



# How to read Inca

We thought they left no written records. Now we're untangling the truth, says Daniel Cossins

**T**HE Incas left no doubt that theirs was a sophisticated, technologically savvy civilisation. At its height in the 15th century, it was the largest empire in the Americas, extending almost 5000 kilometres from modern-day Ecuador to Chile. These were the people who built Machu Picchu, a royal estate perched in the clouds, and an extensive network of paved roads complete with suspension bridges crafted from woven grass. But the paradox of the Incas is that despite all this sophistication they never learned to write.

Or did they? The Incas may not have bequeathed any written records, but they did have colourful knotted cords. Each of

these devices was called a khipu (pronounced key-poo). We know these intricate cords to be an abacus-like system for recording numbers. However, there have also been teasing hints that they might encode long-lost stories, myths and songs too.

In a century of study, no one has managed to make these knots talk. But recent breakthroughs have begun to unpick this tangled mystery of the Andes, revealing the first signs of phonetic symbolism within the strands. Now two anthropologists are closing in on the Inca equivalent of the Rosetta stone. That could finally crack the code and transform our understanding of

a civilisation whose history has so far been told only through the eyes of the Europeans who sought to eviscerate it.

The Spanish conquistadors, led by Francisco Pizarro, first encountered the Incas at the start of the 1530s. They were awestruck by the magnificent stone cities, the gold and treasure. But as the Spanish began to take over the Inca empire and impose their own customs, they became equally enthralled by the way the society was organised.

The Incas governed the 10 million people in their realm with what amounted to a federal system. Power was centred in Cusco, in the south of what is now Peru, but spread through several levels of hierarchy across a series of partially self-governing provinces.

## “Break the khipu code and we might finally read an indigenous Inca history”

There was no money and no market economy. The production and distribution of food and other commodities was centrally controlled. People had their own land to farm, but every subject was also issued with necessities from state storehouses in exchange for labour, administered through an impressive tribute system.

Historians have argued variously that the Inca empire was a socialist utopia or an authoritarian monarchy. But no one disputes its efficiency. “It was an extraordinary system,” says Gary Urton, an anthropologist at Harvard University. “Administratively speaking, it was very sophisticated and it seems to have worked well.”

Key to that success was the flow of reliable data, in the form of censuses, tribute accounts and storehouse inventories. For that, the Incas relied on the *khipumayuq*, or the keepers of the khipus, a specially trained caste who could tie and read the cords.

The majority of surviving khipus consist of a pencil-thick primary cord, from which hang multiple “pendant” cords and, in turn, “subsidiaries”. The Spanish described how they were used to record all manner of information. The poet Garcilaso de la Vega, son of an Inca princess and a Spanish conquistador, noted in a 1609 account that they had “an admirable method of counting everything in the Inca’s kingdom, including all taxes and tributes, both paid and due, which they did with knots in strings of different colours.”

The Inca royal palace of Machu Picchu (right) remained hidden to the Spanish conquistadors – as did their system of writing in khipus, or knotted cords (below)



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There are reasons to think khipus may record other things, including stories and myths – the sort of narrative information that many cultures write down. De la Vega was among many chroniclers who hinted as much, writing in one passage that the Incas “recorded on knots everything that could be counted, even mentioning battles and fights, all the embassies that had come to visit the Inca, and all the speeches and arguments they had uttered”. True, he was prone to ambiguity and contradictions. But about a third of the khipus in collections seem to have a more elaborate construction than the others, as if they contain a different sort of information. For decades the point was moot, however, because no one could read any of them.

The first hints of revelations from khipus came in the 1920s, when anthropologist Leland Locke analysed a bunch of them housed at the American Museum of Natural History in New York. He noticed that the knots are organised in rows almost like beads on an abacus (see diagram, page 37).

He demonstrated that each row of knots at a certain height denoted units, tens, hundreds and so on. That made sense, fitting with the decimal system the Inca used to divide up groups for tribute purposes.

### Hard knot to crack

The discovery sparked a wave of interest in khipus. By the 1990s, though, we still had no idea what the numbers meant. “Say you read off the number 76 – what does it refer to?” asks Urton.

To answer that, you would ideally have a translation of a khipu into a familiar language. It would be an equivalent of the Rosetta stone, which contained a translation of Egyptian hieroglyphics into ancient Greek and unlocked that picture language. In the absence of that, Urton has spent the last 25 years tracking down and carefully digitising the details of every khipu he could find in museums and private collections across the world. Today, his Khipu Database Project

contains details of more than 900 of them.

There are all sorts of varying factors in khipus: the colour of the strings, the structure of the knots and the direction in which they were hitched. Having spent countless hours poring over them, Urton began to think that binary differences in these features might be encoding information. For example, a basic knot tied in one direction could mean “paid”, while in the other it would mean “unpaid”. By 2012, he had developed a more specific hypothesis, proposing that the direction in which knots were tied, the colours of the strings, or some combination of the two, corresponded to the social status of the people whose tributes they recorded, and even individuals’ names. Without a khipu translation, however, the idea looked destined to remain untested.

