

Interpreting Felting and Hat-making at Lincoln's New Salem State Historic Site (1830s)

Petersburg, Illinois

Guide for Staff

Can use for reference at other historic sites or for theater

By Hope Wright, Springfield IL

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Contents

Part 1-- FAQs	1
References: Books and Videos	8
Fabric and Fiber Quiz:	9
Part 2 – Simple balls for a children’s activity (make-it-take-it).....	11
Part 3 – Creating a flat piece of felt	16
Part 4 – Using a resist: Making a hollow 3D object.....	21
Part 5 – Felt hat styles appropriate for the 1830s.....	23
Hat Sizes	28
Part 6 – Blocking a hat hood to shape a hat.....	29
Top Hats.....	29
Country Hats	32
Part 7 – Sewing in a sweat band	40
Part 8 – Care of a felt hat	44
Etiquette or Social Code.....	45

About the Author

I first became involved in historic reenactments at the Clayville Rural Life Center near Pleasant Plains IL in 1973, and spent many years on its Folk Arts Board when the university owned it. I was able to take many historic craft and clothing classes that were offered in the 1970s.

I have been volunteering at New Salem State Historic Site since 1980. During that time I have spent many days in the village, meeting people from every continent and many countries, as well as from every state. I was able to take several classes offered to site volunteers and staff. I have also enjoyed researching clothing styles and several fiber-related activities.

I am a “seminar junkie” and have taken many classes and workshops, traveling throughout the country (32 states) to learn more about many textile-related topics. I particularly enjoy those that have a significant amount of time focused on the historic aspects of the craft.

I made my first wet felt project in 1995 and my first felt hat in 1997. I haven’t made many hats, but I have studied and researched, on a regular basis, historic and modern felting and hat-making. Although new information may always come to light, this information is being written so others don’t have to spend time to search out knowledge sufficient to interpret in the Village (you don’t have to memorize this to interpret, but use it as a reference and guide).

I have learned felting and hat making in many classes and from many people and books (see the references):

- Several instructors taught various aspects of making flat felt and 3D objects such as balls, animals and dolls.
- One instructor taught how to make felt over a resist and how to block a top hat.
- A 82-year-old third-generation hat-maker [from whom I purchased, in 1997, a complete set of hat blocks originally owned by his grandfather] shared his knowledge of traditional hat blocking.
- Others too numerous to mention shared little tidbits about historic and modern felting and hat-making.

Interpreting Felting and Hat-making at Lincoln's New Salem State Historic Site

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Part 1-- FAQs (All of these have been asked of me at some time, and some I had to research to be able to answer. This is more than you will need to answer most people's questions, but I am including it because I think it is good to know even if no one asks such detailed questions.)

Allergies? Caution should be taken when working with wool in groups. Few people are allergic to clean undyed wool as it is similar to human hair, so this is what I prefer to use for the make-it-take-it projects in the next section. Raw wool can be assumed to have much dirt, grasses and pollen in it, so some people will be allergic. Some people are allergic to the lanolin in unwashed wool. Washed wool may accumulate dust mites and other critters that cause asthma and other allergic reactions, so should be stored in muslin bags; completed items should be vacuumed or cleaned at intervals. People may be allergic to the chemicals used to bleach or dye wools, which are different than used on cottons and synthetics – and which may require several washings or dry cleanings to totally eliminate. Coarser (generally cheaper) wools are usually scratchy and may cause redness and other skin reactions -- this is usually due to the prickle-bristle factor (like rubbing your skin with coarse sandpaper or thistles) -- while a better grade of wool may cause no reaction. The cut edges of wool fabric may be particularly abrasive.

What is felt? Felt is a cloth made of animal fur removed from the skin (and often today mixed with other natural or synthetic fibers) through the action of heat, moisture, chemicals, and pressure and/or agitation. True felt is not spun or woven, and has no warp or weft, no right or wrong side, and can be cut without fraying. It can be soft enough to drape in folds or be thick and worked until dense enough to make tents, rugs, or boots. It can be formed into three-dimensional shapes without cutting or seaming; any shape that can be sculpted in clay or sewn from cloth can be achieved with felt. It protects against cold and insulates against heat (just like fur on animals).

Felt made of animal fibers (not modern synthetic felt) can be shaped and molded under pressure, heat, and moisture, so is ideal for making hats. At the time of New Salem (1830s) there were 3 distinct types of felt made and used for hats:

beaver felt (only from beaver fur) was considered the top grade, and cost about 3 times what a wool felt hat cost. By the 1830s the beaver was near extinction, so beaver hats became even more expensive.

fur felt was the middle grade and usually rabbit (hare) was used although other animal furs were possible, including the 'coon Waddell used at least some of the time

wool felt was the low grade, for country hats or inexpensive top hats; wool from sheep was used in the 19th century, but today other animal hair/fur are also felted and called wool felt

One invention of the 1830s was to felt the more expensive beaver onto the surface of a rabbit or wool hat body, bringing the cost down some. In the mid 1830s, the silk (aka silk plush) top hat was introduced, so that by the late 1830s beaver trapping was no longer profitable. After 1840 the majority of the better top hats were made of woven silk, which has to be sewn, although it is still often called beaver. Note that hat hoods are available today called beaver fur, but they are rabbit fur brushed to simulate beaver, so it would be more proper to call them long-hair.

What is the difference between wool and hair and fur? There is no biological or chemical difference, all are keratin. Wool is usually only used for the fur from sheep. Some differences that usually (but not always) apply are that hair continues to grow and is not shed, while fur grows to a pre-set limit and is shed annually, as weather conditions change. Some people make the distinction that hair refers to humans, while fur refers to the hair on non-human mammals. Any actual distinctions are lost to history and are used by custom, not with any logic.

How is felt made? Felt is made in essentially the same way in every age and culture, and the only essentials are fiber, water, soap or an alkaline environment, and two hands. The scales of the fibers are opened with moisture and then interlock.

There are two steps to create felt (a noun). The first step is called felting (a verb), and in this the scales of the fibers open and interlock with adjacent fibers, they lock sufficiently to be difficult/impossible to separate back to the fiber stage. *To felt* is to cause to adhere and mat together. Soap (or any alkaline environment) is used to open the scales. This stage is also called hardening, as the felt becomes hard enough to hold together.

In the process known as fulling, the amount of air trapped between the fibers of the felt is decreased, causing it to shrink. It is not the individual hairs that shrink, but the reduction is in the size and number of air spaces so the fibers are closer together. *To full* (or make fully felt) is to shrink and thicken by moistening, heating, and pressing, beating, rolling, kneading, stomping, or patting. The fulling process can be stopped when desired thickness and texture is reached. A completely fullled piece is machine washable, as no further shrinkage will occur. To make something a specific size, like garments, take into account the amount of shrinkage of the specific wool/fur being used (make a test piece!), or it may fit Paul Bunyan or a doll instead.

Felt can be hard or soft, to create different styles, but is always porous and flexible. There is no perfect breed, each have different characteristics and different uses.

In the 1830s, men's top hats would be given an inside coat of shellac to help keep its shape in the rain. Today a hat stiffener, shellac (use half thinner), glue-water mixture, milliner's lacquer, polyurethane, and other compounds may be used for the same effect. However, the appearance may change so many prefer to make thicker felt or complete the fulling process instead.

