



Åsa Pärson & Amica Sundström

The Weaving Handbook

The Art and the Craft:
Theories, Materials, Techniques, and Projects







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Theories, Materials, Techniques, and Projects**

**Åsa Pärson
Amica Sundström**



TRAEALGAR SQUARE
North Pomfret, Vermont

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First published in the United States of America
in 2021 by
Trafalgar Square Books
North Pomfret, Vermont 05053

Originally published in Swedish as *Konsten at väva: En Praktisk
Handbok*.

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Fakta
English translation © 2021 Trafalgar Square Books

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ISBN: 978-1-64601-086-8
Library of Congress Control Number: 2021930380

Photography: Karin Björkquist
Interior Graphic Design: Anna-Karin Sundin
Illustrations: Peter Alenäs
Editors: Eva Kruk, Cecilia Ljungström
Cover Design: RM Didier
Translation into English: Carol Huebscher Rhoades

Printed in China
10987654321



Table of Contents

8 Preface: Weaving—This Magical Handcraft!

1.

12 Weaving Projects

2.

96 Looms & Tools

3.

114 Materials

4.

126 Setting Up a Weaving

5.

160 Weaving Theory

6.

176 Pattern Drafts

7.

240 Techniques for Art Weaves

8.

266 Edgings, Finishing, & Fabric Care

282 Index, Acknowledgments



Preface

Weaving—This Magical Handcraft!

Stockholm 2 June 2020

We were nineteen and twenty-one years old respectively when we met in 1991; we were both taking a one-year weaving course at Stockholms Folkhögskola (the Stockholm College for Adult Education). During our studies, we visited Väfskolan (the Weaving School) in Borås. The head teacher there, Christina Rinaldo, made a strong impression on us with her focus on both contemporary weaving and the history of weaving.

Christina's stories about various projects being pursued at Väfskolan were so exciting and interesting that we decided to apply for further training, and we both transferred there in the fall of 1992. The three terms we spent studying under Christina were decisive in setting us on our current professional paths, and gave us not only invaluable experience with different types of weaving, but also treasured personal connections with other weavers in Sweden and around the world. Over the years, we have also taught weaving at various levels and become experienced teachers. We love to share our knowledge, and are very happy that we have had the opportunity to write—and weave—for this book.

In this practical handbook, we explain the fundamentals and discuss the materials and methods that make it possible to independently engage in weaving as handcraft. Our intention is to help readers understand how to combine different fibers and techniques, explore various options, and ultimately reach the desired result.

For us, sample weaving is a key method for finding the perfect “recipe” for a woven textile. The ingredients in this kind of recipe are the materials, weave structure, set-up, and color. Once you have a set of ingredients you’d like to try out, the loom can be used to create a quick “taste test.”

The projects in this book were created with function, usability, and durability in mind, and the above-mentioned “recipe” for each is of great importance in determining how the project will turn out. All of these recipes can be adapted, with different “ingredients” substituted, to suit any weaver’s taste.

Weaving is a centuries-old art, and there are many different types of tools, looms, and traditional approaches to the act of weaving itself. In this book, we describe how we personally work with weaving theory and instruction, and how we weave on a floor loom—we begin with what works for us in our own practice and in teaching situations.

The descriptions of the various projects in this book should be viewed as inspiration. We know that access to materials will differ depending on where in the world you are, and it’s never guaranteed that a specific yarn will be available after a couple of years. Therefore, we decided not to describe precisely how a project should proceed as regards warp order and threading, and we don’t list precise amounts for each material. Instead, we recommend a method that is described later on in the book, primarily in the “Weaving Theory” chapter. There, you’ll learn how to determine for yourself what fibers you prefer and want to work with. The projects included here should be regarded as starting points, easily modified with your choice of materials and your own ideas about patterns and colors.

Good luck with your weaving!
Amica & Åsa

In memory of Christina Rinaldo





To weave—to see the threading system bind together, to watch the surface structure take shape—is an experience I can’t help but see as magical. Holding the materials in my hands and creating my own fabric out of yarn is immensely satisfying.

I use various methods and strategies to decide where to begin a new weaving. Sometimes, the materials function as inspiration and lead to ideas—I want to see how they behave, feel, and look in a woven piece. Sometimes, I’m picturing a specific final product—I want it to have certain characteristics and certain functions, and those ideas guide the work. In both cases, I have to make decisions about materials, weave structure, threading, and color, and I have to figure out how to combine these ingredients to make a “recipe,” so to speak. To make a good recipe, you need to test different combinations. An excellent method of “taste testing” is to do sample weaving to see how specific recipes turn out, and to learn how your choice of ingredients can affect the quality and look.

A few years ago, I had the opportunity to rent a cottage. The cottage, originally a soldier’s cottage, is in Sörmland (on the southeast coast of Sweden), and is part of a big farm. I’d already been thinking about trying to weave a full set of textiles for a home, and the cottage seemed just big enough to fill with handwoven goods.

Because interior textiles often have a function, and function implies a certain quality, it was a good starting point for gaining experience with weaving. In earlier times, the list of textiles needed for a home was long. Today, washing options are better and households smaller, so the list obviously looks different. My starting point was a combination of need and desire—and of course I also wanted to present lots of different materials and weaves for the reader. I thought very simply, room by room, about how each room would be used and what textiles would be necessary. It was important that these textiles be durable even when they were purely aesthetic, so I chose to work with block patterns in most of these weaving projects. Weaving stripes in both directions and working with both colors and textures invite endless variations, and blocks are a pattern world one never tires of.

Åsa Pärson

Drapes in Herringbone Twill

The double doors to the cottage aren't insulated very well, so it's drafty and hard to keep the cold out. Weaving drapes to help keep some heat inside was one of the first projects I decided to take on. I looked at Östgötadräll patterns, and was inspired by the various block patterns—traditionally woven in herringbone twill, and often done in golden yellow. I enlarged the blocks to make the scale about the same as the beadboard in the hall. Herringbone or cross twill offsets twill's diagonals, and the surface becomes irregular without lines. In older Östgötadräll textiles, the warp was often linen. I chose the same material for its luster, which, in combination with the yellow color, looks like gold. The weft was natural gray to add a warm feeling.

In Sweden, the woven textiles that hung in front of the built-in beds in farmers' homes were called förhängen ("curtains"). Their function was to close in warmth and create privacy, because traditionally multiple people slept in the same room.

Textiles often had dual purposes in homes; they were partly functional, but also partly a decorative addition to the furnishings. Drapes keep out drafts and contribute to a better sound environment, and at the same time they embellish the room. Tapestries also help with warmth, because they minimize drafts and create an insulating air space if they're hung an inch or so away from the wall.

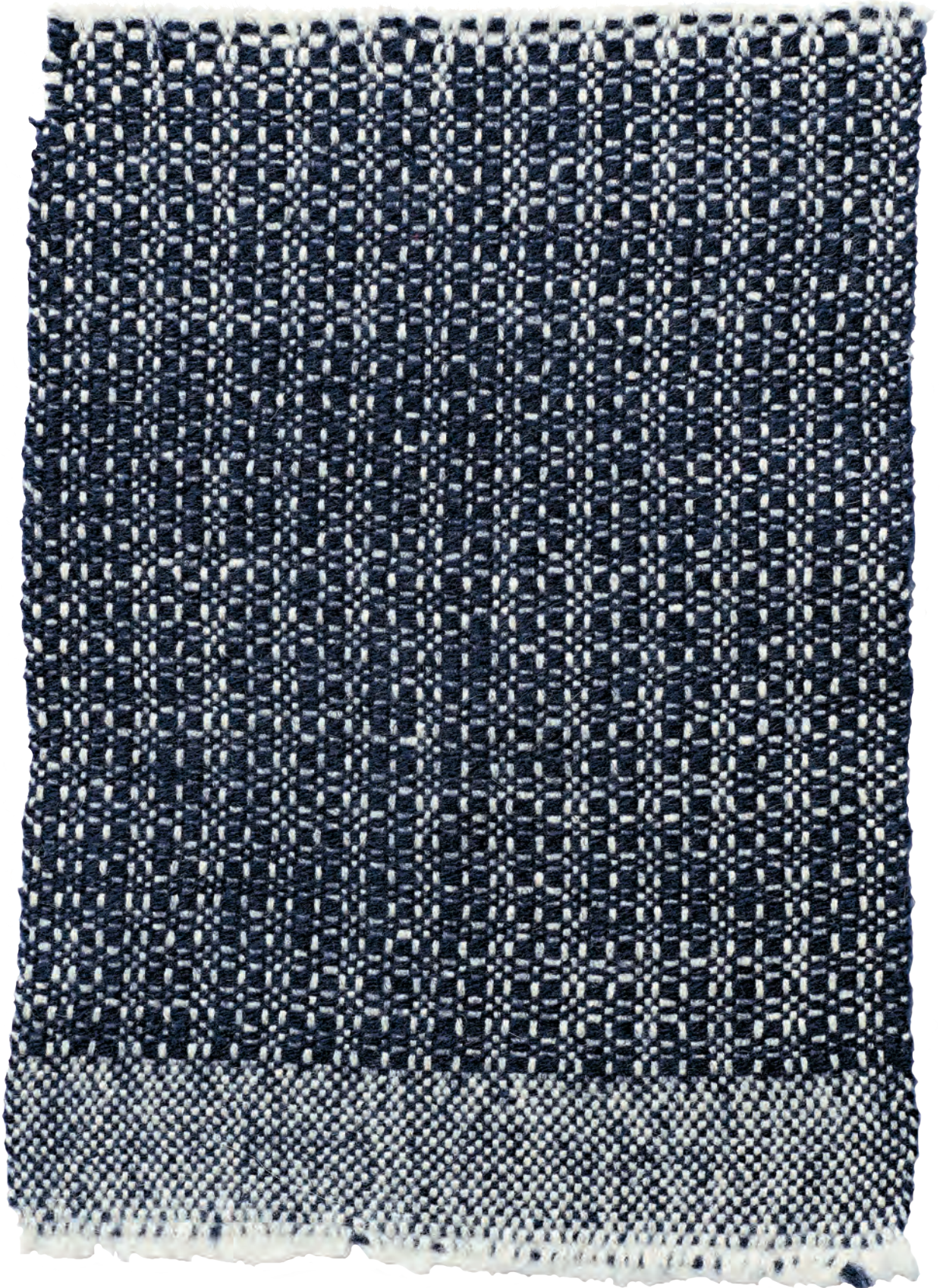


Rep Rug

I wanted the rug in the hall to be a rep rug. A rep weave has a closely-set warp, and a thick weft that's completely hidden by the warp. I was fascinated by how different materials reflect light and how the same color tones can be perceived differently depending on the materials; I ended up trying a combination of cotton rug warp and heavy linen yarn with a high twist, both in tones of black. The linen yarn is heavier than the cotton, and the weft can shine through more clearly in the blocks covered by the cotton threads.

