

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Textile Society of America Symposium  
Proceedings

Textile Society of America

---

2014

## Coast Salish Spinning: Looking for Twist, Finding Change

Liz Hammond-Kaarremaa

Vancouver Island University, lizhk@viu.ca

Follow this and additional works at: <https://digitalcommons.unl.edu/tsaconf>



Part of the [Art and Design Commons](#), and the [Art Practice Commons](#)

---

Hammond-Kaarremaa, Liz, "Coast Salish Spinning: Looking for Twist, Finding Change" (2014). *Textile Society of America Symposium Proceedings*. 938.

<https://digitalcommons.unl.edu/tsaconf/938>

This Article is brought to you for free and open access by the Textile Society of America at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Textile Society of America Symposium Proceedings by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.



# Coast Salish Spinning: Looking for Twist, Finding Change

Liz Hammond-Kaarremaa

Coast Salish textiles from the Pacific Northwest (northwest Washington state and southwest British Columbia) are relatively rare and unknown yet are masterpieces of sophisticated weaving and spinning techniques. Coast Salish blankets and robes, and the tools used to make them, have been the subjects of a few seminal works (Gustafson 1980; Loughran-Delahunt 1996; Marr

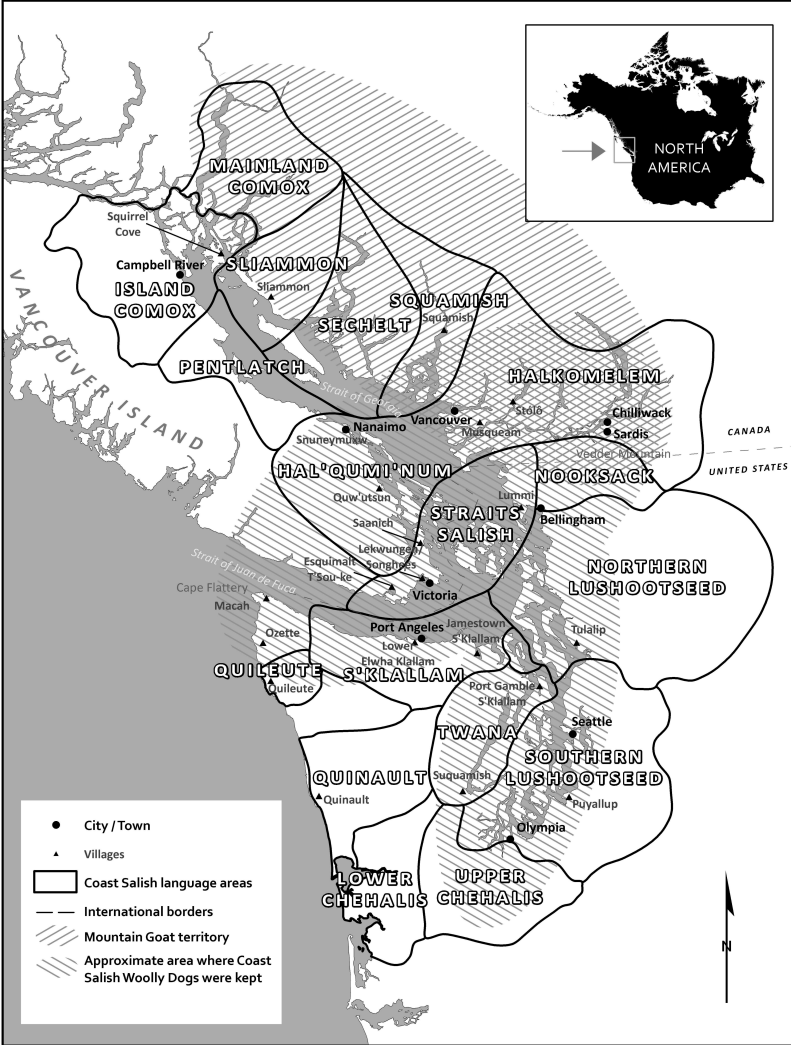


Figure 1: Coast Salish language areas. Map by Carlos Gonzalez.

