The corregidores delivered large quantities of local products, for example vicuna wool, in exchange for prohibited European goods that were sold in Potosi (Bittmann 1977:333). Cobija was also a place where the ships of European smugglers were supplied with water and dried fish (Arze 2004[1787]:193; Bittmann 1977:336). Legal trade with Chile also gave life to this route, and the Spanish ships were logistically supported in the referred manner by this port. Diverse goods produced in colonial Chile were loaded in the ports of Valparaíso and Copiapó by the main dealers along that maritime route (Arze 2004[1787]:194). During the beginning of the 18th century, Cobija remained a very attractive port since transportation to Potosi was cheaper and faster in comparison to other ports (Arze 2004[1787]:194). For this reason, more ships arrived in Cobija than Arica, including ships from Chile and Lima (Arze 2004[1787]:194). These ships carried important goods, including rice, sugar, and diverse copper artifacts (Arze 2004 [1787]:195). Despite this solid commercial activity, local native people continued developing their own economic strategies: exchange or barter (*rescate*) continued to function in parallel along the route (Sanhueza 2011b). In Cobija, indigenous barterers (*rescatiris*) obtained dried fish in exchange for coca and regional textiles, and then sold

the fish in Potosí, Chuquisaca and Oruro (Sanhueza 2011b). During the first half of the century, the population of Cobija included the groups mentioned in a previous paragraph, but also local indigenous governors or “gobernadores” as referred in the official documents of the period (Bittmann 1977:345, 346), and children of French sailors with local native women (Bittmann 1977:347). However, abuse by the local corregidores and the emergence of a new trade route to the Atlantic would cause the decline of this port and its route to Potosi.

During the mid-18th century, the corregidores ruined the long-distance mule driving along the route through the abusive forced sale of goods to native communities and the creation of debt (*repartos de mercancías*). Native mule drivers were forced to transport ships’ cargo to Potosi, accepting very low salaries, often just one or two pesos per load (Arze 2004[1787]:194; Sanhueza 2011b). These salaries could not even cover the cost of a mule that died during the journey or pay for the costs caused by unforeseen delays (Arze 2004[1787]:194; Sanhueza 2011b). However, the problem was even deeper. The salary was not always paid in currency; it was common to receive some in the form of the forced sale goods, preventing the mule drivers from paying their debts (Arze 2004[1787]:194; Sanhueza 2011b). This situation was denounced by Cobija’s inhabitants to the Crown’s official, Doctor José de Arze, at the end of the 1780’s (Arze 2004[1787]:195). Chilean mules were one of the main goods distributed in these forced sales, and a strategic one that was sold by local corregidores at incredible high prices (Sanhueza 2011b). Basically, native mule drivers worked to pay for mules and other forced sale goods, but they could not pay their debt due to low salaries. This generated an economic crisis within native transportation. An official economic census

produced in the mid-18th century reported that only a part of the tributaries of Atacama La Baja were devoted to long-distance mule driving and suggested that wheat should be accepted as the official native tribute (Sanhueza 2011b). The transportation crisis caused the port to be discredited among sailors and maritime dealers after some failed attempts to contract services in Cobija (Arze 2004[1787]:195).

Near the end of the 18th century, the new official route between Potosi and the Atlantic dealt a final blow to the Potosi-Cobija route and its transportation. In 1776, Potosí's administrative unit was incorporated into the Vice-royalty of Río de la Plata (Hidalgo 2012:153), causing the bulk of trade between Potosi and Europe to be made via Buenos Aires (Villalobos 2009[1968]). The rebellion of Tupac Amaru (1780-1783) was caused in part by this measure and the abusive forced sales of goods, leading to the uprising of Indians, mestizos, criollos and even Spaniards, many of whom were dedicated to long-distance commercial mule driving to Potosí (Walker 2014). Atacama also participated in the rebellion under the command of the native leader Tomás Paniri (Hidalgo 2004[1996]:267). The rebellion did not succeed in reversing the status of the new commercial route to Buenos Aires, although it ended the forced sales of goods (Walker 2014). As a consequence of economic abuse, the official promotion of a new competing route, and war against the Spanish empire, the route to Cobija and Atacama mule-driving entered a long period of decline. At the end of the century, the port was inhabited by "miserable" natives dedicated only to the fishing of conger eel (Arze 2004[1787]:194). In this context, the authorities of Potosi studied the possibility of reactivating the route, arguing that long-distance Atacama mule traffic would be profitable without the abuse of forced sales of goods (Arze 2004 [1787]: 195), and that

the port could also be a thriving producer of whale oil (Veles 2004 [1787]: 197). However, these ideas were not carried out. At the beginning of the 19th century, Cobija was inhabited only by one person from Cochabamba and some of his native fisherman (Cajías 1975). The revival of the route had to wait until Bolivian independence.

The route was reactivated in 1825 under orders from Bolívar, Sucre, and Santa Cruz to give the newborn Republic of Bolivia a port on the Pacific (Cajías 1975). This objective was achieved by officially promoting emigration to the port, actively supporting long-distance mule driving and building accommodations along the route (Cajías 1975). Immigrants from various regions of Bolivia and South America arrived in Cobija thanks to a generous offer of land (Cajías 1975). The new economic and political context also attracted European merchants and investors, especially the Spanish and French (Cajías 1975:99). They set up trade houses dedicated to commerce with the interior (Sanhueza 2012:243). These houses reactivated commerce in the second half of the 1820s (D'Orbigny 1847:935). The port began to once again export precious metals during this period. All of the Potosi silver was exported through Cobija at the end of the 1820's (Letelier 2016:230). As in colonial times, not all these imports and exports were legal. In the beginning of the 1830's, traders actively smuggled silver and other valuables to the ships anchored in Cobija (D'Orbigny 1847:936). Each trade house had an official native rafter in charge of these delicate maritime maneuvers (D'Orbigny 1847:936). The land route was reorganized by the official construction of a system of inns (postas) and the implementation of policies that included subventions for fodder cultivation (Cajías 1975; Sanhueza 2011b:22). In this context, native long-distance mule driving flourished,

representing significant economic activity for native Atacameños¹ (Sanhueza 2012:243). Indigenous mule drivers transported freight under the modality of wage-labor, but also moved their own goods for sale and barter (Sanhueza 2012:244).

The construction of the Bolivian *postas* had two main phases. The first *postas* were built in 1830, during the government of Andres de Santa Cruz with government resources (Cajías 1975:86). Specifically, governor Aramayo constructed the *postas* between Cobija and Ascotán during this first phase (Cajías 1975:80). Conflicts with Peru during the 1830s damaged the port, affecting transportation and the infrastructure of the route. For this reason, the *postas* were systematically restored in 1840 during the government of Velasco (Cajías 1975:91). Each phase of construction met the official design and service requirements in order to improve transportation. Santa Cruz's *postas* included at least one house for the travelers supplied with water, food and fodder for the animals (Cajías 1975:80). This system defined a maximum allowable distance between inns of 40 kilometers, ensuring that travelers would reach one each night (Sanhueza, 2011:323). Velasco's reconstruction of the *postas* required two rooms, a kitchen, a local store and a corral to keep the animals (Cajías 1975:91). However, the Bolivian state not only designed and contracted workers to build the inns: they were also concerned with the functioning of this infrastructure.

The Bolivian government sought private tenants (*maestros de postas*) to manage the *postas* but also forced native laborers (*postillones*) to serve in these places (Cajías 1975:82, 85-86). The state supported private tenants by giving them agricultural land,

¹ The native communities of the Atacama Desert oases were called *Atacamas* during colonial times and *Atacameños* since early Republican times.

seeds, livestock, mules, farm tools, as well as capital loans (Cajías 1975:69, 80). The private tenants could sell products and fodder in addition to charging tolls in their postas (Cajías 1975: 80). In Atacama, the postas functioned under this model of private tenants supported by the state during the early 1830s (Cajías 1975:85). However, in practice this was not good business because these inns were occupied only by a few travelers that included businessmen and functionaries (Cajías 1975:85). Indigenous laborers were forced by the state to live and work in these inns to solve the problem of the lack of tenants (Cajías 1975:85). These forced laborers were paid or made exempt from indigenous tribute (Cajías 1975:86, 90). This type of labor made up a large part of the staff at the Bolivian postas and caused an important political debate about the abuses of the postillones by the military and other travelers (Cajías 1975:91). This official concern led to the creation of the Inspector of Roads in 1841(Cajías 1975:91). This was meant to stop these abuses, but also to control mule drivers and their loads (Cajías 1975:91). As a result of these official efforts traffic flourished and mule driving became, once again, an important economic activity for the native Atacameños (Sanhueza 2012:243). As in the past, this activity included transportation of freight for third parties, but also transportation of local goods within interregional circuits (Sanhueza 2011:244). The system of Bolivian postas started during the 1830s, however, the most intense traffic occurred during the 1840s and 1850s in the context of the economic boom of Cobija.

The system of postas supported traffic and long-distance mule driving between 1830 and 1870. Native long-distance mule driving was eclipsed by the introduction of carts in the 1870's (Sanhueza, 2011:324). Accordingly, these inns were labeled as "abandoned" on maps in the final years of the decade (Raimondi 1879). The War of the

Pacific (1879-1883) also contributed to the collapse of the route by creating an international border between Potosi and Cobija. Additionally, new economic poles changed the main roads by the end of the 19th century. For example, the Chilean port of Antofagasta provisioned the mines of Pulacayo and Huanchaca in the Bolivian altiplano. The construction of the Antofagasta-Uyuni railway line during the 1880's and 1890's connected this new port with the mines, and sharpened the crisis of native long-distance mule driving (Sanhueza, 2011:324; Thompson 2006). The Potosi-Cobija route entered the archaeological record. However, indigenous transporters continued to travel, sell, and exchange products between Lipez and Atacama using other routes through the 20th century (Nielsen 1997; Núñez 1992).

Both historic published sources and ethnoarchaeological research suggest that Andean transport in this region never depended on the existence of official road infrastructure. In the first case, none of the sources reported official housing on the Potosi-Cobija route during colonial times (Arze 2004[1787]; Peroud 1960; Domínguez y Cañete 1791). For example, the French merchant Bauver (cited in Peroud 1960:13), who travelled from Cobija to Atacama La Baja at the beginning of the 18th century complained about the use of small circular stone windbreaks for camping. The late colonial route was also constituted by a series of localities utilized for camping, called *pascanas* (Burdett 1928[1826]), in addition to some indigenous hamlets, native pastoralist settlements and haciendas that also supported the traffic (Hernández 1975[1830]). Even after the construction of the Republican system of postas, native mule drivers continued camping in their traditional *pascanas* (Palliere 1945 [1867]). The official regulation of the inns stated that its rooms were only for travelers, and that the

native mule drivers should occupy an alternative refuge (Sanhueza, 2011:323). These sources strongly suggest the lack of official colonial infrastructure along the Potosi-Cobija road and the coexistence of camp sites and inns during early Republican times. In this region, recent ethnoarchaeological studies (Nielsen 1997, 2013) also suggest the independence of Andean traditional transportation from formal road infrastructure.

In sum, the historical data about colonial transportation in South America indicates that the Spanish Empire did not invest in the construction of official road infrastructure until the late 18th century. In the Andean case, the sources indicate that colonial transportation was created and controlled by local elite individuals, and that the Spanish Empire only regulated general aspects of this activity. Among these general aspects were the prohibition of free personal service and porters, the regulation of prices in the inns, and the declaration of freedom of transit through the most convenient roads. In the Potosi-Cobija case, historical data indicates that transportation was a business organized and controlled by important local Spaniards and natives. These local individuals benefited from the movement of native laborers who transported legal and illegal goods using a dirt-road without any official imperial infrastructure. This contradicts the archaeological model of centralized imperial control based on the construction of official road infrastructure. Consequently, the historic data suggests the importance of analyzing colonial movement along the Potosi-Cobija route by focusing on its “unofficial” archaeological remains.

Chapter 3: Locating the Potosi-Cobija route and its archaeological vestiges

The localities linked by the route between Potosi and Cobija were identified and subsequently located by consulting several complementary sources of information. First of all, the identification was based on set of late colonial and early Republican descriptions (Burdett, 1928 [1826]; Cañete y Domínguez, 1952[1791]; Hernández, 1975 [1830]; Palliere 1945 [1867]; Phillipi 1860; Von Tschudi 1966[1858]). These descriptions were compared with historical maps from both periods, resulting in a list of localities referred to in both the writings and maps. Second, these places were located on contemporary maps, which allowed me to pinpoint areas with archaeological potential related to the route. Third, the investigation considered the visual interpretation of satellite imagery of these areas, or the systematic inspection of satellite images in the search for archaeological sites. Finally, some of the identified potential archaeological sites were inspected and analyzed *in situ* in Bolivia and Chile. In the following pages, the methodology that allowed the identification of the archaeological vestiges of the route is explained in greater detail.

The late colonial route was identified based on the descriptions of Cañete y Domínguez (1952 [1791]) and Burdett (1928 [1826]). Both writings describe the locations used as rest-stops during the second half of the 18th century and the first decades of the 19th century, and are the earliest published sources about the route. Some mid-19th-century writings demonstrate that the same late colonial route continued to be used during the early Republican era. On the contrary, there are no published

documents that describe systematically the early colonial route (16th and 17th centuries). Consequently, the definition of the early colonial route requires archival research and excavation in the localities of the late colonial route. For that reason, this research focused on the study of the route used during late colonial times. In the following paragraphs the route is defined based on the descriptions of Cañete y Domínguez (1952 [1791]) and Burdett (1928 [1826]), and these are then compared with other descriptions and maps in order to assess the accuracy of their descriptions.

Pedro Vicente Cañete y Domínguez was an official of the Crown who served as adviser to the Governor Intendant of Potosi (Hidalgo, 1983:191). Cañete y Domínguez collaborated actively in increasing Crown revenues and in the modernization of the mining industry in the region of Potosi (Charcas), defending the Potosi-Arica route as the main connection with the Pacific Ocean (Hidalgo, 1983:191). In his work "*Guía histórica, geográfica, física, política civil y legal del Gobierno e Intendencia de la Provincia de Potosí*" (1952 [1791]), Cañete y Domínguez describes the places through which the Potosi-Cobija route passed at the end of the 18th century. The second systematic description was written by the Francis Burdett O'Connor, an Irish military officer under the command of Bolívar and Sucre, in his report "*Reconocimiento del litoral de Atacama en 1826*" (1928 [1826]). Burdett was commissioned in 1825 to explore the Potosi-Cobija route, assess the implementation of an official system of lodgings (*postas*), and make recommendations for the improvement of the road itself (Sanhueza, 2011:323).