Why doesn't the wool felt while on the sheep or other animal? The wool/fur/hair is laying mostly in one direction, and the lanolin or other oil helps to keep the wool from matting. A very greasy wool will probably felt quite well once washed, this is nature's way of preventing the wool from felting on the animal.

Will any fiber felt? Silk and plant fibers (cotton, linen, hemp, bamboo) can be spun but do not felt by themselves. However, it is possible to card different fibers together, for example, a blend of merino and silk will usually felt quite well.

The guard hairs of many animals have to be removed as they won't felt. Nearly all other animal hair or fur can be felted to different degrees and difficulty; in fact I have successfully felted my own hair (from combings I saved from my brush).

Wool from different breeds of sheep (there are in excess of 100 breeds) have varying characteristics (length of fiber, sheen, softness) so will felt at different rates (speed and difficulty) and will create quite different felts (appearance, sturdiness, feel). Meat-producing sheep are less apt to spin or felt well. Even differences in animals of the same breed (health, age, nutrition, etc) can affect the fleece and thus the ability to felt.

Also, some dyes affect the fibers and wools so they do not felt well, test each color before investing in large amounts or you may need to give to a spinner.

Some of the better felting wools are merino, blue-faced Leicester, and polwarth. [On the other hand, merino does not needle felt as well.] A good felting wool is considered one that will shrink at least 20% but many will shrink up to 50-60% and be quite sturdy, while a poor felting wool may shrink only 5% and practically fall apart in use.

Especially before making a hat hood or any other felt that needs to be a specific size, it is recommended to test each sample, and each fleece, to determine how well it felts and how much shrinkage there is.

Specialty hair fibers (cashmere goat, mohair goat, camel, angora rabbit, cow, horse, long-hair cat or dog, etc.) have less prominent and more widely spaced scales so are less apt to felt and full as well as wool. They are also less durable and more sensitive than wool to chemicals used for bleaching and dyeing.

Wool that is too coarse, short, dry due to improper storage, damaged from dyes, etc to felt can be used for ball cores (see next section) even if it won't felt. Remember that the quality of the felt can be no better than the quality of the wool.

How old is felt? Felt is believed to be the first man-made textile, pre-dating spinning and weaving. It probably originated independently among the nomadic tribes of Asia and in what are now the Scandinavian countries, but because it is so old there is nothing known about whom and how it was discovered (although many cultures have legends). It has been discovered in wall paintings in Turkey dating as far back as 6500 BCE. Felt caps have been found in the bogs of Denmark dating to the Bronze Age, about 3500 BCE. There are felted items found in frozen nomadic tombs in Asia that have been carbon dated to the 4th and 5th centuries BCE. Skilled techniques (3 dimensional, inlays, appliques, etc.) are seen in these artifacts. The Chinese called the areas inhabited by the nomadic tribes as "the land of felt" and felt rugs used as mattresses did

not appear in China until about 300BCE. The Roman Army used felt for helmets and armor, as protection. It does not appear to have been made in Japan, Africa, or the Americas until after contact with Europeans or Chinese.

The nomadic tribes of Asia perfected felt as both a utilitarian product and associated with religious and ceremonial uses (while in Europe it wasn't as perfected and was utilitarian). As late as the early 20th century many of these tribes preserved the ancient mode of life, so ancient methods could still be observed.

Commercial felting is the early form of needle felting, but this uses a very large needle-punch machine with 150-200,000 needles to create large pieces of flat felt. The first patent for the needles was in the late 1850s, and the first commercial felt was made about 1866. Thus in the 1830s all felt was made using the technique now called wet felting. Commercial machines depend on the physical punching or matting of the fibers, so wool and other animal fibers are not necessary to the process, although wool alone was usually used until the mid-20th century.

Nuno or laminate felting, needle felting, and Artfelt® were all invented after 1980, and the specific inventors are known for each.

How was mercury used in felting? Why was The Mad Hatter a common attribute of hat makers? I've heard two explanations of how mercury was used, I do not know which is correct: (1) Beginning in the 17th century, soaking animal skins in a solution of mercuric nitrate was used to separate the fur from the pelt, in a process called "carroting" because the skin edges turned orange. (2) In making the felt itself, mercuric nitrate was used to roughen the hairs, helping in the locking together of the fibers and making a more sturdy felt; it turned the fur orange, and when heated to shape the hat released mercury vapor.

Mercury poisoning, causing tremors and eventually insanity, was thus common among hat-makers, and in their families as they unintentionally carried the mercury home on their clothing. It is in fact the first recognized occupational disease and the cause was recognized quite early. However, hat-making was a big business and the owners were concerned with producing hats quickly for more profits; the workers and their families were deemed expendable and easily replaced. Few independent felt-makers or hat-makers would have been using it by the 19th century, as safer but slower methods were known.

What is beaver cloth? as found on some 1830s descriptions of men's coats. Fabrics available in the 1830s included coatings that were made by weaving wool (a variety of types of sheep breeds and of weaves) and then boiling it to felt and full (shrink) it. It could be given various surface finishes by brushing or polishing, which were given different names. Beaver cloth was one such boiled wool fabric, the nap was brushed to provide an appearance similar to felted beaver fur.

What is boiled (woven) wool? It is much softer and more flexible than non-woven felt, so was preferred for coats and cloaks. When properly and completely full, it also will not shrink more, so no one had to worry about getting caught in the rain.

Traditionally, boiled wool is merino wool fabric that is densely felted and fulled; today boiled wool may have other fibers and may not actually be boiled. Felted fabric (from woven or knitted fabric) is not as dense as true felt but drapes better and is more resistant to scuffs and abrasions. If you've ever accidentally or deliberately shrunk a wool sweater or any other wool item, you have created a form of boiled or fulled wool.

Boil fast or washable wools have had a chemical surface applied to the yarn or fabric so it cannot be used for wet felting.

What is the difference between a hat-maker and a milliner? A hat-maker makes basic felt or straw hats, creating the "fabric" and shaping it. He would also add the sweat band and any decorative hat band, although quite often this was a task he turned over to his wife or other female relatives. His felt hats were for men in the 1830s, although as fashion changed in later decades he would obtain additional hat blocks and create other styles to sell to milliners.

A milliner purchased felt or straw hats and bonnets and trimmed them for ladies hats, or she might sew one entirely of cloth. A milliner was also a dressmaker, although not all dressmakers were milliners (which required additional skills, tools, and materials). Felt hats for women (into the 1860s) were limited to women's riding hats and were made like a man's short top hat with added veiling; feathers or flowers might be added as well.

Were there really artificial flowers available then? Didn't they just use fresh flowers?

Artificial flowers have apparently been around for centuries (see the legends concerning the tests the Queen of Sheba used with Solomon). Different cultures used different materials that included silk, paper, and wax. During the European Middle Ages they were made for decorating church altars in the winter, in silk or metal.

Flower irons or punches were invented by the early 1700s, which allow 8-12 layers of silk to be cut to a petal or leaf shape with the blow of a mallet, in moments rather than hours to cut with scissors. The drawback was that each cutter could cut only one shape, so few individuals or millinery businesses had them, it was a specialty business. By the late 1700s the punches stamped the veins as well as cut the petals. However, this also meant that pre-cut petals were sold, and by 1791 at least one New Jersey teacher was teaching the assembly of flowers as a genteel handicraft.

By the early 19th century, completed flowers were made and exported from several European countries, as well as being made in New York City and Hoboken, using paper, wood shavings, lightweight linen, wax, and silk.