1979; Vanderburg 1953), but other than the occasional recording of the direction of twist, the spinning characteristics of the yarn itself have not been the focus of research. This gap is curious, given the uniqueness of Coast Salish spinning tools, the corresponding techniques, and the fibres used. Notable examples are the Salish large spindle, which employs a tossing motion (Kissell 1916) and was used with mountain goat and dog wool, and the Indian Head spinner, used to produce Cowichan sweater yarn (Gibson-Roberts 1989) from local sheep's wool. The Coast Salish have exhibited a renewed interest in recreating traditional textiles and developing contemporary textiles based on traditional robes and blankets. This research project set out to look at what, if anything, the spinning characteristics can tell us about these traditional textiles and to provide modern Coast Salish spinners and weavers with more resources to make choices in textile design.

“Coast Salish” comprises several nations, each with a distinct culture and language but a related language base, which is a subgroup of the larger Salishan language family. The Coast Salish nations are found along the eastern and southern coasts of Vancouver Island, the lower British Columbia (BC) mainland, and Washington state, along the Salish Sea, Puget Sound, and the Strait of Juan de Fuca.

The Coast Salish created textiles with local fibre resources or fibres obtained by trade. Two key animal fibres were mountain goat wool and wool from a special breed of dogs, the Salish wool dog, raised for its fibre (Crockford 1997; Gustafson 1980; Howay 1918; Schulting 1994; Solazzo et al. 2011). Plant fibres included stinging nettle (*Urtica dioica*), found along the coast, and Indian hemp (*Apocynum cannabinum*), found in the interior. These fibres were often supplemented or blended with plant fluff (e.g., cottonwood, fireweed, and cattail fluff) or feathers.

Very few pre-1900 robes and blankets survive, but those in museum collections reveal both masterful design and weaving that demonstrates highly developed techniques. There are two key styles of Salish blankets: (i) the “organized” style, which refers to blankets that are tightly spun and tightly woven and show strong use of geometric designs, and (ii) “plain” twill blankets, which are looser in both the spinning and the weaving and are typically plain white with a few stripes or plaids added. In addition to these two styles is a “hybrid” style, characterized by tightly twinned weaving along the borders and plain twill weave in the remaining majority of the blanket.



*Figure 2: Plain twill blanket. Collected in Nanaimo, BC, 1898. Pitt Rivers Museum, Oxford, England. Photo by Mark Kaarremaa*



*Figure 3: The Perth Blanket. Collected in Fort Langley, BC, 1829(?). Perth Art Gallery and Museum, Perth, Scotland. Photo by Mark Kaarremaa*

## Methodology

For this project, over 50 blankets, from both main styles, were analyzed for their spinning characteristics, specifically, twists per inch (TPI), angle of twist, wraps per inch (WPI), and direction of spin and twist. The main selection criterion was date—in particular, blankets whose creation dates were either known or whose acquisition dates were well established. If a creation date was unknown (which was common), then the acquisition date was used. From these objects, a selection was made to incorporate blankets from early to more recent dates. Cowichan sweaters were also analyzed however, since more data is still to be collected, these objects have not been included in any detail other than in a general way in this paper

Four locations on each blanket (or sweater) were selected for measurement and recording on a data sheet, usually from the top, bottom, left, and right sides of the blanket. Coloured yarn was only measured if it had obviously been spun by hand and was therefore not a commercial yarn. Commercial yarns were most often three- or four-ply and exhibited very consistent spinning, making them easy to identify. Hand-spun yarn was also easy to identify, as it was usually two-ply and, mountain goat—the most commonly used fibre—always had some guard hairs, which resist dying.



Loose spinning makes it difficult to view and measure the bumps that indicate the twist, so measurements were taken where bumps were tighter and more obvious; hence, the bias in the data is towards more TPI as twist bumps. Warp TPI was usually much harder to see, especially in the classic-style blankets, with the weft being twined and covering the warp. Measurements were taken when there was a break or worn spot in the blanket. However, some of the twist might have dissipated from loose ends. Where warp was intact but weft worn away, it was much easier to take more accurate measurements.

## Direction of Spin and Twist

The direction in which a yarn is spun and/or twisted is often used to describe the construction of a yarn or textile. Fibre needs twist to give it strength and to hold all the smaller fibres together. Spun to the *right*, the fibres will show a slant pointing up to the right, /. This is commonly referred to as z-spun, as a Z is typically written starting at the top and going to the *right*, then slanting down to the bottom left before ending with a horizontal line to the *right*. The slanting vertical line of the Z shows a similar slant as does a fibre spun to the right. Likewise, a fibre spun to the *left* is said to be s-spun. A handwritten S starts with the upper curve of the S to the *left*, then a downward slant, \, starting on the *left* and going to the bottom right before finishing with a curve to the left. Whether you hold the yarn upside down or not, the direction of spin remains the same.