Then in 2016, Urton was browsing his personal library when he picked out a book that contained a Spanish census document from the 1670s. It was what the colonists referred to as a *revisita*, a reassessment of six clans living around the village of Recuay in the Santa valley region of western Peru. The document was made in the same region and at the same time as a set of six khipus in his database, so in theory it and the khipus were recording the same things.

Checking it out, Urton found that there were 132 tribute payers listed in the text and 132 cords on the khipus. The fine details fitted too, with the numbers on the cords matching the charges the Spanish document said had been levelled. It seemed to be the match he had been looking for.

Even so, Urton was struggling to pick apart the detail of the connections between the Santa valley khipus and the Spanish documents. He ended up letting a Harvard undergraduate student named Manny Medrano take a look. He turned out to have the perfect complement of skills for the job. He was a native Spanish speaker and, majoring in economics, he was a whizz with spreadsheets. Medrano painstakingly generated tables of the khipu data and combed through them in search of matching patterns. This year, he and Urton showed for the first time that the way pendant cords are tied onto the primary cord indicates which clan an individual belonged to.

“It is a really important achievement,” says Jeffrey Splitstoser at George Washington University in Washington DC, who specialises in khipus from the Wari empire that preceded the Inca. “It gives us a new way to interpret these sources. Gary ➤



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## Inca inventions

You need only look at the archaeological site of Tambomachay to see how creative the Incas were. The site shown (above, bottom left) is near Cusco, once the Incas' capital, and consists of terraced rocks riddled with aqueducts and canals. We don't know its function, but it may have been a military outpost or a spa for the Inca political elite. Either way, it shows how the people could organise and build.

the mountainous areas where the Incas lived, they also constructed terraces to grow crops. It is thought that they created experimental agricultural stations too, such as the one seen above (bottom right), where they tested which crops would grow best on terraces at different altitudes.

It seems odd that all this sophistication arose but writing did not. That is one reason to think their knotted cords might record ideas and

stories, not just numbers (see main story).

They certainly went to great lengths to transport the khipus. Couriers would loop the cords over their shoulders and run with them across the empire. To navigate the terrain, a vast network of roads and woven grass bridges were built. The last remaining bridge, known as Queshuachaca (top), straddles a river high in the Andes. Local people band together to renew the woven grass ropes every year.

has made things a lot more tractable." Yet the question of whether the khipus also contain stories still hung there.

Urton was not the only one trying to find meaning beyond numbers and names in khipus. Sabine Hyland, an ethnographer at St Andrews University in the UK, has spent the past decade searching in the central Andes for communities with enduring khipu traditions. She starts by looking for mentions of khipus in archives, before travelling to remote villages in the hope they might have survived.

The strategy tends to be more miss than hit, but in 2015, Hyland's persistence paid off. Having seen a documentary about her work, a woman in Lima, Peru, got in touch about the khipus in the remote village of San Juan de Collata, where she grew up. After months of negotiations with the community, Hyland was invited to see two khipus. Villagers believe them to be narrative epistles created by local chiefs during a rebellion against the Spanish in the late 18th century. By that time, the people spoke Spanish too, so there are corresponding written records.

The khipus were kept locked away in an underground chamber in the village church. Hyland and her husband were the first outsiders to lay eyes on them, and she was

## "This writing system is three-dimensional, dependent on touch as well as sight"

not disappointed. "It was an incredible moment," she says. "But I didn't have time to be awestruck because this was my big chance to study them, and I didn't have long." She had 48 hours before the man in charge of the khipus, the village treasurer, had to travel to a nearby community festival.

Under strict supervision, Hyland set about photographing the cords, reviewing the manuscripts and taking notes. Each khipu had hundreds of pendant cords, and they were more colourful and complex than anything she had ever seen. It was clear the various animal fibres used could only be identified by touch. The villagers told her the khipus were the "language of animals" and insisted that the different fibres have significance.

Her analysis eventually revealed that the pendants came in 95 different combinations of colour, fibre type and direction of ply. That is within the range of symbols typically found in syllabic writing systems, where a set of signs (say, the letters C-A-T) aligns with the sound of speech (the word "cat"). "I thought 'Woah,

could this be a syllabic writing system?'" says Hyland. She has since hypothesised that the khipus contain a combination of phonetic symbols and ideographic ones, where a symbol represents a whole word.

Earlier this year, Hyland even managed to read a little of the khipus. When deciphering anything, one of the most important steps is to work out what information might be repeated in different places, she says. Because the Collata khipus were thought to be letters, they probably encoded senders and recipients. That is where Hyland started. She knew from the villagers that the primary cord of one of the khipus contained ribbons representing the insignia of one of two clan leaders.

