Magic in the Water

wet finishing handwovens

Laura Fry

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Definitions

Agitation:

After scouring, the cloth is agitated by hand or machine to encourage the threads in the web to shift toward areas of least resistance. Agitation minimizes or eliminates reed marks, and enhances weave structures dependant upon the movement of the threads from the perpendicular. Wool or hair fibres may also undergo degrees of fulling during agitation or intermittent compression.

Cold Mangling:

Bast fibres can be compressed by cold mangling either by using a small hand mangle, or a large cold mangling machine. See photos/pictures in Linen section.

Compression:

Once the cloth has been sufficiently agitated, and before it is allowed to completely dry, it is compressed. The purpose of compression is to flatten the yarns and lock them into place. Flattening the yarns increases sheen, which is considered especially desirable for linen and silk. Locking the fibres into place increases stability, which helps the cloth to wear longer and to hold its shape.

Hard Press:

Normally done with heat, generally a hard press is done with an ordinary hand iron using a lightly padded ironing board. The heavier the iron, the more efficient the pressing will be.

The still damp cloth is laid out with the grain straight (warp and weft perpendicular) and the iron, set to the appropriate temperature for the fibre, pressed down on the cloth for several seconds. It is then lifted, moved over so that it overlaps the first pressure point and held down hard again. This continues until the complete width and length of the cloth are compressed on both sides or faces, and the cloth is nearly or completely dry.

Generally I will do the first side, then the second, and then the first again. Once the hard press has been completed, the surface can be polished by sliding the iron on the surface of the cloth as for ironing. If the cloth is still damp after hard pressing it can be laid flat, rolled on a slotted beam, or Z-folded to air dry. A small home flat bed press can also be used for hard pressing.

Intermittent compression:

Kneading by hand or foot or using a front-loading washing machine will apply intermittent compression. A fulling mill (a type of hammer mill) also applies intermittent compression. The cloth is pounded in some fashion, rather than just being agitated.

Mercerization:

Cotton yarn or cloth is saturated with a solution of caustic soda while it is held under tension. This process increases the strength, lustre and absorbency of cotton fibres. The process is sometimes applied to linen.

Scouring:

Natural or added spin oils are removed from the yarn or cloth using water and soap or detergent.

Set:

Warp density, i.e. how many ends per inch.

Sett:

The colour order of a tartan.

Staple:

The length of an individual fibre is called its staple.

Web:

Sometimes referred to as grey or greige by industry, cloth that has not yet been wet finished is not considered to be true cloth but a web.

Z-fold:

To air dry cloth that has been wet finished, it can be rolled on a slatted roller, or laid out flat and folded in a zigzag. The folds are not pressed down but allowed to gently curl.

Introduction

The transformation from a web of interlaced threads to cloth can be subtle or dramatic, but until the web has been wet finished, the cloth has not reached its full potential.

While handweavers do not generally apply many finishing treatments after weaving the cloth, the basic processes of wet finishing are well within their capability. In many instances wet finishing may resemble simple washing of the cloth, but it is much more than that.

Wet finishing consists of:

1. Scouring
2. Agitation or intermittent compression
3. Compression

Scouring

Generally, any commercially spun yarn will contain natural or added oils, waxes, sizing, or resins to aid in the spinning, weaving or knitting process. These additives affect the colour of the yarn, usually imparting a yellow cast to it. The oils and waxes also attract and hold dust and dirt. The resins or sizing will feel stiff or harsh resulting in a board-like fabric.
By removing these additives, scouring brightens the colour and improves the drape or handle of the cloth.

Agitation or intermittent compression

Agitation helps the yarns find their proper places in the weave structure, especially in those textiles that depend on threads being deflected from the vertical or horizontal (warp and weft) for their effect. Weave structures such as lace weaves, waffle, honeycomb and deflected double weaves are all enhanced by wet finishing. When the yarn is immersed in water with a little soap or detergent for lubrication, the individual threads relax, bend more easily around each other and begin to move towards areas of least resistance.

Agitation will often remove or reduce streaks in the web caused by the reed dents, as the threads shift and move towards equilibrium of tensions.

If the yarns are wool or other hair fibre, the phenomenon of fulling can produce special effects. The use of intermittent compression rather than agitation alone will affect the quality of fulled wool fabrics. Agitation alone will result in a softer fabric with a loftier nap, or fuzzy surface. Intermittent compression will produce a cloth that feels harder, even using identical wool yarns.

Compression

The final compression can be applied by hard pressing with heat or cold mangling. Compression helps to add stability to the cloth. The application of heat and compression enhances the shine of fibres, especially mercerized cotton and silk. It will also add shine to wool, which if not desired, can be removed by simple steaming.

Linen and other bast fibres have traditionally been cold mangled in Scandinavian and European co untries. In Sweden many apartment buildings have large cold mangles weighing hundreds of pounds in the

laundry area for tenants to use. It is not unusual even today for private homes to have cold mangles. In Sweden small hand mangles consisting of a roller or large dowel and a larger flat board were traditionally made as betrothal gifts. Large mangles are still in use, but there are also smaller cold mangles that can be used for towels.

Although the equipment used during the process of wet finishing may be the same as that used to launder textiles, the wet finishing process is not necessarily recommended for simple cleaning. Wet finishing generally uses much hotter temperatures or greater degrees of agitation than required, or desired, for cleaning. It is important for handweavers to know how to properly wet finish and then how to appropriately clean their handwovens to maximize the performance and longevity of their textiles.

Cotton

Cotton fibres come from the boll or seedpod of the cotton plant. The fibre itself is a hollow tube that upon harvesting collapses into a flat "ribbon". Generally, cotton fibres are approximately ¾ to 1 ½ inches in length. Cotton has greater strength when wet than dry. Even when dry, cotton has above average tensile strength and it has good flex strength as well.

Cotton does not shrink, although it may appear to do so. When it gets wet, the flattened ribbon will absorb water and become round again. This change in dimension will pull the yarn up shorter, but will relax again into its original shape. Although elasticity is low, recovery from minor elongation is good. Cotton has low elasticity and resilience.

Cotton is absorbent and the mercerization process will enhance absorbency even further. It is highly resistant to alkalis, but susceptible to acid damage. It is also damaged by prolonged exposure to sunlight and will mildew and rot after prolonged exposure to water. Repeated wetting and drying will not affect it, so it works well for towels.

Cotton is not affected by cold temperatures but will degrade if exposed for long periods to temperatures in excess of 149C (300F). Rapid deterioration will occur in temperatures over 246C (475F).
Cotton is useful for many household textiles such as towels, tablecloths, placemats, curtains an
d so on. Cotton is also useful for many different types of garments, from simple fashion accessories to constructed clothing.

Wet finishing cotton resembles ongoing cleansing of the finished item as the same sort of procedure is used, but the initial introduction of the loom-state web into water produces definite changes in the cloth. Once wet finished, cotton does not radically alter in appearance and subsequent cleanings will not change the character of the cloth the way initial wet finishing will do.

A natural (undyed) cotton web is somewhat yellow in colour, sleazy and is not stable. If loom-state cotton is cut, it will immediately begin to ravel or come apart. Weave structures such as lace, waffle or honeycomb have not achieved their full effect. Once into water and soap (or detergent) the colour will be brighter; lace weave will be more lacy, or open; waffle and honeycomb will be more three-dimensional. Reed streaks will be minimized and the overall look of the cloth will be more consistent and cohesive. The drape or handle of the cloth will be improved.

Cotton fabrics intended to be cut and sewn into garments should be given a hard press, which will increase stability of the cloth.

Wet finishing cotton is easily accomplished either by hand or machine. I recommend using the hottest water available with ordinary laundry soap or detergent. Cotton can be air or machine dried until damp and then given a hard press.

Small items such as scarves or shawls are easily wet finished by hand. Larger pieces of loom-state cloth can be finished by washing machine and excess moisture removed in a machine dryer. Hard press the still damp cloth by pressing down on it for several seconds, lifting the iron over and pressing down again. When hard pressing fabric, I will press one face of the fabric, turn the cloth over and press the other face, then finish by pressing the first face again. If it is desired to leave some texture on one face, press only on the other (or untextured) side of the cloth, but do it three times.

Future cleaning of cotton items will depend upon what you make from the cloth. Flat items such as placemats or scarves can be hand or machine washed, dried and then ironed if needed. Unstructured garments might be machine or hand washed while structured garments with interlining or interfacings might require dry cleaning.

Linen And Ramie

Linen and ramie fibres are taken from the stems of their respective plants and are referred to as “bast” fibres. Linen fibres come from the flax plant grown especially for fibre.

The plants are pulled from the ground in order to keep the fibres as long as possible, up to 50cm (approx. 20 inches). Rated a moderate to strong fibre, flax is strongest when wet. It does not have good resistance to flexing. Elasticity and resilience are low while absorbency is higher than cotton. Exposure to light will eventually cause degradation. Repeated wetting and drying will not affect the fibre, but it can be attacked by mildew.

Linen will withstand temperatures up to 149C (300F), but exposure to temperatures higher than this over a long time will cause discolouration. It is not adversely affected by cold temperatures. Linen ages well stored in a dry, dark environment.

Ramie comes from a bushy plant in the nettle family. The fibres come from the stem of the plant and can be long and fine with a high lustre. Like linen it is strong but has poor flexibility, low elasticity and low recovery from elongation. It has greater resistance to microorganisms, insects and rotting than cotton and linen.

There are several recommended methods for wet finishing linen and ramie. One is to place the loom-state cloth into alternating boiling and ice water baths. Another method involves freezing the cloth after wetting it out and scouring.

You can also place the web into warm water with an ordinary laundry detergent and apply fairly vigorous agitation, which helps to remove reed marks in the web. It is advisable to avoid wringing the wet cloth, or even spinning it out in a washing machine during initial wet finishing, to avoid permanent creases.

The method of compression I now prefer for bast fibres is cold mangling. This is the application of pressure without heat.

“New” bast fibres are stiff and not very pliable. The application of pressure, or alternating hot and cold water baths, are efforts to break the fibre down somewhat in order to enhance pliability and increase drape. It is accepted wisdom that linen improves with age. The fibre softens with use and laundering. Cold mangling efficiently encourages this softening without unduly damaging the fibre itself.

Cold mangling is achieved by rolling the damp cloth around a dowel and applying consistent pressure. This can be done by hand using a hand mangle.

Larger pieces can be processed in a large cold mangle.

A large cold mangle has a flat bed often made from a large slab of stone, several large dowels (approximately 10 cm or 4 inches) and a top slab that rests on the dowels. The top slab moves, rolling the dowels back and forth.

The damp cloth is rolled tightly around one of the dowels. A length of fabric covers the cloth being mangled, separating the layers and protecting it from the stone slabs. There must be no creases or folds in the cloth or these will be permanently set into it.

The dowel is inserted into the mangle between the two stone slabs and the top stone is lowered onto the dowels. The top stone begins to roll back and forth applying extreme pressure to the cloth. The mangle pictured weighs almost 1500 kilos or well over 3000 pounds.

As the dowel rolls back and forth, slack begins to develop in the rolled cloth as the compression flattens the fabric. The dowel is removed from the mangle, the cloth removed and re-rolled onto the dowel from the other direction and mangled again.

The process is repeated until the desired compression has been achieved.

To mangle small items, tightly wrap around a dowel and roll on a hard surface. I have used a rolling pin, or even a glass bottle with straight sides.

In industry, small hammers are repeatedly banged against the cloth in a process called “beetling”.

Having tried both cold mangling and hammering by hand on small samples, I have found cold mangling to be easier to apply, requiring less physical effort than hammering or banging the cloth. I have processed a length of ramie yardage by beating it and was quite satisfied by the resulting fabric, but it is a noisy and physically demanding way to accomplish the compression of the cloth.

Once cold mangled, the still damp cloth can be ironed to polish the surface and further develop the shine. Stiffness after drying can be worked out by rolling the cloth into a tube and gently squeezing it until the whole cloth has become more pliable. Larger pieces of cloth can be tumbled in a machine dryer with no heat. Iron out any folds in the cloth.

Future cleaning of linen items will depend upon the final intended use for the cloth. Wash flat items in warm water with ordinary laundry detergent or soap, hang until damp, then cold mangle or iron. Hand wash or dry clean

Rayon

Rayon is made from cellulose in the form of wood pulp and/or cotton linters. These are turned into a viscose solution and fed through spinnerets. Since rayon is extruded, the fibres can be any length and a variety of shapes as the nozzle of the spinneret can be chosen for fibre qualities. The solution can have dye added to it or the resulting yarn can be dyed before or after weaving.

Because the cellulose solution can be adjusted by adding various chemicals to it, a great variety of qualities of rayon can be manufactured. Regular viscose rayon has low tenacity, but high wet modulus rayon has high tenacity, while Saponified cellulose rayon is classified as very high.

By adjusting the chemicals in the solution, rayon can have low to high dimensional stability, elongation, and elasticity. All qualities of rayon have good absorbency and are resistant to weak alkalis, although strong solutions will cause loss of strength. Rayon is also resistant to dilute acids, but will disintegrate in concentrated solutions.

Degradation is also caused by exposure to sunlight, and water causes a loss of strength with damage occurring in the presence of mildew. Cold will not affect rayon, but prolonged exposure to temperatures in excess of 177C (350F) will cause damage.

All of the rayons I have used have reacted well to wet finishing as for cottons, although a medium temperature rather than a hot temperature should be used.

Lyocell (Tencel®)

Lyocell, or Tencel®, the brand name owned by Acordis, is the newest fibre available for textile production. It is also a cellulose fibre, but it is made from wood pulp from managed forests. The process is much friendlier to the environment, using a closed loop system which recovers and re-uses the chemicals involved in the viscose solution.

I have only used Tencel A100 brand of lyocell. Tencel A100 is very strong, in fact the strongest of the cellulose fibres. It does not have good elasticity. It is also susceptible to alkali damage. It is very absorbent and as a result, the cloth feels very stiff when wet. When dry, the fabric has a fluid handle and excellent drape.

Wet finish Tencel® with warm water, a light soap or detergent solution, agitation and a hard press. This results in a cloth with a lovely sheen and very good drape.

Chenille

Chenille yarn has a central core from which short fibres protrude. Traditionally chenille yarns were made by weaving them on a widely spaced warp which was then cut into strips along the length of the warp. Recent developments in spinning have resulted in chenille type yarns that are constructed on a knitted core. They may have smooth areas and tendrils, either short or long, spaced along the length of the yarn.

Traditional rayon or cotton chenille used for both warp and weft is finished with the usual warm water, soap or detergent and agitation, but is not generally hard pressed. Some people recommend misting the web, placing it into a plastic bag overnight, and then tumble drying. I find that by wetting the web out thoroughly and agitating that the resulting cloth seems to have more drape, and scouring removes any dust or dirt that may have accumulated during storage and handling. garments as appropriate for their construction.

When used for garments chenille is usually given a hard press in order to prevent seams from showing the tracks of the iron where they are pressed open. The cotton chenille fabric for the jacket in the Project Section was given a hard press only on the “wrong” or back face of the cloth in order to preserve as much of the texture of the honeycomb weave structure as possible.

Again, the future cleaning of items is dependent upon factors such as construction. Flat items might be hand washed, while structured or tailored items using interlinings and facings will respond better to dry cleaning.

Silk

Silk is the fibre extruded by the silkworm for its cocoon. As the cocoon is being formed, the worm sticks the fibres together with a gum call sericin.

The fibre that is reeled from the cocoon is very fine and up to 2750 meters (3000 yards) long. Silk is very strong when dry and is somewhat weaker when wet. Elasticity is good, with recovery from 2% elongation at 92%. Silk has low resistance to alkalis, but good resistance to acids.

Silk has low resistance to sunlight, and while unaffected by heat up to 135C (275F), temperatures over 177C (350F) will cause scorching and rapid decomposition. It is not harmed by wetting and is resistant to mildew. Silk will oxidize, so it is best stored in a sealed environment and away from carpet beetles.

Silk fibre comes in a vast array of qualities. The best quality is considered to come from the Bombyx mori silkworm that has been fed only mulberry leaves, but this fibre also comes in levels of quality. The premium is considered to be the reeled fibre, which is very smooth and lustrous. The shorter fibres left from the reeling can be spun into a somewhat less smooth and lustrous yarn and the very shortest bits are spun into a textured yarn. Silkworms (usually other species) fed on leaves from other than the mulberry bush produce a browner fibre with less lustre than the Bombyx, and this is often referred to as tussah.

Most silk yarns that handweavers use have already been de-gummed, so this process is not generally required. There is an exception, which will be covered under Special Techniques.

Generally, wet finishing silk follows the same procedures as for cotton, but warm water is sufficient. Scour the cloth with a soap or liquid detergent and gentle agitation. Alkali will damage silk so it is best not to soak it in soap or detergents for any length of time. Small items can be hand agitated in a basin and hung until the excess water drains out. It is important to not wring silk as this can set creases into the cloth that become next to impossible to remove.

You can process yardage in a washing machine using the “gentle” action and warm water settings. It is a good idea to remove the cloth from the washing machine before the entire spin cycle is complete so that creases will not be set into the cloth. A few minutes in a machine dryer to remove excess water followed by a hard press on both sides of the cloth until dry, or almost dry, will develop a glossy shine on the fabric.

Once dry, silk fabric will often be very stiff. At this point it needs to be “worked” to soften it. Small items can be slapped against a smooth hard surface such as a tabletop. Larger pieces of cloth can be put into a machine dryer and allowed to tumble with no heat for 5 or 10 minutes. Any fold in the cloth can then be ironed out.

Future cleaning of silk can be done by hand for flat items such as scarves and shawls or unstructured garments. More structured or tailored clothing with interlinings and interfacings may need to be dry-cleaned.

Wool

Wool fibres usually come from sheep that have been bred especially for their fibre. Once or twice a year, depending on climate and how quickly the fleece (coat of fibre) grows, the sheep are shorn and the fleece is sorted for quality and length of staple. As the fibre grows differently on different parts of the sheep, the sorting is done in order to keep fibres of similar quality together so that the yarn spun and the cloth woven from the fibre will be consistent. Generally the 'best' quality comes from the sides and shoulders and may be reserved for worsteds. The next grade is used for woollens while coarse fibres are used for carpeting. Lamb's wool, most often reserved for clothing, is fibre that has been shorn from animals less than eight months old.

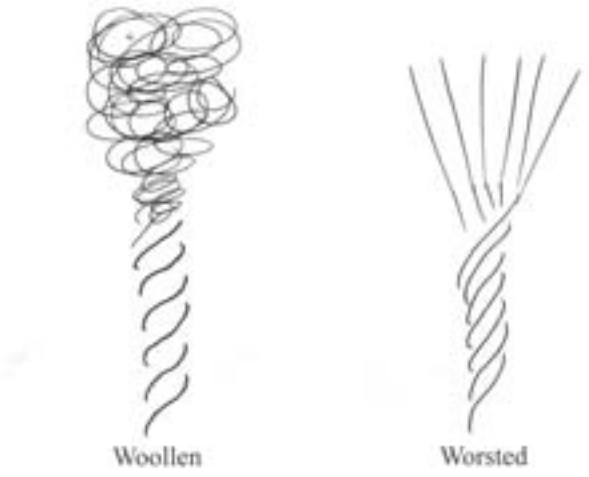
Once sorted into consistent quality of fibre (micron count, length of staple, crimp) the fibre is scoured of the natural oils, called lanolin, and other foreign matter. The lanolin is recovered and used in the cosmetics industry.

The clean fibres are then prepared for spinning to make either worsted or woollen yarn. During spinning, a light application of spin oil is often added to help the fibres hold together.
Wool is a fibre of great variety. Fibres may range in length from very fine, to very coarse (15 microns to 70 microns) and in length from 3.8 to 38 cm (1.5 to 15 inches). They can be flexible or stiff, have a lot of crimp (waviness) or very little.

Although wool fibre is rated as weak, it is very resilient with good elasticity and excellent recovery from elongation. Good flexibility and reshaping by heat, moisture and pressure allows wool fibres to be processed into an enormous range of qualities of cloth.

With a high absorbency rate, and hygroscopic behaviour, that is, the ability to retain heat as it absorbs and evaporates moisture, wool makes good clothing fabric. Depending on the weave structure, wool also will shed or repel moisture.

Wool is susceptible to alkalis, with a fair resistance to mild acids. Prolonged exposure to sunlight will cause deterioration. Wool is weaker when wet, and when subjected to heat and moisture, can become stiff. Dry heat above 132C (270F) will cause yellowing and decomposition. Above 300C (572F) charring will occur.



Most wool and other hair fibres share the characteristic of "fulling". This phenomenon is unique to wool and hair fibres, and while the effect of fulling is well documented, no one seems to know why it happens.

In the presence of heat, moisture and agitation, the fibres will begin to migrate and the scales that make up the

shaft of the fibre will open out away from the shaft. As fulling progresses the fibres increasingly move, shift and entangle with each other. Once dry the scales clamp down against the shaft capturing anything that has gotten in between the scale and its shaft. Dimensional loss may be significant.

Woollen yarns are prepared by carding which encourages the fibres to trap air within the yarn. Woollen yarns are loftier than worsted yarns, which are combed keeping the fibres as parallel as possible.

A specific woollen yarn can produce very different qualities of cloth depending upon the density (number of ends per inch/centimetre), weave structure (number of interlacements per pattern repeat) and degree of fulling applied during wet finishing.

Quality of cloth is also affected by whether one agitates the cloth, or if intermittent compression is applied. A cloth that is only agitated will be much softer and develop a loftier nap (fuzzy surface) than one that has been subjected to intermittent compression.

Woollen cloth with a nap is more likely to develop "pills" (little balls of matted fibres) during wear, but will be warm, as the nap will help trap air for insulation. A cloth that has been intermittently compressed with be denser and can help provide protection from wind as air will not as readily pass through the cloth.

