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The Social Fabric: Deep Local to Pan Global

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Warp and weft twining, and tablet weaving around the Pacific

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Abstract

Warp and weft twining predates loom-woven textiles in the archaeological record. Although it was displaced by other techniques to produce fabric in areas where it is recorded from early times, such as Egypt, this particular approach to building woven structures is still maintained in scattered areas around the world as part of local traditions with deep significance in ritual and festive life, as well in the heavy subsistence work of agricultural and hunting/fishing communities.

In this roundtable, we propose to describe, illustrate and compare warp and weft twined, and tablet woven textiles from Central America, Mexico, Canada, Alaska, China, Myanmar and Central Asia. We will draw on the expertise of scholars who have done ethnographic and archaeological field work in these regions surrounding the Pacific. Furthermore, the participants in the roundtable have experience recreating the various techniques they will discuss, both as textile and basketry artists, and as conservation specialists.

Warp twining is found on the sturdiest tumplines and cinches for pack animals, made with bast fibers, as well as on the finest ribbons for ceremonial use made with silk, inscribed with ritual texts or delicate patterns. This versatility will be a central topic of discussion during the roundtable, along with the flexibility that these techniques (including weft twining) provide for creating curvilinear patterns that allow exquisite script and traditional designs to be transferred from paper to fabric. Disjunct geographical distributions, such as the spotty occurrence of warp twined textiles worldwide, have been conventionally viewed as “relictual” phenomena that bespeak the cultural conservatism of physically or socially isolated peoples. In this roundtable we will take a different approach, looking at these specific techniques as achievements of human ingenuity that may well have been developed independently, and should enrich the repertoire of contemporary textile artists globally.

Paper 1: Tablet Weaving in Gujarat, India

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1. Introduction

When thinking about the origin and development of textiles, it is indispensable to consider warp and weft twining, which predates loom-woven textiles in the archaeological record. In China, a kudzu (*Pueraria montana* var. *lobata*) fiber textile piece, in which the interlacing of two wefts is interwoven with warps, was excavated from the *Cao xie shan* ruins in Suzhou, Jiangsu Province and dated from the 30th to the 40th century BC.¹ My current research indicates that the most logical process for interlacing warp yarns to weave textile is by tablet weaving. In China, a tablet-woven silk textile piece was excavated from the *Feng xia* ruins, Liaoning Province.² Tablet weaving still exists in several parts of the world. It was possibly developed as a more efficient method of weaving warp twining that was originally done by hand.

2. Warp and weft–twining weaving

Before we consider the origin of “weaving,” we need to think about how to make fibers become yarn, thread, string, rope, or cord. These all involve the act called “twisting,” “spinning,” or “twining.”

Yarn, thread, string, rope, cord, and the like were invented because, in everyday life, people needed something they could tie, bind or sew together. These are naturally cylindrical. But sometimes flat rope is necessary. Then it develops into a “weave” in which the threads in the vertical direction cross with the threads in the horizontal direction.

Nevertheless, the idea of “twining” continues from the past. I presume that the earliest “weave” began with the necessity of producing something flat and strong, like a belt or tumpline, and then developed into a “warp or weft twining weave.”

2.1. Ply-split weaving and weft twining

The following pictures were taken at the morning market of Gaopo village in Guizhou, China, in 1995. The woman in figure 1 and 2 are using a tumpline made by ply-split weaving and a straw pad made by weft twining to carry a big basket.

Figure 1. Tumpline and straw pad in action.

1. Weiji Chen, *Chinese Ancient History and Technique* (Beijing: Science Press, 1984), 27

2. Ibid., 28

Figure 2. Chatting with friends. The woman keeps her ply-split weaving tumpline and weft-twining straw pad around her back.

Ply-split woven tumpline: To weave this tumpline by ply-splitting, the warp twist is loosened by over-twisting a section of warp. The weft cord is then passed through the loosened space within the twist. It is an act of connecting a number of identically thick threads to a plane. This is one of the original techniques in the development of weaving (figures 3).

Figure 3. Detail of ply-splitting weaving

Weft-twining straw pads: In weft twining, pairs of wefts are woven across the warp, crossing each other to enclose each warp. In the case of the straw pad in figure 4, bundles of straw, which are not twisted, serve as the weft thread. Each is bent in half to make two weft threads. When doing the weft twining, the bundle of straw then needs to be twisted.

