# Indigenous Record Keeping and Hacienda Culture in the Andes: Modern Khipu Accounting on the Island of the Sun, Bolivia

Sabine Hyland and Christine Lee

*Abstract* How did khipus—knotted cords that encode information—function within the economic systems of the postcolonial Andes? Best known as the method by which the Incas recorded administrative data, khipu use continued into the nineteenth and twentieth centuries. Few studies of modern khipus, however, have analyzed how khipu cords were integrated with the institutions of the modern state, such as the hacienda. This article examines a set of modern khipus from the Island of the Sun in Bolivia. These khipus, which contain dried potatoes and beans, are the first ever known to include agricultural produce. Our analysis demonstrates how the circulation of khipu styles within the Island of the Sun was linked to hacienda production, underscoring the intimate relationship between khipus and hacienda culture. Modern herding and crop khipus did not arise out of a generalized Andean consciousness but were products of specific historical and economic circumstances.

## Introduction

How did khipus, the knotted cords that encoded numerical as well as narrative information, continue to function within the bureaucratic economic systems of the postcolonial Andes? Although best known as the primary method by which the Inca empire (ca. 1400–1532) registered administrative data, khipus continued to be used throughout the Spanish colonial era and into the nineteenth and twentieth centuries.[1] Recent studies have noted the coexistence of khipus with Spanish alphabetic texts in the early Spanish colonial period; for example, Kathryn Burns has examined how alphabetically literate Andeans served as scribes and notaries in the Cuzco region alongside local experts who were skilled in khipu record keeping. Under legislation introduced by Viceroy Francisco de Toledo (1569–81), village notaries were required to

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1. Pärssinen and Kiviharju, *Textos andinos*; Brokaw, *History of the Khipu*; Curatola Petrocchi and Puente Luna, *El quipu colonial*; Puente Luna, "That Which Belongs to All."

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transfer economic information from khipus—such as livestock inventories—into written documents, which implied the ongoing presence of khipu experts in local communities.[2] Alan Durston has theorized that the continuation of khipu records was one of the primary reasons why the Andes never developed for Quechua a colonial tradition of "mundane" literacy comparable to that reflected in the extensive Native-language notarial and legal documents found throughout Mesoamerica.[3]

Although it is known that khipus continued to be used into the republican eras in both Peru and Bolivia, few studies of modern khipus have analyzed how khipu cords have been integrated with the institutions of the modern nation-state. That is, although ethnographers such as Carol Mackey have described how contemporary khipus encoded data, hardly any scholars have focused on how khipu literacy interacted with republican economic systems, such as the hacienda.[4] Modern khipus are often considered to have sprung from an ahistorical "Andean ontology" as a form of Indigenous media that existed in isolation from the modern world. A notable exception to this tendency to view twentieth-century khipus outside their larger economic context, however, can be found in the work of anthropologist Frank Salomon. He has carefully analyzed how the patrimonial khipus preserved in the central Peruvian villages of San Andrés de Tupicocha and San Cristóbal de Rapaz play a vital role in village political and economic life, complementing the local archives of written documents.[5]

This article examines five ethnographic khipus created in the Yumani hacienda on Bolivia's Island of the Sun, in Lake Titicaca, between 1948 and 1949. A Jesuit priest, Antonio Sempere, donated them to the Natural History Museum of the Smithsonian Institution in 1955, along with brief notes explaining the significance of the knots and their general structure. The Island of the Sun khipus encode information about local crop production and actually have pieces of produce—freeze-dried potatoes and a dried fava bean pod—tied to them. These are the first khipus known to display agricultural products attached to the cords. These Island of the Sun khipus represent khipu subtypes previously unknown in the Lake Titicaca islands, as a comparison of their structure with that of other ethnographic khipus demonstrates. Most importantly, our analysis allows us to identify on the Island of the Sun two non-overlapping zones that each deployed a distinct khipu type. Early ethnographies

2. Burns, "Making Indigenous Archives," 676.
3. Durston, "Native-Language Literacy in Colonial Peru."
4. See Mackey, "Continuing Khipu Traditions."
5. Salomon, *Cord Keepers*; Salomon, *At the Mountains' Altar*.

from the late nineteenth and early twentieth centuries and archival research reveal that these contrasting khipu zones developed out of the distinctive histories and cultural practices of the island's two haciendas.

This study contributes to and draws from the field of "New Accounting," which has transformed accounting history in recent decades.[6] New Accounting is characterized by a diversity of research methodologies as well as a focus on how local accounting practices result from particular historical circumstances. A pervasive theme has been the relationship of accounting to political power and how accounting practices respond to and shape structures of inequality. The ethnographic khipus from the Island of the Sun demonstrate that, prior to the implementation of Bolivia's agrarian reform law in 1953, a close relationship existed between khipu forms and the haciendas where the cords were utilized at the owners' behest. Herding and crop khipus did not arise simply out of a generalized and collective Andean consciousness; they can be shown to be the products of specific histories and economic activities.

## Modern Ethnographic Khipus

In the 1890s German anthropologist Max Uhle began to study the khipus that he found in use on Bolivian haciendas.[7] In 1895 Uhle questioned the herder responsible for livestock on the Cutusuma hacienda, located in La Paz department, about the knotted cords that he made to keep track of the herds; Uhle published the first ethnographic account of modern khipu usage based on this interview. Andean workers had created khipu accounts of the haciendas' agricultural production since the Spanish colonial period. For example, court testimony from 1614 reveals that Indigenous stewards (*mayordomos*) on the Cuzco hacienda of Juan Francisco Maldonado made khipus for recording the maize, beans, potatoes, vegetables, and salt produced by the estate for each of the previous ten years.[8] Lucila Castro de Trelles has documented how Andean workers used khipus to record information on the cattle, sheep, and horses belonging to the Tulpo hacienda in Huamachuco, Peru, in the seventeenth century.[9] Galen Brokaw has argued that as far back as the Inca era produce and

6. Piñero, "Cacao Economy"; Miller, Hopper, and Laughlin, "New Accounting History"; Stewart, "Pluralizing Our Past"; Hopwood and Miller, *Accounting as Social and Institutional Practice*; Neu, " 'Presents' for the 'Indians' "; Urton, *Inka History in Knots*.

