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Pastoralism of Camelids and the Emergence of Political Power in the Northern Peruvian Andes: A Discussion Featuring Archeology from the Viewpoint of Ethnography

Tetsuya Inamura
The Open University of Japan
inamura@ouj.ac.jp

The indigenous people of the high plateau south of middle Peru, have been pasturing camelids (alpacas and llamas) for thousands of years. Livestock plays an important role in the region, as it is a source of meat, hide, textile fiber, and dung. Additionally, the animals are used in ritual practices and specially llamas serve as pack animals.

The Andean indigenous pastoral people have been the principal focus of my studies since 1979, when I did fieldwork for about 16 months in the district of Puica in Cotahuasi Canyon, Arequipa, southern Peru. I have also studied pastoral communities in Asia, doing fieldwork in the Himalayas, Tibet, and Mongolia. Comparative studies have revealed the unique characteristics of alpaca and llama pastoralism in the Central Andes, such as sedentarism and no utilization of milk.

In the Central Andes, the earliest large monumental structures were built around 3000 BC in northern Peru. Alpacas were first domesticated in middle Peruvian puna in about 4000 BC, and one thousand years later llamas were domesticated in the northern parts of Argentina and Bolivia, according to recent studies. Prominent studies from the 1980s suggest that, based on archaeological and ethnographic data, camelids would have been locally bred on northern Peruvian coasts, where climatic and environmental conditions were drastically different from their original habitat.

Recently, studies on two intensively excavated archaeological sites in the northern Peruvian highland: Kuntur Wasi and Pacopampa, have found tangible evidences of the emergence of social hierarchy and political power around 800 BC (the beginning of the Late Formative period). Among the evidences of social hierarchy were the special tombs with offerings of precious metals, including gold and copper, and exotic items, such as tropical sea shells and obsidian, obtained from long-distance trade.

Evidence of the beginning of camelid husbandry during the same period has also been identified by the stable isotope analysis. This evidence evoked discussions on the significance of camelids in the formation of the Andean civilization in northern Peru.

In this paper, first I present ethnographical data on pastoralism in Puica. Then I provide an overview of recent research on the domestication of camelids and its spread to northern Peru, and the emergence of political power there. Finally, I discuss themes related to the significance of pastoralism for the formation of the Andean civilization, on the basis of ethnographical data.

Based on the studies in Kuntur wasi and Pacopampa, researchers have indicated the relationships between the rise of political power, the use of llamas for long distance trade, and the practice of letting llamas graze on maize fields so that the land would be fertilized with their dung, helping boost agricultural productivity. They also have assumed the use of llamas as sacrificial animals whose flesh was consumed in feasts and hair were used to produce textile. The ethnographic data provide material for discussion of archaeological studies, and include some images of scenes such as llama caravans, llamas grazing on maize fields, sacrifices, etc. Present-day Andean pastoralism lacks some elements of ancient camelid herding, such as llamas with fine wool (used for textiles) and llama breeding in coastal areas, which we know about from archaeological data from coastal and low areas where the climate is very dry and the remains of animals are well-preserved. These data contribute to anthropological studies of animal domestication and pastoralism.

After the Spanish invasion, in northern Peru, the raising of camelids was completely replaced with the husbandry of cows, horses, sheep, and goats brought from Europe. However, in southern Peruvian highlands, indigenous people have maintained the traditional pastoral practice of keeping camelids, llamas, and alpacas. Therefore, ethnological studies on pastoralism and archaeological studies would complement each other and the collaboration would yield deeper insights. Furthermore, the unique characteristics of pastoralism in the Andes play a vital role in the study of animal domestication and pastoralism in general; thus, cooperation between researchers in the fields of archaeology and cultural anthropology would be fruitful.

En la actualidad los camélidos andinos (alpacas y llamas) son criados por grupos indígenas en la región puna o altiplano andino, hacia el sur desde la zona central del Perú. El ganado andino juega un papel importante, pues es fuente de recursos como carne, fibra o estiércol. Además forma parte del ámbito ritual y especialmente las llamas sirven para el transporte de carga.

Mi estudio se ha centrado en la sociedades pastoriles andinas desde 1979, cuando pude realizar trabajo de campo durante unos 16 meses en el distrito de Puyca, valle de Cotahuasi, departamento de Arequipa, en el sur del Perú. Asimismo he estudiado otras sociedades pastoriles en Asia al hacer trabajo de campo en el Himalaya, el Tibet y Mongolia. Resultados de los estudios comparativos han revelado que las características peculiares del pastoreo de alpacas y llamas en los Andes centrales son el sedentarismo y la no utilización de leche.

En los Andes centrales las primeras estructuras monumentales de gran envergadura se construyeron en el norte del Perú. Por otro lado, las alpacas fueron domesticadas por primera vez en la puna central del Perú, alrededor del año 4000 a. C. y posteriormente las llamas fueron domesticadas en las zonas del norte de Argentina así como en Bolivia, según estudios recientes. Con base en datos arqueológicos y etnográficos los trabajos pioneros realizados en la década de 1980 sugerían que los camélidos habrían

sido criados localmente en las costas del norte del Perú, cuyas condiciones climáticas y ambientales eran drásticamente diferentes de las de su hábitat original.