Cotton was first imported to Sweden on a large scale in the middle of the nineteenth century, and became a popular material, quickly replacing linen and hemp. At about the same time, rugs began to be used as floor coverings, and rep rugs were coordinated with rag rugs for festive occasions. The tight and fine cotton warps of rep rugs cover the weft completely, leaving it visible only at the edges of the rug, and therefore the weft can be made of anything handy: cord, rags, or even straw.





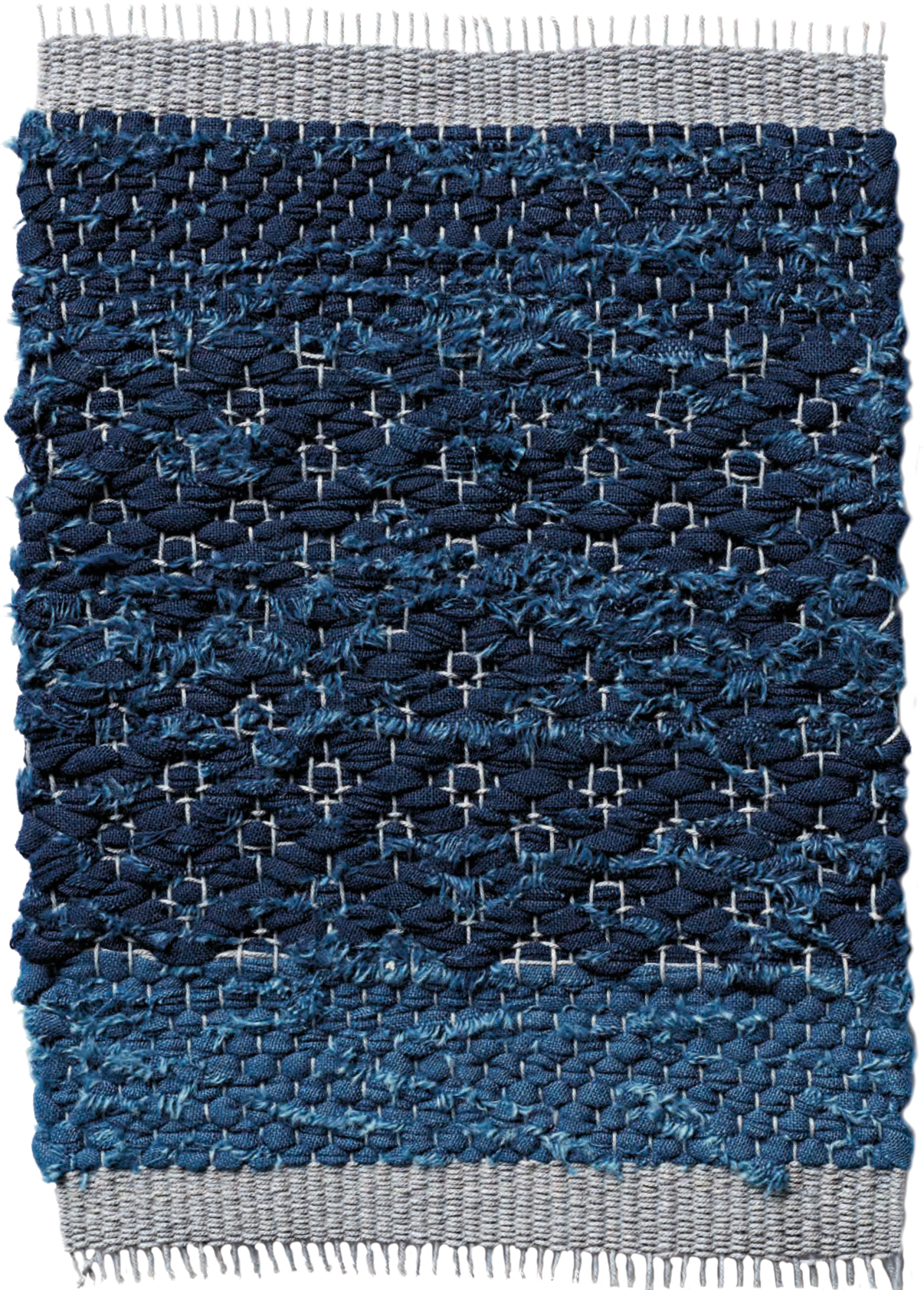


Rag Rugs in Open-Spaced Rep and Rosepath

Rag rugs for the kitchen are Swedish classics! Traditional rag rugs were often made with worn-out clothing and textiles, and had a playful mismatched look. Because my rugs were going to be placed together in the kitchen, I didn't want them to be too different from each other, but at the same time, I wanted to try out all the different kinds of weaves often used for rag rugs. Color was the common element. I didn't follow the traditional method and rip the rags from sheets and discarded clothes, but instead looked through my fabric stash, plus some indigo-colored fabrics from Japan that I had left over from an exhibition project. These fabrics, dyed in various shades of blue, would be good company for a blue-and-white block fabric and an unbleached woven sheet.

Originally, rag rugs were made as an underlayer. People took worn-out linens and wove thin mats to be laid over straw in a bed. They also wove rag rya rugs or rag inlay rugs with strips torn from old sheets, and used them as bed covers. For a time, Sweden had a law requiring that rags be sent to the paper industry for use in papermaking, but in 1824, it was repealed. That meant more torn textiles were left in households. By the time the use of rugs to decorate floors had spread through society, at the end of the nineteenth century, rag rugs were a natural next step. The use of rugs began with estates and bourgeois homes, and spread from there. Originally, rugs were used only for festive occasions and were stored rolled up, but during the twentieth century, rag rugs became an everyday interior textile. These rugs were often woven in narrow lengths and laid out so they overlapped each other. At the beginning, the material used was whatever was on hand, and you'll find linen, wool, and fishnet in older rugs. When cotton became more commonly used in clothing and home textiles, this was reflected in the composition of rag rugs.







Roll-up Curtain in Plain Weave

To have roll-up curtains like those found in the eighteenth century in a cottage from approximately the same period was an obvious choice. These roll-up curtains were inspired by their eighteenth-century predecessors. Curtains like these are made with a piece of fabric trimmed to the window's size, usually cut and glued on the edges to avoid seams (which would otherwise affect the roll when the curtain is cranked up—if the curtain has seams, the roll will be thicker at the edges and the fabric can get stuck in the middle of the roll). If you weave the fabric yourself, you can adjust the size to the measurements of the window and avoid cutting. You'll just have to work hard to ensure you end up with nice straight edges! My curtains hang inside the window frame, but because my window is not exactly the same width throughout, I wove the wider part first and then the narrower.

Roll-up curtains made with fabric became common in upper-class homes during the eighteenth century. The fabric for such curtains was handwoven, and consisted of two narrow lengths that were sewn together in the middle. At first they were single-color, and then check-pattern curtains appeared. Later, by the end of the 1700s, striped fabrics became popular. Often the same fabric was used for furniture covers and roll-up curtains. The curtains were nailed up in the window frame and equipped with a round spoke below. They were raised and lowered with the help of ropes that ran through glass rings, which, in turn, sat fast in leather straps. The ropes were locked around a nail set into the window frame. Normally, these curtains covered only the window, and not the frame.







Dräll Bath Towel

Warp: 16/1 linen

Weft: 16/1 linen

Number of Ends per $\frac{3}{8}$ in / 1 cm on Ruler: 18

Reed: 17.5/in [70/10], 1-2

Sett: 14 ends per $\frac{3}{8}$ in / 1 cm

Number of Ends: 1,036

Selvedge: 1 unthreaded warp end at each side

Width in Reed: 29 $\frac{1}{4}$ in / 74 cm

Finished Width: 27 $\frac{1}{2}$ in / 70 cm

Woven Length: 61 in / 155 cm

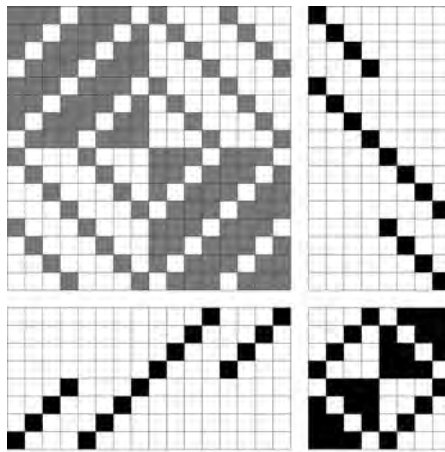
Finished Length: 55 $\frac{1}{4}$ in / 140 cm

Comments:

This towel is woven with an 8 in / 20 cm wide panel in tabby at both ends. The pattern is block-threaded twill, or dräll. You can vary the number of ends in the blocks to increase the block sizes. For this towel, the number of ends is 8 per block.

Finishing:

Hand wash and press. Make a short knotted fringe on each end.





Knotted Rug

In choosing the colors for this knotted rug, I started from a pile rug that I had for the bedroom in the cottage. That rug's irregular pattern was also the basis for the random placement of colors on this rug. The only rule I followed was that every square with a dark color should be followed by a lighter square both sideways and lengthwise.

For this project, I gathered all my leftover yarn from other projects. It included everything from machine-spun materials and leftovers from sample dyeing to small handspun skeins of Swedish wool, plus yarn bought on trips to Jordan, Tibet, and Turkey. The materials differ from each other in luster, twist, and fiber thickness, which makes for a lovely, varied look and feel.

The Pazyryk rug was found in a grave at Pazyryk in Altaibergen in Russia. It's the world's oldest, best preserved rug; still complete, it measures 78¾ x 75 in / 200 x 190 cm. The grave that held it had been plundered, but the rug was saved by permafrost and was frozen in an ice block when it was found in 1947. It was woven with sheep's wool, worked with symmetrical knots, and has approximately 330,000 knots per square meter. The rug may have been knotted in Armenia or Persia, probably around 400 BCE, and is now exhibited at the Hermitage in St. Petersburg, Russia.

Today's pile and rya rugs are knotted the same way as the Pazyryk rug—with the symmetrical Ghiordes knot (also called a Turkish knot).





