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On the Brink of Extinction: Llama Caravans Arriving at the Santa Catalina Fair, Jujuy, Argentina

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Abstract. The practice of using llama (*Lama glama*) caravans has decreased in Jujuy, northwestern Argentina, in recent years. Peasants, in this area known as *pastores*, *llameros*, or *caravaneros*, belong to Andean indigenous communities in Nor Lipez, Bolivia. The *llameros*, with their caravans, travel essentially to barter llama fiber in exchange for industrial food-products, mainly flour and sugar. The caravan trip to and from Santa Catalina takes an average of 12 days, five days going to and from the fair, and two days camping at the fair itself. These *llameros* belong to extended families that include young boys and women. *Llameros* have their own ethnotaxonomy and can recognize each animal of the troop. Today's llama caravans are pre-Hispanic in origin, thereby presenting collective continuance with the past. Yet caravans are disappearing given the ever more ubiquitous presence of vehicles, a trend that is also seen in other regions of the world. This paper presents a systematic study of the factors relating to the decline in the use of caravans in northwestern Argentina based on data collected from 2013 to 2017. Three reasons are offered (two socioeconomic and one environmental) to explain the observed decline: (a) the presence of a growing textile industry in Bolivia, with an increase in the demand for camelid fiber; (b) the improvement in living conditions in Bolivia; and (c) the drought that affected the area, with very little pasture for the animals on their route.

Keywords: llamas, caravans, Santa Catalina, Andean fair.

Introduction

Camels are essential for survival in arid regions and knowledge about them is a key element to understanding pastoral life under the stress of aridity (Franklin 2011). In many areas of South America, llamas (*Lama glama*) are animals that have been used, and are currently used, as pack animals in caravans across the Andes. The practice of traveling in caravans where camels (*Camelidae*) play a central role is declining not only in the Andean Altiplano but also in other areas of the world (Clarkson et al. 2017). The *Camelidae* family consists of seven species, including the Old World dromedary (*Camelus dromedarius*) and bactrian camels (*Camelus bactrianus*), as well as the South American species (vicuña: *Vicugna vicugna*; guanaco: *Lama guanicoe*; alpaca: *Vicugna pacos*; and llama: *Lama glama*).

South American camelids are an essential part of the biocultural heritage of the Andes and are a very important material resource for people living in dry areas (Flores Ochoa 1968, 1977; Grebe 1984; Vilá 2012, 2014). The group has four distinct species, two of which are wild (vicuñas and guanacos) and two that are domestic (llamas and alpacas). The differential conceptualization of wild and domestic camelids is widespread in the Andean world. This is a theme that has been studied thoroughly in Peru (Flores Ochoa 1977), where the use of terms such as *salka* ("belonging to the earth"; for vicuñas) and *uywa* ("belonging to the people"; for alpacas and llamas) is commonplace. This distinction extends to other parts of the Andes, such as northern Chile (Grebe 1984) and has also been reported in northwestern Argentina (Vilá 2014). Llamas are

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an Andean domestic animal. The domestication process occurred during the Middle Holocene when a number of environmental and cultural changes occurred in the Puna or Altiplano region, located between 3200 and 4500 meters above sea level (masl)—the area where camelid domestication took place (Wheeler 1995, 2017). A hypothetical, three-stage model has been developed to describe the possible transition from hunting guanacos to herding and breeding llamas (Yacobaccio and Vilá 2013, 2016).

The llama domestication process was complex, beginning with generalized opportunistic hunting, leading to a second stage of protected herding (which is similar to management, that includes human strategies of approaching habituated animals), and a third stage comprised of selective breeding (confinement and taming). The last two stages are critical parts of the active domestication process. Throughout Andean prehistory and history, llamas have been very important, witnessing multiple uses as a material resource for meat, fiber, skin, bones, and dung. They are also the only native beasts of burden and, as such, transportation of goods was commonly conducted in large caravans (Browman 1994; Clarkson and Briones 2001; Custred 1974; Flores Ochoa 1968, 1985; Nuñez 1996; Nuñez and Dillehay 1979; West 1981). The Andes represent a complex mosaic of landscapes and human livelihood strategies across ecosystem diversity associated with differences in elevation and climate. Human livelihoods developed into a highly integrated complementarity strategy (in ecological and economic terms) (Custred 1974; Flores Ochoa 1972; Murra 1965, 1972, 1976; Nielsen 2002; Nuñez and Dillahay 1979; Rabey et al. 1986).

According to Khazanov (1994), all pastoral populations necessarily require exchanges with "the outside world," i.e., the sedentary agricultural, urban, and industrial world. The degree of mobility that a pastoral society has allows it to be classified according to different levels of movement. This ranges from those that are mostly sedentary, moving only sporadically to engage in exchange, to those that permanently move and are, therefore, nomadic. In addition to trade, pastoral peoples may move because of climatic conditions, especially droughts in arid zones (Galvin 2008; Yacobaccio 2014).

Currently, llama herding communities can obtain few of the necessary ecosystem resources from within their region in the Andean high plains. Most of what they produce is directly derived from their animals, such as meat, leather, and fiber, and woven or braided products, including ropes, sacks, ponchos, fabrics, and bedspreads. Aside from animal products, they produce adobes (wood for building), plants for fuel and roofs, and medicinal plants. The rest of their needs must be obtained from outside their area. Therefore, complementarity is a major requirement for the livelihood of these Altiplano populations (see Nielsen 2000, 2001, 2002). To overcome resource limitations, these herders rely on town markets. Spaces of commercial exchange and marketplaces were widely found throughout the Andes from pre-Hispanic times onwards (Gallardo Ibáñez 2013; Hirth and Pillsbury 2003). Andean markets, better known as fairs, are traditional means by which people in a region can meet. In many cases, these fairs are binational, linking communities in Bolivia and Argentina. Many of these market fairs are held on special days. For instance, an event that can be traced back to the nineteenth century and constitutes an integral element of the identity of the town of Santa Catalina, Jujuy, is the patron saint's anniversary celebration (Saint Catherine of Alexandria [Santa Catalina]) on November 25th. This celebration is preceded by an exchange and commercial market where traditional pastoral production and industrial food products—fruits, vegetables, used and new clothes, traditional medicine, small appliances, and furniture—are sold and bartered. Ethnobiological data