Textiles can be made from single yarns or singles that are plied—i.e. twisted—together. A plied yarn is made from two or more singles. Technically, “spin” or “spun” refers to the initial spin the fibre receives when it is turned to form a yarn from fibres drafted out of a bundle of fibre. In woven textiles, a single yarn is fine for the weft, but a warp tends to need a two-ply yarn to give it the necessary strength to withstand all the handling and abrasion a warp usually receives. Twist is the term used to describe the twisting of single yarns into a plied yarn. For singles to hold together in a ply, they need to be twisted in the opposite direction of the spun yarns. Hence, two z-spun singles need to be S-twisted to create a two-ply. It is this opposite twist that helps lock the singles together, keeping them from untwisting. The slant of the twist in a ply is much easier to see than in a single, where a magnifying glass often is needed.

In this paper, the spin direction of a yarn will be indicated by a lower-case s or z, while the direction of a ply twist will be indicated by a capital Z or S. So, for example, a two-ply yarn z-spun and plied S (or S-twisted) will be written zzS, and a three-ply yarn s-spun and plied Z (or Z-twisted) will be indicated as sssZ. This notation should help avoid confusion.

The direction of spin and twist are part of the character of a yarn or textile—how it looks, feels, and behaves, how it reflects the light, where it will cast shadows, whether a weave will interlock flat or lie more thickly. Spin and twist direction can imbue the cloth with subtle characteristics.

On another level, spin and twist direction have been found to persist through time and can indicate a cultural preference, or at least where strong differences occurred and different communities of practice existed (Minar 2000, 99; Minar 2001). In archeology, spin and twist can be used to identify geographic cultural groupings (Peterson & Wolford 2000, 101) or the sudden introduction of a new spinning method and how it was introduced (Minar 2000, 91). The direction of spin and twist, while not definitive, can rule out certain spinning techniques and provide hints as to how the yarn was created.



*Figure 4: Directions of Spin and Twist.*

### ***Twists per Inch (TPI)***

Twist is what holds the fibres of a yarn together and gives the yarn strength. Not enough twist and the fibres will slide past each other and the yarn will disintegrate. Too much twist, on the other hand, will make a yarn brittle and more prone to break. Twists per inch are counted using the plied bumps method. A yarn of two or more plies creates humps or bumps along the edges of the yarn, which are easy to count. These bumps show the number of twists in a yarn. Since two

(or more) yarns make up the ply, the number of bumps is divided by the number of single yarns to get the TPI of the singles (Berka 2007). So, for example, in a one-inch sample of a two-ply yarn, six humps or bumps would be divided by two, giving three TPI. The longer the fibres are, the less twist is needed to keep them together; shorter fibres require more twist. Likewise, a thick yarn requires fewer TPI than a fine yarn. A linen counter—a small magnifying glass mounted above a one-inch marked square—was used to count the TPI in this study.

### ***Angle of Twist***

Generally, twist angle is used to indicate the softness or hardness of a yarn (Amos, 2001). As twist is inserted into a yarn, the angle of that twist increases. A yarn with a high twist angle (e.g., 45°) will feel harder than the same yarn with a low twist angle (e.g., 20°). As it is difficult to measure twist angle for a single yarn, twist angle in this project was measured for plied yarns. A clear plastic protractor was used to measure the angle to the nearest five degrees.

### ***Wraps per Inch (WPI)***

The thickness of a yarn can be measured in wraps per inch (WPI), which indicates how many times a yarn can be wrapped around a one-inch marker (Amos 2001; Berka 2008). There is some controversy around WPI as a comparison measurement, because different individuals can pull yarn more loosely or tightly, thereby giving different readings (Tyler 2010). A better method of comparison is to lay the yarn on top of a measuring instrument that is marked off in WPI. A WPI tool similar to a ruler was used for these measurements in the present study.

## **Findings**

The data was transcribed into a spreadsheet that could be sorted by any of the variables (TPI, WPI, angle, direction of spin, and direction of twist) or descriptive fields (age of acquisition, place collected, style of blanket, etc.).