Making fabric and wax flowers requires some specialty tools (to vein and to curl petals and leaves) so was not something every milliner, and certainly not every homemaker, would do. There are books in the 1830s and articles in Godey's in the 1840s, for wax and silk flowers, with directions and patterns, but because of the tools needed it was recommended for cottage industries or for large millinery establishments. The information on paper flowers in 1850s Godey's could have been made by any homemaker, although specialty tools were still

recommended. Petal and leaf patterns were interchangeable between the different materials, and assembly of the petals is similar.

What are hat blocks? Hat blocks are the shapes over which a dampened hat hood is placed, stretched, and steamed into the hat shape. Hat blocks were originally wood turned on a lathe, so they were perfectly round on the head. This was fine when men wore wigs. However, in the early 1800s when wigs fell out of fashion, hats needed to be oval to fit the head, so hat blocks were carved by hand. One top hat block in Waddell's is round, the other two are oval.

Currently, only about 4 people in the entire world are *hand* carving wood blocks. Instead other materials are often used for hat blocks, including polystyrene, Styrofoam, and resins. To create a make-shift hat block in a non-historic setting, if you want to continue with hat making, want to make more fanciful hats, or want to make doll hats, many common items can be substituted. Look around for any objects that are approximately the size and shape needed, such as crockery, pans, kettles, dishes, bottle caps, candle stands, etc. Items can even be temporarily taped together for a fantasy hat. For a doll hat or a fascinator, Styrofoam balls wrapped in aluminum foil can be used. For a dollhouse size hat, or for a brooch, corks can be used. Since steam is applied it needs to be a material that will withstand moisture and heat. It is possible to cover some "hat block" materials with aluminum foil.

What is a hat hood? Most hat-makers do not like to work with flat felt but prefer to work with felt "hoods," which are felt pieces created in a dome shape, which is formed over a resist much like seamless pouches or boots can be made. Hat hoods can be made wide brimmed (aka capelines) for blocking hats with wide brims, or short brimmed cones (aka sleeves) for blocking hats with narrow brims or with a separate sewn-on brim. Capelines can also be longer than a sleeve, and used for making cartwheel hats, although more often a separate brim from flat felt is sewn on to the crown.



A cone is shown on top of a capeline to show the difference in width.

What is a resist and what is it made of? To make hats, socks, slippers, vests, and other hollow dimensional shapes without seams, the wool needs to be laid out around a resist to keep the layers from felting together.

The resist can be any material that the fibers will not felt to or through and that can withstand getting soaked. In the 1830s and earlier, oilcloth or what is called mother felt was usually used.

Mother felt is simply a thick felt that has been completely fulled, probably by boiling, and the surface rubbed or oiled to polish it so no new fibers will adhere to it.

A thick heavy cotton or linen canvas or sheeting can also be used, however wool can stick to it (especially if the felt isn't removed at the proper time), and the edges will fray. I have not had problems if I spray starch and iron cotton sheeting or close woven muslin. A piece of cardboard or heavy tagboard can be used but probably will only last for one project so unlikely to have been used historically by a busy hat-maker. If not working in the village, plastic, vinyl, and other modern materials can be used.

The resist is cut larger than the desired final piece by the amount of shrinkage of the specific wool, and is removed after felting but prior to fulling. Since most wools shrink at least 25%, and since hats are around 22", the resist for a narrow-brimmed hat is approximately 14x14. (For an approximately half size hat, which fits dolls with a head circumference about 13 inches, the resist is approximately 6x6. Thus a hat for the 18" child dolls uses about 1/4 of the wool for a full size hat. A capeline for a 18" doll's wide brim hat is about 10x10.)

It is possible to create a hat hood without a resist by felting two separate sides then patching them together where a seam would be, but perseverance is needed to make the join invisible. It also works for other projects where a resist would normally be used.

What are the steps for processing a fleece to the roving or batt stage?

Fleece is wool sheared from one sheep, raw wool means in-the-grease or unwashed. Fleece is preliminarily graded and sorted when shearing or at a separate location. Dusting is the next step to shake off loose dirt. Scouring means washing to remove grease (natural fats and oils, or lanolin), and is usually done before it gets to a carding mill or hand carder. Dirt and (most) lanolin must be removed before felting can occur. However, lanolin can be left when spinning, and will shed water.

The next step done at a carding mill, or by hand, is picking or blending from different fleeces to achieve a mix needed for a particular task or job order.

The next step is *carding* to untangle, comb and collect together preparatory to spinning or felting.

- a. Hand carders produce rolags or rolled batts of fiber.
- b. Drum carders produce a thin sheet, called a web. Batts are several layers from a drum carder; the sheets can be used for felting, quilting, and stuffing.
- c. The web from drum carders can be divided and twisted into roving, which is a long narrow slightly twisted roll or strand of fiber.

Wool roving can be spun into **woolen yarns**, which are characteristically fuzzy; thicker and more loosely twisted than worsted yarn, less costly because less costly wools and fewer steps, usually single yarns with 2-5 twists per inch.

- d. The entire web from drum carders can be gathered and rolled into thick strands called a sliver (pronounced sla! ver), i.e. carded, an even continuous strip without twist, which can be spun into woolen.

Several slivers are blended and combed to straighten the fibers (gilling) and drawn, to pull, shrink, or tighten into a thinner strand. After gilling, it is combed again to remove noils (nothing over an inch long) leaving only the long fibers and is called top (not as fine or soft).

Top is carded again and divided into soft thin ropes of worsted roving. This is spun into **worsted yarns**, which compared to woolen yarns have longer fibers combed parallel to each other so free of fuzz; usually 2-ply yarns with 10-20 twists per inch.

References: Books and Videos

Not all are appropriate to 1830s interpretation, but can provide further information for modern uses.

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Fabric and Fiber Quiz:

What is the earliest textile made, remnants found preserved in Neolithic sites (6500-6300 BC)?

What does noil mean?

What fibers can be felted but not spun?

What fibers can be spun but not felted?

What fibers can be spun and felted?

Mohair is the hair of what animal?

Angora is the hair of what animal?

Why are some silks reeled (or thrown) and others are spun (carded, combed)? Which is stronger?

What is art silk?

What is the difference between rayon and viscose?

What is the world standard for fine wool?

What is boiled wool?

What is the difference between woolens and worsteds (Hint: both are wool)?

Fabric and Fiber Quiz -- Answers:

What is the earliest textile made, remnants found preserved in Neolithic sites (6500-6300 BC)?

Wool felt

What does noil mean?

Nothing over an inch long

What fibers can be felted but not spun?

From fur-bearing animals such as rabbit and beaver, as too short to spin

What fibers can be spun but not felted?

From plant fibers (cotton, linen), silks, and artificial fibers

What fibers can be spun and felted?

Wool and hair fibers (cashmere, mohair, camel, angora)

Mohair is the hair of what animal?

Angora goat

Angora is the hair of what animal?

Angora rabbit

Why are some silks reeled (or thrown) and others are spun (carded, combed)? Which is stronger?

Reeled silk is from the middle portion of a cocoon that was not allowed to hatch. Spun silks are from the un-reelable waste of cocoons (the outermost portion and the part closest to the worm) and from pierced cocoons. Reeled silk is very strong.

What is art silk?

Artificial silk, or rayon (invented in late 1800s)

What is the difference between rayon and viscose?