Figure 4. Detail of weft twining

2.2. Warp-twining weaving and tablet weaving

Warp twining is a weaving technique in which two or more warp threads twist around each other as they interlace with the weft. Warp twining can be done in two ways: using both hands when twisting warp threads or using tablets (tablet weaving). In this paper, I describe an example of warp twining weave using tablets in Gujarat, India; details are in the next chapter.

3. Tablet weaving in Gujarat, India

In most cases, tablet weaving is a technique for warp-twining weaving of narrow textiles such as belts, bands, strings, or ribbons. It is very different from cloth making. The results are flat, strong, and beautiful. In Gujarat, India, people first weave a cloth with loom weaving, then finish it up with tablet weaving.

3.1. *Tangaliya* and *Dhabla*

In February of 2018, I visited Mr. Dayabhai M. Parmar's Tangaliya Weaving studio and dealership at Bajana village (Bajana is in the Surendranagar district, in the Saurashtra region of Gujarat), the gateway to Little Rann of Kutch.

The tangaliya is a traditional hand-woven woolen cloth, used by Indo-Aryan peoples in India in the Saurashtra area of Gujarat State. Tanga means a "knot." Tangaliya is woven using a kind of supplementary weft on plain weave. A short, loosely twisted weft thread is wrapped around a group of four or five threads of warp and knotted. The result is a textured dot, like a tiny cloth bead embedded in the fabric. The dots are arranged to make various patterns. The front and back of the cloth look the same.

In this territory there is another kind of cloth that local people call *dhabla*. It is usually cut to a length of 260 cm and width of 72 cm and is used as a man's shawl. Sewing together two dhabla shawls will result in a blanket. Weave the patterns with the same weaving technique as tangaliya, or supplementary weft (like a brocade). The loom is placed over a hole dug in the ground. Two pedals connected to two heddles for doing a plain weave are placed in the hole and operated by foot while the weaving is done by hand (figures 5, 6, and 7).

Figure 5. A dhabla loom

Figure 6. Weaving dhabla

Figure 7. Detail of finished patterns

Both top and bottom edges of the dhabla have a thick border, which will prevent the ends of the shawl (or blanket) from fraying. These are woven using the dhabla's own warp threads and use the techniques of tablet weaving and weft twining (figure 8).

Mr. Parmar told me that the final step, which strengthens the ends of the dhabla, is accomplished by a relative who lives in a different village called Thori Thumba.

3.2. Strengthening the ends of the dhabla by tablet weaving

In July of 2018, I visited Thori Thumba village to pursue my current research theme, which is the continued existence of tablet weaving in people's lives.

The village of Thori Thumba is in the Ahmedabad District in the state of Gujarat in India, about two hours from the big city of Ahmedabad by car (figure 9).

Figure 8. The yellow arrows indicate where tablet weaving was used to join the two shawls and to finish the edge of the blanket.

The big town near this village is Viramgam. The village is inhabited by Indo-Aryan peoples who belong to a Gujarati-speaking community called Dangayasiya, which consists of about 1,000 families with a population of approximately 5,000. Most are farmers, mainly growing rice, buckwheat, cotton, peanuts, sesame, and beans. The work of finishing dhabla is done by both men and women. During the busy season for farming people give priority to agriculture, but during a slack season on the farm most men of a village will find jobs in the transportation industry or work in factories. Orders for dhabla finishing work will always be accepted.

Figure 9. The red star on the map indicates the location of Thori Thumba village.

The villagers say that they came from the western border with Pakistan about 200 years ago. Previously many villagers were engaged in dhabla finishing work; but, since the number of requests has decreased over the past 25 to 30 years, only three families are now involved.

The villagers refer to tablet weaving as leaf weaving (*Patta Vanat Kam* in their language) or hole weaving, although the hole is more like the inside of a straw. Tablets were traditionally made of the skin of animals, like water buffalo or camels. In the present time, they use cardboard, wood, or similar materials.

3.2.1. Method for finishing the edge of the dhabla shawl

Here I will describe the method used by Mr. Jivenbhai and his niece Ms. Nirmalaben in Thori Thumba village.

Illustration note: I use following marks to indicate the tablet-weaving techniques I refer to in this paper (figure 10).

↗ : The warp thread goes through from left to right in the tablet.

↖ : The warp thread goes through from right to left in the tablet.

f : Turn the tablets away from your body.

b : Turn the tablets toward your body.