Many people believe that wool is a fragile, delicate fibre. Rather it is the finished **state** that is fragile. Fulling is an incremental process that can be continually added to, but not removed from, the cloth. Once the fabric has been processed to its intended final state, great care must then be taken to apply no more agitation during future cleanings. It is therefore generally recommended that "finished" wool items be either hand washed with no agitation or dry-cleaned.

Any additional fulling (or agitation) once the wool item has reached its finished state may ruin the cloth for its intended purpose. The cloth will become thicker and smaller as shrinkage continues. As anyone who has tossed a wool sweater into a washer and dryer will know, said sweater will no longer fit!

Woollen processing – scouring

The initial process begins by scouring to remove the naturally occurring or added spin oils from the web. As long as the oils are present in the web, the fulling process will take much longer to happen as the oil will prevent the scales from opening up and retard the moving and shifting of the individual fibres within the yarn.

Soap or detergent is used to remove the oils. As wool can be damaged by alkalinity in excess of pH 10, it is recommended that a liquid detergent or soap be used. Powdered detergent can be used in a "light" solution. Generally I use only enough detergent (liquid or powder) to produce about 2 cm (1 inch) of bubbles on the surface of the water.

Detergents have an additional chemical that helps to keep solids in suspension preventing them from re-settling onto the fabric. Where I live, the water is considered to be "hard", i.e. it has a lot of naturally occurring minerals in it. If I use soap, a grey scum lies on the surface of the water as the soap reacts with the minerals. Therefore if you have hard water, you may wish to use detergent rather than a "pure" soap. Always choose a soap or detergent without "bleach" or other "brighteners".

Fill the washing machine or tub with sufficient water to cover the web, add the soap or detergent and agitate to bring up the bubbles. The hotter the temperature, the faster the fulling process will take place, so a warm or tepid temperature is recommended if you have not done a lot of fulling. By using a cooler temperature rather than a

hot one, the fulling process will happen more slowly. It will therefore be easier to control the degree of fulling applied to the cloth.

The soap or detergent also acts as a "surfactant" breaking down the surface tension of the water and allowing the fibres to absorb water more quickly.

Enter the web into the soapy water and begin gentle agitation. If the bubbles disappear within a minute or two, the soap or detergent has "neutralized" as much of the present oils as they can and it is necessary to use more. I do this by removing the web from the water, draining out the water bath then adding fresh water and soap or detergent. Use the same temperature of water as the cloth, as wool does not like to be "shocked" by temperature changes. Temperature shocks can cause the scales to break off the shaft of the wool fibres making the cloth feel harsh or brittle.

When fulling by hand, the cloth will sometimes cool to room temperature. In this event, use water at room temperature to continue further processing, or to rinse the cloth of soap/detergents. When using a washing machine, it is best if you can set the temperature of the water for the wash and rinse cycles, and monitor the temperature of each. On my machine, I can choose which part of the wash and rinse cycle I want to use, and the temperature setting of hot, warm or cold water. It is possible for me to adjust the temperature during the in fill part of the cycle by switching from hot to warm, warm to cold, etc.

Once the tub has been filled with fresh water and soap or detergent, re-enter the wet web and gently agitate again. If the bubbles disappear once more, repeat removing the web, draining the water, drawing fresh water and soap or detergent until at least a light skim of bubbles remains in the tub. At this point the web has been scoured of the oils and fulling can begin.

It is not necessary to have a lot of soap or detergent but a little bit acts as a lubricant encouraging the fibres to shift and move.

The Fulling Process

There are a number of ways to full by "hand". The wet web can be kneaded in a tub, bucket or on a flat surface. This is intermittent compression and will develop a "harder" cloth with a shorter nap than agitation alone.
The kneading can be done by foot power, especially if significant fulling is being applied. Fulling can take some time to develop the cloth to its desired state. If significant fulling is desired, it is speeded up by the presence of heat and retarded by cold. Therefore if you have not done a lot of fulling, it is better to start with tepid or cool water so that you can carefully monitor the fulling process as it begins to happen. Soap or detergent will also encourage the fulling process, but you don't need to use a lot – a little will be sufficient. A light skim of bubbles on the surface of the water is all that is required.

As the fulling begins, watch for the size of the bubbles to begin reducing. This indicates that the spaces between the threads are closing up.

Be aware that some wools take considerable time before the fulling process even begins. It may take only a few minutes, but it can also take 10 or 12 minutes or even longer depending upon the yarn – how tightly twisted it is, and the weave structure. However once the fulling process begins it will develop rapidly, so once you start seeing changes begin to happen you will have to monitor the cloth closely to make sure it doesn't go farther than what you wish for the finished state of your cloth.

If you are kneading, the resistance of the cloth to being manipulated will change in character. Instead of a loose

mass that can be easily pushed down, there will be a feeling of more substance and solidity.

Check the stability of the web by running your fingernail across the thread (I usually do this from beneath the cloth) and see how easily the threads shift from their place in the weave structure.

The desired stability of the cloth will depend on the function the cloth is to perform – a shawl need not necessarily be as stable as fabric used for garments or upholstery, for example.

As fulling can be added to but not subtracted from the cloth, it is best to stop the process somewhat short of what you think is necessary. Rinse the soap or detergent out using fresh water about the same temperature as the cloth which may have cooled considerably during fulling. If the cloth is still not quite stable enough, further agitation or kneading can be applied during rinsing.

It is very important to not wring wet wool fabric as it is very "plastic" and can be distorted by wringing it. Instead you can spin it out in a washing machine or simply heap it up and allow gravity to pull the water to the bottom of the mass and gently squeeze. Do not hang larger items as the weight of the water in the cloth can also cause distortion.

When using a washing machine to spin out the excess water, do not use the entire spin cycle, just spin until the cloth is no longer sopping wet.

Roll the cloth on a slotted roller, lay flat or carefully Z-fold it and cover with towels or plastic to prevent it from drying out until you can hard press it.
If you are planning on brushing up a nap, you need to decide at this point if you will brush it before hard pressing, after hard pressing, and/or after the cloth has dried completely.

Brushing before hard pressing will generally develop a much loftier nap which may be desirable for blankets or afghans. Brushing after hard pressing will raise a shallower nap. Brushing after the cloth has been completely dried will usually result in the lowest nap. "Dry" brushing is done after the cloth has been allowed to dry completely and then is spritzed with water which acts as a lubricant.

Fullers Teasels on Left. The head is much denser with harder spines

Brushing is traditionally done with Fuller's Teasels, but can also be done with a pet brush, or other instrument which will pull individual fibres out of the yarn/cloth to raise a nap. Large items are more efficiently brushed when stretched on a frame of some sort, but small items such as scarves can be brushed by laying them out on a flat surface and clamping them down against the surface with your arm while wielding the brush in your other hand. I generally do this on my ironing board.

Fulling by machine

In North America, most washing machines are top loading with a central agitator. If significant fulling is to be applied to the cloth using this type of washing machine, it is recommended that the web be prepared by folding it along the length (warp) and whip stitching the selvedges together. Use cotton or other fibre that does not full! Then fold the length in half and whip stitch the beginning and end together making a large circle or ring. The web should then be placed so that the ring is around the agitator.

By stitching the web together in this way, the fulling process will be more evenly distributed throughout the cloth.

When significant fulling is intended, ruffling at the edges of the cloth may develop if it is left loose. After fulling is complete, remove the stitching and lay flat, roll, or fold and cover with towels or plastic sheet if you cannot begin the hard pressing immediately.

Top loading machines with central agitators will apply agitation only. A front loading machine with rotating drum will apply intermittent compression and does not need the cloth to be prepared in this way. It is very important to not overload either type of machine so that the fabric can move freely and allow the intermittent compression or agitation to be applied evenly. As each machine has its own capacity, you will have to experiment to discover the limits of your own machine.

It is absolutely necessary to monitor your machine and the progress of the fulling. Do NOT simply start the machine and walk away from it. Each machine will have its own vigorousness – an older machine may not agitate as energetically as a new machine, for instance – so careful monitoring of the fulling as it progresses must be maintained. Whenever possible, you should use the same temperature of water for the rinse water in order to not shock the wool and damage it. A machine that allows you to stop the cycle to check for stability is preferred.

A hard press completes the process and generally I press side one, side two and then side one again. If one face has texture that needs to be preserved, I press only from one side but do it three times. I do not use a pressing cloth but press directly onto the wool and remove any unwanted shine by steaming after the pressing is complete. My ironing board is lightly padded to aid in the hard press.
Items such as blankets need not necessarily be hard pressed, but I generally hard press almost all my fabrics except blankets.

Worsted

Technically, worsted fabric is made only from yarn which has been prepared and spun in the worsted manner. The fibres are combed and lie parallel to each other along the length of the yarn.

While many worsted yarns will full, worsted cloth is not. Worsted cloth is sometimes referred to as “cool” wool. As the spaces between the threads are not filled in with fibre, air can readily move from next to the body to the outside air. Worsted fabrics are commonly used for men’s and women’s suitings. Traditionally, tartans are also worsted fabrics. Stability in a worsted cloth comes not from fulling, but from a denser set and hard press.

When finishing for worsted, I fold the cloth into a bundle that will fit into a tub (bath or laundry). Fill the tub with enough tepid water to completely cover the bundle and add a small amount of soap or detergent to act as a surfactant and to scour out any spin oils.

Gently lay the bundle into the tub and carefully push it into the water. Do not agitate! Gently squeeze the cloth into the water until it is completely wetted out.

Push the bundle back and forth a few times to make sure that it is completely wet and that the soap or detergent has had an opportunity to pass through the entire bundle in order to scour the spin oils from the cloth.

Drain the water out and pull the bundle up against the side of the tub to let the water drain out of it. Do not squeeze or wring. At this point, I will leave it for at least 30 minutes and allow gravity to pull the water out of the cloth.

Draw fresh water the same temperature as the cloth and re-enter the bundle into the water. Gently push the bundle back and forth to rinse the soap out. Re-fold the cloth and push gently back and forth again. Drain the water from the tub and again pull the bundle up against the side of the tub letting gravity pull water out of the cloth.

It is tempting to squeeze the bundle, but leave it to drain for at least 30 minutes. In order to remove the rest of the excess water, you can carefully place the cloth into a washing machine and use the spin cycle.

A hard press completes the process. I hard press wool directly onto the surface of the cloth rather than using a press cloth. The shine that develops can be removed by a simple steaming if desired. Press until dry, or nearly dry. Lay flat or Z-fold to dry completely.

Other Animal Fibres

There are many sources other than sheep for fibres to construct textiles, but most of them do not share the propensity for fulling that wool has.

Mohair generally fulls well, but some of the other animal fibres have to be extensively encouraged before fulling will begin.

Mohair is a fine, silky fibre from the Angora goat. It is lustrous, and has good abrasion resistance and resiliency. Mohair works well with wool, and is often seen in combination with synthetics, especially in complex yarns such as loops or bouclés.

Alpaca, a member of the camel family, produces a fine fibre with lustre. Generally it does not have as high elongation as wool and takes more working to get it to full.

Llama, also a camelid, produces fibre weaker than alpaca. It is sometimes blended with wool.

Cashmere is harvested from the Kashmir goat. The very softest fibres are reserved for garments.

Vicuña, a small camelid, produces a very fine, soft fibre. As domestication attempts have failed, it is very difficult to harvest the fibre and the yarn is rare.

Camels produce both a very fine undercoat and a coarser, heavier guard hair. Both are used, but only the fine undercoat is used for garments.

Qiviut is the fine undercoat of the musk ox. This extremely soft and fine fibre is often blended with wool or silk as it insulates very well and is warm to wear.

Angora is technically a fur from the angora rabbit. The fibre is fine, lustrous and resilient and most often used as a knitting yarn.

Opossum fur, from the Australian opossum, is also available on a limited basis, and generally blended with wool.

It is nearly impossible to determine whether or not any of the above yarns will full and to what degree. The only way to know for sure is to test it. When I obtain a new yarn, I put a warp on the loom about 10 to 12 inches wide and at least three yards long. I weave 8 to 10 inches in plain weave and twill, then wet finish it to see what happens in the water. Then I determine whether or not to change the set and weave another sample. As the cloth develops, I then make further decisions on set, weave structure and how to wet finish in order to achieve the quality of cloth I am looking to produce.

Special Techniques

Warp Dressing or Sizing

There are some yarns that are a bit fragile and it is a good idea to use a warp dressing or sizing to make it easier to use these yarns for warp. The dressing or sizing is removed during the wet finishing process.

Wool

One of the dressings recommended for wool is a gelatine sizing. The sizing can be applied to the skeins, or to the wound warp, but I have found it easier to size the skeins.

How much sizing will depend on your wool, but the following recipe will do approximately 300 grams (3/4 of a pound) of wool

14 grams (half an ounce or approximately 3 teaspoons) unflavoured gelatine
250 ml (1 cup) boiling water
200 ml (3/4 cup) cold water

Add the boiling water to the gelatine and stir until the gelatine is dissolved

Add the cold water and stir

Do not pre-soak the wool skeins, but add them to the sizing solution dry. Remove when thoroughly wetted out. I used a small bucket for the sizing, then hung the sized skeins over a rack in the bathtub with the bucket underneath to catch the drips.

Let the skeins dry, squeezing out the excess sizing and rotating them frequently until they are completely dry. If you don't squeeze out the excess sizing, it stays sticky.

When dry, you can snap the skeins out as usual to unwind. The yarn will be a bit stiff and harsh feeling, but the sizing will wash out completely during scouring.

Leclerc makes a warp sizing called Clerco which can be brushed onto a wool warp that is already on the loom and is causing problems by breaking. Paint it onto the exposed warp with a brush, letting it dry before weaving. You can use a hair dryer to speed up the drying time. It will wash out during scouring.

Linen

Linen does not always need a sizing, but there are times when a singles might cause problems. This recipe can be painted onto a warp that is already beamed. If you start weaving with a sizing, you should complete the project with it as the yarn may beat in differently.

Flax seed dressing
1 tsp flax seed
1 cup water

Simmer seeds for 10 to 15 minutes and strain. The solution should not be thick, but should feel gluey or tacky. Add more water if it is too thick. The sizing can be brushed on to a warp that is already beamed, and worked into the yarn with your fingers, particularly the selvedge.

Other sizings can be made using potato flour, cornstarch or wheat flour.

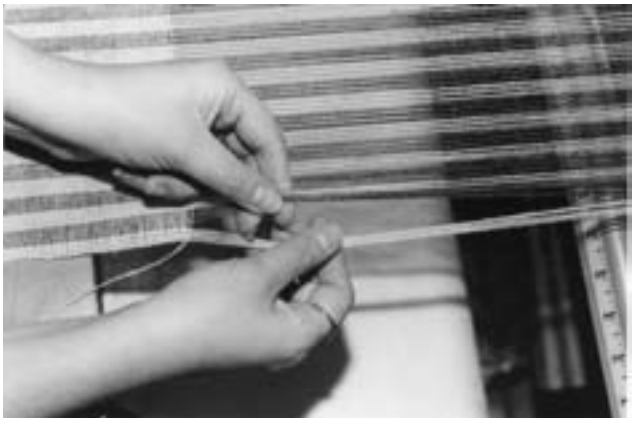
De-gumming Silk

Silk crepe yarns may still have the natural gum or sericin left in it for strength. Once woven, the sericin must be removed, or de-gummed.

To de-gum, you can simmer the fabric in a solution of pure soap and water for 30 minutes. For each 100 grams (3.5 oz) of silk, allow 55 grams (2 ounces) of soap in 7 litres (2 US gallons).
Another recipe calls for a solution of ammonia and soap. If you follow this recipe you should use a very well vented space.

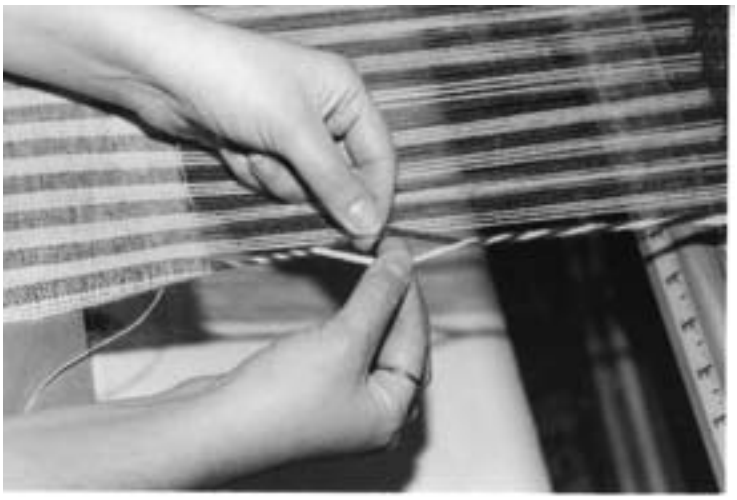
For each one litre (about 4 cups) of water use 10 grams (about 1/3 ounce) of soap and 40 ml (about ¼ cup) of ammonia. Make enough solution to cover the fabric. Boil the silk for 20 minutes.

On Loom Twisted Fringes



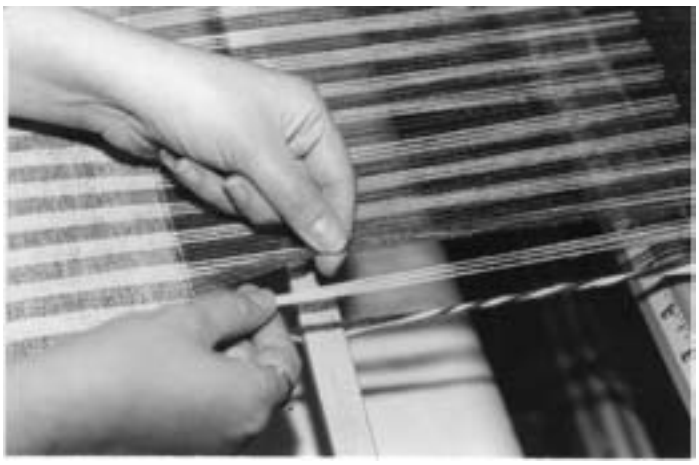
This technique is useful for woollen blankets or scarves.

Weave a header. Select how many warp ends you want to have in your fringe. (For the purposes of illustration, the sample was beamed with two colours. For a yarn this fine I would use fewer ends for an actual textile. Sampling your yarn will tell you how many you need for your yarn.)



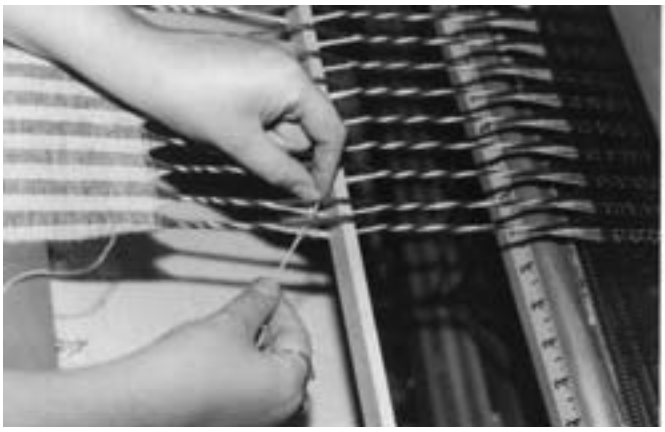
Loosen the tension on your warp and begin twisting the two bouts (groups of ends) around each other. Do not twist tightly as you want the wool to full well in order to be secure after wet finishing.

When you have as many twists in the yarn as you want, insert a small flat stick to hold the twist. Push the stick under the warp to keep it from sliding out while you twist the next bout.



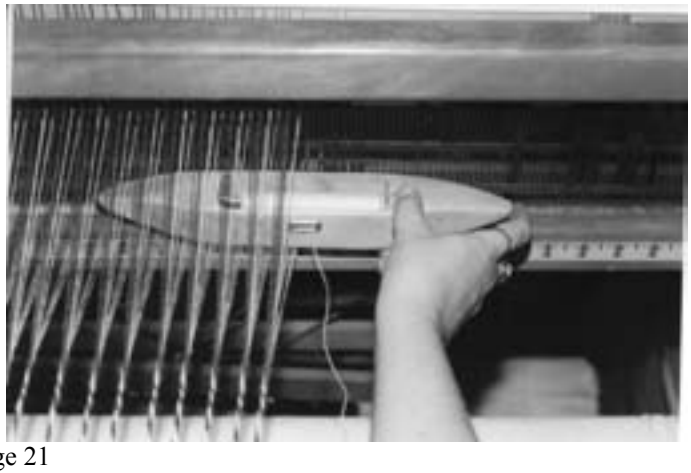
When all the bouts are twisted, turn the stick on its side to form a small shed.

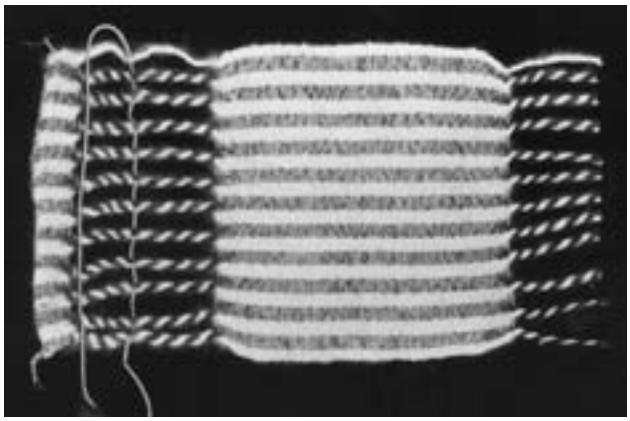
Insert a cotton cord, remove the stick and tie the cord loosely to hold the twist in the fringe.