Often used interchangeably.

What is the world standard for fine wool?

Australian merino

What is boiled wool?

Merino wool fabric that is densely felted

What is the difference between woolens and worsteds (Hint: both are wool)?

Woolens are generally less costly wools and have less processing done to them. They are characteristically fuzzy, thicker and more loosely twisted than worsted. Worsteds have additional processing resulting in longer fibers combed parallel to each other.

Part 2 – Simple balls for a children’s activity (make-it-take-it)

Ideally, staff will be able to learn this and all following techniques in a workshop or classroom situation, or with a mentor, as seeing it done and following along to do yourself is much easier than reading about it or watching a video. However, I have tried to include enough photographs and text so you could learn just from this manual. Be sure to make at least one in advance of leading it, so you know the steps and can make extras if needed to feel comfortable leading. You need to have one completely fulfilled in advance to let children and parents see and feel.

Purpose: While there is no evidence to show that felt balls were made in the 1830s or in the village, it is certainly within the abilities and skill set of the time. It is also a fun activity for kids for a souvenir they have made by themselves. Small balls can be used as beads and larger balls as pincushions. Softball-sized balls could also be used in dryers, to replace fabric softeners.

CAUTION: →Youngens can play with them but they don’t bounce, and it can be given to a toddler or declawed kitten IF they won’t chew it – the wool could come off and cause choking.

Advance Preparation: A number of fiber cores should be created in advance of doing this hands-on activity in the village, due to time constraints, particularly on event weekends or if buses of kids are scheduled! We can easily use 100 in a well-attended event weekend. Nearly any scrap fibers (yarns, fabric scraps, felt scraps cut from “mistakes,” wool fibers that are too old/dry to spin or felt well, quilt batting, pillow stuffing, dryer lint) can be used, as it is not necessary that this core shrink and wet felt. The wool processed by our carding mill is also good, neither spinners nor felters like to use the small rolags. Wrap sewing thread or yarn very tightly around the inner fibers to create a round shape for the core, about 2 yards yarn per core. The core provides something for the wool to be pushed against so the ball can be completed entirely in the child’s hands. Children’s hands are smaller than adults, so make cores that are about 1½ inches in diameter.

Initial fibers, felt bits and strips

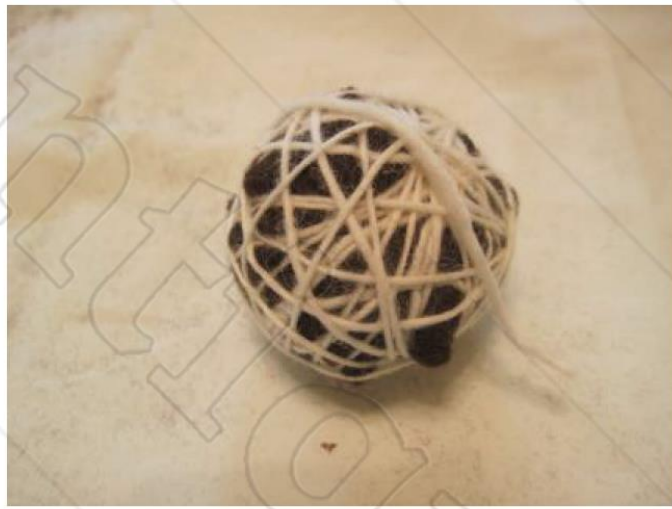


A handful of bits or strip roll



Wrapping to hold fibers together





Roll the ball in your hands to create better shaped ball, and wrap again but tightly. Wrapped balls waiting for the hands-on experience. The second one is to show that wool is not necessary for the core to make a ball.

Have several towels available, both for you to use and to provide a child if they need to “patch” the ball. Have ready a kettle with warm water (105-107 degrees, about like a babies bath water, or just let set in the sun and it will be fine) with a small squirt of Ivory dish soap. The water should feel slippery but not create lots of bubbles.

A second kettle without soap is also needed, to rinse the completed balls. This may need to be changed if there are many children making balls in a given session.

Since I will have my hands in and out of soapy water the entire time I’m working with the children, I do use a product called Gloves in a Bottle to coat my hands, but out of sight of the public, to keep my hands from drying out. For a single ball, it isn’t a concern.

Soap: Many types of soaps are used by many people, and many felt-makers have strong preferences. However, a pure soap with few additives (including fragrance) such as Ivory Dish Soap is best for us within the village, because it is extremely rare to have anyone who is allergic to Ivory, and it reassures concerned parents. (I have had one mother start to refuse as her daughter was allergic to Dawn soap, a favorite of many felters, but she was able to continue since I used Ivory.) Hair shampoos and laundry soaps are *not* good choices as in most cases they have conditioners, lanolin, or bleaching/whitening agents which slow or prevent felting. The soap is mainly used to speed up the process by altering the pH so the scales of the fibers open more, and to make the hands slide better over the wool.

Time: This activity can be done by children in about 20 minutes, but one person who can multitask can start a new child or group about every 5 or so minutes as they can be working different stages. However, if there is a large crowd you need to try to keep groups separate and spaced far enough apart time-wise so you can give instructions as they are ready for them. I try to have several balls at different stages so I can demo each step as a group is ready for it.

Invite participation: I generally start my invitation to participate by saying something like “If you can stay about 20 minutes, you can make your own felt ball.” Some children will not be interested, don’t try to force it. Parents will nearly always agree to the child doing it IF they think the child has an attention span long enough. I’ve only had two families say they didn’t have time, and must be the children whined as they continued on in the village because they both stopped back, with very unhappy mothers! I then whispered loudly to the children “have you thanked your mother for letting you do this?” and after some bear hugs the mothers smiled ruefully and relaxed. Hey, we want everyone happy when they leave, right? It seldom takes a

child the full 20 minutes, but that only makes them and their parents think they are wonderful, but when I say 10 minutes parents may start looking anxious if not finished.

If a young child (about 5 or under) is interested and parents haven't already pulled the child back, I say something like "you're pretty small to do this by yourself but if someone bigger with you can help, you can make one too." I've never yet encountered a group where someone didn't help a small child who wanted to participate (especially with some of the longing looks the children cast to their parents ☺), and they have all been good at helping but not taking over, to the extent of the child's ability.

Wrap the ball: Provide one of the cores to each child, and have them wrap wool to cover the core, working smoothly and in all directions (think of wrapping a ball with fabric not yarn). This needs to be demonstrated for each group of children. The final surface in particular needs to be feathered so there are no edges visible, as hard edges will not felt to the fibers under it. Try to check each child's ball and have them fix it as necessary before they get it wet. It can be fixed if you miss someone, by wringing out as much water as possible, drying their hands, and using dry fiber that is feathered as another layer over the entire ball, but prevention is easier and takes less time than fixing.

Wool on left hasn't been stretched out, and will just clump up if used. The wool on the right has been pulled apart some so can be used to start wrapping the core.

Initial wrapping. Note that the core can still be seen so more wool is needed, plus the edges are very visible.

While the coverage is better, pick out the seed. Also there is a hard edge easily visible, this will not felt to the layer under it.



Two balls ready to felt, they are different wools so appear different. Core is not visible, and all edges are well feathered. Ready to proceed.

