

Complex Weavers

Archaeological Textiles Study Group

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Carpetmaking was an annual activity.

ONE WEAVER'S JOURNEY:

AN EXPLORATION OF PRE-INDUSTRIAL
TEXTILE TOOLS AND FIBERS

Cathy Koos Breazeal 2013

SPECIAL THANKS

- Special thanks to the Golden Gate Weavers Guild of Berkeley, California for their kind financial support of this project and launching me on what looks to be a lifelong journey!

INTRODUCTION

- “If you want to know about a culture, look at its cloth. The materials and tools speak to us of place, and the designs handed down the generations tell us the stories of a people.” -- Anita Osterhaug
- Come with me on my journey of exploration, focusing on Colonial-era textile tools and the people who used them.



A STEP BACK IN TIME

- First we will take a little step back in time to those early twisters of fiber 40,000 years ago
- By 26,000 BC needles were common, along with shell and bone beads with drilled holes.
- A well-preserved piece of neatly twisted and plied cordage dates back to about 15,000 BC
-



A STEP BACK

- CORDAGE could be produced by anyone in camp or on the trail, but women often crafted their fiber needs concurrent with their child-rearing duties
- Hard twisted on the thigh, cordage plies back on itself, creating a strong sturdy fiber.
- Various wild products were used – inner bark, nettles, flax, hemp



MOVING ON TO SPINDLE SPINNING

- Early spinning was spun by rotating a stick or spindle. Addition of a whorl reduced wobble and increased productivity.
- Easily set down, it was another easy chore for child-rearing women
- Later addition of a distaff greatly increased production again



ON TO WEAVING

- Early weaving was little more than darning a web of fiber. It took several thousand more years to come up with lifting devices.
- First backstrap style looms capable of weaving narrow textiles



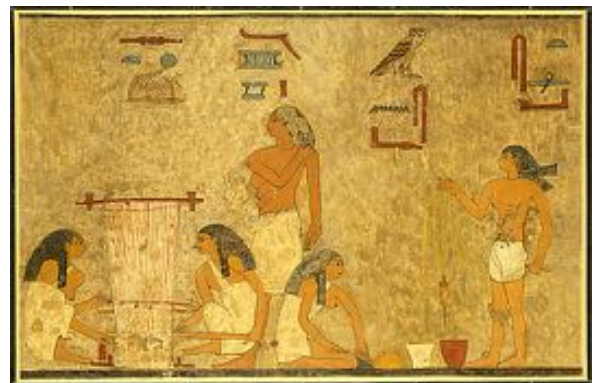
WEAVING

- Next came horizontal ground looms. They left their evidence as post holes in the floors of early dwellings and loom weights scattered about.



EARLY LOOMS

- Next, appearing in Hungary and spreading north and west across Europe and into Egypt was the next step – the wall loom. Many examples remain are displayed on wall art and on pottery.



EARLY WEAVING

- By 4000 BC, nearly every dwelling had a wall loom. Hungary remained a textile innovation hub and weaving moved beyond function and utility to something pleasing to the eye.
- Colored thread also appeared around 2000 BC, and intricate patterns of spirals, lozenges, and hearts graced regional folk costumes
- 800 BC brings us to the late Bronze Age and the Hallstatt culture and creation of early twills.

WEAVING ADJUNCTS

- About 2000 BC, pottery bowls with inner loops arrive – apparent linen wetting bowls



SPRANG

- Sprang also appeared in the Bronze Age with a technique similar to netting and predating knitting. The oldest surviving piece of sprang, found in a Norwegian bog, dates to about 1400 BC.



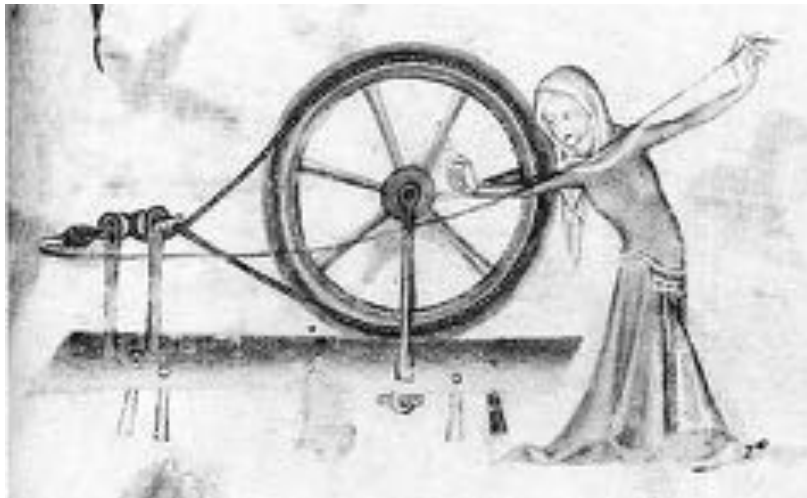
CARDING & COMBING FIBERS

- Early on, textile artists recognized the need to orient fibers by combing. Only in the Medieval times did a carding tool develop: wool teasels set on a board. This example is from the Oakland Museum.



SPINNING WHEELS

- Spinning wheels made first appearance early Middle Ages, likely from travelers to China and India
- Example early Saxony wheel, c 1330 CE



MEDIEVAL ESTATES – THE GUILDS

- Medieval towns arose and demand for textiles increased and soon men took over the occupation of weaving and dyeing. Women still spun from home, but weaving and dyeing now occurred in districts or estates within a town. The guilds continued to dominate textile production in Europe until the end of the 1700s when guilds fell out of favor and trades became more independent.



COLONIAL AMERICA

- William Penn's Great Experiment attracted not only farmers but many skilled artisans to his new colony.
- Huguenots, Anabaptist-Mennonites, Schwenkfelders, Moravians
- Loyalists to King Louis XVI and Marie Antoinette were also offered sanctuary along the Susquehanna River in Penn's Woods in a new town, French Azilum. Very few actually effected their escape



COLONIALS

- Often when packing for the Colonies, women would save space and only bring the flyer and maiden assembly for their spinning wheels, knowing colonial craftsmen could reproduce the wheel, table and footman
- In a sense, due to their isolation from new innovations in Europe, the colonists went back in time to textile production in the home, rather than the towns.



Ca 1805 barn loom, Orwell, PA

COLONIALS

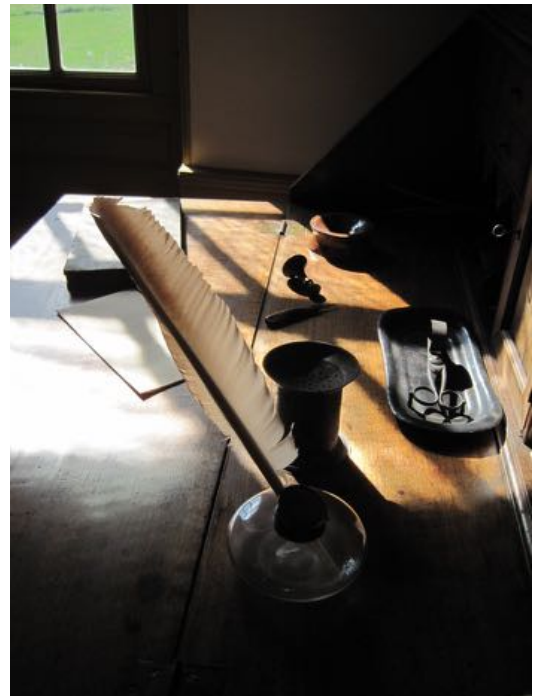
- Every spare moment, the women spun yarn, as it took about 10 hours of spinning to keep the weaver busy for one hour. Barns frame looms were built in many remote homes, often in the loft, weaving the needs of the family
- As towns built up and sprawled, these timber frame looms evolved into a more commercial use, with home spinners still producing the yarn, then delivering the yarn to the weaver to produce lengths of household fabrics that would in turn be sewn back into garments at home

ITINERANT WEAVERS

- Lots and lots of controversy on this topic ranging from “never” to “of course”
- Likely the truth lies somewhere in between and varied geographically.
- As pioneers moved further west, they were more isolated from the services of town, so the pioneer women probably woven most of the regular household items like towels, linsey woolsey for clothing, but either waited for the itinerant to come by for the fancier items like coverlets or went to town

BRITAIN AND CLOTH

- As the colonial population increased in size, Britain disallowed the weaving of any wool cloth in the Colonies – an effort to salvage their wool industry in England.



THE FIBERS

- As with the Paleolithic fibers, the colonists used some wild nettles and dogbane, but primarily grew hemp and flax.
- Hemp was a critical fiber for the British Navy for sails, ropes, and caulking on the ships.
- Every colonial household had a hemp patch



THE FIBERS

- Silk was attempted in several of the colonies and failed; tobacco was easier to grow and more valuable
- Flax was the other key bast fiber – each household raised about $\frac{1}{4}$ acre of flax per member



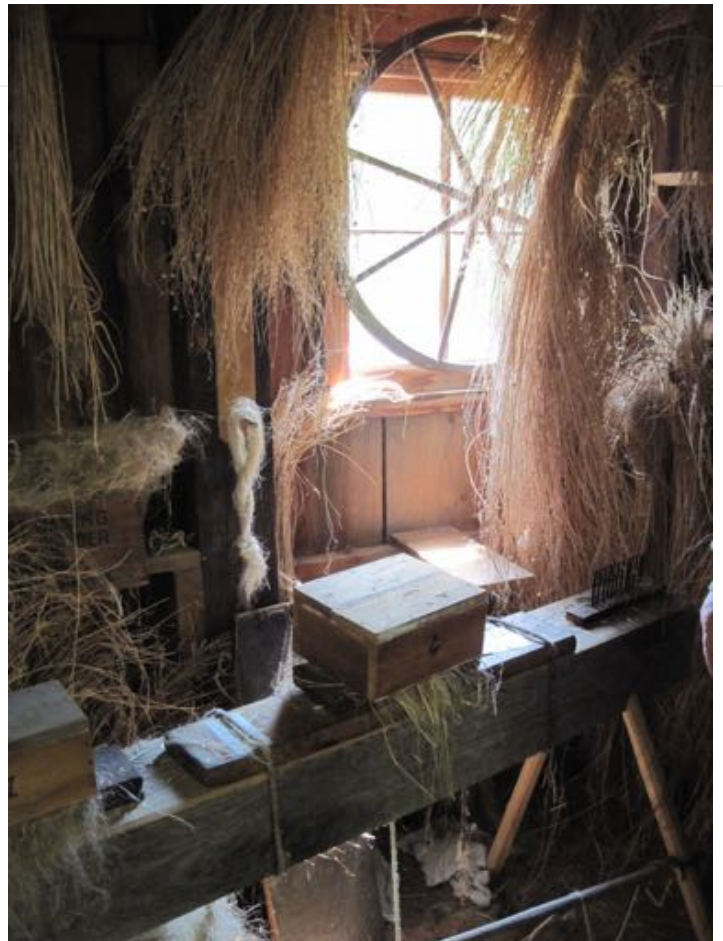
PROCESSING FLAX

- Spring planting, then harvested a month after flowering
- Stalks were pulled out of the ground, not cut
- Rippling removed the valuable seed stock
- Then the stalks were retted or rotted for up to a month, then placed in a brake to start stem removal



PROCESSING LINEN

- Then the scutching knife was used to peel away more woody stalk, revealing fine fibers



FLAX PROCESSING

- Next the hackle, hetchell, heckle to thoroughly clean and orient the strands



WOOL

- Other than silk, the only animal fiber used was wool. During colonial times, raw wool was shipped to England for processing into cloth, discouraging the colonies from producing their own and creating dependency.
- When the Revolutionary War erupted, the British set up a blockade, preventing any other sympathizer countries from providing textiles and goods
- Now the colonists were back to producing their own textiles in America

THE NEED FOR CLOTH

- The colonists found a need for cloth to make uniforms, so weavers set to work once more, fulfilling their patriotic duty to clothe the troops.



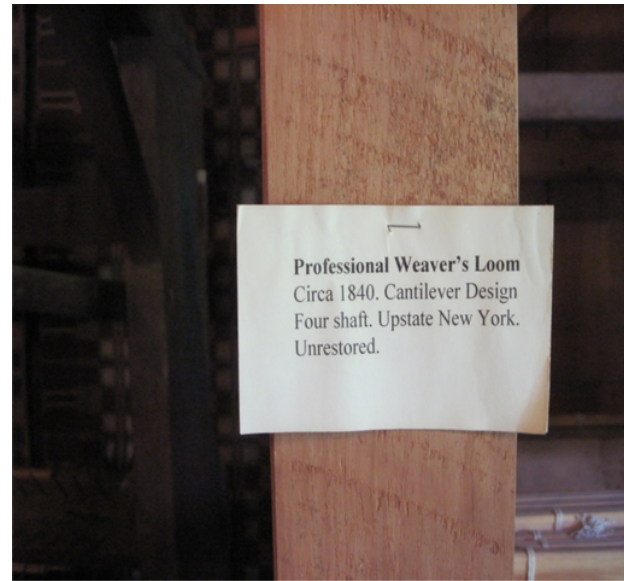
LOOMS OF THE COLONIES – 1805 BARN FRAME LOOM, ORWELL, PA















NEWCOMB RUG LOOM





IRISH LINEN CENTER, LISBURN, N. IRELAND



IRISH LINEN CENTER, LISBURN



SMALLER WEAVING TOOLS TAPE LOOM





DAISYTOWN, PA EASTERN EUROPEAN IMMIGRANTS

WHEELS, WHEELS, WHEELS AMAZING VARIETY



1 - Traditional Flax Wheel

Unsigned, Circa 1790 - 1810. American but signs of European influence.

2 - Dual Spindle Flax Wheel,

Signed "SP" Circa 1790. New England, sometimes called a "gossip wheel" suggesting that two spinners spun at the same time. Designed for spinning flax with both hands. Invented in England in the late 17th Century for use in orphanages to encourage orphans to spin with both hands to increase production. Orphans had to earn their keep.

3 - Irish Castle Wheel (flax wheel)

Unsigned. Circa 1860. Made by Daniel Danner, Mannheim Pennsylvania. Design said to have been developed in Ireland to occupy corner of a small cottage to conserve space.

4 - Farnham Accelerating Flax Wheel.

Signed "JFARNHAM" Circa 1810, Owego, N.Y. Very Rare. Only three examples identified. May have been designed as an "inexpensive" wheel. Unsigned copies by other makers have been found. Not an efficient spinner.

5 - Accelerating Flax Wheel

Unsigned. Circa 1820, upstate N.Y. Note cast iron drive wheel and unusual metal oval-shaped flyer.

6 - Flax Wheel

Signed "SCHENGOVER" circa 1860, Northeast Pennsylvania. Design believed to have first have been used by J. Farnham.

7 - Canadian Production Wheel, Quebec

Unsigned wool wheel. Possible maker Louis Bisson who was noted for this type of flyer. Note its shape.

8 - Double Treadle Castle Wheel

Parts fastened with wooden pegs, accelerating drive wheel construction controlled by two drive bands. Knob to adjust tension.

9 - Flax Wheel

Unsigned. Circa 1800. From French Huguenots, who settled in the Hudson River Valley near New Paltz, N.Y.

10 - Canadian Production wool spinning Wheel

Unsigned. Circa 1890. Probably made by Francois Borduas in Quebec, Canada for cottage industry spinning.

11 - Canadian Production Wool spinning Wheel

Unsigned Early 20th Century. For cottage industry spinning.

12 - Great Wheel

Signed "JFARNHAM" Circa 1830. Owego, N.Y..

13 - Pendulum Wheel

Lyman Wight pendulum wheel made in 1864 in Wisconsin. He first manufactured this style spinning wheel in Pennsylvania in 1856.