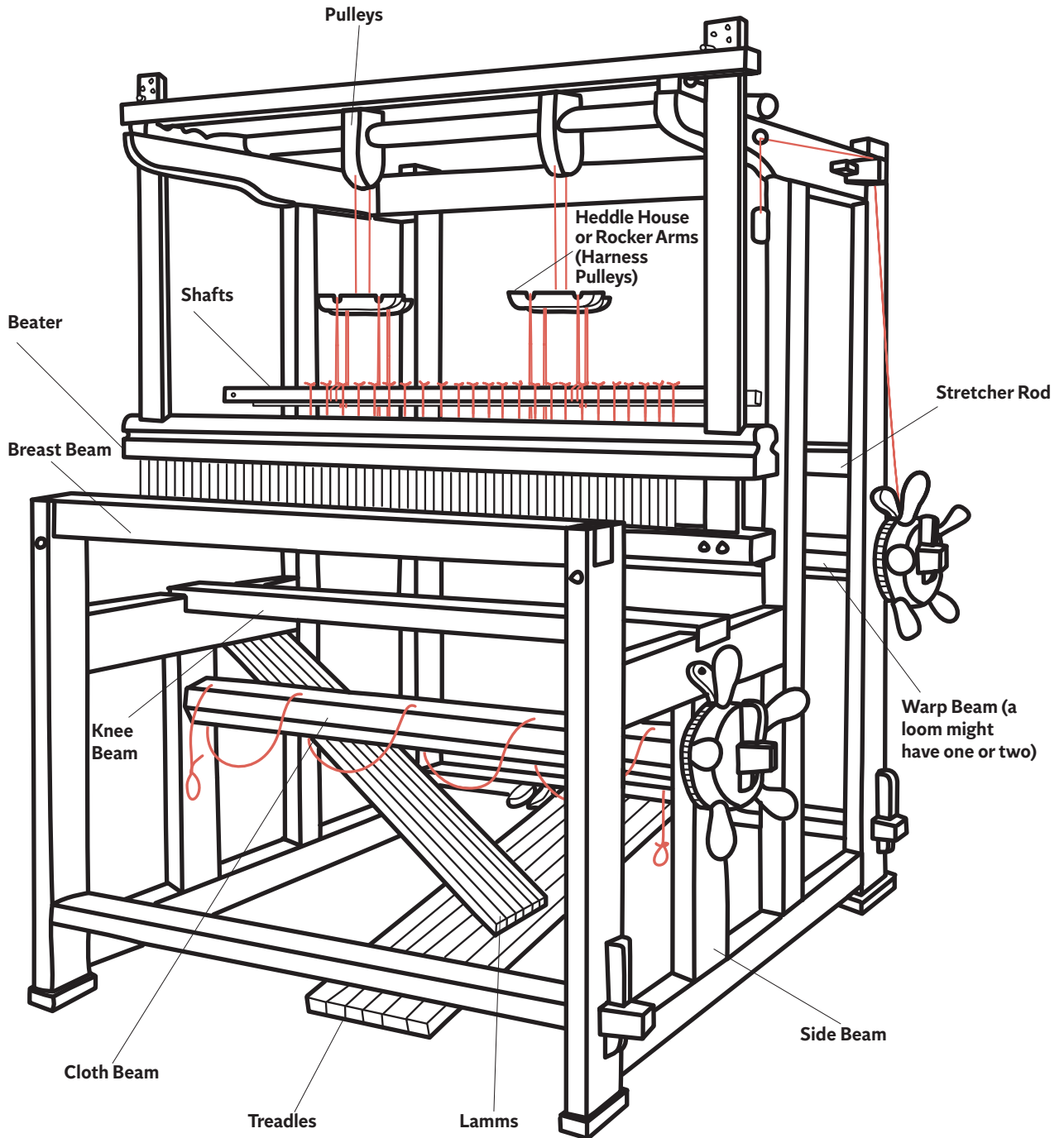
There are many types of looms. They're all based on the same principles: at least two systems of threading, joined together in different ways, where one of those systems of threading—the warp—is held at tension. This book is concerned with weaving on foot treadle looms with an upper tie-up consisting of countermarch or with regular and harness pulleys. Besides a loom, you'll need a number of other tools to be able to weave, from a skein winder to a weaving temple.

Which loom should I choose?

In the Swedish language, we call all types of weaving apparatuses “looms,” but the term is most often associated with the foot loom. There are simpler types of looms—for example, ground, vertical double-back, warp-weighted, backstrap, table, and frame looms. Treadle looms were developed independently in various parts of the world. In Europe, they were developed during the Middle Ages and were the most common type of loom in the fourteenth century. They look essentially the same now as they did then. The number of shafts in the loom determines how large a weaving can be repeated in a shuttled weave. Different models and companies have distinctive designs, but they all work the same way, fundamentally.

A loom can last for several generations and can be purchased used. You simply need to be sure the loom has not been broken and the beater is straight. For beginners, we recommend a loom with 4 shafts and 6 treadles, although a loom with 8 shafts and 8 treadles will allow for many more options to vary your weaving. If you want to weave patterned textiles with many sections, you should invest in a loom with 16 or 20 shafts and an equal number of treadles. How wide a loom you need will depend mainly on what you want to weave and how much space you have for your loom. A loom that is 39½ inches / 1 meter wide is wide enough for most projects, but if you want to weave even wider textiles, a loom 48-60 in / 1.2-1.5 meters wide might be a better choice. On a countermarch loom, you can weave a range of widths on a wide loom; however, on a wide counterbalance loom, narrow textiles can pose problems.

The counterbalance loom is a common forerunner to the floor loom. This picture will help you become acquainted with the various parts of the loom.



1. Heddles are placed on the shaft and the warp ends are drawn through the heddle eyes following the desired threading order so that the warp ends can be alternately raised and lowered to form the shed. We recommend Texsolv heddles (ready-made heddles of synthetic materials). They are durable, washable, and easy to work with. We prefer open-eye heddles because they make it easy to thread the warp through the eyes, but if you are going to weave very firm warps, closed-eye heddles are better because the heddles take up much less space. Always consider using heddles all the same length for a weave—different heddle lengths can cause an uneven shed, making it very difficult to weave.

2. Harness locks generally sit on the shaft on both sides above and below. They ensure that the harness won't fall down. Leave the locks in place during the whole setting-up process and also when you are cutting the woven fabric off the loom.

3. A bobbin of rug warp is always good to have on hand. Rug warp can be used for front ties, heddle eyes on the shaft, and to hang the shed stick on.

4. Tie-up cords are good to have ready as you work, for example, on warping. The cords should be made of a strong, forgiving material—cotton rug warp is a good choice of material.

5. Texsolv straight pegs are used when an eye cord needs to be looped—for example, when hanging up the harness pulleys.

6. Texsolv anchors are used, among other purposes, for attaching the treadles and for attaching cords on a countermarch loom.

7. A threading hook helps when you are drawing cords through small holes, for example lamms and treadles.

8. Nylon cord (Texsolv cord) comes in two sizes. The thick size is used for warp and the cloth beam and the thinner one for hanging up shafts and lamms together with treadle cords.



1.

2.



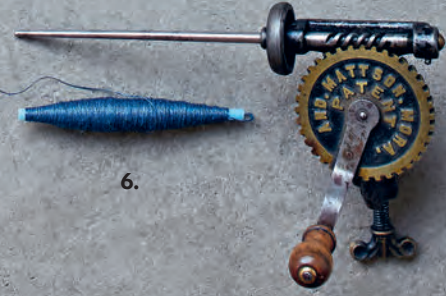
3.



5.



4.



6.

There are many kinds of fibers in nature, but only a few are good for textiles, meaning that they have the characteristics needed to be spun into yarn. The common feature for all textile fibers is that the fibers are very long relative to their diameter. The fineness of the fibers is crucial, and in general, the finer the fiber of a certain type, the more valuable it is. Fibers form the basis of textiles, and a fiber's qualities play a meaningful role in the end product. Therefore, it's important to understand the characteristics of your materials. Thorough knowledge of materials will make it possible to choose the right fiber to create the end result you want; you'll understand how the material should be handled, and know how to take care of woven pieces so they'll stay in good condition for as long as possible.

Textile Materials

Textile fibers can be divided into two main groups depending on how they are produced. The first group is natural fibers, which includes wool from sheep and other animals, silk, linen, hemp, and cotton. They are fibers that grow as parts of plants or are produced by animals; with relatively simple tools, they can be processed into thread. These fibers have been used for weaving since pre-history. These fibers must all be prepared before spinning. The quality of the resulting yarn depends in part on how that preparation is done, and on the spinning process.

The second group is synthetic fibers, which are made chemically. They were first manufactured in the first half of the twentieth century, and production sped up during World War II, when natural fibers became scarce. Synthetic fibers can be divided into two subgroups based on the material they are derived from. Viscose, lyocell, modal, cupro, and acetate are classified as "regenerated fibers." They are manufactured from cellulose extracted from any of a number of sources, including spruce wood, bamboo, pineapple tops, or cotton waste. The other subgroup includes polyester, polyamide, elastane, and acrylic; these are synthetic fibers produced from oil.

In this book, we start with the materials we wanted to use to make durable, beautiful, functional textiles for an eighteenth-century crofter's cottage. We decided to use mostly linen and wool. These materials have a long history in Sweden and a strong tradition of being used for home textiles. When cotton came onto the market in the nineteenth century, it was incorporated into home textiles, but when very fine or high quality was needed or desired, many continued to consider linen the optimal fiber.

1. Dried cotton plant.

2. Varieties of sheep's wool from two Swedish landrace breeds: Gotland and Finnsheep. At top right, carding thistle or teasel, a thistle that can be used to brush finished weavings, such as blankets.

3. Steps in linen processing:

a. scutched linen

b. hackled flax

c. short flax fibers caught in the hackles, used for tow flax yarn, also called tow yarn.

4. Two-ply wool yarn with a high twist.



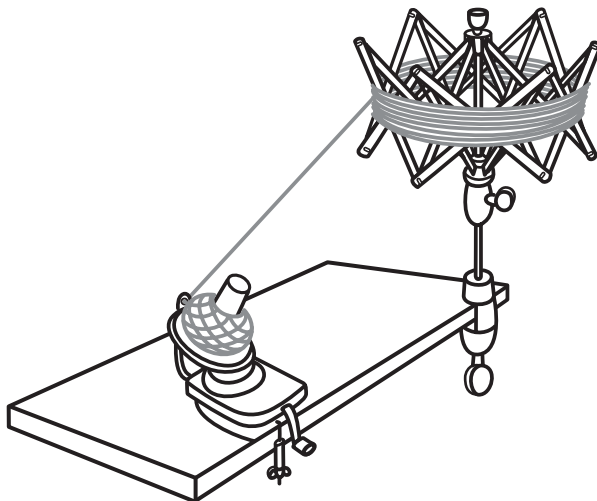
There are many ways to approach the various steps for setting up a weaving. We'll describe the variations we think are simplest and most effective. If you've learned a different way that you're comfortable with, there's no reason to switch gears unless you discover another method that works better. If you're a beginner and are learning to weave, you'll often find that there are many steps to keep track of and a lot of them are time-consuming. In the learning process, it's important to do all the steps accurately. Once you have an understanding of the purpose of all the different steps and have had practical experience with them, you can simplify some of them and speed up the process. For the sake of clarity, we'll try to stick to a general description of each step, and after each, we'll then list common questions and try to clarify aspects you should understand more fully.

Preparing Warp Yarn

Some yarns are wound into skeins and need to be re-wound into balls or "cakes" before warping or winding onto bobbins. Open the skein and make sure no threads are going in the wrong direction over the ties or are over the tie thread. All it takes is one thread in the wrong direction for the skein to be tangled all through the winding. Place the skein on the skein winder before you remove the ties, and then raise and secure the winder arms so the skein won't slide off. Remove the ties, thread the yarn through the eye hook on a ball winder, and then continue and thread it into the slot on the ball winder cone.