Recientemente, la información obtenida en sitios arqueológicos intensamente excavados como Kuntur Wasi y Pacopampa, ubicados en la sierra norte del Perú, ha presentado evidencias tangibles en cuanto al surgimiento de jerarquías sociales y poder político alrededor del año 800 a. C., a comienzos del Periodo Formativo Tardío. A modo de evidencia jerárquica se encontraron tumbas especiales con ofrendas de materiales preciosos como oro y cobre, además de materiales exóticos como conchas tropicales y obsidianas, producto del comercio en zonas distantes.

Las pruebas referentes al inicio de la cría de camélidos durante el mismo período también han sido identificadas por el análisis de isótopos estables, que generó debates en cuanto a la importancia de los camélidos para la formación de la civilización andina en el norte del Perú.

En este artículo primero describo algunos datos etnográficos del pastoreo Puica, luego presento un panorama general de los estudios recientes sobre la domesticación de camélidos y su expansión hacia el norte del Perú, así como el surgimiento del poder político en esta región. También se discuten algunos temas relacionados con la trascendencia del pastoreo para la formación de la civilización andina al mostrar datos etnográficos.

Con base en los estudios de Kuntur Wasi y Pacopampa, investigadores han señalado relaciones entre el auge del poder político y el uso de llamas para el comercio en zonas distantes, además de la manutención de estos animales con maíz en terrazas de cultivo después de las cosechas, lo cual aumentó la productividad del maíz al emplearse estiércol como fertilizante. Asimismo se han utilizado llamas como ofrendas de sacrificio, banquete en las festividades y fuente de fibra en el campo de la textilería. Los datos etnográficos dan recursos para la discusión de estudios arqueológicos, así como también pueden mostrar imágenes concretas de prácticas como las caravanas de llamas, su manutención con maíz, sus sacrificios, etc. Por otro lado, el pastoreo andino en la actualidad carece de algunas características que tuvo el pastoreo de camélidos en el pasado como llamas de lana fina (utilizada para textiles) o la cría de estas en zonas costeras, lo cual se conoce por datos arqueológicos de zonas costeras bajas donde el clima es muy seco y permite que los restos de animales se conserven mejor. Así estos datos contribuyen a los estudios antropológicos sobre domesticación y pastoreo.

Después de la invasión española en el norte del Perú, la crianza de camélidos fue reemplazada en su totalidad por la crianza de vacas, caballos, ovejas y cabras traídas de Europa. Por otro lado, en la sierra sur del Perú grupos indígenas han mantenido sus prácticas pastorales tradicionales al cuidar de llamas y alpacas. Desde esta perspectiva, la colaboración que involucra estudios etnológicos sobre el pastoreo junto con los estudios arqueológicos sería más valiosa en el futuro. Además, las características únicas del pastoreo en los Andes serían cruciales para el estudio de la domesticación y pastoreo de animales en general. Por lo tanto, la cooperación entre investigadores en los campos de la arqueología y la antropología cultural sería más útil.

1 Introduction

Four kinds of camelid inhabit the Andes: two of them, llamas (*Lama glama*) and alpacas (*Vicugna pacos*), are domesticated, while the other two, guanacos (*Lama guanicoe*) and vicuñas (*Vicugna vicugna*)[1] , are wild. Genetic studies suggest that vicuñas may be ancestral to alpacas, with guanacos as the ancestors of llamas (Kadwell et al. 2001, Kawamoto et al. 2005)[2] .

Today, camelids are raised by indigenous people in the region of the *puna* or Andean high plateau south of central Peru[3]. Andean livestock plays an important role as a source of meat, hide, fiber, and dung; serving for rituals; and as pack animals.

Wild camelids have been inhabiting the region of the Andes south of central Peru and were domesticated inside the region. An important pioneering work on domestication by Wheeler and colleagues (1988, 1995) suggested that the first domestication of camelids (alpacas) occurred on the central Peruvian *puna* (high plateau) in around 4000 BC. Later studies suggested other centers of domestication, including the highlands of northwestern Argentina and Bolivia, where llamas were domesticated (Moore 2016)[4] . Camelids domesticated in the Andean highlands south of central Peru spread to the valleys and coast, and also to northern Peru, which is an area outside of the habitat of wild camelids. They were the main resource for Andean economies and social lives, and played a key role in the expansion of early states, starting with Tiwanaku and then the Incas (Yacobaccio 2004).

In the central Andes, the earliest monumental structures were built in northern Peru[5]. Complex societies first emerged in the coastal and lower mountain areas based on the rich marine resources and early horticulture, and then they spread to the highlands.

As Dufour and Goepfert (2019) mentioned, pioneering works carried out in the 1980s and 1990s suggested that camelid livestock breeding would have been possible locally on the northern Peruvian coasts, even though the climatic and environmental conditions were drastically different from those of the original place of domestication and husbandry (Bonavia 1996). Shimada and Shimada (1985) argued that camelid (llama) breeding and herding, introduced from the south, played various important roles in the rise of civilization on the north coast of Peru based on their analysis of data from their own excavations and other archeological studies published, as well as physiological and ethnological data[6] .