Both descriptions present interesting similarities but also some differences (see Tables 1 and 2). Among the similarities, both authors describe a route formed by a

sequence of traditional locations used to camp (*pascanas*), without mentioning the existence of formal lodgings or inns (*postas* or *posadas*). Both authors also mention nine localities used by colonial and early Republican travelers to rest: Chacance, Calama, Chiu Chiu, Santa Bárbara, Polape, Tapaquilcha, Alota, Amachuma and Agua de Castilla (see Figure 2).

Table 1: Colonial *pascanas* according to Cañete y Domínguez 1952 [1791].

Origin	Destination	Leagues	Kilometers ²
Cobija	Chacance	22	122.54
Chacance	Calama	17	94.69
Calama	Chiu Chiu	No reference	
Chiu Chiu	Santa Bárbara	12	66.84
Santa Bárbara	Polapi	8	44.56
Polapi	Tapaquilchas	19	105.83
Tapaquilchas	Viscachillas	8	44.56
Viscachillas	Alota	7	38.99
Alota	Río Grande	15	83.55
Río Grande	Amachuma	16	89.12
Amachuma	Agua de Castilla	9	50.13
Agua de Castilla	Cordillera de los Frailes	10	55.7
Cordillera de los Frailes	Porco	8	44.56
Porco	Potosi	9	50.13
Total		160	891.2

Based on these localities it is possible to describe the route in general geographical terms. Departing from the port of Cobija, travelers had to climb the coastal mountain range to then pass an extensive stretch of hyper-arid desert. The *pascana* of Chacance, located at the confluence of the Loa and San Salvador rivers, was an oasis in the heart of the Atacama Desert. From there, the route mounted the plateau created between the two rivers in the direction of the oases and towns of Calama and Chiu

² Based on the *Legua de veinte mil pies* (1 league = 5.57km).

Chiu. From the latter, the route took the upper course of the Loa River, passing through the hamlet of Santa Barbara and then by the vegetated steppes of Polape. The *pascana* of Tapaquilchas was used as a refuge in the dangerous crossing of the high Andes. From there, the road descended towards the steppe plateau (*altiplano*), specifically towards the high-altitude wetland of Alota. The road crossed the *altiplano*, passing by some rivers and reaching the *pascanas* of Amachuma and Agua de Castilla. During the last days of travel, the route passed a through steep territory heading to Potosi.

Table 2: Late colonial *pascanas* according to Burdett 1928 [1826].

Origin	Destination	Leagues	Kilometers
Cobija	Culupo	12	66.84
Culupo	Chacance	12	66.84
Chacance	Aguacate	6	33.42
Aguacate	Calama	10	55.7
Calama	Chiu Chiu	8	44.56
Chiu Chiu	Santa Bárbara	13	72.41
Santa Bárbara	Polape	6.5	36.205
Polape	Ascotán	9	50.13
Ascotán	Tapaquilcha	9	50.13
Tapaquilcha	Alota	11	61.27
Alota	Avilcha	11	61.27
Avilcha	Santa Catalina	11	61.27
Santa Catalina	Tinajas	10	55.7
Tinajas	Amachuma	5	27.85
Amachuma	Agua de Castillo	7	38.99
Agua de Castillo	Chiutaca	7	38.99
Chiutaca	Río Vicisa	11	61.27
Río Vicisa	Churata	8	44.56
Churata	Cebadillas	12	66.84
Cebadillas	Potosi	3	16.71
Total		181.5	1010.9

Despite the similarities, the authors differ in the rest of the localities connected by the route, the total number of stops, the total distance in leagues, and the distance between *pascanas*. In general terms, Cañete y Domínguez (1952 [1791]) describes a route constituted by fewer *pascanas* and greater distances between them. This author describes a route of 160 leagues (approximately 891 kilometers) with twelve *pascanas*, while Burdett O'Connor (1928 [1826]) describes a route of 181 leagues with nineteen *pascanas* (approximately 1010 kilometers). In 1801 the King Charles IV of Spain defined the “legua de veinte mil pies” as the official measure (Códigos españoles, 1850:210), and my calculations are based on this specific type of league. Consequently, both authors differ on the distance traveled each day: according to Cañete, an average of 12 leagues was covered in a day, and according to Burdett it was an average of 9 leagues. If we consider that one of those leagues equals 5.57 kilometers, the average distance covered in a day would be equivalent to 68.5 kilometers according to Cañete and 50.54 kilometers according to Burdett. This suggests a difference of almost 20 kilometers per day. However, it is not possible to ensure that both descriptions have used the same type of league for expressing distances (among other possible reasons for the discrepancy). In spite of the differences, both descriptions allowed the definition of the general emplacement of the route based on the localities mentioned in both texts.

In order to corroborate the accuracy of the descriptions of both authors, the localities were also compared with those described by other travelers in their diaries. Atanasio Hernández was commissioned by the President of the newly created Republic of Bolivia to traverse the route between La Paz and the port of Cobija in order to obtain information about how to improve communication between the two cities.

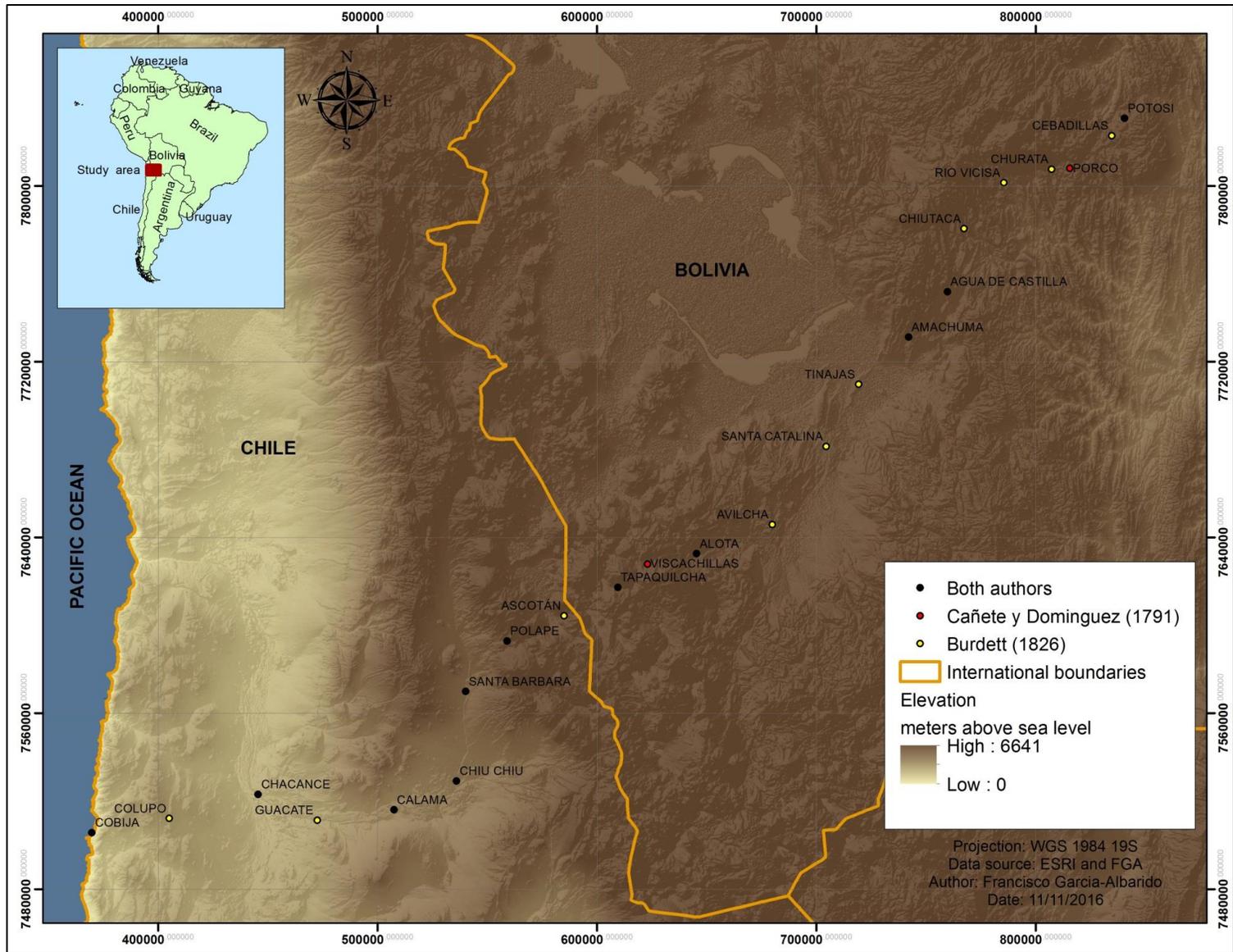


Figure 2: Localities on the Potosi-Cobija route according to Cañete y Domínguez 1952 [1791] and/or Burdett 1928 [1826].

In his "*Diario de un viaje (...)*", Hernández (1975 [1830]) mentions the same rest stops that Burdett does for the segment of the route between Avilcha and Cobija. The route was also described by other three travelers. The German naturalist Rodulfo Phillipi made a trip to the Atacama Desert during 1853 and 1854 by order of the Government of Chile. Phillipi (1860) mentions the localities that constituted the route between Viscachillas and Cobija in his work "*Viage al desierto de Atacama*". These correspond to those mentioned by Burdett, except for Miscanti, Pozo Cavado and Viscachillas, the last of which was also noted by Cañete y Domínguez (Phillipi, 1860:58). In 1858, the Swiss naturalist Johann Von Tschudi traveled from Cordoba to Cobija, describing the segment of the route that crossed the Atacama Desert. Von Tschudi (1966 [1858]) mentions the localities of Calama, Huacate, Miscante and Culupo on the route to Cobija in his work "*Viaje por las cordilleras de los Andes de Sudamérica*". Von Tschudi (1966 [1858]:396) indicates that the stops for the Bolivian Government officials were Calama-Miscante-Culupo-Cobija. Finally, the French artist Leon Palliere landed in Cobija at the end of the 1850s, undertaking the journey to the Argentine provinces via the Atacama Desert. In his "*Diario de viaje por la América del Sud*", Palliere (1945 [1867]) describes with interesting details the localities of Colupo, Miscanti and Calama, but does not include Chacance and Guacate. In general terms, the route described by these four travelers is quite consistent with that described by Cañete y Domínguez and especially by Burdett.

Representations of the road on historical maps were also analyzed to corroborate the route described by both authors and to improve the identification of its location. Cesar Borie (2013) conducted an analysis of historical maps for the segment

of the route between Cobija and Calama. His analysis defined the localities connected by the route using eleven historical maps, including those made by Malavez (1791), Arrowsmith (1834 and 1844), Phillipi (1853), Colton (1866), Bresson (1871), Pissis (1875), Wagner (1876), Bertrand (1884), Espinoza (1903), and Risopatrón (1910). Borie's work shows continuous use during the 19th century of the localities described in this segment by Burdett and Cañete, despite the appearance of some alternatives (for example Miscanti). My analysis of historical maps paid special attention to the segments of the route not analyzed by Borie, and incorporated eight additional maps, including ones made by Walker (1844), Harding (1877), Raimondi (1879), Bertrand (1879a, 1879b, and a different version of his 1884 map), San Román (1892), and Semper (first half of the 20th century).

Most of these maps were made during or after the war of the Pacific (1879-1883) at the request of the Chilean Government and represented only the portion of the route located west of the Andes. In general terms, the localities depicted in this portion are the same mentioned in all the texts cited and represented in the maps analyzed by Borie (2013). Miscanti is a locality represented on the maps of the second half of the 19th century but not mentioned by Cañete y Domínguez and Burdett. However, the full route was represented on four maps; two of them were included in the analysis of Borie (Malavez (1791) and Risopatrón (1910)). My study added two other maps: one made by the Italian geographer and naturalist Antonio Raimondi (1879), and another made by the British geographer and hydrographer James Walker (1844). These maps were studied with special attention since they present information about the route to the east of the Andes.

Hilario Malavez, officer of the Mint of Potosi, depicted a route constituted by the same localities mentioned by Cañete y Dominguez for the segment Cobija-Alota (see Figure 3). However, his "*Carta Geográfica que contiene los seis partidos que comprende la Provincia de Potosi*" (1787) does not present details for the remaining segment of the route (Alota-Potosi). Despite this lack of precision, Malavez's route would follow a path consistent with the description of Cañete, passing through the vicinity of San Cristóbal, the confluence of the rivers Santa Catalina and San Pedro, and the hills of Corregidores, Pampa Pelada and Porco. Although Malavez elaborated this map for Cañete y Dominguez, the depiction of the route does not include all the localities mentioned in the written description. This suggests some independence between both sources and indirectly supports the written description of the adviser of the Governor of Potosi.

The route was represented by English geographers after the independence of Bolivia in 1825. John Walker, author of numerous maps for the British Admiralty, made a detailed representation of the route in the mid-1840s. Walker's map (1844) includes the same locations mentioned in the descriptions by Burdett for much of the route (the segment between Cobija and Amachuma). The map indicates the localities of Tocontaca, Vizisa and Chitaca as stops between Potosi and Amachuma. Burdett (1928 [1826]) also mentions them but only as places where the route passes, not as rest stops. Burdett's descriptions are also confirmed by the map of A. Raimondi (1879). His "*Mapa del Teatro de la Guerra*" has perhaps the most detailed representation of the route, showing a strong similarity with the localities listed by Burdett.

