

Dumbarton Oaks Museum

SPECIAL EXHIBITION

APRIL 2 – AUGUST 18
2019



WRITTEN IN KNOTS

UNDECIPHERED
ACCOUNTS
OF ANDEAN LIFE

CREDITS

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CALENDAR

LECTURE

May 18, 2019 at 2pm

**Shades of Meaning: The nexus of color, knots,
and fiber in the Dumbarton Oaks khipus.**

Jeffrey C. Splitstoser

An overview of the khipus in the Dumbarton Oaks collections and what we know today about the systems of information they contain.

Dr. Jeffrey C. Splitstoser is the leading authority on Wari khipus, having studied all known examples in collections throughout the world. Splitstoser is part of the Castillo de Huarmey archaeological project, directed by Dr. Milosz Giersz, which produced the largest number of scientifically excavated Wari khipus to date. Splitstoser is also the textile specialist for the Huaca Prieta Archaeological Project, directed by Dr. Tom Dillehay, where he discovered information encoded in warp patterning in 6,200-year-old cotton textiles that were dyed with the world's earliest known use of indigo blue. He is the cocurator with Juan Antonio Murro of the exhibition, *Written in Knots: Undeciphered Records of Andean Life*.

CURATOR'S TOURS

Every other Friday at 3pm, beginning on April 12.

Juan Antonio Murro and Jeffrey C. Splitstoser

SCHOOL VISITS

For information about school visits to *Written in Knots: Undeciphered Accounts of Andean Life*, please contact India Patel at pateli01@doaks.org



Catalog design by **Christine Lefebvre Design**.



Dumbarton Oaks
Research Library and Collection



William J Conklin at home,
c. 2016.

THE BARBARA AND WILLIAM CONKLIN COLLECTION



Written in Knots: Undeciphered Accounts of Andean Life is a tribute to the generosity of Barbara and William J Conklin, who gave Dumbarton Oaks their collection of 136 Pre-Columbian and ethnographic objects. Their gift, which includes textile fragments of exquisite manufacture and seven remarkable *kipus*, allows the Museum's Andean collection to reach new heights.

This exhibition explores the long-standing Andean tradition of communicating through cords, knots, and colors. An alternative to writing, these fiber records persisted through time, documenting the particularities of different cultures, while always adhering to the same basic tenets.

Crucial to the development of the show were two *kipu* workshops organized under the auspices of Pre-Columbian Studies at Dumbarton Oaks, in which new developments in the field and the latest research on *kipus* were generously shared by its participants, some of whom also collaborated on this exhibition.

A product of both the Conklins' donation and innovative scholarship, this is the first exhibition in the United States to comprehensively bring together Wari, Inka and Colonial *kipus*. We are honored to share this unique gift with our visitors at Dumbarton Oaks.

JUAN ANTONIO MURRO

ANDEAN CORDKEEPING AN INTRODUCTION



The Andean region of west-central South America was home to a succession of cultures and civilizations whose roots go back millennia before the Christian era. Within this region lay the rugged territory that would eventually become home to the largest empire of the Pre-Columbian Americas, *Tawantinsuyu*—“the four parts intimately bound together,” the name by which the Inkas knew their empire. From the earliest appearance of humans in this territory, beginning some 13,000 years ago, people began experimenting with a variety of plant and animal fibers to produce twisted and knotted cord constructions that were critical to making a living in this challenging environment—from lines for fishing in the cold waters off the Pacific coast to slings and traps for binding the legs of wild camelids—vicuña and guanaco—in the highlands. Indeed, one could say that from the time of the earliest cultures occupying the central Andean region until the rise of the Inkas, in the mid-15th century CE, cord-making was at the heart of subsistence technologies of peoples in this region.

The display of *kipus* (or *quipus*, Quechua: “knot”) recently donated to Dumbarton Oaks by Barbara and William J Conklin featured in the exhibit *Written in Knots: Undeciphered Accounts of Andean Life*, contains examples of what represented the height of Andean cord-making technologies. For included within what are referred to generically as *kipus* is a range of devices that were developed over time primarily for

recordkeeping. These included staffs wrapped with brightly dyed threads linked to weaving and recording technologies of various pre-Inka peoples, to the initial knotted cord administrative records of the Wari, who lived some five-hundred years to a millennium before the time of the Inkas, to the elaborately knotted and colorful cord records used by Inka administrators in *Tawantinsuyu* (ca. 1450–1534 CE), and down to the local cord-keeping technologies of the Colonial era following the Spanish conquest of the Andes, beginning in 1532.