7. Uhle, "Modern Kipu"; Loza, "El modelo de Max Uhle"; Hyland, "Ply, Markedness, and Redundancy."

8. Amado Gonzales, "Los quipucamayos contadores."

9. Castro de Trelles, "Quipus coloniales."

herding khipus existed alongside other kinds of khipus, such as those for documenting ritual offerings, genealogies, and narrative histories.[10]

After Uhle's work, subsequent research on ethnographic khipus in the first half of the twentieth century focused primarily on herding khipus and, to a lesser extent, on khipus for recording produce.[11] Beginning in the 1980s, however, anthropologists became aware of the existence of modern khipus that served nonagricultural functions, particularly in the central Andes. Some of these, such as the funerary khipus of Cuspón that are placed atop the deceased in the coffin and the yearly offering khipus in Rapaz, serve vital ritual functions.[12] In Mangas, hybrid texts known as khipu boards inscribed information about participation in village events, while in the Huarochirí communities of Tupicocha and Anchucaya khipus based on lineage (*ayllu*) recorded communal labor and resources.[13] Farther south in Bolivia, elderly men have re-created models of the offering and genealogical khipus that they used long ago.[14]

Ethnographic research on modern khipus, therefore, has revealed that these objects were created for a wide variety of purposes. Nevertheless, the most common type of modern khipu remains the relatively simple cords that recorded data about livestock and crops. Carol Mackey, who conducted ethnographic research on khipus in the 1960s, created an influential typology of herding and produce khipus based on a survey of 43 known examples, 24 of which she herself had collected.[15] In her research, Mackey interviewed 19 men and 1 woman about the khipus that they made. Most of these individuals worked on haciendas and had to show their khipus to the owner once a year in the annual accounting of their stewardship. However, a few, such as Nieves Yucra Huatta on Taquile Island in Lake Titicaca, kept khipus to record their own personal goods.

Mackey divided livestock and harvest khipus based on their structure into three types: A, B, and C. Type A, which "mimics standard Inca khipu in form," consists of a main horizontal or transverse cord from which hang pendant cords whose knots convey numbers.[16] In most of the examples of this type of khipu,

10. Brokaw, *History of the Khipu*.

11. Núñez del Prado, "El kipu moderno"; Soto Flores, "Los kipus modernos"; Mackey, "Nieves Yucra Huatta"; Mackey, "Continuing Khipu Traditions."

12. Ruiz Estrada, "Los quipus funerarios"; Tun and Zubieta Núñez, "Los quipus funerarios"; Ruiz Estrada, *Los quipus de Rapaz*; Salomon, *At the Mountains' Altar*; Hyland, "Festival Threads."

13. Robles Mendoza, "Quipu y masha"; Salomon, *Cord Keepers*; Hyland, Ware, and Clark, "Knot Direction"; Hyland, Bennison, and Hyland, "Khipus, Khipu Boards, and Sacred Texts"; Hyland, "How *Khipus* Indicated Labour Contributions."

14. Pimentel H., *Amarrando colores*; Arnold, *Metamorphosis of Heads*.

15. Mackey, "Continuing Khipu Traditions."

16. Mackey, 327.

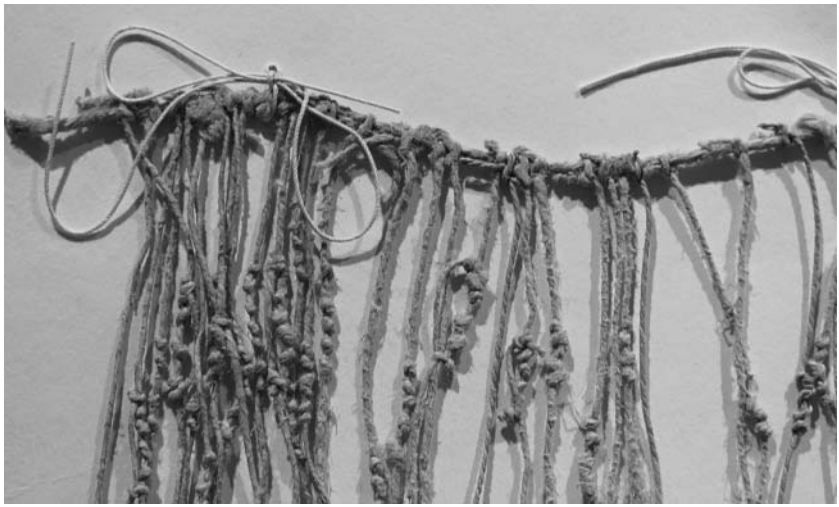

Figure 1. Modern type A khipu from Cuzco, Peru, circa 1920. Private collection. Photo by Sabine Hyland. Note the doubling of the main cord. This khipu was not included in Mackey's survey.

the top cord is free of knots, although three type A khipus from Laramarca, in the central Andes, have knots in the top cord.[17] Type A khipus are found throughout the Andes, from La Libertad in the north to Lake Titicaca in the south (figure 1).

Mackey found that the least common khipu type, type C (9 percent of the sample), consists of a single cord with overhand knots. These knots are grouped along the cord into zones that determine their decimal value. The first zone along the cord has knots that each indicate a value of one; then there is a space, and the following zone has knots that each represent a value of ten, and so forth, with the next following zone's knots signifying a value of 100. One of the type C khipus in her collection came from northern Peru, while the rest were from the Cuzco Valley.

17. Additionally, three other herding khipus from Laramarca are classified by Mackey as type B2 khipus. According to Froilán Soto Flores, who studied these Laramarca khipus in the late 1940s, none of the cords are doubled to create a thicker region for knots. Instead, each khipu is made of a central cord onto which are tied two pendants in classic type A fashion. A black hanging pendant stipulates male sheep, while its black subsidiary cord signifies male lambs; a white pendant represents ewes, while its white subsidiary records female lambs. Unlike most type A khipus, however, knots are tied into the main cord on these Laramarca khipus. Soto Flores, "Los kipus modernos."