14 - Factory Wool Spinning Wheel

Signed "WR" Circa 1810. Wheels of this type were used in spinning lofts, used by hired spinners.

15 - Great Wheel

Unsigned. Circa 1840 Typical Upstate New York Wheel.

PENDULUM WHEEL, 1864 WISCONSIN



DUAL SPINDLE FLAX WHEEL, 1860. TWO HANDED SPINNING



IRISH CASTLE WHEEL, FLAX, 1860; FARNHAM
ACCELERATING WHEEL, 1810; ACCELERATING FLAX
WHEEL, 1820



CHAIR WHEEL



PA DUTCH TEXTILE TOOLS - PLAIN AND FUNCTIONAL

Wheel signed "Sellers",
undated. Note
uncommon support strut
extending from wheel to
leg



GREAT WHEELS, PRODUCTION WOOL WHEELS



OTHER TEXTILE TOOLS

- Braid crusher for hat braids
- Two most common hat styles used by PA Dutch



OTHER TEXTILE TOOLS

- Click or clock wheel



OTHER TEXTILE TOOLS

- Hackles
- Carding devices
- Fullers teasel



FULLERS TEASEL



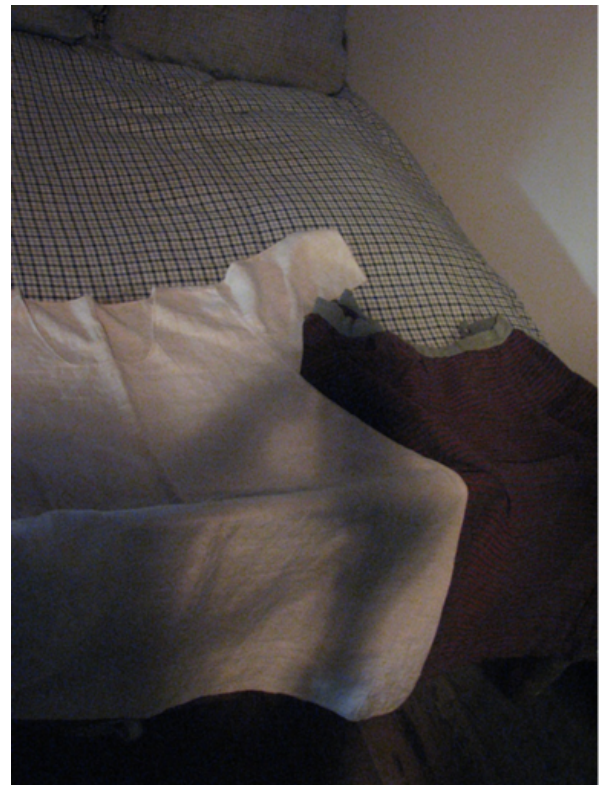
TAPE LOOM – MERCER MUSEUM



HOMESPUN AND WOVEN TEXTILES OF THE PENNSYLVANIA DUTCH



PA DUTCH SHOW TOWEL, BED LINENS, CHEMISE



COLONIAL GRAIN BAG

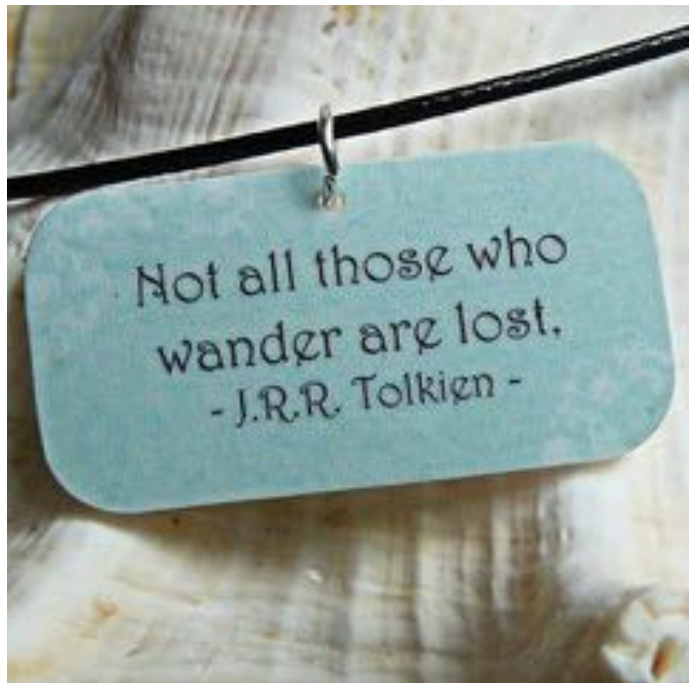


COVERLET IN THE MAKING



IN CONCLUSION

- It has been an amazing journey!
- Just like the Hobbit, the path continues on.....



ONE WEAVER'S JOURNEY: AN EXPLORATION OF PRE-INDUSTRIAL AGE TEXTILE TOOLS AND FIBERS

A PRESENTATION TO THE GOLDEN GATE WEAVERS

Cathy M. Koos
January 2013

INTRODUCTION

Ever since humans began their upright stroll through time, they have manipulated fur, fleece and plant fibers in increasingly successful efforts to clothe themselves, adorn their bodies, make tools and carry goods. Probably first noticing that a clump of fur caught on a branch twisted and became stronger, they began to twist the fur or fleece into cordage using the flat of the hand on the thigh, back and forth, back and forth. Rotted stalks of bast plants like nettles offered up long strands of fiber that could similarly be twisted into cordage or thread.

As Anita Osterhaug of “Weaving Today” tell us, “If you want to know a culture, look at its cloth. The materials and tools speak to us of place, and the designs handed down the generations tell us the stories of a people.”

I have always been interested in the how-to part of history: old tools; old books; strange and mysterious implements devised by creative individuals throughout time to do a job or streamline their work. I am especially curious about those tools of everyday life that created textiles. Particularly fascinating to me are the old weaving drafts designed in an era before iPad, WeaveIt software, or even printed graph paper. The creators of those complex designs, if they lived today, would probably be engineers.

When I was awarded this research scholarship from the Golden Gate Weavers Guild, I leaped at the opportunity to delve further and satisfy my curiosity at least about recent textile events of the early American colonists.

A STEP BACK IN TIME

Let's first take a little step back in time to set the stage for those pre-Industrial Colonial crafters.

Archaeological evidence shows a surge of various crafts in Europe as long ago as 40,000 BCE during the Upper Paleolithic period. The ice sheets were receding, and humans were making tools such as chisels and awls. One neatly spun and plied piece of cordage dated about 15,000 BCE has survived, displaying knowledge of fiber manipulation. About 40,000 years ago needles became a common tool, along with shell and bone beads with drilled holes and evidence of sewing found in burial sites. Metals produced during the Bronze Age around 3000 BC prompted another surge in crafting.

Manipulation of fibers and creation of textiles has long been women's work even back to ancient times. This likely evolved because textiles like cordage and baskets were needed by the community, and these items could be produced by the women in the community concurrent with their child-rearing and food production responsibilities. Cordage, thread making, and baskets could be easily set aside and returned to as other chores permitted. Thus, textile production remained mainly women's occupations all the way through to medieval times when the artisan guilds arose and men began to take over the craft.

In the far north, bark fibers also produced cordage for hunting and fishing nets. According to Dr. Elizabeth Wayland Barber [[Women's Work: The First 20,000 Years](#), W.W. Norton & Company, New York, 1944], the creation of string is probably the most important ancient invention.

In addition to animal fibers, cordage was also spun from the many bast plants found in the wild, including flax, hemp, nettle, and the stringy inner layers of cedar bark.

Cordage was originally spun on the thigh. If a piece of cord was needed while travelling, a few feet of cord could be quickly thigh-spun from readily available plant materials by anyone in the community. During resting times, various lengths and grists of cordage were produced to have available for a variety of needs.

Early spindle spinning consisted of rotating the spindle with one hand and feeding the fiber with the other, spinning and wrapping the product on the stick or spindle. About 10,000 years ago, introduction of the drop spindle with a whorl greatly reduced wobble and increased production. Easily set down, a drop spindle could be

operated while walking or in later times, riding an animal. The addition of a distaff allowed the spinner to carry larger quantities of prepared raw fiber, again increasing production.

Early weaving began to take place using a technique like darning, and it took fully several thousand more years to develop lifting of multiple warp threads at the same time – about 6000 BC. Likely first were band looms, securing one length of warp threads around a nearby tree or post and the other end around the weaver’s waist. We still see these looms today as backstrap looms. These looms were really only capable of weaving narrower textiles like bands.



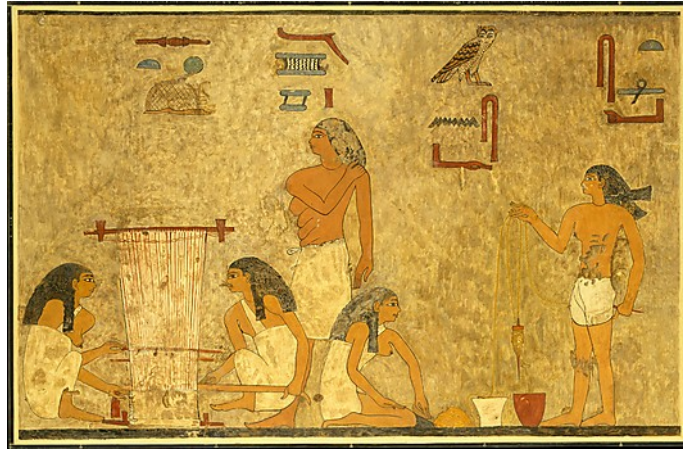
[Backstrap loom, Smithsonian Institute]

Next were horizontal ground looms, but these took up valuable floor space and so wall-mounted warp-weighted looms came on scene. Early looms did not survive, but evidence abounds in the form of clay or stone loom weights and loom post holes in ancient dwellings.



[University of Michigan, Kelsey Gallery]

We also see evidence of looms on wall paintings and pottery, giving us a good visual idea of their appearance.



[Egyptian weaving shop, 12th Dynasty, Metropolitan Museum of Art]

First showing up in Hungary, these looms spread north and west across Europe and into Egypt. Nearly every dwelling had a wall loom. By 4000 BC, Hungary remained a textile innovation hub, adding bags and baskets, as well as woven pattern designs like stripes, checks, triangles, and fancy edges. Weaving had gone beyond function and utility to an item pleasing to the eye.



[Greek vase, ca. 560 B.C., Metropolitan Museum of Art]

In the late Bronze Age, back around 800 B.C., the Celts were residing in today's Austria, southern Germany and Hungary, attracted by the salt and metal ore mines. This was the beginning of the Hallstatt culture. In addition to mining and trade, they were already gifted weavers, creating early twill textiles. This population later

fanned out westward into Europe and Britain, taking their mining and textile skills with them.

While colored threads show up around 4000 BC, colored cloth and intricate woven patterns of spirals, hearts, and lozenges first appeared on textiles from the island of Myrtos and Crete in about 2000 BC. resulting in regional folk costumes.

In Mediterranean countries, pottery bowls appear with a loop in the base of the bowl. Research has shown that these are linen-wetting bowls, with the loop being used as a guide for the fibers.



[Rosicrucian Museum, San Jose, CA]

Sprang also appears to surface in the Bronze Age, similar to netting and predating knitting. The oldest surviving piece, found in a Norwegian bog, dates to about 1400 BC. Worked on a rectangular frame, the warp threads are manipulated by interlinking, like children's Cat's Cradle.



[Wikipedia]

Early on, fibers were combed, with carding only making an appearance in the Middle Ages, using teasels set on boards. Flax, hemp and nettle were the primary bast fibers used, using streams for retting. Tools such as brakes to beat the stems

and hackles have been uncovered in Swiss lakebeds, giving evidence of skill in processing the fibers.

By inspecting various Bronze Age woven pieces that have survived, it is apparent that women helped each other with their weaving, evidenced by textiles with crossed threads and row shifts. Women are still working in pairs on warp-weighted looms in Scandinavia.

About 8000 years ago, nomads began to domesticate and raise sheep for both fiber and meat.

Spinning wheels make their first appearance in the early Middle Ages, possibly inspired by travelers to China or India, and drop spindling became an away-from-home endeavor, while heavier production spinning occurred in the home on spinning wheels. Home textile production came into full swing, with each cottage creating its own threads and yarn. It was estimated that 10 hours of spinning production would be consumed in one hour of weaving. In order to keep the weaver supplied, spinning of one sort or another occupied any spare time a household member had, usually the women.

MEDIEVAL ESTATES

As medieval times approached, towns became built up and demand for textiles both utilitarian and fancy began to outpace supplies. The Black Death altered social structures both in rural areas and towns. Crafts and tradespeople – usually men -- began to set up shops in towns. As the towns grew, business-specific districts would evolve, known as medieval estates or guilds. While men pursued the other trades, frequently women were still weavers and dyers, even within the guilds. These guilds were both professional organizations and social groups, too. The entire community of a specific trade such as weavers would be embraced and protected – the professional as well as their family members, even educating the children of guild members. In addition to security, there were codes, rules, secrecy and regulations bound up in these guilds and they became very powerful politically and socially. Guilds ruled the European textile trade from about the 13th to 18th centuries.



Coat of Arms Wool Weavers Guild, Italy [Wikipedia]

For the weaver guilds, specific drafts or patterns were developed within each guild and these drafts were closely guarded, handed down from generation to generation. By the end of the 18th century, the guilds fell out of favor and the trades became more independent.

THE COLONIAL CRAFTSMEN AND WOMEN

I grew up in southeastern Pennsylvania, right in the heart of Colonial America. Think Betsy Ross, the Liberty Bell, Independence Hall and Ben Franklin.

As Europeans immigrated to Colonial America beginning in the late 1600's, many were drawn to Pennsylvania, keen to take part in William Penn's Great Experiment based on ideas of equality and tolerance, public good, private enterprise and religious freedom. By coincidence, Penn's community attracted not only farmers, but many skilled artisans to the new colony, bringing their skills and knowledge to the new land. Huguenots fleeing religious persecution in France; Anabaptist-Mennonites from Switzerland, Germany and the low counties; as well as Moravians, and Schwenkfelders from Germany and Silesia came to Penn's Woods, liked what they saw, and stayed on.

The Shaker movement emigrated from England right before the Revolution and took up residence further north in New England, where they crafted simple clean-lined furniture, weavings, and basketry.

Pennsylvania was also attractive to loyalists of King Louis XVI and Marie Antoinette escaping the bloody revolution, and the small planned town of French Azilum was

created along the Susquehanna River. Originally intended for Marie Antoinette and her followers, Marie never arrived, facing the guillotine instead. Most of the refugees returned to France when Napoleon Bonaparte came into power and offered repatriation. The Queen's Azilum is now a museum with some lovely period coverlets and textiles.



French Azilum, Towanda, PA, [C Koos, 2012]

Often, to save packing space when coming to the colonies, women immigrants would only bring the flyer and maiden assembly of their spinning wheel, knowing that colonial woodworking craftsmen could reproduce the wheel, table and footman assembly once they arrived in the new land.

In a sense, due to their isolation from Europe, the new colonists went back in time to textile production in the home rather than in the towns, spinning fiber during every spare moment and building immense timbered frame looms in the home. Then as towns built up and sprawled out, these timber frame looms evolved into a more commercial use, with spinners delivering their yarns to be woven into household goods and lengths of cloth that would in turn be sewn into garments back at home.



ca. 1840 Barn Frame Loom, Orwell, PA [C Koos, 2012]

Then as the colonies increased in population, Britain began importing almost all the cloth used by the colonists. Soon, Britain disallowed any wool cloth production in the colonies, in an effort to salvage their wool cloth industry in England. Raw wool produced in the colonies was exported to Britain, spun and woven into cloth, and then exported back to the colonies for sale.

