

Telling Tales: Twist as storyteller



Figure 1 The Inca system of writing in khipus, or knotted cords. Khipus (aka Quipu) in the Museo Machu Picchu, Casa Concha, Cusco
Credit: Pi3.124, CC BY-SA 4.0 <<https://creativecommons.org/licenses/by-sa/4.0/>>, via Wikimedia Commons

As spinners, we think of twist as an essential technique to hold fibres together, providing a myriad of options for form and function. It does just that, but if you are looking at historical textiles, twist also provides a fascinating window into the past. One can think of textiles as ‘text’ (the word ‘text’ comes from ‘to weave’): story books and historical documents, the patterns and designs revealing much about our histories. Even the yarn has much to reveal, its twist providing detailed information or, at the very least, suggesting where a yarn was made, how it was made, what the purpose of a textile might have been, and even if historical events may have impacted a culture.

Among the most remarkable examples of this are khipus, a collection of twisted cords and knots hung from a main cord made by ancient Peruvian Wari and Incas. When Spanish conquistadors invaded Peru, they met a very sophisticated culture with no western writing system. Eventually, khipus came to be understood as a form of writing one we are still trying to read. Gary Urton, a Harvard professor, in studying khipus, happened upon a census record document written in the 1600s. Realizing it was from the same region and time period as khipus found in a burial, he suspected these might be two versions of the same document. He set Manny Medrano, an undergrad student, to look for patterns between the two. Matching the two enabled Manny to break the code as it related to kinship groups within that particular census, providing clues to decoding others.

Telling Tales: Twist as storyteller

Oral history tells of khipus being used for record keeping and, astoundingly, as letters, histories, and narratives. Cotton khipus seem to be a different type of document from the animal (vicuña, alpaca, guanaco, llama, deer, and vizcacha) fibre khipus. Cotton khipus in which the twist direction is the same for all cords, may be used for counting (e.g. census records and storehouse inventories), whereas animal fibres provide more variables to encode information. These variables include texture and a rich array of colour and colour combinations, allowing these khipus to use the ‘language of the animals’ for narratives in which more meaning is needed.

Depending on the context, the twist direction of the final ply plays a significant role and can indicate lineage, gender of an animal (e.g. S-ply = ewes, Z-ply = male sheep), or reveal opposite meanings (e.g.: the number of cows milked vs. the number not milked) while colour (alpacas have at least 22 natural colours) and colour combinations convey countless meanings (e.g. names or syllables or words). Even the twist of the knots signifies meaning (e.g. S-knots= upper class and Z-knots= lower class). The stories of these remarkable khipus are still being decoded and telling us more Peruvian history according to Wari and Inca records.

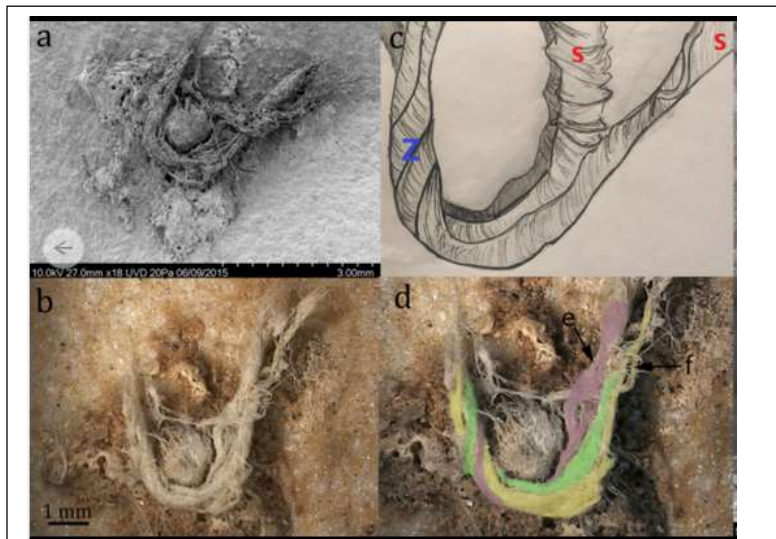
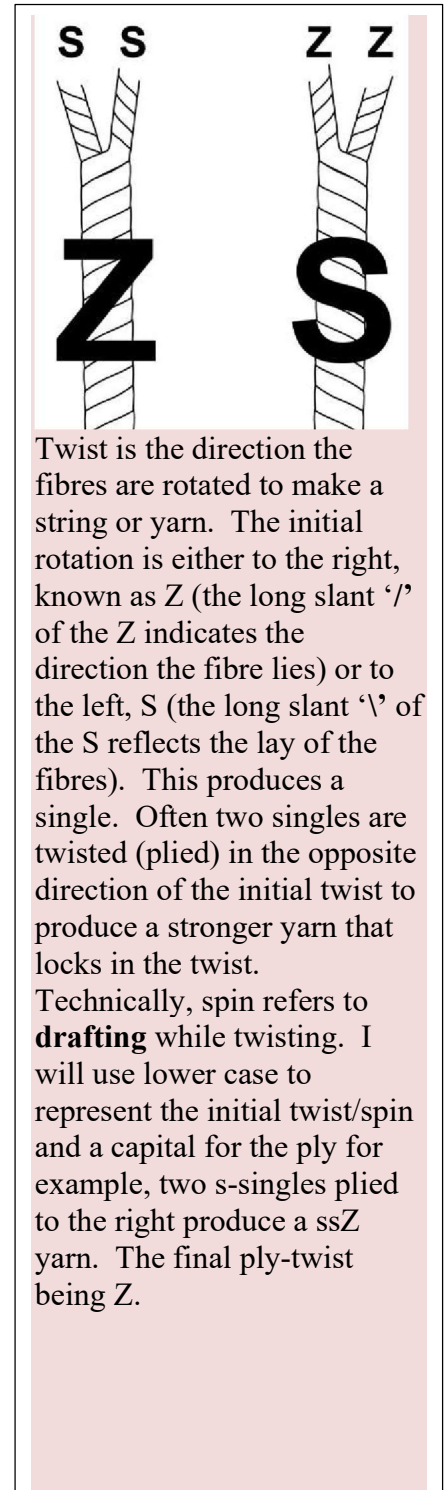