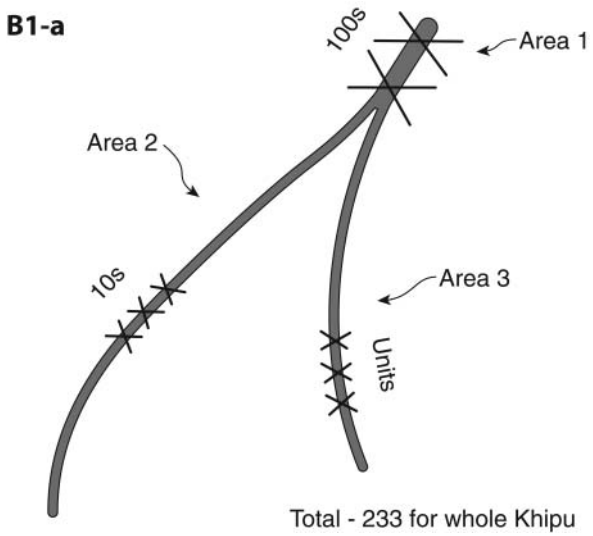


Figure 2. Type B1-a khipu. Mackey, "Continuing Khipu Traditions," 330.

All but one of those khipus classified as type B, the most common form of herding and produce khipu in her sample, come from the Cuzco area; the one exception comes from the central Andes. Mackey divides type B into two subtypes, B1 and B2, and further subdivides B1 into B1-a, B1-b, and B1-c. The characteristic that unifies all type B khipus, according to Mackey, is that they "are formed by using one length of two-ply yarn, which is then doubled." As Mackey goes on to explain, "When the yarn is doubled, the thicker portion at the top, composed of four plies, is knotted," which "leaves the bottom portion as two loose pendant cords of two plies each," one of which is intentionally made longer than the other.[18]

All B1 khipus have the same shape; they differ only in the values assigned to the knots on the various parts of the khipu. The overriding principle in B1 khipus is that knots made in the doubled portion have a higher value than knots in the single cords. So in B1-a khipus, each knot in the thick doubled portion equals 100, each knot on the longer of the loose cords equals 10, and each knot on the shorter of the loose cords equals 1 (figure 2). In B1-b khipus, each knot in the hefty doubled portion equals 1,000, each knot on the longer of the loose cords equals 100, and the shorter cord is divided into two zones, one for 10s and one for single units. In B1-c khipus, in contrast, the longer cord has zones for

18. Mackey, "Continuing Khipu Traditions," 330.

100s and 10s, while knots on the shorter cord each signify 1. All the B1 khipus in Mackey's sample come from the Cuzco region.

Mackey states that all 14 of the type B2 khipus in her sample were formed by tying two B1 khipus together with a piece of string. She illustrates her discussion of the B2 type with a khipu from near Cuzco for counting llamas.[19] Except for a single khipu from the central Andes, all of the B2 khipus in her sample were acquired in the Cuzco area.

The Cutusuma khipu collected by Max Uhle near Lake Titicaca in 1895 is listed by Mackey as type B2, but unlike her other examples of this type, this one was not formed by tying two B1 khipus together. Rather, the Cutusuma khipu was created by doubling an S-plied string to form a handle from which protrudes a cord of equal length on either side (see figure 3). The S-plied cord to the right indicates male sheep, while the cord to the left, which is picked apart to reveal two Z plies, indicates female sheep. Unlike Mackey's other type B variants, the Cutusuma khipu has no knots on the doubled portion of the string. Instead, the cord on either side is picked apart into smaller plies halfway down. Knots on the thicker portion of the cord on each side indicate 100, while the thinner sections have knots indicating either 10s or 1s. Pendant cords, which convey information about lambs and milking cows, hang down from the top cord. On the Cutusuma khipu, ply direction and knot direction play key roles in signifying meaning.[20] In 1842, the Swiss ethnographer and natural scientist Johann Jakob von Tschudi observed that Andean herding khipus routinely encoded information "by some peculiarity in the twisting of the string."[21] It is unknown whether the other khipus in Mackey's sample used ply direction to indicate meaning.

While the Cutusuma khipu does have a doubled length of yarn, as do the other B types, in the former this functions as a top cord to which pendants are attached, in the manner of type A khipus. The knots on the top cord are similar to those on the type A Laramarca khipus. The Cutusuma khipu appears to be a variant of a type A khipu with the type B characteristic that knots of different thickness indicate distinct decimal values. Mackey based her assessment of the Cutusuma khipu on Uhle's schematic diagram instead of the actual cords, which resulted in her misunderstanding of its structure.

Mackey's pioneering analysis reveals the geographic reach of the three kinds of herding and produce khipus that she identified. Inca-style type A khipus are found throughout the Peruvian and Bolivian Andes. Type B khipus

19. Mackey, 334–35.
20. Hyland, "Ply, Markedness, and Redundancy."
21. Tschudi, *Travels in Peru*, 345.

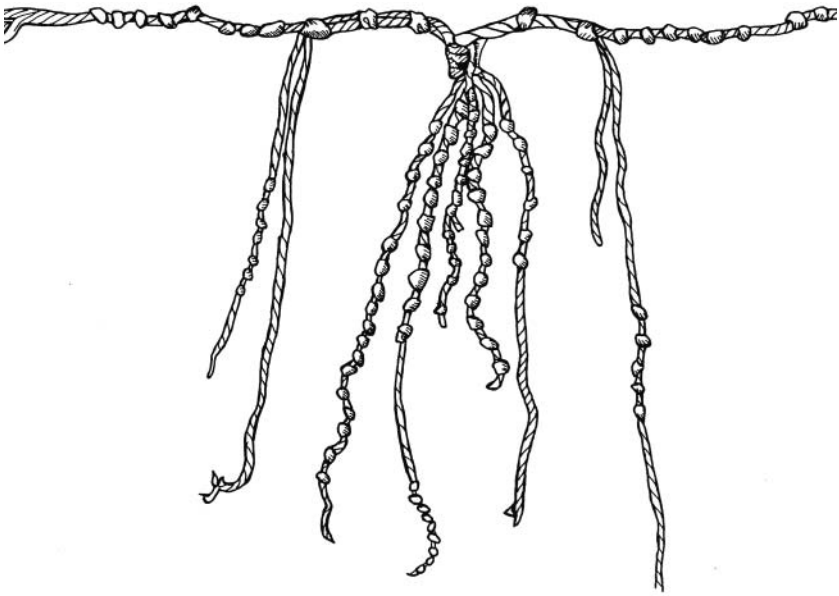

Figure 3. Cutusuma khipu, 1894. University of Pennsylvania Museum of Archaeology and Anthropology, object no. 36392. Drawn by Sabine Hyland.