There is some contradiction between informants as to how prevalent itinerant weavers were in the colonial era, as well as contradictions on other aspects of colonial textile production. By the 18th century, some women still wove at home, but weaving was becoming a male professional trade, with boys apprenticing at a young age. According to Les Spencer of the Home Textile Tool Museum (HTTM) in Orwell, Pennsylvania, there was a contingent of men who were itinerant weavers, dismantling their looms and hauling them in wagons from farm to farm, village to village, staying with a family for several weeks while weaving goods for the household.

However, later interviews I conducted with both Marjie Thompson, of Complex Weavers, and Bob Woods of the Goschenhoppen Historians Museum (GHM) in Green Lane, Pennsylvania, contradict the itinerant nature of the trade. Thompson and Woods concurred that men became the primary weavers in the professional trade, but very little was done on an itinerant basis in southeast Pennsylvania partly because there were more villages, but mainly because of the difficulty in dismantling these large looms with their massive beams. Both informants state that weaving became a village trade and local folk would bring their home-spun yarns to the weaver.

Further research at the library of the Pennsylvania German Cultural Heritage Center at Kutztown University reflects both itinerant and village-based weaving businesses. It is possible that a small contingent of itinerants served those homesteading pioneers who moved further west. The pioneer women would still weave their basic household textiles, but the itinerant weaver, often professionally trained in Europe, would come with his multi-harness or draw loom, his book of samples and fancy patterns. After poring over the choices, the weaver would settle in “for the season” and create coverlets and other fancy textiles with names, dates and pictorial designs. There is much contradiction, and this deserves further investigation.

Village-based weaving shops increased as the population and demand for textiles increased. To help fulfill this increased demand, shopkeepers took advantage of the wave of indentured white servants coming to the colonies. Unable to pay their own

way but desiring a life in the colonies, many young men and some women had their fare paid by shopkeepers, tradesmen and farmers, and in exchange they worked off their passage for a set number of years.

Well known for carrying on their grandparents' early 1800s weaving business are the Weaver Roses of Rhode Island. William (1839 – 1913) and his sister Elsie collected and used almost 250 old drafts – many recorded on scraps of paper and even pieces of wood. During the arts and crafts revival, Marguerite Davison of southeastern Pennsylvania subsequently collected many of Roses' drafts and salvaged other early American drafts and published them in 1944 in an effort to keep these drafts from vanishing along with the old weavers. Davison's book, [A Handweaver's Pattern Book](#) [Marguerite P. Davison, Publisher, Chadds Ford, PA] is still the go-to reference for Colonial drafts.

Fiber dyeing later moved away from the households and the village weaver would also do most of the dyeing. According to the Les Spencer (HTTM), indigo was likely imported, but the source of madder is unclear. Colonial Williamsburg contradicts that assertion, stating indigo came from the Carolinas. During early colonial days, in addition to wild plants harvested for dye, colonial and pioneer households grew patches of woad, bulls blood beets, onions, and coreopsis. Bob Woods (GHM) tells us that red would not have been in local use in southeastern Pennsylvania. More likely colors would have been blues, browns and greens. This lack of red may have been a cultural choice or a lack of available dye stuff.

BAST AND ANIMAL FIBERS

Nettles were heavily used by the earliest Neolithic weavers and spinners of cordage, but by the time the colonists began to settle America, there were other bast fibers that were easier to grow and use, such as flax and hemp.

While dogbane is another bast fiber producer, it was generally only used as a last resort by early settlers because of its toxicity to livestock. Dogbane's biggest users were the Native People.

Hemp was a critical fiber crop in the colonies, grown from New England down into Maryland. Every colonial household had a hemp patch in addition to their flax fields. Used mainly for coarser fibers, hemp was turned into rope, sails and caulking for ships and farms. Britain required its colonies to grow hemp and British ships carried hemp seed with them in order to have hemp available for repairs all over the

world. With care, hemp was also spun and woven into finer cloth and sources tell us that the first American flags were made from the strongest fiber available: hemp.

In an effort to reduce the need to import silk from Asia, early attempts at silk cultivation in Virginia failed – silk was a more difficult, while tobacco was easier and netted more profit. So even though King James I tried to compel the plantations to cultivate mulberry trees, tobacco prevailed. Silk production in Georgia gave way to King Cotton by the mid-1750s. Other attempts in the Carolinas, Pennsylvania, and New England produced novelty quantities at best.

In addition to hemp, flax became the staple bast fiber in the colonies. Each household grew sufficient flax to net enough fiber for the family, generally about ¼ acre per household member. The Home Textile Museum stated that flax was only processed by the men, but Goschenhoppen staff stated that flax preparation was a family affair, each member having a role in the processing.

Colonists processed flax into linen as had their ancestors in Europe, Britain and Ireland. Seeds were planted close together in early spring, lightly raked and then harvested about a month after flowering. The entire plant was pulled for harvesting in order to maximize fiber length. The stalks were grasped by the handful and ripped or pulled through a threshing tool to remove the seeds. Seeds were saved for next year's crop, cattle feed, and pressed for linseed oil. Then the stalks were left to ret or rot – either using dew in the field for a month or submerging the stalks in a stream or shallow pond for up to two weeks.



Home Textile Tool Museum, Orwell, PA [C Koos, 2012]

Once thoroughly retted and dried, the stalks were first beat with a flail, and then placed in a wooden brake machine to further break up the wood outer stalk. From there, a wood scutching knife was used to further peel away or knock off the outer stalk, revealing the fibers inside.

The next tool was the heckle, hetchell or hackle – a wood base with a bed of long, sharp spikes protruding. A handful of fiber was drawn through the spikes multiple times to further clean the fibers of woody stalk and orient the strands. Several hackles would be used progressing from a coarse spacing to a closer spacing of spikes, thoroughly cleaning and orienting the longer linen fibers from the shorter tow fibers. Tow was used for coarser woven cloth or for stuff items. Tow fabric was differentiated from linen by ends per inch.



Wedding gift, dated 1766, Goschenhoppen Historians Folk Life Museum, Green Lane, Pennsylvania [C Koos, 2012]

Cotton from the South flooded the markets in the early 1800s and flax production dropped off because cotton production used cheaper slave labor. Then the Civil War halted cotton production and flax surged again. By the late 1800s with the end of the war, cotton has once again taken over and large-scale flax production completely died off.

Other than silk, the only animal fiber used in colonial times was wool. According to an interview of members of the Liberty Bell Encampment at the Rising Sun Inn, during colonial times sheep were sheared and raw wool shipped to England for processing and return as whole cloth, thus discouraging the colonial weaving industry and making the colonies more dependent on England. While many textiles were imported from England and other European countries to the colonies, once the Revolutionary War erupted, all textiles were produced in America.

During the Revolution, British warships lay just off the coast, effectively cutting off any cargo coming from France, Spain and other sympathizers. The need for cloth and thread for uniforms was so great that tailoring shortcuts were employed.

Woolen cloth was woven at 16 ends per inch rather than 24 or 32. False cuffs, false welt pockets and shorter coats required less fabric, so colonial weavers and tailors could produce more uniforms with less cloth. Many colonists began to weave again, as it was considered their patriotic duty.

LOOMS OF THE PRE-INDUSTRIAL COLONIES

In visits to various textile and colonial history museums, I was reminded over and over again that weaving looms have really not changed that much since those Bronze Age backstrap, post, and warp-weighted looms. Weavers way back in time knew that tension had to be placed on warp threads and used pretty ingenious methods to achieve that tension – posts, clay weights, even their own toes. Eventually these weights were replaced by back beams to keep the warp under tension.

Even yet today, we still weave by lifting one or more tensioned warp threads, inserting a weft thread and repeating to produce a cloth matrix.

Heavy, dense hardwood was and still is the material of choice for construction. Breast beam, warp beam, beater, lamm, heddles, reed. A weaver of today could sit down at a Bronze Age loom and have it warped and operational in no time. And their Bronze Age counterparts would immediately recognize the working parts of a contemporary loom.

At the Home Textile Tool Museum, there was a vast collection of American-made looms dating as far back as 1805 and another loom undated but estimated to be late 1700s. Mr. Spencer related that the Ralphs, now deceased, original founders of HTTM would often return home from town to find a pile of old loom parts stacked on their front porch – no note attached. Mr. Ralph was well known for his skill in repairing and reproducing missing parts on spinning wheels, looms, and old textile tools. The aforementioned pile of parts actually netted several frame looms.



Home Textile Tool Museum: Southeastern Pennsylvania German Linen Loom, 2-shaft, ca. 1805 [C Koos, 2012]



Close-up detail of upper beams with date inscribed [C Koos, 2012]

Colonial era looms were commonly 2- or 4-shaft, counter-balanced barn frame looms, built of immense pegged timbers; and usually of such a size that the weaver sat inside the loom frame with the weaver's bench an integral part of the framework. Because of the size, the loom often dominated the room or was relegated to the loft or the barn. In Ireland, England and Europe, weavers often built the cottage around the loom, frequently excavating the floor to accommodate the treadles.

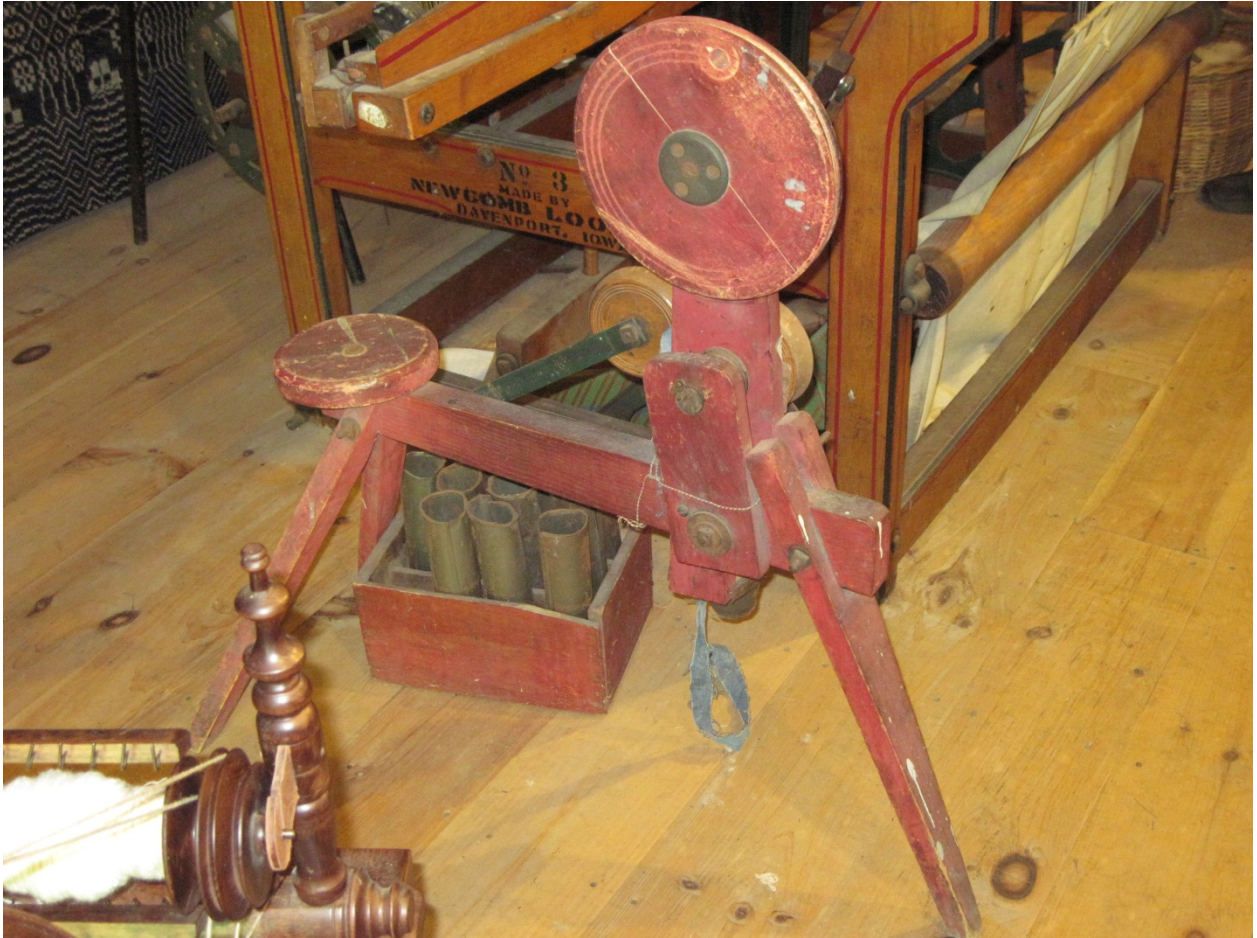
While the colonial home weavers used counter-balanced frame looms, it is likely that the village and itinerant weavers probably utilized drawlooms capable of more complex pattern weaving. The village weavers, especially, were usually professionally trained in Europe and would have been more likely to have the draw

loom equipment and skills. Dobby looms arrived on the scene around 1843, but drawlooms were common from around 1400.

Amongst the collection at HTTM is a Newcomb Commercial Rug Loom, dated 1870 from Davenport, Iowa. This was a popular loom for a very short period of time. The weaver activated the spring action shuttle with a foot pedal. Using child labor, the child would cut cloth strips for the rug and place the strips in a tube, which were handed off to the weaver. The spring-action of the shuttle was often unpredictable, frequently seriously injuring or killing the child assistant. Because of this, the loom quickly fell out of favor.



Newcomb Loom, Home Textile Tool Museum, Orwell Pennsylvania [C Koos, 2012]



Close-up Newcomb Loom, rag cutting tool, paper tubes to convey rags to weaver – Home Textile Tool Museum, Orwell, Pennsylvania [C Koos, 2012]

I was told that all the textiles on display at the HTTM could have been made with a loom at the museum; however, there are Jacquard coverlets displayed but no Jacquard looms. Jacquard looms, invented in 1801, arrived in America around 1830. Using a series of punched paper cards, this invention expanded a weaver's ability to create complex weave structures. The example in this photo is from the Irish Linen Center in Lisburn, Northern Ireland. It is still in use and the weavers frequently create fancy linens for Queen Elizabeth's household.

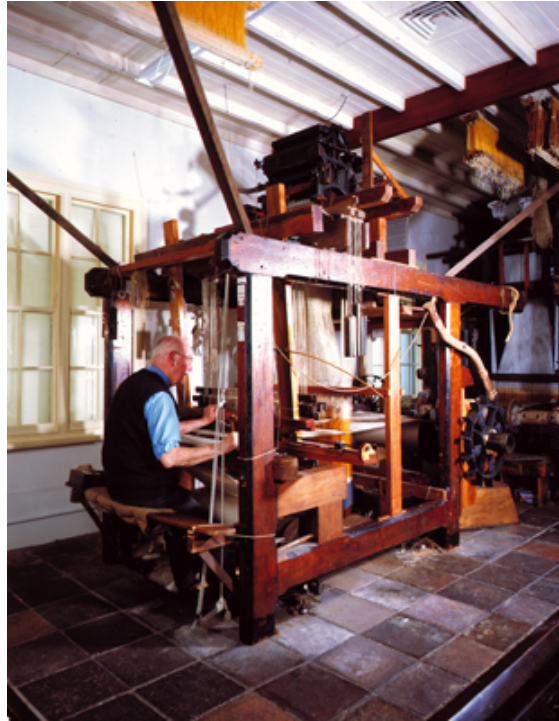


photo courtesy Irish Linen Center, Lisburn, Northern Ireland

Small tape looms wove tapes for a vast assortment of household and farm needs such as waistbands, hats, and garters. Weaving tapes was labor intensive and so used for higher value, longer use items and not for grain or seed bag closures. Tape looms were used to create a variety of colorful patterns and were generally used by the children.