On display in the Textile Gallery, next to the exhibit, is an ensemble of textiles produced by Wari and Inka weavers. It is appropriate to view *kipus* in relation to textiles, as the two share much in common, especially in terms of their materials (cotton and camelid fibers), as well as many of their techniques of production (spinning, plying, knotting and dyeing of threads). These similarities notwithstanding, it is clear from the archaeological record, as well as from testimony recorded in the Spanish chronicles and documents, and from close study of Wari, Inka and Colonial *kipus* by scholars today that *kipus* served different ends from the textiles. For, in whatever period they were produced, *kipus* provided the means for recording local and state administrative information (e.g., censuses, tribute records, etc.), as well as notations for the production of narratives, or stories of the past, recounted by Wari, Inka, and Colonial cordkeepers of the ancient Andes.

DR. GARY URTON



Andean landscape.

WARI KHIPUS



The Wari ruled most of present-day Peru from 600 to 1000 CE, a period of time also referred to as the Middle Horizon, forging South America's first empire. The Wari developed the khipu to meet the demands of running an empire without writing. Most likely created by combining the metaphorical connotation of knots (representing something that ties, binds, "commits") with existing emblematic systems based on color (such as those found in Paracas and Nasca wrapped staffs and wrapped cords), they developed a device that for all intents and purposes served as script.

Wari khipus are the most colorful of all the khipu traditions, perhaps reflecting a connection with earlier color-wrapping practices. To understand the importance of khipus to the Wari, we must imagine living in a society where color was not merely decoration like it is for the most part today. In a society without writing, color most likely held far more importance as a messaging medium than it does today.

All Wari khipus have wrapped pendant cords, a feature not found in Inka khipus. Wari subsidiary cords are also colorful coming in monochrome, barber-pole, mottled, or segmented patterns. While both Wari and Inka khipus incorporate natural colors of cotton and camelid fiber, Wari khipus are more likely to also include dyed fibers.

Wari khipus rarely, if ever, seem to have color banding, but they frequently have color seriation, like khipus PC.WBC. 2016.067 and PC.WBC.2016.068, or random

Types of cord-color patterns.



SEGMENTED

MONOCHROME

MOTTLED

BARBER POLE



Paracas wrapped staff with wrapped cords.

Photo by Jeffrey C. Splitstoser courtesy of the Cerrillos Archaeological Project.



patterning, like PC.WBC.2016.136, where pendant-cord colors do not have a pattern. In Wari khipus with color seriation, the first or last pendant cords are frequently not wrapped but knotted instead.

We know almost nothing about Wari khipu numerical systems. Unlike Inka khipus, where a knot's type (overhand, figure-8, and long) and position on a cord determine its value, Wari knots are always overhand, double overhand, or in rare instances triple overhand (or more), and they are tied immediately after a cord's wrapping or attachment to a parent cord. Hints about their numerical systems come from the number of knots tied on cords, which never exceed ten, suggesting a base-10 numerical system; however, almost 70% of all Wari cords have either zero or one knot, suggesting perhaps the simultaneous presence of a binary system based on presence or absence. The mathematics found in khipu PC.WBC.2016.136 seems to support this idea.

DR. JEFFREY C. SPLITSTOSER

Wrapping detail of
PC.WBC.2016.136.

Photo by Joseph Mills.