are found exclusively in the Cuzco area, except for one khipu that Mackey collected in the central Andes. Finally, the single-cord type C khipus pertain to the Cuzco region, except for one example from a hacienda in northern Peru. All the khipus from Lake Titicaca, either from Taquile Island or the lakeside area of Puno, are type A or, in the case of the Cutusuma khipu, a modified version of type A.[22]

The association between Lake Titicaca and type A khipus is supported by Uhle's research on the Island of the Sun. In his 1894–95 field expedition to Bolivia, he acquired khipus from the Challa hacienda on the Island of the Sun, in addition to the khipu that he collected in Cutusuma.[23] The Challa khipus, which were not part of Mackey's survey, are exclusively type A khipus. The first contains knots on the top cord, similar to the Laramarca and Cutusuma cords, while the second possesses a classic type A Inca-style structure (figure 4).

Given the predominance of type A khipus in the Lake Titicaca region, from Puno and Taquile Island to the Challa hacienda on the Island of the Sun, one

22. Mackey, "Continuing Khipu Traditions," 328–29. For Taquile Island, see Mackey, "Nieves Yucra Huatta"; Prochaska, *Taquile y sus tejidos*.

23. Loza, "El modelo de Max Uhle," 125.

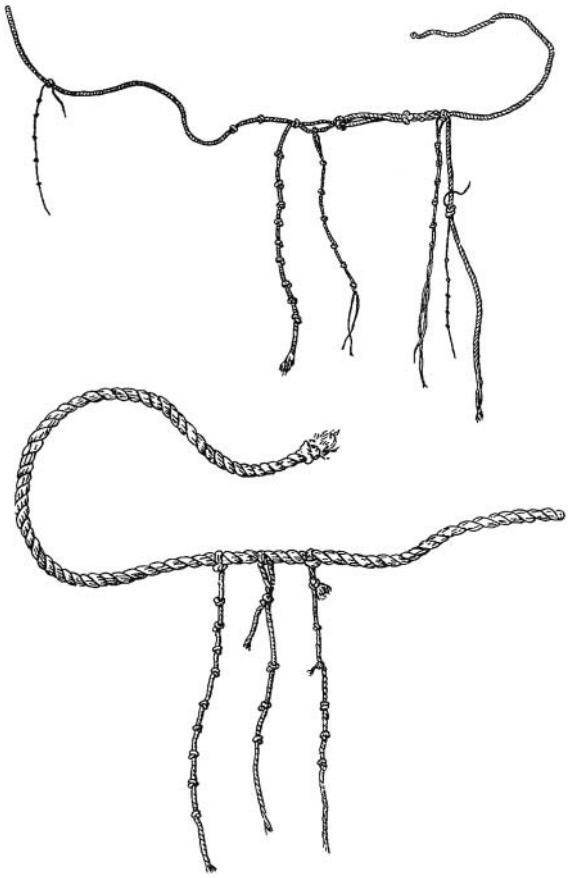

Figure 4. Type A khipus from the Challa hacienda on the Island of the Sun, 1895. Drawn by Sabine Hyland based on Loza, "El modelo de Max Uhle," 139.

would expect the khipus from the Yumani hacienda—the only other estate on the Island of the Sun—to share this form. Yet, as shown below, the khipus collected by Father Sempere from this hacienda have a completely different logic and structure.

### The Yumani Khipus

In 1955 the Jesuit priest Antonio Sempere donated to the Smithsonian Institution five ethnographic khipus that he had collected from the Yumani hacienda on the Island of the Sun in 1949. Father Sempere was the director and founder of a natural history museum at the Jesuit high school in La Paz, the Colegio San Calixto. The five khipus had been on display in the high school's museum with "many khipus or cords with various knots, the accounting system of the ancient

Indians, and that is still used today on the Island of the Sun."[24] In addition to khipus, the ethnological and archaeological section of Sempere's museum exhibited 60 skulls from pre-Hispanic burials, ceramics from the Island of the Sun, stone arrowheads, pictorial catechisms on leather hides, bows and arrows from the Amazon, and other assorted objects. It is likely that the Vatican Mission Exposition of world culture in 1925, which displayed a khipu from the archaeological site of Pachacamac and which later became the Vatican's Missionary Ethnological Museum, inspired the ethnological section of the Colegio San Calixto's museum.[25] Sempere also organized at the high school museum sections on zoology, mineralogy, and paleontology, demonstrating the Catholic Church's commitment to the scientific education of Catholic youth.[26]

On October 10, 1955, the priest sent the five khipus, an ear tally, and three modified skulls from an ancient burial tomb near Oruro to the Smithsonian Institution through the US embassy in La Paz.[27] Doctor Thomas Hart, the chief of the US embassy's educational mission, oversaw the exchange, in which the Smithsonian curators agreed in turn to send books and other printed material to the embassy for the library of the National Industrial School in La Paz.[28] Later that same month, the US public affairs officer in Bolivia, Charles Harner, explained to a visiting US congressional delegation the reason for the

24. "Muchos quippus o cuerdas con diversos nudos, sistema de contabilidad de los antiguos indios, y que aún hoy se usa en la Isla del Sol." The Smithsonian's accession materials include an essay by Father Sempere about his museum. He explained that he created the museum in 1933 (when he arrived in Bolivia from Italy) to augment the school's science classes. Sempere, "Un colegio paceño" (a copy of this published article can be found in papers relating to donations by Antonio Sempere, Smithsonian Institution Archives, Washington, DC, record unit 328, box 34, folder 8). For khipus in private Peruvian museums in the nineteenth and twentieth centuries, see Gänger, *Relics of the Past*.

