



Threads Crossing the Warp

MODULE 5

The Technique of Weaving and The Oldest Known Woven Textiles



Partners



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Topics



A. What is Weaving?

- ▶ What is weaving?
- ▶ How is weaving performed? What are the warp and weft?
How does the loom function?
- ▶ How do different textures and patterns occur?
What are the different weaving techniques?
- ▶ What are the different types of weaving looms?

B. The oldest woven textiles

- ▶ Brief history
- ▶ The oldest known woven textiles



A. The Art of Weaving

What is Weaving?

Weaving is a method of *textile production*. **Two or more distinct sets of yarns or threads are interlaced at right angles** to form a fabric or cloth.

The technique is used for the production of clothes, personal and home accessories, tapestries, rugs and is also common in other crafts, such as basket-making.



How is Weaving performed?

What are the warp and weft?

How does the loom function?

There are various techniques; yet, cloth is usually woven on a *loom*. The loom is a tool used for weaving yarn into textiles. It is a device and, in its simplest form, a frame that holds the longitudinal threads tight in place and helps pull the lateral threads through them.

The longitudinal threads, *tightly stretched across the loom or frame and parallel to one another*, are called the **warp**.

This set of thread **runs vertically** through the fabric.



How is Weaving performed?

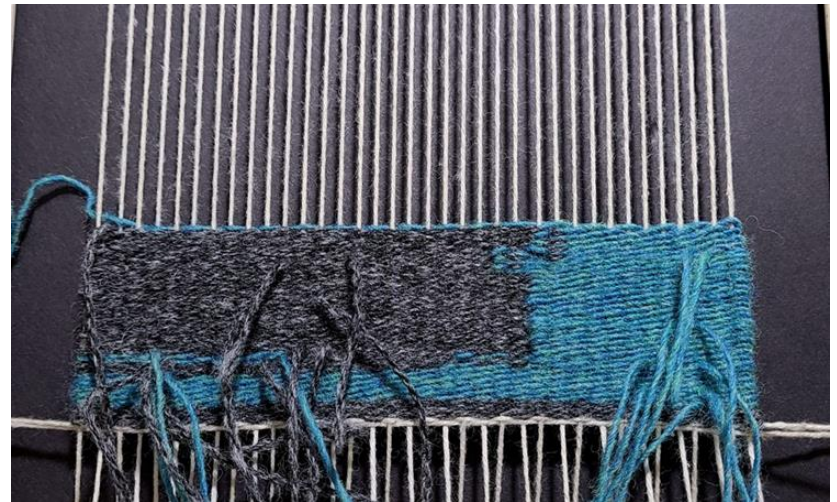
What are the warp and weft?

How does the loom function? (2)

The lateral threads, inserted and **pulled through the warp in an under-and-over pattern**, are called the **weft**. They are, therefore, *woven between the warp threads to create various patterns* and are also called “filler” threads, as they fill in the design.

This set of thread **runs horizontally**.

The *lacing of these sets of threads together at 90 degree angles* creates a joined piece of fabric. This constitutes the basic principle, on which, weaving is based.



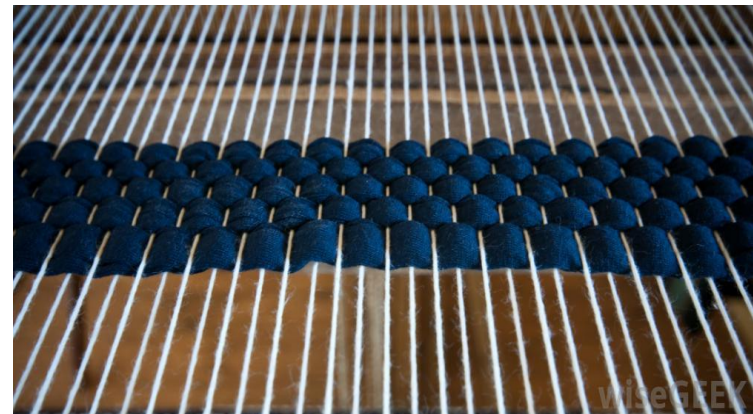
How is Weaving performed?

What are the warp and weft?

How does the loom function? (3)

The weaver *starts by placing the warp threads*. These threads are usually stronger, as they get tightly stretched on the loom and provide a core of support for the fabric. This is why some of the first materials used were *straw and reeds*, popular for creating baskets, mats and rugs.