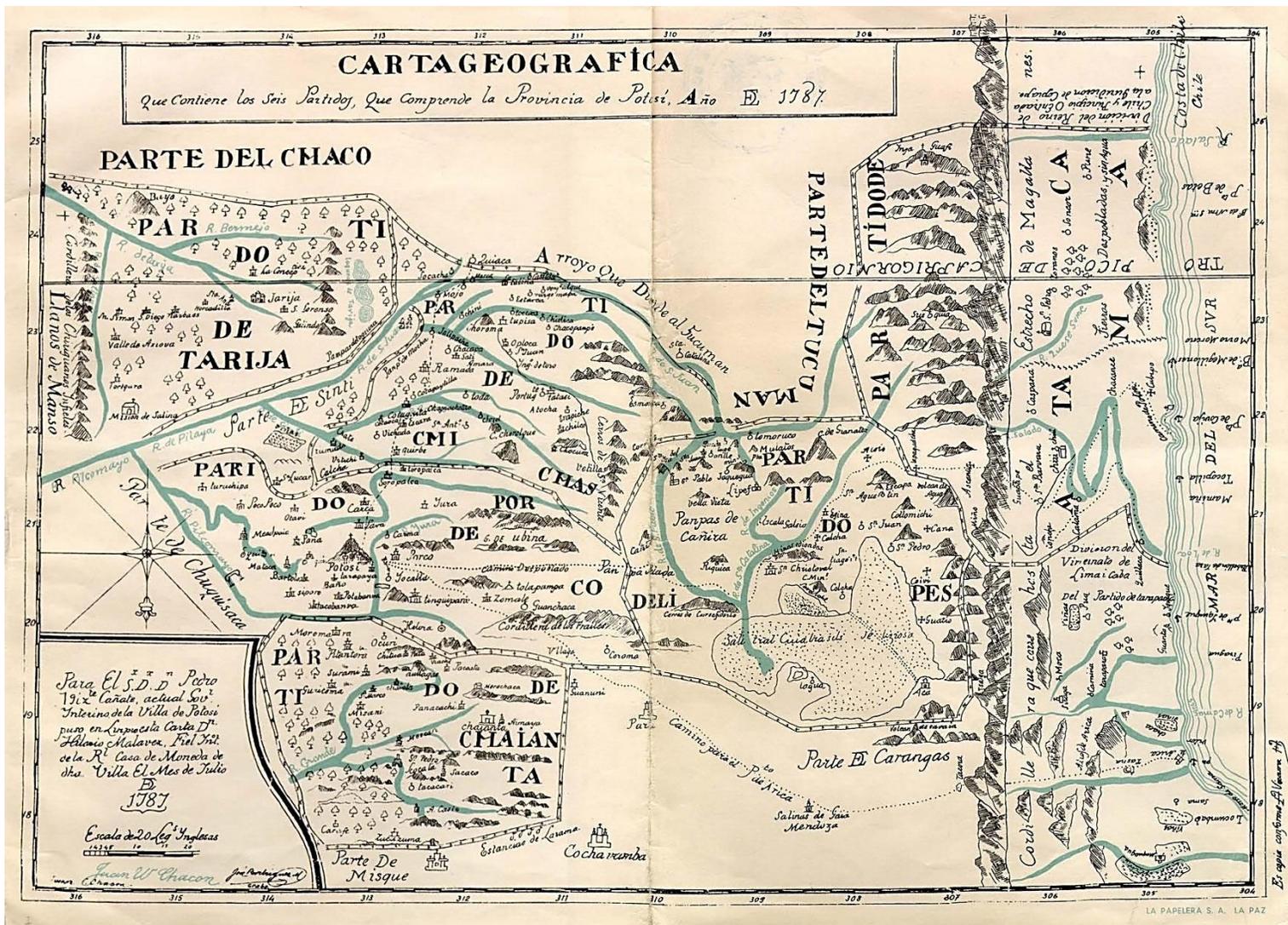


Figure 3: “Carta geográfica que contiene los seis partidos que comprende la Provincia de Potosí” (Hilario Malavez 1787).

The map also points out that the *postas* of Colupo and Ascotán were abandoned, naming them "Colupo Viejo" and "Ascotán Vieja". Finally, the map of Luis Risopatrón (1910) re-confirms the locations mentioned by Cañete y Domínguez and Burdett, although with some variations related to the growth of the mining center of Huanchaca.

In addition to descriptions and old maps, a third source of information reaffirmed the location of the route: the archaeological literature. Two types of studies presented information about the route: those focused on the routes and inns (*tambos*) of the Inca Period; and those that describe early Republican inns (*postas*). The first have been carried out in the upper course of the river Loa (Chile) and in the Andes of the Nor and Sud Lípez provinces (Bolivia), while the initial investigations on *postas* have been done only in the Atacama Desert.

In the case of the Inca Road (*Qhapaq Ñan*), several segments have been recorded by Berenguer and collaborators (2005) between the localities of Santa Barbara and Lasana. These segments of the Inca road show a direct spatial association with segments of roads used during the Late Intermediate and Colonial periods (Berenguer et al. 2005). On the Bolivian side of the Andes, Nielsen et al. (2006:226) have recorded segments of the Inca Road in the "Corredor Ramaditas", suggesting that it would cross the Potosi-Cobija route in the vicinity of the Hedionda lagoon. Both publications suggest that the Inca roads advanced parallel to the Andes heading north to Collahuasi and Colcha-K respectively. Similarly, the first publication suggests that colonial and Republican transportation would have used the late pre-Columbian route of the upper Loa River, while the second suggests that the segment of the Potosi-Cobija route that crossed the Andes would have originated in colonial times. Both publications

confirm the existence of the route and the veracity of the historical descriptions for this particular region.

Evidence of historical traffic has been discovered in various multicomponent archaeological sites in the area (Nielsen, 1997:357; Nielsen et al., 2006:227). In the case of the upper Loa, excavations in several sites with structures have also shown that they were occupied by colonial and Republican travelers. In this area, the main Inca sites associated with the Inca Road were also occupied during colonial and republican times (Berenguer et al., 2005:17). The *tambo* of Incaguasi presented an interesting case of continuous occupation from Inca to Republican times (Berenguer et al., 2011:18). In the locality of Santa Bárbara, several sites have pre-Columbian and colonial domestic deposits, as well as the rock art of llama drivers (*caravaneros*) in some cases (Cáceres and Berenguer, 1996:387-391; Berenguer et al., 2005:35; Berenguer, 2006:194; Berenguer et al., 2007:47). Similarly, in Santa Bárbara the rock art of 19th century travelers includes names, dates and even the drawing of a ship (Berenguer et al., 1985:103). The continuity of occupation has also been identified in the archaeological sites associated with the Inca road of Ramaditas and several campsites in Lípez, Bolivia (Nielsen, 1997:357; Nielsen et al., 2006:227).

Burdett's (1928 [1826]) mention of the use of Colupo and Guacate as places to rest on the route was confirmed by archaeological research on early Republican *postas* in Atacama. Borie and collaborators (2016:215) described the *postas* of Colupo Viejo, Colupo Nuevo, and Guacate, while the same author described the *posta* of Despeñadero (Borie 2013). Varela et al. (2008a and 2008b) also mention the existence of colonial and late pre-Columbian ceramics in the first three sites. In sum, the late

colonial and early Republican route was solidly defined using three complementary sources of information. The written descriptions provided the names of the localities connected by the route, which were confirmed by the historical maps, and finally by archaeological research in the case of some specific localities.

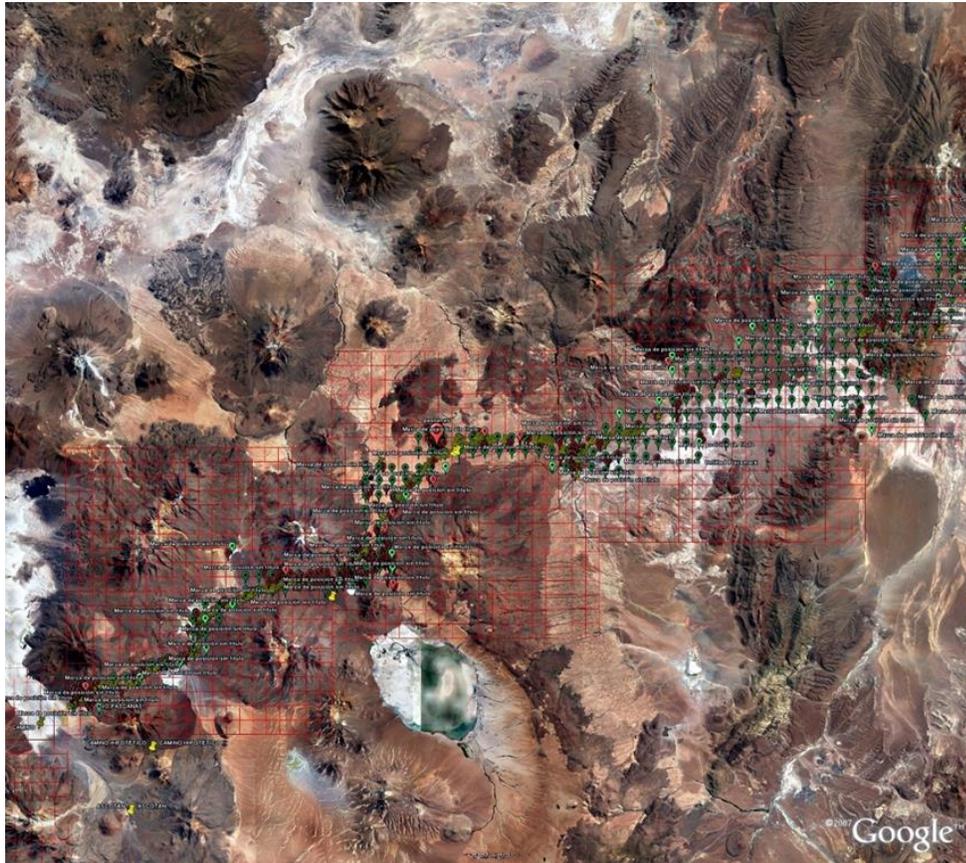


Figure 4: Visual interpretation of Google Earth satellite imagery.

The second stage of the research entailed locating the places mentioned in historical descriptions on contemporary maps. This task was carried out using the topographical maps of the military geographical institutes of Bolivia and Chile (scale 1:50,000). In the Bolivian case, the maps were digitized by the institute and are

available on the internet³. These topographic maps were studied in depth to relate contemporary toponyms with the locations mentioned by the historical sources. All the places noted by Burdett (1928 [1826]) were identified on contemporary maps. This facilitated the identification of the locations in the satellite imagery provided by Google Earth, allowing the solution of problems related to the repetition or absence of toponyms. As a result, the historical place names were transformed into current locations and identified in satellite images. This made possible the development of the next stage.

The third stage was the identification of archaeological sites through the systematic visual interpretation of satellite images of the route. This step required the use of high spatial resolution images as well as a digital grid (see Figure 4). The images used were those produced by Digital Globe and CNES/Spot, and provided by the Google Earth software. These images have high spatial resolution, with a pixel size of one square meter, for the majority of the localities. To develop a systematic visual interpretation of each locality, a series of digital grids were superimposed on the satellite images of Google Earth. The grids were generated using the program Create KML Grid⁴ and loaded into Google Earth (in .kml format). Nineteen of these grids were used to cover the route. The dimensions of each grid were 33 by 31 kilometers, covering an area of 1,023 square kilometers. Each grid was subdivided into small units of observation measuring 1.6 by 1.5 kilometers. A subset of these small units was selected in each grid for visual interpretation based on traversable topography and the presence of key resources such as water and pastures. The observation included a majority of

³ <http://www.igmbolivia.gob.bo/downloads/cartografia/h50psad56/pdf/>

⁴ <http://www.binaryearth.net/CreateKMLGrid/>

units in areas of easy transit. On the contrary, topographical obstacles like steep mountains or volcanoes were not inspected.

The visual interpretation of these units resulted in the identification of a total of 166 anomalies that were interpreted as potential archeological sites with architecture. Additionally, 31 linear anomalies were interpreted as possible segments of archeological routes. Unfortunately, the spatial resolution of the images did not allow the identification of archaeological sites without architecture, except for the linear features. The following stages of the research focused on the first set of anomalies: potential campsites with structures (*pascanas*) and inns (*postas*). The potential route segments were left out. This decision was made in part based on logistical factors such as the time and other resources available for field work. The following step was the selection of potential archaeological sites with architecture for ground-truthing.

The selection of these targets was based on the expectations provided by archaeological, historical and ethnohistorical descriptions of *pascanas* and *postas*. Archaeological expectations for pascana sites were provided by ethnoarchaeological research on modern-day llama caravaneers and mule-drivers from the South Central Andes. Nielsen (1997:341) demonstrated how the native llama and mule drivers of Sur LÍpez (Bolivia) base their routes on a sequence of well-known campsites called *jaranas* or *pascanas*. These places are occupied repeatedly to rest and eat, but also to perform rituals and repairs, for one or more nights, depending on the needs of humans and animals (Nielsen, 1997:341). Within these places, the native drivers build simple windbreaks by stacking rocks in a circle or semi-circle, between 1.5 to 2 meters in diameter, bigger U-shaped structures to load and unload the animals and, in some

cases, corrals (Nielsen, 1997, 2013). Similar types of archaeological campsites have been identified along pre-Columbian routes in the region (Berenguer 2004; Berenguer et al. 2005; Nielsen 1997; Nielsen et al. 2006), and were described by colonial travelers along the Potosi-Cobija route (Peroud 1960), suggesting a traditional transportation logistics based on campsites and informal architecture used for centuries in Atacama and LÍpez.

In the case of republican postas, the archaeological expectations were provided by descriptions of the known sites (Berenguer et al. 2005; Borie 2013; Borie et al. 2016; Varela et al. 2008a, 2008b), such as Colupo and Guacate, but also by historical descriptions by mid-19th century travelers (Palliere 1945 [1867]; Phillipi 1860; Von Tschudi 1966[1858]). The archaeological descriptions mention the existence of rectangular structures and corrals in these sites. They also describe specific material culture remains, such as glass bottle fragments and cans that are also mentioned by historic travelers. The historical descriptions provide an incredible degree of detail about the architecture and other characteristics of these inns. Although the design of each posta varied, they all included at the very least a room for the native worker and a room for passengers, a kitchen, and a corral (Palliere 1945 [1867]; Sanhueza, 2011:323). The construction materials included worked rocks and adobe bricks, or wooden boards (Palliere 1945 [1867]; Phillipi 1860; Von Tschudi 1966[1858]). In these sites, the postillones sold a wide variety of products including water, hot and canned foods, tobacco, and European alcohol, including beer, wine, and cognac (Palliere 1945 [1867]; Von Tschudi 1966 [1858]: 394). The inns also provided tableware to travelers (Palliere 1945 [1867]:180). The mules were fed with dry fodder sold by the postillones. However,

numerous corpses of dead mules littered these sites (Palliere 1945 [1867]:178; Von Tschudi 1966[1858]:388). These expectations led to the selection of potential *pascana* and *posta* sites represented by anomalies that suggested the presence of clusters of small circular structures or quadrangular structures associated with corrals, respectively. A total of 45 anomalies were selected for ground-truthing, corresponding to 27% of the potential archaeological sites with architecture. The rest of the anomalies presented characteristics not so well aligned with the archaeological expectations of *pascanas* and *postas*.