INKA KHIPUS

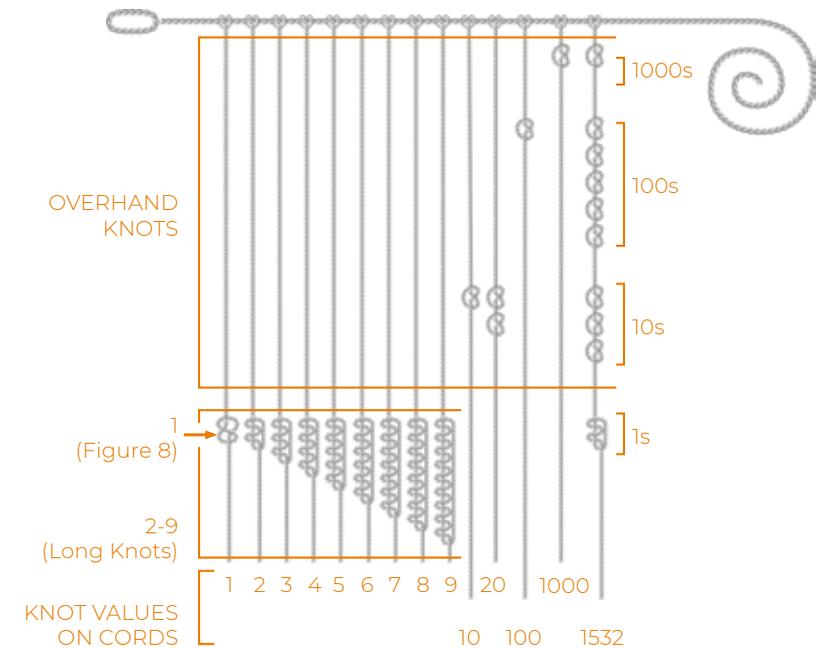


The Inkas offer one of the great enigmas of world civilizations. Although they were the conquerors and overlords of what would become the largest civilization of the ancient Americas, the Inkas did not invent the wheel, nor did they have markets, nor, most perplexing of all, did they invent a system of writing, at least not one in the form of a two-dimensional, graphic script. Unlike every other major civilization of the ancient world—e.g., the Mesopotamians, Egyptians, Shang Chinese, and the Mayas—each of which invented a version of a grapheme-based “logosyllabic” (i.e., word/syllable) writing system, the Inkas relied on a three-dimensional, cord-based system of recording information—the khipu.

Inka khipus were cotton or camelid (llama or alpaca) fiber constructions of spun and plied (or twisted) cords. The core elements of a khipu were: a) the primary cord, which was usually the thickest cord on a khipu and was the horizontal cord from which, b) a variable number of secondary cords, commonly referred to as pendant cords, were suspended; and c) subsidiary cords, which were second-, third- etc.-order cords attached to the pendant cords. These three types of cords were often of different colors, either from the natural color differences of cotton or camelid fibers, or from the application of natural dyes to the construction threads.

Pendant and subsidiary cords are commonly knotted in tiered arrays of three different types of knots: figure-eight knots, long knots, and overhand knots. The tiers

Inka base-10 positional knot system.



of knots signified the place values of clusters of knots in the base-10 system of Inka/Quechua decimal numeration. In the unit’s positions (i.e., the lowest tier of knots), figure-eight knots signified “1s,” while long knots signified values between 2–9. Each subsequent tier higher on cords held between one to nine overhand knots, signifying increasing values of 10 (i.e., 10s, 100s, 1000s, etc.). The numerical values recorded on cords generally pertained to administrative matters, such as censuses, tribute records, and accounts of resources stored in state storehouses. Differences in cord colors divided the data into different categories (e.g., individual tribute-payer records vs. group [*ayllu*] records, as well as differences in items recorded, such as corn, beans, chili peppers, etc.).

Khipus were maintained by cadres of *khipukamayusqs* (*Quipucamayocs*, “knot makers/keepers/animations”),

administrators who served the Inka at local, regional, and imperial levels of accounting and recordkeeping. Spanish administrators and chroniclers who questioned khipu-keepers after the time of the Spanish conquest note that some of the khipus recorded information for the production of narratives of the Inka past, such as life histories of the kings, accounts of wars of conquest, and other such mytho-historical matters. About 1,050 Inka khipus exist today in museums in Europe and North and South America. GU



Khipukamayuc.
Adapted from Murra et. al., 1980.

POST INKA KHIPUS



Khipus were involved with almost all aspects of Andean life. When the Third Council of Lima (1583) mandated the universal destruction of idolatrous khipus, it simultaneously encouraged their adaptation for ecclesiastical purposes and helped incorporate indigenous populations into the colonial administrative system. It is not known if the new khipu types that followed represent new forms or the reemergence of suppressed regional traditions, or both.

Post-Inka khipus continue many Inka traditions, including base-10 numerical notation. However, they also display significant variation in their methods. For example, some post-Inka khipus use loops to represent ten, and some use groups of ten overhand knots to represent 100. Post-Inka khipus incorporate a wider variety of fibers, from traditional cotton and camelid fiber to *maguey* and animal fibers, such as deer, sheep wool, human hair, horse hair, and *vizcacha*, that must be identified through feel.¹

Khipu boards are post-Inka devices consisting of plied, multi-colored strings inserted through holes in a wooden board and knotted. The knot's twist represents a parishioner's moiety, or group affiliation. Khipu boards recorded the activities of parishioners, from attendance and the use of ritual implements and clothing to the quality of work and worker's enthusiasm.

