VKR TEX - Tutorials

Manufacture of All Kinds of Auto loom Fabrics and Natural Dye Fabrics.

Website: www.vkrtex.com E-Mail: info@vkrtex.com

Weaving

Tweed loom, Harris, 2004

Woven sheet

Weaving is an ancient textile art and craft that involves placing two sets of threads or yarn called the warp and weft of the loom and turning them into cloth. This cloth can be plain (in one color or a simple pattern), or it can be woven in decorative or artistic designs, including tapestries.

The majority of commercial fabrics, in the West, are woven on computer-controlled Jacquard looms. In the past, simpler fabrics were woven on other dobby looms and the Jacquard harness adaptation was reserved for more complex patterns. Some believe the efficiency of the Jacquard loom, and the Jacquard weaving process makes it more economical for mills to use them to weave all of their fabrics, regardless of the complexity of the design. However, an industrialist weaving large runs of simple plain weave fabric may need to be convinced of the logic of investing in Jacquard machines, when a much lower cost loom would suffice.

Handweaving, along with hand spinning, is a popular craft. Weavers use wooden looms to create rugs, fabrics, and tapestries.

Fabric in which the warp and/or weft is tie-dyed before weaving is called ikat. Fabric decorated using a wax resist method is called batik.

- Satin weaves, twill weaves, and plain weaves are the 3 basic types of weaving by which the majority of woven products are formed.

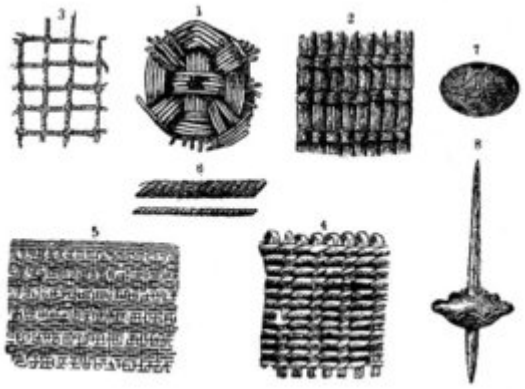
Process

An Indian weaver preparing his warp.

In general, weaving involves the interlacing of two sets of threads at right angles to each other: the warp and the weft. The warp are held taut and in parallel order, typically by means of a loom, though some forms of weaving may use other methods. The loom is warped (or dressed) with the warp threads passing through heddles on two or more harnesses. The warp threads are moved up or down by the harnesses creating a space called the shed. The weft thread is wound onto spools called bobbins. The bobbins are placed in a shuttle which carries the weft thread through the shed. The raising/lowering sequence of warp threads gives rise to many possible weave structures from the simplest plain weave (also called tabby), through twills and satins to complex computer-generated interlacings.

Both warp and weft can be visible in the final product. By spacing the warp more closely, it can completely cover the weft that binds it, giving a *warpfaced* textile such as rep weave. Conversely, if the warp is spread out, the weft can slide down and completely cover the warp, giving a *weftfaced* textile, such as a tapestry or a Kilim rug. There are a variety of loom styles for hand weaving and tapestry. In tapestry, the image is created by placing weft only in certain warp areas, rather than across the entire warp width.

Weaving in ancient and traditional cultures



Prehistoric woven objects and weaving tools

There are some indications that weaving was already known in the Palaeolithic era. An indistinct textile impression has been found at Pavlov, Moravia. Neolithic textiles are well known from finds in pile dwellings in Switzerland. One extant fragment from the Neolithic was found in Fayum at a site which dates to about 5000 BCE. This fragment is woven at about 12 threads by 9 threads per cm in a plain weave. Flax was the predominant fibre in Egypt at this time and continued popularity in the Nile Valley, even after wool became the primary fibre used in other cultures around 2000 BCE. Another Ancient Egyptian item, known as the Badari dish, depicts a textile workshop. This item, catalogue number UC9547, is now housed at the Petrie Museum and dates to about 3600 BCE. [1]

Enslaved women worked as weavers during the Sumerian Era. They would wash wool fibers in hot water and wood-ash soap and then dry them. Next, they would beat out the dirt and card the wool. The wool was then graded, bleached, and spun into a thread. The spinners would pull out fibers and twist them together. This was done by either rolling fibers between palms or using a hooked stick. The thread was then placed on a wooden or bone spindle and rotated on a clay whorl which operated like a flywheel.

The slaves would then work in three-woman teams on looms, where they stretched the threads, after which they passed threads over and under each other at perpendicular angles. The finished cloth was then taken to a fuller.