Felting: When the children have completely covered the core, and have a smooth surface of wool spread over the ball core as above, have them loosely curl their fingers (demonstrate for

each group) around the ball and gently put their hand in the soapy water. It only takes a few seconds in the water. I then tell the children to cradle the ball between their palms as if they had a tiny kitty or puppy between them (i.e. not tightly) or if you are rubbing lotion into a sunburn, and gently roll the ball back and forth in their palms. Again, this is best demonstrated. Have them continue to do this for a minute or two, and watch that 11-year-old boys don't get too aggressive at this step (voice of experience). Have them check to see if the surface is changed and looks solid, without individual "hairs" visible, you may need to check for them.

Gently cradle the wrapped ball in one hand



Submerge the ball into the water



Don't relax the fingers yet!



After rolling between palms (not fingers) for about a minute.



After rolling a little longer.



Completely felted. Notice the covering is now one solid piece but has not shrunk down to the core, as seen in the pinch test. In fact, it has grown.



If the ball has bald spots, flaps, or ridges, stop as soon as you notice it, rinse out the ball, squeeze out as much water as possible out, dry your hands and that of the child. Now wrap another layer of dry wool around to make a new covering. Dry wool will felt to wet felt, note the key word here is dry. When the new layer is in place and smooth, start over dunking the ball in the water. I may sometimes offer to exchange one I've gotten to the felted stage and proceed to do the "fix" myself, but only if the parents start looking impatient. 😊

Fulling: Once the surface has felted, or is one solid piece (usually less than 10 minutes from start), you can check it and then say to the children and to the listening parents, "Great, you've 'felted' it, now you need to shrink or 'full' it. To do this step, you gradually increase the pressure of your hands so you are putting pressure on the ball as you roll it. Once it has shrunk so it feels tight against the core, and doesn't pull up when you pinch it, the ball is done. You can even let

the ball dry out, then wet again and continue. Feel my finished ball so you know what it should feel like. You can stay here and work longer, but if you want to walk through the village while you do this, you can stop back to rinse your ball, or you can work more later. It will take a day or longer to dry [depending on the size of the ball and the heat and humidity]. You can also put it in the toe of a nylon or cotton sock and tie or rubber band around it, and put in the washer to get rid of all the soap and then in the dryer to dry it. You'll have to cut the sock off, so use an old lonely one. It should be put in the washer and dryer if you plan to use as a kitten toy (only if they have been declawed **and** won't chew on it) to get all the soap out and shrink as much as possible."

And yes, I do always use the correct terms of felting and fulling, even though I doubt many visitors will remember them.



After MUCH more rolling, the wool is completely full and can no longer be pulled up – so it passed the pinch test. Show to all so they can see the goal.

Note to make-it-take-it leaders: After doing this a day or two with many youngens, you will probably have many felted balls that are not completely full, that were used as demonstrations. I admit that at this point, since I seldom work in the village on “slow” days, I take them home, tie a series into an old sock or nylons with runs (you need knots between each ball to help keep the balls shape), and let my washer and dryer do the job of completely rinsing out the soap, completing the fulling, and getting the balls dry. The socks will have to be cut off the balls.

More things you can do with this technique: You can felt around a great many objects in addition to small fiber balls or cores, as long as they can get wet! Examples:
Use a small bell instead of fiber, to have a ball that jingles.
Felt around a bar of soap to have a “washcloth” that is already soaped.
Felt around a river stone or small block of wood, then when the fulling is complete, cut a smooth line around – you’ve now created a container or pouch. If you leave a hinge uncut, the lid will stay right on the container.
To make a doll or animal, form a skeleton of cord or pipe-cleaners, then wrap long thin pieces of wool around the “skeleton.” Make it twice as fat as you want the finished piece, as it will shrink.
Or if you get really ambitious, felt around something large to create a new cover – such as a pillow or footstool.

Check list of supplies to have ready when doing a make-it-take-it in the village:

- Cores ready to be felted around
- Wool roving or batting
- Several towels
- Pan of warm water, with a squirt of Ivory dish soap
- Pan of warm water, for rinsing
- Optional: Gloves in a Bottle

Part 3 – Creating a flat piece of felt

Purpose: Making a flat piece of felt should be mastered before making something with a resist, as the steps are mostly the same as making the first side of the hat hood. However, because they are only one layer, they take a lot less wool and time for practicing felt making. And if you mess it up (holes, thick and thin) beyond an easy fix, use for ball cores! You can also cut the felt with scissors to keep just the good portions, and use the discards for ball cores. For learning purposes, don't worry too much about the shrinkage. Concentrate on learning the process, how the texture changes and how it feels.

A test to determine shrinkage, specific to each fiber including the dye colors, should be done before cutting a resist so a completed garment will actually fit! Many people make squares of felt, and they can be saved as a reference if you are experimenting with a variety of wools/fibers. The squares can also be used as mug rugs, candle mats, wall hangings, etc., so are not a waste.

Method: There are so many ways to make felt that you may be confused if you search the Internet or books. The method described here is intended to be reasonably historic to an individual hat-maker in the nineteenth century, although a large hat-making establishment would have used additional tools (hatter's bow, rollers, etc., steam hat block invented in the 1860s). It is also a method that can mostly be completed while working in the village (the final pressing may be done elsewhere in order to use an electric iron) without using "tools" that are not period.

Wear NO jewelry that will snag or be damaged when they get wet. Have available a piece of cotton (sheet, muslin, etc.) larger than the desired piece to lay on the table, so it is easier to pick up as needed. I like to spray starch the cotton, and iron well, as the starch helps prevent wool fibers from sticking to the cotton.

Laying out the fibers: First the fibers must be carded (roving is easy to use) and laid out in even layers on one sheet of cotton that has been starched and ironed. The key to getting even felt without holes is to lay it out evenly to start with. I don't know of anyone whose first piece was wonderful, but often you can trim it to get a decent sample. Use what gets trimmed off as cores for more balls.



Starting to lay out the first layer. Note that there are many thick and thin spots which must be worked more, but when it is correctly even the direction of the fibers is not obvious. The finished layer needs to be evenly dense and every edge feathered and loose so not apparent to sight or touch. (In other words it should appear loose but solid.) Incorrect overlapping of fibers will cause the fibers to felt within the bundle, not to neighboring fibers.



There should be at least 2 layers that are perpendicular, although usually three or even more are used. Again this is only the start, so you can see that the direction is at 90 degrees from the first layer. If left with thick and thin areas as this is, there will be holes and layers that won't felt together.

Also note that until you have gained experience in felting, you should use one color for all layers, as thin areas will be more noticeable with different layer colors. I removed this layer and replaced it with same

color after the photograph, which was done only to show fiber direction.



A third layer has been added, and needs a little more straightening. Note the ridges in the wool, if you moisten at this stage you will almost certainly have ridges in your finished felt.

To have straight edges at any edge, tuck them under with each layer. However, note that since the edges are not confined, the wool will spread as you felt it resulting in thin irregular edges so trimming is to be expected when beginning.

{For modern fun, to have a decorative surface, lay wool yarns or cut pieces of felt (pre-felt or not yet felled) on in pleasing pattern. If you want to use any fibers other than wool/hair/fur, add a very fine layer of wool across the top –which will work if the non-wool pieces are not too large!}

Introducing moisture: Hot/warm soapy water is then sprinkled across the surface taking great care not to let the fibers move. This should have more soap than making balls, as it is harder to keep the fibers aligned on a larger area than the ball. Cold water can be used but felting is harder.