Canuto-type khipus likely represent a Colonial innovation but are poorly understood. One was carbon dated to



Community leaders
wearing Inka-style khipus
at Tupicocha, Peru.

Photo by Frank Salomon.

1629 CE.² Canuto khipus have wrapped pendant cords, yet they only use long knots, which are not in registers, making their numerical values, if they had them, unclear.

Herding khipus are a post-Inka tradition used by pastoralists throughout the central Andean region to the present day. Made of a single natural or dyed camelid hair cord, or a cord that was doubled and knotted leaving two loose ends, they typically recorded a single category of information, such as herd size. Two or more were frequently joined, so categories could be broken down into subclasses, like male and female.

“Inka-style” khipus, another post-Inka tradition, closely resemble Inka pendant-type khipus. They frequently have objects attached to their pendant cords such as dolls, fragments of hide or fabric, and tufts of raw fiber. Inka-style khipus were possibly used into the 19th century in communities like Tupicocha.³ Much of what we know about the significance of color banding and seriation and pendant cord attachment comes from post-Inka khipus.⁴

JCS

¹ Hyland and Hyland forthcoming.

² Personal correspondence with Gary Urton dated 6 April 2017, based on MALI khipu 28709.

³ Salomon 2002.

⁴ Hyland 2016; Medrano and Urton 2018; Hyland 2015.

Hyland, Sabine

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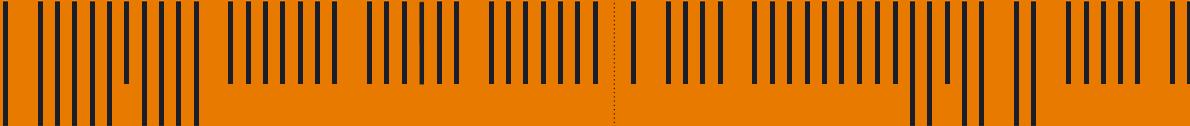
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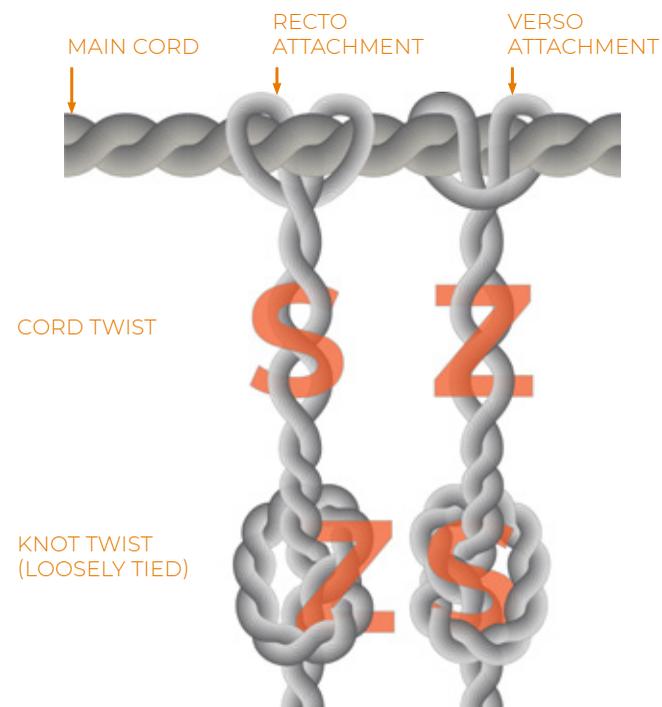
CATALOGUE





PC.WBC.2016.067

Cord attachment, cord twist, and knot twist.