on the fair and caravans in Santa Catalina have been previously published (Vilá 2014, 2015). At this market, based on Madrazo (1981), two types of exchange were observed (Vilá 2015): a) a reciprocal intra-ethnic barter; and b) an asymmetric exchange between traders arriving by truck (many of these traders also shared the same cultural roots) and the herders. The latter was also based on barter, as no cash was involved (for instance, wool-fiber exchanged for processed foods). Even though money is not used, the international market price of fiber underpins all barter transactions between the truckers and the herders (Vilá 2015).

The Santa Catalina fair is further embedded in a context of high sociability that includes traditional healers with stalls of medicines and parties, music, and dancing while eating and drinking at traditional food stalls. At the fair, *Quechua* and *Aymara* are spoken, mostly by the people coming from Bolivia. Since 2013, there has been an expo-fair of llamas from local Santa Catalina breeders: the Askha Llama. The llamas at this expo-fair are brought from nearby fields. The event is organized and promoted by local authorities (Secretary of Production of Santa Catalina) and agronomic development institutions.

It is widely recognized that caravans with animals require resources (trail routes, foraging and resting places, local fairs), yet these are in danger of disappearing altogether under pressure from modern development (Clarkson et al. 2017). Most scholars on the theme of caravans are archaeologists (Clarkson et al. 2017), and there are very few publications that investigate contemporary caravans (Nielsen 2000; Vilá 2015). Tripcevich (2008) made an interesting study on the physiology of the llamas while walking in a caravan. An ethnozoological approach focuses on the relationship and management of the caravans by the *llameros*, the routine, as well as the interchanges occurring at the fair. It is well known that caravans are ever-decreasing in number. This in itself is not untoward given that caravaning is intimately related to pastoralist activities, and pastoralism is under tremendous pressure as a viable activity (Dong et al. 2011). Therefore, a detailed description of these resilient practices is both fundamental and crucial, given that we are possibly recording what could be the extinction of an ancestral practice.

The objective of this paper is to investigate, from an ethnozoological perspective, one way in which modernity is affecting the pastoral way of life; in this case the llama caravans arriving at the Santa Catalina fair. The study includes an analysis of the phenotypes and ethnotaxonomies of the animals in the caravan, the techniques of arriving, unloading, loading, and departure, the manner in which the *llameros* interact with the animals, the kinship relationship between the *llameros* in the caravans, and the commercial and other exchanges they engage in and manage.

Methods

Study Area

Santa Catalina is the northernmost town of Argentina, bordering the Plurinational State of Bolivia. It is a small traditional community that was founded in the seventeenth century. The town is located in the Rinconada mountain range, in the fluvial valley of the Santa Catalina River at ~3800 masl. At the time of its founding, the area was already inhabited by pre-Hispanic communities, as can be observed by petroglyphs showing camelid iconography discovered in the Morritos area, and in the northern sector of the village. Incidentally, the northern sector is the contemporary thoroughfare for these llama caravans.

Santa Catalina consists mainly of adobe (mud-brick) houses, with a historical church that dates to the seventeenth century. It is the center of administrative, political, sanitary, commercial, religious, festive, and educational functions for the locality and nearby rural areas, including

two schools, one primary and one secondary. The main economic activity of the inhabitants of this area is livestock herding of sheep and llamas for the production of fiber, leather, and meat. In Santa Catalina, the Indigenous inhabitants belong to three aboriginal communities, known as Aukarpina Champi, Athu Saphi, and La Cruz. There is also a cooperative of agricultural producers; these are locals who own private land. As the llama caravan drivers call themselves *llameros*, I use this term to refer to them in this paper.

Research Design

The data presented in this paper were obtained during the 2011, 2013, 2014, 2015, 2016, and 2017 field seasons, and include:

1. *Ad libitum* surveys during the fair (arrival of caravans, techniques for loading and unloading animals, management of llamas);
2. Participant observation of the daily routine of *llameros* during their stay in Santa Catalina;
3. Documentation of dialogues between different participants during the exchanges and meetings at the fair;
4. Specific questionnaires, especially regarding the family relationships between *llameros*, the individualizing of the different llamas, caravan trips, and the caravan departure ceremony; and,
5. Unstructured interviews and open surveys.

It is important to note that the VICAM (Vicuñas, Camélidos y Ambiente) research team has been working in the area for ten years, so the presence of researchers is a relatively common occurrence in the village, and researchers have established a very good rapport with the local people. The current research was conducted using the ethics established for research, research-action, and ethno-scientific collaboration in Latin America, set by (Version two) SOLAE, Latin American Society of Ethnobiology.

Results

In total, 175 interviews of variable duration (from a few minutes to almost two hours) were conducted. Several interviews with the *llameros* on successive days and years were analyzed. Each year, during the three days of the fair, data collection was undertaken from dawn until dusk.

The Fair

From the afternoon of the November 21st, temporary stalls of wooden posts covered by a thick plastic sheet are erected at the large square in front of the town's cemetery. These are primarily for food and drink, mostly organized by local residents. The meals prepared at these stalls are typically regional, combining llama meat, local potatoes, and corn in dishes known variously as *calapurca*, *machorra*, *majadilla*, and *calapi*. Additionally, the municipality erects other structures for different purposes, such as marquees for dancing, exhibitions, and talks.