Check for dry spots, pressing down to disperse the water throughout the wool and to eliminate air pockets. The water should not pool around your fingers, if it does tilt the project or blot with a towel. Take a look at the wool, as if there are lots of hairs that stand up or if your hands are dry you will need to rub your hands with soap just to keep your hands from sticking initially to the wool. However, that means you will need more frequent rinsing.

Felting: With wet soapy hands, fingers together but using your palms, and parallel to the table, gently start rubbing (use a light touch) the fibers to cause the surface to felt or harden, going over the whole area, don't work just in one spot. Work in all directions, and don't forget the edges. After about a minute per each palm-sized area of wool, lift off the cotton so fibers don't latch themselves to the cotton – not quite as important if you starched and ironed it, but still do it as a preventative measure. Increase pressure as time goes on. Make sure you don't press in wrinkles. Special attention needs to be paid along the edges so you don't create a ridge or thin spots (which can be trimmed at any point). Most of the work should be done with the heels or palms of your hands, not your fingers.



Carefully, turn over when the fibers don't separate. Continue to felt the fibers until "hard," that is until fibers on both sides stay in place at a light pinch. You can reapply warm soapy water as needed.

It does take experience to make flat felt (or with a resist) that doesn't separate or have holes. First concentrate on correct overlapping of the fibers in each layer and uniform thickness. You may also feel the fibers are moving away from you when you wet it down, one technique is to lay your fibers out on fabric and cover it with another fabric piece. You can even baste the layers together, and this is a valid technique if making large pieces of felt.

Fixing Problems: It is imperative that you fix any ridges, flaps, and holes before you full the wool. *It is easiest as soon as you notice the problem.*

A wrinkle in the wool will quickly turn into a ridge, so as soon as you notice a wrinkle, smooth it out. If the wrinkle has already started to felt and create a ridge, try pulling on it taking care not to pull holes into the surrounding areas. If you can't work the ridge out, use scissors and cut it off (but not out), then add soap and felt along the cut edge to make the fibers adhere – you may need to apply a patch as you would a hole to get the edges smooth.

A flap is caused by not having the wool well-feathered before you start felting. Depending on the thickness of the flap and the good portion, either pull/cut it off or layer a thin dry layer over it, and continue as if it was a hole.

If you have a hole or very thin spot in the felt, stop, and rinse out much of the soap, then squeeze much of the water out. Lay it out flat again, and dry your hands well. Pick up some dry wool, and feather it out across the hole. Carefully add soapy water to the patch area and rub to felt it to the previous part. Once it has adhered, wet the entire piece and continue.

If the layers separate, keep the "patch" wool dry and sandwich it between the layers a little larger than the section that came apart. When in place, remoisten and slowly work the area again.

Fulling: Once the fibers are felted together on both sides (will hold together but feel spongy and will stretch), with no holes or thin/thick areas, and don't separate when you lift it, it is time to full (to make fully or completely felt), which is to thicken and shrink the felt. It is not the wool fibers themselves that shrink, you are shrinking the spaces between fibers by removing the air. It makes the felt much stronger. There are several methods to do this.

You can simply continue to rub the wool between your hands, or with your hands on the table, but this takes a long time. The direction you work is the direction it shrinks, so try to work in all directions, and on both sides. You can get quite aggressive, get rid of lots of energy. Throwing it on the table will help shock it to shrink.

A fulling board could be used, or for a somewhat more modern substitute a wash board can be used. The purpose of this is to increase the movement of the fibers so the process can be done easier in less time, so obviously it isn't an absolutely necessary piece of equipment. Most felters prefer this technique because the shape, shrinkage, flatness, and thickness are under your control.

The felt can be placed in boiling water to shrink as much as possible, and can be alternated in boiling and cold water (the shock of temperature changes causes it to shrink faster, but it is hard on the wool). Note that boiling is probably the technique used by Waddell, since he had the large kettle out front. Many people recommend you check frequently during this process as the shrinkage can be stopped at any point. However I prefer to let it go as far as possible so it can be washed later without further shrinkage, but you need to have already done a shrink test if making anything to fit – this is personal preference.

If not working in an historic setting, you can also roll the felt inside a piece of cotton sheet, "mother" felt, bamboo mat, bubble wrap, car floor mats, and so forth, and roll on a table using your forearms, or for large pieces roll with your feet. Stop frequently, unroll and re-roll in a different direction so the shrinkage is uniform. I have found no evidence this method was used in European/American hat-making establishments, it seems to have been a nomadic Asian and middle Eastern method, but it is popular today.

To complete shrinkage, you can also place the partly fullled piece in a washing machine then a dryer but it should be rolled and tied inside a towel or pillowcase so it stays together and isn't caught by the agitators as it fulls. Wash with a load of towels or sheets, not with anything with buttons, hooks, zippers. The washing machine applies more agitation faster than people can do, and the heat and tumbling of a dryer also speed up the fulling. The older I get and the more my joints ache, the more I use this modern technique to finish my felt at home. However, the drawback is that you do not have control over the process and it may not shrink as desired.

Finishing: Once shrinkage is complete, rinse all the soap out, and you could soak in a pan of water with about a tablespoon of white vinegar for 15 minutes, to restore the natural pH. Re-rinse in cold water. Lay flat to air dry. (Your mother or grandmother may have told you to rinse your own hair in vinegar to keep it shiny, the principle is the same, restore to the natural pH after using soap.)

To make the felt smoother, you can (outside of the village) use an electric steam iron over the entire piece, lifting and pressing but not using an ironing motion. If working in the village, you

could use an old-fashioned flatiron (or smoothing iron) or a sadiron (or sad iron) or the hatter's iron in the village, heated in the fireplace, and dampen the felt, but this takes some practice to get the iron the correct temperature. Note: sadiron meant heavy + iron, it wasn't expressing an emotion.

Check list of supplies to have ready before demonstrating in the village:

Table to work on, that will not be damaged when it gets wet

Cotton sheeting, that has been starched and ironed

Wool batting or roving, or specialty fibers

Several towels

Pan of warm water, with a squirt of Ivory dish soap

Extra soap

Pan of warm water, for rinsing

Optional: Gloves in a Bottle

Optional but recommended: wash board or fulling board

Part 4 – Using a resist: Making a hollow 3D object

Purpose: A resist is used to create a continuous piece (no seams) of felt that is hollow. Most of the steps of making something with a resist are the same as making a flat piece of felt, so I am only including here the differences. Master the flat piece before trying to make anything with a resist. Also master a pouch or doll-sized hat before making a full size hat (less time and wool invested if you have problems).

Many hollow or shaped items made of felt can be made without seams, including hats, vests, boots, slippers, containers. However, most nineteenth century felting was limited to making hats, including doll hats after about 1850. For purposes of learning and for demonstrating at a historic site, you can also make pouches. They will take much less time and use less wool than a people-sized hat, so will hopefully be allowed wherever you demonstrate.

Expect to spend a day to make the felt and block a full sized hat, even with experience. An early 19th century professional hat-maker would start with washed wool, then do all the steps from carding through blocking, working on 6 hats at a time and completing the process in 6 days, so even the experienced professional took a day per hat, this simply isn't a fast process.

Laying out the fibers: Start with 3 layers of wool just as for a flat piece, however, the ends should extend beyond the shape you will use. For these illustrations, I am making a hat to fit the American Girl doll. Her head has a circumference of 13" or 6½" per half, and my wool shrinks about 40%, so I am starting with a 10x10 inch size to allow for shrinkage. This is about half the size of an adult hat, but uses a quarter of the wool, so is good for practice. The same piece could instead be a pouch/purse. There is some depth to my resist, as I want a wide brim.