Wrapped-main-cord *kipu* with color seriation

Wari, 600–1000 CE
Cotton and camelid fiber

PC.WBC.2016.067

PC.WBC.2016.067 is a pendant-type *kipu* with a wrapped main cord. Its pendant cords are seriated with five different wrapping patterns that repeat, although its colors are darkened making their patterns difficult to discern. Its main cord is 224 cm long and its longest pendant cord with subsidiaries is 16 cm. It has 14 groups. Each group would have had six pendant cords, five of which would be wrapped, and one would instead be knotted. Today, however, several cords are missing or broken, and, like the final groups of PC.WBC.2016.068, the last two groups in this *kipu* are also unfinished: its pendants are not wrapped, and in both *kipus* their final subsidiary cords are missing. The *kipu* also has a “blank” pendant cord attached to its dangle end, or tail. Each pendant cord in the first 12 groups has two subsidiary cords, and most of them have two knots, although some have zero or one knot, suggesting a numerical system that could signal presence vs. absence or other binary-type information. The last pendant cord in each group is unwrapped and has a single knot.

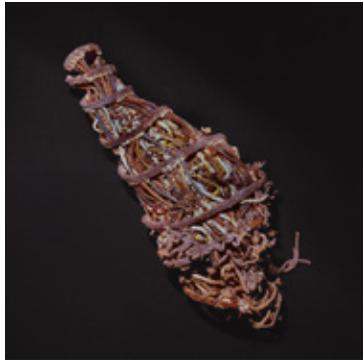
All cords have a Z twist, and all subsidiary and most pendant cords have recto attachments. All knots have an S twist. The main cord and pendant cords are mottled brown-and-tan cotton, as are one of the two subsidiary cords; the other is red camelid hair. The wrapping on pendant cords includes red and golden-brown camelid hair and black, brown, and golden-brown cotton. JCS



ABOVE:
PC.WBC.2016.068

RIGHT:
Detail of braided main
cord and color seriation.
Photo by Joseph Mills.

BELOW:
Khipu in its rolled-up state.



This is the largest Wari khipu known in museum collections around the world and the only with a braided main cord. In 2003, William Conklin had this khipu carbon-dated, producing an approximate age range of 779–981 CE, placing it at the end of the Middle Horizon. It is made entirely of cotton. The khipu is color seriated with monochrome wrapping, meaning that each pendant is wrapped with a single color that repeats. It has 101 wrapped pendant cords placed in 20 groups of five each with an extra pendant in Group 4 (Pendant 21), whose colors and wrapping are different from the rest. The khipu has four “blank” pendant-like cords without wrapping and shorter and thinner than other pendant cords. Perhaps they supported the khipu when it was being made or displayed.

Most pendant cords have nine or ten subsidiary cords, each with a different color, whose sequences repeat on every pendant cord. Most subsidiary cords have no additional subsidiaries; however, the pendant cords in Groups 3 and 4 often have an extra subsidiary with subsidiaries up to five levels deep. Many subsidiary cords in the last four groups are missing, and the last group has none at all, indicating an unfinished state. Still the khipu originally had 1000 cords, all with a Z twist, although several black-and-white cords, are missing, because the black dye weakened the cotton fibers. These black cords are better preserved in some groups.

Color shades are inconsistent across the khipu. For example, the blue in Group 1 and 2's subsidiary cords is different from the blue in Groups 3 and 4. These color differences are accompanied by differences in yarn



Pendant *khipu* with color seriation

Wari, 779–981 CE
Cotton

PC.WBC.2016.068

structure, in which the structure associated with one shade of blue is different from the structure of another strongly suggesting that the cords were made by different people and dyed in different vats over time.

All the knots on cords in Groups 1–10 have an S twist, while all the other knots have a Z twist, although their significance is elusive. When acquired by the Conklins, the khipu was rolled-up and an unidentified, red, earthy substance adhered to the braided main cord and lower ends of its pendant and subsidiary cords, making them brittle. JCS





ABOVE:
PC.WBC.2016.136

BELOW:
Detail of wrapping and
beginning loop.
Photo by Joseph Mills.



Wrapped-main-cord *khipu* with color seriation

Wari, 600–1000 CE
Cotton and camelid fiber

PC.WBC.2016.136

Despite its small size, this khipu has several remarkable features, including the presence of wrapped cords down to fifth-level subsidiary cords. Its main cord is looped and begins with an intricate wrapping pattern with crosses somewhat reminiscent of an Inka *kayte* (beginning knot). The remainder of the main cord is wrapped between each of its five groups of pendant cords. Additionally, similar to many Wari khipus, its pendant cord colors do not fall neatly into banded or seriated patterns but display a mix of both color banding in its wrapped pendants and color seriation in its unwrapped pendants and most of its subsidiaries.