Figure 2(a) SEM photo of cord fragment, (b) 3D Hirox photo of cord fragment, (c) schematic drawing illustrating s and Z twist; (d) enlarged Hirox photo with cord structure highlighted, arrows indicate location of photos - (Drawing by C. Kerfant; Hirox: C2RMF, N. Mélard)

The oldest string ever found is @50,000 years old--a miniscule fragment stuck to a stone tool, all the more interesting because it is 3-ply, twisted and plied zzzS, and laceweight. This tells us that since Neanderthals could make cord, they most certainly could tie things together, make fishing nets, clothes, bags, and attach stone tools to handles. This piece of cord also tells us Neanderthals knew the complex method for processing bast fibres and 3ply indicating they thought about numbers, a step in the evolution of the ability to



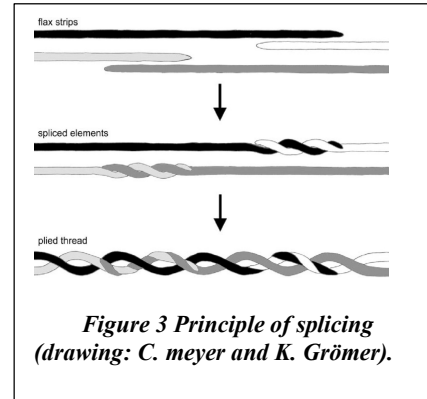
Twist is the direction the fibres are rotated to make a string or yarn. The initial rotation is either to the right, known as Z (the long slant ‘/’ of the Z indicates the direction the fibre lies) or to the left, S (the long slant ‘\’ of the S reflects the lay of the fibres). This produces a single. Often two singles are twisted (plied) in the opposite direction of the initial twist to produce a stronger yarn that locks in the twist. Technically, spin refers to **drafting** while twisting. I will use lower case to represent the initial twist/spin and a capital for the ply for example, two s-singles plied to the right produce a ssZ yarn. The final ply-twist being Z.

Telling Tales: Twist as storyteller

do abstract math. Given this, our notion of Neanderthals being unevolved, and ignorant requires a major rethink.

Singles can be made by twisting a bundle of bast fibres (adding more as needed) or by twist-splicing long fibres together by hand, twisting two ends together to lengthen the thread. Once a long thread has been made, a larger diameter string can be made by twisting a number of these threads together before plying--a labour-intensive process.