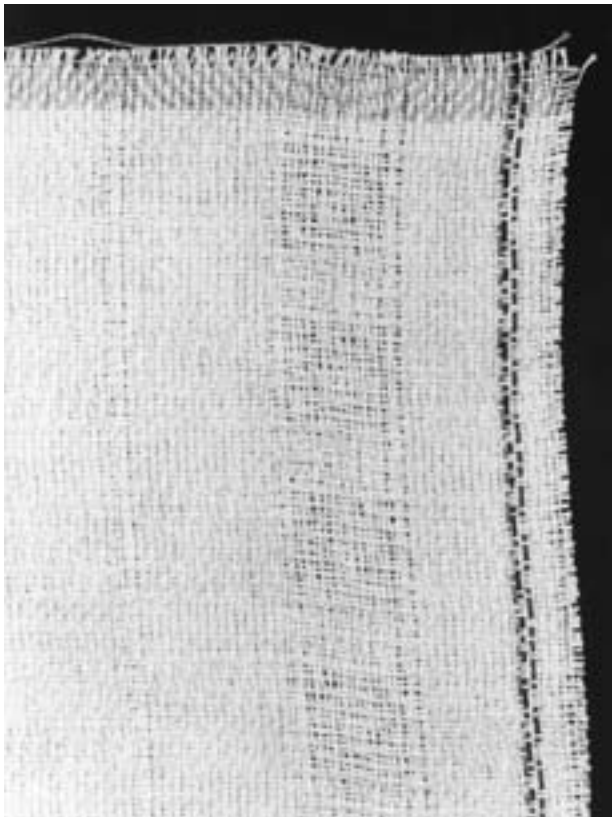
Advance the warp and begin weaving again.

If your loom has enough room between breast beam and beater, you can just leave unwoven warp and begin weaving your blanket, then go back and do the twisting. The advantage to this is that you can twist your weft thread into the first bout of fringe.





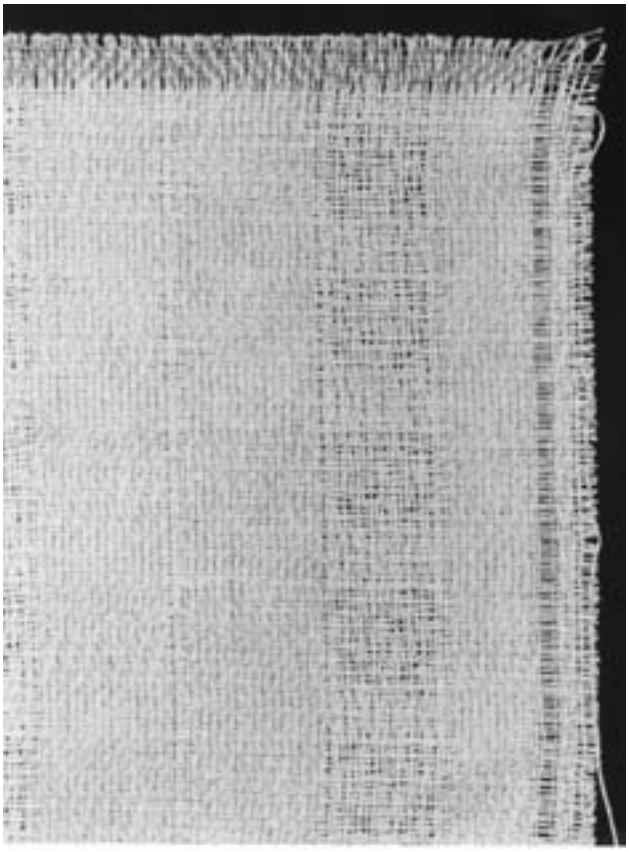
After wet finishing, cut the fringe where the cord was passed through.



Fringe On Four Sides

For cotton place mats and table runners, you can make fringe on all four sides of your cloth. This technique is particularly useful if your loom is wide and you can make two or more mats side by side.

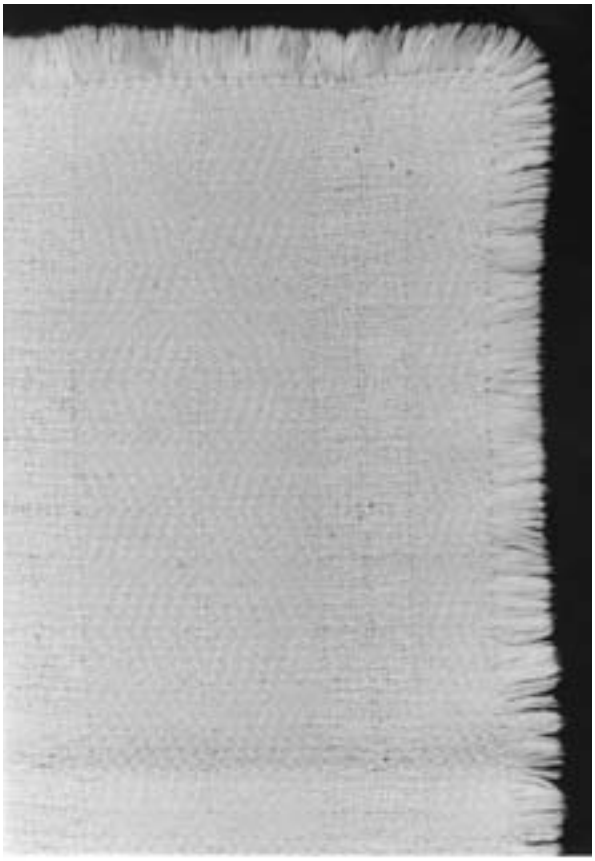
To make the fringe on the sides, wind your warp wider than your mat, allowing about ¾" extra for the fringe. On the selvedges allow an additional ¾" on each side. These extra ends are referred to as "fugitive" because they will be taken away. Make the fugitive ends a different colour than your place mat, or include different coloured ends to designate where the mat ends and the fugitive ends begin. I also add coloured ends to indicate the cutting line to separate the mats.



During weaving, use a different colour at the beginning and end of the mat for the fugitive weft picks.

When the cloth is removed from the cloth beam, inspect and repair and cut the mats apart, removing the extra selvedge.

The cloth is unstable at this point, so care must be taken in handling it. Remove the 3 or 4 ends adjacent to the mat to create a "ditch". Sew one line of straight stitching around the mat overlapping the beginning by about 1 to 1 ½ inches. Remove the rest of the fugitive ends and picks and wet finish. The finished place mat will have a ¾" fringe on all four sides.



After wet finishing this is how the place mat looks.

The Final Word – So Far

On page 608 of J. Schofield's book "Cloth Finishing: Woollen and Worsted" he advises that "Absolute adherence to routine does not prevail in the finishing of wool materials. The operator must utilize or abandon, change the order of application or adapt the intensity of the treatment to the requirements of the case in hand."

How a cloth will turn out depends on so many factors that it is difficult for one person to guarantee someone else's results. Right from the beginning, the fibre may be somewhat different due to climate, diet or health of the animal or plant. How it is spun will affect the behavior of the fibre. The density and weave structure will also affect how wool fulls. The type of equipment and how vigorous it is will also determine the degree of fulling.

In this manual I have set up certain parameters and explained my methods. But in the end, it is the resulting cloth that you achieve that matters. It will be up to each individual to experiment and discover the potential of the yarn in hand. Only by increasing your own experience will you begin to achieve the results that you need for your cloth.

Working on this presentation, my biggest lesson has been that the potential for creating a precise quality of cloth is less a science than an intuitive art. After over 20 years of weaving, exploring the relationship between fibre, density, interlacement and wet finishing, I have only scratched the surface of what is possible.

"Unfinished cloth is like an unbaked cake."
Jack Lenor Larsen

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The Projects

My primary focus as a weaver has always been to create textiles for a specific function. I find that by keeping my concentration on what the textile is to **do** that decisions such as type and size of yarn, set and weave structure become fairly obvious. Decisions such as colour and placement of design may take a bit longer.

The relationship between fibre, set, weave structure and wet finishing can be adjusted, minutely, or greatly, to affect the behaviour of the cloth. A window curtain does not need the same degree of stability as upholstery; a shawl does not need the same degree of stability as cloth for a tailored suit. Decisions regarding how the threads are put together exist on a spectrum, with each variable making changes to the overall characteristics of the cloth.

The projects offered here are for your information. A set of parameters has been chosen, based on 20 years experience, to produce cloth of a particular quality. My hope is that you will examine these samples closely, analyse how they have been made, and judge how well these cloths will meet your needs. Then I trust that you will make whatever adjustment is appropriate to create cloth that meets those needs.

Even though you might use precisely the same yarn as in the samples, a slight adjustment to the set will affect the drape and stability of the cloth. A looser set will provide more drape; a tighter set more stability. The number of picks per inch will likewise affect the cloth. A change in weave structure to more or fewer interlacements will produce similar changes in terms of drape and stability. The choices are nearly infinite! Ultimately it is this very fluidity in terms of cloth construction that appeals to me, and keeps me excited about creating functional fabrics.

By providing these projects for your examination, I hope that you will use them as a starting place for your own creativity.

My wish for you is many, many years of Happy Weaving!

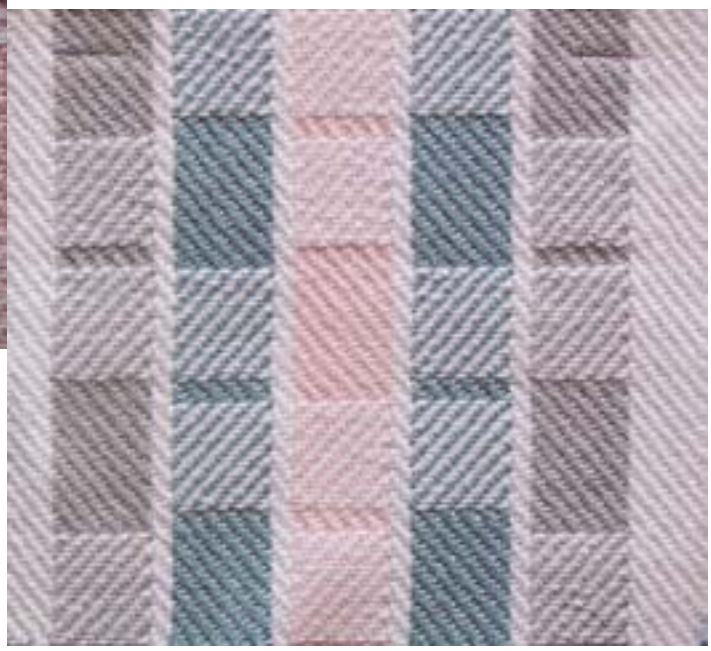
Project 1

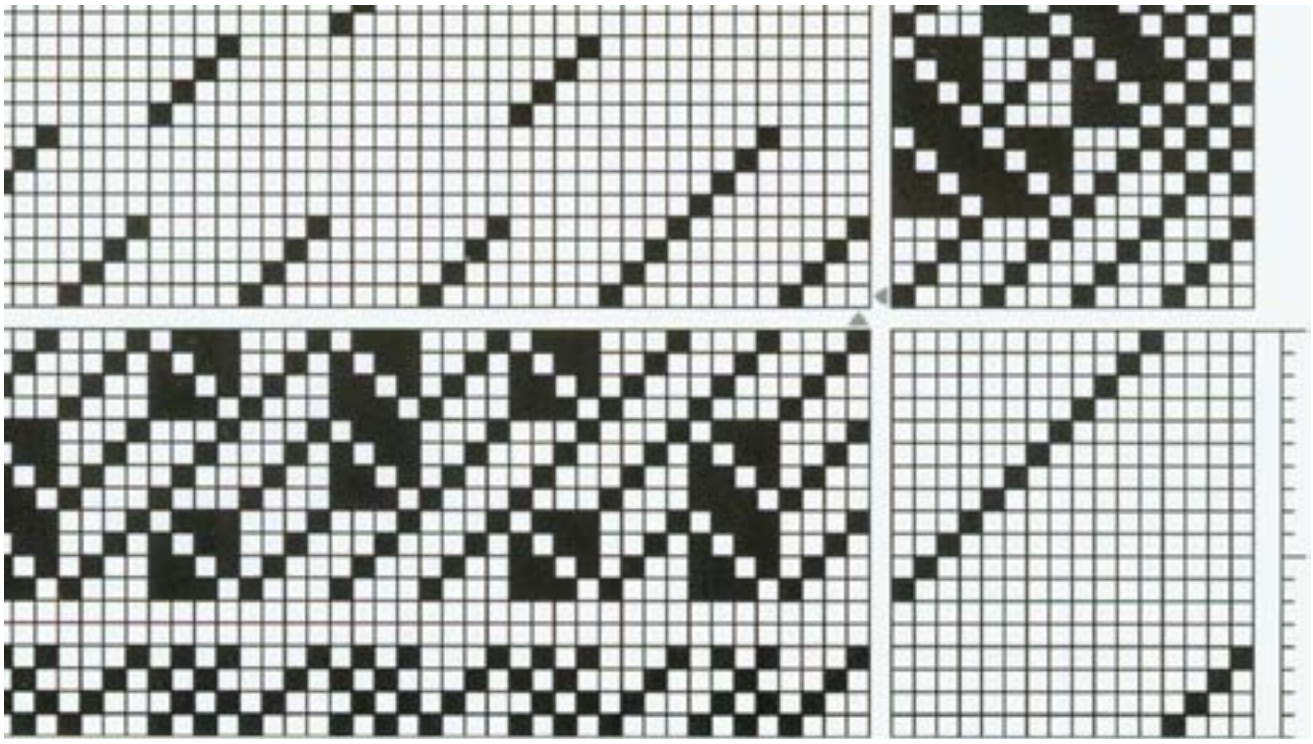
Cotton bathrobe and nightshirt

Warp: 2/8 cotton
Weft: Bathrobe 2/8 cotton, nightshirt 2/16 cotton
Set: 24 epi

The bathrobe was woven in blocks of 1/3-3/1 twill, while the nightshirt was woven in plain weave with stripes of 1/3 twill to make a lighter weight fabric. I trimmed them with handmade bobbin lace, also in cotton. For looms with fewer shafts, the bathrobe could be woven completely in 1/3 twill with plain weave for the nightshirt.

Wet finish the fabric using the hottest water available and the regular full-length wash cycle, which on my machine is a 10 minute wash. Use a small amount of detergent, along with liquid fabric softener if you use it. When the wash cycle is complete, put the fabric into the machine dryer to dry until just damp, and give it a hard press.





Block A – Bleached white – threaded on shafts 1-4

Block B – Grey – threaded on shafts 5-8

Block C – Blue – threaded on shafts 9-12

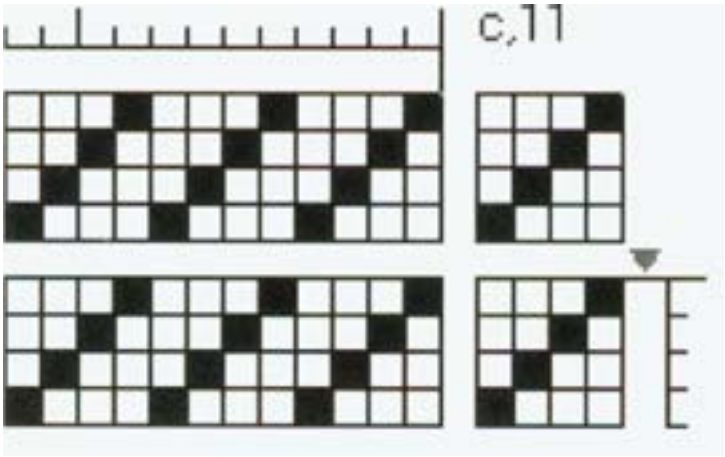
Block D – Pink – threaded on shafts 13-16

Repeat block to desired size.

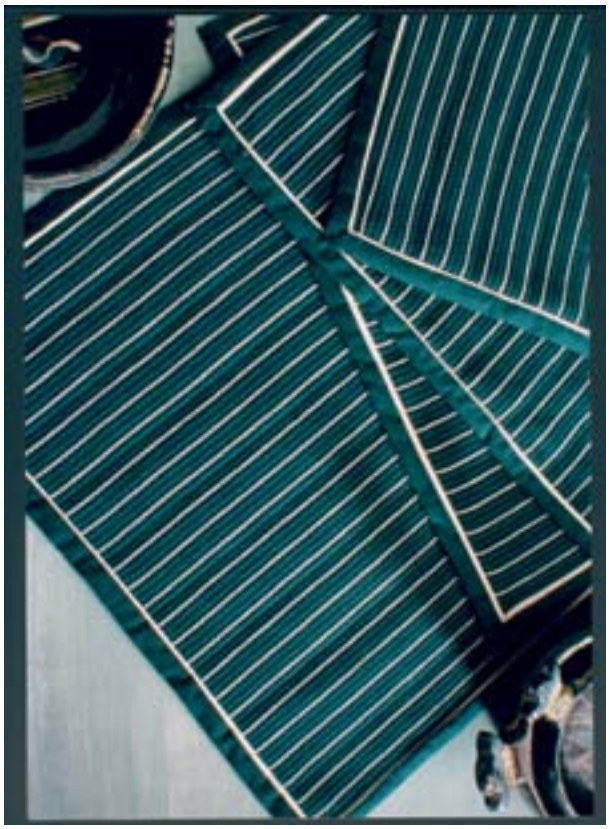
Bathrobe was woven in blocks of 1/3-3/1 twill.

Nightshirt was woven with Block A in 3/1 twill and the rest of the blocks in plain weave. When weaving an unbalanced twill, I will create the tie up so that the fewest number of shafts have to be lifted. This sometimes means that I weave the fabric with the back side up.

If only four shafts are available, the bathrobe can be woven in a 1/3 twill, the nightshirt in plain weave.



Project 2



Bedford Cord place mats and seat cushions

Warp: 2/8 cotton
Weft: 2/8 cotton
Set: 32 epi

For this project, I used the simplest version of a cord weave that can be woven on 4 shafts. If you want deeper or more prominent ribs, you must use more than 4 shafts.

The ribs are woven alternately, in plain weave. If more shafts are available you can use cutting ends (warp ends that will help make the ribs more prominent) or you can use twill instead of plain weave.

Selvedges are not important for this project, so I didn't bother to make a self-edge. This would require more shafts, or a floating selvedge. A compromise would be to thread the outside 4 ends in a straight twill order.

To wet finish, place the cloth into the washing machine using the hottest water available, and a small amount of detergent. Use the full length of the wash cycle then place the fabric into the dryer to remove excess water. Give the damp cloth a hard press on the back only.

I applied a fusible tricot interlining for additional stability and a commercial fabric to bind the edges of the place mats.

Bedford cord has been used for upholstery and fabric for hard wearing clothing. This is the simplest form of a cord weave. If there are more shafts available, the ribs can be made more prominent, or a twill can be used instead of plain weave. You can also stuff the ribs by carrying a wadding end for each rib.

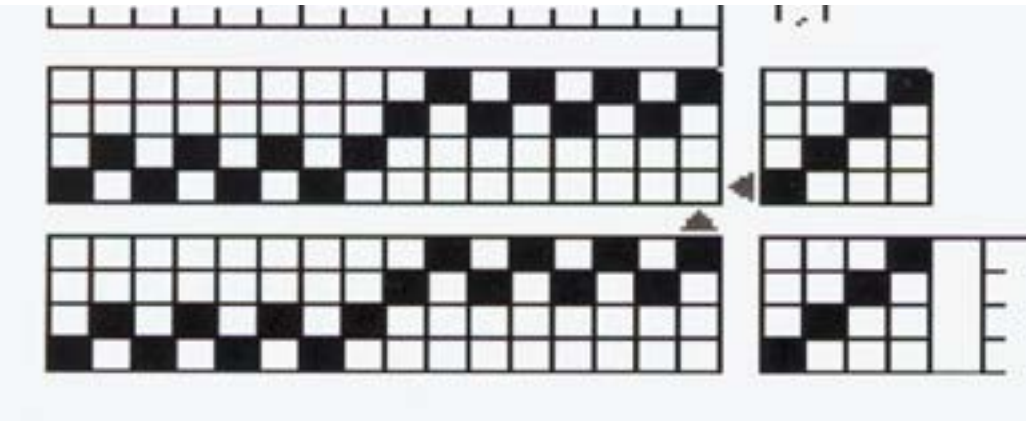
For more information on this versatile weave, consult:

Goerner, Doris. Woven Structure and Design, part I – Single cloth construction

Grozicki, Z. Watson's Textile Design and Colour; Elementary weaves and figured fabrics

Straub, Marianne. Hand Weaving and Cloth Design

Tovey, John. Weaves and Pattern Drafting



Project 3

Kitchen Ensemble

Warp: 2/20 mercerized cotton
Weft: 2/20 mercerized cotton
Set: 40 epi

One of the things I enjoy about weaving is the ability to take one threading and create many different co-ordinating fabrics by changing the treadling. This grouping of fabrics is for the kitchen. The samples is for tea towels and I also wove cloth for curtains, place mats and dishcloths.

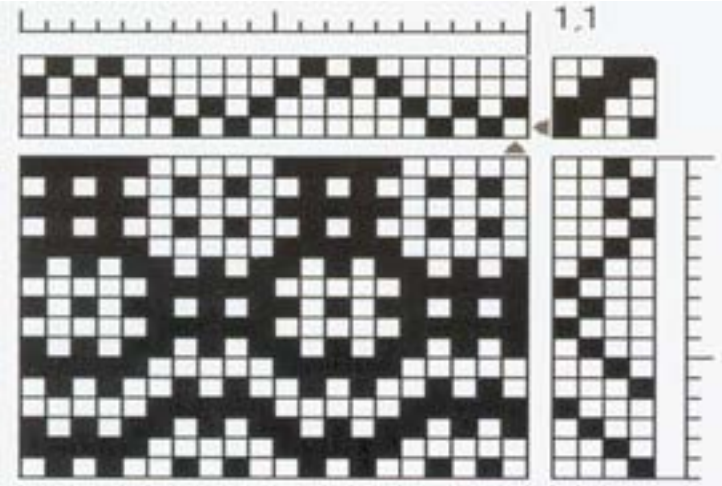
The tea towels are woven in twill, the curtains in huck lace, the place mats in plain weave (using two strands of 2/8 cotton for weft) and the dishcloths are in waffle weave. All except the dishcloths were hard pressed.