The fourth stage of the research was the *in situ* verification of the targets. This was carried out in the *altiplano* and the Atacama Desert during the months of May and June, 2016⁵. To make this possible, the coordinates of the objectives (UTM, Datum WGS1984) were exported from Google Earth and converted to GPX format (using the GPS TrackMaker software). The method described above proved ineffective in the case of the anomalies interpreted as potential archaeological *pascanas* but highly effective for archaeological *postas*. The anomalies interpreted as possible *pascanas* corresponded to sandy surfaces or vegetation eroded by the wind generating grouped circular or semicircular patterns. To mitigate this problem, archaeological inspections were carried out in areas of high occupation potential like perimeters of the wetlands of Chaquilla and Alota (Bolivia). This allowed the identification of *pascana* sites both in the highlands and in the desert, suggesting that the problem originated from both the presence of natural anomalies as well as by the spatial resolution of the images (a sub-metric spatial resolution might solve this problem). In contrast, the remote interpretation

⁵ In addition to the author of this thesis, Dr. Mary Van Buren and the Bolivian archaeologist Valeria Antezana collaborated in the ground-truthing phase of the research.

turned out to be very effective in the case of the *posta* sites and other types of sites with large architecture. It also allowed the identification of the archaeological remains of hamlets and even individual households, suggesting that the methodology would have allowed the identification of all those sites with medium and large scale architecture. It also proved to be useful for the identification of potential archaeological road segments associated with the archaeological sites.

This stage of the research also included material culture analysis. Once identified, the archaeological sites were analyzed *in situ* to address the question about their potential association with historic transportation in chronological and functional terms. The analysis was based on surface material culture and architecture, without doing any collections or excavations. The analysis considered diverse variables depending on the type of evidence, and employed specific forms for recording ceramic, glass and architecture. Ceramic and glass remains were primarily analyzed to define the chronology of the sites and the main activities performed at them (for example food consumption). Architectural remains were analyzed in order to characterize function and the degree of investment in the construction of the structures. The *in situ* analysis produced an important body of information that was used to answer several of the research questions.

In sum, the modern-day location of the Potosi-Cobija route was defined using historical descriptions, historical maps and contemporary maps. The localities connected by the route were systematically analyzed using satellite imagery and a grid of cells. The visual interpretation of these images allowed the identification of an important number of potential archaeological sites. Complementarily, historical,

ethnographical and published archaeological data was used to define specific archaeological expectations about pascana and posta sites. These expectations were used to select a subsample of targets for field inspection among the potential archaeological sites. This inspection included architecture and material culture in situ analysis that allowed a better chronological and functional understanding of the sites related to historic transportation on the route. As a result of this methodology, a set of colonial and early Republican sites was identified in the 19 localities connected by the route. Interestingly, the range of identified archaeological sites was not limited to the two types of sites referred to above. The next chapter presents a detailed account of the archaeological results obtained as a result of this methodological approach.

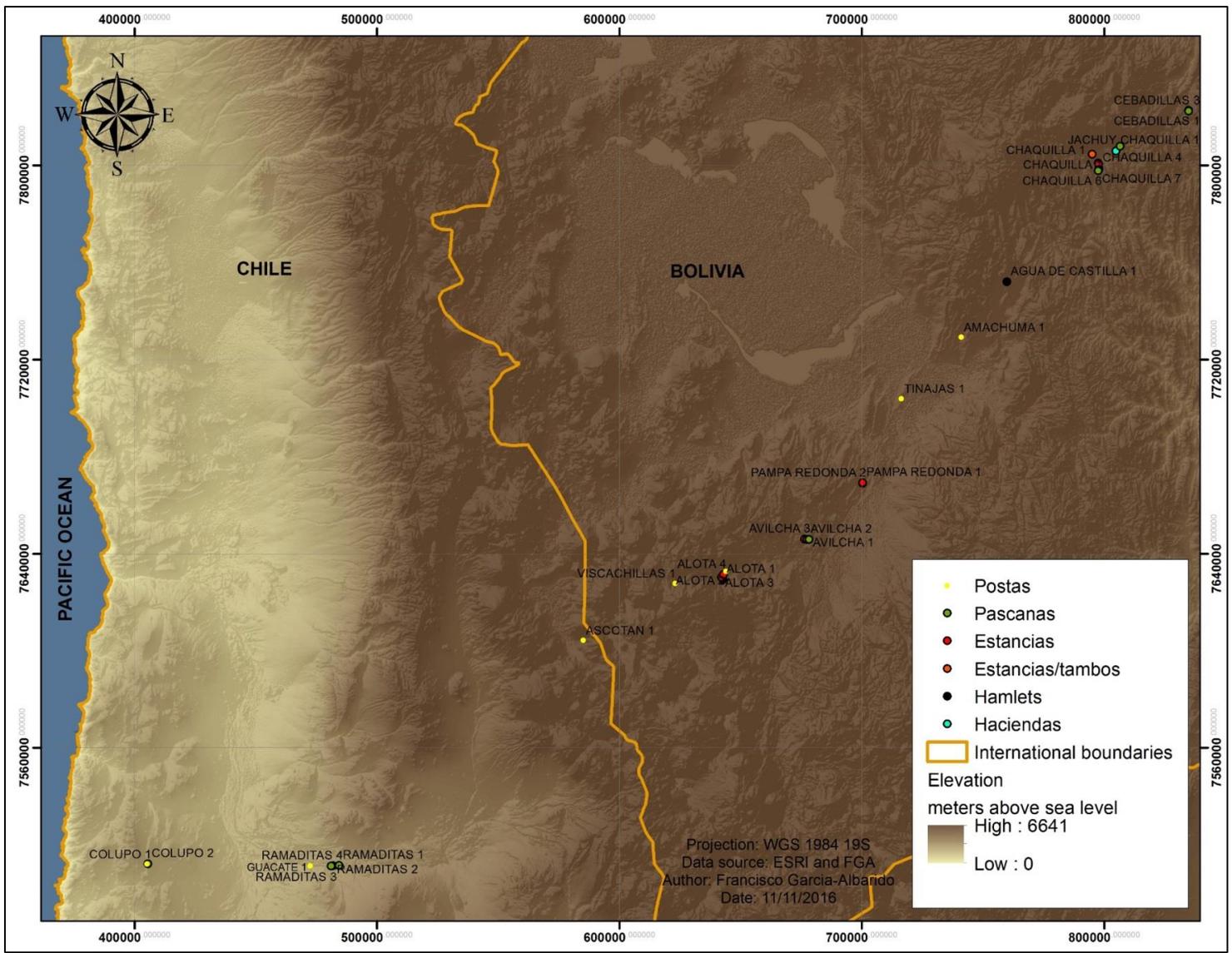


Figure 5: Location of the identified archaeological sites by type.

Chapter 4: Historical archaeology of the Potosi-Cobija route

A total of 34 archaeological sites related to historic transportation were identified in the localities that constituted the route (see Figure 5). These sites ranged from specialized lodgings for travelers to pastoralist settlements with evidence of the presence of pack animals. The sites were grouped into five main categories: *postas* (7 sites); *pascanas* (12 sites); *estancias* (12 sites); hamlets (2 sites); and *haciendas* (1 site). These results indicate the existence of specialized infrastructure during early Republican times and suggest the absence of an infrastructure of support and control during the colonial period. In general terms, this panorama is consistent with Nielsen's (2011) statement that in this particular region only the Inca and the Bolivian states made an effort to build infrastructure along the routes. This set of archaeological sites represents different functions and moments in time.

As we saw in Chapter 2, *postas* were specialized infrastructure designed and operated to support early Republican transportation along the Potosi-Cobija route. Campsites or *pascanas* are also a type of site directly related to colonial and early Republican transportation (Burdett 1928 [1826]; Martínez 1985; Nielsen 1997, 2013; Nielsen et al. 2006). This type of site is the product of the movement of people and goods along the road during both periods. These sites are the places used by native travelers to rest during their trips, but they do not present any type of official infrastructure. The other two types of sites, *estancias* and hamlets, were primarily related to pastoral activities. However, according to historical and archaeological

sources they also were a key component of the support for travelers on this particular route (Burdett 1928 [1826]; Cajías 1975; Hernández 1975 [1830]; Berenguer 1994, 2006; Berenguer et al., 2005, 2007; Nielsen 1997).

This research focused on the potential construction of control and support road infrastructure by the Spanish government along the Potosi-Cobija route. Consequently, ground-truthing was oriented towards the identification of archaeological inns and other potential types of road infrastructure. The research was not focused on the official investment in the road itself. However, historical sources suggest that even the most important caminos reales were simple dirt roads created by the movement of people and animals (Diago and Ladero 2009; Pérez 2001; Sanjurjo 2012). This was the situation on the Potosi-Cobija route: it was constituted by dirt roads during the colonial and Republican periods. Archaeological inspection of segments of these roads was not part of the objectives of this research. However, dozens of segments of dirt roads were located during the remote sensing phase. Many of them evidenced a clear spatial association with some of the identified archaeological sites. Its archaeological survey remains as a future task.

Despite this fact, the research identified an interesting diversity of archaeological sites that constitutes an entry point to analyze colonial and early Republican transportation. In the following pages, five main categories are described and analyzed.

4.1.- Specialized accommodations (*postas*)

The archaeological *postas* represent direct evidence of specialized infrastructure along the route that was built during the early Republican era (see Figure 6). Seven of

these sites were identified and analyzed (see table 3). Two had been previously located (Colupo 01 and Guacate 01) by Chilean archaeologists (Borie 2013; Borie et al. 2016; Varela et al. 2008a, 2008b). Another five were identified by the combination of visual interpretation and archaeological inspection. The architectural features and material culture of these seven sites suggest a detailed official plan with regard to construction and logistics. These sites were planned and carefully built, and particular locations protected from the wind and near water upwellings⁶ were selected. In these places, rectangular architectural compounds were constructed including subdivisions that, despite some variations, served similar functions. Three main elements are included in these sites: rectangular rooms, enclosed patios, and rectangular corrals. Wood fired ovens are also located in the majority of patios.

This pattern of subdivisions was created to serve specific functions: rooms served for the accommodation of groups of travelers and native *posta* workers (*postillones*); patios served as spaces for cooking and feeding travelers; and corrals were used to shelter pack animals. Logistics planning is also indicated by the material culture observed on the surfaces of these sites. The vestiges of local, regional, and imported foods suggest the regular supply of these remote facilities. These architectural characteristics, their relationships with certain activities, and the remains of the available products in the *postas* are highly consistent with the descriptions of mid-19th century travelers who stayed at these inns (Palliere 1945 [1867]; Von Tschudi 1966 [1858]). The evidence of architectural planning and supply is presented in the next pages.

⁶ Except in the cases of Ascotán 01 and Colupo 01.

Table 3: archaeological *postas* and architectural features.

name	rooms/ mts ²	corrals/ mts ²	patio/mts ²	ovens
Amachuma 01	3/130.4	3/613.5	1/216	1
Tinajas 01	2/145.4	3/1078	Indet.	Indet.
Alota 02	8/430	3/640	1/indet.	Indet.
Viscachillas 01	8/285.8	1/262.5	1/216.7	1
Ascotán 01	5/174.8	2/554.2	1/377.5	1
Guacate 01	3/154	2/472.2	Indet.	1
Colupo 01	2?/96?	3/732,3	Indet.	1

Each of these sites exhibits a constructive effort aimed at the accommodation of groups of travelers and their animals. The sites included between two and eight well-constructed rectangular rooms. These rooms were on average 9.2 m long and 4.7 m wide, with an average roofed habitation area of 43 meters². Several of these sites suggest a significant capacity for accommodating travelers. For example, Viscachillas 01 includes eight rooms occupying an approximate roofed area of 285 meters². This represents an important capacity for a remote facility constructed at 4248 m.a.s.l. during the early 19th century. On the other hand, Amachuma 01 had the least accommodation capacity⁷. However, it includes two large rectangular rooms and a small one, with enough space to accommodate small groups (130 meters²).

The official effort put into the construction of these inns is also suggested by the materials used to build the rooms. The walls were constructed using worked stone and/or regular adobe bricks. The walls built with these materials were regular, thick (between 60 and 80 cm), and absolutely vertical. This effort was also suggested by the walls' height and finish, such as whitewash, which can be seen in cases with good conservation. For example, in Amachuma 01 walls were preserved up to 4 meters high,

⁷ The poor preservation of Colupo 01 did not allow reliable estimates.

while in Guacate 01 and Viscachillas 01 walls covered by white lime plaster were identified.

The architectural planning also included a rectangular walled patio associated with rooms in most cases (see Table 3). Two patterns were identified: patios created by rooms built in a U-shape (for example, Amachuma, Alota y Viscachillas) and rectangular walled patios that had a single row of rooms along one side (for example, Ascotán, Guacate y Colupo). These architectural patterns are illustrated by Figure 7. In the last two cases, the presence of layers of manure suggests that these patios were also used as corrals during reoccupations of the sites. However, the original architectural project included the careful construction of rectangular corrals. The same building materials found in rooms and patios were used to construct the corrals. The number of corrals varied between one and three depending on the site, while their capacity for sheltering animals varied between 262 and 1078 meters² (see table 3). Despite this variability, it is clear that the design included space for pack animals in all cases. It is not clear why there is so much variation in the size of corrals. However, the sites closer to Potosi or Cobija tend to have more corrals, while Viscachilla 01, located at the crossing of the high Andes, has only one.

Other evidence also suggests planning aimed at the support of groups of travelers. Wood fired ovens were carefully constructed in five of seven of the sites using adobe bricks and worked stones. The presence of this element suggests the existence of food service for travelers and consequently the presence of workers in charge of the functioning of the inns, as it was clearly described by historical sources (Palliere 1945 [1867]).



Figure 6: Early Republican postas of Viscachillas 01 (above) and Ascotán 01 (below).