25. Aigner and Mapelli, *Americas*.

26. In 2015 we examined a nineteenth-century khipu board in the storehouse of Ayacucho's Ministry of Culture. There is no documentation for this object, but one ministry worker remembered seeing it in the one-room "museo de cultura" of a local Catholic high school in the 1960s. One wonders how common such Catholic high school museums were in the Andes. See Hyland, Bennison, and Hyland, "Khipus, Khipu Boards, and Sacred Texts," figure 4.

27. The ear tally was a single cord containing 26 ear tips from the llamas, sheep, and vicuñas belonging to the Yumani hacienda's owner at the time that it was made, identified as "Mrs. de Perrin." The tips, cut from the animals' ears during the annual marking ceremony, were examined the following year to foretell the herd's fortunes. If the ears were whole and unblemished, this presaged a good year; if they were worm-eaten, this foretold a bad year. Lira, "Puhllay"; Dransart, *Earth, Water, Fleece and Fabric*, 82–94.

28. Thomas A. Hart to Clifford Evans, 18 Oct. 1955, Smithsonian Institution Archives, Washington, DC, record unit 328, box 34, folder 8.

embassy's promotion of such cultural exchanges between the United States and Bolivia. According to Harner, "one of the problems which faces us here is the fact that there has been Marxist ideology among many leaders in the labor movement. That ideology is something which the United States Information Service here has set as one of its goals of correcting." Harner then described the embassy's efforts to host cultural events in La Paz to show that "the United States was much more than a materialistic nation, had a lot of art and culture."[29] Hewson Ryan, the cultural affairs officer, echoed these sentiments when he testified that "the longstanding and deep infiltration of the Marxist thought pattern in intellectual and labor circles here. . . . is our biggest problem." Ryan presented a long list of educational and cultural programs that the embassy had created to counter Marxist critiques of the United States.[30] Thomas Hart likewise provided the delegation with an impressive series of educational initiatives that he had overseen, including the creation of the National Industrial School.[31] Hart appears to have been the prime mover in acquiring the khipus for the Smithsonian in return for the museum's gift of books for the National Industrial School; the Smithsonian's acquisition of the khipus clearly grew out of the United States' Cold War strategy of sponsoring cultural exchanges to combat Marxism in Bolivia.

Father Sempere composed two explanatory notes to accompany the khipus that he sent to the Smithsonian. The first described a type C khipu with zones for three different crops (figure 5): "Triple khipu. The white potato in the middle is called *thunta*, which is the ordinary type [of potato], which they freeze, leaving it in water for a week or more out in the open."[32] This khipu contained three counts, one for each type of crop that was tied to the cord. In addition to the white freeze-dried potato in the middle, there is a piece of black freeze-dried potato on one end and an unknown crop (probably freeze-dried oca) that has come loose from the other end.

At the turn of the century, freeze-dried potatoes, known as chuño, were commonly made on the Island of the Sun, with white chuño processed differently than black chuño, as the Swiss American anthropologist Adolph Bandelier explains:

29. *United States Technical Assistance*, 385–86.

30. *United States Technical Assistance*, 386–87.

31. *United States Technical Assistance*, 406–9.

32. "Quippus triple. La patata blanca del medio se llama Thunta, que es la ordinaria, pero que se la hace helar, teniendola en agua durante una semana o mas, a la intemperie." Note accompanying type C khipu from the Yumani hacienda, Smithsonian National Museum of the American Indian, Washington, DC, E554332-0.

Figure 5. Type C khipu from the Yumani hacienda. Smithsonian National Museum of the American Indian, E554322-0. Photo by Christine Lee.

> For the common or black chuñu, small and indifferent-looking potatoes are selected; for the white or "tunta," white potatoes with thin skins are set apart. In case of the common chuñu, the potatoes are crushed; but in making the tunta the potatoes remain entire. Both kinds are first thoroughly soaked and the black chuñu remains in pools of standing water for a long time. . . . They are next spread out to freeze, and when thoroughly frozen, crushed to express every drop of liquid, and then dried. The white tunta, as stated, is not crushed, and furthermore it is washed in running water.[33]

As this description indicates, unlike the black chuño, which is made from poorer quality potatoes, white chuño is made from specially selected potatoes and is more highly valued, especially when the resulting chuño is large, perfectly white, and without cracks. Indeed, the specimen held in khipu E554322-0 (figure 5) is beautiful—even after 70 years, it remains white, whole, and without cracks—indicative of the high quality of chuño represented on this khipu.

Although the Yumani khipus are unique in having actual potatoes tied to them, other kinds of inclusions are found occasionally in both pre-Hispanic and

33. Bandelier, *Islands of Titicaca and Koati*, 36.

modern khipus. For example, a khipu from a Peruvian mummy acquired by the Italian researcher Ernesto Mazzei contains tufts of raw vicuña fiber tied to the pendants.[34] The Rapaz khipus of central Peru include raw wool, leather tags, and even cloth figurines.[35] A khipu made in the village of Santiago de Anchucaya in the 1930s has a rectangular white cloth with two circles drawn on it tied to a pendant. This particular khipu pendant signifies that the stamped paper for official documents that ayllu members had to buy had been purchased.[36] Such objects are rare, however, and the Yumani khipus' inclusion of agricultural products is unique for the ethnographic and archaeological records.

Father Sempere's second note referred to the remaining four khipus, exemplified by the fava bean and potato khipu, numbered E554323-0 by the Smithsonian National Museum of the American Indian, that is shown in figure 6: "The big knots are worth ten, the smaller ones are worth one. When there are two threads, the longer one signifies what is produced; the shorter one, the amount sold. Generally they tie the related product at the end; and sometimes they put two [crops] on the same cord, but it is as if they were two separate accounts. These khipus are from the Island of the Sun from 1948 and 1949."[37]

Khipu E554323-0 is comprised of a length of doubled wool cord with a loop in the middle. The longer of the two ends has a small piece of white chuño attached, which is associated with 7 large knots and 3 small knots, indicating that 73 units of chuño were produced. The shorter cord, with a fava bean pod, has four small knots, revealing that four units of beans were sold. Both plants were among the few crops grown on the island, according to Bandelier.[38]

This fava bean and potato khipu is a variant of Mackey's type B1 khipu, as are the remaining three khipus in the set. For example, khipu E554324-0—which contains two pieces of what appears to be black chuño and knots indicating 14 units produced and 2 units sold—is also a type B1 khipu (figure 7). All four of these khipus are comprised of a doubled cord of yarn, with knots valuing ten in the thickened part and knots equaling one in each of the thinner strands.