Hint: for the place mats, use 2/20 cotton for the hems so that they can be turned under and sewn without creating bulk.

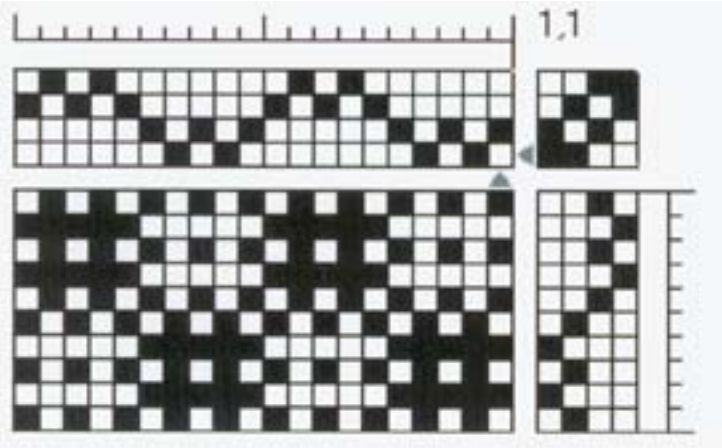
To wet finish, use the regular wash cycle of your washing machine and the hottest water available. I used the full cycle with a small amount of detergent but no fabric softener.

Simply dry the dishcloths and allow them to pucker up. Hard press the rest of the fabrics while still damp.

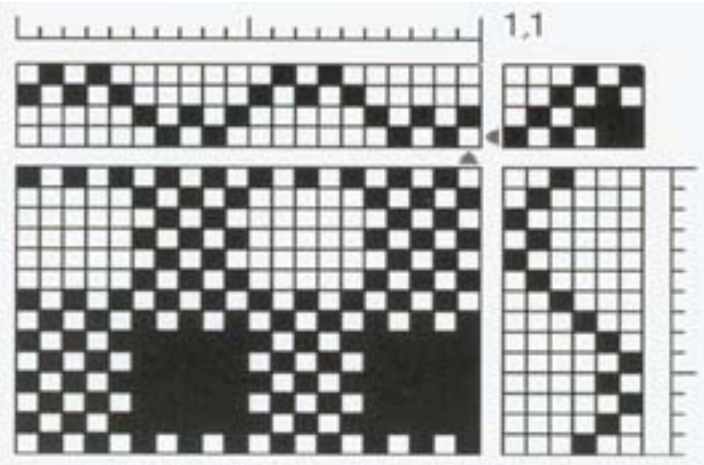
The tea towel fabrics can be woven in a variety of twill treadlings. Draft A shows one variation.



The curtains were woven in huck lace – Draft B.



The dish towels were woven in waffle weave – Draft C.



Project 4

Tea Towels

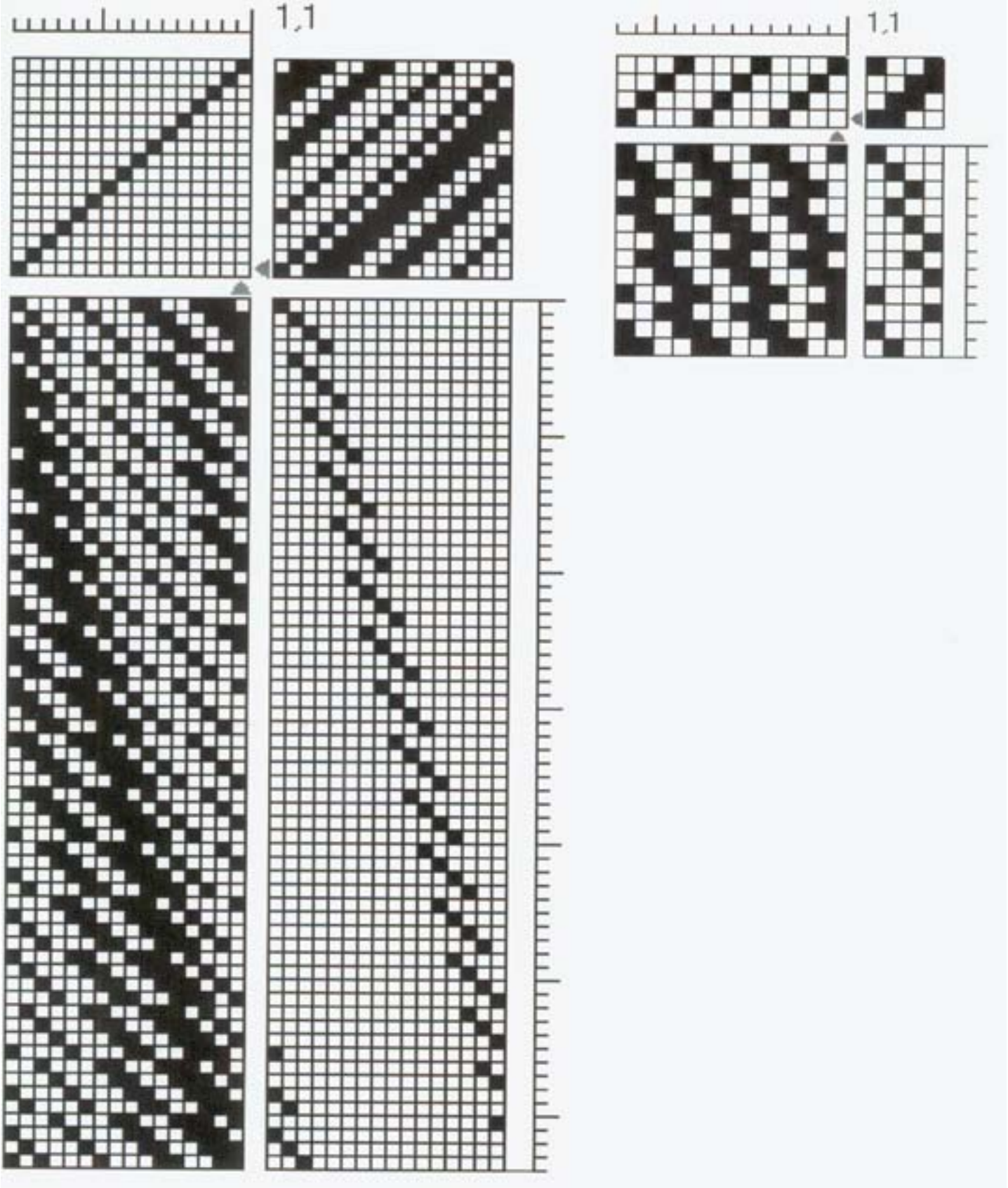
Warp: 2/16 cotton
Weft: 2/16 cotton
Set: 36

These towels were woven in an advancing twill on 16 shafts. If woven on fewer shafts in a weave structure with more interlacements, I recommend a set of 30 to 32.

Wet finish the cloth in the washing machine on the regular wash cycle with the hottest water available. Use a small amount of detergent, but no fabric softener, as the softener will impair the absorption of water.

Remove excess water in the dryer and hard press the cloth while still damp.

You can still do an advancing twill on four shafts. By threading and treadling an advancing twill on four shafts you can create quite complex looking patterns. For more information on advancing twills, consult S. Zielinski. He refers to them as step twills.



Project 5

Cotton Suit

Warp: 2/16 cotton
Weft: Jacket – 2/20 mercerized cotton for the cells, cotton chenille for the outline thread
Blouse – 2/16 cotton with 2/20 mercerized cotton for the coloured stripes
Slacks – 2/8 cotton
Set: 30

The fabric for this suit was designed to be turned for the jacket and blouse, so one warp could be used for all three pieces. In other words, the fabric was oriented so that the weft runs up and down the body for the jacket and blouse. The slacks have the warp running vertically.

I threaded the warp in three blocks on 12 shafts, but you could weave on 8 shafts and create co-ordinating fabrics using two cells of honeycomb and two twill blocks.

Hint: Cut each section of cloth apart and serge the raw ends, then wet finish the pieces separately for ease of handling. The different weights of fabric dry at different rates, so processing them separately makes it easier to judge when each is ready for the hard press. As the hard press can take quite some time, it is a good idea to only wet finish as much as you are willing to press at one time.

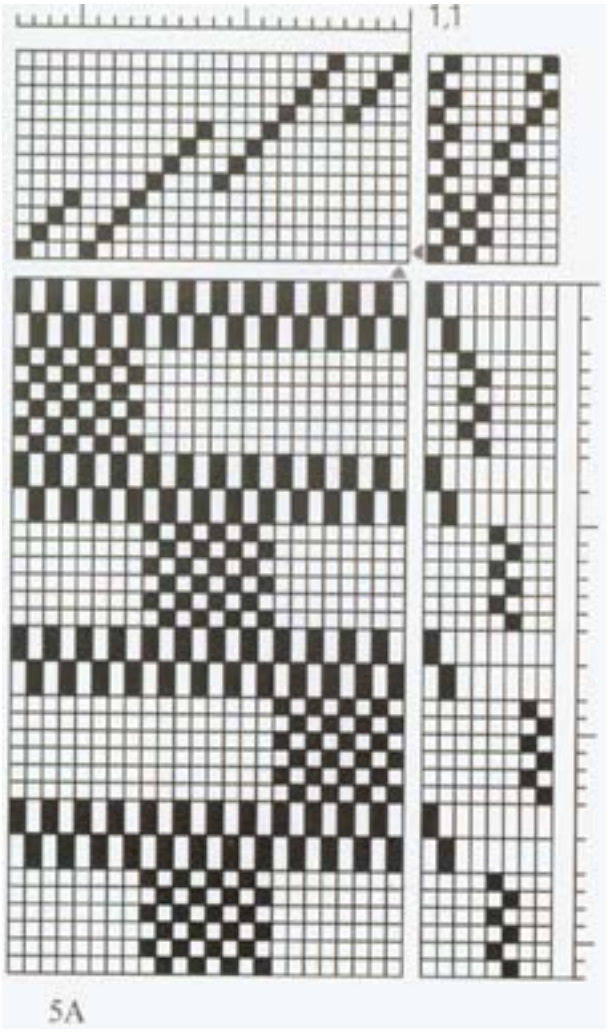
For each piece use the full regular wash cycle with a small amount of detergent and fabric softener, if you use it. Using the machine dryer, dry the cloth until just damp and give it a hard press. Press the honeycomb fabric only on the back side.

I have worn the jacket while traveling and it simply does not wrinkle!

Draft 5a shows the honeycomb cells outlined in thicker cotton chenille woven on treadles 1 and 2.

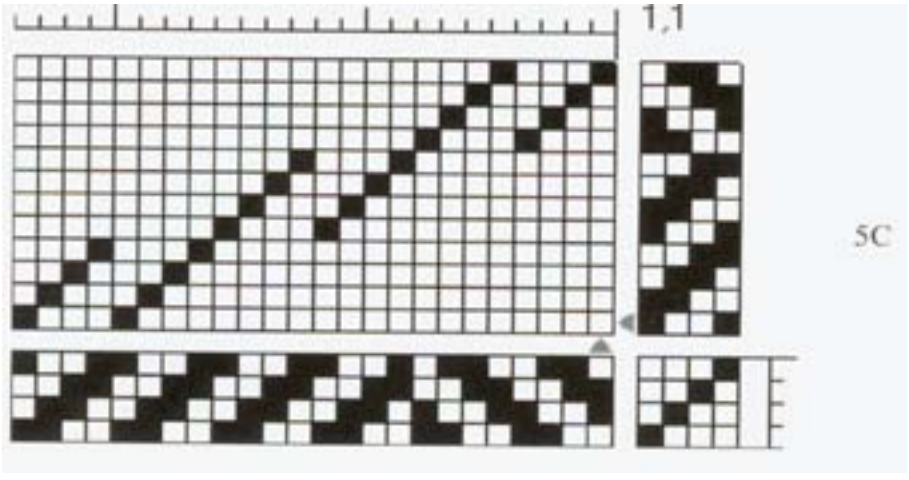
In the draft for 5b, the twill blocks have been woven in a twill progression, reflecting the same order as the honeycomb cells.

For the slacks (draft 5c) the twill has been turned for the third block to provide interest in the form of a small herringbone stripe effect.



5A

5B



5C

Project 6

Tea towels in cotton and cottolin

Warp: 2/16 cotton
Weft: cottolin
Set: 30

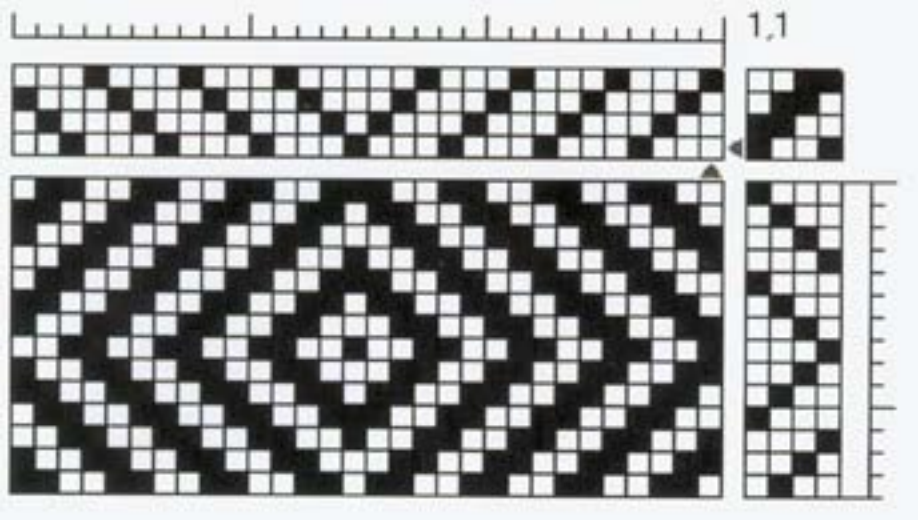
Many people prefer towels heavier than 2/20 or 2/16 cotton so I recommend using the 2/16 cotton for warp and cottolin for weft.

These towels are woven on four shafts in a 2/2 twill. Interest is in the warp in the form of coloured stripes, so you can weave them quickly using only one shuttle.

Hint: Use the 2/16 cotton for hems so they can be turned under and sewn without adding bulk. A coloured thread woven in as a cutting line makes it easy to separate the towels after weaving.

Use the regular wash cycle with warm water and a small amount of detergent, but no fabric softener. Machine-dry the fabric until damp, then give it a hard press. I have a small home flat-bed press that works very well for small items like tea towels. You can cut the towels apart and serge the ends before putting them into the washing machine or after removing them from the dryer and before pressing for ease of handling. Hand-hem the dry towels.

Any twill threading can be used. You can design your coloured stripes to coincide with the points in the twill threading as in this example – the red ends have been threaded on the points with the green stripes on the straight twill to bracket the red. Variations in treadling will produce a variety of patterns.



Project 7

Linen table runner and mats

Warp: 2/16 linen and 2/22 cottolin
Weft: 2/16 linen and 2/22 cottolin, singles 20 linen for hems
Set: 20

Woven in Swedish Lace, this cloth uses a coloured cottolin thread to outline the two pattern blocks and accent the half-bleached line linen.

Wet finish using the regular wash cycle and cold water with a small amount of detergent and no fabric softener. Interrupt the spin cycle after most of the water is spun out. If you allow the spin cycle to complete, the wet linen may set creases that cannot be removed.

Air-dry the cloth until damp. A machine dryer may reduce the sheen of the linen.

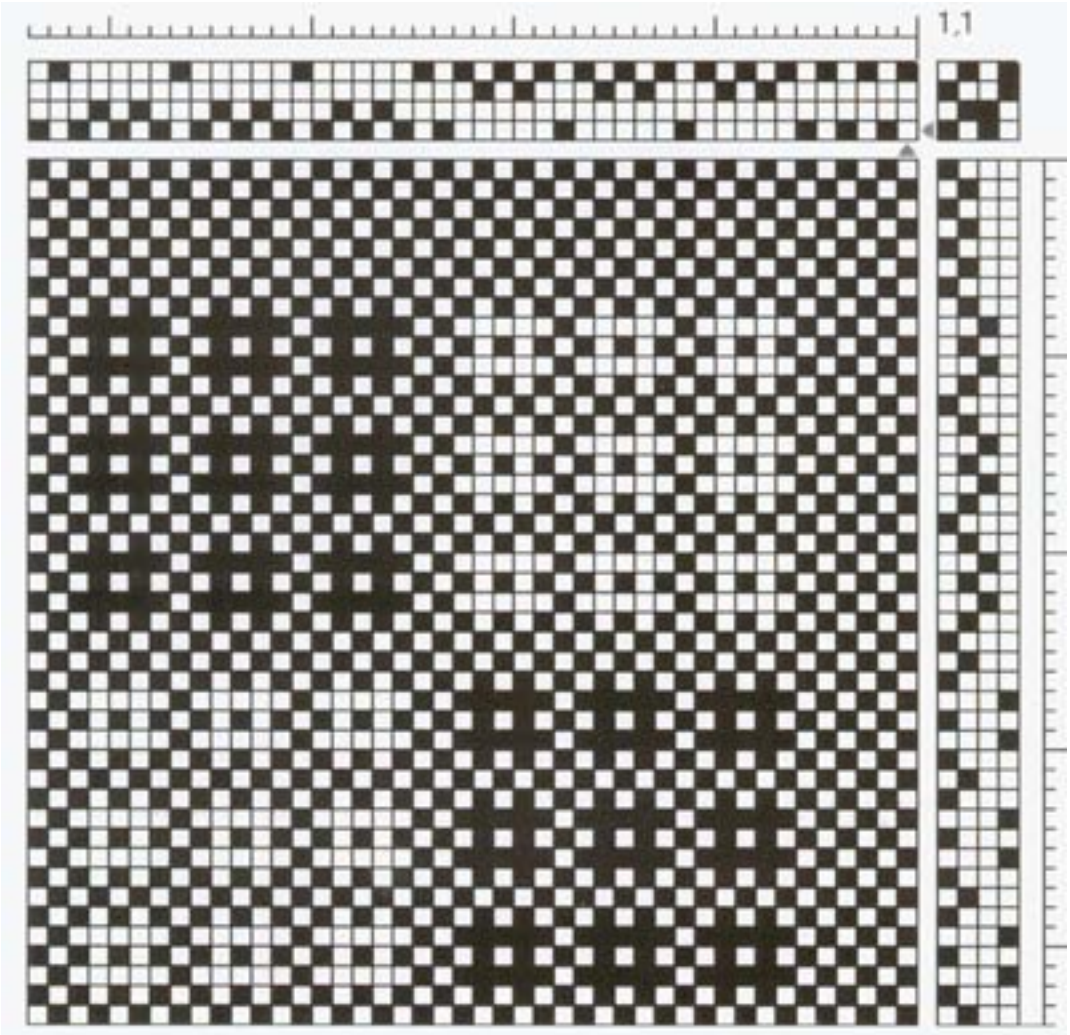
In Sweden, linen is cold mangled (see Special Techniques). The Swedes never use hot water or heat, just extreme compression. While cold mangles are not common in North America, there are ways to achieve the cold hard compression.

I use a large PVC pipe one meter (39.5 inches) in circumference. The pipe is approximately 90 cm (36" long). I roll the length of linen carefully around the pipe making sure there are no wrinkles or creases, and cover with a plastic cloth. Sitting on the pipe, I rock back and forth, applying compression and rotating the pipe until the entire circumference has been compressed.

To finish, I then press until dry with a hot iron on the cotton setting.

Hint: Do not leave fringes on linen items intended for regular use as the fringe will eventually wear away. Using a finer yarn (in this case a singles 20) for the hems allows them to be turned under and sewn without becoming bulky.

In the draft, the six ends on the right are for selvedge. The two blocks of Swedish Lace have been threaded with three units of lace each and separated by blue threads. The blocks can be enlarged or contracted as you wish for blocks of various sizes. Balance your design by finishing with the same number of ends threaded for selvedge on the left as you used on the right.



Project 8

Linen tablecloth

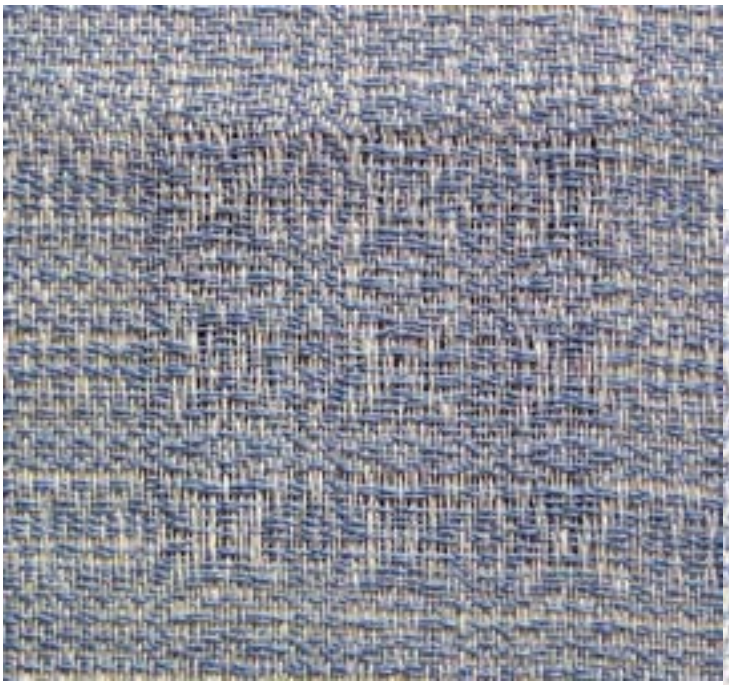
Warp: 2/40 line linen
Weft: singles 20 linen
Set: 32

Woven in an advancing twill on four shafts, this yarn could have been set at 36 for a slightly firmer, more formal weight. At 32 epi, the cloth is much looser, with a softer hand suitable for a luncheon cloth.