Then, local breeding was demonstrated by recent stable isotope analyses performed in northern Peru (Dufour and Goepfert 2019, Takigami et al. 2019), along with the excavation of important archeological sites. One of the most interesting themes is the relationship between the rise in political power and pastoralism of camelids in this region.

Data obtained by the studies of two archeological sites that have been intensively excavated, Kuntur Wasi and Pacopampa, located in the Northern Peruvian highland, revealed the tangible emergence of social hierarchy and political power in around 800 BC (the beginning of the Late Formative Period) (Onuki 1997, Onuki and Kato 1995, Inokuchi 2008, Inokuchi and Druc 2019, Seki ed. 2017). Among the evidence of social differences were special tombs with offerings of precious materials, including gold and copper, and exotic materials such as tropical shells and obsidian, brought in via long-distance trade. Evidence of the beginning of camelid husbandry during the same period has also been identified, leading to discussions of the significance of camelids in the formation of the Andean civilization in Northern Peru (Uzawa 2008, Takigami et al. 2019).

I have been studying mainly Andean indigenous pastoral society since 1979, when I engaged in fieldwork

for about 16 months in the District of Puica, Cotahuasi Canyon, Arequipa, southern Peru (Inamura 1981, 1986, 1988, 1995, 2006). I have also studied pastoral societies in Asia, conducting fieldwork in the Himalayas, Tibet, and Mongolia. Comparative studies have revealed the unique characteristics of alpaca and llama pastoralism in the Central Andean area, such as sedentarism and the lack of milk utilization (Inamura 2002, 2014).

In this paper, I first describe some ethnographical data on pastoralism in Puica[7] . Then, I present an overview of recent studies on the domestication of camelids and their spread to northern Peru, and the emergence of political power there. Finally, drawing on ethnographical data, I discuss some themes related to the significance of pastoralism and the roles of camelids therein.

2 Traits of Andean Pastoralism

2-1 Pastoral communities in Puica District

The ecological environment of the Central Andean highlands is roughly divided into two ecosystems: the high plateau, called *puna,* and the valley, called *quebrada*. The Puica District extends about 30 km from south to north and from east to west, located in an area from around 3,000 to over 5,000 m above sea level (Figure 9.1). Thus, Puica includes both ecosystems and indigenous inhabitants in each area engaging in pastoralism and agriculture. These two communities in the district have a close reciprocal dependence on each other. A large part of Puica has a high plateau at more than 4,000 m, where herders raise alpacas and llamas, and the rest is valleys, where farmers cultivate potatoes, maize, and other crops on terraced farmlands.

Figure 9.1.

Map of Puica district, La Unión county, Arequipa.

In *puna,* there are u-shaped valleys that were formed by glacial erosion in the Pleistocene era, where rich *bofedals* (alpine wetlands) are scattered (Figure 9.2). Alpacas are mainly pastured in *bofedals* with rich vegetation, which are maintained throughout the year thanks to the melted ice derived from the snow-covered high mountains. Llamas are bigger than alpacas and are more adaptable to the diversity of the environment, so they are usually pastured in arid higher areas surrounding *bofedals.*

Figure 9.2.
Alpacas grazing in a bofedal (wetland).

Figure 9.3.
Llama caravan, A carguero (leeder llama) goes first and a herder is going behind.

In *puma,* each pastoral family (extended family) raises on average about 300 to 400 domestic animals, or up to around 2,000 at maximum; 70–80% are alpacas, with the rest being llamas. Some families also keep a small number of sheep, cows, and horses.

The purpose of alpaca herding is for wool production, because the quality of alpaca wool is superior to that of the llama in its strength, warmth, and texture. The wool of alpacas was once an important article in trading with farmers for agricultural products, but as it began to be exported abroad, it came to be sold mainly for cash, starting in the 1960s.

Llamas are used for transportation. A mature llama can carry up to about 40 kgs on its back and travel about 20 kms a day. A caravan is usually composed of 10 or more llamas (Figure 9.3).

Both alpacas and llamas are consumed for meat, although, not for milk. This is a unique feature of Andean pastoralism, very different from pastoralism in Eurasia and Africa (Inamura 2002, 2014). Another unique characteristic of Andean pastoralism is its sedentary nature. As explained in the next two sections, these characteristics are related to the ecosystem of the Central Andes and the close relationship between herders on the high plateaus and farmers in the valleys.

2-2 Composition of an *estancia* and sedentary pastoralism involving “micro-scale seasonal movement” inside an *estancia*.

In Puica, although farmers usually live in nuclear families, herders of *puna* tend to form extended families. An extended family is composed of two or more married brothers with their wives and children.

The household together with the surrounding

pastureland of a herder's extended family is called *estancia.* The average size of each *estancia* is approximately 20 km^2 in Puica. Herders living side by side recognize the boundaries of *estancias* based on natural features such as rivers, rivulets, ridges, and big rocks. The reason herders have extended families is to avoid dividing their *estancias* into smaller parts.