If you're using a bobbin instead of a ball winder, it's smart to draw the yarn through a metal ring you can guide the thread with.

Place the skein on a skein winder and pull one end out to the ball winder. When you crank the ball winder, the yarn will wrap onto the cone.



TIPS

If you have a large number of warp ends, you can divide them up into several warp braids for a more even tension.



When changing color/yarn or splicing strands, tie the new thread to the old thread with a bead knot (see page 275) so it will wind up near the end at a turning peg, either at the top or bottom of the reel. The thread pair that goes around the turning peg is called a pass.

don't spread out too much and become longer and longer.

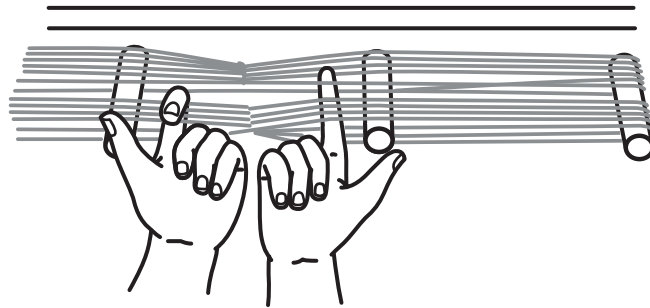
When warping with two strands held together, they have to lie together at the turn so they'll return together. These four strands that hang together are called a pass. If you are warping with only one strand which then turns, the pass consists of two strands. After the warp is drawn through the loom, the pass is cut and becomes strands that can be threaded individually.

Counting Warp Threads

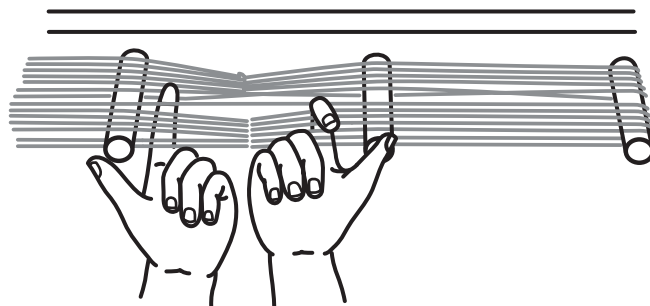
Count the warp threads with even space between while warping. If you've warped with two threads, you can either count all the threads in the lease—the count will go as 2-4-6-8-10, etc—or divide the total number of warp threads in half and count two threads together as 1-2-3-4, etc. After about 50 or 100 threads, you can wrap a counting thread around each group so that you won't have to recount from the beginning each time.

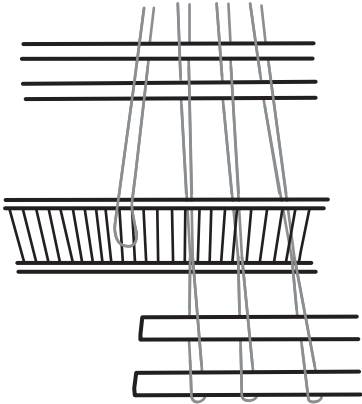
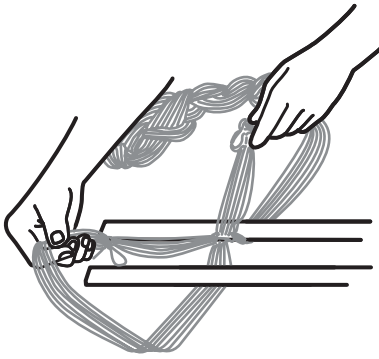
Tying the Warp and Removing It

Before removing the warp from the reel, you must first tie the lease and then tie two times per row around the reel. The ties around the warp should be firm enough that the warp threads cannot slide around, because that will create unevenness in the warp. Also, the warp should not be able to move between the ties. There should be no risk that the knots will untie themselves, but they should still be easy to untie later.



To count the threads, insert your index fingers on each side of the cross and pull the warp slightly towards you. Open up one index finger and pull out the first thread pair so that you've caught it on your finger; as you count it, close your finger over it. Slide the next thread pair onto the other index finger, and count that one the same way, closing that index finger so it's holding both thread pairs. You can then remove your starting index finger from between the first and second thread pairs, and catch the third thread pair with it, and so on. Continue until all the ends have been counted.





Insert the lease sticks into the cross and remove the ties.

Place a weight on the warp. Spread out a small bundle at a time to make it easier to see the cross in the lease. Take the next pass in turn and draw it through the reed. Bring the ends around a new lease stick in front of the reed. This way, you move the lease already in the reed and avoid a risky moment when beaming.

A raddle can be used to pre-sley in the same way as with a reed, but the work can be carried out more advantageously on the loom.

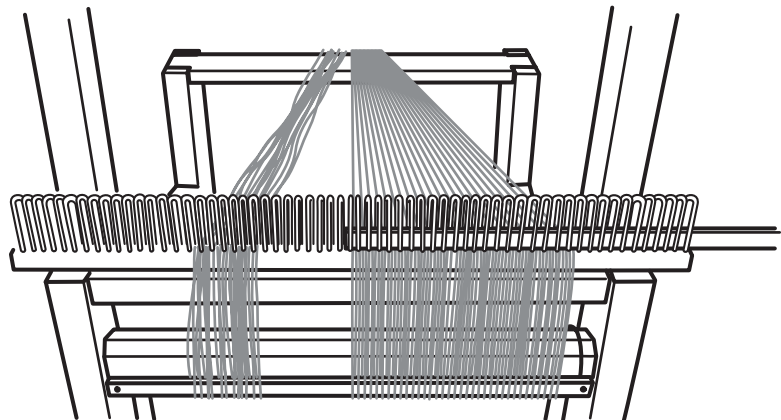
reed width so they won't constrict the warp when beaming and weaving.) Take a small bundle of warp ends and arrange them so they are clearly in the same order as the ends will lie in the reed. Take the first pass in the lease and draw it through the reed using a reed hook. Lay the pass loop in a figure 8 around the lease sticks in front of the reed. Continue the same way until all the warp ends are in place. When the pre-sleying is finished, tie the lease sticks in front of the reed together and remove those in back.

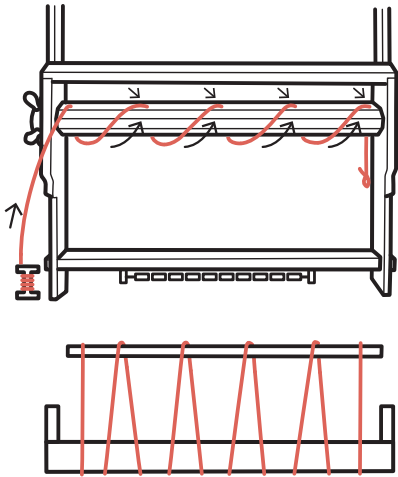
If you are pre-sleying with a raddle, the warp threads are drawn between the slots in the raddle. You can work with the raddle sitting on a table, or, preferably, set directly on the loom. Begin by tying the raddle securely to the back stretcher rod. Then hang up the lease sticks on a cord from the loom's top crossbar. Spread the warp between the beaming rod and the breast beam. Use only the outer cords from the warp beam—when all the warp ends are gradually spread out across the width, it's easy to measure where the remaining cords should be. Divide the warp ends per inch/centimeter between the slots in the raddle. In contrast to pre-sleying in the reed, the passes can be divided because the raddle is open on the top edge. Once the ends have been spread out, secure them by inserting a lease stick into the loop like a lock. The advantage of a raddle is that the work goes relatively quickly and the warp stays spread out during pre-sleying, which minimizes the risk of the warp becoming unevenly tensioned. The disadvantage of the raddle is that the warp ends can easily twist around each other if you have many ends per inch/centimeter.

Questions and Answers

What is a pass and how does it affect the pre-sleying?

When you are warping, the ends sit together with each other at the turn around the lease setup and form a so-called pass. If, for example, you warp with two ends, there will be four ends in a pass. Ends in a pass are pre-sleyed together in a slot. That means you don't have to draw ends into every slot, but can divide them so that the spreading out corresponds to the number of ends per



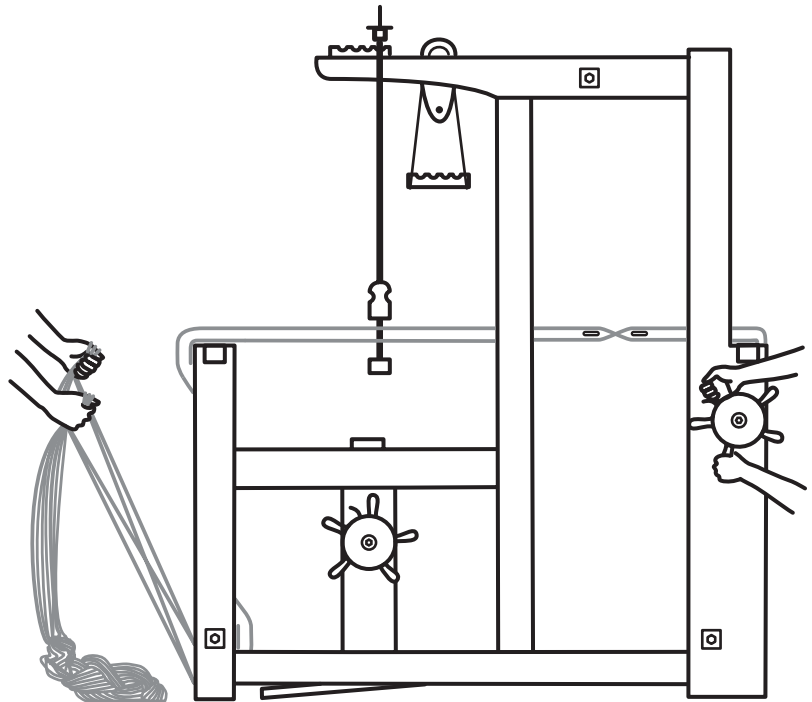


Many people think it's easier to get the beaming rod parallel to the stretcher rod if the loom has several cords of a specified length between the beaming rod and the warp beam. However, these cords will be rolled up on the warp beam in such a way that they build up more in certain places, which will cause the beam to become uneven, and then it will be harder to beam the warp on evenly. We recommend that you have a long cord that can be drawn through the hole on the beam, around the rod, through the beam's hole again, etc. That way, the cord is spaced across the entire beam.

helps to even out any unevenness in the braid which might have built up during pre-sleying and to release any ends lying on the surface. These might need to be straightened out separately, but you should avoid combing the warp with your fingers—combing can create even more unevenness in the warp that will need to be fixed all through the beaming process. Spread the warp over the breast beam; if the warp is long or a little uneven, it's a good idea to let the warp go down around the lower crossbar on the loom for a little more stretching. If the section you're holding is wider than about 11¾ in / 30 cm, then you should divide it into two sections and hold one half in each hand. Try to avoid wrapping the warp around your hands so tightly that you cut off your blood circulation. Grip from above with your thumb towards you, grab around the warp ends, and tilt your hand up. That way, you'll have a loop around your thumb and the warp will lie on the outside of your hand. Stretch the warp.