Trucks selling industrial foods in exchange for wool arrive haphazardly on November 22nd or 23rd. All traders and outside participants camp at the esplanade located on the Bolivian-facing side of town; this includes the animal caravanners and truckers in their large vehicles and vans. The fair is an integral part of inter-Andean integration, with nearby Bolivian villages, such as Mojinete, represented by their authorities (mayors) and soccer teams. Annual celebrations include women's and men's soccer championships. On November 25th, the patron saint of the town—Santa Catalina de Alexandria—is taken out of the church in a procession around the town. On the same day, all official activities with dignitaries are undertaken with the feast-day festivities finishing late into the night.

There are several forms of arrival to the fair: by foot from the nearby villages in Bolivia; by public transport from the city of

La Quiaca in Argentina; by rented vehicles that taxi people and packages mostly from Bolivia across the border; and by donkey and llama caravans. The numbers of vehicles and pickup taxi services have been steadily on the increase. In 2016, for instance, 20 individual pickups with families and their merchandise arrived, while a further seven pickup-taxis ferried people and packages to and from the Bolivian border every two hours. People from Villazón, the nearest Bolivian town and an important market for traditional products, also came to the Santa Catalina fair, where it is easier to purchase Bolivian wares, such as llama fiber, from this centralized market than directly from the producers in their isolated farmsteads.

Arrival of the Caravans

The people of Santa Catalina expressed their concern about the decrease in caravan arrivals to the fair. As a local stated, "[The] last year came fewer ... they used to come in greater numbers ... they would cover all this mountain with llamas ... as the wool is not worth much, because of this they do not come… There are no more llamas because people have already changed, vehicles arrive when vehicles did not arrive before, now one pays a truck, gets them and comes" (Interview 10-2013).

Caravans

Caravans are composed of either donkeys or llamas. There are more donkey caravans (18 in 2014, 16 in 2015) than llama ones. Donkey caravans aggregate fewer animals—a mean of 16 and 13 (in 2014 and 2015, respectively), with a minimum of two animals and a maximum of 28. There are usually about three herders in attendance and women make 24–38% of the setup. The donkey caravans also bring with them females with calves and between 10% and 30% of the total animals do not carry loads. The caravans come from a variety of Bolivian towns (Cerrillos, Chuqui, Sacarí, Piscuno, San Pablo, Cocani, Tupiza, Uyuni, Villazón) as well as some Argentinean towns (Rinconada, San Juan de Oros, La Quiaca). The trip to and from these places can take anywhere from a few hours to up to six days.

Donkeys can carry twice as much as the llamas. Therefore, while a donkey can carry a *quintal* or about 50 kilos, the llama carries two *arrobas*, a total of approximately 24 kilos. One of the *llameros* who traveled with the two types of caravan compared llamas and donkeys. He stated that llamas were better for long distance trips because, although llamas get tired, they continue walking, while the donkey just stops. He also compared the animal's digestive physiology, saying that llamas, as ruminants, are better adapted to local range than donkeys (Interview 64-2014).

Llama Caravans

In 2012 and 2017, no llama caravans arrived at the fair and in 2013, only one made it. In other years, two caravans arrived annually. These caravans ranged from between 30 to more than 80 animals, with approximately five animals not carrying loads, which were used as auxiliary or replacement animals. The caravans leave from Villa Loma, Colcha K, Nor Lipez, in Bolivia. The round trip takes 12 days, five days to arrive at Santa Catalina, an average stay of two days at the fair (Table 1), and then the subsequent trip back. There are four fixed overnight stops at San Vicente, Pukuni, Zapatera, and Cumbre. The *llameros* bring hides and blankets to shelter themselves as they sleep in the open-air during the trip.

There are a series of ritual departure activities that are undertaken by the *llameros*. Starting at home, this includes a ceremony in which some llama sugar figurines are offered and burnt. In addition, a ceremonial table is set with a plate of smoking coca leaves mixed with coa (a resinous plant, *Parastrefia* sp.). This admixture is sprinkled with singani wine. Small stones in the vague shape of llamas, found in fields, are considered by herders to have llama souls and are called *cushkani*. Herd-

Table 1. Llama caravans (named in relation to the head of *llameros*), date of arrival, hours spent at the fair, number of animals and people, and rate of llamas/*llamero*.

Year	Caravan	Arrival	Hours staying the fair	Number of llamas	Persons	Llamas/ People in caravan
2013	1	Nov 22, afternoon	36	32	3	10/6
2014	A-Natalio	Nov 22, 17:00	40	32	3	10/6
	B-Santos	Nov 23, 15:10	44	58	5	11/6
2015	A-Natalio	Nov 22, 11:20	48	58	5	11/6
	B-Santos	Nov 23, 12:00	43	83 (2 slaughtered at the fair)	4	20/7
2016	A-Natalio	Nov 22, 10:30	53*	34	3	11/3
	B-Sergio	Nov 23, 10:15	53*	53	4	13/25

*Trucks did not bring enough flour and *llameros* had to wait for the truckers to find more flour in the nearby town of La Quiaca.

ers place four *cushkani* stones facing the sunrise when on their way to the fair. The stones are dressed with streamers and the herders smoke coa around the *cushkani* before departing. Also, along the way, they stop at *apachetas* (rock cairns), where they offer wine and coca leaves to Pachamama (Interview 150-2016 and 152-2016).