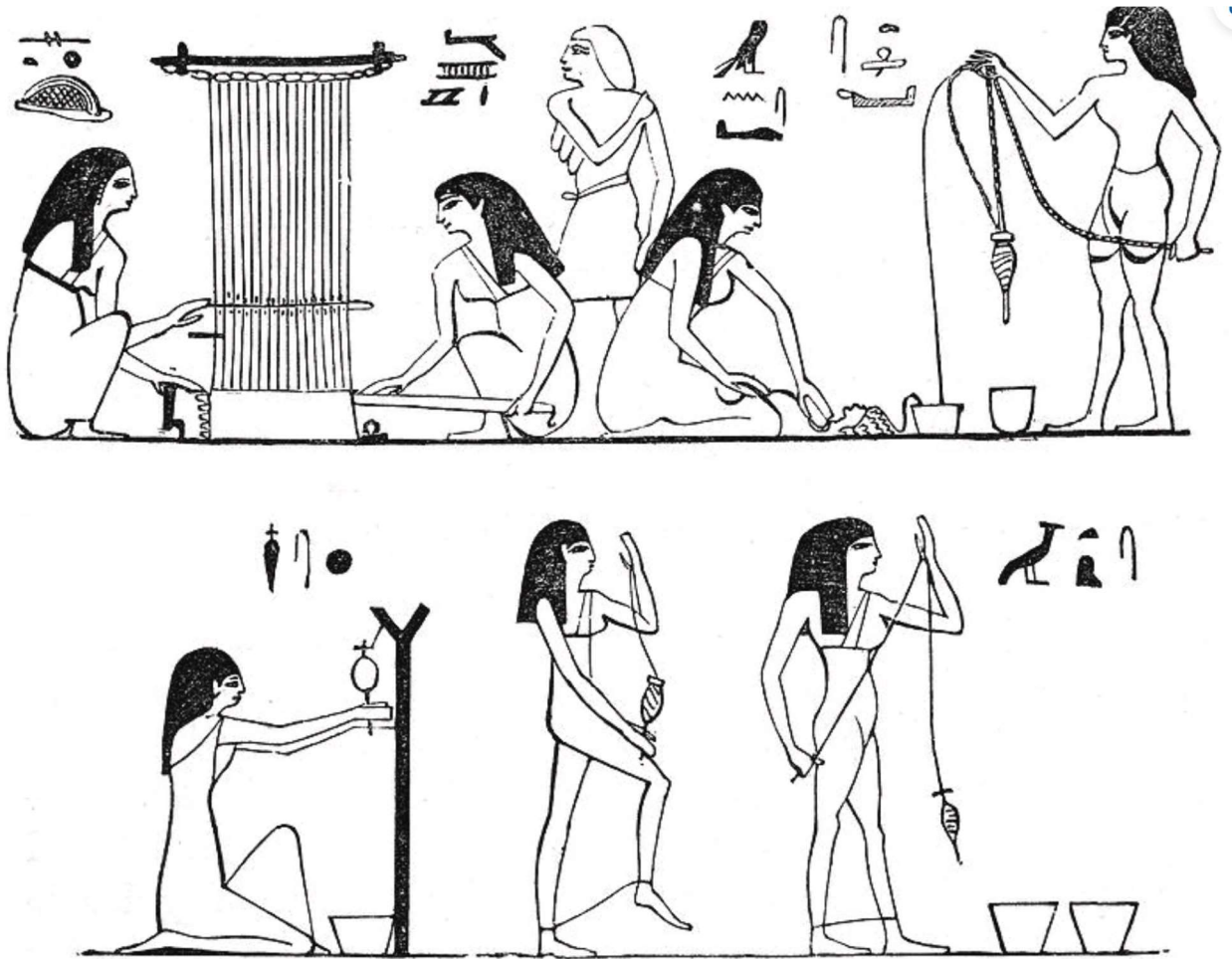
The Kwakwaka'wakw of northern Vancouver Island once spliced nettle threads this way. They would splice long thin nettle fibres twisting together the thicker root end to the thinner top end of the next thread, coiling this lengthening thread in a box. After six feet has accumulated, sand was sprinkled over it to weigh it down, and the splicing continued with the thread and sand eventually filling a box, before starting on another box. Twist-splicing produces a weaker thread at the spliced joins hence needs to be plied. If the Kwakwaka'wakw wanted sewing thread, 3 or 4 nettle threads, each hanging from a box, were joined and then twisted using a spindle and finally wound into a ball. A thicker yarn meant adding thread from more balls.



Many cultures and some of the earliest known fabrics found have twist-spliced threads. Indigenous cultures like those of eastern Asia still use this method. Seeing a splice within a ply will tell you more about how that yarn was made.

Splicing, of course, does not work for animal fibres, as they will slip apart. Animal fibres require different processing, which involves drawing out (drafting) fibres to be spun. Drafting and spinning simultaneously is much faster than splicing, as twist-splicing is a two-stage process. Even spinning by rolling down your thigh is estimated to be 1.5x as fast. Using a spindle is more than twice as fast as twist splicing and a wheel is four times as fast. If you know how a yarn is made, you can estimate how long it takes to make the yarn needed for a textile, and you start to build up knowledge of a lifestyle, household economies and trade. Did spinners have to spend most of their time processing and spinning enough yarns for clothing and household goods, or could they spin fast enough to produce excess textiles for trade?