The *weft creates the pattern and form*. It may be one colour or multi-coloured and of different material types to provide various textures. It is often attached to a *shuttle* that moves back and forth through the warp.

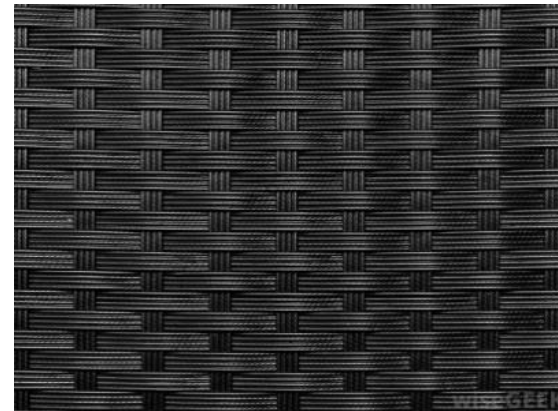
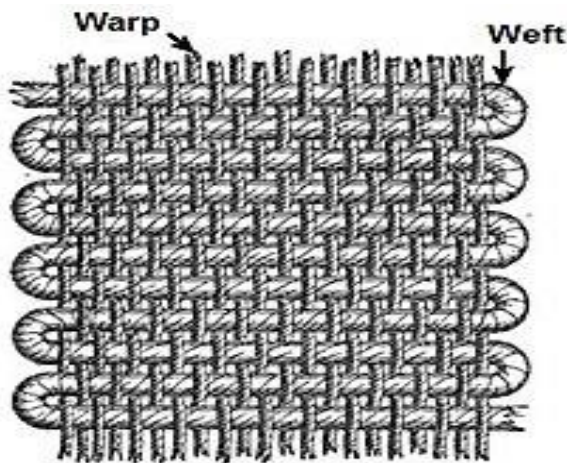


A loom with **white warp** and **blue weft**.

How do different textures and patterns occur? What are the different weaving techniques?

The process, through which these threads are interwoven, affects the characteristics of the cloth. There are *three basic weaving methods* used in the majority of woven products: the plain weave, the satin weave and the twill weave.

The plain weave is the most basic type of weave. The warp is stable and the weft is made to go under one warp thread, then over the next warp thread, and so on. The cloth that is produced has a *checkered pattern with uniform blocks*.



Warp and weft in plain weaving.
On the right, monochromatic warp and weft.

How do different textures and patterns occur? What are the different weaving techniques? (2)

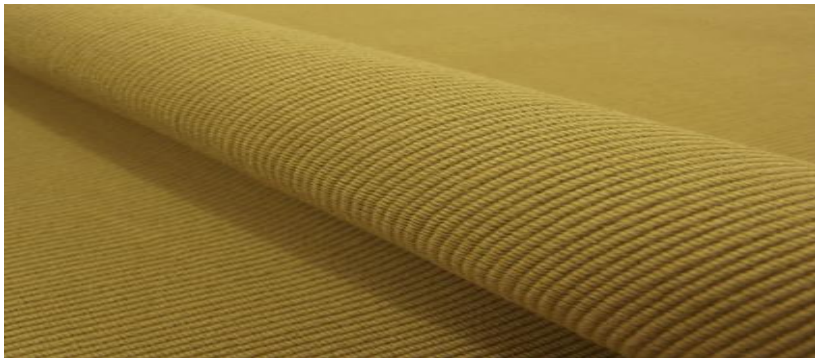
Woven cloth can be *plain or classic* (in one colour or a simple pattern) or can be woven in *decorative or artistic design*.

The *weight and quality* of a woven fabric *depends on the weaving techniques* used.

The *plain weave produces lightweight* fabrics, like cotton and muslin. Variations, like the use of many *different pieces of warp yarn*, instead of one that plain weave uses, leads to *different results in terms texture*.

How do different textures and patterns occur? What are the different weaving techniques? (3)

An example is the rib weave, which results from the use of a different, **thicker fabric for the weft, compared to the warp** and which creates a bulky texture and feel.