Tape Loom, Goschenhoppen Historians Folk Life Museum [C Koos, 2012]

While the Industrial Revolution occurred between 1820 and 1840, many later immigrants coming to America brought pre-Industrial skills with them. My father, now 91, grew up in Daisytown, a coal patch of western Pennsylvania. Coal patches were impoverished company towns where the homes were generally tar paper shacks. Most of the miners, including my grandparents, were recent immigrants from Slovakia, Hungary and other eastern European counties. One of 11 children, Dad remembers Grandma scrubbing the bare wood floors on mornings so cold that the scrub water frozen on the floors.

To warm the floors in these houses in the 1920s, the women of the community would gather and make rugs. Using a huge rigid heddle similar to one used on an Appalachian barn loom, they would fasten the warp threads to adjoining porch railings, stretching the warp the distance between the houses. Some women cut cloth strips for the rugs and others rolled the strips into balls. Operating the heddle was a two-woman operation and a third rolled the ball of weft strips down the shed. In this way, the women wove communally as they had in old times, sharing the labor and providing a social outlet.



photo courtesy [A Daisy of a Town](#)

SPINNING WHEELS

Investigation of spinning wheels produced the most variety. With looms and flax tools in the large barns, the Home Textile Tool Museum devotes the entire downstairs of their 1823 Federal-era home to a vast array of spinning devices, and most of the wheels are still in working order. Unusual in the collection was the pendulum wheel – a uniquely American invention.



Pendulum Wheel, 1864 Wisconsin, Home Textile Tool Museum, Orwell, PA [C Koos, 2012]

The gossip wheel had two spindles with a common wheel in the middle and two seats; spinners sat on either side of the wheel facing each other. A lot of coordination and similar spinning style and ability was required for two people to successfully spin.



Gossip Wheel, Home Textile Tool Museum, Orwell, Pennsylvania [C Koos Breazeal, 2012]

Another wheel with a sad story was the two-handed wheel. So named, according to HTTM docent Les Spencer, because these wheels were employed by children in orphanages. The child's spinning production could be doubled if he or she spun with both hands, each hand feeding fiber into the two spindles. The acceleration wheel was cast iron, giving the tool both added weight and longevity.



Dual Spindle Flax Wheel (left and middle), New England 1790; Home Textile Tool Museum, Orwell, PA [C Koos, 2012]

There were novelty wheels, also, such as this spinning wheel chair. According to HTTM, it was pegged together as a chair, easily dismantled and could be put back together as a spinning wheel. However, an article in Yankee Magazine contradicts that statement, saying that at the advent of the Industrial Revolution, old wheels were made into chairs solely for the novelty of being a chair as well as a desire to connect with America's Puritan past.



Chair Wheel, Home Textile Tool Museum, Orwell, Pennsylvania [C Koos, 2012]

At the Goschenhoppen Museum, their spinning wheel collection reflects the more conservative “Plain Dutch” population with minimal decorations on the wheels. However, only 30 to 40 miles further north in the “Fancy Dutch” Reading area the spinning wheels were quite colorful and decorative. In this picture note the uncommon support strut extending from the wheel to the leg. This wheel is signed “Sellers,” likely from a wheelmaker in the Sellersville area.



Goschenhoppem Historians Folk Life Museum [C Koos, 2012]

OTHER TEXTILE TOOLS

Pegged boards of one sort or another to measure out warp have been in continuous use for millennia. Relative recent innovative tools for measuring range from niddy noddys to click or clock wheels to warping wheels.

Farmers have always needed hats to protect themselves from the sun, so they began braiding the cast-off stalks from rye grain production. Needing to flatten those braids uniformly to make the hats, a braid crusher was developed. Displayed at the Goschenhoppem Historians Museum was a braid crushing device that is still in use during their summer reenactment events. The two styles displayed, a man's and a lady's hat, are styles still used today.

HTTM had one early colonial loom reed on display that was made with actual reeds, held in place with pitch. As more metalwork was produced in the colonies, the reeds were replaced with iron.



Goschenhoppen Historians Folk Life Museum [C Koos, 2012]

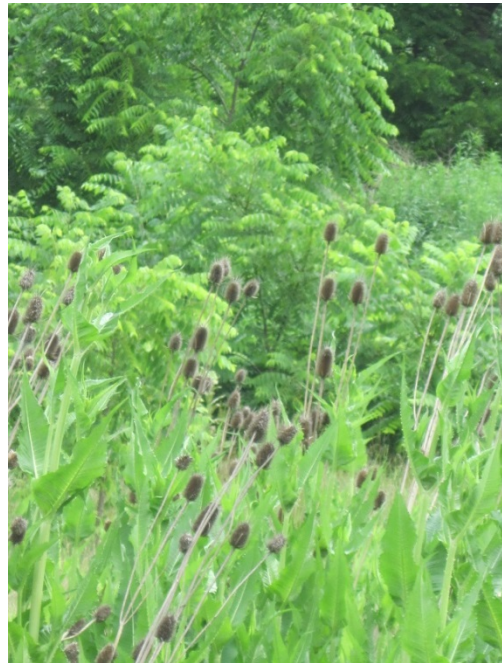
This click or clock wheel measures a capacity of 300 yards. Most commonly, these wheels measured increments of two yards, some with a variant of 2.5 yards. This particular clock wheel has a knuckle on one arm that flips and bends over to allow the yarn to slip off the wheel.

Hatchels or hackles for processing linen were considered a valuable enough tool that they were often given as an engagement or wedding gift. In the Goschenhoppen Folk Museum collection are several with dates and initials embossed, signifying a wedding gift.



Goschenhoppen Historians [C Koos, 2012]

Fullers Teasel (*Dipsacus fullonum sativus*) was brought from Europe where it had been used for centuries as an early carding tool. Used until the late 1880s, it is now considered an invasive species. Hand carding tools were first made using teasels attached to wood, then wire teeth were developed in the latter half of the 19th century. Larger scale drum carders were developed early by the mid-1700s.



Roadside teasel patch near Orwell, PA
[C Koos, 2012]

HOUSEHOLD TEXTILES

Clothing needs were simple in the colonies. Women wore a plain linen shift under their outer wear and that same garment served as sleep attire.

As the colonies became more settled and weaving went beyond the basic necessities, overshot coverlets came to replace the common feather ticking as a bed topper. As today, the coverlet and pillow cases would match.



Show Towel, Goschenhoppen Historians Folk Life Museum
[C Koos Breazeal, 2012]

Much like the fancy finger towels we haul out of the closet during the holidays, show towels or handtucher were another fancy household item where the housewife could display her textile skills. Usually hung on the back of the door of the stove room, these towels were woven in linen and then either worked in embroidery, often in turkey red, or other needlework techniques such as hardanger or pulled thread, and fringed with thrums from the weaver.

Tow grain bags were important to the farmer. Woven either long and narrow, then folded and seamed; or woven wide-wise, folded and seamed. Because the farmer wanted to ensure his grain came back from the mill, the bags were stenciled simply with the farmer's initials and sometimes included more fanciful designs like leaves or flowers.

Early settlers covered their beds with simple woven bed rugs – a duvet-like bed cover which was filled with down. Coverlets began to appear in the 1760s and continued to be popular through the early 1900s. Coverlets were produced using a multi-shaft loom or a loom controlled with a loom head in order to produce figures and fancy patterns similar to patterns later produced by Jacquard looms.



Homespun linen garments and bed linens
Goschenhoppen Historians Folk Life Museum
[C Koos, 2012]

IN CONCLUSION...

There is so much more to find out, that I believe I shall be on this journey for quite some time. But then again, life is in the journey, not the destination.

CITATIONS

Home Textile Tool Museum, Orwell, Pennsylvania (Les and Jean Spencer)

Goschenhopp Historical Folk Life Museum, Green Lane, Pennsylvania (Paul Woods)

Landis Valley Museum, Lancaster, Pennsylvania

Mercer Museum, Doylestown Pennsylvania

Pennsylvania German Historical Society and Library, Kutztown University, Pennsylvania

The Rising Sun Inn Liberty Bell Guard Reenactors Guild, Telford, Pennsylvania

The French Azilum, Towanda, Pennsylvania

Mennonite Historians of Eastern Pennsylvania, Harleysville, Pennsylvania

Schwenkfelder Library and Heritage Center, Pennsburg, Pennsylvania

Irish Linen Center, Lisburn, Northern Ireland

Stephenie Gaustad and Alden Amos, Jackson, California

Christina Gresh, photo, Irish Linen Center

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http://wiki.answers.com/Q/What_was_the_first_flag_made_out_of

<http://www.textilehistory.org/SilkinAmerica.html>

<http://www.history.org/foundation/journal/winter07/>

Tablet Weaving from Anatolia and the Ottoman Court

Şerife Atlıhan

Marmara University Press

2017

ISBN 978-975-400-404-5

€45; €15 shipping to US

227 pp

Review by Sarah Goslee (www.stringpage.com), February 18, 2019

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 3. Designing
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 7. Summary
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I've been eagerly awaiting this book for several years, in hopes that it provides additional information about the elaborate tablet-woven presentation bands given as gifts by the Ottoman Sultan in the 16th and 17th centuries. Despite the 2017 publication date, it did not become available until late 2018 (or possibly only in English translation), and at that time at least was only available directly from Marmara University. The book is the product of the author's field work in Anatolia, where she discovered tablet weaving and learned the technique, and of her access to the textile collections of the Topkapı Museum and other regional collections.

The hundred-page catalogue, half of the book, is a delight. For each of the forty-nine items featured, it contains a two-page spread with an overview photo of the item, a detailed close-up of the tablet-woven band, and a threading and weaving draft. There is a mix of Anatolian material from recent decades, and Ottoman bands from the 15th -17th centuries (some undated). The Anatolian bands are primarily ram's horn variants and double-faced bands woven on four-holed tablets, often showing signs of hard wear. None of the ram's horn bands are dated before the 17th century. The museum material includes double-faced, brocaded, and warp-twined

bands, woven on four-, six-, or eight-holed tablets. The bands included were used for many purposes: sashes, caftan closures, harness and tack, and edgings on larger textiles. No other source I've seen on Topkapı textiles has detail photos that satisfy the weaver.

There are several band types I haven't seen elsewhere, or in such elaboration. There were bands woven in a double-faced technique that used silk for the obverse (often also brocaded), and a single strand of a heavier cotton for the back, to make a sturdier wear-resistant reverse side. That could be very useful. Many of the museum bands were woven on six-holed tablets, often in a intriguing structure requiring the tablets to be threaded in pairs, with three threads apiece in alternate holes. This produces apparently-complex patterns with minimal effort. I've already begun samples of three of these bands (and in the process discovered an error in one of the pattern charts).

The catalogue includes one of the Uzbeki two-sided tablet-woven velvet bands, and there are several pages of discussion on how these bands were woven. Collingwood suggests several ways in which a tablet-woven velvet could be constructed; Atlıhan states that the method she describes is the one used for the band pictured, but it was unclear what evidence this claim was based on. The method is similar to Collingwood's conclusion, and does make sense. I'm looking forward to trying it.

The historical overview was disappointing. The author makes much of the antiquity of tablet weaving, based on the girdle of Ramses (3000-2000 BCE). However, Collingwood definitely demonstrated that the girdle was not tablet woven. The Museum of Liverpool describes the band as not tablet-woven, and discusses the very interesting structure in more detail (<http://www.liverpoolmuseums.org.uk/wml/collections/antiquities/ancient-egypt/item-299418.aspx>). Atlıhan relies heavily on research published in the early and middle twentieth century, and does not mention any of the newer research on tablet weaving, even those finds that would support the age of the technique, such as the finds from Hallstatt, Austria (1400-1250 BCE; Grömer, 2014), Verucchio, Italy (800-700 BCE; <http://www.tabletweaving.dk/research/reconstructions/verucchio/>), and Hochdorf, Germany (520-530 BCE; <http://www.tabletweaving.dk/research/reconstructions/hochdorf-germany/>).

The ethnographic information and discussion, however, was fascinating. Here Atlıhan is working from her own experience in the field, both talking to weavers and finding woven items from various sources. She discussed tools, techniques, and uses, with many photographs, and provides lists of terms in regional dialects. The general instructional material suffered in translation, I think, but the first-hand accounts of practices observed in Anatolia are quite nice.

Overall, this book was a worthwhile purchase for its specific Turkish information, and for the catalog. The author is not a tablet weaving specialist, and the general material, both historical and technique, reflect her lack of familiarity with current research on the subject, and with the vibrant international community of tablet weavers. The Anatolian information is as far as I know not otherwise available in English, and the catalog contains by far the best close-ups of Topkapı bands that I've seen. The museum information supports my existing research into Ottoman bands nicely, including extending the temporal range of the type of band I'm studying. I would not recommend this book to a new weaver, or to anyone looking for a good global history of the technique, but it is a solid addition to the research library of a devoted tablet weaving researcher, or for anyone interested in detailed information on Turkish textiles.

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Tularosa Diamond Twill Fragment: a window into the past

Lin Bentley Keeling

December 2019

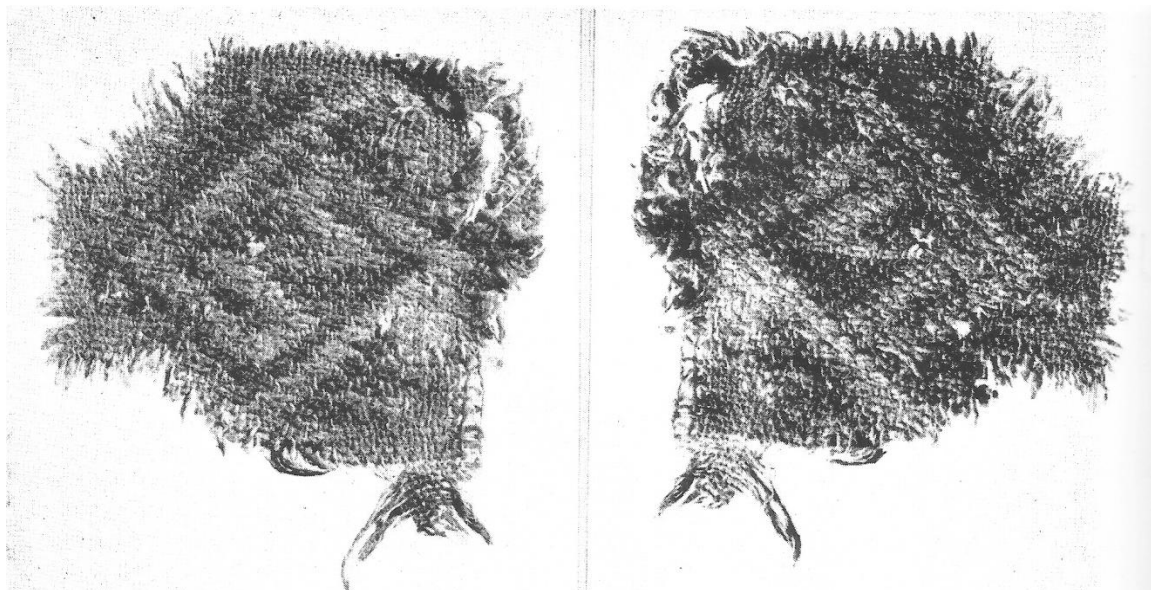
Contribution to Complex Weavers Archaeological Textiles Study Group

In 2012, I became interested in the use of twill in tapestry after reading Clotilde Barrett's, *Boundweave*, in which she discusses briefly the use of the technique for tapestry weaving (1982: 77). I began searching for examples of boundweave tapestry online which led to a search for twill tapestry when I found intriguing examples in Kate Peck Kent's *Prehistoric Textiles of the Southwest*. One in particular caught my eye: an illustration of the design and weave structure of a small cloth fragment from Tularosa Cave in New Mexico (Figure 98 A, Kent 1983: 166-167).