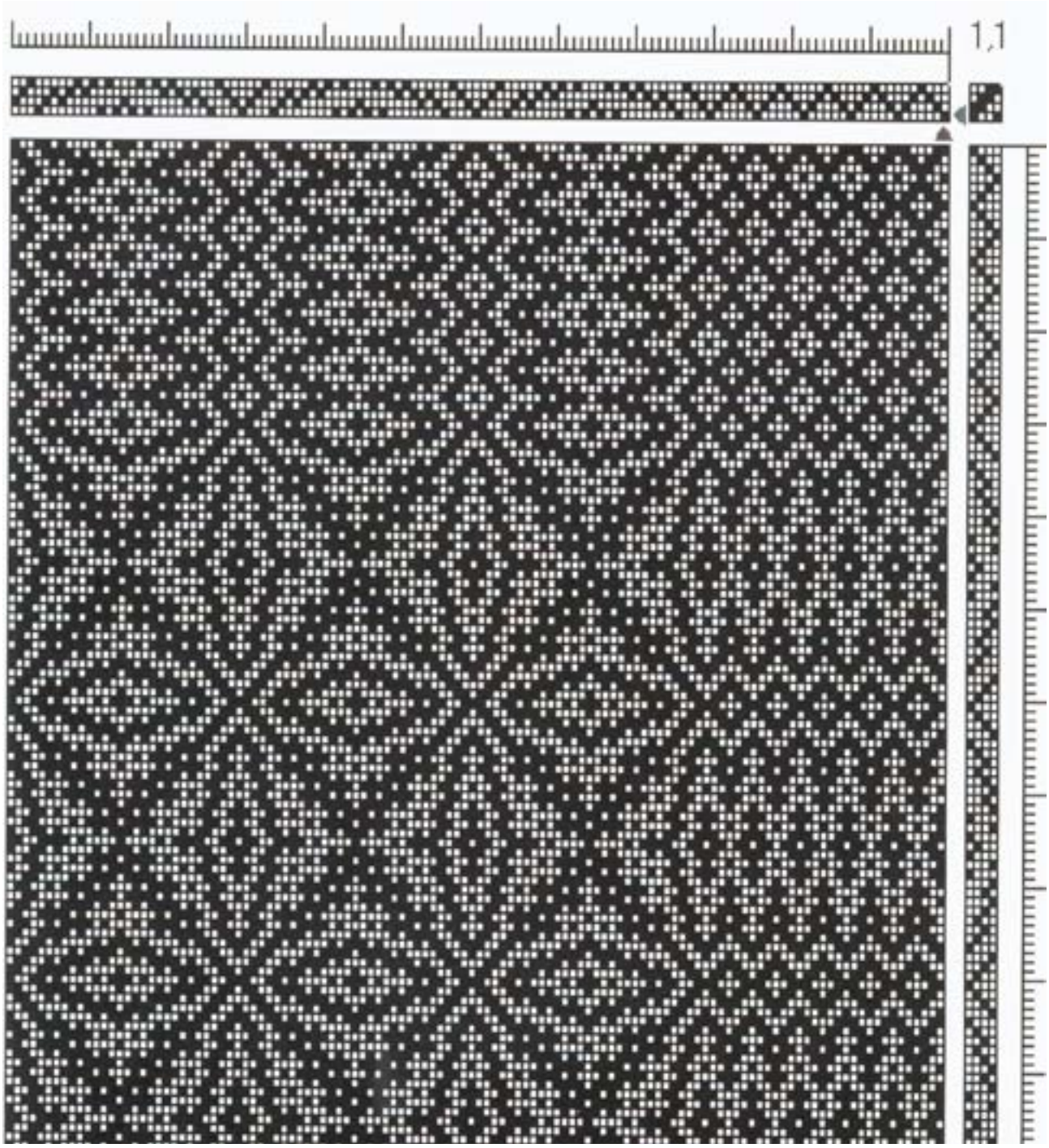
I used a large cold mangle to compress the cloth (see Special Techniques). The bed of the mangle is 27" wide, so fabric wider than this must be folded in half or thirds.

Wet finish using the regular wash cycle and cold water. Air-dry the fabric, then spray it with water to dampen and cold mangle it. If you cold mangle linen when it is sopping wet, it becomes papery or stiff, so it is best to compress the fabric while damp.

Hint: You can cold mangle a small item by wrapping it around a dowel and rolling it on a hard surface. In a pinch I've used a glass bottle with straight sides, or a rolling pin.



This draft is a four shaft reduction of the eight shaft Swedish Snowflake. The cloth has been woven so that bands of point twill separate the motif. You could just repeat the Snowflake across the cloth using the point twill for borders.



Project 9

Tencel shawl

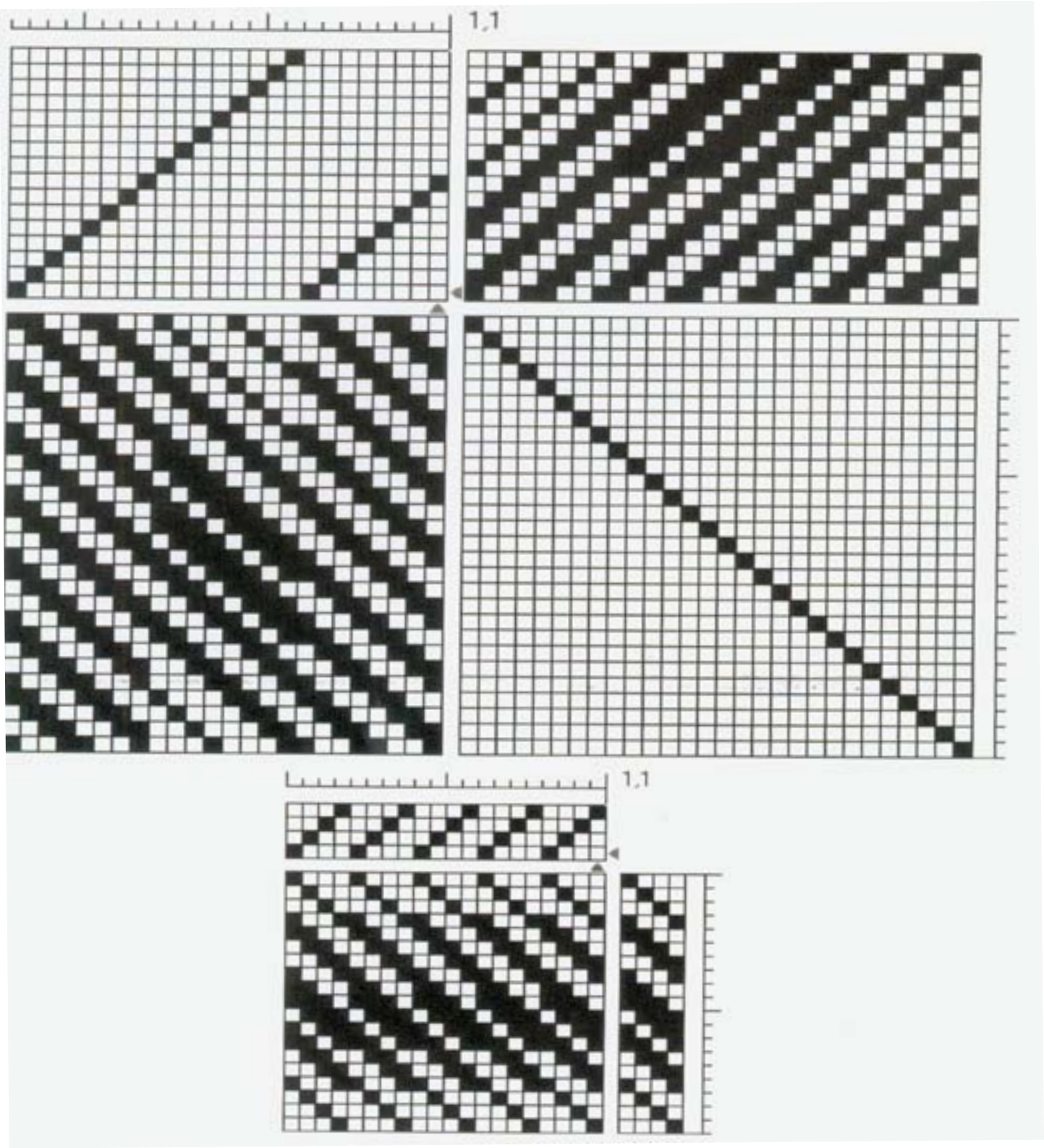
Warp: 2/20 Tencel, natural and air brush dyed by Pamela Marriott of Alberta
Weft: 2/20 Tencel
Set: 48 epi (woven at 40 ppi)

It is important to set Tencel tightly to achieve stability. It will swell when it gets wet and then shrink when it dries. While it is wet, it will feel very stiff and hard, but when it dries it will have a lovely soft handle.

To show off the dyed stripes I set the warp for slight warp emphasis. You could set this yarn at 40 or 45 epi for a 2/2 twill. Twist the fringe when the shawl comes off the loom, then machine-wash it, using the regular wash cycle and warm water. Use a small amount of detergent but no fabric softener.

Interrupt the spin cycle once excess moisture is removed and put the shawl into the dryer for a few minutes. Hard press while the cloth is still damp, polishing both sides with a hand iron to develop the shine.

Weaving shaded twills requires lots of treadles! If you have a four shaft loom, you can set your treadles up for a direct tie up and use two feet. The dyed Tencel was threaded on shafts 9-16. If you have fewer shafts, you can just thread them on the same shafts as the body of the shawl and have the whole cloth woven in the same structure.



Project 10

Scarves

Warp: 2/10 Tencel
Weft: Rayon chenille 3000 yards per pound or 2000 yards per pound
Set 32 (for 3000 yd/lb) or 24 (for 2000 yd/lb)

Gold mylar thread accents the white scarves. The blue scarf has a solid blue and a variegated blue Tencel for warp.

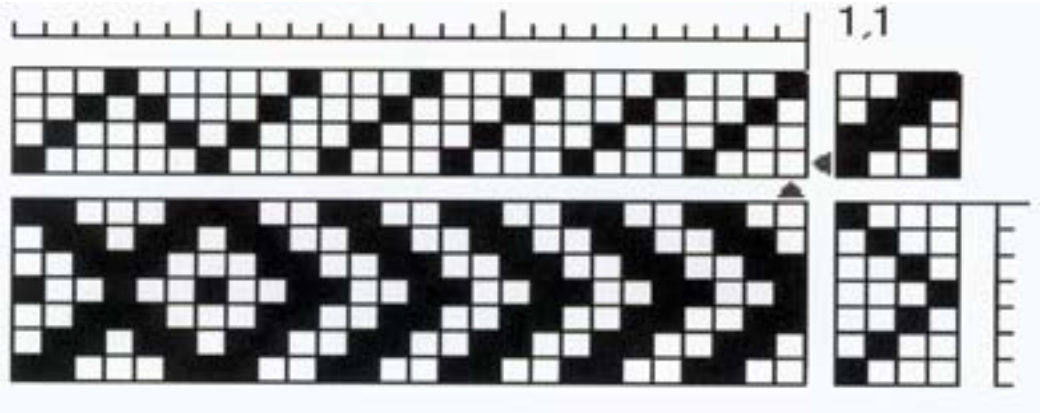
Weave four picks of waste yarn at the beginning and end of each scarf to hold the weft in place when it's off the loom. Remove the waste yarn and twist the fringe before wet finishing.

Hint: I allow six inches for each fringe and twist each bout (or group of warp ends) 30 times using a small hand fringe twister. After wet finishing, trim the excess yarn so that the end of the fringe looks beaded. Unless Tencel fringe is twisted, it will deteriorate very quickly during wet finishing and future laundering.

Finish a single scarf by hand in a basin using tepid to warm water and a small amount of liquid detergent. Several scarves can be finished together in the washing machine on the regular wash cycle and warm water setting. Rayon chenille is best dried in the machine dryer. Remove chenille scarves from the dryer as soon as they are completely dry so wrinkles will not form in the cloth.

Chenille is not usually hard pressed. With very fine chenille, however, I like the suede-like quality of the cloth when it is hard pressed.

Use various twill threadings to make accent stripes. You can also add effect yarns such as mylar to set these stripes off or use different colours in the warp.



Project 11

Silk Suit

Warp: 2/30 silk
Weft: Jacket, blouse and skirt – 2/30 silk; vest – 3000 yd/lb
Set: 30

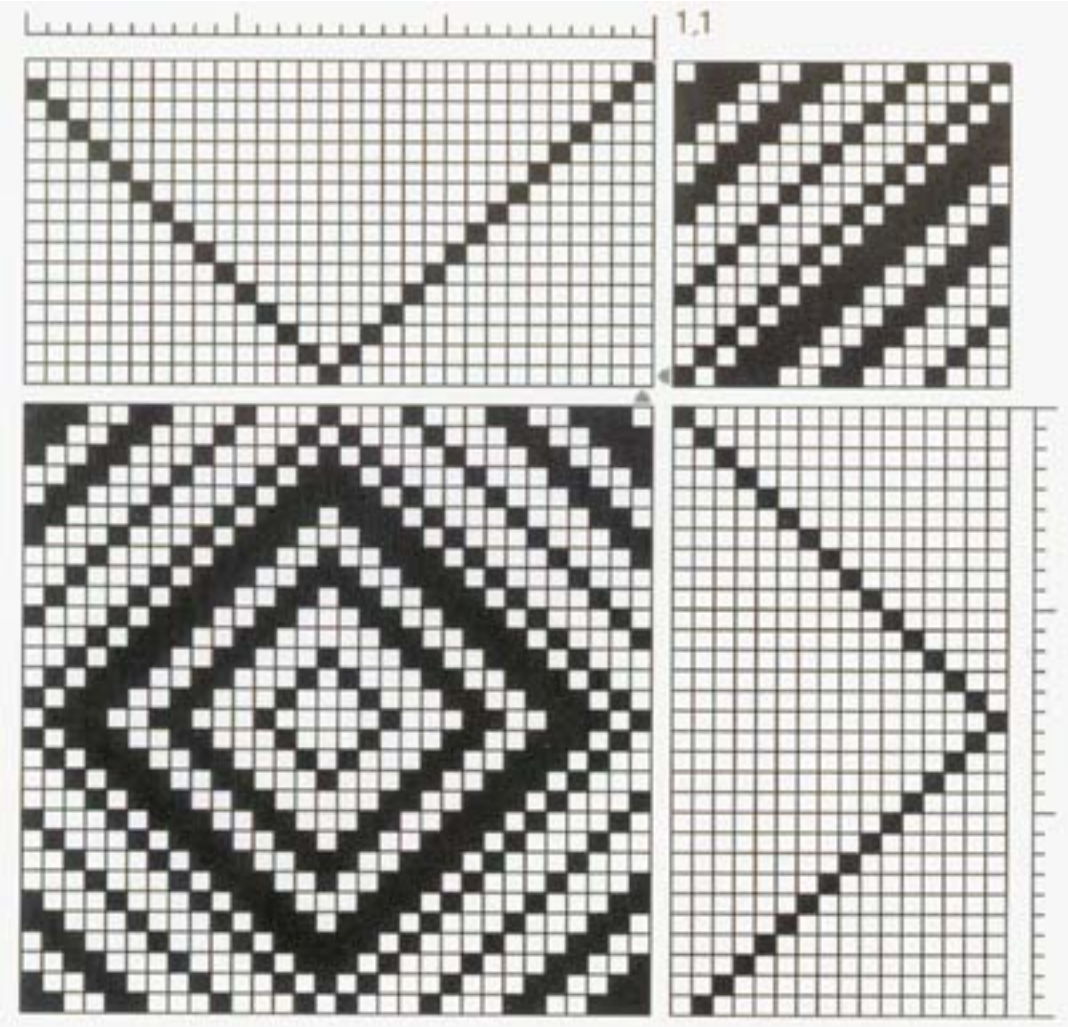
This project was woven by Karena Lang on a 16 shaft point twill threading but could have been done on four shafts by simplifying the treadling for the vest.

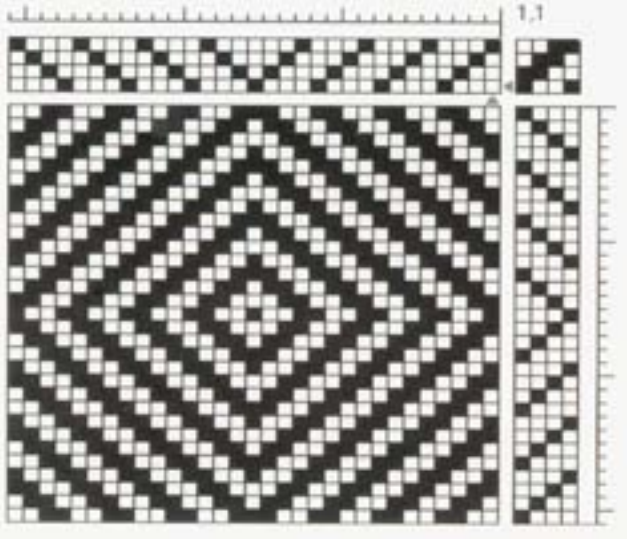
Karena wove the fabric for the jacket in a large goose eye treadling, the skirt and blouse in 2/2 twill and the vest in an advancing twill. For ease in wearing, the jacket and skirt are lined.

Cut the fabrics apart at each treadling change and serge the ends. Wet finish each piece separately in the washing machine on regular cycle, with warm water. Interrupt the spin cycle after excess moisture is spun out and machine dry the cloth until just damp. Hard press on the silk setting (I used a flat-bed press).

When completely dry silk often feels very stiff. Tumble the pieces in the machine dryer with no heat to soften them. Iron out any creases or wrinkles.

If you don’t have 16 shafts a large goose eye can still be woven on four. The top and skirt were woven in a simple 2/2 twill, the vest fabric in an advancing twill.





Project 12

Mohair Throw (woven by Jane Stafford)

Warp: brushed mohair
Weft: brushed mohair
Set 6

Hint: Use a 6 dent reed not a 12 as the reed is too fine for the yarn. Tie one treadle to one shaft and then treadle with two feet opening the shed by lifting one shaft, then the other. Open the next shed with the beater forward against the fell line. Be careful to keep your picks per inch at 6 or 7. Js

Jane recommends the following method for wet finishing brushed mohair:

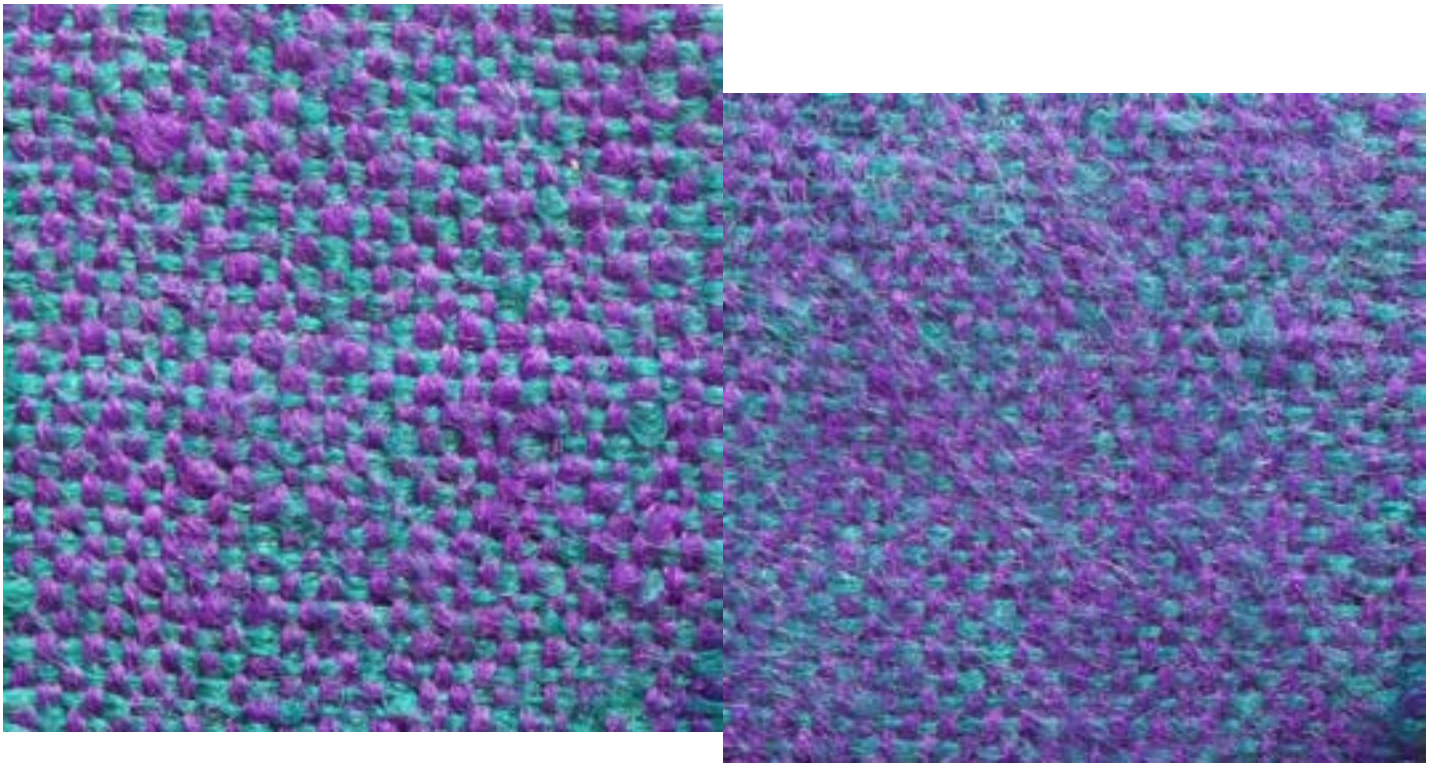
"As with any handwoven fabric before it goes through a finishing process, repair any skips and darn in joins. We full our blankets in the washing machine with great care. The first thing you must discover is a way to run your machine with the lid up during the wash cycle. Most lids have a little plastic doodad (for lack of a better word) that fits into a little hole on the machine. When the doodad is in the hole, the machine runs. You can stick a pencil in the little hole and the machine will think it's the doodad. Presto, it's now washing with the lid up.