The daily routine and four scheduled stops were described by one of the *llameros*, thus:

> The stops are always in the same place, we stopped in the old places of many years ago. Dad knew the places where to stay, these are fixed places for the llamas. The oldest people have fixed that place, a place that already has water. We call them *jaranitas* in Quechua. The llamas sleep beside us, in some places they are tied with rope because at night they can wander off or because a lion (puma) or something can frighten them. At half-past five in the morning we load all the llamas, we fix their loads, ready, by half-past six or seven we leave. We rest at ten o'clock for about fifteen minutes, nothing more. We walk all afternoon until five. (Interview 60-2014)

Llamas

Caravan llamas are all castrated young males called *pakarane* or *orco llamita* and their phenotypes are varied, including short-haired animals (*C`cara*), as well as a number of long-haired ones (*C´haku*) (Figure 1). The *llameros* use their own ethnotaxonomy to identify each individual animal of the herd, mainly by characteristics of their coloration. Some types of coloration have their own particular name, such as *tajllu*, which means "collage of mixed colors and small spots" (similar to an Appaloosa). Other types directly refer to the coloration of different species of animal, in many cases birds, such that *huallatas* means "white frontage and black chest, posterior flank, and tail"; *condorí*, signifying a white ring around the neck; and *guanaco* which describes an animal with similar coloration to that of the llama's wild ancestors. There is also an intensity scale that encapsulates the color and tonality from white to black of the llamas such as *blanco*, *choclo*, *paco*, *cafe*, *chumpi*, *chuchi*, and *negro*; reddish animals are known as *parro*. Spots or patterns on certain parts of the body also have specific names, for example, *trensani* is a nape spot, *calzada* means legs that look

as if they are wearing socks, *huangalli* designates animals whose back is darker in color, and *alca* are those animals with white neck and front legs with a darker body. Animals with short ears are called *mullus*, and those with clear eyes *coquencho*. All the above combinations of particular features allow for the individualized characterizations of each animal.

Within a herd of llamas, there are internal hierarchies in which the behavior of certain individual animals makes them stand out from among the others. These animals are always the most prominent, traveling at the head of the caravan and literally "knowing the way." These animals are usually christened with a name and are considered a companion of the *llamero*. Each carries a collar of colored wool called a *puiso* that has bells and that varies according to the llama's position within the llama hierarchy. In general, caravans travel with three to five of these leading llamas.

The *llameros* decide which animals will make good leaders, having watched them since they were calves. As llama calves play games, the *llameros* observe to see which will lead and which will follow, as

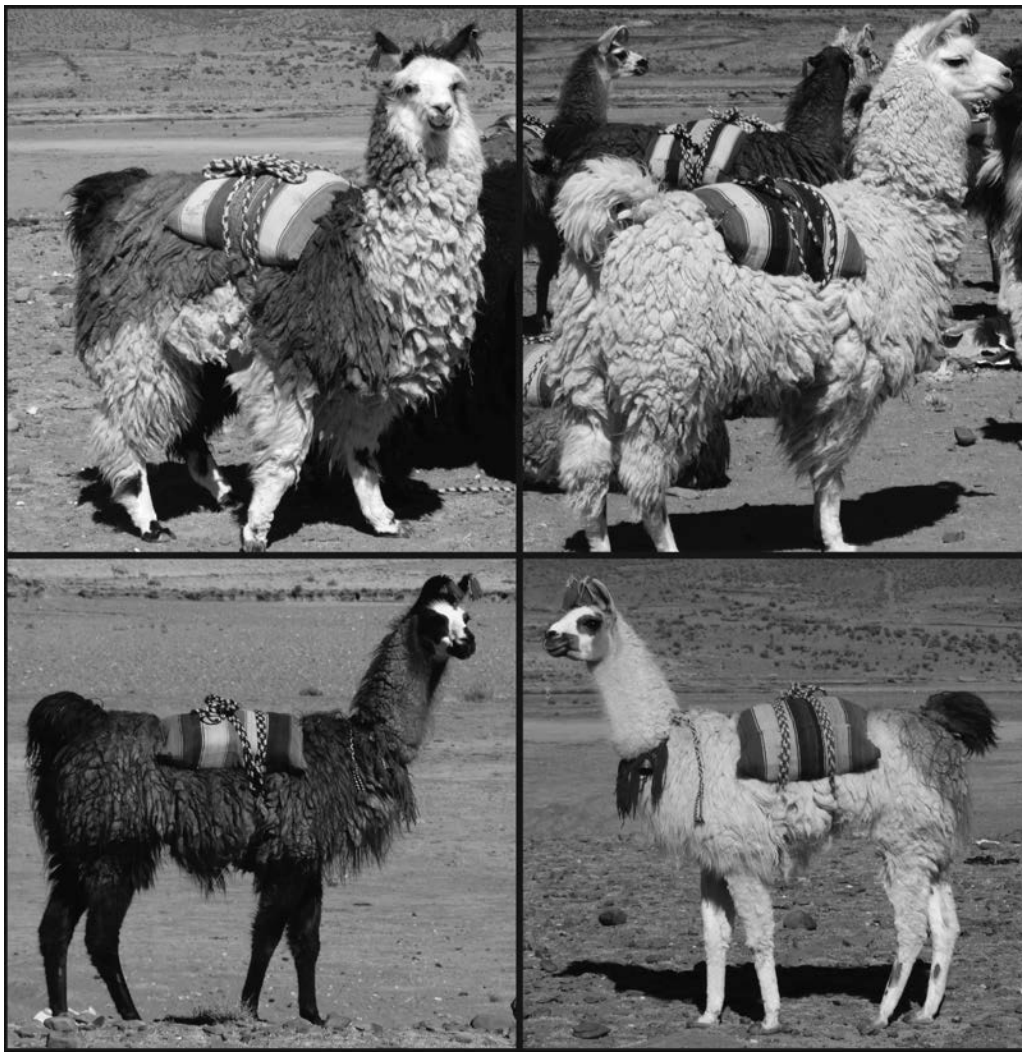

Figure 1. Four llamas of the same caravan. Note the diversity of phenotypes and fiber quantity (photo Bibi Vilá).

well as watching for which are strong and have broad-backs, known as *cuerpudos*. The *cuerpudos* are castrated when they are one-year old and go on their first trip at two years of age, when they are known as *maltones*. On this trip, the *maltones* do not carry loads or have only light loads. Some young *llameros* in 2014 were protesting because they had ten *maltones* in the caravan who were unruly, not being used to ropes.