34. Mazzei's khipu can be found in the Florence Ethnological Museum, #3887.

35. Salomon, *At the Mountains' Altar*.

36. Hyland, "How *Khipus* Indicated Labour Contributions."

37. "Los nudos gruesos valen 10 (diez), los delgados valen 1 (uno). Cuando hay dos hileras, la mayor significa lo producido; la menor, la cantidad vendida. Generalmente se ata al final el producto de que se trata; y a veces se ponen dos en la misma cuerda, pero es como si fueron dos cuentas aparte. Estos quippus son de la Isla del Sol de los años 1948 y 1949." Note accompanying type B1 fava bean and potato khipu from the Yumani hacienda, Smithsonian National Museum of the American Indian, Washington, DC, E554323-0.

38. Bandelier, *Islands of Titicaca and Koati*, 87.

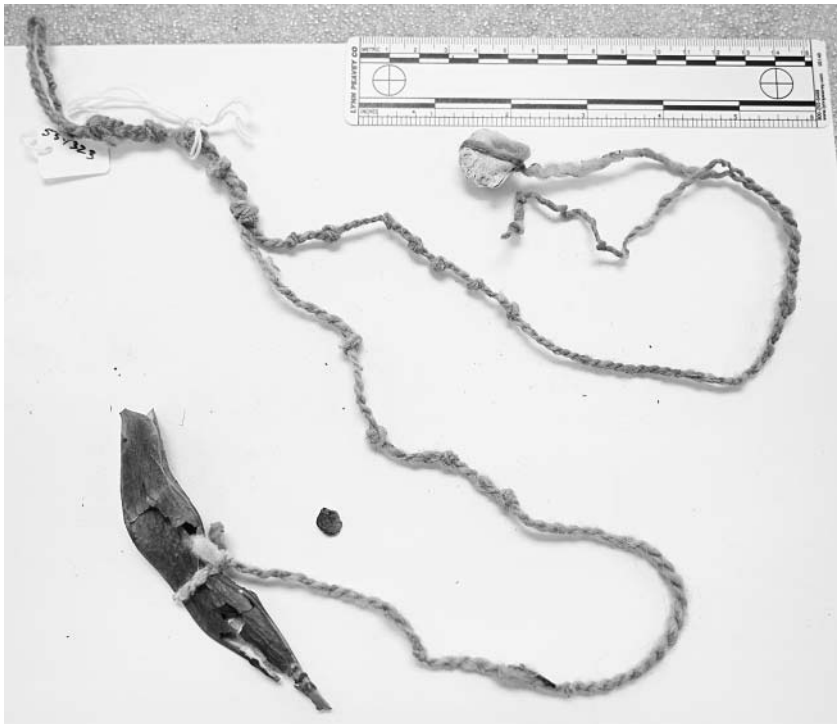

Figure 6. Type B1 fava bean and potato khipu from the Yumani hacienda. Smithsonian National Museum of the American Indian, E554323-0. Photo by Christine Lee.

Given the pieces of agricultural produce tied to their cords, they represent a unique addition to the B1 type.

Thus the five khipus collected by Sempere from the Yumani hacienda are unique because neither type B1 nor type C khipus have been previously described for the Lake Titicaca region. This clearly demonstrates that Andean workers on the Island of the Sun's two haciendas maintained completely different styles of making khipus to record the production and sale of freeze-dried potatoes and other crops, which is remarkable. One would expect that Native communities on a small island would have influenced each other's way of recording information. An examination of the specific histories of the two haciendas, along with their economic and social interactions, explains how such distinctive styles were maintained side by side with no evidence of intermixing and provides insights into how ethnographic khipu styles were transmitted in the modern era.

Figure 7. Type B1 Yumani khipu with what appear to be two pieces of black chuño. Smithsonian National Museum of the American Indian, E554324-0. Photo by Christine Lee.

### The Challa and Yumani Haciendas

The Island of the Sun (also known as Titicaca Island) lies in the southern portion of Lake Titicaca, within Bolivian jurisdiction. According to legend, the sun arose for the first time from a rocky escarpment on the island. During the Inca era, a major pilgrimage shrine dedicated to the sun dominated the landscape.[39] Today the island is a popular tourist destination, famed as the birthplace of the Incas, with hostels, restaurants, and tourist shops supplying much of the islanders' income.

The hilly and rocky terrain of the island, only five and a half square miles in area, poses a challenge to agriculture. Until the advent of tourism in the late twentieth century, the primary crops cultivated on the island were potatoes, oca, fava beans, quinoa, and maize. "Originally the whole Island was the property of the Garcés family of Puno," Bandelier wrote, referring to the city of Puno, on the Peruvian side of the lake.[40] During their annual visits to the island, the

39. Bauer and Stanish, *Ritual and Pilgrimage*.
40. Bandelier, *Islands of Titicaca and Koati*, 51.

Garcés family resided in the Challa hacienda. In the late nineteenth century, the Guarachi family from La Paz, Bolivia, purchased the Yumani estate on the island's southernmost part.

The Indigenous people on the Challa estate belonged to the kinship group of Aran-saya centered in the peninsula of Copacabana, with branches throughout the mainland. Aran-saya was represented on the island by two groups, the Challa ayllu and the Kea ayllu.[41] Every year the Aran-saya residing on the Island of the Sun interacted with kin from around the lake during religious festivities; they also participated in informal trading networks. Prior to the agrarian reform law of 1953, the workers on the Challa estate had to perform free labor on the Garcés properties in Puno, and they traveled regularly between the island and the city. The Challa hacienda laborers, therefore, maintained close contact with Native groups living along the mainland.