Figure 10. Diagram of steps referred to in the text

Warping: Prepare the warp thread. In this case the thread material is wool. In order to make a thread ball, which is about 3 m, use the thumb and little finger as a measure. One lap between the thumb and little finger is about 30 cm, so it will be 3 m after 10 laps. In this way, make 10 thread balls (yellow x 2, pink x 4 and blue x 4). This is the length of warp yarn necessary to weave one edge of one dhabla shawl. (figure 11). Also prepare 10 elliptical, not rectangular, pieces of tablet, made out of wood board measuring about 9 cm x 7 cm. Each tablet must have two holes.

One of the yellow threads is used for the tablet number 1. It goes through two holes (hole A and hole B) of this tablet. Another yellow thread is used for the tablet number 10. One of the blue threads goes through hole A of tablets number 2 and 3, one of the pink threads goes through hole B. (figures 12 and 13). Threads are passed through the pairs of tablets 4 and 5, 6 and 7, and 8 and 9 in the same way as they did with tablets 2 and 3.

Figure 11. Making thread balls

Figure 12. Warping for tablet weaving

Figure 13. A detailed look at warp threading

Weaving: The weaver sits on the floor and arranges the shawl back side up parallel with the warp. In order to give tension to the thread, the front end of all the threads are pulled together and held in place by the big toe (figure 14). The back end of all the warp threads are gathered in one place and tied to something, for example, to a pile driven into the floor, or secured with a weight (figure 15).

Figure 14. Securing the warp with his foot

Figure 15. Using a weight to secure the warp

According to the pattern you are using, arrange tablets to ↖ or ↗. Place them all so that hole A is at the top of the tablet and hole B is at the bottom, then start to weave. With each 180° turn of the tablet a new shed is created, and each full rotation introduces a twist. According to the pattern, all tablets turn f 180° (or b 180°) continuously. A pattern can be created by regularly alternating the rotation of the turns, f 180° and b 180° (figures 18 ~ 22). Every time the tablets are turned, beat the weft using the index finger, then using eight warp threads of dhabla as a weft thread, turn the tablets. The edge woven with 10 tablets is about 1.7 cm wide (figures 16 and 17). Turn the tablets as if rolling on the ground. This is why the tablets are intentionally created in an elliptical, rather than rectangular, shape.

Figure 16. Using eight warp threads of dhabla as a weft thread

Figure 17. Doing tablet weaving

10	9	8	7	6	5	4	3	2	1	Number of tablets			
●	●	●	●	●	●	●	●	●	●	Hole A			
●	●	●	●	●	●	●	●	●	●	Hole B			
↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	Direction of warps			

Figure 18. Pattern graph (left) for the photo on the right. All tablets were turned $f 180^\circ$ continuously.

10	9	8	7	6	5	4	3	2	1	Number of tablets			
●	●	●	●	●	●	●	●	●	●	Hole A			
●	●	●	●	●	●	●	●	●	●	Hole B			
↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	Direction of warps			

Figure 19. Pattern graph (left) for the photo on the right. All tablets were turned $f 180^\circ$ continuously.

10	9	8	7	6	5	4	3	2	1	Number of tablets			
●	●	●	●	●	●	●	●	●	●	Hole A			
●	●	●	●	●	●	●	●	●	●	Hole B			
↖	↗	↖	↖	↗	↗	↖	↖	↗	↖	Direction of warps			

Figure 20. Pattern graph (left) for the photo (center) of the woven result of tablets turned $f 180^\circ$ two times, then $b 180^\circ$ two times and repeated. On the right all tablets were turned $f 180^\circ$ continuously.

10	9	8	7	6	5	4	3	2	1	Number of tablets			
●	●	●	●	●	●	●	●	●	●	Hole A			
●	●	●	●	●	●	●	●	●	●	Hole B			
↗	↗	↗	↗	↗	↖	↖	↖	↖	↖	Direction of warps			

Figure 21. Pattern graph (left) for the photo on the right, showing the woven result of counts from when hole A is at the upper side and all tablets are turned $f 180^\circ$ five times, then $b 180^\circ$ five times.

10	9	8	7	6	5	4	3	2	1	Number of tablets			
●	●	●	●	●	●	●	●	●	●	Hole A			
●	●	●	●	●	●	●	●	●	●	Hole B			
↗	↗	↗	↗	↗	↖	↖	↖	↖	↖	Direction of warps			

Figure 22. Pattern graph (left) for the photo on the right, showing the woven result of counts from when hole A is at the upper side and all tablets are turned f 180° five times, then b 180° five times.