When I first started looking into twill tapestry, I was only interested in finding examples of the twills used for tapestry by different weavers. But, Kent's illustration of this fragment kept coming back to me. It was different because the weave structure of the cloth is plain weave while the motif is created using diamond twill. In 2015, I did a little research about this fragment and presented a lecture and workshop about it.

Now, I am returning to, and attempting to reconstruct, my 2015 research from notes and photocopied images I took at the time, as the starting point for a more in-depth study of this cloth fragment. In this article, I will use my notes and photocopied pages to describe this woven fragment, Kate Peck Kent's analysis of it and my own experiments in 2015 and this year based on Peck's analysis, followed by a brief discussion of some of the future research questions I would like to explore.

The Tularosa Diamond Twill Woven Fragment



Unless otherwise indicated, all images in this article are scanned photocopies from the referenced texts and are included here for educational purposes only. Please do not publicly share this document until proper permissions can be obtained.

The image above is a photocopy I made from Kate Peck Kent's 1957 text, *The Cultivation and Weaving of Cotton in the Prehistoric Southwestern United States*. It shows the front side of the cloth on the left; the back side on the right. From these images, it is clear that the design on the cloth is not brocade or supplementary weft. Kent described the fragment as a four-thread diamond twill. "This is a tapestry weave, with blue, brown, and natural white wefts which interlock at points of contact. The interlocking takes place along the edges of diamonds. Wefts are tied in with square knots when first introduced. Additional lengths of thread added in the midst of a colored section are not tied, however, but overlap for a short distance. The twill design is set into a plain weave cloth. It may have been a unit pattern on a large cloth, or one of a series of design units placed along the border of the cloth, or at the end of a plain weave sash" (Kent 1957: 544-545).

Elaine Bluhm, in her analysis of the textiles found in Tularosa Cave (in Martin et al. 1952: 299), described it as having "a geometric design [...] sawtooth lines and a key of interlocking triangles. ... The design resembles some on the Reserve Black-on-White pottery the original colors were probably blue or green, black and The design was produced by using different-colored weft ... which were interlocked at their common boundary, and varying the under-one-over-one pattern by skipping warps." (The ellipses in this quote are due to the poor quality of the photocopy I have on file.)

In 1983, Kent mentioned the fragment within a discussion of "Regular twill tapestry" (162) as one of six fragments woven using a diamond twill structure with discontinuous interlocking wefts of multiple colors. "Patterns are constructed using the small diamond figures automatically produced by maintaining a regular heddle order as units of measurement or building blocks. Oblique lines are established, for example, by the slanting edges of the diamond."

Kate Peck Kent places the Tularosa Diamond Twill fragment within the Mogollon 5 culture time period, which coincides with the time period of Classic Mimbres culture, 1000 – 1450 AD (Wheat, 1955). I have been unable to discern from my original notes why she places the fragment within Mogollon 5, though she does describe in both texts a potential heddle rigging to create the diamond twill pattern. This, coupled with the presumed arrival of a "true" loom (using heddles) to the region around 1000 AD and the fragment's deposition within the cave are likely reasons for the designation.

Kent described the heddle rig in 1957 (545) as follows:

"The four heddles control the following warp sets:

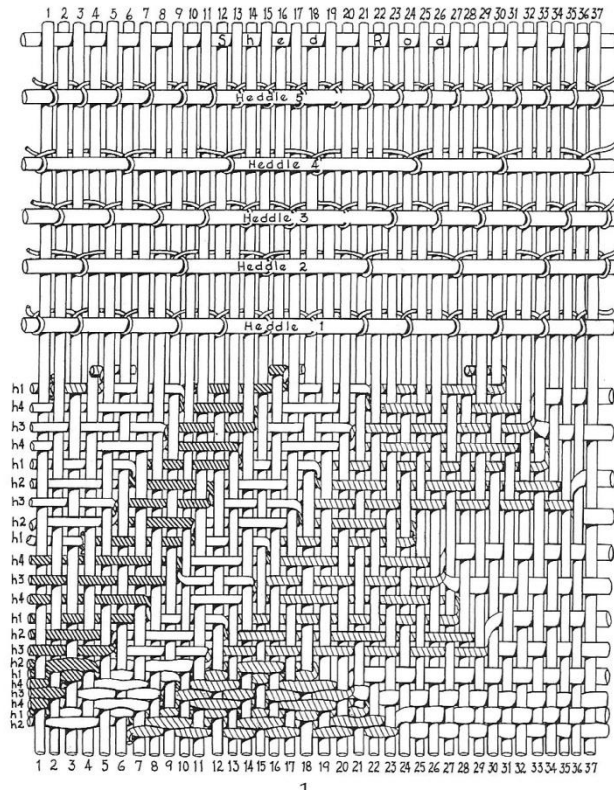
Heddle 4: - 2 3 4 - - - 8 9 10 - - - 14 15 16 - - - 20 21 22

Heddle 3: - - 3 - -6 - -9 - -12 - -15 - -18 - -21 -

Heddle 2: 1 - - - 5 6 7 - - - 11 12 13 - - -17 18 19 - - -

Heddle 1: 1 2 - 4 5 - 7 8 - 10 11 - 13 14 - 16 17 - 19 20 - 22"

In Figure 98A from 1983, she also illustrated these and includes a fifth heddle and shed rod for controlling the plain weave. In this illustration, you can see the way the motif was created using diamond twill.



My experiments based on Kent's analysis

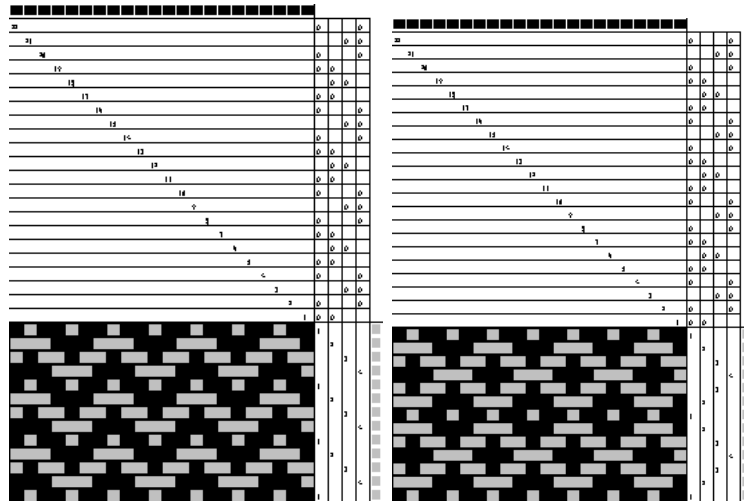
In 2015, I presented a lecture and workshop (Keeling 2015) on this fragment and another fragment in weft-wrap openwork that had been found in Bear Creek Cave, also discussed by Kate Peck Kent (1983). For that project, I created a sample of the weft-wrap fragment on a frame loom using a needle, and then tried creating the diamond twill of the Tularosa fragment on the same cloth.



I had no difficulty creating the diamond twill with just a needle and thread. Kent mentioned “bits of cotton thread from Tularosa Cave [where this diamond twill fragment was found] in levels that dated from 300 BC to AD 500. There is

no evidence the plant was grown by the Mogollon in those early years (Haury 1976:302; Martin et al. 1952:207)” (Kent 1983:28). I wondered at the time whether this fragment was necessarily created using what she called a “true” loom, which didn’t appear in the region until around AD 1000.

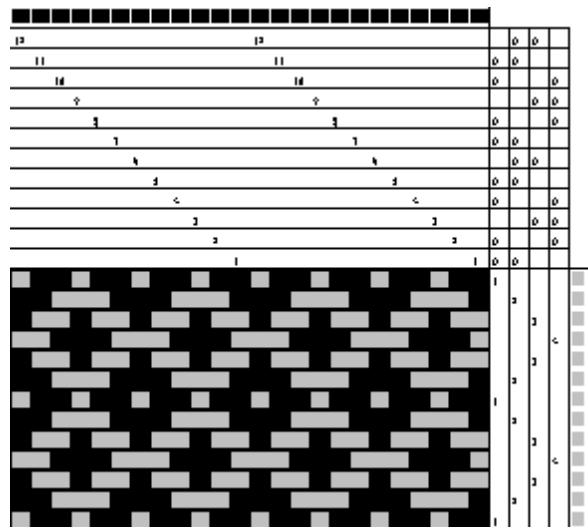
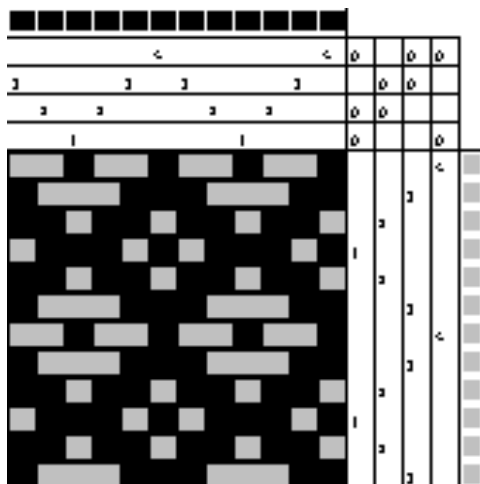
For this paper, I worked on understanding the heddle rig Kent proposed in both 1957 and 1983. Using graph paper then weaving draft software (iWeaveIt), I discovered that the diamond twill in the



Tularosa fragment is not a four-thread twill, as described by Kent, but an interleaved twill on opposites of 2/1, 1/2 alternating with 3/1, 1/3. So, we have a 3-thread twill alternating with a 4-thread twill. Here is the draft using the 22 threads Kent used in her 1957 discussion of the twill, in a straight and then point draft which results in the diamond twill found in the fragment and in my needle woven sample.

I then reduced the diamond twill to a 12 thread repeat which results in a manageable draft that could easily be remembered with practice.

This is not a diamond twill in the usual sense in which point twill is used in the threading and treadling. Instead, there are two sets of interlocking diamonds as seen in bird’s eye twill.



The Tularosa draft is similar, but not the same as a bird’s eye draft, shown at left.

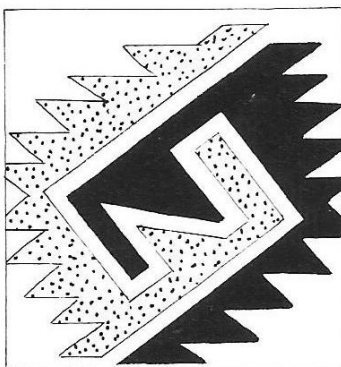
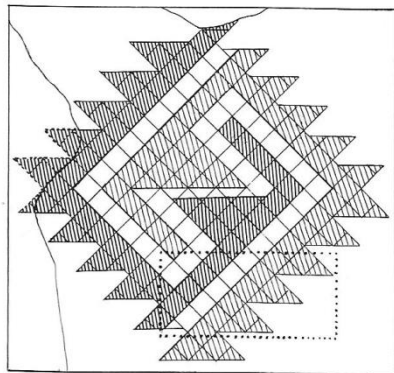
Future research questions and lines of inquiry to pursue

When I first discovered Kate Peck Kent's research and this diamond twill fragment, I was primarily interested in how twill had been used for tapestry by others. In 2015, as I began exploring the context of this fragment more closely, I became interested in how it fit in with my previous work studying basketry in the Greater Southwest region. My next step will be to return to the sources I consulted then and expand my research to more fully understand the way this cloth was constructed and learn more about the culture in which it was created and used. Here are some of the questions I am interested in:

The discovery that the diamond twill is interleaved, coupled with the interlocking nature of the plain weave and twill in each pick suggests a skilled weaver. Kent says that the plain weave and twill threads interlock where they contact each other in the pick (1957: 544-545). How often do they interlock and where? How difficult would this be to weave with a needle versus with a loom with heddles? Is this weave structure used in any other cloth or basketry in this region? Or elsewhere? Why would a weaver use such a complicated approach to this fabric? Why not weave the entire cloth in 2/2 twill, which might facilitate weaving of the motif just as well? Is the interleaved twill significant in some way?

Are there any known examples of twill basketry with the same diamond twill patterning? It seems likely to me that basketweavers would be the natural individuals to take up cloth weaving when it was either independently discovered or introduced to the region and that they would naturally adapt their skill sets to a new medium. Yucca was a common basketry material. The fragment reminded me of diagonal twill basketry, which is prevalent in this region of the Greater Southwest. Kate Peck Kent discussed yucca fibers found in archaeological contexts which were very similar to cotton in texture and fineness (1983:20). Can a connection between the two technologies in this region be established?

Bluhm in Martin et al 1952 said the design reminded her of Reserve black-on-white pottery. How frequently is this design found within the known artifacts from the region? Is it found elsewhere? Did it hold significance within the culture or was it simply a preferred aesthetic pattern?



The design on the fragment, diagrammed by Kent in 1983 (Figures 98A and 134C) and an example of Reserve Black-on-White pottery designs from the same region.

Finding clearer images of the fragment would facilitate a better understanding of its construction. I have tried to enhance the images I have using Photoshop without success. Are all the threads the same grist and twist? In the images, the dyed motif threads look thicker than the undyed, plain weave sections. Are the dyed threads thicker than the undyed threads? I know I must have seen the dimensions of the fragment, but do not have that information in my notes. Knowing its size would help to determine the threads per inch in the weave. Are they all plied or singles? Are they cotton or possibly yucca? Examining the fragment itself would be even more helpful. It should be at the Field Museum in Chicago where the artifacts and other data from Paul S Martin's expedition to Tularosa Cave in 1952 are housed. I will try to access these archives and get better images and possibly arrange to see the fragment in person at some future date.

As you can see, many questions remain to be explored. And, others will probably suggest themselves as I continue my research. Some of them may be unanswerable, but they suggest lines of inquiry. I have a long way to go with this research and look forward to sharing what I find with all of you.

Thank you for this opportunity to share what I learn.

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Gashkibidaaganag: Ojibwe Bandolier Bags

by Linda Pocan Laffler

We all have things that we treasure, that give us remembrance, reassurance, status or identity.

We value these items highly.

Sadly, however, treasured objects sometimes fall victim to evil. Native people of this continent have had much taken from them, in the worst ways. Anger over stolen objects almost pales beside stolen and nearly destroyed lifestyles, histories and entire cultures. Genocide against native peoples was practiced throughout North and South America in the last few centuries, encouraged by land-hungry settlers and immigrants, and condoned by newly created governments pursuing economic growth as the expense of ethics.

We cherish ancestral European historic districts, log cabin lifestyles and our various cultural roots. Yet, seldom do we seek to experience or archive or recreate or preserve actual Native American ancient lifestyles, which blossomed originally on the continent. The Ojibweg, known as Ojibwe/Ojibwa/Ojibway/Chippewa/Saulteaux are an Anishinaabe people of Canada and the United States, residing in the North American Great Lakes vicinity and American West, and are one of the most numerous indigenous peoples north of the Rio Grande. For centuries they treasured their bandolier bags, which they created, and imbued with religious and cultural significance.

Who are the Ojibweg, the people who endured for thousands of years where we now live? White historians think these ancient people crossed the Bering Land Bridge (from what is now Asia to Alaska) an estimated 20,000 years ago and then migrated south to establish their new homelands

on the US east coast and then what is now southern Canada and the Great Lakes area, dwelling successfully for 12,000 years according to collective tribal memory, before being victimized by greedy European immigrants. However, Louise Erdrich explains in her book “Books and Islands in Ojibwe Country” that the tribe believes that they have lived in the Lake of the Woods in Ontario and Minnesota forever. Their basis for this conviction is “mazinibaganjigan, or dental pictographs made on birchbark, perhaps the first books made in North America..... 2000 B.C. is only the date of the oldest archaeological evidence found in the area.” Ojibwe believe they did not cross the land bridge, instead resided in this area originally. They moved around the area seasonally, due to warfare with other tribes and then with incursion of whites. The Ojibwe language, Ojibwemowin, is based on pictographs like the ancient markings on the landscape, which can still be understood by native speakers. Ojibwemowin is entered in the Guinness Book of World Records as one of the most difficult languages to learn, Erdrich also notes. “The great hurdle to learning resides in the manifold use of verbs- a stammer-inducing complex. Two thirds of the words are verbs, and for each verb there are countless forms. It is a language of action and human relationships.” It is still widely spoken, although the number of fluent speakers has declined sharply, and currently elders are the fluent speakers. Since the early 21st century there is a growing movement to revitalize the language, and restore its strength as a central part of Ojibwe culture, according to Wikipedia.