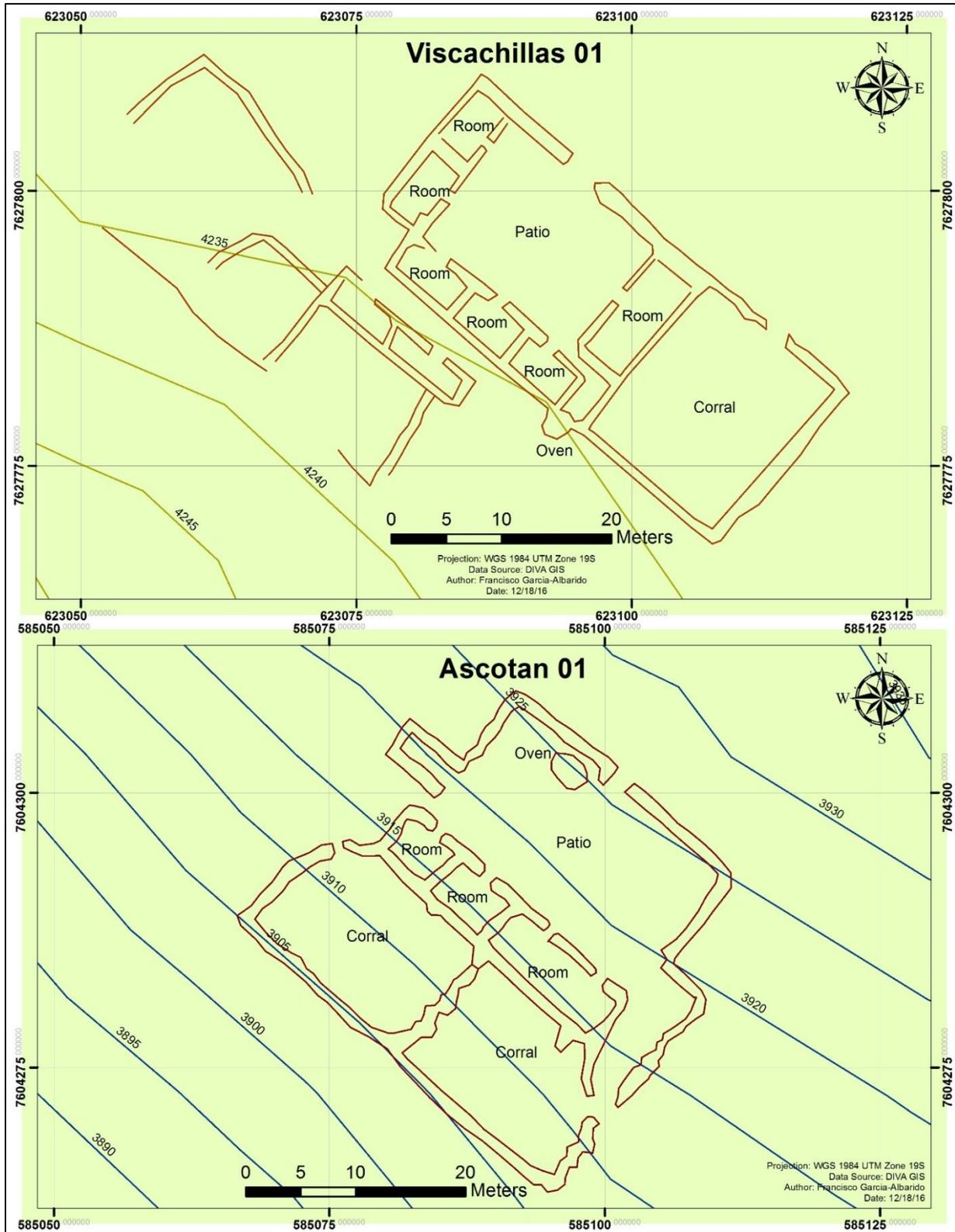


Figure 7: Architectural patterns in early Republican postas.

The supply of the postas with various foodstuffs was evidenced by garbage middens. The remains of local, regional, and imported products used and consumed by residents and travelers were identified in these places. These products are mentioned by historical travelers (Palliere 1945 [1867]; Von Tschudi 1966 [1858]).

In general, local and regional products were represented by faunal remains, floral remains (in the case of sites located in the desert such as Colupo 01), and fragments of coarse earthenware and majolica (used to cook and serve food). However, the sites were also supplied with European products. These included diverse types of alcohol, refined earthenware, and canned products (see Figure 8). Many of these products were of British origin.

In sum, evidence from the postas indicates that the early Republican route was equipped with official infrastructure for housing and food. In these places, the travelers rested and consumed diverse foods sold by resident laborers. The first activity is indicated by the remains of roofed rooms, and the second by the presence of wood-fired ovens and dispersed middens. In the second case, the diversity of evidences in these middens suggests inns that were stocked through economic relationships that involved local, regional and long-distance transportation.

4.2.- Campsites (pascanas)

In the South Central Andes, pascanas were places used to camp alongside trails or roads (Nielsen 1997:341). They were chosen due to the presence of key resources such as water and pasture (Burdett 1928[1826]:276). Travelers rested and ate in these places, building and using informal structures for the first activity in some cases (Nielsen

1997:343). However, written sources also point out that many of these places did not have any kind of architecture (Burdett 1928 [1826]; Hernández 1975[1830]). The archaeological remains of twelve pascanas were identified along the Potosi-Cobija route (see Table 4). Nine of these sites included informal architecture (see Figure 9), while the remaining three sites corresponded to camps without architecture. Both sets of sites are described in this section.

Table 4: Archaeological pascanas and architectural features (meters).

locality	site	n° structures	morphology	diameter
Guacate	Ramaditas 1	1	U-shaped	2.5
	Ramaditas 2	2	U-shaped	2.6/1.5
	Ramaditas 3	1	semicircular	2.5
	Ramaditas 4	2	semicircular	1.5
Colupo	Colupo 02	2	semicircular	1.5/4
Cebadillas	Cebadillas 3	1	semicircular	1.6
Chaquilla	Chaquilla 05	1	semicircular	2.4
	Chaquilla 06	1	semicircular	3.7
	Chaquilla 07	1	semicircular	3.5
Avilcha	Avilcha 01	0	/	/
Churata	Churata 01	0	/	/
Cebadillas	Cebadillas 01	0	/	/

Pascana sites with architecture were identified both in the altiplano and the Atacama Desert. In each of these sites a single structure or two paired structures were used by travelers as windbreaks for overnight camping. These structures are U-shaped or semicircular, and were made rapidly with little effort. The walls were constructed with a single row of small local rocks (less than 25 centimeters long) without the use of mortar. In general, the dimensions of the structures suggest temporary use by an individual. Most of the structures are less than 2.5 meters long, while walls have heights lower than 40 centimeters. Evidence of the feeding of travelers was found in direct

association with the structures, including small numbers of ceramic fragments and organic remains⁸. These scarce remains also suggest an ephemeral use of the sites. This type of site was identified in four localities.

In the Atacama Desert, several pascanas with architecture were located in Guacate and Colupo. Four sites were identified in the vicinity of Guacate in direct association with segments of the road (see Figure 9). The area also has a large number of geoglyphs associated with pre-Columbian and colonial transportation. Diverse remains were associated with the structures, including iron horseshoes, maize cobs, fragments of native textiles, shards of blown bottles, fragments of brown coarse earthenware ceramics and fragments of botijas. One pascana with architecture was identified in Colupo. The site showed two paired structures associated with historic materials (fragments of early 19th century bottles), and is in direct association with the road itself. This small sample is the result of a non-systematic archaeological inspection done near the posta sites in both localities. However, these exploratory results suggest that the Atacama Desert has amazingly preserved this fragile archaeological record due to its aridity and isolation, and that this area is a good entry point to identify the colonial and early Republican system of pascanas on the Potosi-Cobija route.

The environmental conditions of the altiplano did not allow the preservation of organic remains (in contrast to the desert). Chaquilla and Cebadillas were the only localities in the highlands where pascanas with architecture were identified. Three of these sites were found in the first locality. The sites have individual semicircular structures with diameters ranging between 2.4 and 3.7 meters. Only ceramics were

⁸ The latter only in the desert.

observed. One of these sites (Chaquilla 05) had fragments of Andean polychrome majolica in association with the structure. This suggests its ephemeral occupation during the colonial period. Only one pascana with architecture was identified in the locality of Cebadillas (Cebadillas 03). This site had a semicircular structure associated with coarse earthenware ceramic fragments. Diagnostic ceramics from prehispanic, colonial or Republican periods were not observed. Finally, archeological reconnaissance led to the identification of these nine pascanas with architecture, suggesting the need for traditional techniques of archaeological survey for this type of site. Remote sensing did not provide good results for campsites with small informal architecture. The same happened with campsites without architecture in other localities of the route.

Three sites identified in the localities of Avilcha, Churata and Cebadillas corresponded to pascanas without architecture. These sites were located in strategic places in the rest localities mentioned by written sources. These locations were directly associated with water and natural protection from the wind⁹. In Avilcha, a colonial pascana was identified on a sandy plain near springs (Avilcha 01). The site had a low density and dispersed colonial deposit constituted by fragments of bronze horseshoes, blown bottles, green glazed ceramics, and fragments of botijas. This deposit suggested ephemeral colonial occupations of the site, including food consumption and the presence of pack animals (probably equines). The presence of abundant lithic debris also suggested the importance of these springs for earlier occupants.

⁹ Excepting the case of Avilcha 01.

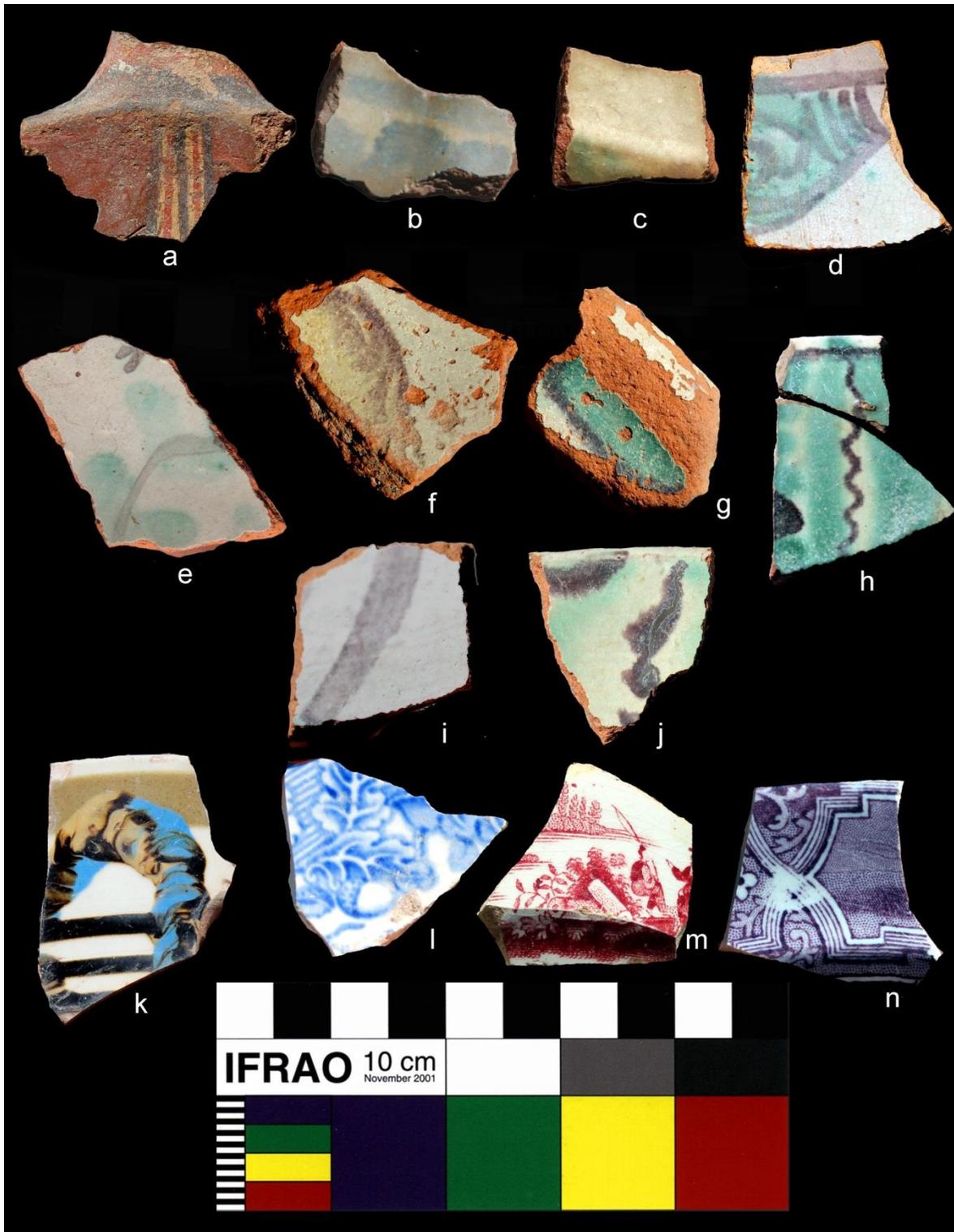


Figure 8: Main ceramic types identified in the *in situ* analysis: local Inca (a); Panamanian majolica (b, c & d); unidentified Latin-American majolica types (e-h); Andean majolica (i & j); English banded refined earthenware (k); English transfer print refined earthenware (l-n). For provenience see Appendix 1.



Figure 9: Pascanas of Colupo 02 (above) and Ramaditas 03 (below).

In contrast to this case, the other two camps did not contain diagnostic artifacts, and would require absolute dating to confirm their antiquity. A possible camp site related to the route was identified in Churata (Churata 01). This site was discovered in a strategic place supplied with pastures and water, and connected with an archeological road that passes through the site. Unlike Avilcha 01, in this place neither botijas, horseshoes nor colonial glass were identified. Only monochrome and decorated coarse earthenware fragments were observed. These might correspond to late pre-Columbian ceramics (Axel Nielsen and Pablo Cruz personal communications). However, a fragment of Blue on White Panamanian majolica was discovered near the site. This find confirmed the colonial occupation of this naturally protected space at some point between the second half of the 16th century and the second half of the 17th century. In the nearby San Juan river, a *cruz de calvario* was painted on one of the canyon walls. This motif is representative of the colonial rock art of the South Central Andes (Arenas and Odone 2015).

Another camp (Cebadillas 01) was identified near the banks of the river in Cebadillas, at a point protected from the wind and connected with one old road that arrives at the river 80 meters from the site. This site exhibits similar ceramic types to those of Churata 01, including fragments of monochrome coarse earthenware, and decorated ceramics with linear designs in black on orange. The latter could correspond to late Pre-Columbian Yura ceramics (Axel Nielsen and Pablo Cruz personal communications). In consequence, the last two cases might be late pre-Columbian sites. However, the continuity during early colonial times of late pre-Columbian ceramic types, and the location of these sites in strategic locations for camping (with colonial

evidence in Churata), indicates the need for absolute dating to confirm the dates of occupation.

4.3.- Pastoralist settlements (estancias)

Pastoralist settlements were an important part of the traditional logistical system that supported Andean travelers in the South Central Andes (Berenguer 2004:38). Written sources mention that these settlements also supported transportation along the Potosi-Cobija route during early Republican times (Burdett 1928 [1826]; Hernández 1975 [1830]). In the highlands, several of the localities along the route demonstrated a marked presence of pastoralist settlements of both periods. Twelve of these sites were identified and analyzed *in situ*. The sites ranged from single households ephemerally occupied by pastoralists to more complex settlements constituted by households and corrals, and occupied more extensively. The last type of site strongly suggests mixed functions that involved pastoralism but also transportation. Ten sites corresponded to pastoralist settlements constituted by one or two households, while two sites represented more complex settlements and are described in the next paragraph.