In one herd, for example, there was a special llama called Javier (Figure 2). His owner, Natalio, stated that, "Javier is the best leader, the highest, the chief, the *malku,* always goes first." Javier has traveled to Santa Catalina since 2013. In 2016, he traveled without any load because he was getting old and was skinny. According to Natalio, this would be his last trip because *"*…[although] he knows the way, and guides, he is already tired*"* (Interview 152-2016).

Llameros

The *llameros* of the two llama caravans belong to the same extended family and are related to many of the shepherds who live in the Villa Loma zone in Bolivia (Figure 3). Depending on the year, people are organized into the different caravans. On three occasions, *llameros* have included women on the trip, the wives of Natalio and Modesto. The three leaders, Natalio, Santos, and Sergio, all claimed that their first trips to the fair started when they were twelve in the company of their elders, either their father and/or their uncles. In 2014, Natalio brought his two young nephews, who were 17 and 18 years old, while Santos brought his 14-year-old nephew. The teenagers stated that they enjoyed the trip, but that they were studying and did not think that caravanning would be a suitable profession for them. They did it more for the experience and adventure, rather than as training for the future. In 2015, the Santos caravan

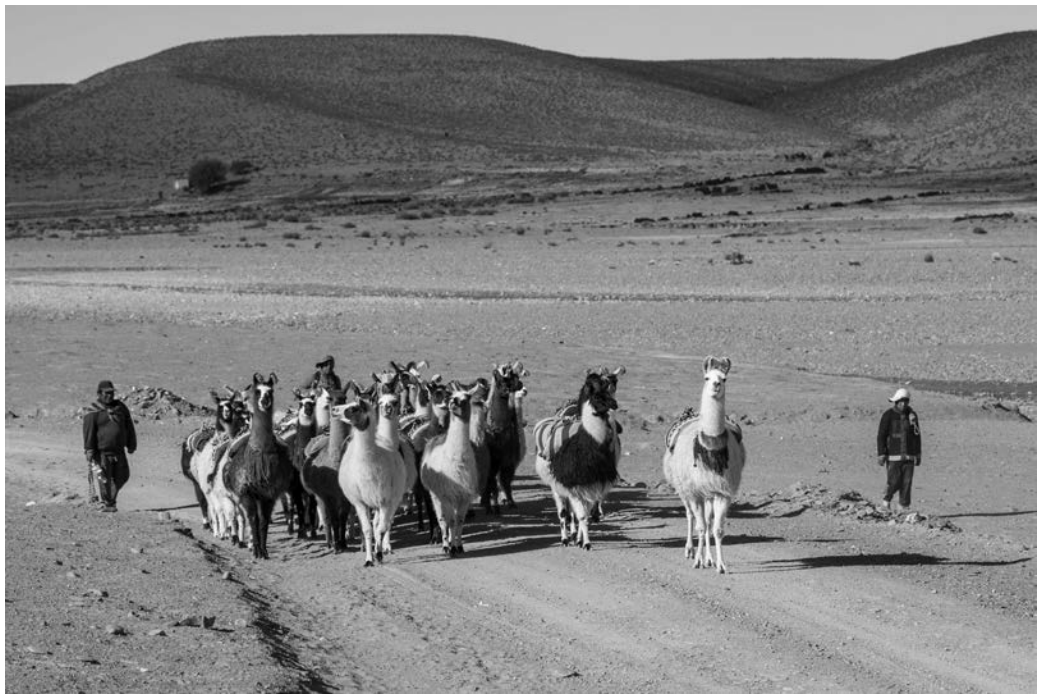

Figure 2. Natalio's caravan arriving at Santa Catalina. Javier is the first animal on the right. Observe his posture as the head of the herd (photo Silvina Enrietti).

traveled with Santos' two adult sons. They had returned to the caravan because they had been working in the mines, but mining was in crisis.

Arriving at the Fair

Llameros use llama fiber ropes to handle their animals. These ropes are soft but very strong and are multi-purpose, being used to tie the animals, to hold the load in place across the animal's back, as well as for handling the herd. When the caravan arrives at Santa Catalina, the animals are grouped within a circle that is formed by three ropes that have been knotted together and that are passed around by the animal's back, creating a type of virtual corral known as a *tihuaico* or *saibi* (Figure 4). Animals used to this kind of enclosure remain remarkably calm and stay within the "fake" enclosure, even though they could easily wander away. Once inside the *tihuaico* or *saibi*, the *llameros* grip the llamas by their neck with one hand and untie the load with the other, dropping the load onto the ground. Then the *tihuaico* is opened up and the llamas are allowed to graze or drink water nearby, while the *llameros* count the number of packages and ropes, thereby verifying that all the animals have arrived.

The *llameros* mainly brought llama fiber (approximately 200 kilograms per caravan) and some leather to the Santa Catalina fair. As they state, "we bring 200 kilos of wool for our own consumption, not for business. The wool belongs to the family and within the family we distribute it (the merchandise) according to whom they sent the wool to. Rice, sugar, but mostly flour. Flour is what we consume the most. We have registered the quantities and according to that we share it within the family" (Interview 53-2014). In 2012, Santos's