This khipu is special not only because it is possibly the only known complete Wari khipu, but also because it might provide clues to the enigmatic Wari numerical system. It has five groups of pendant cords separated with wrapping of the main cord. The first pendant cord of each group has no wrapping, and it has subsidiary cords whose color sequences are the same (with alterations) as the remaining cords of the group. Interestingly, the number of knots tied onto the subsidiaries of the first (unwrapped) pendant cord equals the sum of the number of knots in the other subsidiary cords of the same color of the group.

Its main cord is 50 cm long, it is 39 cm wide, and it has 41 pendant cords. This is the only known khipu with wrapping on fifth-level subsidiaries. All cords have a final Z twist and, except one 5th level (unwrapped) cord, verso attachments. Subsidiary cords are solid or mottled with and two or three colors, but it has no barber-pole cords. This khipu's bright colors and complex wrapping patterns incorporating crosses and floats are similar to the wrapping patterns found in other Wari khipus, particular those in the American Museum of Natural History in New York. JCS



Rolled-up seriated *khipu*

Inka, 1450–1534 CE
Cotton and camelid fiber

PC.WBC.2016.070



When khipus were moved from a place of recording, for instance, to an accounting center, the khipu would be rolled up for transport in a spiral, as seen in this large and beautifully colored example. Rolling was accomplished with a section of the primary cord—seen here in the spiral at the top of the bundle—called the dangle end, or tail. Rolling in this fashion allowed for easy carrying of the khipu, as well as for storing multiple khipus in archives. Since it is thought that the color patterning of primary cords may have indicated the subject matter of what was recorded on khipus, one could see at a glance the topics of khipus rolled and stored in an archive.

The khipu seen here has never been opened; therefore, researchers cannot know the cord color patterning, nor the values knotted into the strings. Nevertheless, from what may be observed, it appears that this khipu is organized by color seriation. This is a patterning of cords into a repeating color series, such as: dark brown, medium brown, light brown, white cords. Seriated khipus generally carry higher quantitative values, as when records from multiple lower-level accounting units (e.g., the Andean clans, or *ayllus*) were aggregated into collective accounts. Therefore, this khipu may have been an accounting record of a regional-level organization within the Inka empire.

An interesting feature of this khipu is the presence of multiple tufts of unspun fibers attached or pressed into the khipu cords at various points. These may have come into contact with, and been pressed into, the bundle of khipu cords in storage.

Un-rolled khipus offer a conundrum to museums and researchers alike. For while it is ideal to maintain samples in the pristine condition in which they are discovered, only by un-rolling a sample and spreading it out can researchers study the cord, color, and knotting patterns and, thereby, attempt to interpret the meaning and significance of the khipu. Since the discovery of un-rolled samples is unusual, it has been decided not to un-roll this khipu. GU



RIGHT:
PC.WBC.2016.070

LEFT, TOP:
Spiraled main cord at the top of the bundle.

Photo by Joseph Mills.

LEFT, BOTTOM:
Provincial administrator carrying rolled-up khipu.

Adapted from Murra et. al., 1980.



ABOVE:
Detail of beginning knot
and banding pattern.

Photo by Joseph Mills.

RIGHT:
PC.WBC.2016.071



Color banded *khipu*

Inka, 1450–1534 CE

Cotton

PC.WBC.2016.071

There are a number of features of this khipu suggesting that it may have been an accounting of activities of a social group, or clan—termed an *ayllu* in the Andes—composed of some 33 members. Each member of the group may have been associated with one or the other of 33 six-cord groupings that compose the khipu. The six-cord groups are most evident in color differentiated groups of cords on the left two-thirds of the khipu. There is a total of 202 cords on the khipu, which is close to what would be an arrangement of 33 six-cord groups ($33 \times 6 = 198$).

Color banded khipus, like the example displayed here, are composed of cords organized into differently colored cord groupings—e.g., six green cords, then six white cords, then six brown cords, etc. Color seriated khipus have their cords organized in a repeating color series—dark brown, medium brown, light brown, white; dark brown, medium brown, light brown, white; repeat.... From studies of hundreds of banded and seriated khipus, researchers have found that banded khipus record lower numbers, likely records of several individuals that made up a clan. Seriated khipus record higher numbers, as would be the case when the records of numerous banded (individual-level) khipus were aggregated.