The person taking care of the beaming should now crank the ratchet wheel until the beaming rod reaches the warp beam. If necessary, the person with the warp should adjust their hold on it. The warp braid should never slide through the hand. Hold it with a steady grip; when it gets near the breast beam, it's time to take a new grip. Each time you stop to take a new grip on the warp, it's important to make sure the tension is very even. You can do that by drawing your fingertips from side to side over the warp between the stretcher rod and the warp beam.

You'll usually need several helpers for beaming: one or more to hold the warp and one to beam on and place the beam sticks. By drawing the warp over the breast beam and then down over the lower crossbar, the ends are stretched and it will be easier to beam the warp on evenly. If the warp is short, you can skip drawing it over the lower crossbar, but always remember to hold the warp down over the breast beam and never let the warp slide through your hands. If it's difficult for the person beaming the warp onto the warp beam, she can use a foot to draw it out.



Tying on the Warp Ends

In this step, the warp ends are attached to the front tie-on rod on the cloth beam so that the warp is stretched evenly and all the ends will have the same tension. It's important that the threads be adjusted until all have the same tension because any unevenness will impede or sabotage the weaving.

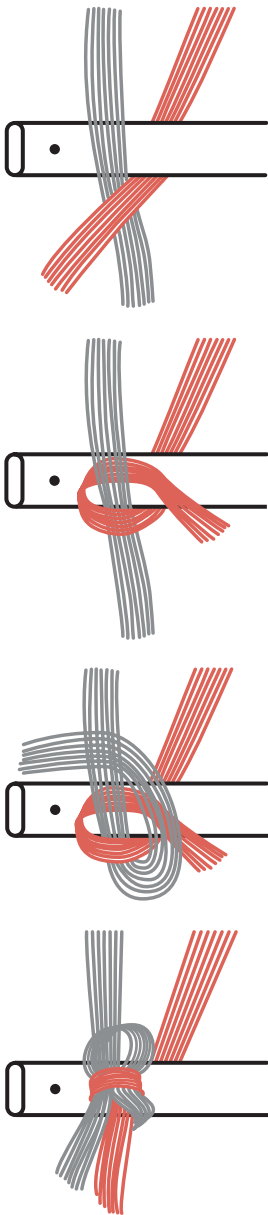
There are many ways to tie onto the rod. We describe two variants which are suitable for most types of material. Try out various methods until you find the way that gives you the best tensioning.

Begin by moving the shafts to the place they will be during weaving and setting the reed in the beater. The warp should be centered—measure from the last warp end to the edge of the beater and make sure you have the same measurement on both sides. Next, make sure the warp threads are straight; neither the heddles nor the lease sticks should raise or lower them.

Insert the front tie-on rod and make sure it's parallel to the breast beam and the cords from the cloth beam are straight. If the loom has a knee beam, the cords should lie over it.

Tying on

One way to tie on at the front is to take a smaller group of warp threads, about $\frac{3}{4}$ -1½ in / 2-4 cm in the reed, and stretch them so that all the warp threads in the group are extended to the same length. Divide the group into two equal halves and bring one half under the front tie-on rod and the other half over it and tie a knot. Pull the top group (red in the illustration) downwards, and then take the lower group (gray) and insert it in from the opposite direction between the rod and the knot, and pull it down so that threads are securely locked. This is done so the knot won't untie and so it will be easy to adjust the tension until it's even. To hold the rod in place, it's wise to begin by tying the warp thread group farthest out on one end of the tie-on rod and then the one farthest



One variation of the front tie-on knot.

When tying onto the front rod, tie equally-sized thread bundles around the front tie-on rod. If you use the knot illustrated above, the warp threads will begin on different levels. You can adjust the threads by bringing a cord under the lower placed bundles and over the higher bundles. Once the thread is tensioned, the bundles will all be on the same level.

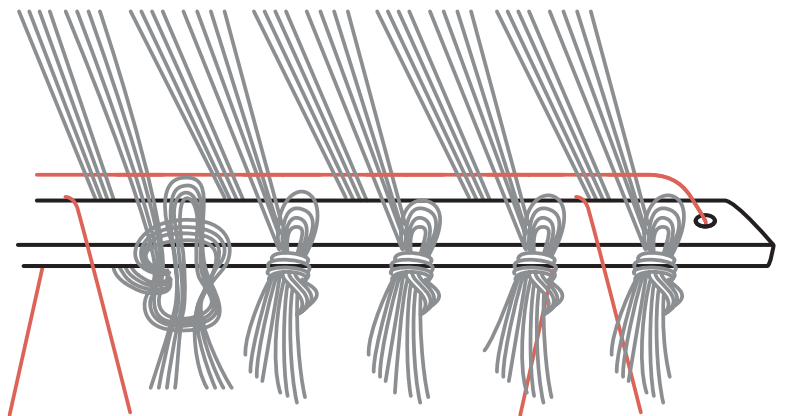
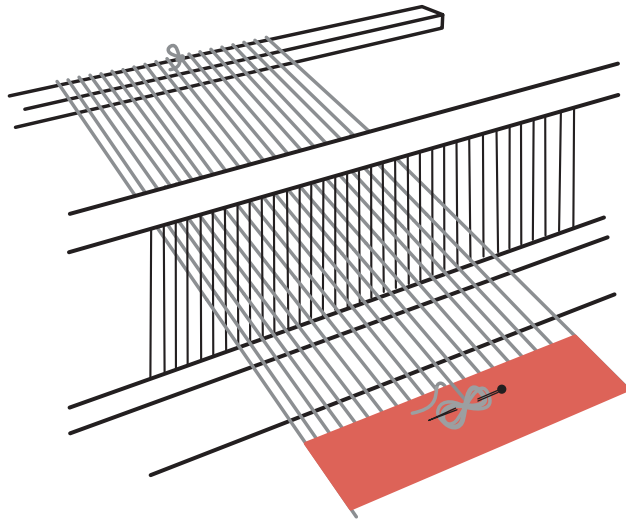


figure eight. Bring the thread through the reed, heddle, and lease sticks, and knot it securely in the broken thread. Make a bow that can be easily undone but still won't slide out. When that is done, correct the tension on the new thread by stretching it up around



When a warp thread breaks, you can fix it by substituting a new strand until you've woven far enough along that the original thread can be pulled forward again. Insert the new thread through the reed and heddle. Secure it with a pin into the fabric at the warp beam and tie a bow. Adjust the tension in front of the pin.

the pin again so the thread has the same tension as all the other threads. When you have woven past the broken thread, pull the original thread forward and fasten it around a pin in the weaving just as for the new thread. If you are weaving hand towels or something similar, you can pull the original thread forward between the two towels to avoid having to fasten it off when the weaving is finished. Thread breaks that are not between two pieces can be dealt with after you cut the fabric of the loom; thread the new strand in a sewing needle and sew in the new thread, overlapping it an inch/a couple of centimeters with the old strand so they won't slide out of the fabric.

Broken Weft Thread: Weft threads can break if you are not careful when placing the temple. You can “unweave” (rip out) and splice the weft.

Beating

Beat the weave and pack the weft by alternately placing your right and left hand on the center of the beater and drawing it towards you. Alternatively, you can place both hands spaced as for the fabric's outer edges. Depending on what you're weaving, you will beat at differing rates of firmness. Usually, rugs are the only projects you have to beat really hard and beat at least twice—once right after the weft is shot through, and then once again after changing the shed.

Once you've decided what you want to weave and what materials and weave structure you will use, you have to calculate how many warp ends the weave needs per inch or centimeter so you can produce the quality you want. You will also need to calculate how much yarn you'll require for both weft and warp, and if you want different colors in the warp, you have to decide on a warp sequence.

Calculations for the Warp Sett

Begin by taking out a ruler and wrapping your chosen yarn around it so that it fills 1 inch or 1 centimeter. Wrap as tightly as you can without pushing the yarn with your finger, although you should align the strands next to each other as you wrap. The number of wraps you can make tells you approximately the maximum number of ends you can have per inch or centimeter. The maximum sett does not allow for the weft to be visible, and so the warp should usually be more open. How much depends on what weave you have chosen and how thick the weft is.

Different weaves have many different intersection points in their repeat. Tabby or plain weave, which is the tightest weave, has the most points. The intersection points take more room because that's where the weft runs through.

It's easiest to calculate the quality starting with a squared sett, which has about the same number of threads for the warp and respective weft and the same thickness of yarn. Later on and with more experience, you will gain an understanding of how you can



Warp sequence for the drapes

Black	1	24		24+1
Ochre			84	
x11				

Yarn amounts for the drapes

Warp, black 12/2 linen:

$$\frac{290 \text{ tr} \times 3.78 \text{ m} \times 2}{12 \times 700} = 0.26 \text{ kg}$$

Warp, ochre 12/2 linen:

$$\frac{924 \text{ tr} \times 3.78 \text{ m} \times 2}{12 \times 700} = 0.83 \text{ kg}$$

Weft, gray 6/1 linen:

$$\frac{12 \times 280 \times 1.01}{6 \times 1000} = 0.57 \text{ kg}$$

Example

Here's an example showing the weaving record sheet with all its calculations for a project in the book: Drapes in Herringbone Twill on page 17.

Pattern Sequence

After sample weaving, I decided on $2\frac{3}{4}$ in / 7 cm blocks framed by $\frac{3}{4}$ in / 2 cm wide bands worked with 12 ends per $\frac{3}{8}$ inch / 1 centimeter in 12/2 linen yarn. The width of the blocks was multiplied by the number of ends per centimeter in the warp (12 ends). The black contour stripe would be $\frac{3}{4}$ in / 2 cm, which means 24 ends ($2 \times 12 = 24$). The ochre block is $2\frac{3}{4}$ in / 7 cm for 84 ends ($7 \times 12 = 84$). Altogether the drape has 11 blocks, and because it begins and ends the same way, the outer edges have a black stripe added on. The total number of ends is 1,212 [$(24 + 84) \times 11 + 24 = 1,212$]. That requires a reed width of $39\frac{3}{4}$ in / 101 cm (1,212 ends divided by 12 ends in $\frac{3}{8}$ in / 1 cm). The drapes are woven in twill and threaded in two blocks. Each block requires four shafts. The thread count in each respective block divides evenly over the four shafts so no further adjustments need to be made to the thread count before warping.

Yarn Amounts

In order to calculate how much yarn is needed for the warp, multiply the number of ends by the warp length in yards or meters and the yarn's number of plies. The number you get is then divided by the yarn number multiplied by the system number (see page 171).