I drew a survey map of an *estancia* situated around 4,500 m above sea level (Figure 9.4, Inamura 1995, 2002). A extended family of herders usually has two domiciles within its *estancia*: the main domicile, called *qatun wasi* (casa grande), and a sub-domicile, called *asatana*. The main domicile is located near a rivulet, which flows from the slopes of the U-shaped valley, so it is easy to obtain water for daily life. The rivulet sustains the alpine moor plant community throughout the year, making the area suitable for raising alpacas[8]. At the main domicile, there are six stone houses, including deposits of food, with some large and small stone corrals for livestock (Figure 9.4A). Livestock sleep in big corrals, called *warans*, at night. Small corrals, called *rutuna cancha* (corral for cutting), are used for cutting alpaca wool, loading and unloading the freight of the llama caravans, or for rituals involving livestock. These corrals are small so that the herders can control the movement of the domestic animals inside of them.

Food and daily necessities are kept in the main domicile, and some of the family members, and all of the livestock, move seasonally between the two domiciles. During the dry season from May to October, they move about every month for grass rotation between these two domiciles. During this season the domestic animals sleep inside a half-opened *waran*.

During the wet season from November to April, some of the family members with livestock stay at the sub-domicile, located on a well-drained, gently rising hill. The

Figure 9.4.

Map of an estancia (drawn by Inamura).

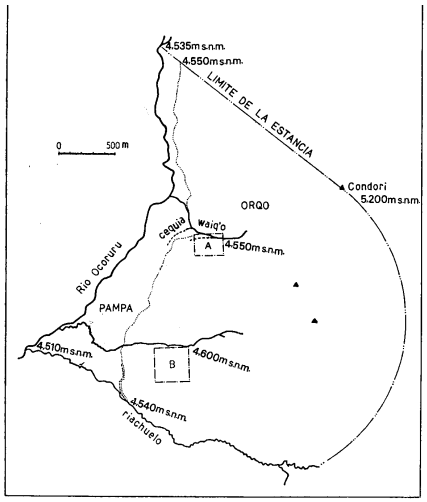

Figure 9.4A.

Main comicile of the estancia.

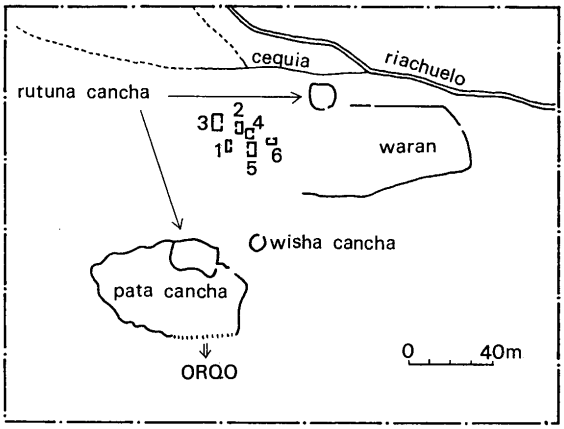

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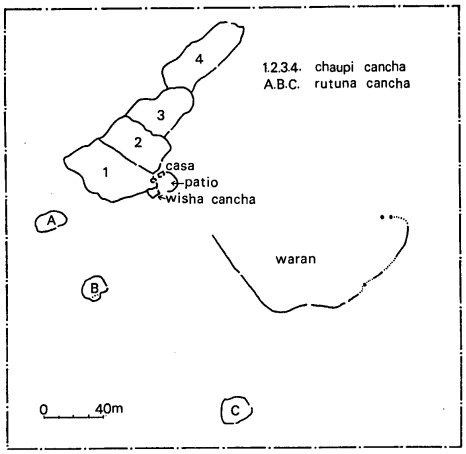
Figure 9.4B.

Sub domicile of the estancia.



sub-domicile has only one house and many large and small corrals for livestock (Figure 9.4B, Inamura 1995, 2002). They use the corrals in rotation for the following reasons:

The wet season is the time of lambing for domestic animals. To protect newborn animals from foxes and condors, livestock are kept inside a large, neatly closed corral *chaupi cancha* (central corral) at night. On the other hand, Andean camelids have a habit of leaving their dung in one area. In the wet season, the ground of the corral gets muddy with a mixture of dung and water, causing the risk of pollution with contagious bacteria. Therefore, it is important to maintain clean corrals in order to reduce the death rate of newborn animals. This is the reason why the sub-domicile is located on a well-drained site and has many corrals for rotation. The herders rotate *chaupi cancha*, or big corrals (1, 2, 3, 4), as well as *rutuna cancha*, or small corrals (A, B, C) (Fig. 4B).

The seasonal movement of the herders occurs on a micro-scale, limited to the area of one *estancia*, and its most important objective is to secure better conditions for the corrals in the wet season. This seasonal migration is far different from the pastoral transhumance practiced by Himalayan yak herders. The distance between the domiciles is only slightly more than 1 km, and there is hardly any difference between the altitudes of these places. Therefore, we can consider Andean pastoralism of this type as sedentary.

Figure 9.5.

Llamas on a terraced field, pasturing maiz after harvesting during the herders are staying in Puica village for the transportation of crops.