On the right: Handwoven fabric with coarse warp and delicate weft

How do different textures and patterns occur? What are the different weaving techniques? (4)

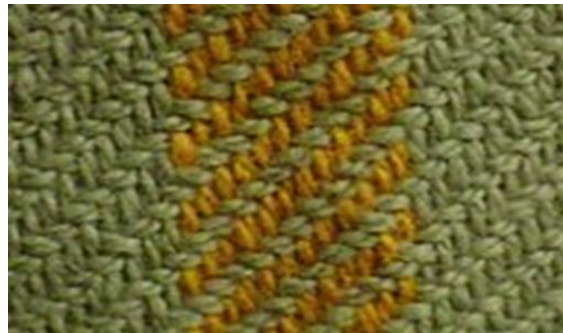
The **basket weave** is created by lacing **two pieces of weft over-and-under two pieces of warp** yarn, but may even use a *three-weft-three-warp* pattern, sometimes even a *four by four* one. The pattern may be emphasized through the use of different colors of the weft and warp.



How do different textures and patterns occur?

What are the different weaving techniques? (5)

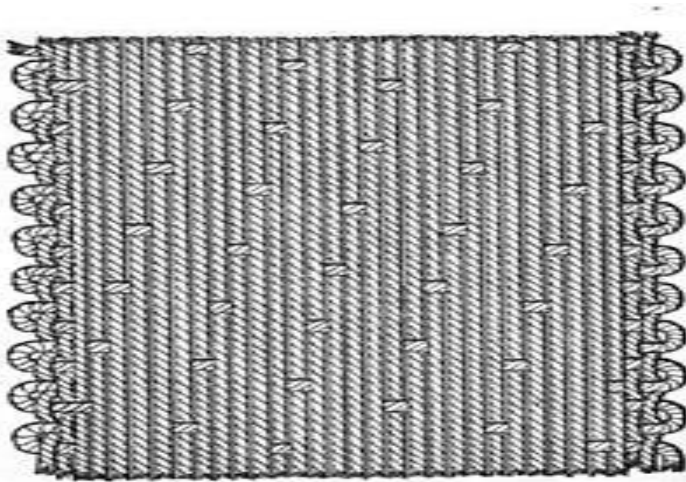
The **twill weave** is similar to the basket weave. It also uses *many threads, often three or four weft threads laced through two or three warp threads*. These threads are usually of *cotton*, while the pattern produced is **diagonal**, showing the blocks lined up in a slanted manner.



Left: woolen twill in the herringbone tweed pattern. *Center above:* cotton twill or chino.
Center below: A twill weave can be identified by its diagonal lines. This is a 2/2 twill, with two warp threads crossing every two weft threads. *Right:* Diamond twill, with weaving edge (left), blue warp, red weft.

How do different textures and patterns occur? What are the different weaving techniques? (6)

The **satin weave** leads the **weft thread** pass **under four pieces of warp** thread, but makes it go **over just one piece of warp** thread. Threads are usually of **silk**, while the fabric created is *delicate and loose*.



A satin weave, common for silk, in which, each warp thread floats over 16 weft threads.



Satin cloth



Sateen fabric

Generally, the types of weave that require **equal ratios of weft and warp**, like the basket weave, create **sturdier cloth**, while the others, like the satin weave, create **softer and more delicate fabrics**.

How do different textures and patterns occur? What are the different weaving techniques? (7)

Gauze weaving creates thick, but *extremely lightweight* fabrics, which look *almost transparent*. The two different **warp threads** used **are not necessarily parallel** to each other and in some cases, may even be at such an angle that they become weft threads.

The fabric produced is *versatile* and used for a variety of reasons, including medical ones (to dress up wounds), due to its durability and absorbency.



How do different textures and patterns occur? What are the different weaving techniques? (8)

Another favorite technique is the pile weave. Through this process, **three or more different layers** are developed, giving the fabric a *soft feel*. The textile produced is plush, yet resilient and is used to make velvet, corduroy, upholstery cloth and carpeting.



Chenille bedspreads



Shag carpet



Corduroy

How do different textures and patterns occur?

What are the different weaving techniques? (9)

Wall-to-wall carpeting is usually based on this weave that creates a soft feel under the feet and is easier to keep clean. *Area rugs* are still manufactured with such hand weaving techniques that were developed centuries ago.



Left: Carpet with coat of arms, made with cotton warp, silk weft and pile, as well as metal wrapped thread (Iran, 17th c.).

Center left above: Medallion, a common design in Persian carpets.

Center right above: Carpet seller in India.

Right above: Weaver in Morocco.

Right below: Traditional rug being woven on a carpet loom.



How do different textures and patterns occur? What are the different weaving techniques? (10)

Tapestry weaving is elaborate, as it involves detailed images, which are produced by weft threads in a *variety of colors*. Images are placed behind the stretched warp threads and the weaver tries to match the image, using two weft threads at one time or separately, depending on the colour that needs to be created.