She took a gamble and assumed that the ribbons referred to a person known as Alluka, pronounced "Ay-ew-ka". She also guessed that the writer of this letter might have signed their name at the end, meaning that the last three pendant cords could well represent the syllables "ay", "ew" and "ka".

## Tangled mystery

Assuming that was true, she looked for cords on the second khipu that had the same colour and were tied with the same knot as the ones she had tentatively identified on the first khipu. It turned out that the first two of the last three cords matched, which gave "A-ka". The last was unknown. It was a golden-brown fibre made from the hair of a vicuna, an alpaca-like animal. Hyland realised that the term for this hue in the local Quechua language is "paru". And trying this alongside the other syllables gave, with a little wiggle room, "Yakapar". That, it turned out, was the name of another of the lineages involved in the revolt that these khipus recorded.

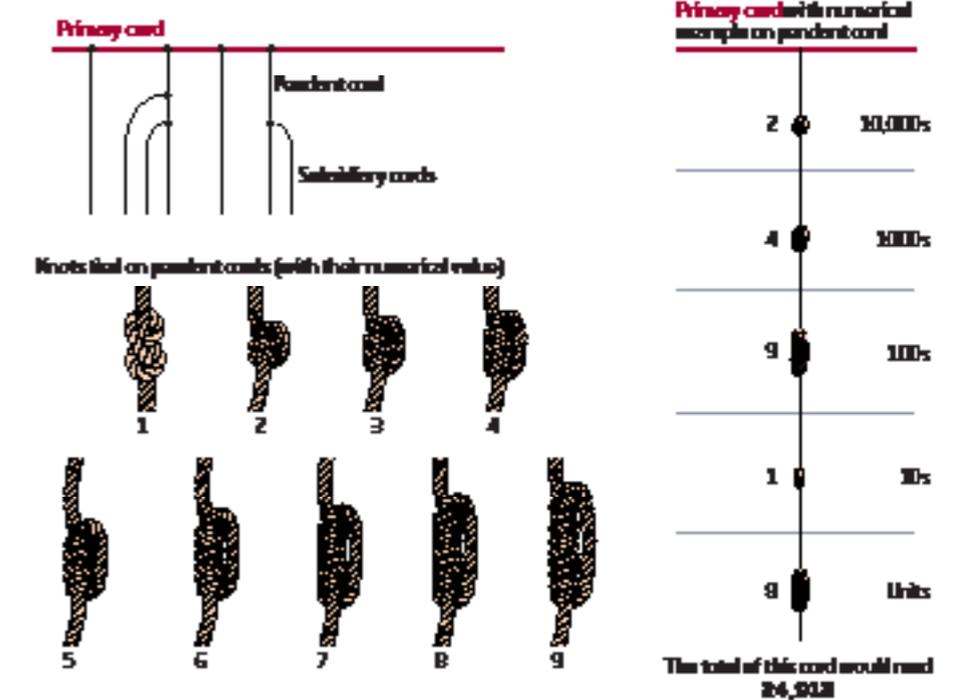
"We know from the written testimony that one of the khipus was made by a member of the Yakapar clan and sent to Collata, and we think this is it," she says. Hyland claims that the Collata khipus show that the cords really do hold narratives.

Yet even if she is right, it is possible these later khipus were influenced by contact with Spanish writing. "My feeling is that the phoneticisation, if it's there, is a reinvention of khipus," says Urton. Equally, the Collata khipus might be a regional variation. Possibly even a one-off.

Hyland is the first to admit that we don't understand the link between these khipus and those dating from before the Spanish arrived. That doesn't make them any less interesting though. "Even if these later khipus were

## Written in knots

The Incas recorded census data in knotted cords called khipus. The primary cord had offshoots, which may have signified individual people or villages. The number of twists in a knot represented units, and its position on the pendant cord signified tens, hundreds and so on.



influenced by the alphabet, I still think it's mind-blowing that these people developed this tactile system of writing," she says.

She will spend the next two years doing more fieldwork in Peru, attempting to decipher the Collata khipus and looking for similar examples elsewhere.

Urton too is turning his attention to

narrative khipus, even if he has a different idea on how they encoded information. He suspects they are semasiographic, a system of symbols that convey information without being tied to a single language. In other words, they would be akin to road signs, where we all know what the symbols mean without having to sound anything out. That makes sense, given that the Inca ran a multi-ethnic, multilingual empire, says Urton.

There is no solid evidence that any Spaniard living at the time learned to read or make a khipu. That suggests that they were more complicated than conventional writing – or perhaps just conceptually very different. "This is a writing system that is inherently three-dimensional, dependent on touch as well as sight," says Hyland – and that presents us with a uniquely tangled mystery.

It also gives us an important insight. If the Inca used khipus in this way, it might tell us something about their world view. With a writing system dependent on touch, says Hyland, "you must have a different way of being in the world". ■



DR WILLIAM HYLAND

Sabine Hyland holds one of the incredible Collata khipus

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