Chaquilla 01 and Chaquilla 04 are colonial sites located on an important fertile plain, rich in pasture and water, used for the breeding of camelids, sheep and donkeys even today. In both cases, the material culture and architectural remains evidenced the presence of pack animals, and suggested the extra-regional traffic of people and goods. Consequently, it is probable that both sites supported transportation and pastoralist activities. Both sites had rectangular rooms and corrals able to accommodate small groups of travelers and their animals. For example, the area of the rooms and corrals of Chaquilla 04 is similar to that of the enclosures in the specialized *posta* of Viscachillas

01 (see Table 05). However, both sites would have had more rustic buildings. Their walls were built using small, local, unworked rocks, placed in single or double rows. These irregular walls had a thickness of less than 60 centimeters, and do not seem to have been plastered or white-washed. Chaquilla 01 and 04 could correspond to pascanas of prolonged occupation. However, it is very difficult to archaeologically discriminate between this type of site and complex estancias in the South Central Andes (Nielsen, 1997:365). A more detailed description of these sites and associated evidence of transportation is provided in the following paragraphs.

Table 5: Complex estancias, haciendas and architectural features.

name	rooms mts ²	corrals/ mts ²	patio/mts ²	ovens
Chaquilla 01	2/74.7	1?/78.3	0	0
Chaquilla 04	3/232	1/207	1/73,5	0
Jachuy Chaquilla 01	10/481	1/249	2/334	3

Chaquilla 01 was located in the northwest extreme of the marsh (*bofedal*) in direct association with a stream and two archaeological roads that arrive to the part of the bofedal where the site is located. This location is consistent with the written sources: Burdett (1928 [1826]) mentioned that the route arrived at that part of the bofedal. Two rooms and a rectangular corral were identified at the site, while some fragments of botijas were observed outside the corral. This suggests the presence of pack animals. Blue on White Panamanian majolica was also found in association with the architecture of the site. A dense domestic deposit was located in the interior of one of the rooms. A fragment of a local Inca ceramic plate with a bird's head handle was observed in association with other plain coarse earthenware sherds, ash and animal bones. The diagnostic ceramic types demonstrate an early colonial occupation of the site, while the

presence of fragments of botijas, a corral and archaeological roads arriving at the site suggest a relationship to colonial transportation.

Table 6: Names and architectural features of small estancias.

name	rooms/ mts ²	corrals/ mts ²
Chaquilla 02	1/8.2	0
Chaquilla 03	3?/ not det.	0
Chaquilla 08	1/10	0
Chaquilla 09	1/44	0
Pampa Redonda 1	2/26.1	0
Pampa Redonda 2	0	2?/no det.
Avilcha 2	2/not det.	0
Avilcha 3	1/24.5	2/378.5
Alota 3	2/not det.	0
Alota 4	2?/108,4	0

This relationship was more evident in the case of Chaquilla 04. The site is located in the southwestern extreme of the bofedal and is partially covered by dunes of fine white sand. Despite that, wind erosion allowed the observation of a good part of its architectural and ceramic remains. Several rooms were built around a central patio (see Table 5). A large rectangular corral was constructed at the back of this architectural compound. The site exhibits a high frequency of botija fragments, some of which have incised marks. These ceramic containers were frequently used for colonial transportation and suggest the recurrent presence of pack animals in the place. Although diagnostic colonial ceramics were not identified (e.g. Panamanian majolica), the abundance of plain coarse earthenware and the absence of glass and iron horseshoes (or other types of Republican artifacts) indicates a colonial occupation of the site. Its architectural remains and material culture reflect use by colonial travelers with animals loaded with botijas.

Ten small pastoralist estancias were identified in ideal areas for livestock with extensive pastures and abundant water, such as Chaquilla, Alota and Pampa Redonda (see Table 6). These places were occupied in an ephemeral way by small family groups of pastoralists. In general, the sites include the foundations of one or two rectangular houses, associated in some cases with the remains of an oven. In spite of the scarcity of material culture on the surface of these sites, fragments of botijas and horseshoes were observed. A potential relationship with transportation is suggested by the logistical importance of estancias for colonial and early Republican travelers, their location in the main localities that constituted the route, and archaeological evidence of pack animals in these sites. Their general characteristics are described in the following paragraphs.

In Chaquilla, several of these *estancias* were located on the sandy slopes to the west of the bofedal (Chaquilla 02, 03, 08 and 09). Most of these sites include the foundations of a single rectangular structure (see Table 6). The walls were constructed using local unworked stones. The area occupied by these buildings vary between 8.2 and 44 meters², suggesting that they were used by individuals or by small groups of pastoralists. Fragments of botijas, glazed ceramics, monochrome coarse earthenware, and decorated earthenware¹⁰ were found at most of these sites. Glass fragments or iron horseshoes were not observed. Consequently, it is probable that these sites correspond to the estancias of colonial indigenous pastoralists.

¹⁰ Linear black on red and linear dark brown on brown decorations.



Figure 10: Estancias of Chaquilla 01 (above) and Chaquilla 04 (below).

In Pampa Redonda (near San Cristóbal) an estancia and two large corrals associated with late colonial and early Republican artifacts were identified (see Table 6). The first site (Pampa Redonda 01) includes two rectangular structures built with worked blocks of volcanic tuff. Both buildings are small and are associated with a midden. These characteristics suggested that a family lived at the site. Andean majolica, brown-glazed ceramics and monochrome coarse earthenware fragments were identified in the midden and in association with both structures. These elements, in addition to some black glass bottle fragments, indicate a probable early to mid-19th century occupation. The second site corresponded to large reutilized corrals (Pampa Redonda 02). Fragments of *botijas* were identified in the interior of the corrals, while a single fragment of colonial majolica of an unknown type was observed in the exterior. The original architecture of the site was impossible to determine due to the reutilization of the corrals.

A couple of estancias were also identified in the locality of Avilcha (see Table 6). Avilcha 02 was discovered on the eastern slope of a hill that protects it from the strong winds existing in the area. The site exhibits an interesting low density but multi-component archaeological record. Two rectangular historic structures are included at the site, one of them almost completely modified to construct a modern circular corral, while some potential pre-Columbian structures were also present. Evidence of flintknapping and fragments of stone tools were found in association with monochrome and decorated coarse earthenware sherds, green-glazed ceramics, early to mid-19th century black glass bottles, and iron horseshoes (very worn out by use). A fragment of glass was knapped to create a sharp unifacial edge. In consequence, it is possible that

Avilcha 02 was occupied ephemerally but continually from pre-Columbian to early Republican times. Avilcha 03 corresponded to a mid-19th century estancia. This site exhibits the foundations of small rectangular buildings, two irregular large corrals, and some fragments of stoneware bottles and European refined earthenware¹¹.

Finally, two other historical pastoralist estancias were discovered in Alota in direct association with a stream and pastures. The first of these sites (Alota 03) shows the foundations of at least two rectangular structures, constructed with blocks of volcanic tuff and associated with the remains of an oven. Artifacts were scarce; however, fragments of botijas were identified. The second site (Alota 04) includes at least two rectangular highly eroded structures. The walls of these houses were constructed of adobe, while its foundations were built with stone. The site was probably occupied in the mid-19th century, yielding fragments of transfer print refined earthenware and iron horseshoes. The first site would have been occupied in colonial times while the second during the 19th century. Again, the location of both sites in Alota, one of the main bofedales along the Potosi-Cobija route, its direct association with water and pastures, and the presence of archaeological evidence of botijas and horseshoes, suggest a potential relationship between pastoralism and transportation.

4.4.- Rural Estates (*haciendas*)

In Spanish, hacienda refers to a farm dedicated to livestock and agricultural production. The archaeological site of Jachuy Chaquilla 01 corresponds to the ruins of a specific hacienda mentioned by travelers as part of the logistics of the 19th century route (Cajías 1975). The role of this place in supporting early Republican travelers was also

¹¹ Gaudy Dutch.

suggested by the archaeological evidence analyzed at the site. Its accommodation capacity exceeds any of the *postas* (see Table 5). The site has 10 rooms distributed in two sectors (A and B). Sector A corresponded to the main architectural compound (see Figure 11). This sector includes eight rectangular rooms built around a central patio in a U-shaped pattern. This pattern was also observed in some of the *postas* (e.g. Viscachillas 01). This sector also has the remains of two ovens and fragments of Andean majolica, green and brown-glazed ceramics, 19th century British refined earthenware, and glass bottles.

Sector B contains two rectangular rooms within a walled rectangular patio with one oven. A dense historic midden was also identified outside the patio. Seasonal runoffs generated an exposed profile of the midden. This profile showed a dense deposit of ash, animal bones, and fragments of plain coarse earthenware. Similar materials to those described for sector A were observed on the surface of the midden. This evidence suggests that many people ate at the site, and that it was stocked with a diverse range of products, such as local meats, regional ceramics, and European alcoholic beverages. In general, the pastoralist settlement system has been strongly associated with traditional transportation in the South Central Andes until recent decades (Berenguer 2004; Nielsen 1997, 2013). This system included livestock farms like Jachuy Chaquilla, located in strategic pastures associated with streams and water upwelling.

4.5.- Hamlets

The ruins of two large hamlets were identified in Alota and Agua de Castilla (see Table 7). Both sites were located close to water in areas with agricultural and livestock

potential. Both include the foundations of more than a dozen houses and large corrals associated with a diversity of artifacts including bronze and iron horseshoes, and different ceramic types. As in the cases described above, their relationship with transportation is suggested by the role of towns and hamlets supporting transportation (as mentioned by written sources), its strategic location near water sources in two localities of the route, the presence of large corrals, and archaeological evidence related to pack animals (such as botijas and horseshoes). Both sites are briefly described in the following paragraphs.

Alota 01 is a colonial hamlet located at a strategic point in the bofedal (see Figure 11). The site occupies a hill near to the convergence of two streams and important pastures. In general terms, this site has a relatively large capacity for housing people and animals (467 meters² and 1,411 meters² respectively). The site includes the foundations of 19 structures distributed in two main sectors (A and B). Most of the houses are located in the high part of the site (sector A), while the pens and some houses are in its lower part (sector B). An architectural compound was identified in sector A. This is constituted by six rectangular rooms constructed in an L-shaped pattern with an open patio, and one independent rectangular structure. This compound was carefully built using worked blocks of volcanic tuff. These blocks were used to build regular, double row walls that are 60 cm wide. An interesting diversity of colonial materials was identified in association with the structures. Ceramic fragments constitute the most common evidence, including a variety of polychrome Andean majolica, monochrome coarse earthenware and botijas. Some small fragments of glass bottles, glass beads, copper and bronze are also present. The lower part of the site shows

similar ceramic types, but its architectural remains were directly related to livestock and pack animals.

Sector B includes housing and large corrals, suggesting an intensive residential and livestock use. Nine rectangular foundations of houses are included in this sector. These remains exhibit the same construction characteristics of the ones in Sector A: regular walls comprised of a double row of worked blocks of volcanic tuff¹². In this sector, two ovens were built to feed the occupants of the hamlet. One of these is associated with a large area covered by small burnt bone fragments. The continuous occupation of this part of the site generated another midden associated with the corrals. Sector B was also intensively used for sheltering pack animals and livestock. Two large rectangular corrals were built with volcanic tuff, enclosing an area of about 1,411 meters². In the interior and exterior of both corrals, a large quantity of botija fragments was identified in association with fragmented bronze horseshoes (see Figure 12) and the same variety of polychrome Andean majolica found in sector A. These remains suggest the recurrent presence of loaded equines in the lower part of the site during colonial times.

Finally, it is interesting to note Hernández's (1975 [1830]:383) mention of the "*white houses of Alota*" as a place of support along the route. The presence of the foundations of houses and corrals constructed with white tuff suggest a clear relation with that description. However, fragments of colonial Panamanian polychrome majolica

¹² One of the residential structures was reoccupied during the second half of the 19th century, showing different construction characteristics and associated artifacts.

(Juan Guillermo Martín personal communication) were also identified near the modern town of Alota, suggesting other potential locations for those white houses.

Table 7: Area of hamlets.

name	total mts ²
Agua de Castilla 1	52,260
Alota 1	13,801

In Agua de Castilla a larger hamlet (Agua de Castilla 01) was discovered. This site is located on a hillside directly associated with a spring and a segment of an archaeological road. This site also includes the foundations of rectangular houses associated with rectangular corrals. The walls of the houses were built with small local rocks arranged in double rows. Rectangular corrals were identified in close proximity to the houses. These structures were built with the same type of material used for the houses. A wide variety of ceramics was identified in association with the structures. Ceramic types included monochrome and decorated coarse earthenware, Andean majolica, green-glazed ceramics, and botijas. Some iron horseshoes were also observed. The decorated sherds include linear and naturalistic motifs in grey on the brownish surface. This type of decoration could correspond to the late Pre-Columbian Yura style; however, it is not clear if the production of this ceramic type continues through the early colonial period or not (Pablo Cruz personal communication). This situation and the abundance of coarse earthenware sherds make absolute dating necessary for this case. This hamlet could have been occupied during early colonial times, late pre-Columbian times, or during both periods.

In sum, the results of the archaeological inspection of remote sensing targets along with archaeological reconnaissance, allowed the identification of five main types of archaeological sites related to historic transportation along the route. Early Republican postas and colonial and republican pascanas represent sites generated exclusively as a consequence of the historic transportation that gave life to the Potosi-Cobija route. However, despite sharing the same origin, these types have very different characteristics. Early Republican postas are planned, specialized inns officially built and supported by the Bolivian state. They evidence solid construction and an architectural design that considered the specific needs of the travelers. The sites also show a supply of products from different and distant origins. In contrast, pascanas are campsites that supported colonial and republican transportation, and only include some informal windbreaks and scarce material culture. Despite their simplicity, these sites represent the traditional native way to travel the routes of this area. Finally, other types of sites suggest the close relationship between travelers and native pastoralists. Complex colonial estancias and pastoralist hamlets evidenced the presence of loaded pack animals. Both types of sites reaffirm historical and ethnographical statements regarding the importance of the pastoralists' settlements for native mule-drivers and llama caravaneers.



Figure 11: Hamlet of Alota 01 (above) and hacienda of Jachuy Chaquilla 01 (below).



Figure 12: Bronze horseshoes from Alota 01 (a, c), and Avilcha 01 (b). Botija fragments from Alota 01 (d, f, and h) and Chaquila 04 (g).