Tapestry yarn that's used in looms can be made of wool, silk, linen, and cotton fiber.

How do different textures and patterns occur? What are the different weaving techniques? (11)

An interesting, *geometric* look results from clasped weft weaving.

In this technique, the weaver **changes the weft thread to a different color in the middle of the row.**



Left below: a perfect example of a clasped weft combined with a twill.

What are the different types of weaving looms?

Weaving looms are used to *make handmade fabric and textiles*. There are many different types of looms.

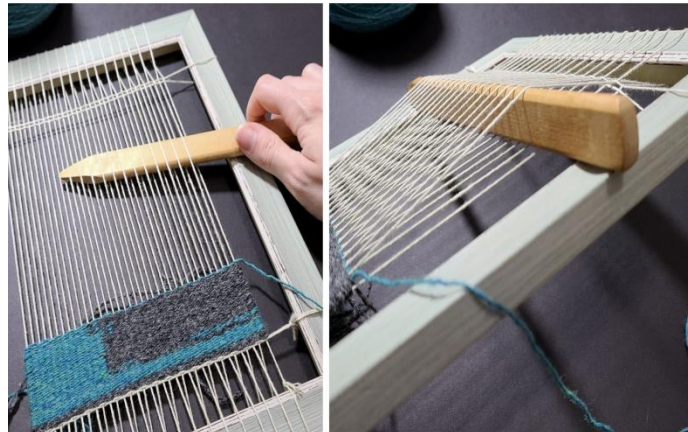
The **floor loom** is the *most popular* among experienced or professional weavers. It is large, free standing and usually operated with a foot pedal. It also has the greatest *versatility*, as it can *produce the largest size of fabric*, as well as develop *complicated and intricate designs* in textiles. It is, therefore, used to make blankets, rugs, even tapestries.



Left: In some looms, a shuttle is used to weave the weft

What are the different types of weaving looms? (2)

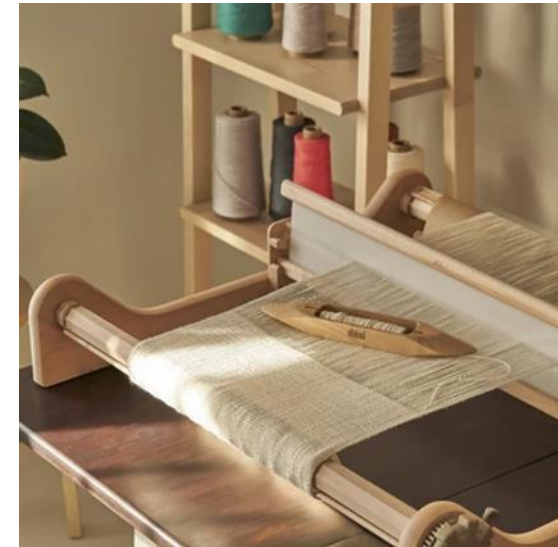
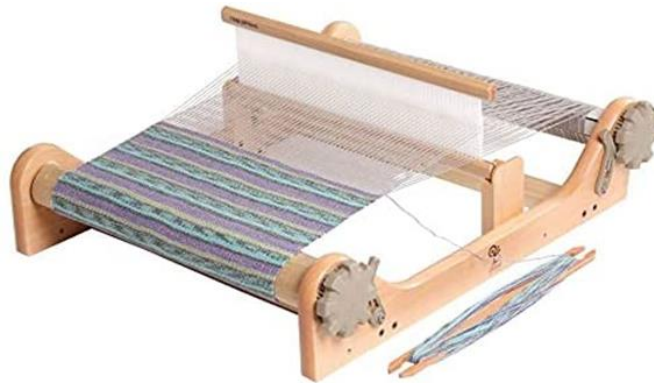
A **frame loom** is a very simple type of loom, although it can develop elaborate designs. Its disadvantage is that it can only produce *textiles at the size of the frame*.



What are the different types of weaving looms? (3)

Table looms are smaller and often portable.

They can often produce intricate designs, but are not large enough to create rugs or large blankets, like a floor loom.



Rigid heddle weaving looms are easy to work with and are, therefore, recommended for beginners. Yet, they can only weave a *textile of short width* and are often used to manufacture pillowcases, placemats and scarves.