Fill the machine with warm water (baby warm) and place your blanket evenly around the agitator. When it is fully saturated, move it to the side and add the soap. We use quite a lot of soap to make the water slippery. Fulling requires heat, agitation and a fulling agent which is the soap. Start agitating on the gentle cycle so that the process happens slowly. The entire process generally takes 6 minutes in my machine for a 45 by 80 inch throw, however, everyone's machine is different, so it cannot be stressed enough that you should try a few samples before going the whole nine yards. Pardon the pun.

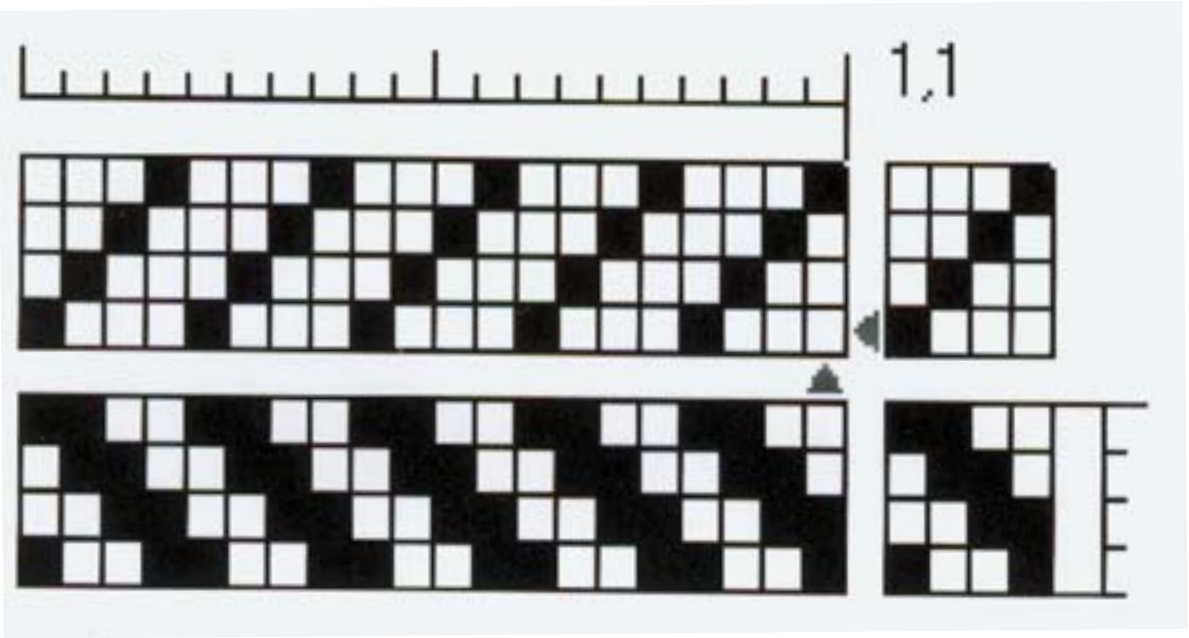
Gently turn the throw over several times while is it agitating. This prevents one area from fulling more than another. If you think your throw is fulled enough before 6 minutes is up, stop the wash cycle and let the throw spin out. Let the machine fill up with warm water again for the rinse. We generally hand manipulate the rinsing because the fabric has fulled to where we want it and now we just want to get rid of the suds and not agitate anymore.

When your fabric is sufficiently rinsed, let it go through the spin cycle once more. Remove your fabric from the machine and while it is still damp, brush it. Use a fine nylon hairbrush or better still, a cat brush that does not snag the mohair. Working with a small amount of the fabric at a time, brush lengthwise with the warp in both directions, followed by selvedge to selvedge with the weft.

Never leave the washing machine. You can always full your fabric a second time, but it is very difficult and most often impossible to reverse the process."



Set your loom up with direct tie up and treadle by stepping on number 1, then number 2 at the same time for the first pick. For the second pick treadle number 2 then 3, and so on.



Project 13

Woolen blankets

Warp: Briggs and Little singles
Weft: Briggs and Little singles
Set: 12 epi – thread outside 4 ends double in the heddle, but sley at 12 epi.

Allow six inches for each fringe and weave four picks of waste yarn to keep the threads in place on each end. Remove the waste yarn and twist the fringe before wet finishing.

If you have a top loading washing machine, fold the blanket in half lengthwise and whipstitch the selvedges together loosely. Stitch the beginning to the end making a 'ring' of cloth.

Hint: Use cotton yarn or thread so that you can easily remove the stitching after fulling.

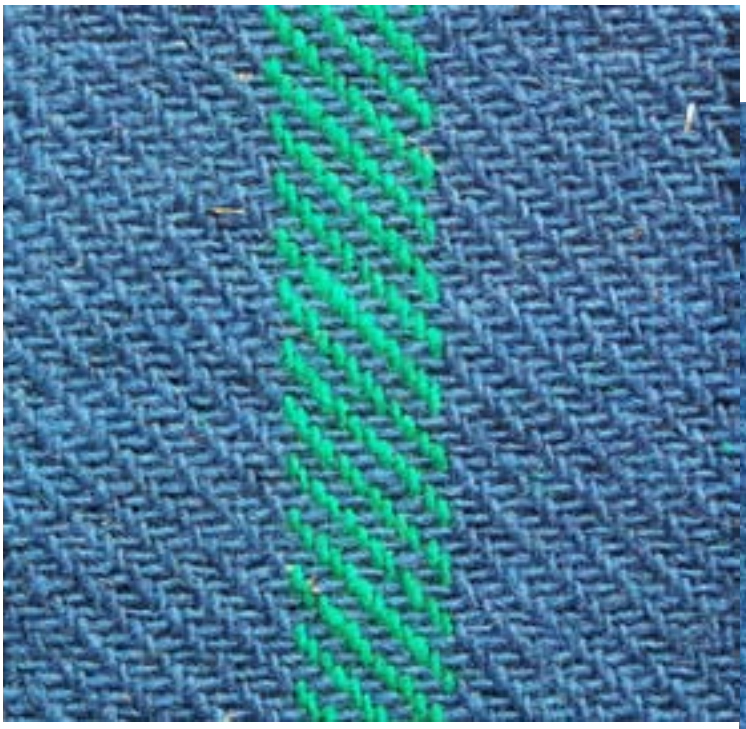
Fill the washing machine with warm water, along with a small amount of detergent. There should be no more than about an inch (two centimetres) of bubbles on the surface. Enter the ring of cloth into the tub so that it encircles the agitator, making sure the cloth is evenly distributed.

If the suds completely disappear after a short period of agitation (one minute), spin out the water, carefully remove the cloth, draw fresh water and add detergent. Always support wet wool as it is very plastic and may distort if you wring it out or allow it to hang.

Monitor the cloth from time to time as it agitates. I allowed about 13 minutes of agitation for the natural blankets and about 19 minutes for the dyed blankets. The dyed blankets were wet finished separately from the natural coloured ones.

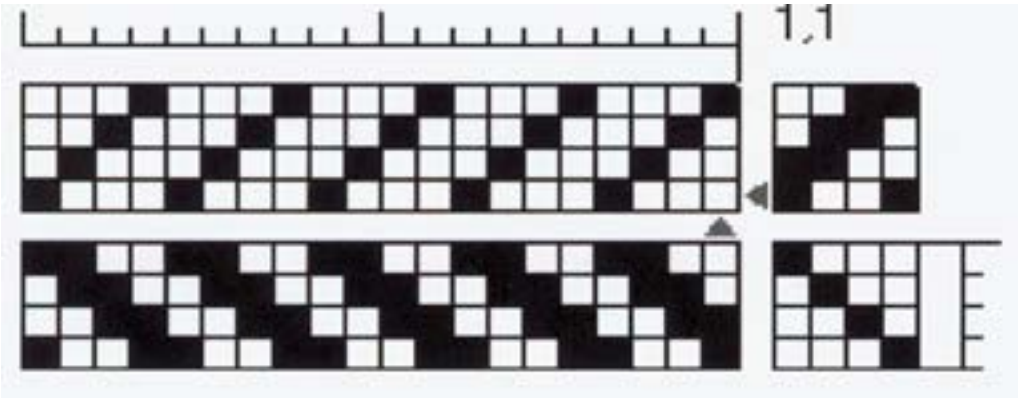
When the cloth reaches its finished state, spin out the water and carefully remove the cloth from the tub. Draw fresh water, the same temperature as the cloth and re-enter the fabric into the clear water. Agitate for 20-30 seconds to rinse. Spin out the water and remove the cloth.

Carefully cut away the selvedge stitching without cutting the blanket and without stretching the cloth. Smooth the blanket around a slotted roller or lay flat to air dry. After several hours remove from the roller and roll back on from the other direction. If laying flat, turn the blanket over.



When using a singles yarn for warp, I generally double thread the outside four ends for the selvedge, keeping the density the same in the reed as the rest of the cloth. In other words, even though the ends are going through the heddle two at a time, if the set of the cloth is 12 the selvedge threads are sleyed so that they are also 12 ends per inch.

For example, if you are using a 12 dent reed, sleying one end per dent, sley the doubled selvedge ends two per dent with an empty dent between. In a 6 dent reed, you would just sley the doubled ends two in a dent.



Project 14

Wool vest and jacket

Warp: 2 ply Flame yarn
Weft: Briggs and Little singles
Set 12

I wet finished the fabric for both the vest and the jacket at the same time and brushed the vest fabric only before hard pressing. I didn't whipstitch the fabric together because I didn't intend to full it significantly.

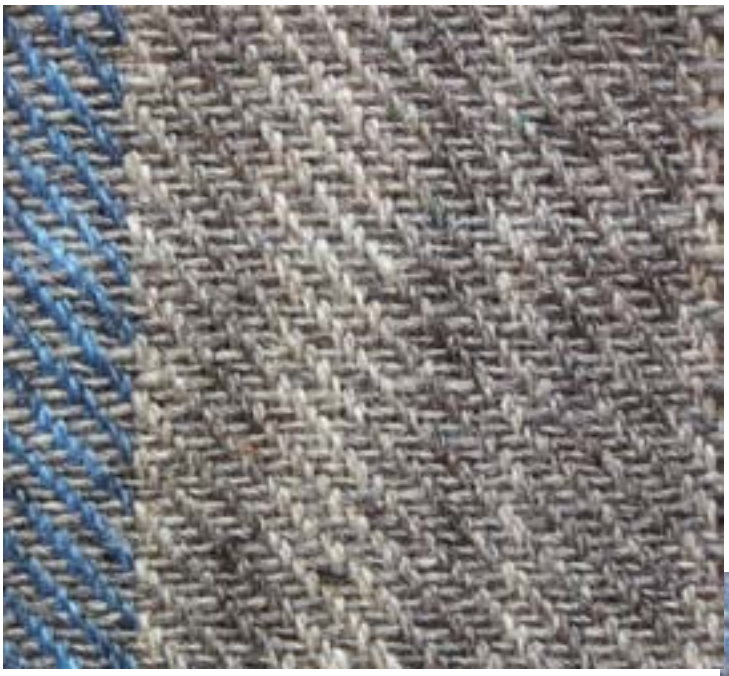
Fill the washing machine with warm water and some detergent. Enter the fabric into the water and allow it to agitate for about two minutes or until the suds disappear. Spin the water out, carefully remove the fabric and add fresh water with more detergent. Return the fabric to the machine and resume agitation. I allowed about eight minutes of agitation at this stage, at which point fulling had just begun. Continue agitation, monitoring the state of the cloth every minute or two.

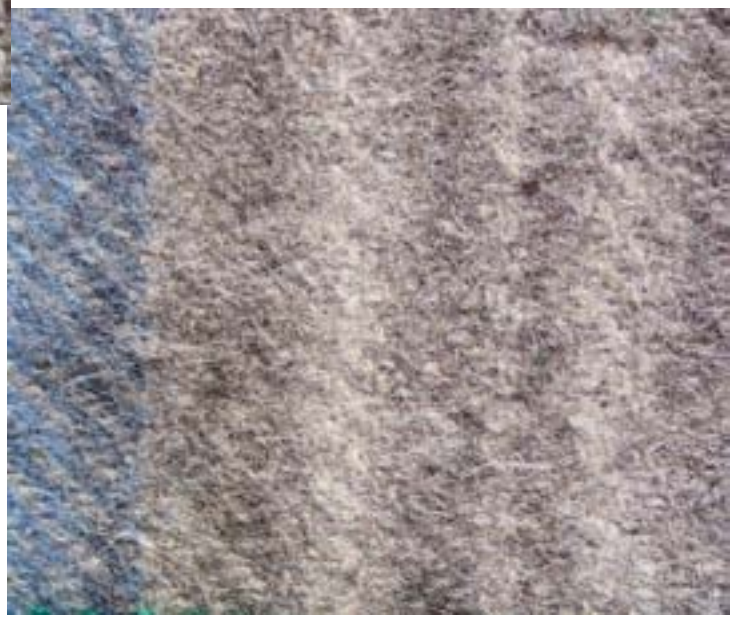
Hint: To check for stability, scrape your fingernail along the threads from beneath the cloth. As fulling progresses the warp and weft threads will shift less and less from their positions.

I deemed my cloth 'finished' after approximately 12 minutes of agitation. My washing machine has a set maximum wash cycle of 10 minutes. By resetting the time, I can control how long the agitation continues. At the end of a wash cycle, I can set the machine to spin out and refill with hot, warm, or cold water, controlling the temperature as needed during the fill by switching setting from hot to warm, or from warm to cold.

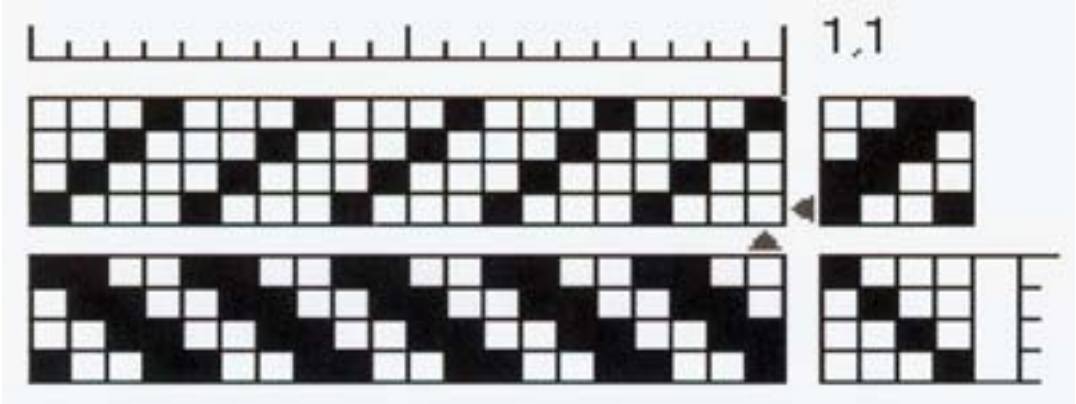
To rinse the fabric spin it out, remove it from the machine and fill the tub with clear water the same temperature as the cloth. Return the cloth to the machine and allow it to agitate for a little bit in the rinse cycle. Spin out the water.

To raise a nap brush the cloth while it is still damp. Roll the cloth around a slotted roller or lay flat to air dry until just damp then hard press.





Beat the weft in lightly – it is more of a squeeze than a beat. You want to try to achieve a 45 degree angle for your twill line.



Project 15

Winter jacket

Warp: Pony worsted and mohair loop
Weft: Pony worsted
Set: 20 (sley two per dent in a 10 dent reed except the loop which is sleyed one per dent)

This fabric was woven in a 2/2 twill. Although this yarn is a worsted yarn, it is one that likes to full. I also like this yarn set at 18 epi but not everyone has a nine dent reed, so I've found that 20 works well, too.

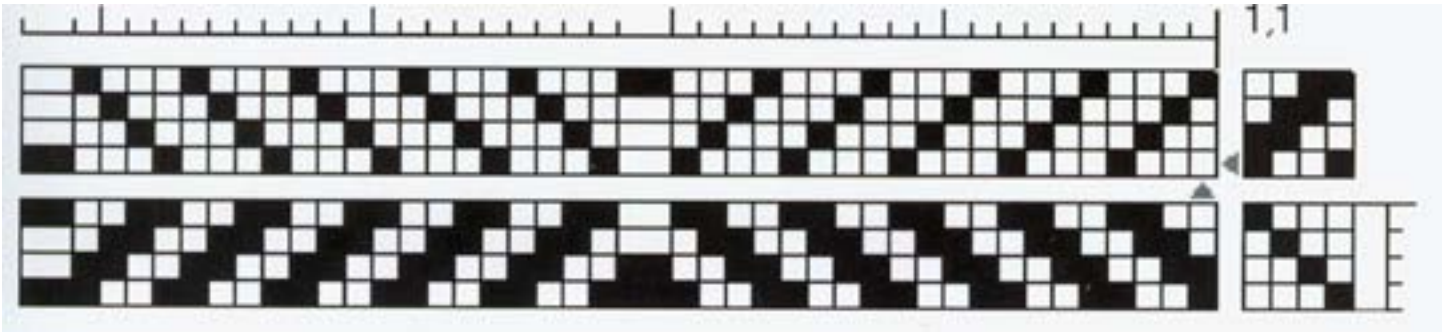
At this set, significant fulling is intended, so whipstitch the yardage together selvedge to selvedge, then end to end with cotton yarn, to create a large tube of cloth. Fill the washing machine with warm water and a little detergent and add the tube so that it surrounds the agitator.

Agitate for a while (I allowed nine minutes) and examine the cloth for stability. At this point I found it to be too unstable for the intended winter jacket so I proceeded with six more minutes of agitation. Determining when your cloth is 'done' will depend on the intended use of your cloth. Check the cloth every two minutes, then every minute as fulling progresses. After a total of 15 minutes of agitation, my cloth was fulled sufficiently and I spun out the water.

Remove the cloth from the tub and draw clear water the same temperature as the cloth. Return the fabric to the washing machine, agitate for 20 to 30 seconds to rinse, then spin it out again.
Remove the stitching, roll the cloth around a slotted roller or lay flat to dry and then hard press while the cloth is just slightly damp.

**** Shortly before going to the printers, the Pony Worsted yarn was 'improved'. This project sample was woven with the old Pony. Project 18 is woven with the 'improved' yarn.*
The new Pony has more twists per inch and more elongation under tension. Test samples indicate that it does not full as readily as the old Pony, so I suggest a set of 24 epi. Stitching the cloth into a tube is not necessary as fulling is not as extreme. The resulting cloth is smoother and denser than this sample, but equally fine.

The Pony yarn is sleyed 2 per dent in a 10 dent reed. The mohair loop is thicker and sleyed one per dent.



Project 16

Worsted suit

Warp: 2/30 worsted wool
Weft: 2/30 worsted wool
Set: 40 epi

To create a true worsted fabric, the web must not be fulled at all. Stability comes from the set and the hard press.

This cloth was woven in a 20 shaft fancy twill. For a 2/2 twill, a set of 36 might be sufficient as there would be more interlacements.

After inspecting and repairing the fabric, fold it into a bundle that will fit in your bathtub. Draw warm water deep enough to cover the bundle and add a small amount of detergent. Gently press the bundle down into the water until it is saturated. Then gently push it back and forth to insure that the detergent has penetrated the fabric to scour out the spin oil.

Drain the water out of the tub and pull the bundle up against the side of the tub to drain as much water as possible. Resist the temptation to squeeze the fabric, as this will begin the fulling process.