Fibres that can be fluffed up and drawn out like wool and cotton can be spun and used as singles, spun either to the right or the left. Either direction will work and while you can twist either direction, one direction inclines to be more efficient. Cultures tend to have a preference and spin and twist direction remains constant over broad geographic areas and over generations.



Ancient Spinning and Weaving, perpetuated in Africa at the present day.
From Wilkinson's 'Ancient Egyptians,' pp. 85, 86.

Twist direction can often tell you about the technique or tool used to make yarn. Hand twisting or rolling a spindle down the thigh produces an s-yarn. Working up the thigh produces z or a plied ssZ. Bottom whorl flicked with the thumb produces z, while a top whorl produces s, and typically a spinning wheel goes to the right producing z. From 5000BC -100BC the Nile area people rolled their hi-whorl spindles down their thighs achieving an s-twist. Around the same time European and Indian cotton textiles flicked their low whorl producing z-twist. Finding z-twist textiles in a town in the Nile area meant either a robust trade between that town and a foreign town, or, in the case of a town with difficult access to a trade port, a foreign immigrant community residing there.

Spin and twist preference seems to be based on what was taught, and can be one of the indicators of origin (along with things like fibre, construction technique) of the textile or, in some cases, the people who made it. However, when twist direction changes this signifies a change in society and a story needing to be told.

During the early settlement of Iceland (ca. 800-1000) women spun z-singles to the right and wove 2/2 twill from z-yarns, just like their relatives in Norway from whence they came. But that started to change, and by 1100AD textiles became z-spun warp with s-spun wefts. Why? One

Telling Tales: Twist as storyteller

suggestion is the influence from non-Norse areas of Britain or Europe (Celts) where twill was made with z-spun warp and s-spun weft. Interestingly, mitochondrial DNA studies show a significant Celtic makeup among later Icelandic female (but not male) immigrants!

Another change came in the 15th century when Icelandic warps became plied, producing a thicker and warmer fabric. This change coincided with both the declining temperature at the start of the Little Ice Age (16th-19th C) and declining economic trade of cloth exported from Iceland, therefore a refocus on textiles serving local needs.

Looking at an old textile in Iceland one can make a reasonably educated guess about the time-period a cloth was made. A thick plied cloth is more likely to be after the 16thC. A cloth of z singles in both warp and weft is likely to be much older.

In my research on Coast Salish textiles of the Pacific North West, I found dog fur and mtn goat were thigh spun, going down the thigh and plied up the thigh producing a ssZ yarn. When looking at old Coast Salish blankets, one can tell the commercial yarn from the handspun by the number of plies (handspun=2, commercial = 3 or 4 or more) and the direction of the ply (handspun=Z-ply, commercial=S-ply). After recording spin and twist direction, twist angle, twists per inch of over 100 blankets I found a pattern emerged. Blankets from the early 1800s have more twists per inch and more wraps per inch while blankets from a hundred years later have fewer twists and wraps per inch. This holds true for different styles of textiles: closely twined, looser twills and even Cowichan-style sweater yarn. In theory, you could use this information to estimate an age of the textile. The change in twist and wrap characteristics reflects the changes and challenges spinners and weavers faced with the impact of colonialism: smallpox decimating the population; European mass-produced blankets flooding the area; and the disruption of a cultural way of life. All these factors led to blankets being more rapidly produced using thicker and looser spun yarns.

Twist direction often reflects cultural beliefs. In Navajo spinning, spinners are taught that Spider Woman instructed the Chief Medicine Woman, saying, "You must spin towards you, or the beautiful goods will depart from you". In Colombia, Kogi men twist to the left while women twist to the right. In many cultures if the twist direction is opposite to traditional direction, this carries significance. In some areas of Peru, it is thought that threads twisted against the traditional direction were used to counteract black magic and to improve wellbeing. In Korea, the non-traditional direction of twist was used only for mourning clothes.

Knowing how to process fibres and use twist to make string, yarn, cordage, rope, and everyday objects had huge material, social and economic implications for our evolution. Twist helped to keep our ancestors' worlds together, it determined the strength and style of their essential fabrics, it encoded cultural messages, it carried history. With careful study we can learn from twist, as it reveals to us invaluable fragments of story.

Liz Hammond-Kaarremaa

Liz retired as Director of Research Services at Vancouver Island University. She holds a Master Spinners Certificate, completing a research project focused on the Coast Salish spinning of

Telling Tales: Twist as storyteller

traditional fibres into yarns. This opened her eyes to textiles and the stories they can tell. When not spinning, she often paddles the west coast by kayak or in Tribal Journeys with First Nations or walks various Caminos in Europe. Next journey she will be taking a spindle!

Links to more resources on this story are on her website: <https://lizhk.ca/writing>