Cotton fabric with resist shape drawn on it, for size purposes



Each layer of wool extends outside the resist. I am using pink for the outer layer, white for middle.



I am using blue for the inner layer. After laying out 3 layers, tuck under the bottom to make a straight line, then lay resist on top.



The inner layer has been added to the second side, with care to wrap the wool around the edges.



The outer layer has been added, with care to wrap the wool around the edges.



Once the wool is laid out, proceed with felting and fulling as for flat pieces. However, the edge where the wool goes around the edges is worked first and needs particular attention so ridges and holes are avoided. Always push into the middle when felting the edges. Once the hood is felted sufficiently to hold together, work alternately on both sides and on both interiors – remember you have four surfaces rather than two as for flat felt.

When you are ready to start fulling the wool, trim the edges if needed, and you can remove the resist whenever it starts getting in your way or if it starts to buckle. Use any of the suggested fulling techniques, and all subsequent steps.

If not working in a historic site, you can use a ball that can be deflated, like a beach ball, to lay out the wool around it, which eliminates the need to fold around the edge of a resist and the care that is needed to make smooth edges.

Hat hoods and capelines are available commercially, and can be used if you only want to demonstrate hat making/blocking rather than felt making.

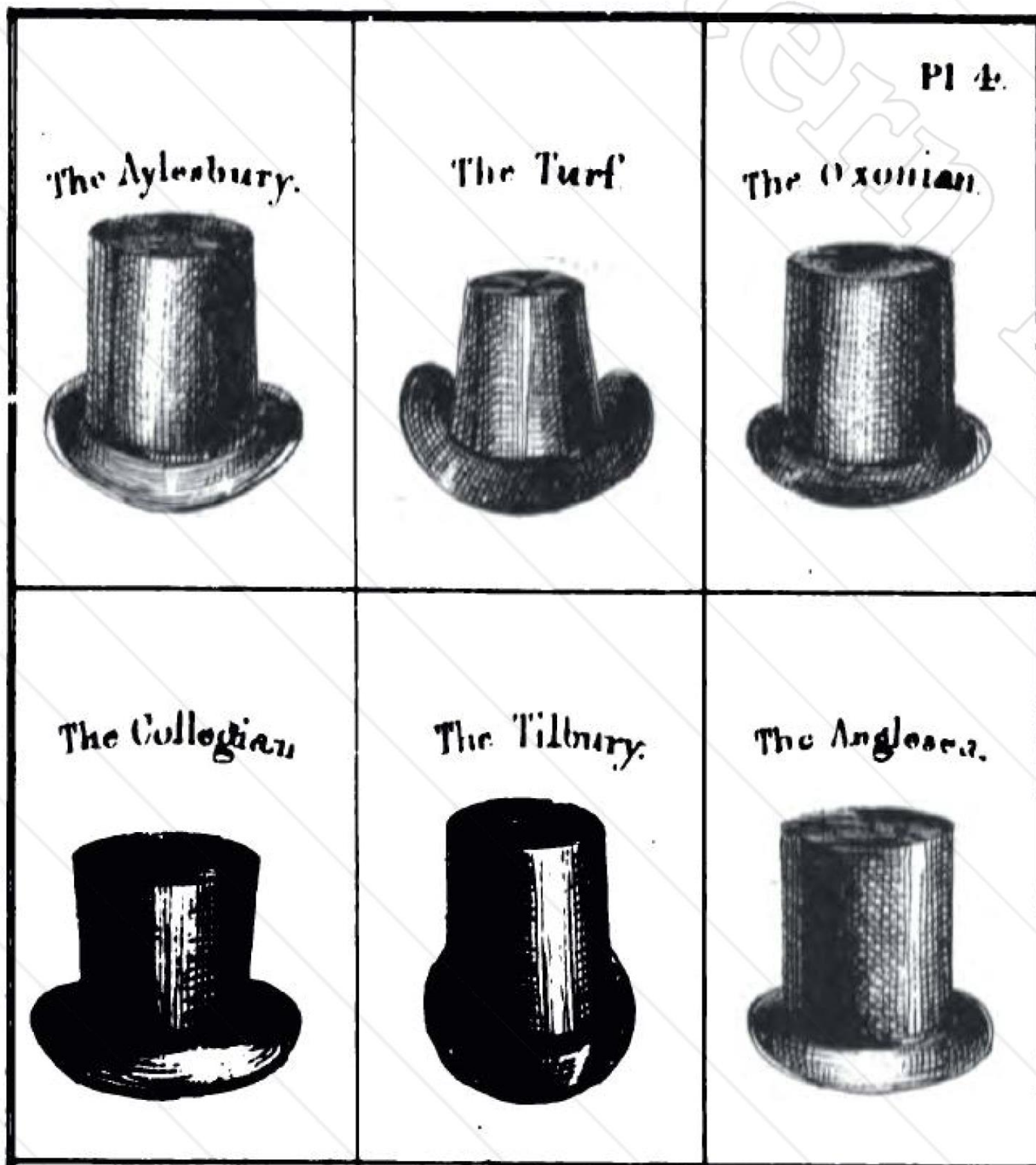
Part 5 – Felt hat styles appropriate for the 1830s

Top hats are often called beaver hats, although originally that meant any hat made of beaver fur felt regardless of shape/style. Top hats were worn in France around 1795, and in England around 1805. There were a number of felt top hat styles being worn in the 1830s, many with their own names. The tallest crown became known as a stovepipe in the 1850s. From 1790 through the 1830s, the top hat was usually a 6-7 inch crown, with a narrow brim that curved downward in both front and back. A crown of 4-5 inches was popular among the working class. Crown height, brim width, and curves vary greatly in later decades.

In the 1830s, straight sides were the most popular, although particularly in the 1840s and '50s, hats also sloped with either the top or the bottom wider, as well as having curved sides. Both the wider top and the curved sides require a special hat block that is in 3 or 5 pieces, and the center pieces are removed first so the hat can be removed from the block. They did not last as a fashion as long as the straight sides or the narrower top.

A collapsible top hat was patented between 1834 and 1840, but the few extant hats and few fashion plates indicate not many were made.

From *The Whole Art of Dress*, 1830:



By Constantin Hansen, Portrait of Dutch Artists, 1837



The man sitting on the floor is wearing a brimless hat that looks like a fez; it is a smoking hat, and was worn in men's clubs or sometimes lounging in the home. It was not worn outside. There are no occasions at New Salem where this would be worn. However, the top hats show more variety than people today normally associate with 1830s top hats so I thought sharing it has value.

Because of their expense, top hats might be worn long after they were a fashionable style, or might be passed on to relatives or servants, or sold to peddlers to sell to the less affluent. They were often included in wills.

Ladies Felt Hats: The only felt hat for women in the 1830s was a riding hat, which is similar to a man's top hat with added veiling, flowers optional. I think it is very unlikely any one in New Salem would have had one, although they are certainly period. Appropriate for the Morgan Horse Show event or other riding events. Illustration from my antique collection.

Even though felt hats are not appropriate for ladies at an 1830s site, the same techniques as will be described to make top hats are those used for later eras when ladies did wear wool felt hats (any exceptions will be noted), but additional blocks may be needed or desired.