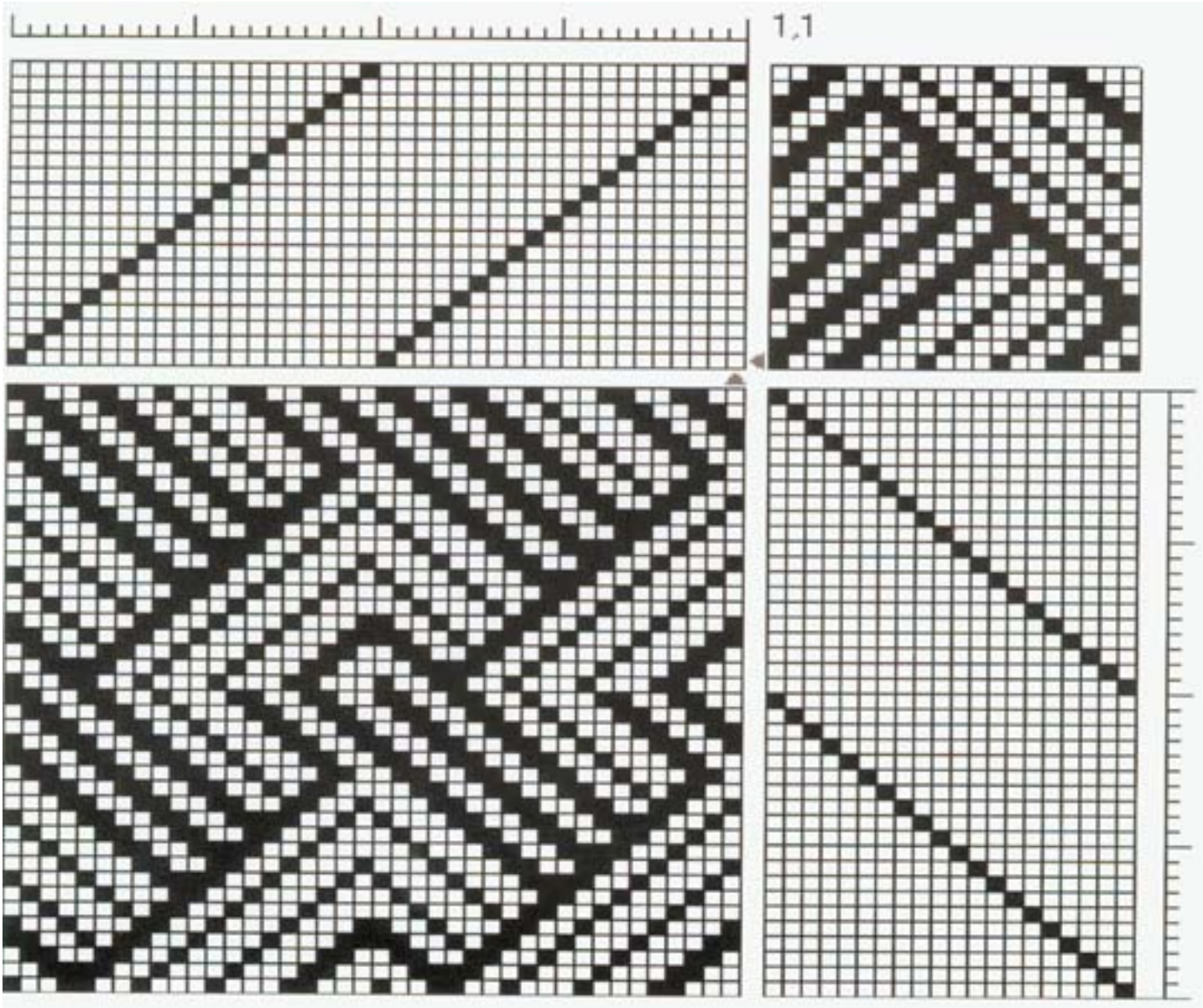
Allow gravity to pull the water out of the bundle. I generally walk away from the tub for at least 30 minutes so that I'm not tempted to help gravity along.

Draw clear water the same temperature as the cloth and push the bundle carefully into the water. Gently push back and forth to rinse the fabric of detergent, drain the water and again pull the bundle up against the side of the tub and walk away from it letting gravity do its work.

After about 30 minutes or so, carefully put the cloth into the washing machine and let the spin cycle pull out the remaining excess water. Finish the process by hard pressing the cloth.

Hint: If you do not want the shine on the cloth from the iron, steam to remove.

Fancy twills can be done on fewer shafts. Or a very nice worsted quality cloth can be made in various plaids or tartans in 2/2 twill.



Project 17

Alpaca cape and sweater coat

Warp: 2/16 alpaca
Weft: 2/16 alpaca
Set: 24

The fabric was woven in two twills, one a large goose eye with black weft, the other an advancing twill with red weft.

I did not whipstitch the fabric together, just placed it into the washing machine with warm water and a small amount of detergent.
This alpaca is reluctant
to full. After 10 minutes of agitation, I wasn't happy with the stability, but since I didn't want to full it too much, I rinsed the cloth and gave it a hard press.

A consultation with the seamstress confirmed my opinion that it was not stable enough, so I processed it again. The black appeared to be more stable than the red, since the advancing twill had fewer interlacements. When weaving two weave structures with such different amounts of interlacements, I recommend cutting the two cloths apart and serging the ends before fulling.

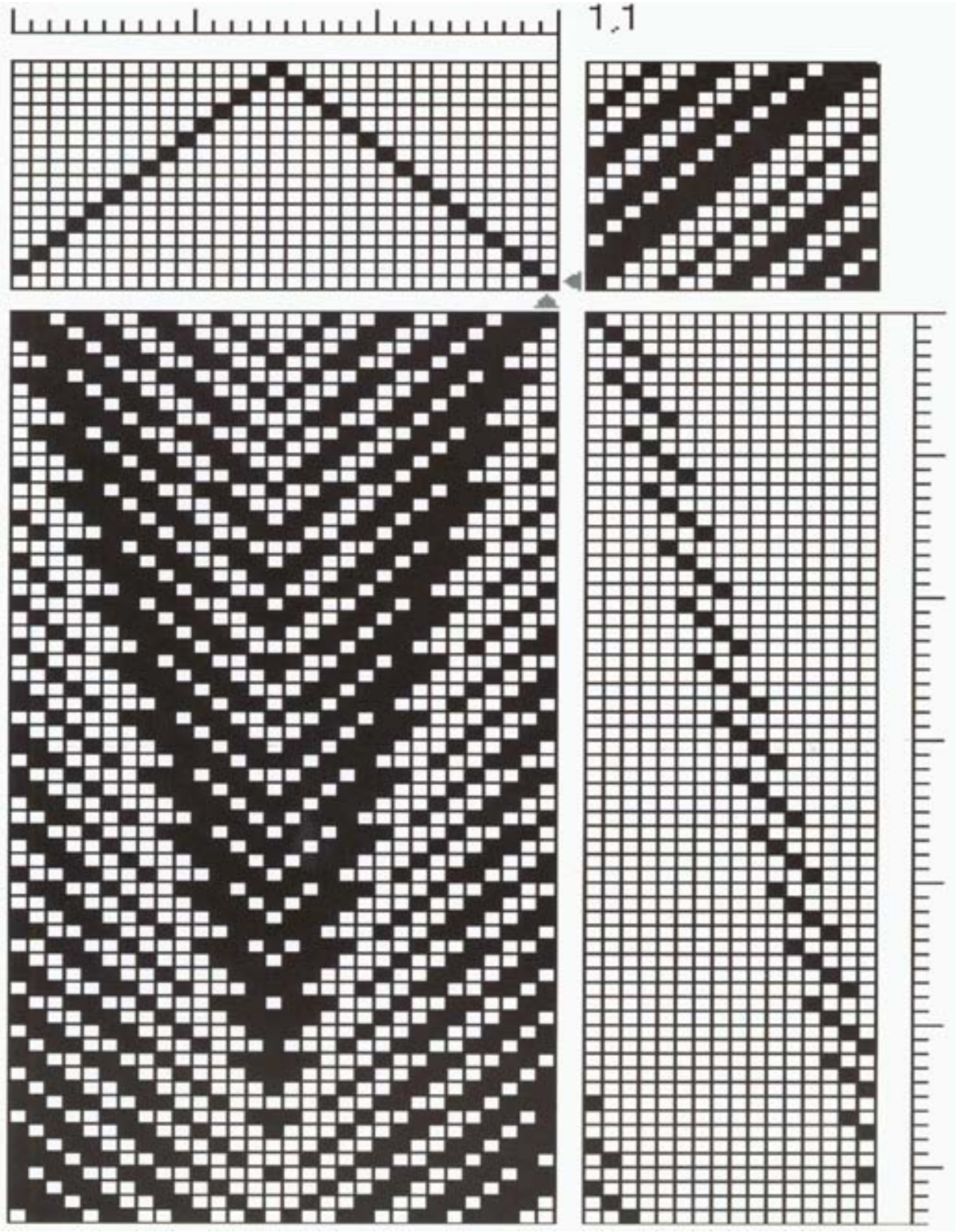
To encourage fulling, use hot water and a little detergent to make the water slippery. Full the pieces at the same time, checking the cloth at two minute intervals at first, then at one minute intervals until it is done.

Hint: When doing two pieces that are progressing at different rates, it is very important to monitor both pieces closely and remove the one that is done at the appropriate time.

During the second fulling an additional 11 minutes of agitation was applied to both pieces, then six more minutes was applied to the red before it was stable.

Spin out and rinse. Give the cloth a hard press while still damp. With the significant fulling given to the red fabric, it did distort a little at the edges but the hard press flattened it down and the waste along the selvedge was minimal.

The alpaca was woven in a large goose eye for the black cloth (see Silk Suit project) and in an advancing twill for the red on black.



Project 18

Deflected warp/supplemental warp

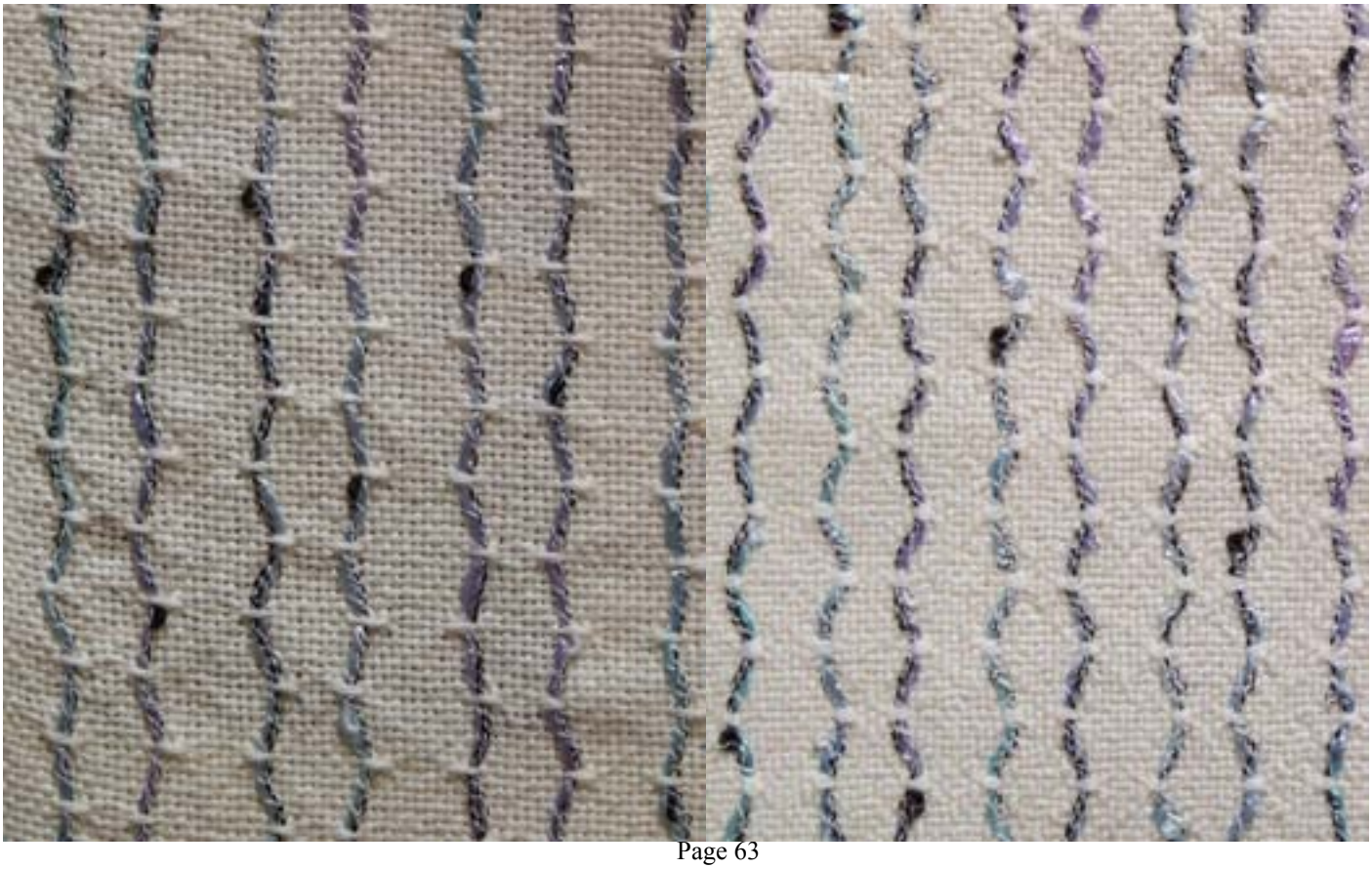
Warp: Pony worsted and rayon novelty yarn
Weft: Pony worsted
Set: 20

Sometimes it is nice to highlight a lovely yarn by attaching it to the surface of a ground cloth. Usually novelty yarns are very expensive, so it is nice to make them as effective as possible and showcase them. This weave structure allows you to do that.

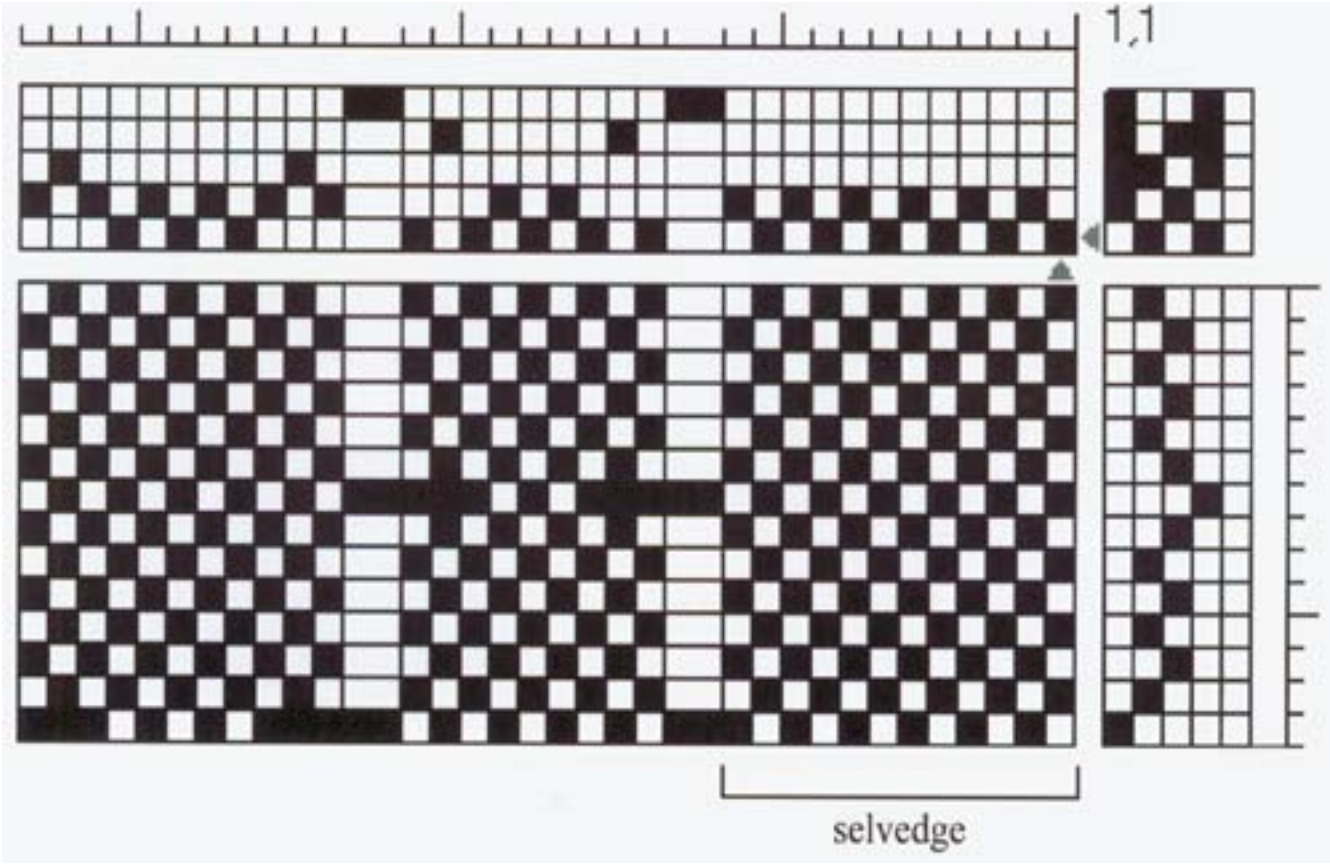
Hint: Beam and weight the supplemental warp separately from the ground cloth. If you have a second beam, use that; otherwise you can weight it with jugs filled with water. Keep the tension on the supplemental warp as light as possible to encourage it to deflect.

The ground cloth is plain weave in wool with the novelty tied down every few picks. Depending on how large the novelty yarn is, and how textured, you will want to adjust the threading and treadling to make the most of your yarn.

Twist the fringes off the loom, then wet finish by hand in a basin using a little liquid detergent. Air dry the scarves until damp, then hard press them only on the back side to avoid flattening the novelty yarn.



When using the eyelash yarn you must thread the warp so that each eyelash yarn is far enough apart so that they do not catch on each other and interfere with the shed opening properly. Insert more ends on the foundation shafts (1 and 2) to space them farther apart.



Project 19

Collapse effects

Warp: 2/20 mercerized cotton
Weft: a fine crepe silk for one scarf, a fine crepe wool for the second
Set: 36

The collapse effect in these scarves comes mostly from the twist in the yarn and is also encouraged by using 1/3-3/1 twill stripes. (Crepe yarns have more twist than ordinary yarns.)

Thread the outside four ends double in the heddle, but keep the set at 36 in the reed. The selvedges are not great when weaving a 1/3 twill, so a floating selvedge may be preferred.

See the section on Special Techniques for degumming the silk. Very fine crepe silk yarn will usually still have the sericin or gum left in it. Check with your supplier.

Wet finish the wool weft scarf in a basin using warm water and a little detergent. Agitate it to encourage the wool to relax and collapse. I form my hand into a claw and agitate the cloth by swishing my hand quickly in the water. About three minutes of agitation are sufficient to wet finish the wool weft scarf.

The de-gumming process will also wet finish the silk. The hand of the silk crepe yarn is quite hard, especially in comparison to the wool, but the silk sets up firmer ridges in the cloth. The more firmly the textile is beaten, the more prominent the ridges become, but the hand of the cloth also becomes stiffer.

When the silk dries the fabric must be 'worked' to soften it. Grasp the scarf by the selvedges, pull out and stretch the cloth on the bias several times, alternating the right and left hands up and down. Move up a hand width and repeat. It may take several times along the length of the scarf to soften it.

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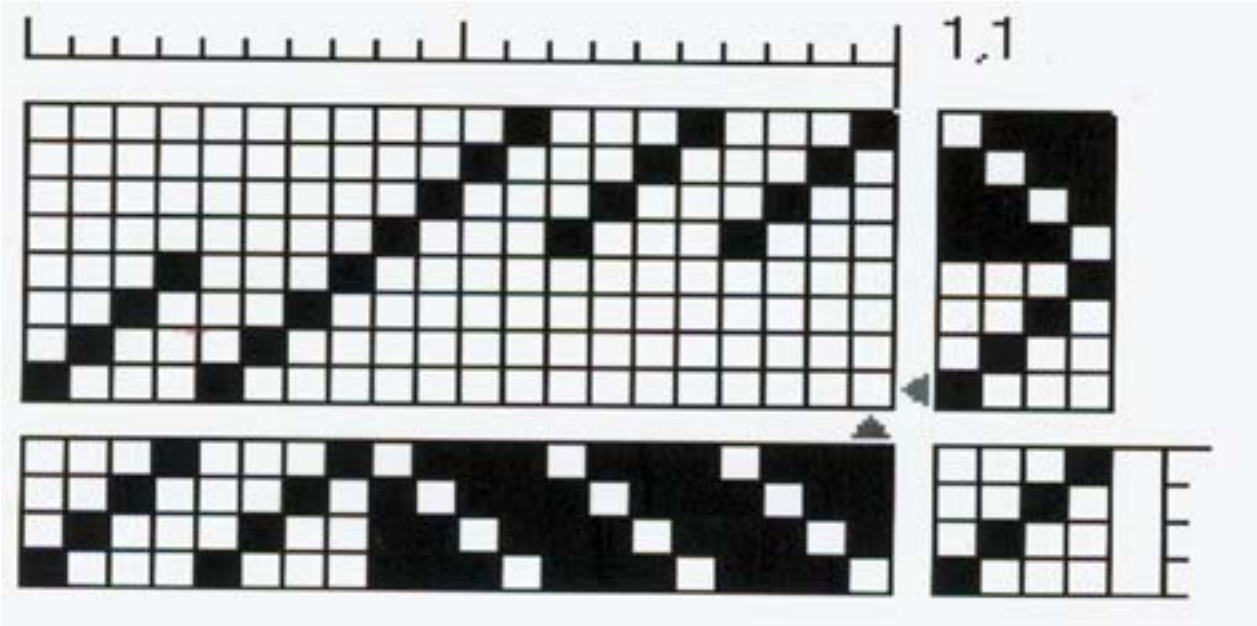
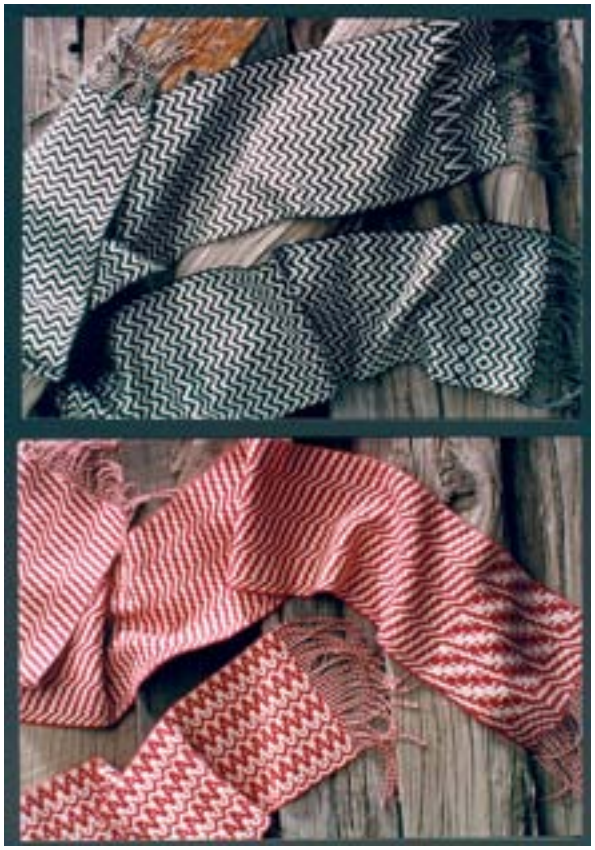
Make the stripes different sizes changing colours as the stripe changes, or overlapping them for another effect. For the 2/20 size of yarn, I find a stripe no more than 16 ends works well. You can make your stripes 4, 8, 12 and 16 ends, varying the sizes and the colours to create an interesting design.