Chapter 5: The archaeology of local mercantilist movement: dirt-roads, campsites, and elites along the Potosi-Cobija route.

In this chapter, I address the questions about continuities and transformations in colonial transportation and Spanish control infrastructure raised in the introduction. This is done through the discussion of my archaeological results and the historical data presented in a previous chapter. The typology of archaeological sites found in Bolivia and Chile is interpreted in relation to the three main eras of colonial transportation (cargas, tratos, and postas). My approach highlights the material remains of the labor practices that made colonial transportation possible. I show how the identified types of archaeological sites do not fit completely with the expectations of infrastructure derived from written sources. I argue for the importance of campsites and pastoralist settlements in the archaeological analysis of colonial movement along Andean routes. Some methodological challenges associated with this archaeological approach are discussed. My approach also highlights the role of local elites and their strategic access to traditional native transportation labor. Finally, I use the Potosi-Cobija case to discuss some ideas about early modern imperialism and suggest future directions for the historical archaeology of Andean colonial transportation.

On the Potosi-Cobija route the main continuities in colonial transportation are represented by the continuation of traditional labor practices and the early utilization of the Inca transport system. In the first case, colonial native transportation was based on traditional practices that included the use of traditional campsites and a close

relationship with pastoralist communities. These practices were based on the deep history of specialization in long distance transportation by local communities (Berenguer 2004; Nielsen 2013; Núñez and Dillehay 1995) identified in the late-Pre Columbian and historical archaeological record (Araneda 2017; Berenguer 2004, 2006; Berenguer et al. 2005, 2007; Cáceres and Berenguer 1996; Nielsen 2013; Nielsen et al. 2006), explicitly described by early Republican travelers (Burdett 1928[1826]; Hernández 1975 [1830]; Palliere 1945 [1867]; Peroud 1960; Phillipi 1860), and observed in recent ethnographic contexts (Nielsen 1997). On this route, a system of pascanas, estancias and pastoralist hamlets made possible native transportation since the 16th century and even after the construction of the Bolivian postas system.

My archaeological results demonstrate the existence of a historical archaeological record associated with these practices that includes traditional campsites as well as salient pastoralist settlements. Campsites and pastoralist settlements are key scenarios for the archaeological analysis of the native actors of transportation (Nielsen 1997:341). These types of sites open the possibility of analyzing colonial movement based on native labor and independent from official imperial infrastructure. Pascanas are traditional campsites used by caravaneer people who did not construct infrastructure for overnight stays along the routes of the region (Nielsen 1997:343). These sites may include informal constructions used for a short time, including circular windbreaks, U-shaped structures, and corrals (Nielsen 2013:397, 395). These elements may appear isolated or in small groups, however, those locations traditionally used to camp for centuries may include dozens of circular windbreaks associated with U-shaped structures and corrals (Nielsen 2013:395). My results included colonial

campsites with only one or two circular windbreaks like Chaquilla 05, 06 and 07, and some campsites without this informal architecture, such as Avilcha 01. Other campsites, such as Colupo 02, evidenced early Republican materials associated with windbreaks. Archaeological reconnaissance in the Atacama Desert also showed clusters of campsites in some localities such as Ramaditas or Chaquilla, suggesting that these places were traditionally used to camp during colonial and early Republican times.

The ethnoarchaeology of native transportation in LÍpez (Bolivia) provides an interesting interpretive framework for the analysis of colonial native transport along the Potosi-Cobija route. This framework can also serve for understanding the relationship between traditional transportation and pastoralist settlements. Nielsen (1997) suggested that routes of LÍpez can be understood as a system of ritual practices, traditional places and social relationships. These native routes cross sacred landscapes and require ritual practices in order to achieve a successful journey (Nielsen 1997:341). As a system of places, the routes of llama caravans are constituted by traditional campsites (Nielsen 1997:341). These campsites are defined according to communal and family traditions, and are used over generations to eat, sleep, socialize, and perform rituals (Berenguer 2004; Nielsen, 1997, 2013). As a network of social relationships, traditional routes are constituted and populated by known people and ritual kin (Berenguer 2004:47; Nielsen 1997:341). These social networks allow access to resources available in areas populated by pastoralists such as pasture and water, and are “inherited” from one generation to another (Berenguer 2004:57). In the region, the close relationship between pastoralism and transportation is also evidenced by some archaeological sites

that may correspond to a mixture of estancia and pascana (Berenguer 1994:30; Nielsen 1997:365).

The archaeological results of this research also indicate the association between transportation and pastoralist settlements during colonial times. The main colonial estancias and pastoralist hamlets identified near the wetlands along the route exhibit architectural and ceramic evidence associated with the presence of loaded pack animals. Large corrals and the high frequency of botija fragments are indicators of the presence of these animals. Both types of sites also exhibit structures capable of accommodating groups of travelers. These sites are located in areas of high livestock potential mentioned by historic travelers of the route (Burdett 1928[1826]; Hernández 1975 [1830]). These areas attracted travelers due to the presence of all the necessary resources (pasture, water and firewood). The main examples of these types of sites were identified in the rich wetlands of Chaquilla and Alota (Bolivia). Both cases, Chaquilla 04 and Alota 01, exhibit high frequencies of botija fragments on the surface of large corrals. The estancia of Chaquilla 04 was frequently visited by loaded pack animals. Its structures allowed the enclosure of these animals and the accommodation of groups of people. However, not all of these pastoralist sites can be related to transportation. Small estancias such as Chaquilla 02, 03, 08 and 09, present scant surface material culture suggesting only ephemeral pastoral activities.

A similar situation is represented in the case of the colonial hamlet of Alota 01. This site was also frequently occupied by groups of loaded pack animals and accommodated travelers and a small pastoralist community. Its large corrals are associated with high frequencies of botija sherds, while the presence of worn down

fragments of bronze horseshoes suggest the arrival of loaded mules during colonial times. The remains of a large wood-fired oven associated with a dense deposit of small bone fragments also suggest repeated cooking for groups of people. It is evident that both sites were occupied by pastoralists. Despite that, their location in key wetlands on the Potosi-Cobija route, large corrals, and high frequency of botija sherds, suggest that these sites were frequently visited by colonial travelers. The last two characteristics differentiate these two sites from the rest of the identified pastoralist settlements. In consequence, archaeological research on colonial transportation requires a detailed analysis of associated pastoralist settlements, focusing on salient sites such as Chaquilla 04 and Alota 01. Fortunately, these sites can be found doing systematic visual interpretation of the satellite imagery provided by Google Earth, given the relatively large size of corrals and other structures. However, remote sensing did not permit the identification of the colonial pascanas along the route.

The archaeological investigation of the colonial system of pascanas presented several methodological challenges. These can be summarized as problems of visibility, chronology, and context. The pascanas are sites of low visibility due to their small size, scarce archaeological deposits, and subsequent alterations caused by human action. The visibility of camps without windbreaks is even less than those that have these structures. These characteristics made identification impossible using the available satellite imagery. In the altiplano, high altitude vegetation and wind erosion on sandy surfaces created patterns that looked like circular windbreaks. In the desert, despite the absolute lack of vegetation, the spatial resolution of the available satellite imagery still did not allow the identification of windbreaks. The use of higher spatial resolution

satellite imagery, air photos, and pedestrian archaeological survey of places with strategic resources (i.e. bofedales) can help solve the problem of locating pascanas.

The archaeology of the colonial pascanas also requires a careful approach to the chronology of these ephemeral sites. Chronological problems arise due to the continuity of many native pottery types during the colonial period. Some of the identified pascanas only exhibit non-diagnostic coarse earthenware fragments (i.e. Cebadillas 03), while other campsites present decorated Yura sherds (i.e. Churata 01 and Cebadillas 01). The latter could correspond to late pre-Columbian Yura ceramics; however, further studies are required to understand when production of this ceramic ceased (Van Buren and Weaver 2012). In consequence, the ceramic typology must not be the only method used to define the antiquity of these campsites. Thermoluminescence dating is necessary to roughly assign the ceramic remains to Pre-Columbian or historical epochs.

Finally, campsites with ephemeral occupations that did not generate waste associated with the windbreaks present a problem of archaeological context. These are sites that only have one or two small structures. However, this problem can be solved by incorporating the sites into a broader archaeological context. Some of these campsites are directly associated with segments of archeological roads. These roads usually have archaeological evidence of the periods during which they supported indigenous transportation (Nielsen 2013). Consequently, it is possible to understand the chronology of occupation of these roads, and this can also serve to assess the chronology of the associated campsites. Along with campsites and pastoralist settlements, the early colonial movement can be also analyzed through the colonial occupations of Inca inns.

In the South Central Andes, the utilization of the Inca system of transport during the first decades after the conquest represents another important continuity of Andean transportation. This system supported intensive mercantilist traffic between 1532 and 1590. It was clearly based on the Inca organization of transport, as well as the use of Inca roads and the associated infrastructure of accommodation. During the era of *tambos* and *cargas*, native communities served in the inns along the routes of the area, while native porters and llama caravans made the mercantilist movement possible. Unpaid personal service provided the necessary labor to make possible the functioning of inns and roads. Despite the use of traditional labor and infrastructure, this system was organized to meet the new economic requirements of Spanish mercantilism. The services provided by the porters were organized by the local native leaders to satisfy the labor demands defined by the Spanish *encomenderos*. In consequence, this system made use of the traditional organization of transportation to obtain benefits from the new economic system imposed in the Andes.

This era has clear documentary and archaeological evidence in the case of the Potosi-Cobija route. This evidence indicates that early colonial traffic was based on the use of some segments of the Inca road and inns during the second half of the 16th century. The existence of indigenous porters is clearly mentioned by historic sources. Atacama porters transported diverse products from Cobija to the highlands, and made the important trade in dry fish possible (Martínez 1985:170; Sanhueza 2011:316). The work of these porters was particularly intense on the route and existed until the end of the century, despite an official ban (Martínez 1985). In some segments of the Potosi-Cobija route, the archaeological evidence also demonstrates the use of the Inca system

of tambos. Several tambos investigated in the upper Loa river region (Chile) have evidence of colonial occupation (Berenguer et al. 2005:26; Berenguer et al. 2011:18). The same is true for the Inca road between Ramaditas and Colcha-K (Bolivia). This road intersects with the Potosi-Cobija route and evidence for the use of tambos during the colonial period has been recovered by archaeologists (Nielsen 1997:357; Nielsen et al. 2006:227). In addition, the colonial road is superimposed over the Inca road in the upper Loa region (Berenguer et al. 2005).

My own archaeological results also suggest early colonial transport based on pre-existing Inca infrastructure. In the first place, my findings indicate the absence of imperial investment in new specialized inns along the route during the second half of the 16th century. The only pattern of specialized inns identified corresponded to the early Republican postas. Secondly, the early colonial site of Chaquilla 01 evidences a clear association between local Inca ceramics and early colonial Panamanian majolica. This site could correspond to an Inca tambo reoccupied during early colonial times, although archaeological research has suggested that Inca ceramics were used for several decades after the conquest (Van Buren 1993; Van Buren and Weaver 2012), and the archaeological analysis of the potential association of this site with the Inca road is a pending task. In consequence, historical and archaeological data indicates the use of pre-existing Inca infrastructure and the personal service of native porters for early colonial transportation along the Potosi-Cobija route. What are the main factors that can help us understand the continuity of traditional transportation?

During the first decades after the Conquest, the rural South Central Andes were economically exploited by the new colonial elite based upon access to traditional labor

organization. The rural settlement pattern was not radically transformed, and some of the means of communal production, including llama caravans, were maintained. Access to traditional labor was based on close personal relationships between the new Spanish elites and the native elites. At a higher level, these close relationships included the frequent marriage between the conquistadores/encomenderos and the Andean native nobility (Lorandi 2002). Obviously, this was an important means of gaining access to native labor. On the Potosi-Cobija route during this period indigenous labor was obtained by the encomenderos through a close personal relationship with native leaders of the Atacama communities (Martínez 1985:170). There is a clear description of these personal interactions in a document transcribed by Martínez (1985) that indicates frequent invitations and drunkenness at the encomendero's house in Atacama La Baja. One of the main goals of these meetings was to obtain complicity and silence about the exploitation of native porters transporting dry fish. Indigenous labor, and especially transportation, benefited monetarily both the Spaniards and the native elites of Atacama (Hidalgo 2012).

Transportation was initially based on the traditional rural settlement pattern, including native villages and its roads. On the altiplano, the Spanish did not radically change these rural nodes until the forced resettlement that was implemented in the 1570s by Toledo. In consequence, early colonial transportation made use of the traditional roads between rural native villages. In Atacama, it was also based on the use of llama caravans as an important means of transportation (Berenguer 2004). In this region, the Spaniards did not introduce mules until the first decades of the 17th century (Sanhueza 1992). These elements explain why the same roads and means of

transportation were used by native transporters on the Potosi-Cobija route during the second half of the 16th century. However, native transportation would be transformed during the end of the 16th century and the beginning of the 17th century.

The main transformations associated with native transportation included new forms of labor, the incorporation of new means of transportation, and the emergence of new roads during the era of *ventas* and *tratos*. Wage labor replaced unpaid service as the main form of transportation labor. This was accompanied by the replacement of *encomenderos* by the *corregidores* as the main local organizers of transportation. The service of native porters was replaced with wage labor, a replacement that occurred at the beginning of the 17th century on the Potosi-Cobija route. Local elites benefited from this new form of work. Spanish *corregidores* and native leaders offered transportation services to third parties and used native transportation to commercialize their own products. They also leased the necessary native labor to important transportation companies. Theoretically, native unpaid service in *tambos* was replaced by wage labor in *ventas*. The native communities sold their products in these new inns. Native leaders played an important role in organizing the necessary labor for these places. In general, the native communities used the money obtained on the routes and the inns to pay their tribute to the Crown.

The incorporation of mules and other equines represented a revolution in the means of transport. This revolution included a significant increase in the speed of travel, daily maximum distances, and carrying capacity. Andean routes could be traversed without walking for the first time in history. This happened at the beginning of the 17th century on the Potosi-Cobija route. This revolution, in addition to new mercantilist

demands for long-distance transportation and the foundation of new towns, ports, and cities, caused the emergence of new routes and the modification of pre-existing ones. In the case of the Potosi-Cobija route, some segments would have corresponded to pre-Columbian routes, while others such as the crossing of the high Andes would have been colonial additions. Archaeological analysis of tambos, pascanas and pastoralist settlements could help understand these modifications.