2-3 Lack of milking and the importance of llamas for obtaining agricultural products

Andean pastoralism also has the unique feature of not utilizing milk. Even though some herders engage in complimentary agriculture, possessing farmland derived from intermarriages between farmers, a large number of herders are specific pastoralists (without farmland) in Puica. Even though they have many animals, they cannot consume meat as their main diet because if they constantly slaughter their livestock, they cannot be maintained. Thus, their main diet is agricultural products such as potatoes and maize obtained from farmers. There are two traditional ways to acquire agricultural products. One is to get them in exchange for fresh meat, dried meat, and other objects such as rock salt, dry fruits, and pottery that are carried from other places by llamas. The other is transportation services using llamas, as follows:

In the valley, the farmers harvest potatoes and other tubers in April and maize in May and June. At each harvest time, the herders go down to the village and stay at the house of a close farmer for around one month. Answering the requests of some farmers, they engage in carrying crops on the backs of their llamas during their time in the village. If the herders carry 10 sacks of crops from a farmer's terraced fields to his house, generally 1 sack from the farmer is gifted. Thus, by providing transport services to several farmers, considerable quantities of produce can be acquired. During their stay in the village, the herders lead their llamas to the terraced fields after a harvest to feed them leftover maize cane (Figure 9.5).

2-4 Rituals involving domestic animals in the Andes

Herders practice rituals on various occasions related to important pastoral activities, such as the departure and arrival of the caravan for bartering products, for participation as *carguyoq* for the catholic feasts held in farmers' villages (which I explain in the next section), for shearing the wool of alpacas, for the treatment of skin diseases among livestock. The rituals are composed of *t'inka* (offering *chicha* or liquor made of corn; the action of pouring it), *q'ompo* (burning incense), and *mesa. Mesa* is a ritual performed on a table (*mesa* in Spanish) made of stone placed inside a corral. On the flat stone, they spread a *mesa q'epi* (package wrapped by a cloth) and set wooden plates and shells, on which they arrange maize grains, incense, flower petals, alpaca and llama fat, coca leaves, *llampu* (corn flour), and the powder of different kinds of ore. These are the offerings to spirits such as *Pachamama* (goddess of the earth), sacred mountains, etc. Participants bring these offerings near their mouths and chant the names of the spirits successively. They then cast the offerings into a fire burning in a niche in the stone wall of the corral.

The most important ritual for the herders is *puqllay* (meaning play or recreation), performed as a prayer for the healthy growth of livestock. I participated in this ritual in February 1979 at an *estancia* on the *puna* Ocoruru in the Puica District. The extended family occupying this *estancia* was composed of three component families that independently owned their livestock animals, although all the extended family members jointly raised their animals together. The rituals continued for 12 days as they were performed for all of the animals belonging to the component families. I will present an overview of the most important parts of the rituals held for a group of female llamas of a component family.

On the first day, they sacrificed a male alpaca. They pulled the alpaca down with its right side up and tied its legs. The head of the component family cut its side and inserted a hand to cut a blood vessel. He then pulled out the heart of the alpaca and put a paddle of blood into the intestine taken from the body of the alpaca. Next, they placed the heart in a ceramic basin. They then poured the blood from the intestine onto the center of the corral where they performed the ritual.

The following morning, they gathered in the corral, bringing a *mesa q'epi*, and started a fire in the center, which they called *qonu pacha*, meaning a hot place (of *Pachamama*). After *q'ompo* and *t'inka*, they performed *mesa*. They prepared offerings consisting of many plates for the various spirits and multiple llamas and alpacas, and offered them to *qonu pacha* after chanting.

In the afternoon, they grilled the meat and intestines of the sacrificed alpaca, and ate them together with a special food called *sanku* (corn dumpling). This holy meal is called *samekuy*. After the meal, they drove a group of female llamas into the corral where the women purified them by performing *q'ompo* and scattering *llampu* (corn flour) over the llamas.

Thereafter, they pulled down three infant llamas at the center of the corral, where they were rubbed with a paste of ground corn, *chicha* (liquor made from corn), and *wera* (fat from camelids), and coca leaves were placed on their heads. The chief of the component family then prayed by raising the basin containing the heart of the sacrificed alpaca and *uña llamita* (coat of an alpaca fetus) (Figure 9.6). The oldest man of the extended family pressed an apple against the people holding down the llamas and against the llamas themselves, saying "*Samerikusun kallpan kananpaq* (Let us renew)."

Such rituals are held for all the different groups of both sexes of llamas and alpacas belonging to different component families.

Figure 9.6.

The ritual of Puqllay, blessing three new born alpacas with uña llamita and heart of an alpaca sacrificed in a clayware.

2-5 Indigenization of Catholic tradition, reciprocity, and redistribution

The feasts of Catholic saints are important events to strengthen the ties of members of a community. Farmers as well as herders participate in the feasts held in the village of Puica, so the feasts work to reinforce the relationship between them. They nominate people called *carguyoq* (*cargo* holders), who embrace *cargos* or roles in the feasts in Puica. Three important feasts are celebrated in Puica Village: *Virgen de Concepción*; *Santiago*; and *San Juan* and *Santa Bárbara*. The feast of *Virgen de Concepción* is exclusively celebrated by the farmers of Puica village. The feast of *Santiago* involves both farmers and herders. *San Juan* and *Santa Bárbara* are patron saints of herders, who therefore hold their feasts. To celebrate the last two feasts, some herders are nominated as *carguyoq*. When a herder assumes a *cargo* in a feast, he should come down to the village to carry out his obligation, such as preparing a special altar or participating in a procession of a Catholic saint with his llamas. He also offers a banquet for more than a week in a house of his close farmer, *compadre* in many cases, inviting all the inhabitants to attend. He should bring the meat of an alpaca from his *estancia*, prepare enough food and *chicha* (alcohol made from corn) in collaboration with his *compadres* and other close farmers, and offer music, inviting musicians to play the indigenous harp and violin.