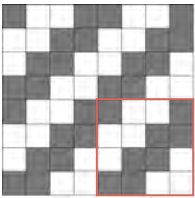


A weaving consists of vertical threads, the warp, and horizontal threads, the weft. These two thread systems are interlaced in many different ways and create textiles of wildly differing types with different looks and functions. Generally, one can say that there are three basic weaves—tabby or plain weave, twill, and satin—and from these you can create innumerable derivations that lead to new weaves. In order to weave, you have to describe the movements of the threads in the various weave structures and for that you have weaving drafts. With the help of a weaving draft, you can then derive the tie-ups—that is, the information about how the warp is threaded and how the shafts are tied to the treadles so that you can produce the result you want.

Weaving Drafts

In order to show how a weave is constructed, we use a weaving draft. It's a graphic picture that shows how the warp and weft cross each other following a specified system. A filled square means, according to international standards, that the warp thread goes over the weft thread. In Swedish handweaving tradition, a filled square indicates that the warp thread is lowered and the weft is visible. This is because those of us in Sweden, for the most part, use treadle looms and therefore need to know which shaft should lower for treadling, thus lowering the warp. Internationally and within industry, the focus is instead on which shaft is to go up, indicating a raised warp. In this book, the international standard is used so a filled square in the draft means a raised warp thread.

Even the direction the draft is read from differs. In Sweden, we read a draft from right to left, while it's the opposite internationally, and read from left to right as for regular text reading. On the loom, the shaft nearest the weaver and the treadle furthest to the left is number one. Even that is the opposite in Swedish handweaving. You can draw your drafts following the international standard but then later read the finished weave and threading order from right to left—which is usually easiest if you are right-handed because the steps follow in that direction. The results will be the same as long as you read and weave from the same direction.

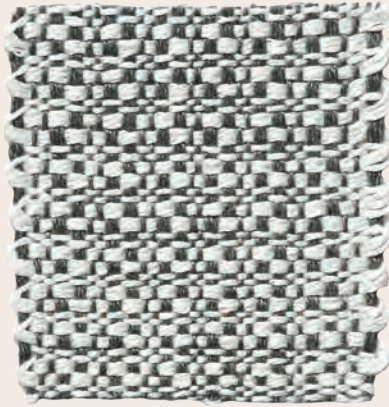


Weaving draft. The outlined blocks represent a pattern repeat.

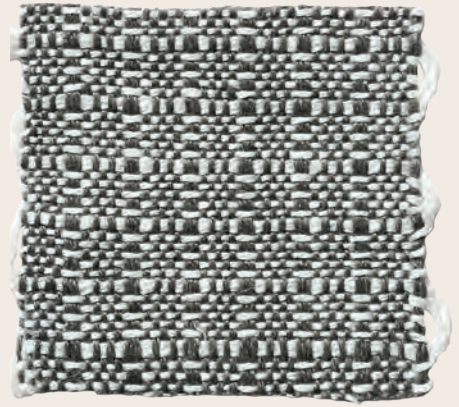




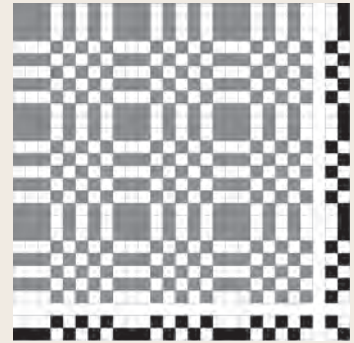
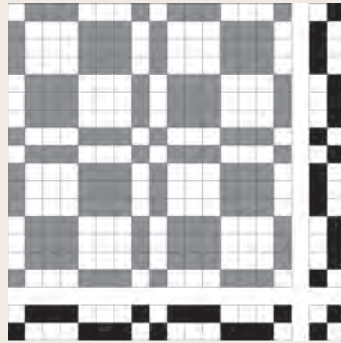
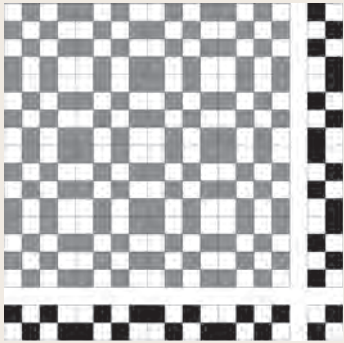
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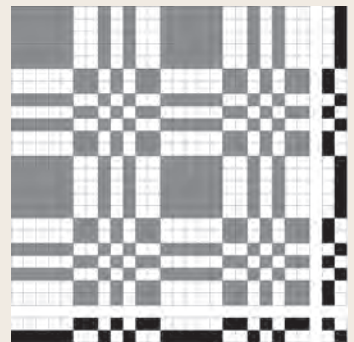
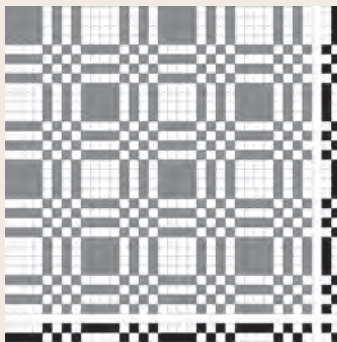
- 7. English tabby 8 x 8 threads.
 - 8. English tabby 8 x 8 threads.
 - 9. English tabby 8 x 8 threads.
 - 10. English tabby 16 x 16 threads.
 - 11. English tabby 12 x 12 threads.
 - 12. Weft rep with doubled warp.
 - 13. Warp rep in tabby.
 - 14. Warp rep with thick weft.
 - 15. Warp rep with doubled warp with alternating thick and thin weft.
 - 16. Warp rep with alternating thick and thin weft.
 - 17. Warp rep with alternating thick and thin weft.
- By alternately threading light and dark threads, and then switching the order, you can weave blocks.

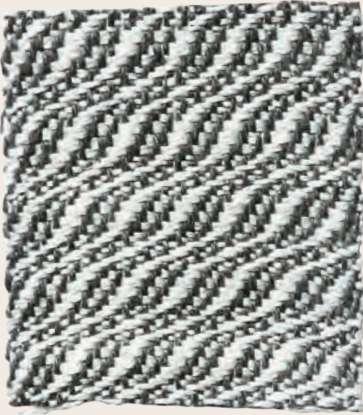


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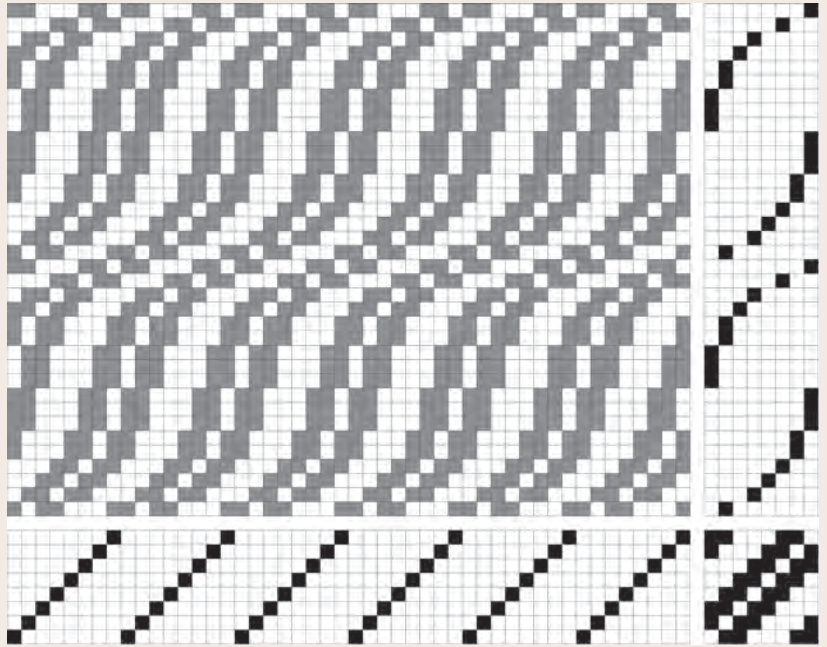


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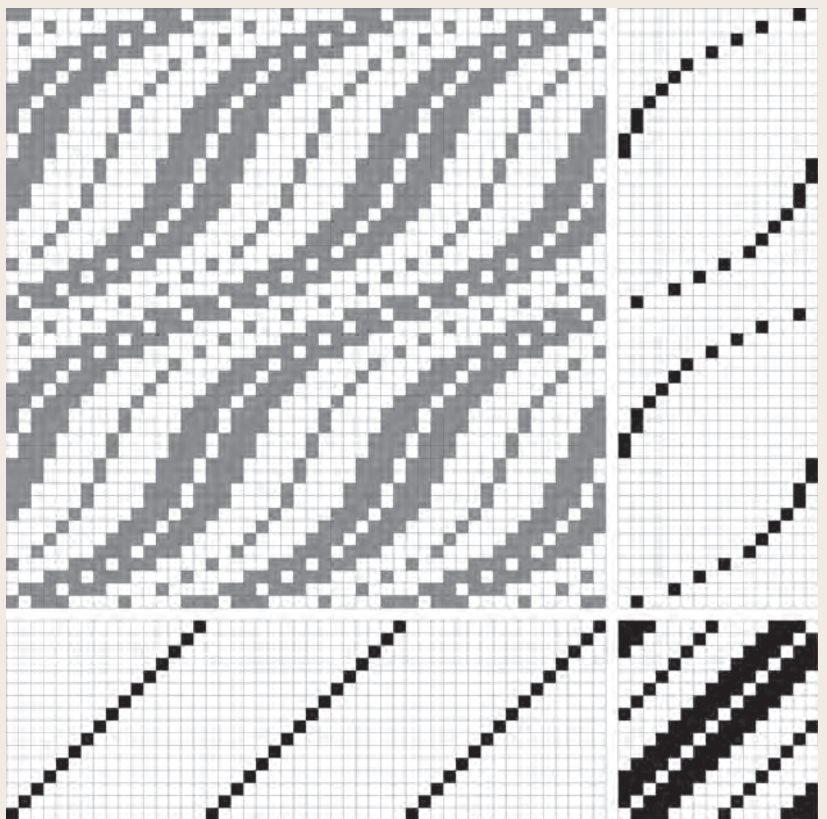




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77.



Combined Weaves

The group of combined weaves consists of weaves composed from two weave patterns. They could be two different weaves that either adjoin each other or overlap, but can also be the same weave with different warp or weft effects.

Three-Treadle or Rackel Weave

Three-treadle weaves are a combination of threads interlacing in tabby and threads binding in panama. The construction means that the weave cannot be woven on two shafts, and so there is no derivation from tabby without there being a combined weave.

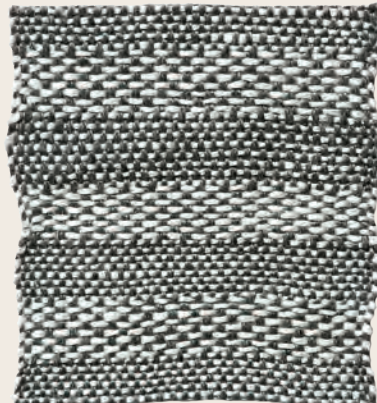
The weave produces a small-patterned texture and was often used historically for furniture and clothing fabrics. It typically combines a surface structure with a color effect.