Project 20

Deflected double weave scarf



Warp: 2/20 silk and 2/20 worsted wool
Weft: 2/20 silk and 2/20 worsted wool
Set 30 epi (15 per layer)

Deflected double weave relies on wet finishing to develop the textile to its full potential. The threads of the two layers need to slip and slide together and this happens best when the web is wetted out and agitated.

The combination of silk and wool in deflected double weave makes a very sumptuous textile. This particular worsted wool is one that does not full readily, so agitating the textile to encourage the slippage does not start the fulling process.

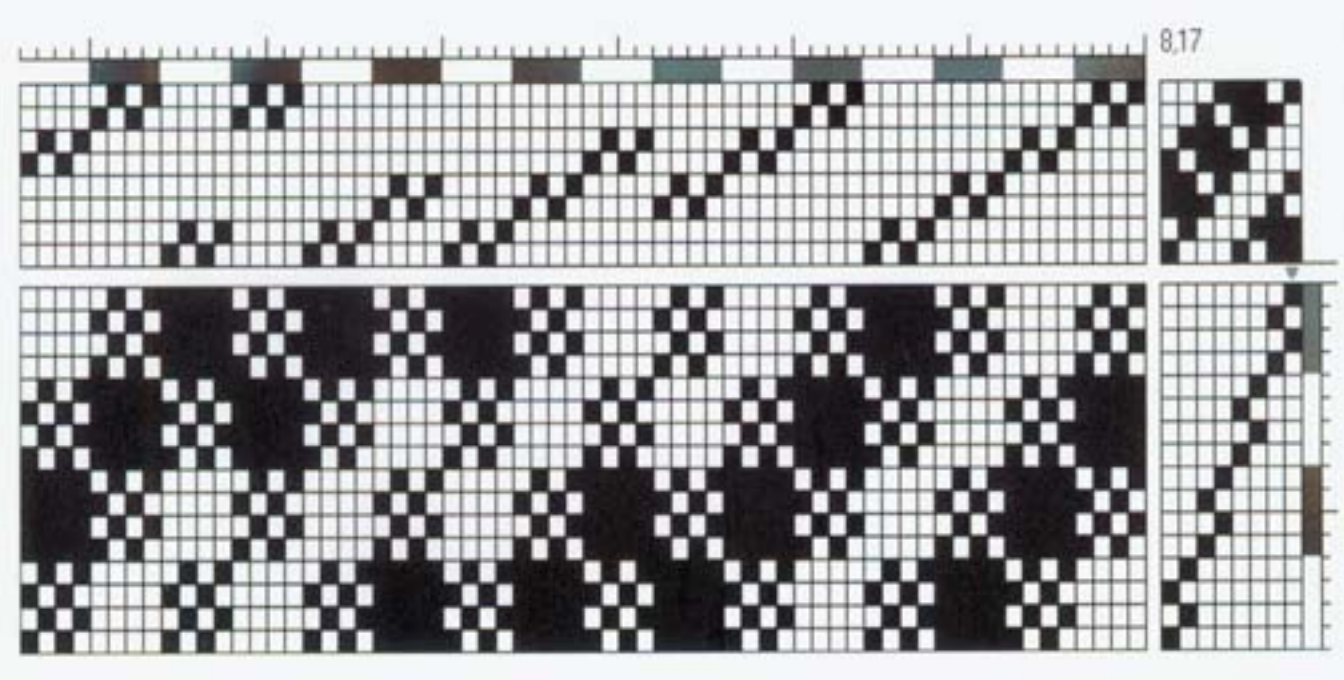
I generally wet finish small items like scarves by hand but you can use a washing machine for several items. For these scarves, I did use the washing machine on regular cycle and a small load setting. It is very important to finish the black fabric separately because this yarn does shed black dye. The red dye was colourfast. In this case, the black imparted a lovely silvery sheen to the silk that I liked, but of course it would not be desirable in most instances. Even the use of a Dye Magnet (a product designed to absorb excess dye) did not prevent the transfer of black dye to the natural silk.

Twist the fringes before wet finishing. Fill the machine with warm water and a little detergent (less than half inch or one centimetre of suds) and enter the scarves into the water.

Agitate, (I allowed approximately eight minutes) spin out the water, remove the scarves and fill the machine with fresh warm water. Enter the scarves into the water, agitate for 20-30 seconds to rinse and spin out the water. Allow the scarves to air dry until damp, then give them a hard press. If the silk dries a little stiff, put the scarves into the dryer to tumble for about five minutes with no heat. My scarves came out very supple.

Deflected double weave can be threaded in any number of patterns. There have been numerous articles in Weavers Magazine and Handwoven. There is a great deal of scope in designing interesting textiles using yarns that behave similarly in terms of wet finishing, or combining radically different yarns that will create texture and bumps due to the difference in shrinkage during fulling

For the scarves pictured, four ends of silk were alternated with four ends of a worsted wool that does not full readily. The surface of the scarves are therefore smooth and flat.



Supplemental Sample Set

CD Weaver III

It isn’t finished (until it’s wet finished)

Laura Fry June 2008

It isn't finished until it's wet finished!

Weaving the threads into a web does not create "real" cloth. Like potters who must fire the clay in order to have "real" pots, weavers must wet finish their webs before they have fabric.

The samples in this supplemental set have been selected to show the principles of wet finishing: scouring, agitation and compression. Two of the samples have also been brushed to raise a nap. These steps are applied to a woven web to enhance it and make the fabric stable and durable. Without wet finishing, the threads remain "individual" – the cloth has no cohesiveness and will not stand up to the wear and tear of use.

The red wool fabric needed to be scoured to remove the spin oil. It was also fulled sufficiently to increase the stability so that it could be cut and sewn into a garment.

The yellow and white fabric shows how reed marks will be reduced during the agitation part of the process, and it was then cold mangled to develop the shine that makes linen so attractive to our eye.

The mohair loop was woven very loosely, fulled significantly and then brushed vigorously to develop a luxurious nap.

The wool, silk and bamboo fabric was woven and fulled vigorously, then brushed with a different type of brush in order to develop a shallow nap for a cozy flannel type of finish.
The Tencel and bamboo cloth was compressed in order to create a gleam in the fabric, and a smooth, silky finish.

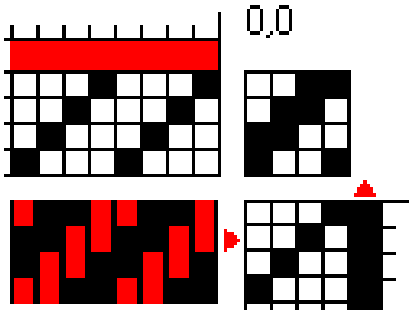
All of the above samples have the before (loom state) and after (wet finished) samples included so that the difference made by wet finishing can be clearly seen and felt.

As a bonus, there is also a finished sample of the wool fabric fulled in the hammer mill in Norway as described in A Vadmal Adventure, also on CD Weaver III as a separate title.

Although several of these fabrics have been woven on more than four shafts, the same principles apply to similar yarns woven on fewer shafts. Twills woven on four shafts are as lovely as "fancy" twills woven on more.

Come join in the Magic in the Water!

Red Wool

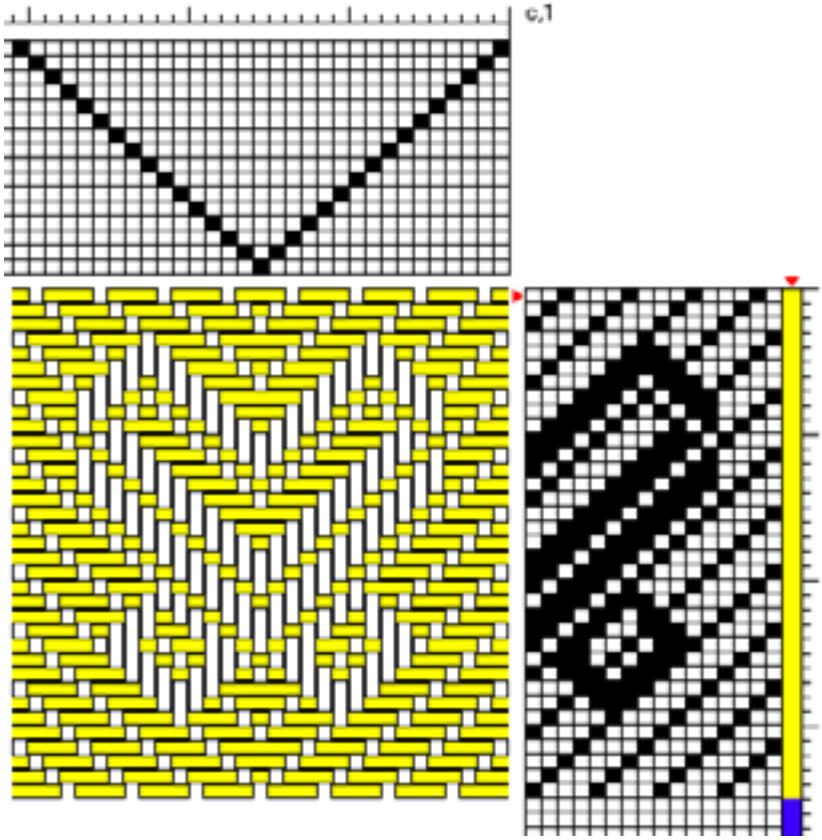


This fabric was woven as a 2:2 twill on four shafts using a two ply woolen yarn for warp, and a very fine two ply worsted yarn for weft in order to keep the fabric fairly light.
EPI: 16
PPI: 16
The fabric was scoured using several baths of light soapy water in order to scour the spin oils out and remove the fugitive dye. (Never soak fabric until you know the dyes are stable and will not migrate!)
The fabric was agitated for about 8 minutes in total, including the scouring and rinsing, then tossed into the dryer on low heat for about 20-30 minutes until the fabric was stable. Actual fulling time will vary according to your cloth – how dense the threads have been woven and how much fulling your final cloth requires to reach its finished state.

It was then laid flat to dry completely.

The fabric was made into ruanas, but could have been used to make nice winter jackets, too.

Yellow Butterflies



Warp: 2/20 mercerized cotton
Weft: fine linen singles 16
EPI: 36
PPI: 36

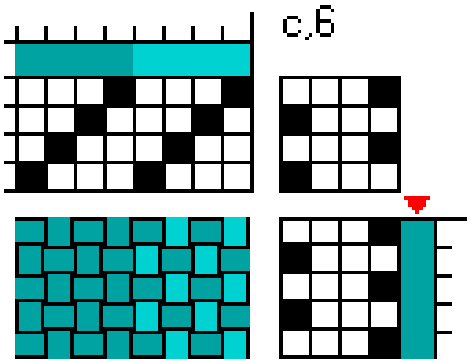
This fabric is shown on CDWeaver in one of the video clips. It was scoured in a light soapy bath, and agitated by hand and rinsed.

It was then cold mangled – that is, compression without heat was applied – to flatten it and bring out the shine of the linen yarn.

The streaks from reed marks are reduced, although not gone entirely.

Mohair Loop

Warp and weft: Mohair loop
EPI: 4
PPI: 4 to 5



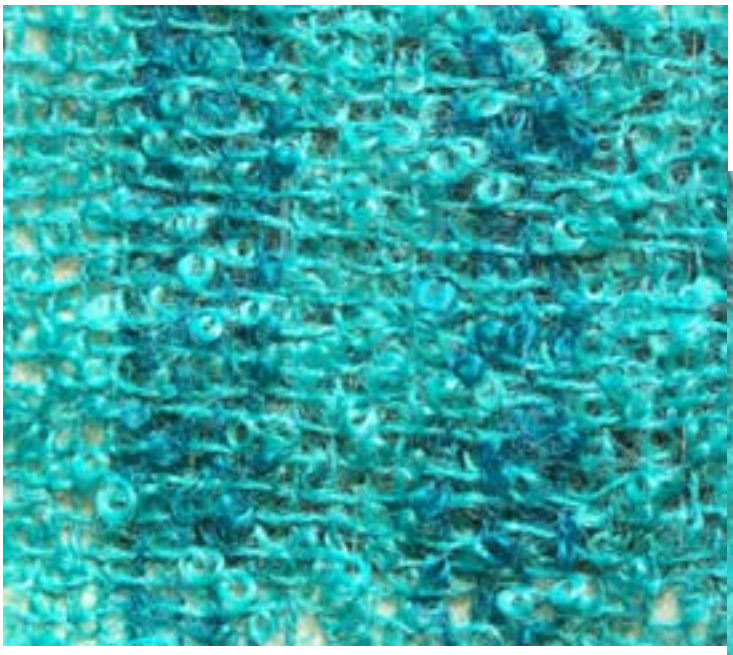
This yarn isn't heavily oiled so only a light soapy solution was needed to scour it.

Since this fabric was woven so openly, it required vigorous fulling to develop sufficient stability for it to be brushed.

While fulling can be done by hand, it can take quite a long time, and can also become physically tiring. When I have a lot of significant fulling to be done, I will toss the wet cloth into the dryer with a wet towel and let the dryer tumble the cloth for me. Use low or no heat so that it doesn't dry out too quickly.

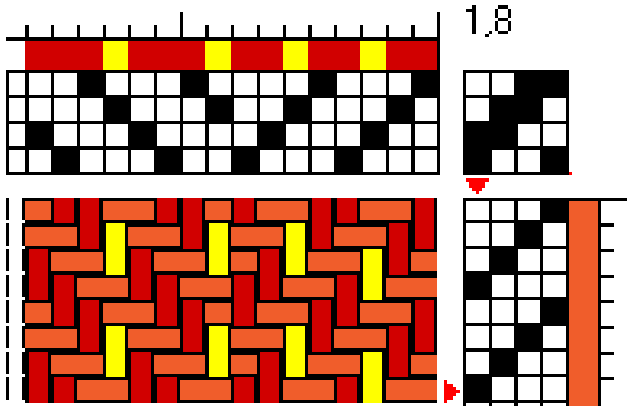
If the fabric dries before it is sufficiently stable, re-wet and continue to tumble in the dryer. Brushing was done with a pet brush (see cover or the cd) and can also be physically tiring. If you are brushing a larger item, you may find it helpful to have a partner to help.

For a scarf, I brush the nap so that it will lay downwards as it is being worn, so the nap changes direction at the centre of the scarf.



Wool, Silk And Bamboo Blend

Warp: Wool, silk, bamboo blend (approx. 1600 yyp)
Weft: Silk City's Bambu 12
EPI: 20
PPI: 20



This warp was woven in Herringbone Twill. This weave structure is very attractive for fabrics for clothing since the change of direction at the point is not 3 threads. It is also nice if you want to do a change in direction of the twill line in the weft at large intervals as the selvedge threads will not "drop out" of the fabric as long as you also drop a pick as you treadle as has been done in the threading.

The cloth was given a light scour, then a vigorous fulling. The addition of silk and bamboo will retard fulling so it will take quite a lot of agitation to full.

After fulling, the fabric was given a brushing with a scrub brush. See the video clip on the cd.

Tencel And Bamboo

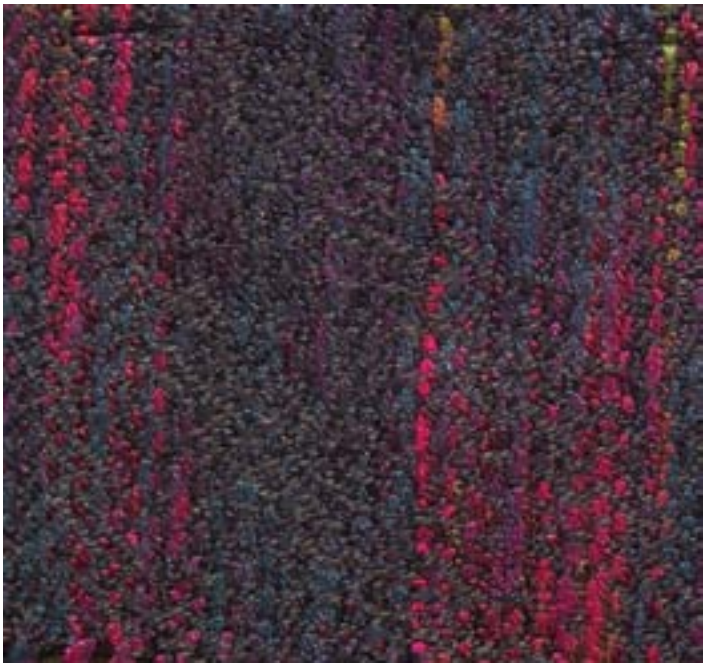
For several years I made a line of scarves using 16 shaft fancy twills on a painted warp. Theses scarves can be made on four shafts as well by using any sort of "fancy" twill threading that is appealing, or just a straight twill.

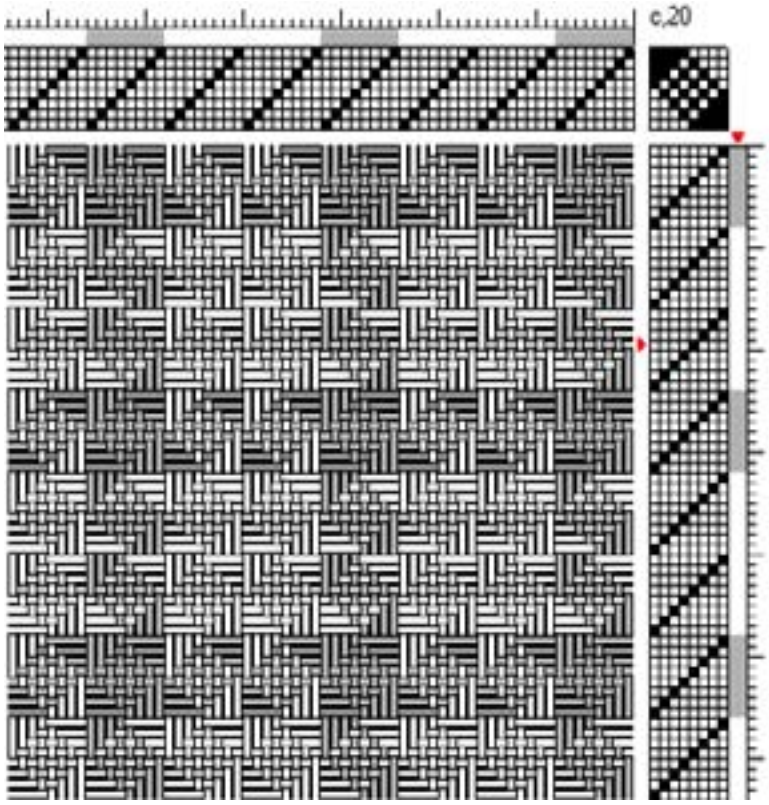
Warp: Painted warp with one end of 2/5Tencel, and one of Bambu 7 (Silk City), threaded randomly
Weft: Tencel 2/8
EPI: 20
PPI: 20

Generally hand dyed cellulose fibres will have fugitive dye. I always add a sheet or two (or three) of Color Catchers to help sop up the loose dye molecules. Never soak any web that may have loose dye. Get it into the water and rinse it quickly with lots of water so that there is no encouragement of the loose dye to settle elsewhere on the cloth.

After scouring and rinsing at least twice - more if the water still isn't running clear - the scarves are put into the dryer and dried until just damp. A hard press is applied to make the fabric as smooth as possible. See the cd for a video on hard pressing.

Set the iron for the lowest setting. There is no need for steam as the damp cloth will produce the steam required. If your iron has steam, that's fine, too. Make sure your ironing board is firm, not soft. A very soft board will make the application of compression more difficult and time consuming. My board has a single cotton flannel sheet folded to just cover the board and its edge. A cover keeps the sheet in place.





The fabric to be fulled at the vadmalsstamp was woven in an 8 shaft pinwheel twill at 24 ends and picks per inch. The fabric was designed to have a one inch "check", partly because I wanted to see if the shrinkage would be equal in warp and weft. As it happens, the fabric shrank more in the weft direction than the warp, probably due to being laid into the trough so that the hammers were striking the fabric from the selvedge or side of the cloth.

The fabric was fulled for a total of 90 minutes, in 15 minute intervals. At each interval, the fabric was pulled from the trough and re-folded so that fulling would be applied evenly. It was then given a thorough pressing.

Biography

Laura Fry chose weaving as a career in 1975 and took weaving classes at every opportunity, including study at Banff School of Fine Arts in Alberta and Varpapuu Summer Weaving School in Finland. She started her business in 1977 and since 1980 has worked full-time as a professional handweaver.

Laura's business focus has evolved with the changing economy and market trends from a concentration on table textiles to weaving yardage on contract for a fashion designer. In addition, Laura teaches throughout Canada and the United States, writes for a variety of textile publications, and wins awards for the beautiful clothing fabrics that have always been her passion. After years of work and study, Laura earned certification in 1997 as one of Canada's Master Weavers, the 27th weaver to achieve the honour.

Laura's meticulous approach to weaving quality fabrics is characterized by her attention to wet finishing, a procedure often neglected and little understood by most handweavers. In Magic in the Water; wet finishing handwovens, Laura Fry shares her expertise derived from years of research and experimentation. Her guidelines make professional-quality finishing achievable by every handweaver, hobbyist and professional alike. By examining her actual fabrics, both before and after wet finishing, you will understand why Laura says, "It isn't finished until it's wet finished."