There are four main *cargos* arranged in order and ranking. The system of *cargos* is relative to "redistribution." A *carguyoq* does not receive any remuneration; rather, he should spend a lot on the banquet for the feast. In return, he will gain prestige in the community[9], and by completing all the *cargos* in his lifetime, he becomes an elder of the community and gains respect and influence.

3 Significance of Llamas to the Formation of Political Power in the Andean Civilization

3-1 Domestication of camelids in the Andes

Wheeler (1984, 1988) concluded that the domestication of alpacas began in the Central Peruvian highlands in about 4500–4000 BC, based on data from the excavation of Telarmachay cave on the high plateau of Junin. To uncover evidence of domestication, she analyzed the proportion of camelids in animal bone assemblages (increase in camelids in comparison to cervids), the age distribution of camelids' bones (abrupt increase in the death rate of newborn camelids), and morphological changes in the teeth (emergence of alpaca-type incisors), although she could not determine the domestication of llamas because it was impossible to distinguish differences in the teeth of llamas and their ancestral wild animals or guanacos.

Recent studies have elucidated the domestication of llamas. Moore (2016) suggested, based on the current evidence, three separate possible camelid domestication events: first in the central Peruvian *puna* (as Wheeler suggested), second in northwestern Argentina, and third on

the Bolivian high plateau (Browman 2016). She suggested that the Argentina camelid evidence obtained from fibers and bones supports the domestication of llamas as early as 5,000 years ago, and the development of cargo llamas as a relatively later stage (3,000 years ago) in the control of llama behavior and ecology. She also said that the evidence indicates clear apparent domestication of large camelids (llamas) by at least 3,000 years ago in Bolivia, which is generally too dry for vicuñas (and thus also alpacas).

Researchers believe that the camelids found at the archeological sites in Northern Peru are llamas, judging from their bone size, although discerning the remains of llamas from alpacas is not easy because there is little difference between the bones of the two, except for the incisors of alpacas (Uzawa 2017).

Ethnographic evidence coincides with this opinion because actual alpacas are confined to pasture in the *bofedal* (alpine moors) on *puna* (high plateaus). On the other hand, llamas can feed in rather arid areas and can be taken almost anywhere, as they are adaptable to various environments, even arid and hot climates. Wild camelids also show the same tendency. The vicuña's range covers the highest and coldest regions of the Andes, and the guanaco is less water dependent and more heat tolerant than vicuñas (Moore 2016). Llamas exhibit greater flexibility, while alpacas are restricted grazers (Vining 2016).

3-2 The spread of llama herding in northern Peru

From the samples of the excavation at the Pacopampa Site, located outside the habitat areas of wild camelids, researchers revealed not only the appearance of camelids but also the beginning of camelid breeding in northern Peru (Takigami et al. 2019). They extracted the remains of camelids from the PC-I (Middle Formative Period of Pacopampa: 1200-800 BC) and PC-II (Late Formative Period of Pacopampa: 800-250BC)[10]. Isotope analysis was used to identify the type of plants that the animals ate. The PC-I data showed that the main diet of camelids was C_3. They presumed that a small number of camelids that were raised in a region with predominantly C_3 vegetation (maybe the Andean high plateau) were brought to the site during the Middle Formative Period. On the other hand, dietary estimation of camelids of the PC-II indicated that they consumed C_4 plants (maize)[11] . This evidence suggests that they were likely fed maize leaves, stalks, etc., and that camelid breeding began at the site during the Late Formative Period. They assumed that the maize-foddering system led to a beneficial cycle: camelid dung works as a fertilizer and would have helped to increase maize production (ibid.).

This hypothesis of maize-foddering husbandry coincides with ethnographical data because I have observed scenes of llamas eating maize cane and leaves after harvest in the terraced fields on multiple occasions, when they were used to transport maize from the fields to farmers' houses, as described previously (Figure 9.5). However, in Puica, llamas are pastured for only one or two months in the terraced fields after harvesting, and it is not possible for llamas to be fed maize throughout the year. In Pacopampa, the isotope data showed that llamas used to eat C_3 food as well as C_4 food, so we can imagine the cycle of both maize-feeding and pasturing with natural resources.

3-3 Emergence of political power and social differences during the Late Formative Period in Northern Peru

The researchers who carried out the excavations at the Kuntur Wasi archeological site in the Northern Highland indicated evidence of certain social hieratchy, as follows: The architecture was developed in the Kuntur Wasi Phase (800–550 cal BC), and the main structure

was aligned symmetrically to a main axis. Four special tombs associated with several offerings were unearthed on the main platform. Cranial deformation was only found for individuals buried in these tombs, indicating the beginning of social differentiation (Seki et al. 2019). Rich archeological remains, including artifacts made of gold, tropical shells, precious stones, and obsidian, were found in burial and other contexts of the Kuntur Wasi and Copa Phases (Uzawa 2019).