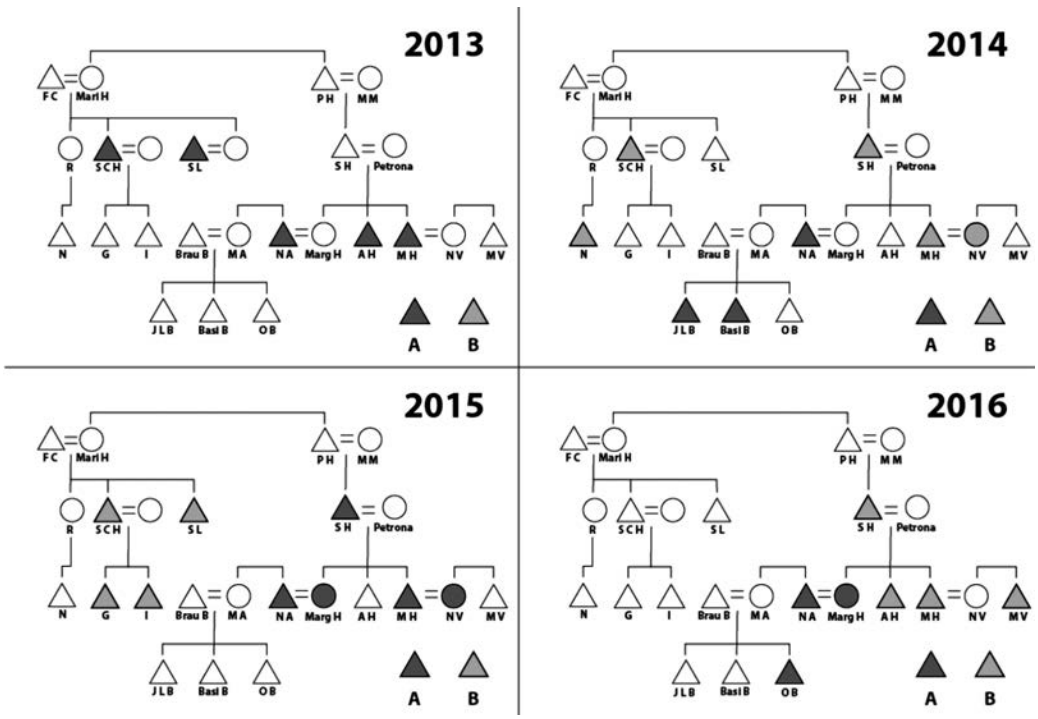

Figure 3. Kinship between the caravans and changes in the conformation of the groups that carry caravans on different years. A and B are the two independent caravans. Abbreviations are the acronyms of the family names of *llameros*.

Figure 4. *Tihuaico*: animals enclosed by a rope (photo Bibi Vilá).

caravan brought two of his cousin's llamas; these were slaughtered at the fair and their meat sold at the market.

Exchange

Big trucks from Bolivia and Argentina also arrive at the fair on November 22nd or 23rd. These trucks bring packed industrial food to exchange for fiber (Figure 5). The price ratio between llama fiber and a 50-kilo sack of flour can vary considerably (Table 2), such that, in 2013, the *llameros* claimed that the exchange price did not make the trip worth their while. The *llameros* obtain their yearly supply of flour, sugar, rice, and noodles at the fair and, because they do not use cash, they are subject to the truckers' fixed prices, since it is only the truckers who are in contact with the outside currency-led market. At the periphery of these large transactions with the truckers, there are other exchanges between local people of smaller and more diversified products. These exchanges include fat for cooking pots and corn flour for *charqui* (dehydrated meat), among other minor deals. In these transactions, the value of the barter is agreed between the two parties and is not subject to the fixed prices of the external market and, therefore, not linked to market inflation.

As the llamas can only carry a maximum load of 25 kilograms (2 *arrobas*), the 50-kilo flour sacks have to be distributed into two separate bags. These are then closed and covered with llama woven sacks called *costales*. The *costales* present a naturally striped decoration and measure approximately 96 cm x 62 cm. Once full, the sacks are sewn shut. Once again, inside the *tihuaico,* the llamas are tied in threes for loading, which is undertaken by two people. Once all the llamas are loaded, the return trip to Bolivia commences.

Figure 5. Trucks bring industrialized food, mostly flour, which is exchanged for fiber (photo Bibi Vilá).

These *llameros* make two trips a year to different places, to Santa Catalina in November and another during winter to the Tupiza Valley to exchange salt from the Uyuni saltpans for maize and other vegetables. In all the management observed during the arrival at the fair, the market days, taking the animals to graze and drink, and during loading, we saw no negative reinforcements or punishment during handling. The tools and resources used by *llameros* for handling were ropes, sounds, and body postures. Unlike during the unloading of the animals, when llamas remain calm and quiet, during the loading process, llamas are not as cooperative. Remarkably, during the whole loading operation, the *llameros* never twisted the ear of the animals. This is a common technique to calm an unruly animal in Argentine llama management (the animal stays still because of the pain inflicted). Instead, we observed that the *llameros* took an upright body posture with their head raised in front of the animal as if to spit on the llama if necessary. This upright position, which mimics that of the dominant llama male, was intimidating and the animal tended to back down and allow for a calmer loading. Although body language signals are common among people and some domestic animals, it was interesting to observe it between the *llameros* and the llamas.

In 2017, no llama caravans arrived at the fair. Three reasons for this were given. First, a new fiber fair has been started at Cocane, a Bolivian town closer to where the *llameros* live. At the new fair, the

Table 2. Prices of llama fiber, flour package, and exchange rate in the last five years.

Year	Llama fiber price in Argentine pesos	Price of 50 kgs of flour in Argentine pesos	Exchange rate Kg Fiber/50 kg flour
2013	8	350	44
2014	20	280	14
2015	25	260	10
2016	23	320	14
2017	40-45	320	7-8

llameros were "cheated" with low prices because buyers were very few and had made an agreement with the local authority (the *corregidor*) that impeded the presence of other buyers. The *llameros* did not have time to reach Santa Catalina, given that the Cocane fair was two days before the Santa Catalina fair (Interview 17-2017 of a fiber buyer from La Quiaca, Argentina). Second, there has been a general improvement in *llamero* living conditions:

> Before there was no mobility and we all had to walk with llamas..., but now there are roads and trucks, it has changed, the president has changed and there has been stability, thanks to Evo. I liked llamas, but not anymore. Once you have mobility, you cannot walk, you know it gets tiring after a while, that's the problem, people are weaker, now everyone has mobility thanks to Evo. (Interview 19-2017, from an ex-*llamero*)

The third reason given was a drought that affected the area: "with the rain that has not been, there is no grass to stay, no water, that's why they did not come, the llamas are weak, more so than the donkeys" (Interview 25-2017, from a female shepherdess who raises sheep and llamas). The factors underlying these three reasons are socio-economic and environmental, involving the new fair (probably related to the demand from a recent textile factory), the economic possibility of using vehicles, and drought.