The Challa hacienda was overseen by two Aymara officers, the *ilacata* (*jilaqata*) and the *alcalde*. The former represented the administrative power; he distributed land annually, received the shares of crops owed to the landowner, and oversaw communal labor. The alcalde, on the other hand, was the executive officer who rendered decisions in all cases of conflict.[42] Both these individuals were obliged to create khipu records for the hacienda, as part of maintaining strict vigilance over the harvest and livestock accounts. Their responsibilities also included keeping khipu accounts of the sale of agricultural products. When Uhle traveled to Challa in 1895, he interviewed the current alcalde and jilaqata, who explained to him how their accounting khipus functioned.[43] They refused to sell him their current 1895 khipus but, after much persuasion, grudgingly parted with their khipus for 1894 (see figure 4). They were required to show their current khipus to the landowner as evidence of their stewardship and would have been severely punished if their records were incomplete or lacking.

In the 1940s, when Father Sempere collected the five khipus from the Island of the Sun's Yumani hacienda, it was owned by Alberto Perrin Pando, a Swiss Bolivian scholar. According to Sempere's notes in the Smithsonian accession materials, the accounting cords that he acquired from the Island of the Sun were made for "Señora de Perrin" (Mrs. de Perrin). Alberto Perrin Pando's daughter, Carmen Perrin—now an artist and sculptor living in Switzerland—has identified "Mrs. de Perrin" as her paternal grandmother, Leonor Pando de Perrin Guarachi, which establishes that the khipus were made and used in

41. Bandelier, 82.
42. Bandelier, 82–83.
43. Loza, "El modelo de Max Uhle," 136–38.

Yumani.[44] Father Sempere and Alberto Perrin Pando were colleagues and friends with similar interests in archaeology and ethnography. Perrin Pando was keenly interested in Indigenous Andean material culture; he carried out excavations of Inca artifacts on Yumani and directed films about Aymara life and culture on the island. Both attended the First and Second Roundtables of Bolivian Archaeology, exclusive events where fewer than two dozen people were invited.[45]

Tracing the khipus to Yumani and to Alberto Perrin Pando is key because through his lineage we can—for the first time—demonstrate a direct historical link between a set of modern ethnographic khipus and a known khipu archive from the past. Alberto Perrin Pando had inherited Yumani from his mother, Leonor Pando de Perrin Guarachi.[46] Her parents had been respectively the former president of Bolivia, José Manuel Pando, and Carmen Guarachi Sinchi Roca, descended from the famed Guarachi *kurakas* (Native lords) of Jesús de Machaca.[47] They had been "one of the richest and most powerful noble families of the Collao region during the colonial period," managing to retain much of their power and wealth even during periods when the influence of the Inca nobility had been in decline.[48]

This branch of the Guarachi family was descended from Juan Colque Guarachi, the "lord of the Quillacas," whose life spanned the Spanish invasion and the decades following it.[49] He had been "much favored by the Spaniards," and his father had been closely allied with the Inca ruling elite in Cuzco; a hereditary lord from Qullasuyu, the southern part of the Inca empire, he had served on the war council of Manco Inca Yupanqui (the half brother of Inca emperor Atahuallpa) and submitted to Francisco Pizarro alongside him.[50] In the 1570s, Juan Colque Guarachi produced a series of *probanzas de servicios y méritos* (proofs of services and merits) in which he laid out his genealogy back to three generations before the Spanish invasion. He explained that his paternal great-great-grandfather had been a kuraka named Colque, who after allying himself with the Inca emperor Pachacuti in Cuzco was awarded the honorific title of Inca Colque. Inca Colque's son, Inca Guarachi, was rewarded for services to the Inca state by the gift of three shirts—of silver, of gold, and of

44. Carmen Perrin, email message to author, 18 Oct. 2019.
45. Ponce Sanginés, "Información antropológica de Bolivia."
46. Schmid, *Beggars on Golden Stools*, 238.
47. Mendieta, *Entre la alianza y la confrontación*, 156.
48. Phipps, Hecht, and Esteras Martín, *Colonial Andes*, 365.
49. Medinaceli, "La ambigüedad," 98.
50. Abercrombie, *Pathways of Memory*, 139.

precious stones, respectively. Inca Guarachi's son, Colque, served during Huayna Capac's reign, and Colque's son, Guarachi, was Juan Colque Guarachi's own father.

Such probanzas were subjective documents designed to put their subjects in the best possible light; Juan Colque Guarachi's probanzas thus showed off his illustrious ancestors, framed in ways that were acceptable and comprehensible to Spanish courts. While the probanzas demonstrated his indisputable influence and prominence, they also revealed his fluency and investment in the Andean ways of knowing—especially through textiles—that were a key aspect of his authority. Not only did he employ highly skilled artisans to weave *cumbi*—a type of fine cloth that was rich in Andean symbolism and iconography—for him throughout his life, but his probanzas seem to have been based on his own khipu records.[51]

His khipus were stored in his famous archive in southern Bolivia. Juan Colque Guarachi's home was renowned in the sixteenth century for housing a substantial and significant collection of manuscripts and khipus.[52] This khipu archive was so well established that the Jesuit chronicler Blas Valera cited them in his *Relación* as evidence for his accounts of pre-Columbian history.[53] Indeed, Valera credited Juan Colque Guarachi with an extensive knowledge of history gained from his mastery of khipus and his khipu archive.[54] Among Juan Colque Guarachi's archive would undoubtedly have been herding and produce khipus, quite possibly of the same genre as the five khipus from his descendants' estate on the Island of the Sun. Such a direct historical link is evidence of the historical interrelatedness of ethnographic and colonial khipus, which emphasizes the potential continuities in Andean accounting practices.[55] It is tempting to speculate that the five khipus created under the auspices of Juan Colque Guarachi's descendants may be similar in form to those that he himself employed to account for his harvests and flocks.