Easton's Bible Dictionary (1897) points to numerous Biblical references to weaving in ancient times:

Weaving was an art practised in very early times (Ex. 35:35). The Egyptians were specially skilled in it (Isa. 19:9; Ezek. 27:7), and some have regarded them as its inventors.

In the wilderness, the Hebrews practised it (Ex. 26:1, 8; 28:4, 39; Lev. 13:47). It is referred to in subsequent times as specially the women's work (2 Kings 23:7; Prov. 31:13, 24). No mention of the loom is found in Scripture, but we read of the "shuttle" (Job 7:6), "the pin" of the beam (Judg. 16:14), "the web" (13, 14), and "the beam" (1 Sam. 17:7; 2 Sam. 21:19). The rendering, "with pining sickness," in Isa. 38:12 (A.V.) should be, as in the Revised Version, "from the loom," or, as in the margin, "from the thrum." We read also of the "warp" and "woof" (Lev. 13:48, 49, 51-53, 58, 59), but the Revised Version margin has, instead of "warp," "woven or knitted stuff."

Weaving in the American Southwest

Textile weaving, using cotton dyed with pigments, was a dominant craft among pre-contact tribes of the American southwest, including various Pueblo peoples, the Zuni, and the Ute tribes. The first Spaniards to visit the region wrote about seeing Navajo blankets. With the introduction of sheep and wool by Europeans, the Navajo adopted the new source of thread and the resulting woolen products have become very well known. By the 1700s the Navajo had begun to import yarn with their favorite color, Bayeta red.

Using an upright loom, the Navajos made almost exclusively utilitarian blankets. Little patterning and few colors were characteristic of almost all early blankets, except for the much sought after Chief's Blanket, which evolved from the 1st Phase, few wide bands, to the 2nd phase, wide bands with squares on the corners to the 3rd Phase which made more and more use of patterns and colors. The Navajo also traded for commercial wool, including the uniforms of soldiers, to reweave into intricate multicolored blankets called Germantown.

Under the influence of European settlers at trading posts, the local Navajo's began to weave blankets and rugs into distinct styles. They included "Two Gray Hills" (predominantly black and white, with traditional patterns), "Teec Nos Pos" (colorful, with very extensive patterns), "Ganado" (founded by Don Lorenzo Hubbell), red dominated patterns with black and white, "Crystal" (founded by J. B. Moore), oriental and Persian styles (almost always with natural dyes), "Wide Ruins," "Chinlee," banded geometric patterns, "Klagetoh," diamond type patterns, "Red Mesa" and bold diamond patterns. Many of these patterns exhibit a fourfold symmetry, which is thought to embody traditional ideas about harmony.

Weaving in Amazonia

In Native Amazonia, densely woven palm-bast mosquito netting, or tents, were utilized by the Panoans, Tupí, Western Tucano, Yameo, Záparoans, and perhaps by the indigenous peoples of the central Huallaga River basin (Steward 1963:520). Aguaje palm-bast (Mauritia flexuosa, Mauritia minor, or swamp palm) and the frond spears of the Chambira palm (Astrocaryum chambira, A.munbaca, A.tucuma, also known as Cumare or Tucum) have been used for centuries by the Urarina of the Peruvian Amazon to make cordage, net-bags hammocks, and to weave fabric. Among the Urarina, the production of woven palm-fiber goods is imbued with varying degrees of an aesthetic attitude, which draws its authentication from referencing the Urarina's primordial past. Urarina mythology attests to the centrality of weaving and its role in engendering Urarina society. The myth of post-diluvial creation accords women's weaving knowledge a pivotal role in Urarina social reproduction. Even though palm-fiber cloth is regularly removed from circulation through mortuary rites, Urarina palm-fiber wealth is neither completely inalienable, nor fungible since it is a fundamental medium for the expression of labor and exchange. The circulation of palm-fiber wealth stabilizes a host of social relationships, ranging from marriage and fictive kinship (*compadrazco*, spiritual compeership) to perpetuating relationships with the deceased.[1]

Weaving in Persia

Hand weaving of carpets and kilims has been an important element of the tribal crafts of many of the subregions of modern day Iran. Examples of carpet types are the Lavar Kerman carpet from Kerman and the Seraband rug from Arak.

Weaving as an industry

Before the Industrial Revolution, weaving remained a manual craft, usually undertaken by craftsmen in their homes. Looms might be broad or narrow; broad looms were those too wide for the weaver to pass the shuttle through the shed, so that the weaver needed an assistant (often an apprentice). This ceased to be necessary after John Kay invented the flying shuttle in 1733, which also sped up the process of weaving.