Discussion

The llama caravans that arrive at Santa Catalina can be considered an example of the exchange that typical pastoral societies practiced, as described by Khazanov (1994). These Andean pastoralist societies present a high level of technological resilience and an organization characterized by clan units or extended families. In turn, these perpetuate the communal ownership of pasture and family owned livestock. As described for several pastoralist communities (Khazanov 1994; Medinaceli 2005; Paz Flores 2000), the *llameros* arriving at Santa Catalina maintain a social organization that engages in a periodic relationship with "the outside world." But, as has happened in the deserts of Africa and Asia, the *llamero* population has declined over time. This mirrors a worldwide trend, as pastoralists have decreased from 10 to 1.5 percent of the population during the last five decades (Faye 2016). An analysis of the reasons behind the inherent vulnerability of pastoral systems shows that these are weaknesses common to agriculture-based livelihood systems in response to global changes (Dong et al. 2011). These mainly include climatic, cultural, and economic factors.

Caravans can be interpreted as an economic practice, undertaken to ensure livelihoods and sustenance, thereby offsetting the ecological constraints (mountainous and stepped, arid, waterless areas), while partially meeting the social needs of Puna societies (Nielsen 1997, 2000; Yacobaccio 2012). Caravans can have many similarities

or convergences across many parts of the world (Clarkson et al. 2017). In the Andes, recent research on caravans in Peru (Tripcevich 2008), Chile (Clarkson and Briones 2002), and Bolivia (Gabelman 2015; Medinaceli 2005; Nielsen 1997, 2000) serve to emphasize the existing commonalities across the region. In family terms, caravanners are usually members of an extended family, with young people participating on the caravan from the age of 12. Regarding the travel routines, there are also similarities in the number of walking hours, the type of camps en route, and the relationship between the number of animals and people. In terms of materials and technologies, these similarities are found in the use of llama fiber ropes, the use of different materials for the *costales* in relation to the type of load, and the amount of load, with a mean of two *arrobas* per animal.

Researchers have commonly accepted a direct relationship between a llama phenotype and function, even when the animals have not been observed undertaking their "designated" function (Reigadas 2014). For example, I found that many of the llamas that traveled in the caravans were hairy and, therefore, of a shaggy phenotype, which is not normally associated with cargo animals. In a review of phenotypes and functions, Yacobaccio (2010) cites the description of compound words such as *wakaywa apaq llama/chaqnana* which denotes the "large woolly ram of burden" (Dedenbach-Salazar Sáenz 1990), implying that, in the past, hairy llamas were also used to move loads. For the *llameros*, the only necessary condition of a load-carrying llama is that of a wide back, hence described as a *cuerpuda*. Palomino (2007) describes different sizes of llamas and loads and found that all the llamas were able to carry two *arrobas*, except the young *maltones*.

Another assumption in the literature is that the *llameros* are typically only males (Clarkson and Briones 2002; Tripcevich 2008). In three of the caravans, women (wives of *llameros*) accompanied and worked in the caravan. The role of women in llama caravans was also highlighted by Gabelman (2015) on a caravan from Asanaques in Bolivia. The woman walking on this particular caravan was 71 years old. During our conversations with individual *llameros*, we reported some of the strategies described by Nielsen (2002) concerning the diversification of the Andean family's economy. For example, Santos's sons had migrated to temporarily work in the mines. Given the crisis in this sector, they had returned to caravan work, where they had always kept their own animals.

Llameros are cultural mediators *par excellence*, but they are also a driving force in the camelid fiber markets (Casaverde 1977; Nielsen 2001). Most of the literature on caravans is based on the pastoral-agricultural interaction (Kuznar 2016), but the Santa Catalina fair exchanges are of a different nature, as the main interchange is between the pastoral llama fiber and the international wool market mediated by industrial food brought in by trucks. The trader-truckers maximize their own economic benefit given their access to outside money-driven markets (including those that set international wool prices), while garnering resources they require from the *llameros*. This asymmetric exchange is based on unfair barter of fiber for manufactured goods, in which the *llameros* lose out by "paying" more than the monetary value of the goods in fiber. The exchange rate of llama fiber for flour packages had high variations, fluctuating between seven and eight kilos and 44 kilos of fiber per package of flour. A previous article (Serapio 2008) set the rate at 20 but pointed out that this had been as low as five "in less recent times." In only five years, we recorded rate shifts of up to 500%. In this system, it is difficult for the *llameros* to know the price beforehand, given that any prices they might have from a previous fair could be outdated; the real price is the one that happens in the fair of that year. These fluctuations cause

vulnerability and can mitigate against the long-term viability of the fair. In 2016, there were meetings between the fiber producers in an attempt to unite and resist abusive prices. This worked, and the truckers slightly increased the base price of fiber. In June 2017, a textile plant was opened in La Paz, Bolivia (EFE 2017); it has the capacity to process more than a thousand tons of wool fiber per year to benefit Altiplano camelid pastoral communities throughout the country. It is clear that, as of 2017, a high local Bolivian demand for llama fiber has commenced. This is in direct competition with the Argentine market mediated by *barraqueros* and serves to explain the emergence of the Cocane fiber fair in Bolivia.