In the late nineteenth and early twentieth centuries, the main properties of this branch of the Guarachi family could be found in La Paz and its environs. While the workers on the Challa hacienda performed their forced unpaid labor as "pongos" in Puno on the shores of Lake Titicaca, those from Yumani traveled to La Paz to serve as pongos for the Guarachis.[56] Likewise, when the

51. Medinaceli, "La ambigüedad."

52. Saignes, "Colonial Condition."

53. Valera, *Account of the Ancient Customs*, 54.

54. Medinaceli, "La ambigüedad," 98.

55. For colonial khipus from nonhacienda settings, see Curatola Petrocchi and Puente Luna, *El quipu colonial*.

56. Bandelier, *Islands of Titicaca and Koati*, 78.

workers on the Island of the Sun's haciendas delivered their shares of the harvest to the landowners, those from Challa went to Puno and those from Yumani went to La Paz. As Bandelier wrote, "What the hacienda of Challa gives to its owners is sometimes carried to Puno by balsas in a three days' voyage; and what the Guarachi family needs at La Paz is taken to that city on pack animals from [Yumani by way of] Yampupata."[57] Members of each hacienda maintained a relatively segregated network of interactions: the men and women of Challa formed part of a lacustrine network with strong ties to Puno and other communities along the shore, while the people of Yumani were oriented toward the capital region of La Paz. This lack of integration on the Island of the Sun seems to be reflected in the highly divergent khipu traditions found on each hacienda. The Challa khipus share the type A structure found elsewhere in Puno and Lake Titicaca, while the Yumani khipus are of types B and C, which are normally found in Cuzco, although the latter occurred in the La Paz area as well.

During his ethnographic fieldwork in Bolivia, Bandelier spent much time at the Llujo hacienda outside La Paz, where he observed the use of khipus: "For keeping their accounts with the hacienda, the Indians . . . still use a simple 'quippu' or knotted string. . . . We have seen the former in use at Llujo."[58] Bandelier donated three khipus from Llujo to the American Museum of Natural History. All three of these (labeled by the museum as SAT/1079a, SAT/1079b, and SAT/1079c, respectively) clearly conform to Mackey's type C. Although the Llujo exemplars lack pieces of produce tied to the cords, their general structure is the same as the thunta khipu from Yumani (figure 5), underscoring the relationship between Yumani and the La Paz area.

The sharp demarcation of khipu types on the Island of the Sun indicates how closely the use of these objects was linked to the haciendas. Presumably both type A and type B khipus encode detailed information about flocks and produce equally well; the use of one or the other on the Island of the Sun appears to have been determined primarily by the ties between the workers and the hacienda whose crops they produced and whose flocks they herded. Prior to the agrarian reform law, all land on the island was owned by one of the two haciendas. Access to farmland for the Indigenous inhabitants came through a type of sharecropping arrangement with the hacienda owner. Every year each family received usufruct rights to a small plot of land; in exchange, the workers farmed the owner's fields most days of the week and provided other forms of unpaid labor, including personally attending at the owner's house (in Puno or La Paz)

57. Bandelier, 52.
58. Bandelier, 89.

and transporting the owner's goods.[59] Khipus mediated the unequal economic and social relationships between peasant and landowner on the Island of the Sun, serving as the essential and tangible memorials of each time that peasants had to hand over crops and livestock to the hacendados.

Bolivia's agrarian reform law of 1953 abolished forced peasant labor, mandated the redistribution of land, and ultimately led to the disappearance of the hacienda system.[60] On the Island of the Sun, Challa and Yumani have been transformed into independent Aymara villages with their own land base.[61] Khipus, which were associated with peonage, were abandoned at the same time that the two estates were dissolved and are no longer used on the island. Mackey has noted that khipu usage eventually disappeared after the agrarian land reforms abolished the hacienda systems in Peru and Bolivia; the same appears to be true for the Island of the Sun, where khipus were intimately tied to the history and economic functions of the two haciendas.[62] While the cessation of khipu production could be viewed nostalgically as a cultural loss, it is important to recognize that the islanders abandoned khipu making due to a new political and economic self-determination brought about by the dismantling of the haciendas.

## Conclusion

The Yumani khipus endured a remarkable journey through multiple epistemes before they landed in the collections storage unit of the Smithsonian Institution. From the smoke-filled homes of the hacienda's Aymara-speaking mayordomos in charge of crop harvesting and sales to an elite high school in La Paz, where they formed part of an ethnographic and archaeological mélange inspired by Pope Pius XI's missionary museum, and finally the Smithsonian, through the intervention of US embassy officials intent on fighting Marxism by hosting cultural exchanges, these five objects have reflected a series of shifting meanings over time. Additionally, these khipus, prepared by the hacienda workers for the Guarachi landowners, represent an Indigenous record-keeping tradition with direct historical links to a renowned colonial khipu expert, Juan Colque Guarachi; Guarachi kept exactly the kinds of khipu accounts that Durston has suggested precluded the development in the Andes of a "mundane literacy" in Quechua.

59. Bandelier, 78–79.

60. Fabricant, "Mapping a New Geography."

61. Murillo Aliaga, Bautista Durán, and Montellano Loredo, *Paisaje, memoria y nación encarnada*, 1.

62. Mackey, "Continuing Khipu Traditions," 322–24.

Our analysis, which expands the corpus of ethnographic khipus, demonstrates the degree to which the circulation of khipu styles within the Island of the Sun's economic system was linked to hacienda production. Prior to agrarian reform on the Island of the Sun, khipu styles adhered closely to the style employed by the haciendas where they were created, which underscores the intimate relationship between these knotted cords and the institution of the hacienda and demonstrates the historical and social factors that determined khipus' stylistic distribution. The Yumani khipus reveal how an accounting system based on cords and knots, rather than ledgers and Arabic numerals, continued to serve as an integral part of hacienda economics well into the twentieth century.

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**Sabine Hyland** is an anthropologist at the University of St Andrews (Scotland). She earned her PhD from Yale University, supervised by Richard Burger and Mike Coe. For over a decade, she has collaborated with elders in remote Andean villages to discover how Native Peruvians communicated through 3D colored cords known as khipus. Her research has uncovered isolated communities where khipus—once thought to have been wiped out during the European invasion in the 1500s—were used within living memory. The National Endowment for the Humanities, the National Science Foundation, the National Geographic Society, and the Leverhulme Trust have supported her research. In 2015 the National Geographic Society selected her as a National Geographic Explorer in recognition of her scholarly contributions; in 2018 she was awarded a Guggenheim Fellowship.

**Christine Lee** earned her degrees from the University of St Andrews and the University of Cambridge. Her PhD research examined a pioneering generation of Native Roman Catholic clergy in the rural south-central Peruvian Andes. She is now a postdoctoral research fellow at East China Normal University in Shanghai, China, where her current research focuses on the influence of Vatican II Catholicism on anthropological theories of ritual.