Carefully, through the care and foresight of the Ojibway people, a material object/icon that represents tribal honor and displays a badge of esteemed office has survived the ravages of time and oppression. Bandolier bags date back over 1,000 years according to cumulative tribal memory and have been long admired and sought by other tribes and Europeans. A vaguely

similar circumstance has occurred with Navajo blankets/rugs, in terms of trading value over time. Today gashkibidaagan are rare, and perhaps luckily found at high end art auctions, displayed in museums and private collections, and of course, carefully collected and preserved by the Ojibweg. They are distinct and beautiful, and each one has a story.

The story of each bag is subtle and layered, constructed by cultural definitions of their physical and spiritual environment. Red, blue, green and white are the colors of the directions, which Louise Erdrich cites in her book “The Round House”. Ojibwemowin is based on ancient symbols and shapes representing the sky, sun, people and animals. Clan affiliations, with drawings, serve as identity markers for individuals, direct and define their actions and life styles. Medicinal plants can refer to illness, location, history, health.... Thus, the design that a non-Ojibwe sees on a bandolier bag probably has no resemblance to what is being communicated to a tribal member. Incorporating all this symbolism in designs, apparent simplicity belies depths of complexity.

Gashkibidaaganag is the Ojibwe name for bandolier bags. According to Michael G. Johnson in his book “Ojibwa People of Forests and Plains”, they were also known as friendship bags, often given away at tribal and intertribal gatherings. He speculates that they were modeled after the 18th century colonial soldiers’ bullet pouches, and decorated with quillwork and later, beads, becoming an item of ceremonial dress worn first by man and later by some women also. However, he thinks it is likely that non-Indians began using this term because gashkibidaaganag are worn similarly to military ammunition bags from as early as the 16th century, which had the strap over one shoulder and pocket resting on the opposite hip. Ojibwe bags never had any association with weapons.” According to Ojibwe belief, they were anciently used to gather life

saving medicinal plants. The bag strap crosses over a person's heart so that good intentions go into the bags to symbolically empower the wearer, and by custom the bags do not leave the tribal community unintentionally.

Sometimes a bag is sold to raise money for an important purpose. Erdrich's character, Nanapush, in her book "Tracks" sells his 'beaded bandolier bag' to raise cash to retain their land. Nanapush is wise in his idiocy, an enduring old man who refused to betray his mother, Akiwe, Earth Woman, when the tribe was starving in winter, having been forced onto reservation. In Ojibwe mythology Nanapush carries out the wishes of the Great Spirit, Kitche Manitou.

Anderson says "No one knows when American Indians, and more specifically the Ojibwe of Minnesota, first began creating gashkibidaaganag. Eastern tribes made utility bags before Columbus arrived in 1492 and in the Minnesota region they predate French traders in the 1720's." (However, French traders were in Green Bay, Wisconsin, in the 1600s, so perhaps documentation is lacking.) "Smaller related bag forms with straps, decorated originally with quillwork bands and later with glass beads, existed among the Ojibwe, Dakota, Delaware, Creek, Micmac, Meskwaki, Potawatomi, Montagnais, Seminole and other Woodland Indian cultures." These could have evolved into medicinal and then bandolier bags. During their seasonal migrations, the Ojibwe mixed with and traded with many cultures for thousands of years across the continent. The use and trade of copper across the continent proves a large trading network for thousands of years, back to the Hopewell tradition. Exchanges of ideas and information would have contributed to the evolution of the specific gashkibidaaganag structure and purpose.

Designs on the bags typically show medicinal plants, to mirror and honor their woodland environment, which grow in the area of the bag maker. Older bandolier bags also featured the X design representing a thunderbird. Thunderbirds in Ojibwe mythology are giant birds who lived atop Thunder Bay's Mount McKay located on the sacred site Fort William First Nation, overlooking the city and Lake Superior. Thunderbirds are supernatural, powerful Manitous (spirits) and can create rain, wind and violent thunderstorms with their wings and eyes, according to an article published in Northern Wilds Magazine, online. The giant birds protect the Ojibwe, whose mythology says they were created by Nanabozho to fight underwater creatures and protect humans against evil spirits. They arrived in spring and headed south in the fall. As 'spirits of the sky realm', thunderbirds were believed to be links between the spirit and physical world; they are revered and considered sacred.

Other tribes, including the Sioux, Hopi, Lakota and Apache, have different designs which refer to and symbolize their environments and lifestyles. Some tribes make similar bags, but with their own design motifs. The Navaho indicate water by a narrow horizontal zigzag line. Hopi design for mountains is high peaked inverted Vs.

Clans originated from godlike beings in an Eden-like place who came to teach the people the Middle way of life. Clans or 'doodems', form and define the social fabric of Anishinaabe life. Based on animals which are an interwoven necessity and complement in their lives, clans provided identity, purpose, social structure and standing, marital rules and intertribal relations within the tribe. Ancient beliefs defined five tribes, and today six are the accepted framework. The number of clans and their purposes has varied due to circumstances of the tribe. Historically,

William Whipple Warren recorded at least twenty-one Ojibwe doodems/totems in all. Wikipedia explains that currently “The crane and the loon are the chiefs, responsible for over-seeing and leading the people. The fish are the scholars and thinkers and are responsible for solving disputes between the crane and loon. The bear is both the physician and the police. The martins are the warriors. The moose are craftsman and artists. Clans are both a means of acquiring and retaining knowledge for the Anishinaabe. Knowledge gained through experience and interactions with the Spirits and other clan members is passed down and built upon through generations.” Ojibwe communities have a strong history of political and social activism. While Europeans and Asians have maintained class and caste systems to assign individuals places and roles in the larger society, the Anishinaabe mythology created clans for a system of government and division of labor, whose mission is probably more benevolent than their counterparts across the oceans. Ojibwe dealings with the white U.S. government were diplomatic, establishing many treaties over centuries, rather than warfare. Shamefully, provisions of the treaties were often not fulfilled by government agents, who enriched themselves while the Ojibweg starved and died.

The psychology of giving a gift to an esteemed person is interesting. The bags are beautiful and are a labor of love. They represent the tribe’s spiritual health from the earth; thus bestowing that symbol on a person is very meaningful. Everyone in the tribe recognizes this significance, and the wearer is highly respected, making the bag a badge of office, Gashkibidaaganag also have religious significance, representing spiritual health. Traditionally, the Ojibweg were highly superstitious, acknowledging supernatural powers around them and acutely aware of the need to acquire the protection of personal guardian Manitous (spirits) to protect them. Both men and women were expected to have visionary experiences through isolation, fasts and deprivations.

Visions guided their lives, with rituals. The decorations were regarded as imbued with the Manitous guardian power. Hence, the sacred value of the bandolier bags to the tribe. Ruth Landes in *The Ojibwa Woman* writes that “the cultural keystone is individualism”, with pride and shame and personal health being paramount in importance to an Ojibwa person. Visionary understanding of the supernatural was vital. It had to be acquired, developed, and of course, was part of the gift. The Ojibweg sought to understand their world to the extent of the most subtle senses, and dwell in health and harmony with the forces surrounding them.

Native American peoples had vast and complex trade networks. They traveled great distances, had defined routes and bartered. Marcia G. Anderson in “A Bag Worth A Pony” writes “By the 1870’s and 1880’s the bags were in use as a form of currency, exchanged with the Dakota and other Plains nations for a pony. While the bags no longer served this particular form of exchange by the early twentieth century, their symbolic embodiment of status, gratitude, respect and leadership remained.” Anderson quotes Gilfillan’s “Ojibways in Minnesota”: Indian ponies received hard/starvation treatment in winters. Gilfillan explains, “One would wonder that, with the continual hard treatment every winter (when the people themselves had little or no food) and the great numbers that starve, there are any ponies left; but the explanation is that they get a fresh supply of ponies every summer from the Sioux, who abound in ponies. Most of the Ojibway men have their women make quantities of their beautiful bead-work every winter and store it up. When summer comes, the husband carries it to the Sioux country, and brings back as many ponies as he had tobacco pouches (kashkibitagunug). One of the bead-work pouches is the great ornament of an Ojibway, and any person wearing it is considered to be in full dress; it is worth a pony among the Sioux. Thus the stock of horses is every summer replenished. The Ojibways

are not horse Indians; naturally they have no horses, excepting those they get from the Sioux.” Animals were vital to the tribe’s existence, and they tended to live in small groups so hunting, fishing, gathering and preparation of food was very important. Johnson states “Feasts, songs and prayers were addressed to Nahahbozhoo or Nanabush for the gifts of food (game they caught) and failure to make offerings could lead to starvation. The bear was treated with special respect.” The Ojibwe hunted bears, using dogs for assistance.

Longfellow’s “The Song of Hiawatha” in 1855 publicized the Ojibwe culture.

Johnson states that the many bags made in the late 19th century by the southern Ojibwa were first made in woven beadwork. Later with the availability of easily obtainable cloth, appliqué beadwork done by hand, for each bead was sewn onto red or black cloth or velvet, with borders around the lower panels. Some bandoliers at this time even lacked the opening, or had a small slit called a mailbox instead of an attached bag. And some bags had décor that showed X motif which was a symbolized thunderbird, an emblem of the tribe, with religious protection overtones. Gash kibidaaganag have tassels at the bottom, which is a practical finish for weaving but no doubt has symbolic value. The number of tassels varies, as do the designs on the tabs or tassels.

The Ojibweg utilized various types of bags and pouches in their daily life, including panel bags, octopus bags, fire bags, tobacco bags and pipe bags. Fire bag is also another of the many names for gashkibidaaganag. All were decorated with colorful quillwork and later, beadwork, in motifs symbolic of the maker’s intentions. The book “A Bag Worth a Pony” by Marcia G. Anderson

explains that “For generations the Ojibwa of the Great Lakes moved seasonally for trapping, hunting, fishing, berry picking, wild ricing, trading copper which they had mined, and making maple sugar. Their homes were conical-shaped teepees or ‘round houses’ made from ancient mythological instruction when Nanapush sheltered from a winter storm in the carcass of a female buffalo who had given her life to save the starving tribe in winter. Louis Erdrich recounts the story in her book “The Round House”: ‘Your people were brought together by us buffalo once. You knew how to hunt and use us. Your clans gave you laws. You had many rules by which you operated. Rules that respected us and forced you to work together. Now we are gone, but as you once have sheltered in my body, so now you understand. The round house will be my body, the poles my ribs, the fire my heart. It will be the body of your mother and it must be respected the same way. As your mother is intent on her baby’s life, so your people should think of their children.’ (Erdrich’s round house also symbolizes a cherished part of Ojibwe tradition, one that has been somewhat destroyed by whites.)The poles were then covered with bark. Contemporary buildings have wooden shingles, for the same purpose. R. Buckminster Fuller advocated the geodesic dome much later in history, for its strength and utility, but perhaps it was not entirely his idea.

Because they traveled through the year to obtain sufficient food, the Ojibwa developed more portable household items than many other indigenous cultures of North America.... Bands, sashes, belts and bags that could be rolled up for easy transport and storage were practical. Women made bags and containers from tanned leather, from birch bark, from the inner bark of basswood, and from stinging nettle fibers twined into cordage. To decorate these objects, Ojibwe women used porcupine quills, bird quills, moose hair, shells, seeds and other materials available

in nature. Natural pigments and minerals were used originally to dye the quills and sometimes to color areas of the surface material. Eventually women adopted glass beads and other materials they acquired from traders. Landes comments in her book that the original natural dyes outlasted dyes that were later introduced, and were brighter and sustained color better. Porcupines were also part of their diet.

Ancient bags were woven on primitive looms consisting of two poles driven into the ground parallel, the distance apart that would be the width of the bag. Natural fibers were then twined around the poles to make a tube the height of the pouch part of the bag, secured at the bottom, and a strap was added or woven at the top in a specified width on each side and connected. An Ojibwe weaving loom is shown on page 15 of Eric Broudy's "The Book of Looms", referenced from "The American Indian" 1917. The Ojibwa loom is a simple frame loom consisting of two parallel poles on a stand or it could be a frame loom. Free warp twining technique is used to weave the bag. Ojibwa weavers have long been skilled in using the twining technique, which is described on page 57 of Verla Birrell's "The Textile Arts". She discusses Bow Belt looms also, which were built upon the same principle as the bow used with arrows. Structure of the loom: "The warp of this particular loom is stretched between two ends of a bent limb or bow, taking the position of the thong of a regular arrow. The natural spring of the bow holds the warp at a high tension, as weaving progresses and the warp tightens, the flexible bends slightly to adjust to this change of tension. On the early primitive bow looms, pieces of heavy leather called warp spreaders, a little wider than the width of the warp, were fastened at the ends of the bow, The warp yarns were sewed through and stretched between them and thus kept properly spaced for weaving. Sometimes two pieces of birch bark, drilled with as many holes as there were warp

threads, were used instead of the leather strap spreaders. Most of the early bow looms did not have heddles; the weft had to be darned into the warp with a finger, a thorn or a needle”: from page 116 of her book.

For decoration/symbolic intent, porcupine quills, bitten off to small widths, preceded beads to decorate gashkibidaaganag in ancient times, before extensive trade networks were established to procure trade beads. Using porcupine quills for decoration involved a great deal of work to prepare the quills: the quills are plucked from a freshly killed porcupine, soaked in water until pliable, flattened with a thumbnail, dipped in dyes and left to dry before being stitched with a bone needle and tendon thread to cured hide garments and moccasins. Ruth Landes, in her book “The Ojibwa Woman”, explains further that quill work had been supplanted by the far simpler beadwork, which was concomitant with the introduction of curvilinear designs. She witnessed geometric designs in quillwork, probably the thunderbird design.

In bags made from cloth rather than entirely woven, final construction of the beadwork was stitched onto red or black fabric or black velvet to cover the front of the pouch. Beadwork could be woven on a bead loom, however, floral designs were always done by hand, maybe using the spot-stitch appliqué process. Contemporary bags are made with calico type cloth and beadwork is attached because cloth became readily available due to the industrial revolution. Before that, “trade cloth” was precious and hard to obtain, like trade beads. The making of a bag was a singular event in the life of the artist, requiring much time and careful work. Designs are thoughtfully and religiously constructed to include specific motifs. Trade beads come from different countries, indicating the business affiliations of the maker, and different clans/totems had bags that symbolized trade relationships with nations. The beadwork in itself is a fine art.

Gashkibidaagan design and workmanship identifies the maker, just as a Rembrandt painting indicates the artist's identity.

In terms of weaving, apart from the bandolier bags, another vital woven article made routinely by Ojibwe women was rabbit robes. Landes explains: “..by trapping rabbits in twine traps set near their living area, to keep away pests, then skinning the rabbit and cutting the fur into a long thin continuous rope which is tied onto another from the fur of another rabbit. One rope is then used in the weaving as warp and the other rope is used as weft. These robes are pretty and warm, and invaluable to hunters.” Part of the utility of the robes is when the fur brushes against a branch as hunters move, it makes no sound, as opposed to a stiff garment, noted in her book “Tracks” by Louise Erdrich.