Diagonal Weaves

Diagonal weaves are combined weaves in the weft direction in which every other weft interlaces in a basic twill weave and alternately in another weave, most usually tabby or another twill. Diagonal weaves are constructed by first drawing in all the odd-number weft threads and, second, drawing the even number weft threads in-between. The weave has an embellished diagonal line.



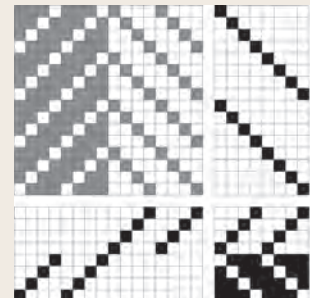
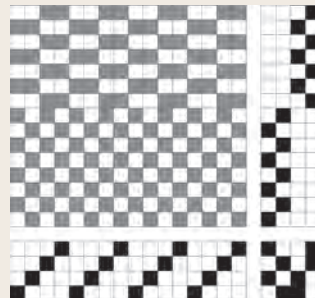
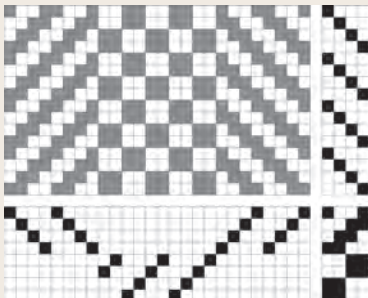
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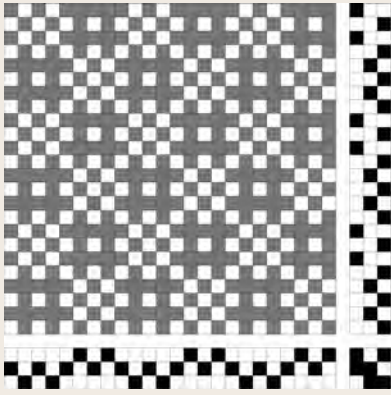


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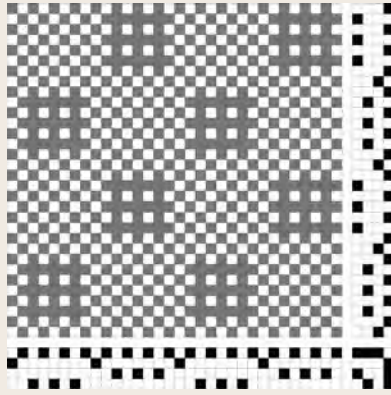


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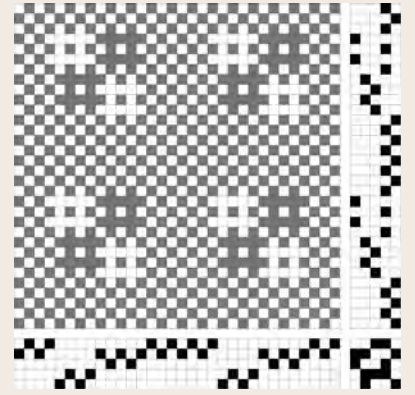




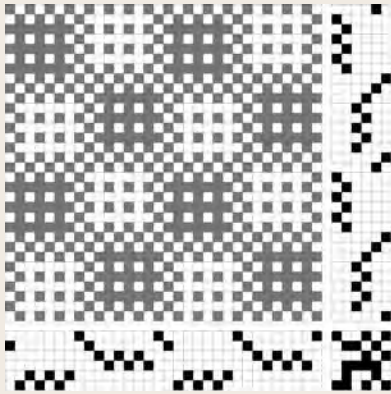
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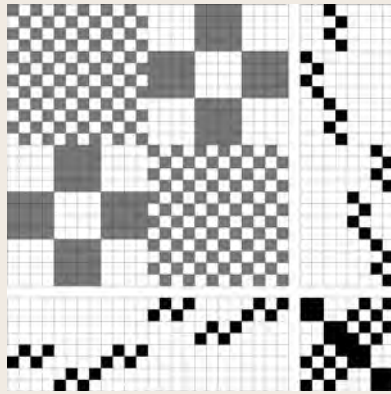
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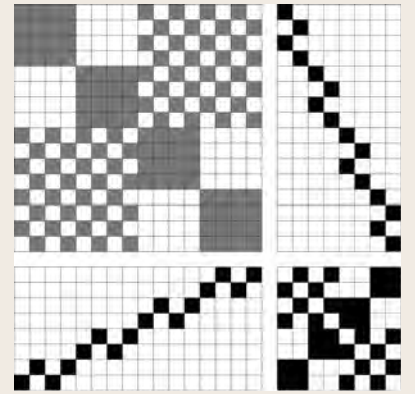
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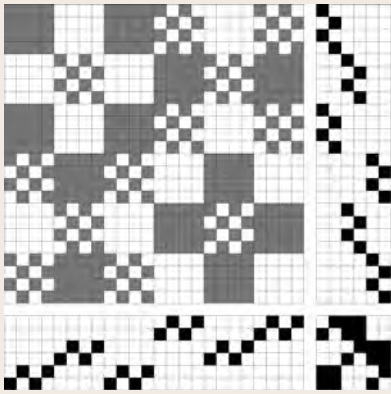
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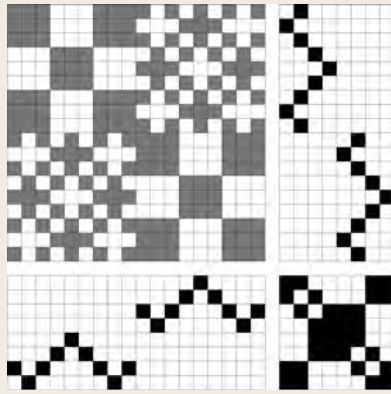
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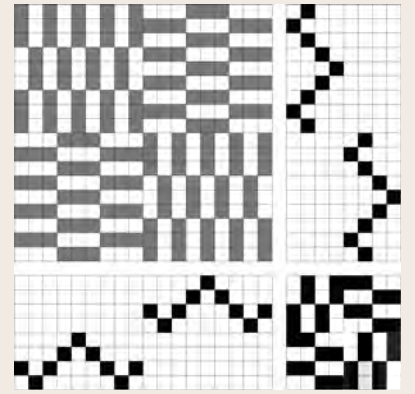
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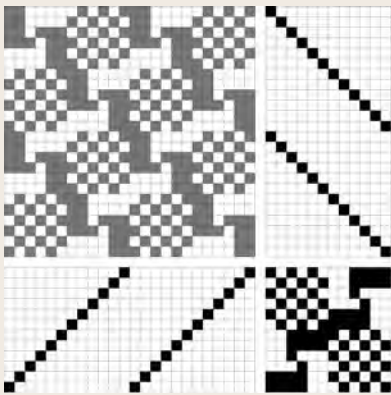
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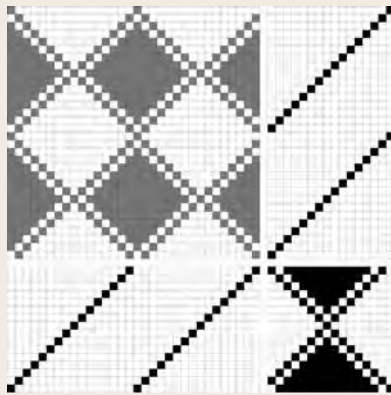
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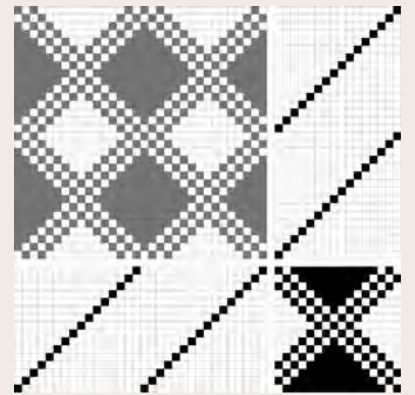
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161.

There are weaves in which the shuttle doesn't travel all the way from one side to the other, or where areas are inlaid between throwing the background weft—for example, rökakan, rya, and tapestry. For these art weaves, even those with thrown pattern weaves such as rosepath, flat weave, and simplified drälls can be included, and will therefore be discussed in this chapter. Numerous types of rugs, cushions, tapestries, and hangings are based on the same technique: weft rep. However, depending on where you are in the world, the materials used, and how the colors are arranged and interlocked, these weaves will have different names. The same applies to techniques for the patterns woven between the thrown background weft. In this chapter, we describe the techniques and material combinations that are anchored in Swedish weaving traditions.

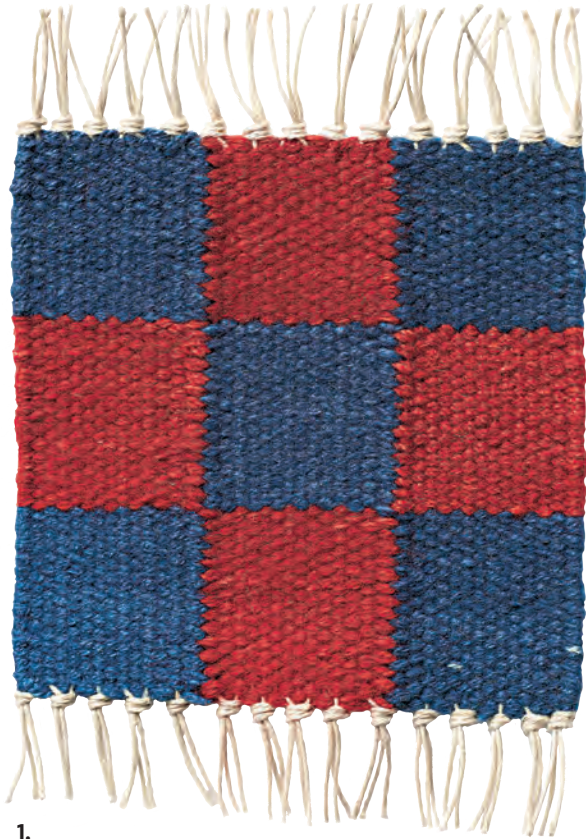
Weft Rep

Weft rep, the most common weave for wool rugs and tapestries, is a tabby weave in which the warp is completely hidden by the weft. The pattern is built on sections with various weft colors, and depending on the technique, the transitions between colors occur in different ways.

Rölakan

Rölakan is a weaving technique for producing patterned textiles in which the weft doesn't go over the warp's entire width, but instead wanders when you want to change colors. The color areas are bound by how the different wefts interlock around each other when they meet. Today, when talking about rölakan, rugs come to mind first, but the technique was also used earlier for cushions, pillows, and wall hangings.

There are two ways to interlock or ensnare the weft—either they interlock at every meeting, or at every other meeting. Interlocking at every meeting point is also called double interlocking, and that produces a non-reversible textile most often woven with the wrong side up. The front is smooth and has sharp contours, while the back has ridges at the interlocking points. This type of rölakan was commonly woven by country people, and due to the large number of textiles in this technique preserved in Skåne (the southernmost county in Sweden), it's also called “Skånsk” (or “Scanian”) rölakan.