### ***Direction of Spin and Twist***

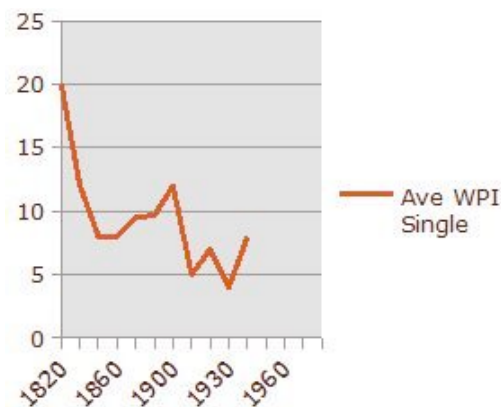
The majority of the yarn, either still in a ball or woven into any of the blanket styles, was ssZ—that is, a two-ply s-spun and Z-twisted. The notable exception was cedar, which was always zzS except if there was more than a two-ply, in which cases a single was z with a final twist of S. This difference for cedar could indicate a different technique for making the cordage, i.e., using a hand-twisting rather than a thigh-spinning technique.

### *Angle of Spin*

Half of the twill blanket warps and wefts had looser twist angles of 30–35°, while the other half had angles of 35–45°. The classic-style blankets had warp and weft angles closer to 45°. Both these measurements make sense, as blankets woven in twill provides a softer weave. One would spin a softer yarn for a softer, thicker, warmer textile. Twinned blankets, on the other hand, were intended to have a tighter weave and therefore required a more tightly spun yarn. Oral histories mention blankets or robes that were woven so tightly as to be waterproof.

### *Wraps per Inch (WPI)*

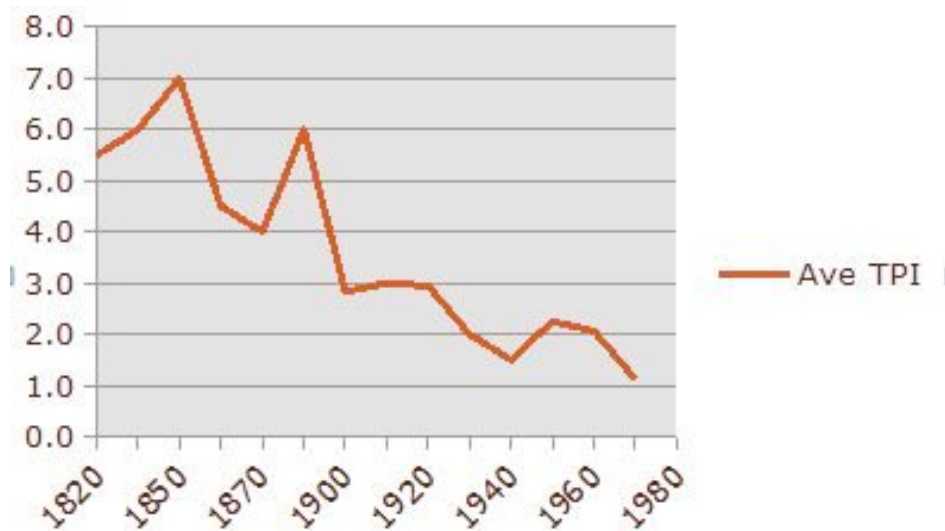
WPI decreased over the years, both in each category of style and overall. The lower the WPI value, the thicker the yarn. Single yarns went from a high of 20 WPI in 1820 to eight to 12 WPI during 1870–1930 and four to eight WPI during 1950–1980. This is easily observed in the textiles, with older blankets having finer yarns. Often, the finer the yarn, the older the blanket.



*Figure 5a: Average wraps per inch - single yarns*



*Figure 5b: Average wraps per inch - plied yarns*



*Figure 6: Average twists per inch*

### ***Twists per Inch (TPI)***

Similar to WPI, TPI also changed over the years, both overall and within the different blanket styles. The older the blanket, the higher the TPI.

### **Changes**

There are probably many reasons for the changes in spinning and yarns. The obvious ones are the impact of western European visitors, starting in the late 1700s, and the smallpox disease epidemics that followed, which wiped out many villages (Boyd 1994); some scholars suggest mortality rates of 50–95%. This depopulation not only would have impacted knowledge transmission but also may have led to a decline in the Salish wool dog and its eventual extinction by 1870.

The arrival of the Hudson Bay Company (HBC) in Nanaimo, Victoria, and Fort Langley in the mid-1800s would have changed the economy of blankets. With manufactured blankets being brought into the area by the HBC and used as a trade item, the value of Salish blankets would have diminished. The Yukon gold rush, which brought thousands of Europeans to Coast Salish territories, would also have impacted the cultural practices of the Coast Salish, as did the settlers who brought sheep, providing a new source of fibre, along with new tools such as the spinning wheel and novel techniques.