Landes mentions floor mats, another woven utility item, made by interweaving long strips of grass and cedar bark. These mats were also stood up against a lodge wall. One is pictured outside, attached to a line from the Ojibwe dwelling - page 13 in Anderson's book.

The elder women of the tribe, who are decision makers, determine who makes the chief's bag. Contemporary bags are made by women, who may be requested to do so. They bestow the bags according to their own judgment. Historically bags were mainly bestowed on men who then carried out the decisions of the women elders. This illustrates the flow of wisdom in the tribe, with its matriarchal base. Men are warriors and workers. Having a stable intellectual base is a very strong asset for a group of people, and the Ojibway are one of the largest North American tribes who have for centuries chronicled their history and customs, produced many prominent

social leaders, and endured the influx of Europeans. Ojibwa were also renowned as warriors, their name meaning “cook/boil until it puckers” which has been attributed to the method for sealing the seams of moccasins (Roy 2008). Warren, a well-respected historian, in 1984 states instead this was a method of torture which the Ojibwa implemented upon their enemies. Erdrich, 2003, explains the meaning of the name as “those who keep records (of a vision), referring to their own form of pictorial writing and pictographs used in Midewiwin rites.” Still another historian, Johnston, 2007, says the word means “those who speak-stiffly”/”those who stammer” referring to how the Ojibwa sounded to the Cree”. Erdrich has another meaning from Ojibwe, “from the verb Ozhibii’ige, which is ‘to write’. Ojibwe people were great writers from way back and synthesized the oral and written tradition by keeping mnemonic scrolls of inscribed birchbark. The first paper, the first books.” They have been keeping records for thousands of years. Actually, all the definitions relate to facets of Ojibwe life.

‘Midewiwin, the Great Medicine Society, teachings focused on efforts to deal with physical and mental sicknesses, including personal ethics. The Ojibweg believe healing with plants was learned from observing the animals around them. Teachings govern spiritual beliefs passed through oral tradition, including a creation myth and a recounting of the origins of ceremonies and rituals, which were very important to the Ojibweg because they believed that spirits guided them through life. Birch bark scrolls and petroforms, pictorial writing, on rock were used to pass along knowledge and information, as well as used for ceremonies. The many complex figures on the sacred scrolls communicate much historical, geometrical and mathematical knowledge. Wikipedia says “the use of petroforms, petroglyphs and pictographs was common throughout the Ojibwe traditional territories. Petroforms and medicine wheels were a way to teach the important

concepts of four directions and astronomical observations about the seasons, and to use as a memorizing tool for certain stories and beliefs.” Pictographs were also used for ceremonies’, per the New World Encyclopedia, online. Michael Johnson’s book “Ojibwa, People of the Forests and Prairies” explains that the Grand Medicine Society’s objectives were to promote individual and community success in hunting, good health, wellbeing and long life. Essentially it was tasked with continuity and prosperity of the tribe. The encroaching Jesuits disapproved, of course, because independent, psychologically and physically healthy native peoples did not promote their greedy imperialistic interests.

William H. Warren, an Ojibwa who labored to chronicle an extensive history of the tribe for several hundred years in his book “History of the Ojibway People” explains that there has been intermarriage between the tribe and whites for centuries, and primarily with the French because they lived among and respected Ojibweg culture. The tribe has tended to trade/tolerate/survive the whites rather than outright warfare. Consequently Metis, the children of mixed marriages, comprise a large group, and many have been well educated, socially accomplished and enjoyed high standing in their communities. Metis language is Michif, a blend of Cree, French and English, now an endangered language. Warren states that whites have intermarried with the Ojibway tribe more than any other tribe of the red race. Marcia G. Anderson outlines some biographies of famous Ojibweg.

Contemporary bandolier bags continue to be made, on the reservation and by tribal members living all over the US and Canada. Marcia G. Anderson, in her book “A Bag Worth A Pony”, celebrates contemporary bead artists, collectors, communities and renowned Ojibweg who own

gashkibidaaganag. Collections in Minnesota, Wisconsin and Canada contain beautiful, ancient bandolier bags. The iconic gashkibidaaganag symbolizing “speak for the people” has over the centuries remained a treasure. Bestowed on special individuals recognized as rank specific to the organization of the tribe, its message continues to inspire Ojibweg to endure and revere their identity.

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Cambodian Weaving Sites

Institute for Khmer Traditional Textiles (IKTT) Siem Reap

<http://www.esprit-libre.org/iktt>

Take time to look thru the site! It has been newly updated.

Lotus Pond, #245 Street 51, lotuspond@online.com.kh - Phnom Penh

Bantheay Sreipit, #71, Street 430, Tomnop Teuk Quarter, yin_sivutha@hotmail.com.kh
Phnom Pehn

Artisans D'Angkor, Siem Reap site for silkworm farm, www.artisandangkor.com

Geographical Areas in Cambodia to Seek out Weaving

Takeo Province, Kaoh Dach Island, Kampong Province

Publications/Texts where my research on Lao weaving has been cited. Our move from Delaware to Texas in 2007/2008 has precluded me from writing about Cambodia techniques...yet!

- Ladies of Laos DVD – self published DVD documenting techniques of Lao silk weavers
- Complex Weavers Journal – September 2001 & January 2003
- Technical Contributor -
 - Weaving Tradition – Carol Cassidy and Woven Silks of Laos
 - Pattern Techniques for Handweavers – Doramay Keasbey
- Photo Contributor – Magic of Handweaving, Basics and Beyond,

References for learning more about Southeast Asia textiles:

Reference – Selected for the Weaver in mind, other great cultural books are available

Country	Type	Title
Burma	Book	Handwoven Textile of South-East Asia, Sylvia Fraser-Lu, ISBN-10 0195889542 Please note another book is in the works specifically about the weaving culture, no publication date yet
Burma	Book	Mantles of Merit, David W. & Barbara G. Fraser, ISBN 974 9863 01 1
Cambodia	Web	Artisans D'Angkor, Siem Reap site for silkworm farm, http://www.artisansdangkor.com/
Cambodia	Book	Chandracharoen, Thirabhand. Tied Together, Khmer Lao and Thai Mudmee Textiles. Bangkok, Thailand, 2004. James H. W. Thompson Foundation. ISBN 974-92705-4-1.
Cambodia	Book	Fukuoka Art Museum. The Textiles of Cambodia. Fukuoka Art Museum, 2003
Cambodia	Web	Institute for Khmer Traditional Textiles (IKTT) Siem Reap http://iktt.esprit-libre.org/en/ Take time to look thru the site! It has been newly updated.
Cambodia	Book	Institute for Khmer Traditional Textiles and Center for Khmer Studies 'Hol' The Art of Cambodian Textiles, Seminar Proceedings, 12-13 Dec 2003. With the Support of The Japan Foundation Asia Center
Cambodia	Book	Kikuo, Morimoto. Silk Production and Marketing in Cambodia. Unesco – Revival of Traditional Silk Weaving Project 1995.
Cambodia	Web	Lotus Pond, #245 Street 51, lotuspond@online.com.kh - Phnom Penh
China	Book	History of Textile Technology of Ancient Chia, Cheng Weiji, ISBN 1-880132-02-8 (relevant to all ethnic group weaving in Laos, Thailand and Vietnam)
China	Book	Spiritual Fabric, Sadae Torimaru, ISBN4-8167-0691-7 (relevant to all ethnic group weaving in Laos, Thailand and Vietnam) p. 74-76, p. 78, p. 90-93
Laos	Mag	"The Bulletin of the Needle and Bobbin club", vol 44, 1960.
Laos	Book	Beyond Tradition; Lao Textiles Revisited, The Museum at the Fashion Institute of Technology
Laos	Web	Carol Cassidy web page - Carol Cassidy's gallery and collection of hand woven silks can be found in the centre of Vientiane in a charmingly restored French Colonial house. http://laotextiles.com/
Laos	Mag	Complex Weavers Journal, Sept 2001 and January 2003, Deb McClintock
Laos	DVD	Ladies of Laos DVD – Deb McClintock, self published DVD documenting techniques of Lao silk weavers – sold out
Laos	Book	Lan Na Textiles, Patricia Cheesman, p. 29
Laos	Book	Lao Textiles and Traditions, Mary F. Connors
Laos	Book	Lao-Tai Textiles: Textiles of Xam Nuea and Muang Phuan, Patricia Cheesman ISBN 974-272-915-8
Laos	Book	Legends in the Weaving, Japan Foundation Asia Center, ISBN 974-548-202-1
Laos	Mag	Pattern Weaving, Laotian Style, Doramay Keasbey, Handwoven, 05 81, p. 54
Laos	Web	Phaeng Mai Gallery – Daughters of Sam Neua, trained by their mother, the sisters offer high-quality handspun silk, natural dyes and traditional weaving techniques. They also provide opportunities to learn the traditional ways of weaving. http://www.phaengmaigallery.com/gallery.html and http://laotextile.blogspot.com
Laos	Mag	Southern Laotian Textiles by Dorothy K. Washburn and Andrea Petitto, Ars Textrina 15 (1991)

Country	Type	Title
Laos	Book	Weaving Tradition, Carol Cassidy ISBN 0-9747847-0-2
Regional	Book	Art of Southeast Asian Textiles, Linda S. McIntosh, ISBN 978-1-932476-59-0, good comparison of regional textiles, no weaving equipment noted
Thailand	Book	Costume and Culture, Patricia Cheesman Naenna
Thailand	Web	Studio Naenna – background information on the collection of exquisite clothing and eco textiles in ikats, silk, and cotton designed by Patricia Cheesman Naenna. Studio Naenna is a learning experience with natural dyeing and weaving to see. Indigo vats and backstrap loom weaving are our highlights. http://www.infothai.com/naenna
Thailand	Web	Suntree Thai Weaving Center, The Thai Phuan at Had Sieo Village, Si-satchanalai District, Sukhothai Province, weave their Tin Chok with the right side facing up which is unusual as in most other areas the weaving is done in the reverse. http://www.suntreethai.com/en/node/1779
Vietnam	Mag	Complex Weavers Journal, June 2013, article by Deb McClintock
Vietnam	Book	Textiles of the Daic Peoples of Vietnam, Michael C. Howard & Kim Be Howard, ISBN 974-7534-97-5, minimum but referenced loom discussion
Vietnam	Book	Trang Phuc Hoa Van Tho Cam, Bo Van Hoa & Thong Tin
Vietnam	Book	Viet Nam, The Great Family of Ethnic Groups in Viet Nam, Nguyen Van Huy, Le Du Dai, Nguyen Quy Thao & Vu Xuan Thao http://seap.einaudi.cornell.edu/node/10914
World	DVD	World Weaving Traditions, Janet Willoughby, looms & warps + weaving techniques http://www.endsoftheearth.co.uk

Known Texts/Papers Deb McClintock's research is cited:

- Ladies of Laos DVD – self published DVD documenting techniques of Lao silk weavers
- Complex Weavers Journal – September 2001, January 2003 and June 2013
- Technical Contributor
 - Weaving Tradition – Carol Cassidy and Woven Silks of Laos
 - Pattern Techniques for Handweavers – Doramay Keasbey
- Photo Contributor – Magic of Handweaving, Basics & Beyond, Sigrid Piroch, May 2004
- Weaving Tradition, Carol Cassidy ISBN 0-9747847-0-2, research on Khao Tam Huuk
- The Lao Khao Tam Huuk–One of the Foundations of Lao Weaving, 2007 Textile History Forum, Winterthur Museum, Winterthur, Delaware
<http://www.thistlehillweavers.com/textilehistoryforum.html>
- Background material of anthropologists, Dr. Sandra Cate and Dr. Leedom Leffert
- Re-Crafting Silk in Southeast Asia, 0312 paper, Dr. Sandra Cate and Deb McClintock, Association for Asian Studies, Toronto, Ontario

Modern Adaptation of Ancient Technique

Sara von Tresckow

Nov. 2019

Contribution to Archaeological Textile Study Group, Complex Weavers

This is a little different from a scholarly article about a new find or an attempt to recreate an ancient textile. It is an exploration of how a well documented textile technique can play a role in creating a modern wearable garment.

It is known that Northern European cultures used a combination of S- and Z-spun yarns to enhance their twill fabrics. In some examples the entire warp and/or weft were spun in opposing directions. In others there is a mix of directions in warp, weft or both creating subtle patterning. In designing, weaving and sewing a new tweed skirt, I decided to incorporate the use of opposing twist in singles yarn.

I have woven skirt and jacket fabrics off and on for decades using variations of herringbone (zig-zag) twills, in subtle stripes using both dark and light weft on a solid light or dark weft. When using handspun yarns, even worsted spun, there was a certain irregularity in the twill structure – that seemed to come from the energy left in the singles. For the project shown in this article, I wanted to see if using singles spun in opposite directions made a difference.

In my yarn collection was a large amount of a Shetland cross fleece (unfortunately spun just a tad too fluffy) in white and a dark chocolate brown CVM/Border Leicester fleece – both colors spun in either S- or Z as a medium weight single. The fluffiness of the white yarn is pretty and makes the fabric nice to wear, however it did lead to considerable warp breakage in spite of sizing.

In a previous project using handspun Shetland z-singles in a twill, I had utilized some contrasting s-spun stripes. Though the stripes were narrow, the twill structure was much more clear and visible than the sections where all yarns were z-twist. It appeared that the energy left in the singles was preventing the intersections from forming as nicely as when the twists were opposite – much the way a balanced 2-ply (as in the case of the jacket above) settled into a regular herringbone pattern.

The yarns were spun more or less because I had the wool and divided the batches into S- and Z- portions without a specific purpose. So when I began the skirt project, it was determined that the s-spun white was enough for warp and there was also adequate brown. The sett of 20 epi (8 cm) was a good match. I did size the warp threads with laundry starch to keep the fuzzy places under control. Understandably this contributed to some unevenness in the final fabric.