When the tablet weaving is completed, all its warp threads are knotted together and cut.

The finishing work of dhabla uses two different weaving techniques, tablet weaving and weft twining, and is finally completed with tassels (pompons) (figures 23 and 24). The cost and price of this finishing work varies according to the amount of decoration and technology involved.

When doing tablet weaving to finish the edge of a dhabla, warp threads become weft threads. When doing weft twining to finish the edge of a dhabla, warp threads remain warp threads.

Of course, you need to do the same finishing work for the other edge of the dhabla shawl as well.

Figure 23. Doing the weft twining

Figure 24. Finished edge of the dhabla

Figure 25. Joining two dhabla pieces to make a blanket

Figure 26. Detail of joining two dhabla pieces

3.2.2. Tablet weaving to make a dhabla blanket

Tablet weaving is also used for joining two dhabla pieces to make a blanket: Place a warp of tablet weaving between two dhablas. Turn tablet f 180° (or b 180°) continuously (or regularly alternating the rotation of the turns, f 180° and b 180°) to make a shed. Prepare a weft thread with a needle at the top of the weft. After the weft has passed through the first shed, sew it to one of the dhabla. After passing the next shed, sew it to the other dhabla and repeat (figures 25 and 26). The edges can be finished after sewing together two dhablas, or the two dhablas can be sewn together after the edges are finished.

4. Conclusion

Warp and weft twining, which includes tablet weaving, is an ideal technique for weaving narrow textiles such as bands, strings, ribbons, and the like. It is very different from the making of cloth or fabric. People have discovered and used various forms of this technique to make products that are flat, strong, and beautiful. The dhabla shawl and blanket give us insight into the history of weaving and shed light on the relationship between human beings and textiles (figure 27).

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Figure 27. A man wearing a dhabla blanket

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Paper 2: Weft Twining

Kathryn Rousso

Weft twining is a universal basket-weaving technique that is also used for creating Northwest Coast Haida, Tlingit and Tsimshian regalia, and New Zealand Maori cloaks. Two-strand twining is the most common weave structure, where two weft strands cross each other as they make a half or full twist around one or two warps always at the same angle (twisting up or down creates the angle) to enclose a successive group of warps (Figure 1). Two-strand twining can be compact or spaced. Three-strand twining, where three wefts alternate around warps are used for outlines around two-strand twining, and for creating concentric pattern figures or selvage patterns in Northwest Coast weaving (Figure 2). Three-strand twining can travel horizontally or vertically. Three-strand braiding is used in Chilkat weaving and differs from three-strand twining as in addition to traveling horizontally or vertically, the strands interweave or braid with each other, and are used for outlining design elements, making curves possible.

Figure 1: Two-strand twining is achieved when two weft strands cross each other as they move to enclose successive groups of warps. (Samuel 1987, 28).

Figure 2: Three-strand twining is achieved when the working strand travels behind the two other wefts, over four warps and under two warps. (Samuel 1987, 30).

In the early 1980's I began my textile journey in Ketchikan, Alaska, where many teachers shared their knowledge, mostly Delores and Holly Churchill, Janice Criswell, the late Irene Bienick, Diane Douglas Willard, Cheryl Samuel, Dorica Jackson and Evelyn Vanderhoop. From them I learned the techniques for creating two and three strand weft twined spruce root and cedar bark baskets, Ravenstail and Chilkat weaving (Figure 3).

Figure 3: Twined cedar bark basket woven by Haida weaver Diane Douglas Willard

Cheryl Samuel began reintroducing Ravenstail weaving to the region in the late 1980's and I was part of that wave of new Ravenstail weavers. Ravenstail pre-dates Chilkat and is a geometric patterned textile. It is hand-woven on a non-weighted loom and in some ways resembles Haida-style basketry, which is woven with warps down instead of up. The structure is created with two and three strand twining (Figure 4).

Figure 4: Ravenstail weaving

Another similarity between Ravenstail and basketry is skip stitch, a common weft design technique. The pattern is achieved by the changing four warp movement of the weft (Figure 5).

Figure 5: Skip-stitch pattern is the all-white section

The transition from basketry to Ravenstail is illustrated in old cedar bark robes, where weft cedar bark is twined over cedar bark warps or cedar bark spun with mountain goat wool. Some had borders of geometry twined patterns. These robes were observed by explorers in the late 1700's. Six robes were collected in 1778 at Nootka Sound on Cook's third voyage which are examples of technical transition.³ One of these, the "Vienna Robe" I saw in the Anchorage Museum a few years ago, and marveled at the Chilkat-style faces.