All of these factors would have influenced the spinning and weaving of Coast Salish textiles, which could explain the decreases in WPI, TPI, and the angle of twist. Changes in each of these yarn characteristics would have produced a yarn that was spun more loosely and produced more quickly than a pre-settler-era traditional yarn.



## **Implications**

Three key implications arise from these spinning characteristics. The first is that external impacts on the Coast Salish culture also had consequences on the spinning and weaving complex of the Coast Salish. Hence, when looking at a textile, one needs to see not only the yarn characteristics but also the history that helped influence the textile's creation.

The second implication is that the data derived from this study help to identify the defining characteristics of the yarn for the different styles of blankets, providing modern spinners and weavers with options for recreating yarns and textiles, or for creating new ones.

And finally, the data provide a method for approximating the creation date of a blanket; at the very least, they may provide a clue to the date. While these results are not surprising, as experts in textiles would no doubt be able to look at a blanket and approximate the date, it is good to know that the data align with and support that expertise.

## Bibliography

- Amos, A. 2001. *The Alden Amos Big Book of Handspinning*, vol. 1. Loveland, CO: Interweave Press.
- Berka, A. 2007. "Twists per Inch." *Spin-Off Magazine*, (Winter): 11–12.
- Berka, A. 2008. "Wraps per Inch." *Spin-Off Magazine* (Spring): 32.
- Boyd, R. 1994. "Smallpox in the Pacific Northwest: The First Epidemics." *BC Studies* 101: 5.
- Crockford, S. J. 1997. *Osteometry of Makah and Coast Salish Dogs*. Burnaby, Canada: Archaeology Press.
- Gibson-Roberts, P. A. 1989. *Salish Indian Sweaters - A Pacific Northwest Tradition*. Saint Paul, MN: Dos Tejedoras Fiber Arts Publications.
- Gustafson, P. 1980. *Salish Weaving*. Seattle, WA: Douglas & McIntyre.
- Howay, F. W. 1918. "The Dog's Hair Blankets of the Coast Salish." *Washington Historical Quarterly* 9 (April): 83–92.
- Kissell, M. L. 1916. "A New Type of Spinning in North America." *American Anthropologist* 18(2): 264–70.
- Loughran-Delahunt, I. 1996. "A Functional Analysis of Northwest Coast Spindle Whorls." MA diss., Western Washington University.
- Marr, C. J. 1979. "A History of Salish Weaving: The Effects of Culture Change on a Textile Tradition." MA diss., University of Denver.
- Minar, C. J. 2000. "Spinning and Plying: Anthropological Directions." In *Beyond Cloth and Cordage: ARCHAEOLOGICAL TEXTILE RESEARCH IN THE AMERICAS*, edited by P. B. Drooker and L. D. Webster, 85–100. Salt Lake City, UT: The University of Utah Press.
- Minar, C. J. 2001. "Motor Skills and the Learning Process: The Conservation of Cordage Final Twist Direction in Communities of Practice." *Journal of Anthropological Research* 57(4): 381–405.
- Peterson, James B, and Jack A Wolford. 2000. "Spin and Twist as Cultural Markers: A New England Perspective on Native Fiber Industries." In *Beyond Cloth and Cordage*.

Penelope B Drooker and Laurie D Webster, eds. *ARCHAEOLOGICAL TEXTILE RESEARCH IN THE AMERICAS*, 101–17. Salt Lake City: The University of Utah Press.

Schulting, R. 1994. “The Hair of the Dog: The Identification of a Coast Salish Dog-Hair Blanket from Yale, British Columbia.” *Canadian Journal of Archaeology* 18: 57–76.

Solazzo, C., S. Heald, M. W. Ballard, D. A. Ashford, P. T. DePriest, R. J. Koestler, and M. J. Collins. 2011. “Proteomics and Coast Salish Blankets: A Tale of Shaggy Dogs?” *Antiquity* 85(330): 1418–32.

Tyler, A. 2010. “Debunking the Wraps-per-Inch Myth.” *Spin-Off Magazine* 34(Fall): 32–34.

Vanderburg, J. 1953. *Chilkat and Salish Weaving*. MA diss., University of Washington.