What are the different types of weaving looms? (4)

A power loom is a mechanized tool that uses a drive shaft for power. This enables manufacturers to *create textiles much faster* than with a hand-driven loom. They were invented in the early 19th century and are considered to be *a major achievement of the industrial revolution*.

The source of the power that allowed them to operate varied. Originally they were *powered by water*, later on that changed to *steam power* and eventually *air powered and electricity powered* looms were created.

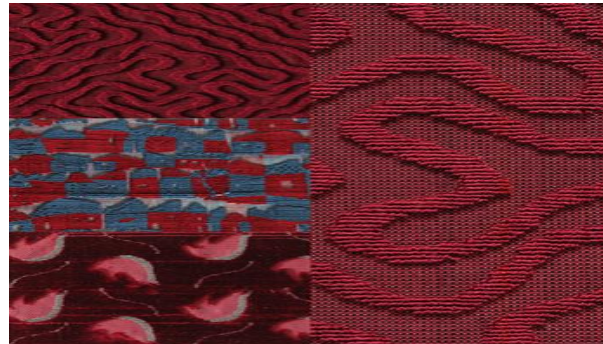


Left: Textile machinery at the Cambrian Factory, Llanwrtyd, Wales in the 1940's.

Right: Mechanical looms are used on an industrial scale. Power looms work faster than hand-driven ones.

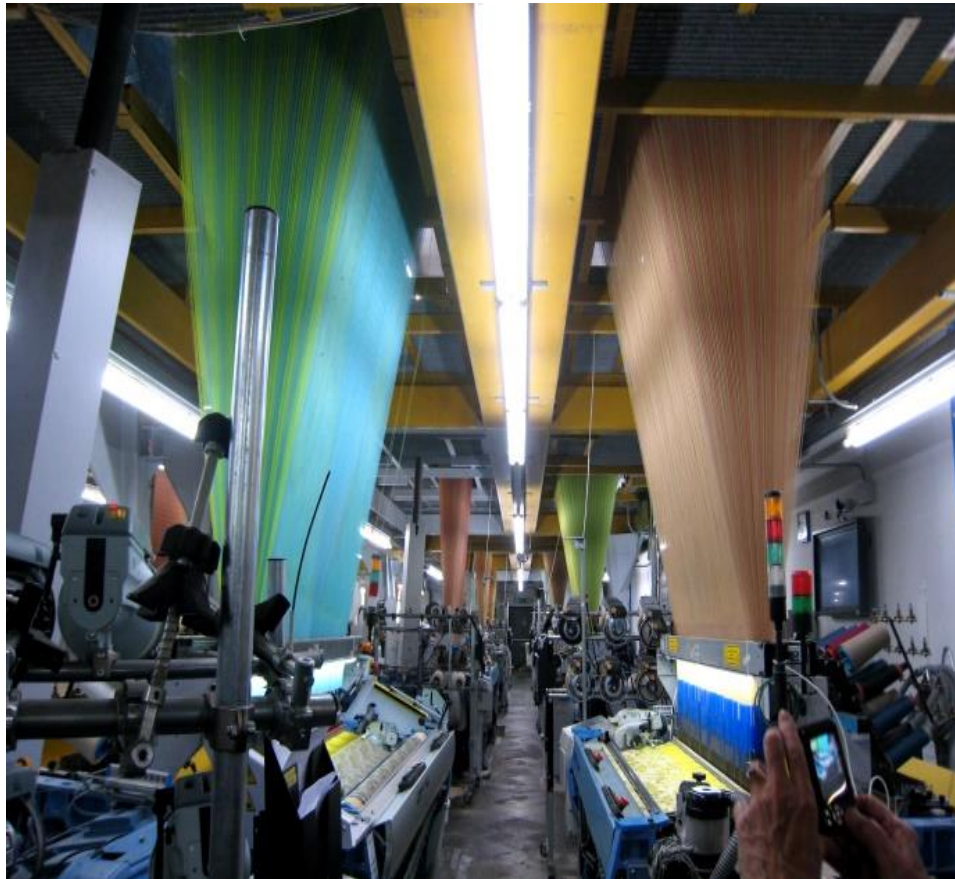
What are the different types of weaving looms? (5)

Among the types of looms developed is also the first computer-controlled, electronic, **Jacquard loom**, introduced around 1803, which used punch cards to create complex patterns in the weave and is considered to be a pioneer that helped introduce concepts of computer programming.



What are the different types of weaving looms? (6)

Contemporary Industrial Weaving



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