Precious offerings—like Strombus and Spondylus shell artifacts from the Ecuadorian coast and stone ornaments made of sodalite from Bolivia—indicated the importance of extensive interactions such as long-distance trade, as well as being evidence of the power exercised by leaders who controlled these materials (Seki et al. 2019).

The data from Pacopampa almost correspond to that from Kuntur Wasi: the relatively egalitarian societies of the Early and Middle Formative Periods were transformed into societies of the Late Formative Period, when social differences were tangible (ibid.). However, the characteristics and source of the power that leaders used at both sites are different[12] .

According to Seki (2006), the appearance of these exotic artifacts in the Late Formative indicates the development of an elite class who used these luxury items to form the base of their political power and control long-distance trade. Based on the notion of Burger (1992)[13] , Uzawa (2019) indicated that domesticated camelids, more precisely llamas, would have contributed noticeably to transporting materials between widely separated societies.

3-4 Camelid (llama) herding and the roles of llamas

In addition to the important role of llamas as pack animals in the formation of political power, researchers have argued about how llamas were bred and what other roles they had. According to Uzawa (2019), the introduction of llamas was not necessarily intended to resolve the need for meat but rather to fulfill social functions. The thinking is that the demand for meat could be satisfied by deer hunting, which continued until the end of the Sotera Phase, the last phase of the Formative Period at the Kuntur Wasi site. In Pacopampa, researchers presume that llamas would have initially been used as a tributary or ritual animal rather than as a food resource in the Middle Formative Period (PC-I), as sufficient protein resources were available, such as deer, freshwater fish, and guinea pigs, living around the Pacopampa site. Also, in PC-II (Late Formative Period), camelid husbandry would have been introduced for other purposes, such as transportation, trade, or the production of woolen fabrics (Takigami et al. 2019) [14].

We can grasp the real images of the diverse utilization of camelids by way of the archeological data from later periods. Burials of camelids accompanied by high-status humans is widely reported in the Andes in various cultural periods (Browman 2016). The discovery of 26 perfectly preserved, naturally desiccated alpaca and llama mummies at the Chiribaya culture (AD 700–1300) site of El Yaral, located in the extremely arid coastal desert of southern Peru, provided the first reliable example of the existence of camelid herding there during the pre-Inca period, as well as evidence of their sacrifices. Researchers could classify the animals according to the quality of the fiber, and indicated the existence of fine-fiber llamas (Wheeler 2012).

At Huachaquito-Las Llamas (AD 1400–1450) on the northern Peruvian coast, the animals sacrificed were mostly young (less than one year old) and selected according to their coat colors; only those that were brown, beige, or mixed were used (Goepfert & Prieto 2016, Dufour et al. 2019).

Chronicles written after the Spanish conquest also report various cases of camelid sacrifice. For example, José

de Acosta (1951) mentions that people paid much attention to the coat colors of the camelids sacrificed according to the season and purpose of the ritual. According to Wheeler (2012), under Inca rule, an annual census was taken of the state and shrine herds. Special emphasis was placed on breeding pure brown, black, and white animals for sacrifice to specific deities, as well as on quality fiber production for the state-controlled textile industry and the production of sturdy pack llamas for the Incan army.

Uzawa (2017) assumed the use of llama fiber as a textile because many spindles were found in Pacopampa, although it is possible that the spindles were for cotton. Today fine-wool llamas have disappeared, and llama wool is only used to weave sacks for transporting things like crops using llama caravans. Hence, the ethnographic data do not coincide with the hypothesis, but archeological data from coastal areas during later times may support the use of llama fiber as a textile.

4 Conclusion and Perspective

Ethnographic data can provide a concrete image of the usage of camelids, although they cannot be used directly as evidence for archeological studies. The main diet of herders was agricultural products that they obtained from farmers by means of barter trade and the transportation of crops, although camelid meat was an important nitrogen source. On the other hand, we also have knowledge that they consumed much camelid meat on the occasions of feasts in farmers' villages. We can also observe the actual Andean herders' rituals, including the sacrifice of an alpaca with its heart extracted, offering it to sacred mountains and *Pachamama.* After the ritual, all members of the extended family eat the meat of the sacrificed animal together with the spirits that they worship.

We could also consider the weight of domesticated camelid meat as a special food for feasts, rituals, and sacrificed objects in the context of the archeological sites in Northern Peru. Uzawa (2017) focused on a semi-underground patio in Pacopampa, identified as a place for feasts, where many fragments of earthenware and animal bones were found. Llamas and deer were the most important among the nine species of mammals. I think that feasts had symbolic and economic functions relating to redistribution, both of which were important for the prestige of political leaders.

In this article, I discussed the significance of camelid herding in the rise of the complex society and political power in northern Peru. I hope that the ethnographic data have evoked discussions that lead to archeological studies and provided concrete images of the activities of domestic camelids and their herders, such as feeding cornstalks in the terraced fields after the harvest, traveling in caravans, conducting rituals, and holding feasts.