The system of *ventas* and *tratos* was based on the Spanish model of transport at the time, and looked to replace the previous system, based on the “tyrannical Inca order” according to Viceroy Toledo (Glave 1989:141). In this new system, both transportation and lodgings were privately held businesses. The activity was only loosely regulated by the Crown (Diago and Ladero 2009:356). In the Andes, transportation was in the hands of the mercantile elites (Glave 1989:97). These regional elites lived in the main Andean cities and were racially and culturally hybrid in the sense that included important native leaders, rich mestizos, and Spaniards (Glave 1989:13). During this era, the transportation system was based on communal salaried labor and lease contracts. The *curacas* leased the necessary labor for transportation to Spanish merchants through the intermediation of the *corregidores* (Glave 1989:152). As in the case of *tambos* and *cargas*, this system did not rely on an official investment in infrastructure on the part of the Spanish Crown. The *ventas* were private establishments controlled by the Spanish and *curacas*, where products were marketed and animals were leased (Glave 1989:142). Despite the intentions of Toledo, my research suggests that transportation on the Potosi-Cobija route was not supported by *ventas*.

During this era, the main transformations associated with transportation on this route were related to the introduction of mules and wage labor. The mules replaced llamas as the principal pack animals beginning in the 17th century (Berenguer, 2004:48; Sanhueza, 2011:322), while native muleteers transported freights for a salary (Sanhueza 1992; 2011; 2011b). Native muleteers also engaged in selling and bartering the products of the local native communities, and to pay their debts for the acquired mules (Casassas 1974; Martínez 1985; Sanhueza 2011). Historical documents indicate that transportation was controlled by a small elite of Atacamas and Spanish corregidores, who prospered as a result (Casassas 1974:100; Hidalgo 2012:118; Sanhueza 1992:178). In addition to control of the transport of legal freights, this elite developed highly successful smuggling operations with European merchants for two centuries (Arze 2004 [1787]; Bittmann 1977; Casassas 1974).

Despite an intense legal and illegal flow of resources, the changes in transportation did not include the construction of *ventas* on the route. The word *venta* was not mentioned in any of the colonial written sources (Arze 2004[1787]; Peroud 1960; Domínguez y Cañete 1952 [1791]), and the toponym was not identified on the maps used to locate the route. Only the main towns on the road are mentioned as the primary support infrastructure. It is possible that the towns along the route had *ventas*, however, confirmation requires primary documentary research. My archaeological results also suggest the lack of a system of *ventas* along the route supporting transportation during the 17th and 18th centuries¹³.

¹³ However, a detailed analysis of primary written sources is required to discard the functioning as *ventas* of complex *estancias* or pastoralist hamlets such as Alota 01 or Chaquilla 04.

The most important transformation in terms of road infrastructure occurred right after the War of Independence. The leaders of the Independence of Bolivia broke the Spanish logic of not investing in official infrastructure along the Potosi-Cobija route. The Bolivian state organized and invested in the construction of a system of support for transportation in 1830. This system was based on the contemporary Spanish model and coexisted with traditional pastoralist support and the use of campsites. The system of *postas* was carefully designed, constructed, and maintained by the state of Bolivia in order to connect the cities of the altiplano with their port on the Pacific Ocean. The system was clearly inspired by the late 18th century model of Spanish transportation. In the Iberian Peninsula, this model included the official reorganization of sequences of *postas* and the construction of a network of paved roads. Even in the metropolis the official investment in transportation infrastructure was a late phenomenon. The first paved roads were built with money from the Crown during the 1750's, although the network was not completed until the 1830's (Diago and Ladero 2009:380). The system of early Republican *postas* on the Potosi-Cobija route was very similar to the contemporary system being used in Spain at the same time, and its characteristics impressed early Republican travelers (Cajias 1975:80).

My archaeological results demonstrate this important official investment in road infrastructure made by the Bolivian state during early Republican times. The Bolivian *postas* represent a well-defined type of archeological site along the route. These sites share important characteristics related to architectural design, building materials, and supply. These characteristics also met the expectations based on the historical sources. The architectural features required by the Velasco government for reconstruction are

present in the majority of the sites (see Chapter 2). The archaeological postas exhibit between two and eight rooms, and between one and three corrals. These postas had at least two rooms and a corral in all cases, while three sites have enough roofed areas to house an independent general store and a separate independent kitchen (Ascotán 01, Alota 01 and Viscachillas 01). Two cases include three main structures which could have corresponded to the two rooms and an independent kitchen (Amachuma 01 and Guacate 01). The presence of ovens in the patios of the majority of the sites suggests the use of open spaces to cook. The use of relatively standardized building materials in the sites also suggests a centrally planned constructive effort. All of these inns were built using worked rocks or adobe bricks, as noted by the mid-century travelers (Palliere 1945 [1867]; Phillipi 1860; Von Tschudi 1966[1858]).

This pattern of sites evidences not only the construction of official infrastructure during the early Republican era: the archaeological remains identified on their surfaces suggest a regular functioning of these inns between the decades of 1830 and 1850. The archeological evidence also shows the supply of these inns with regional and imported food. Faunal remains represent vestiges of the animals consumed in these places, while canned European food, ale and cognac bottle fragments represent the remains of imported products. This coincides with specific statements by the mid-19th-century travelers, especially in the case of the alcoholic beverages (Palliere 1945 [1867]; Von Tschudi 1966 [1858]). These historical sources also mentioned that food service was provided to travelers in the postas. Despite its distance from the cities of the early Republican era, all the posta sites show fragments of the main British refined earthenware ceramic types used in Europe and the South American capitals during the

mid-19th-century (Samford 1997; Schávelzon 2001). For example, blue, red and black on white transfer print refined earthenware fragments are frequent on the surface of the sites. The presence of this type of ceramics suggests a food service that included the use of imported crockery in these remote places. In contrast, my archaeological results indicate a lack of an archaeological pattern of official inns for colonial times.

In sum, colonial transportation in the Potosi region had three main historic configurations in terms of labor and infrastructure. These configurations introduced transformations but at the same time were based on strong continuities. The era of *tambos* was based on the continuous use of Inca road infrastructure, free labor, and local means of transportation. The era of *ventas* introduced private inns, wage labor, European riding and pack animals, and new dirt-roads created by mercantilist movement. Finally, the era of *postas* introduced official planning of lodging infrastructure on the Potosi-Buenos Aires route. However, on the Potosi-Cobija route my results suggest a strong continuity of native transportation labor independent from any centrally planned official lodging infrastructure throughout colonial times. Native transportation was based on traditional practices that included the continuous use of certain localities as campsites and an important support of pastoralist settlements. These traditional practices allowed a movement that gave life to the Potosi-Cobija route during colonial times.

In consequence, to address the question about official control infrastructure along Andean colonial routes it is possible to say that the Spanish Empire did not invest resources in road infrastructure until the end of the 18th century, and only the Potosi-Buenos Aires route received this investment. The rest of the routes in Potosi were

constituted by variable networks of dirt roads without any kind of official investment (Lopez 2016). According to historical sources, the Potosi-Arica route, intensively used for the transportation of silver, did not have any kind of infrastructure on some of its segments (Lopez 2016:68, 114). In the Potosi-Cobija case, the Crown's funds were not used to build accommodations or checkpoints. Colonial-era travelers had to sleep in camps, pastoralist settlements, and towns on their way to or from the port of Cobija. However, Andean routes were partially provided with private hosting infrastructure due to the actions of individual local elites. These individuals organized the reconstruction of the Inca tambos and the construction and functioning of private ventas along the roads. In the Potosi-Cobija route, some tambos supported colonial transportation at least in the upper Loa river region, but the existence of ventas is not mentioned by the historical sources or depicted on maps. These tambos were private businesses and not an official lodging system built by the Spanish Empire.

In general terms, my results support what Nielsen (2011) suggested, that only the Inca Empire and the Bolivian state constructed official road infrastructure in LÍpez and Atacama. Historical data indicate that the Bolivian state planned, invested in, built, and organized the staffing of support infrastructure, which also served to control the transportation and smuggling of silver (Cajias 1975). My research identified a noticeable archaeological pattern of early Republican postas built by the state right after the independence of Bolivia. These sites show evidence of the feeding of travelers with local, regional and European products during the mid-19th century. This contradicts the idea of the Chilean historian Milton Godoy (2013:127) that Bolivia never had a clear presence in the Pacific coast of Atacama due to the lack of connectivity between Potosi

and Cobija. In consequence, it is possible to state that the Potosi-Cobija case shows an early Republican effort at connectivity based on official road infrastructure.

Official investment in road infrastructure has been considered an archaeological indicator of imperial economic control over the flow of resources in various regions (Sinopoli 1994:171). This specific indicator has been used to analyze Inca control in the core regions of the empire (Julien 2012:157). However, the construction of official infrastructure only in populated nodes and their absence in internodal spaces has been suggested in the case of southern regions of the Inca Empire (Garrido 2016:107). In these regions, the spatial distribution of official Inca infrastructure and other evidence has suggested that fully centralized imperial control of the movement of goods on long distance routes was not implemented (Garrido 2016). This research suggests a similar situation in one of the most important economic regions of the Spanish Empire. In the colonial Andes, official imperial infrastructure was mainly located in the most populated nodes. The Spanish Empire based its territorial control on the foundation of cities, ports, and indigenous resettlements. In contrast, the Andean dirt-roads were simply produced by the movement of the colonial actors and did not receive any official investment. The lack of official investment on the colonial routes of the Potosi region suggests that even in this key economic area of the Spanish Empire the fully centralized control over the flow of resources was not implemented. This lack of imperial road infrastructure can be interpreted as a consequence of the local economic control of the mercantilist movement.

The economic role of local actors emerges as an important factor to consider in the analysis of Andean colonial routes. Nielsen (2013:413) has suggested the

importance of considering local agents and their particular interests in the research of movement along the South Central Andean routes. The local actors were not economically passive and acted according to their own economic goals (Garrido 2016:106). Colonial transportation was a private business based on privileged access to native labor and independent from official road infrastructure. Local elite actors created the mercantile movement that gave life to the “caminos reales” (Pérez 2001:52). Even the transport from Potosi to Arica of the Quinto Real (silver tribute to the Spanish Crown) was a private business controlled by a few trajineros (López 2016). In the Potosi-Cobija case, this movement was organized by the local elites residing in the main nodes along the route. Spanish encomenderos and later the Spanish corregidores, along with curacas from Atacama and other native leaders, were responsible for the creation of the route as a product of their private legal and illegal businesses (Casassas 1974; Glave 1989; Hidalgo 2012; Sanhueza 1992, 2011, 2011b). Consequently, my research suggests an active economic role of local elites based on their strategic access to traditional native labor.

The analysis of labor relationships can help us understand the economic functioning of the Spanish Empire and the associated archaeological remains (Voss 2008). Andean colonial elites were empowered by political and kinship alliances that included Spaniards, indigenous leaders and their descendants. In the Potosi-Cobija case, political and economic negotiation, along with kin relationships and the use of coercion, allowed local elite individuals control over transportation labor. The strategic access of local elites to traditional native transportation labor explains the continuous use of pascanas and salient pastoralist settlements to travel the route throughout

colonial times. New official imperial road infrastructure was not necessary. However, it is not possible to interpret all the archaeological evidence of the colonial movement as a product of the economic objectives of the local elites. This movement never excluded the economic movement of native transportation for non-elite purposes. The archaeological remains associated with colonial transportation are also the product of the economic needs of the native communities, which continued bartering and trading between the different nodes of the route (Sanhueza 2011b). Both mercantilist and communal movement should be considered, avoiding the simplistic colonizer-colonized dichotomy (Senatore and Funari 2015). Andean colonial routes allowed diverse flows of resources that satisfied different economic purposes.

Wallerstein (1979) stated that since the end of the 15th century a global economic system incorporated diverse types of sociopolitical organizations, allowing an enormous accumulation of wealth in the European core regions based on the flow of raw materials from the peripheries. For Hall et al. (2011:236, 239), regional peripheral societies were responsible for ensuring this flow of resources based on their obedience to rules and institutions, and this consolidated the imperial system as an integrated whole. The last idea strongly suggests a flow of resources controlled by the European powers through passive and obedient peripheries. However, the case of Andean colonial transportation shows that mercantilist movement was the result of private legal and illegal businesses controlled by regional colonial elites. These elites benefited from the permanent smuggling of products and resources (Villalobos 1992), including the systematic smuggling of significant quantities of silver on the Potosi-Cobija route between the 16th and 19th centuries. Consequently, the mercantilist movement was not based upon

centralized imperial control of the circulation of goods or on the obedience of the semi-peripheries to Lima or Madrid. Andean colonial regional elites should be considered active and disobedient agents that were in competition with the core Spanish elites since the 16th century (Lorandi 2002; Walker 2014). My research suggests that the initial terrestrial flow of wealth from the Andes to Spain was controlled by empowered local elites. These elites had their own political and economic agendas, and conspired to destroy the Spanish Empire during the War of Independence.

Finally, this research provides new methodological directions for future historical archaeological research of Andean colonial routes. First, the colonial deposits found in Inca inns (tambos) should be systematically re-analyzed in order to understand initial mercantilist transportation during the era of tambos and cargos. This can be done through laboratory analysis of existing archaeological collections from tambos. Obviously, new tambos can be found along colonial routes through the use of remote sensing and archaeological inspection. Second, in the South Central Andes, the colonial system of pascanas and pastoralist settlements related to transportation emerges as a meaningful archaeological record for the analysis of how native labor served mercantile interests and native economic objectives throughout colonial times. The archaeology of this system requires the development of systematic surveys in spaces provided with key resources and/or protected from environmental conditions. This archaeology also requires a detailed analysis of the associated materials within these sites and the archaeological evidence deposited over the associated segments of archaeological roads. Third, early Republican inns located in strategic and protected locations, such as the postas of Viscachillas or Guacate, have to be excavated in order to test the

existence of buried colonial archaeological deposits. In general terms, the historical archaeology of colonial routes has to include as part of the research design systematic surveys of resource rich areas and roads, test excavations of campsites and inns, absolute dating of ceramic sherds and other non-diagnostic archaeological evidence, and in-depth study of primary written sources. The present investigation lacks all of these significant components. However, its exploratory nature has allowed the suggestion of new directions of research for the archaeology of the routes and colonial transport in the Andes.

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Maps

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Appendix 1

Ceramic fragments' provenience in Figure 8:

Fragments a, b, c: Chaquilla 01

Fragment d: identified near the modern-day village of Alota.

Fragment e: Pampa Redonda 02

Fragments f, g: Viscachillas 01

Fragments h, i, j: Alota 01

Fragments k, l, m, n: Colupo 01