This khipu has a complexly constructed primary cord, which is the thick horizontal cord from which the 202 pendant cords are suspended. It is composed of threads of at least three colors spun and plied together into a thick, final S-twist cord. To the left side, the primary cord begins with a needle-work bundle wrapped with medium brown threads. It is thought that recording began from this beginning knot and moved toward the opposite end to terminate (as seen here) in what is termed a “dangle end.” The dangle end is used to roll the khipu into a spiral, for carrying (as seen in another khipu in this exhibit). It is thought that the primary cord color patterning and bundle identified the subject matter of the recording. GU



Khipu with summary cords

Inka, 1450–1534 CE

Cotton

PC.WBC.2016.072



This exceptionally large and complex khipu contains an arrangement of cords and knot values that suggests this was an accounting record of some good or resource whose quantities and organization were in line with the decimal accounting principle that governed Inka administration. The organization of cords is brought about by spacing between groups of cords, as well as (in some cases) by differences in cord colors.

The khipu is composed of a total of 438 cords. The most pronounced decimal feature of the khipu is the repetitive organization of groups of $10 + 1 = 11$ cords. Two of the cord groupings are made up of only five cords. Each of what is therefore a total of 39 cord groupings contains 11 cords, in which one cord of the group is a “summary cord.” The summary cords are those in the arrangement as displayed here that leave the horizontal primary cord straight up. The 10-cord groups hang down from the primary cord. The summary cord sometimes leaves the primary cord from the middle of the 10-cord group, sometime from one end or the other. There are also numerous subsidiary cords attached to pendant or summary cords; these are displayed here at oblique angles.

The general principle of the 11-cord arrangement is that the values recorded on each group of 10 cords (and any subsidiaries) is repeated on the associated summary cord (and any subsidiaries). Some cords in several of the cord groupings are broken; therefore, there are several cases in which the sums of values on the 10-cord groups do not equal that on the summary cord.

Although the sample appears to be a single khipu, it is, in fact, composed to two khipus spliced together. The splice is located between the 9th and 10th 11-cord groupings, as counted from the left. The $10 + 1 = 11$ arrangement of cords is identical between the two khipus, although there is a greater concentration of subsidiaries on the smaller khipu, to the left.

Unfortunately, we do not have archaeological information from which to determine what items were being accounted for by means of this extraordinary khipu. GU



Canuto-type *kipu* with color banding

Colonial, 1534–1821 CE

Maguey (?), camelid fiber, and cotton

PC.WBC.2016.069

This pendant-type *kipu* is canuto-style with color banding. Its main cord is 58 cm long, and its longest pendant is 67 cm. This originally had 48 pendant cords (44 are present) arranged in twelve units, each consisting of four pendants joined together and attached to the main cord by doubling them over the main cord and spiral-wrapping them. These 12 units are clustered into three groups of four, each cluster separated by spaces and distinguished by shared wrapping patterns that are symmetrical about the *kipu*'s two central pendants. Unlike other *kipus* in the collection, this *kipu* has no subsidiary cords, and its pendant cords are color-wrapped at their distal ends. The colors found in wrapping yarn at the tops of pendant cords are white, natural-dark-brown, and dyed red and yellow (all camelid fiber); those at the ends of individual pendant cords are dark-brown, red, and yellow camelid fiber and a single instance of blue-green cotton.

The *kipu*'s knots are all long knots (S) representing the numbers 3 through 9, with the majority being 6 to 9. Characteristic of canuto-style *kipus* but unlike Inka statistical *kipus*, the *kipu* has no overhand or figure-8 knots. Its knots are not arranged in decimal tiers, or registers, potentially implying that they contain narrative information. Unlike Inka *kipus*, but similar to Wari *kipu* practices, the majority of this *kipu*'s pendant cords have a Z twist, and its main cord has the opposite twist of S. In addition to the cotton and camelid fiber used to make nearly all Pre-Columbian and post-Inka *kipus*, canuto-style *kipus* often include other fibers, such as sheep's wool, horse and/or human hair, and—like the fiber found in this *kipu*—*maguey* (*Furcraea* spp., a leaf fiber in the agave family) JCS

ABOVE:
PC.WBC.2016.069

LEFT, TOP:
Detail of distal ends
wrapping.

LEFT, BOTTOM:
Detail of long knots.

Photos by Joseph Mills.





Andean dyes.