On the other hand, actual Andean pastoralism lacks some elements that past camelid herding had, such as llamas with fine wool (used for textiles) and llama breeding in coastal areas, which we know about from archaeological data in coastal and low areas where the climate is very dry and the remains of animals are well preserved. Textiles are another source of information. These data contribute to anthropological studies of domestication and pastoralism. The establishment of trade between different ecological levels in the Andes, described using the concept of "Andean verticality and the archipelago" for the Inca period (Murra 1975, 2002), has been considered as the basis for the emergence of complex societies in the central and south-central Andes (Dufour & Goepfert 2019). Domesticated camelids played an especially important role in this development. However, we do not have a clear picture of when, where, and how this development occurred. Northern Peru may be the most important area for that theme because

it is where the earliest large-scale public and monumental structures were constructed. Additionally, northern Peru is not in the habitual region for wild camelids, which clarifies that all the remains of camelids excavated in archeological sites were domesticated.

After the Spanish invasion, in northern Peru, the raising of camelids was completely replaced with the husbandry of cows, horses, sheep, and goats brought in from Europe. On the other hand, in Southern Peru's highlands, the indigenous people have maintained the traditional pastoral practice of keeping camelids (llamas and alpacas). Therefore, collaboration involving ethnological studies on pastoralism in Southern Peru and archeological studies would be more valuable hereafter. Furthermore, the unique characteristics of pastoralism in the Andes could be vital to the study of animal domestication and pastoralism in general; thus, cooperation between researchers in the fields of archeology and cultural anthropology would be useful.

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[1]They are extant New World camelids (order: Artiodactyla, family Camelidae), a mammalian family whose lineage can be traced to the Eocene of North America (Stahl 2008).

[2]Renaming of the alpaca (V. *pacos*) has been fixed to accord with molecular studies (Kadwell et al. 2001, Stahl 2008). Traditionally, the ancestry of both llamas and alpacas was attributed to the guanaco, while the vicuña was assumed never to have been domesticated (Kadwell et al. 2001).

[3] The pioneering ethnological studies were practiced by J. A. Flores Ochoa and his colleagues (Flores (ed.) 1988).

[4] The evidence shows that domestication of the llama took place in several Andean locations, while evidence for the domestication of the alpaca comes only from the ***puna*** de Junín (Yacobiccio 2004).

[5]The period, known as the Late Preceramic period (roughly between 3000 and 1800 BC), has recently attracted much attention because of massive amounts of public construction documented at major sites on the north-central coast, such as Caral (Shady et al. 2001), and claims that these constructions constituted evidence of Peru's "first civilization" (Burger 2012).

[6]Some of the ethnological data is what I offered them when we met in Lima just after I finished my fieldwork in Puica (Shimada and Shimada 1985).

[7]There are agro-pastoralist societies in the Central Andes, in areas such as the eastern slope in southern Peru, studied by some researchers (Webster 1973, 1983; Yamamoto 1982, 1985). It is interesting to compare pastoralism and agro-pastoralism (Inamura 2002), although, I cannot deal with that theme because of the length limits of this article.

[8]Efficient mastication, fine fleece, and resistance to disease are attributed to pasture composed primarily of *'k'unkuna (Distichia muscoides and Plantago rigida)*, found in the high-altitude moors (Webster 1973). Llamas, with their broader tolerance for forage and terrain, are sometimes pastured in the intermediate or lower zones when their services in burden bearing are needed locally (ibid.)

[9]Details on the *cargo* system in Puica are provided in my previous articles (Inamura 1986, 1995).

[10]In the Central Andes, large-scale monuments and constructions began to be built around 3000 BC. Instead of the Period of Early Horizon, which is based on the concept of the geographic spread of Chavín de Huantar's cultural elements, some researchers who have been engaging in the study of the formation of Andean civilization have proposed the chronology of the Formative Period, based on recent studies (Seki ed. 2017), as follows:

Initial Formative Period: 3000–1800 BC
Early Formative Period: 1800–1200 BC
Middle Formative Period: 1200–800 BC
Late Formative Period: 800–250 BC
Final Formative Period: 250–50 BC

[11]Although maize and amaranth were cultivated C_4 plants in the ancient Andean region, in Pacopampa, only maize has been observed in analyses of starch granules on human teeth and ceramics (Takigami et al. 2019).

[12]Seki and his colleagues mention the differences in the sources of power used by the leaders of the two sites: the leaders at Kuntur Wasi focused on long-distance trade in precious goods and rejected previous architectural structures (and probably the earlier ideology as well). The leaders at Pacopampa focused on the production of copper objects as well as long-distance trade, and they chose to partly respect the traditional ideology. Reusing the axis and some architectural components indicate the incorporation of the landscape and its related ideology or cosmology in the new social arena (Seki et al. 2019).

[13]Burger (1992) suggest that an impressive variety of foreign ceramics allowed scholars to trace the wide-ranging ties maintained by the center and that these patterns of exchange may have been important in terms of maintaining the prestige of Pacopampa and its leaders.

[14] There are different opinions; for example, Moore (2016) believes that the introduction of llamas to the coast of Peru 3,000 years ago does not necessarily imply that the llamas there were only used as cargo animals, but perhaps the main focus in introducing and pasturing them was for meat.

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