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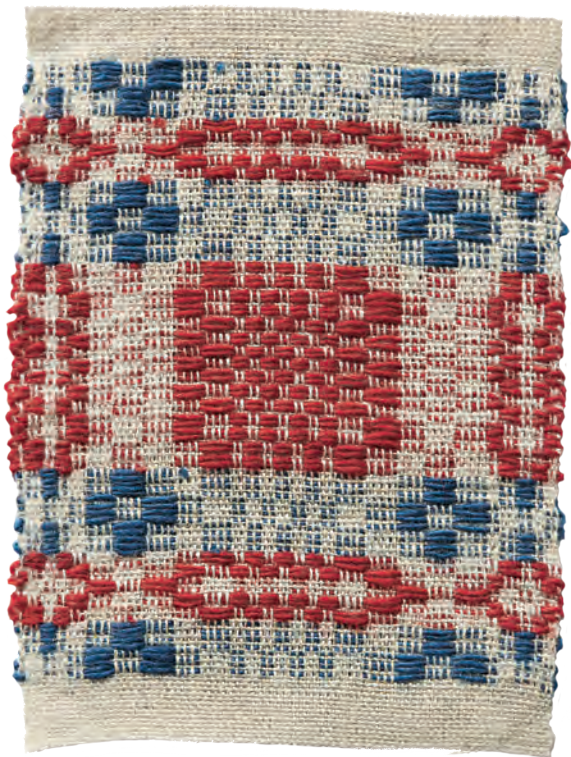
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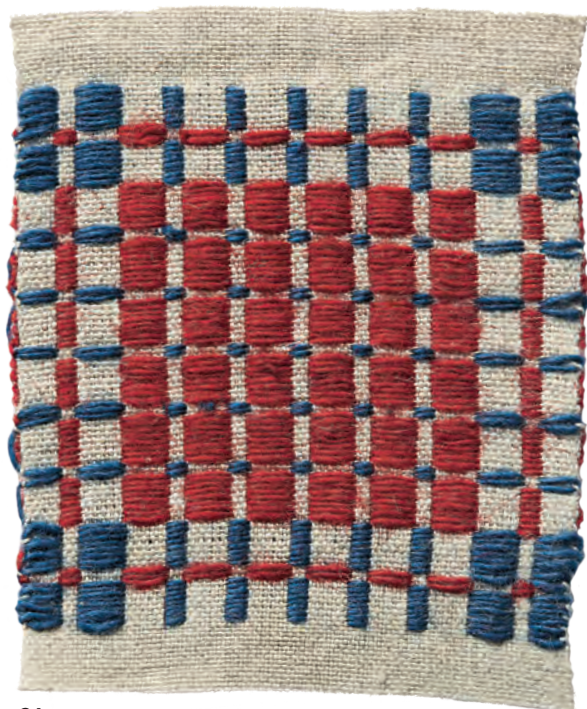
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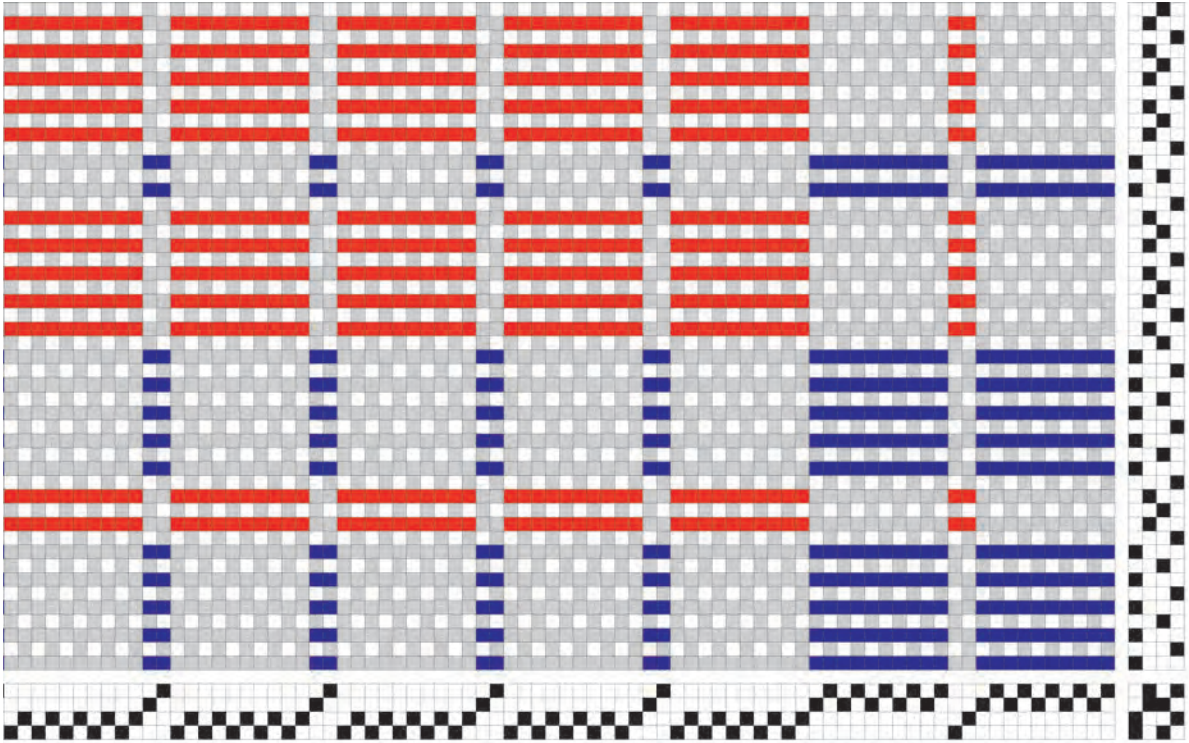
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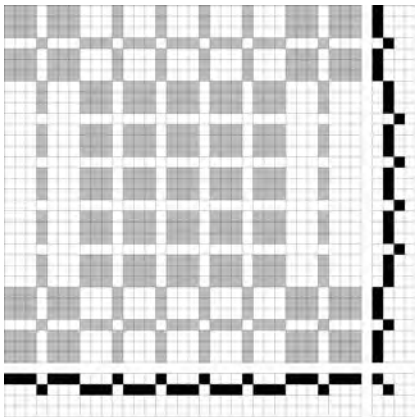
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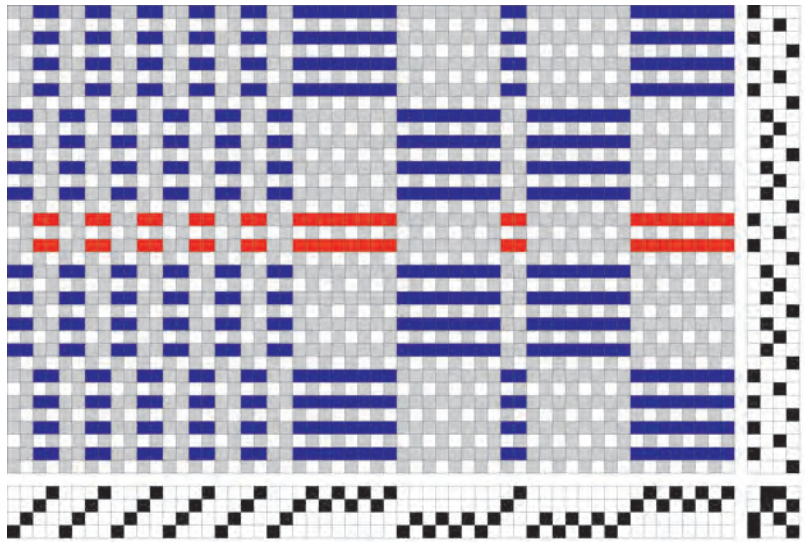
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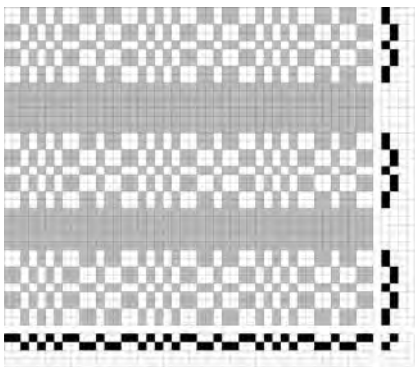
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45.



44.

After a weaving is cut from the loom, a few steps still remain before you are completely finished with your project. The weaving should be washed and the edges finished neatly. Your weaving might also need to be mangled or felted. For a woven fabric to have as long a life as possible, you need to continue to take care of it by washing and storing it correctly.

Handling a Raw Weaving

The fabric that has just come off the loom is called a “raw weaving.” During setting up and weaving, the threads and fibers have been held under great tension/stress that needs to be released so the weaving can draw in and assume an attractive surface. That’s most easily done by handwashing. When the fabric draws in, the reed marks, splices, and uneven edges usually diminish. Note: Even though woven textiles can be machine washed, we recommend handwashing for the first wash.

Before washing, it’s a good idea to assess the ends woven in as you worked and to trim any ends from spliced weft and joins. If you plan on hemming the fabric, you can do that either before or after washing. If you decide to hem after washing, you should overcast the edges before washing so the weft won’t unravel too much. If you’re going to add fringe, twist or braid it before washing.

For weavings that shouldn’t be washed, a common after-treatment is wet blocking. For that, you’ll need a pad or other surface you can drive pins into. Begin by covering the pad or surface with a damp sheet. Stretch the weaving out until the angles are squared: begin by pushing a rustproof pin or brad into each corner, another pin into the middle of each side, and then pin from the center to the corner of each side. Space the pins about $\frac{3}{8}$ in / 1 cm apart. Lay a wrung-out damp cloth or sheet over the weaving. Once the sheet has dried, you can remove the pins.



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HANDMADE



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6 ACCEPT CHANGE AS INEVITABLE
7 ADMIT MISTAKES
8 SAY IT SIMPLE
9 BE CALM
10 SMILE



The Ins and Outs of Hand-Weaving

Weaving by hand is an ancient and fascinating art, encompassing hundreds of variations, techniques, and approaches to creating textiles of all shapes and sizes. Here, designer and weaving expert Åsa Pärson and professional textile curator Amica Sundström have compiled a modern reference guide to the fundamental principles and practice of weaving for the novice and the experienced weaver alike. Focusing on foot treadle looms with counter-march or pulley tie-up systems, Pärson and Sundström cover everything you need to know about the arrangement and preparation of the loom, weaving tools and materials, reading drafts, and the three basic foundational weaves, plus the multitude of variations that derive from each, in the Swedish hand-weaving tradition. A selection of sample projects, themed around filling a home with handmade décor, demonstrates the breadth of the possibilities and provides a starting point to explore the astonishing creative potential of weaving.

- Instructions and full-color photos of projects, covering a wide variety of weaves and textures –
- Discussion of fibers and fabric types, including look, feel, visual effects, and optimal care and treatment –
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ISBN: 9781646010868



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