As stated by Kuznar (2016), trade is the way in which pastoralists can influence social stability or instability, and if Bolivian pastoralists start selling all their fiber in their own markets, this in turn could generate problems in the fiber economy of northern Argentina. It would not be a surprise to find high prices offered at Santa Catalina in 2018, thereby tempting the *llameros* to return to Argentina and benefitting the La Quiaca *barraqueros* with a large part of the southern Bolivian fiber production. According to an interview with a truck owner, between 5,000 and 10,000 kilos can be bought by each trucker. In turn, they prepare the wool in their huts and then take it down to southern Argentina, Patagonia, where companies then export it. The decision of which market to target for their fiber (Argentina or Bolivia) benefits business from either side of the border. This is similar to what Kuznar (2016) observed in Asia, albeit at a lesser scale, where pastoralists play key roles in destabilizing whole nation-states.

At the periphery of these trucker-*llamero* exchanges are other smaller intra-ethnic reciprocal exchanges, with barter of certain products conducted in a non-inflationary manner. People who approached the *llameros* asking for coa to produce smoke at ceremonies believed that the coa transported by llamas was more medicinal, that it had more power, and that it was more authentic.

At the fair, varied ecosystem resources were exchanged, reflecting the existence of Andean vertical complementarity. In a previous article, Tartaglia Gamarra and Vila (2016) found at least ten ecosystems are represented by the products found at the fair, from the Argentinean sea (canned sardines) to the *pantanal* with tropical fruits and wood. The mixture of economies at the fair makes caravans part of an overall strategy of diversification that allows the *llameros* to move flexibly between a capitalist economy and traditional exchange structures (Caro 1985; Goebel 1998; Molina Rivero 1987).

The growing tendency to travel in vehicles or pay for the trip by pickup/van-taxi to transport the products at the fair is increasing. This leads to a decrease in the total number of caravans (donkeys and llamas) compared with historical times, rendering traditional caravanning ever more marginal. In fact, the continuation of some caravans comes down to a lack of cash in the *llamero* economy. When, in 2016, Natalio sold some fiber for cash, his wife decided to use the money to go back to her home in a vehicle.

One ex-*llamero* emphasized, in 2017, that the decrease in caravans also had to do with reasons of "good living." An economic upswing and concomitant increase in comforts has led to a negative reaction to activities as hard as caravanning with llamas. Many fiber sellers, in fact, had traveled to the fair using a rented vehicle and were ex-*llameros*. They explained that they traveled by vehicle because their lives had improved, maintaining their economic activity—exchange in fairs—but with a modernized mode of transport. This process of "good living" serves to show how large-scale socioeconomic forces make caravans vulnerable in the first place. In fact, caravans are a visible element of a wider crisis within the pastoral system, risks which are widespread across different pastoral communities

in the world (Dong et al. 2011). If this trend continues, caravanning could disappear altogether and with it a herding and pastoral life. In Chile, ethnographic reports by Clarkson and Briones (2002) have shown the disappearance of caravanning as a consequence of roads, rail, and cheap transport to such an extent that it no longer exists. It is also in clear decline in Peru (Enrique Michaud, personal communication, July 2017). The most resilient place for these practices is the Plurinational State of Bolivia, but even there, the caravan system had been increasingly displaced by a growing market infrastructure based on vehicles (Gabelman 2015). Medinaceli (2005) comments that, in 2002, the number of *llameros* that gathered at the Salar were reduced by one-fifth compared to previous years. In the analysis of two Andean pastoral communities in Bolivia and Peru, Dong et al. (2011) found an increased vulnerability in terms of the condition of the agroecosystem, livelihood, and institution as a consequence of an increasing in inequality and poverty, added to the pressures on pastures by diminishing governmental participation and dismantling of traditional indigenous land tenure system.

In many parts of the world, caravans are closely related to mountains, deserts, and steppe environments (Clarkson et al. 2017), which are sensitive to global climate change processes, such as aridification, desertification, and periodic droughts. The succession of wet and dry cycles in the Puna has affected human populations through variations in the availability of resources, causing profound changes in their mobility patterns and social organization (Morales et al. 2009). The drought in the Santa Catalina area, in addition to markedly affecting the productivity of vegetation, caused the reduction of livestock herds (mainly sheep), in some cases by over 50%, due to natural mortality and management decisions of the producers, including the slaughter and sale of animals (Rojo et al. 2017). Additionally, the risk of not having enough pastures and water sources on the road surely affects a *llamero*'s decision to lead a caravan to the fair. Several authors note that the process of aridification and climate change was a driving factor in the caravan's development (Clarkson et al. 2017). It is not surprising to note this trend, as climate change and variability are identified as forces driving vulnerability in fragile worldwide pastoral ecosystems (Dong et al. 2011).

Conclusion

There is a notable decrease in the prevalence of caravans across the world; thus, it is increasingly important that researchers document this pastime and livelihood. Sharing data with other caravan researchers from other areas of the world will reveal common themes. There is some consensus, at least in South America, that the main cause of decline is an increase in roads and vehicles across the Altiplano.

The caravans that arrived at Santa Catalina maintain a number of resilient Andean practices, albeit eroded by modernity. The llama caravans discussed in this paper share much with other caravans by pastoralists in other areas. *Llameros* are members of the same families and can handle the llamas without aversive punishments. It is difficult to think of ways in which these practices can be fostered and sustained in the future, because, though young people accompany llama caravans with their relatives, they express no interest in the caravans as a component of their adult professions. The fairs are also in danger, but their Andean cultural essence permeates and lends them strength. Dong et al. (2011) has shown that, at present, there is severe vulnerability among pastoral communities around the world. They propose a joint human and natural systems approach to identify research approaches towards helping pastoral societies cope with global change based on facilitating effective collaboration among social scientists, bio/physical scientists, practitioners, managers, and users to protect and sustain pastoral environments.

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