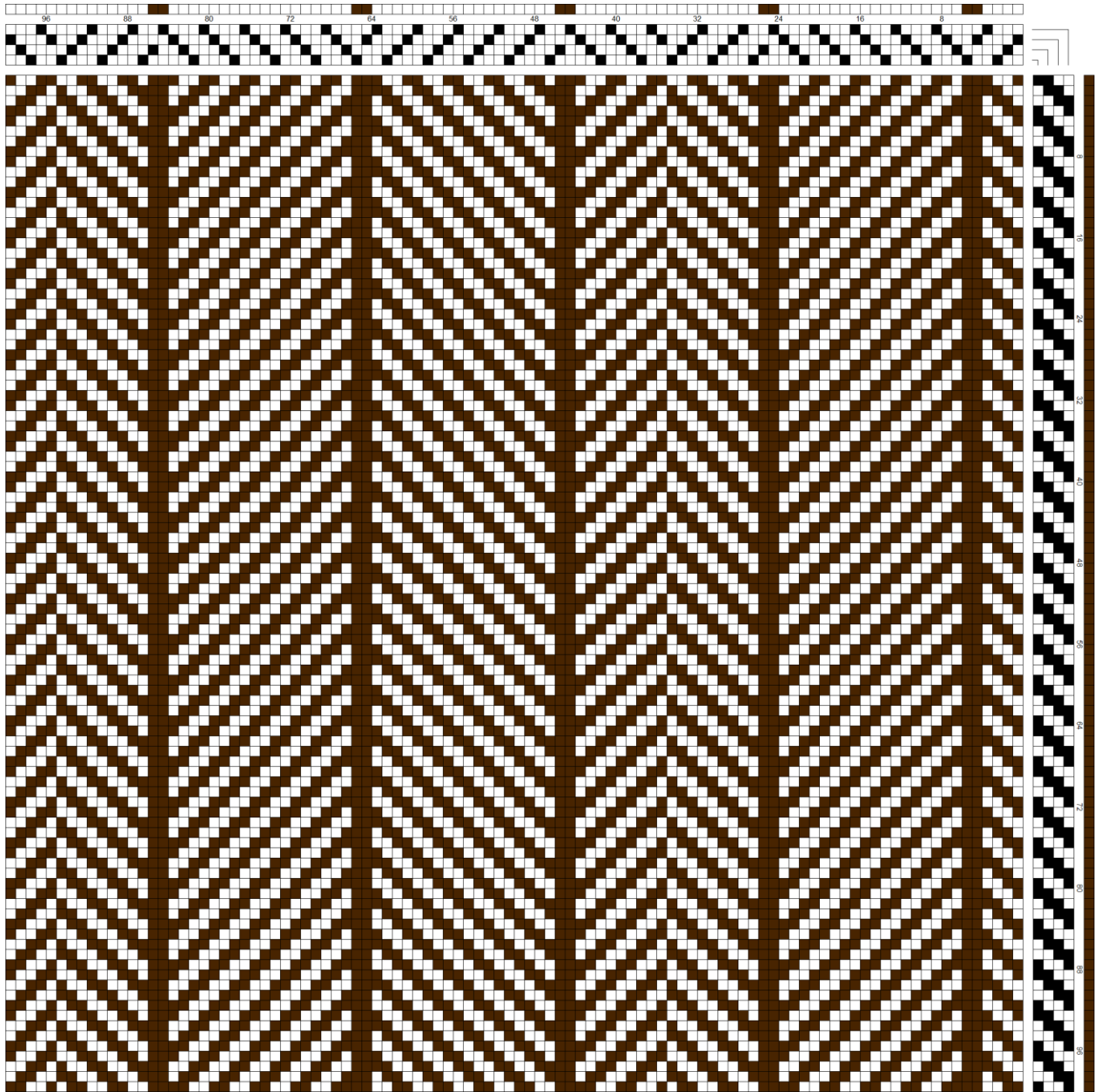
The warp was put on my Cranbrook rug loom – straight up countershed 4-shaft dornik twill – where I did add one stripe with split directions to make it a bit less boring. Because I did not know at that time just which pattern I'd like to sew, I used all the yarn I had, about 32" wide, and wove just over 5 yards of fabric. The last half yard was woven with s-spun weft (the same spin direction as the warp) as a contrast.

Now that the skirt has been sewn and worn, I can honestly say that using the directional change when weaving fabric does produce a noticeable difference in both the appearance and the hand of the fabric, worth going the extra mile to make two different yarns for a garment. The hand of the fabric, which cannot be demonstrated on paper, is the surprise – the texture of the fabric is much smoother than the sample woven with warp and weft in the same direction. By using 20 epi instead of the 24 in the skirt from the 80's, the fabric is lighter, thinner and more like commercial would be.

I can't say that there will be more skirts in the near future, but spinning yarn in both directions (properly labeled) has now become more attractive.

For a smaller project, I might even consider mixing twists in either warp or weft to see what patterning might result. Certainly the old weavers who pioneered using opposing twist did it consciously for good reason.

Draft for the project pictured below:



The following pages are illustrated with the projects and results over the last decades leading up to the new twill skirt.

Sample 1: commercial yarn – early 1980's



This is an early piece that was made into a jacket for my husband – the yarn a Shetland weight 2—ply knitting wool. Fabric had nice weight for a jacket and the yarn allowed for handknit cuffs, collar and waistband.

Note that the twill lines are very straight and regular due to the very uniform nature of the commercial 2-ply yarn.



Sample 2: mis 1980's



First skirt fabric entirely of handspun wool. Wool spun from our herd of East Frisian milk sheep, single, hand combed, worsted spun. Sett 24 epi. All S-spun.

Sett is a little dense, the twill lines are not as straight as the jacket fabric out of commercial yarn.



The skirt looked like this:

Sample 3: Around 2015



Shetland wool handspun singles, 20 epi – blue threads are Z-spun, Gray S-spun. I noted that the grey stripes show a more regular twill line. Using the grey as weft, the effect was more pronounced.



Same loom warp – with Z-spun blue and S-spun grey where the more regular twill line is in the blue stripes where the weft with opposite direction of twist.

Intrigued by the apparent ordering of the twill line resulting from the use of Z- and S-twist yarns in warp and weft, I wished to try another twill skirt, less dense than the first one, and with the ancient technique of using the opposite twist of the yarn as a design element.

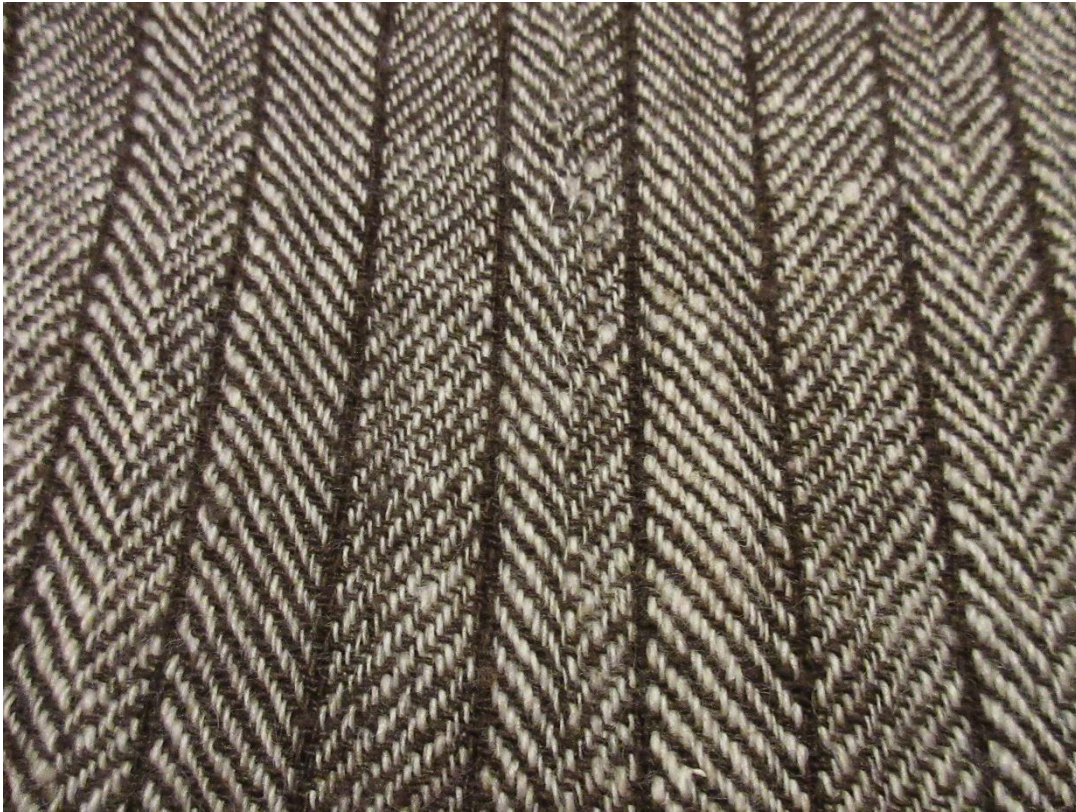
S and Z Skirt Project - 2019

In my yarn collection was a large amount of a Shetland cross fleece (unfortunately spun just a tad too fluffy) in white and a dark chocolate brown CVM/Border Leicester fleece – both colors spun in either S- or Z as a medium weight single

In a previous project using handspun Shetland z-singles in a twill, I had utilized some contrasting s-spun stripes. Though the stripes were narrow, the twill structure was much more clear and visible than the sections where all yarns were z-twist. It seemed as though the energy left in the singles was preventing the intersections from forming as nicely as when the twists were opposite – much the way a balanced 2-ply (as in the case of the jacket above) settled into a regular herringbone pattern.

For this project, I chose Z-spun white and brown as warp and S-spun white as weft, the choice based on the available quantities.





Above: the fabric with opposing directions of yarn, note the rather straight twill lines despite the irregularity of handspun singles.



Below: both yarns spun in the same direction. While there is not a lot of contrast, the increased irregularity of the twill lines does make a good case for taking the time to spin yarns for such fabrics in different directions when the quality of the resulting fabric was important.

The 30+ years later, I have another herringbone skirt of handspun wool, this time in a different technique testing the old finds of singles being spun in opposing directions – and displaying my pretty conservative and consistent sense of fashion. This time there are no pleats – just a simple A-line to accommodate the spread that comes with aging.



Exploration of the Weave Structure of the Shroud of Bernard of Clairvaux
Sue Walsh for the Complex Weavers Archaeological Textiles Study Group
September 3, 2019

I was a member of the Medieval Textiles Study Group (MTSG) in the late 1990's and early 2000's and was intrigued by the description of the shroud of St. Bernard of Clairvaux by Carolyn Priest-Dorman, which was published in the December 2001 issue of the MTSG newsletter: <http://www.medievaltextiles.org/news30.pdf> A version of this article by was published in the December 2002 issue of the Complex Weavers Journal (CWJ).

The original 12thC piece was unusual in that it was completely linen-free. The warp was a fine hemp of about the weight of a 20/2 cotton, with heavier cotton for the ribs. The weight of the fine cotton weft was about 12/2. In that time, hemp for weaving was relatively difficult to acquire at reasonable prices and in a range of sizes. I wove my sample for the MTSG 2004 sample exchange in 20/2 cotton for the finer warp (substituting fine cotton for the hemp) sleyed 3 ends per dent in a 12-dent reed, 5/2 pearl cotton at 2 ends per dent for the heavier cotton warps, and 14/2 cotton for the weft. I used various shades of deep pink to see the weave structure better. The sample wet-finished at 36-epi over the entire warp compared with 37-epi in the medieval piece. In late December of 2004, I submitted my sample. The sample is seen at <http://www.medievaltextiles.org/gallery/gallery4.html>

The sample had a nice feel and drape. Weaving it was not really a challenge because it was less than a yard long, but I suspected that the longer floats of the heavier warps making the vertical ribs would eventually cause tension issues over the longer length of a shroud. The hemp/cotton blend of the original would have been quite expensive for the 12thC, possibly because Bernard of Clairvaux was highly regarded and later canonized as a saint. I thought that it was quite probable that this weave would have also been worked in linen and wondered what the result might be in a more common fiber of that era. Linen would be closer in feel and character to the original hemp than the 100% cotton I'd used in 2004 and might give a better sense of whether there would be tension issues over a long warp since linen is less forgiving than cotton. I thought I'd explore this draft more fully in the future, but that day just never seemed to arrive.

Flash forward to Christmas 2017 ... I asked my dear husband, who never had asked for much of anything from my weaving, what he wished me to weave for him. Curtains. Curtains for the wall of unadorned windows with a lovely view of Mt. St. Helens to the north. After many years, he confessed that he really wanted a bit more privacy from the occasional dog-walkers in the park behind us. I recalled the draft of the shroud and thought it might be perfect for a wall of curtains, especially in neutral tones.

I decided to first weave a prototype as a test. For my prototype, I purchased Henry's Attic 40/2 Normandy linen (bleached). I used the yarn singly for the ground design and tripled for the ribbing, and sleyed the entire piece at 3 ends per dent in a 12-dent reed. The weft was 16/2 linen (natural). I measured a 921-end warp of 5 yards. I used a Tools of the Trade jack loom,

warping from front to back. I beamed it all at once, using sticks on the warp beam. I tied directly onto the front. I did not require any additional humidity to “tame” the linen, and did not break any warp threads. I added doubled ends of the 40/2 on each side for floating selvages. Thin sticks served as the header and a firm foundation for the weaving.¹

As expected, the warp threads of the ribbing, with fewer interlacing than the ground design, started to sag noticeably by the end of the first yard and was too much of a challenge to continue without adjustment by the middle of the second. I used a warp stick on edge behind the heddles to aid the shed. I cut off and re-tensioned to complete the second 2-yard panel, with the same tension issues. To finish, I completely wet the pieces and then machine washed them in warm water with Dawn, used a slower spin speed, then pressed dry. The yardage, which started at about 25.5” in the reed, finished at 23.5” or about 39-epi (shrinkage of 8%). I made two curtain panels, finished top and bottom with rod pockets and hems respectively, and hung them in a bedroom window as a test. The curtains themselves were a success, and the yardage was probably fairly close to the weight and drape of the original shroud. The Henry’s Attic bleached linen made a beautiful warp that had a lovely sheen after finishing, but it was expensive. The fabric was certainly something that could be used as a shroud, blouse, or dress.

However, the prototype curtains blocked quite a bit of light when tested on the north-facing window in the living room. I also needed a much wider panel for the significantly larger windows. I decided to make a wider warp of about 44” and have a single flat panel on each window rather than two ruffled ones. I also opted to widen the sett to 3 ends per dent in a 10-dent reed to increase the transparency. I was concerned about the overall cost of using the Henry’s Attic linen; Webs had a well-timed sale on their 40/2 half-bleached linen. The Webs linen was slubbier but had an appealing texture. I had plenty of the natural linen for weft. I measured off 1327 ends of the 40/2 linen for a 12 yards warp and used the same loom and front-to-back process as for the prototype bedroom curtains.

As expected, the ribbing warp tension started to worsen as the weaving progressed. After about the first yard, I inserted a stick under the ribbing ends behind the heddles, carried the stick to the back, and then weighted it with six 1# deep sea fishing weights to keep tension (as sort of make-shift double back beam). This was a great solution for two panels worth of warp length or about 5 yards. I cut off, re-tensioned, and wove the second pair of panels the same way. There was about 27” of loom waste. I finished the cloth using the same process as the sample panels. The resulting curtain cloth finished at 41” and 32 epi (shrinkage of 7%). The sheerness was just about perfect for the intended use, but very close to being sleazy. Tom had his curtains (and privacy) by Christmas 2018.

¹ In a recent thread on WeaveTech, several contributors shared their experiences with weaving linen and most said that they had to take certain measures to weave linen successfully, such as using only a countermarche loom, lightly spraying their warps with water, tensioning certain ways, using certain shuttles, etc. I’ve woven hundreds of yards of linen ranging in size from rug warps to 70/2, and some techniques and equipment work better than others, but I have never had to take extreme measures or use certain tools exclusively to “tame” the linen.



The upper photo is the prototype cloth at 39 epi using Henry's Attic 40/2 bleached linen for the warp; the lower is the final cloth at 32 epi using Webs 40/2 half-bleached linen as the warp. The prototype (top) was a prettier cloth, but the final version (bottom) was a better curtain at much less cost. The prototype was probably a good approximation for the 12thC shroud worked in hemp and cotton, which finished at 37epi. The diamond pattern between the heavier warps is easier to see in the prototype, but is still very faint since there is very little contrast between warp and weft coloring.



Four semi-sheer panels in place in the living room

What might this mean for the medieval shroud? By the 12thC, Europe south of Scandinavia had pretty much transitioned from the warp-weighted loom to the floor/shaft loom for production of cloth. If a floor loom were used, the weaver(s) would have experienced the same tension issues with the ribbing warps as I did (unless they also used a separate tensioning device for the heavier warps). A warp-weighted loom would have been able to correct for those tension issues as the cloth was rolled on the cloth beam and the warp advanced. Diamond designs were woven very early in Europe on warp-weighted looms, so it's possible that this pattern was

originally woven on a warp-weighted loom without tension problems, and those tension problems were realized when the design was transferred to production on the floor loom. It would be difficult to prove this without archaeological evidence.

So where do I go from here? First, I'd like to do a bit more research on the original shroud, using the references cited by Priest-Dorman in her articles. Second, I'd like to weave a true reproduction. Hemp is becoming much more accessible, so I could use hemp and cotton. However, I'd need to conduct research to discover if the yarns were singles or plied, the degree and direction of the twist, and any other characteristics of the fibers before weaving the cloth.