Great Britain

The first attempt to mechanise weaving was the work of Edmund Cartwright from 1785. He built a factory at Doncaster and obtained a series of patents between 1785 and 1792. In 1788, his brother Major John Cartwight built Revolution Mill at Retford (named for the centenary of the Glorious Revolution. In 1791, he licensed his loom to the Grimshaw brothers of Manchester, but their Knott Mill burnt down the following year (possibly a case of arson). Edmund Cartwight was granted a reward of £10,000 by Parliament for his efforts in 1809. However, success in power-weaving also required improvements by others, including H. Horrocks of Stockport. Only during the two decades after about 1805, did power-weaving take hold. This led ultimately to hardship among handloom weavers, whose wages were driven down by competition from machine. This led to machine breaking by the Luddites. Textile manufacture was one of the leading sectors in the British Industrial Revolution, but weaving was a comparatively late sector to be mechanised. However, ultimately, the various innovations took weaving from a home-based artisan activity (labour intensive and man-powered) to mass-production under the power of steam undertaken in factories. See also Textile manufacture during the Industrial Revolution.

Another important step forward was the invention in France of the Jacquard loom, enabling complicated patterned cloths to be woven, by using punched cards to determine which threads of coloured yarn should appear on the upper side of the cloth.

Colonial America

Colonial America was heavily reliant on Great Britain for manufactured goods of all kinds. British policy was to encourage the production of raw materials in colonies. Weaving was not prohibited, but the export of British wool was. As a result many people wove cloth from locally produced fibers in Colonial America.

In Colonial times the colonists mostly used cotton and flax for weaving. They could get one cotton crop each fall. Flax was harvested in the summer.

In preparing wool for weaving, colonists would first shear the sheep with spring back clippers. This was done while keeping the sheep's feet from touching anything so it would not try to break free. They would try to cut the wool off the sheep in one big chunk because that way they would get long fibers. Sheep-shearing was done in the spring so that the fleece would regrow in time for the winter.

After shearing, wool would be washed in hot water to get out the dirt and grease (lanolin), then carded, at which point it would be ready for spinning into yarn. Washing the wool was a delicate procedure, because they didn't want to agitate the fibres too much in the process, and end up with felt. If the wool was clean enough (little to no vegetable matter), they could wait until after it is spun to clean out the lanolin, at which point it is easier to clean because it is yarn.

A card is a set of two brushes stroked one on the other with the fibre in the middle. This process of carding loosen and fluffs the fiber, as opposed to combing, which lines up all the fibres in the same direction, making the wool or cotton ready for spinning.

Cotton was harvested from little stalks. The cotton boll is white, roughly spherical and fluffy. Its seeds had to be removed before carding, a difficult and time-consuming process. (Later, a "cotton gin" was invented which took a lot of the work out of seed removal.) After carding it would be ready for spinning.

Linen is made from flax fibre. After growing the flax, workers had to ret it. To prepare flax for weaving, the stalks would be "braked", meaning beaten, with a tool that looks like a paper cutter but instead of having a big knife it has a blunt arm, then a scutching tool (a blunt wooden knife) is used to scrape away pieces of the stalk, and then the fibre is pulled through a heckling comb to get it ready for spinning. A heckling comb is like a brush with metal bristles that you pull flax stalks through.

After they spun the yarn, it would be dyed with berries, bark, flowers, herbs or weeds, often gathered by children.

With the yarn made, they would prepare the loom. The strings on a loom run in two directions. The yarn that is attached to the loom is called the warp, and the woof or weft is woven through it. The woof is wrapped around the shuttle, and woven alternately over and under the warp strings.

A plain weave was what most people liked in Colonial times. Almost everything was plain woven then. Sometimes designs were woven into the fabric but mostly designs were added after weaving. The colonists would usually add designs by using either wood block prints or embroidering.

Weaving in America, 1800-1900

The Jacquard loom attachment was perfected in 1801, and was becoming common in Europe by 1806. It came to the US in the early 1820's, some immigrant weavers bringing jacquard equipment with them, and spread west from New England. At first it was used with traditional human-powered looms. As a practical matter, previous looms were mostly limited to the production of simple geometric patterns. The jacquard allowed individual control of each warp thread, row by row without repeating, so very complex patterns were suddenly feasible. Jacquard woven coverlets (bedspreads) became popular by mid-century, in some cases being custom-woven with the name of the customer embedded in the programmed pattern. Undyed cotton warp was usually combined with dyed wool weft.

Natural dyes were used until just before the Civil War, when artificial dyes started to come into use.