Form-line weaving mirrored the work of men, who were creating curvilinear style crest designs which they are able to do in Chilkat weaving. One half of a symmetrical black form line pattern was painted on a pattern board, which the weaver interpreted with mountain goat wool and cedar bark. Chilkat patterns are possible because "the weft strands travel outside of the warp and these strands are woven vertically by using the underlying horizontal wefts as their base."⁴ Twining is worked back and forth and joined where colors change, covered and defined by three-strand braids, and curved shapes could be formed. (Figure 6).

³ Cheryl Samuel, *The Raven's Tail* (The University of British Columbia Press, 1987), 155-159.

⁴ Ibid., 158.

Figure 6: Chilkat Weaving

To illustrate this, weaving the perfect circle is achieved because the braids cover where the black and white twined joins occur. To weave a circle the black is twined back and forth from both sides the size of the top third of the circle going out one warp each row (1). Next step is to place three strand braids along the curve, a black braid first, then a white one (2). Next twine back and forth white to fill in the upper third of the circle (3). The next step is to twine back and forth the black from both sides, joining with the white and continue the braids as the circle is woven downward (4). Once the middle is woven, twine back and forth the bottom third with white (5). Bring the white braid around and then the black braid to complete (6). Finally twine back and forth the black from both sides, until they join (7), and then twine all of the way across (8). The final photo is the backside, which illustrates the join between black and white.⁵

Step 1 *Step 2* *Step 3* *Step 4* *Step 5* *Step 6* *Step 7* *Step 8* *Backside*

An advantage of non-weighted loom weaving is that warps can be added to increase size as is done with Chilkat and basketry (Figure 7).

⁵ Cheryl Samuel, *The Chilkat Dancing Blanket* (Norman and London: University of Oklahoma Press, 1982), 158-160.

Figure 7: Ravenstail weaving on loom

My interest in Maori weaving is because of its similarity to Ravenstail, the Taaniko woven geometric patterned borders in particular. The main body of work is created with a type of twining , where as many as five colors can be carried along behind and brought forward to create geometry patterns.⁶ Each weft twist occurs between every warp. It is worked from left to right on a non-weighted loom (Figure 8).

Figure 8: The twist occurs after every warp and several colors can be carried behind for color changes in the pattern..

The element I mostly use is one variation of a two-pair interlocking weft casting on and off technique which makes it possible to begin twining at the top and work downwards without a header or loom and forms the upper and lower selvages (Figure 9).

⁶ Hirini Moko Mead, *Te Whatu Tāniko: Tāniko Weaving Technique and Tradition*. (Reed Publishing, 1999), 104.

Figure 9: These are examples of casting on and off, for more on casting on see 99-103 and for casting off, 114-115: Mead. Far right is twined band before casting off.

I relate this information as part of my own weaving influences which combine traditional northwest coast basketry, Ravenstail, Chilkat, Maori Taaniko with Guatemalan looping techniques (which I learned while researching agave fiber textiles) (Figure 10).

Figure 10: Simple-looping, or knotless netting, 31, Emory.

Guatemalan simple-looped net bag made by Guatemalan artist,

The basic design concept evolved from understanding Athabaskan babiche or caribou thong net bags. Athabaskan babiche bags are constructed with a top band of hide (A) designed with porcupine quills and the bottom (B) looped caribou thongs (Figure 11).

Figure 11

Most baskets begin at the bottom and are worked to the top opening, but I work in reverse beginning at the mouth and working towards the bottom. This is possible because of the nature of looping, which is easy to decrease as needed and the Taaniko casting on and off techniques, allowing me to work around my knees with between 150-200 warps. Combining my love and knowledge of traditional two and three strand basketry, Ravenstail and Chilkat twining and braiding, I bring to the present these amazing traditional techniques into the contemporary textile world.

Wild pineapple fiber basket around a gourd, twined in the Taaniko style.

“Trick or Treat” with top border of two and three strand twining. Yellow and red cedar bark and round reed.

“Memories of Mexico” with top border of two and three strand twining. Waxed linen thread, beads, yellow cedar bark and round reed.

All woven examples (unless noted), diagrams and photos by Kathryn Rousso.

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