LATEST FASHIONS FOR LADIES' RIDING DRESSES.

Country hats: Besides top hats, what were in the 1830s (also much earlier and later) simply called "country hats" were also worn. These were worn by both wealthy city men when at their country estate and by rural dwellers, but would not be worn by wealthy men in large cities.

THE

LADIES POCKET
Magazine.



WINDSOR FOREST.

1838. — PART 1.

JOSEPH ROBINS, *Google*
3, Bride Court, Bridge Street, LONDON.

The following are paintings by William Sidney Mount in the 1830s showing country hats.



Most other hat styles that you may think of are not appropriate styles for the 1830s:

Ascot dates to early 1900s

Bicorn, or cocked hat, and tricorne were worn in the 1700s when wigs were in fashion, and by European military.

Boater was worn in summers from about 1900; it is a low-crowned relative of the top hat.

Bowler, aka derby in the US, was created in 1850 for servants of the 2nd Earl of Leicester

Coonskin cap, worn by frontiersmen, so residents of New Salem are unlikely to have worn

Deerstalker is a tweed cap worn while hunting in Scotland, circa 1850s.

Fedora is a soft felt hat with a lengthwise crease in the crown, from about 1882.

Homburg is an early 1900s style.

Panama hat is a straw hat made in Ecuador, popularized in 1850s as Gold Rush miners traveled through Panama to California

Pork pie hat refers to 3-4 different styles popular since mid-19th century.

Quaker hats are a low-crown top hat with a flat wide brim*, from 18th century styles.

Stetson or cowboy hat, or boss of the plains, invented by John Batterson Stetson in the 1860s.

Sugar loaf or steeple hat, forerunner of the top hat, was worn in the first half of the 17th century.

*Note that hats with brims more than about 3 inches require a hat to have separate crown and brim, and a sewn join. The ribbon band developed to hide the stitched join.

Hat Sizes

The top hat blocks in New Salem are for XXS and XS hat sizes. To measure for hat size, measure about ½ inch above the ears with one finger under the tape measure (to allow room for a sweatband). The following are standard hat sizes, and the US hat size (traditionally, better hats are measured in 1/8 inch increments):

XXS	20-20½ inches	6-6 ½
XS	20½ -21 inches	6 5/8 6 ¾
S	21-22 inches	6-7
M	22-23 inches	7-7 ¼
L	23-24 inches	7-7½
XL	24-24¾ inches	7½ -7¾
XXL	24½ - 25 inches	7¾ - 8
XXXL	25-26 inches	8 - 8¼

Part 6 – Blocking a hat hood to shape a hat

Handmade felt hoods usually will stretch more (to fit the block) without steam, and shrink more with steam, than the commercially made hoods available for purchase today, but will not usually be as stiff. Commercially made hoods have some stiffener already in them. Either type may need stiffener applied in order to wear.

Felt that has had steam applied in this process as described has “memory” so will return easily to the finished shape. It can be re-shaped if wet, even though the original shape will return if wet again. To permanently re-size or re-shape, steam must again be applied.

When determining size of blocks, measure the circumference at the base and subtract about $\frac{1}{4}$ inch to determine hat size – the extra will be filled in with the sweatband.

Top Hats

Equipment:

Top hat blocks in Waddell’s, two have oval bases and one is the older round base style, and measure 20.5 or 21.5 inches, so on the small size for modern wearers.



Steps to blocking a top hat:

Step 1: Dampened hat hoods placed over top hat blocks:



Step 2: After first shaping the top and tying cords at bottom, note the number of folds. Wrap twice and tie a bow or slip knot (it can be used over and over, so you need to be able to release the knot!).



Step 3: After hand shaping and stretching, before steam is applied. Folds still remain, but adjust so they are evenly spaced.



Check list of supplies to have ready before demonstrating in the village:

Table to work on, that will not be damaged when it gets wet

Hat hoods

Hat blocks

Tie cord

Pan of warm water

Towels to sop up water

Step 4: This step may be best done outside the village, so you can use an electric steam iron over the entire piece, to shrink out the folds. If working in the village, you could use an old-fashioned sad iron or a hatters' iron (see photo)



heated in the fireplace or a kettle of boiling water, and dampen the felt, but this takes some practice to get the iron the correct temperature (hot enough to do any good but not so hot the felt will scorch).

You could also repeatedly remove the hood from the block, hold over a steaming kettle (or coffee pot), and return the hood to the block to shape it. Warmth and moisture are both needed to shrink the hood to the block and to permanently set the shape.

After steaming/pressing:



In a larger hatmaking business, additional items would be available to speed up the process.

Country Hats

Equipment

Pictured are crown blocks (acquired in 1997 from a 82-year-old third generation hat maker, who taught me a lot) in the “styles used for men’s hats today.” Men’s hats have used amazingly few block shapes for a long time, these crown blocks could be used for 1830s country hats or today. Additional shaping and creases are usually done in the hand even today, more specific blocks were not used without a commercial steamer - which wasn’t invented until the 1860s when those styles became popular. Also two blocks can be stacked, with a flat crown block on the bottom, to make a taller crown such as for a top hat.



Crown spinner and Crown blocks on spinners. Note that in the 19th century a leather strap or linen cord would have been used to secure the hat hood to the base of the crown. An old hat can be re-blocked (but not re-sized) without removing all trims or the sweatband, the sweatband however must be flipped down before placing on the block. Having the crown block on a spinner makes it much easier to rotate the hat so you can work on all sides equally.



Brim blocks or flanges in the basic “styles used for men’s hats today.” Men’s hats have used amazingly few block shapes for a long time, these brim blocks could be used for 1830s top and country hats and for modern hats. Additional shaping and creases are usually done in the hand even today.



Brim block stand, side and top view.



Brim block on stand.



Note that the hat is removed from the crown block before blocking the brim. A hat size retainer or band block is placed inside the crown when placed into the brim block. Many people mistakenly identify this as a hat stretcher. There is adjustment in these retainers, to fill the head (size) opening.



A hat stretcher will stretch the entire crown, not just the base. To use, all trims and the sweatband have to be removed, the hat is dampened (soak for several minutes to absorb much moisture and soften/remove the sizing), then stretched. Once stretched, it is then re-blocked, dried, and reassembled. Care should be used so as not to split the felt, limited stretch can be accomplished without altering the shape or height of the crown. You must also work slowly, do not work too fast as the wool has to have time to soften and stretch.



Old Hats: An older dirty or misshapen hat made of fine quality wool can often be salvaged. First remove all trims and stitching. Clean well by washing in warm soapy water, and as necessary work with a dry cleaner to remove any stains. A hat may be turned inside out and from front-to-back or front-to-side if areas are worn. Now, just block as if you are starting with a new hood. You may not be able to block to the same size or shape, but you should be able to use the wool for some hat. If all the sizing is removed in the cleaning process, you may need to apply again (see later for more information).

Steps to blocking country hats

Start by soaking the hat hood in water, dampening BOTH sides of the felt. You don't need to soak more than a half minute or so, but moisture on both sides is important so it penetrates.

Place hood on crown block. Pull on hood with heels of hands against the felt and hands on opposite sides of the block. Sample on left is a round tip, on the right is a flat tip.



Continue working the felt by pulling, always using the heels of the hands on opposite sides of the felt. In order to get the felt to be tight against the block, it may be necessary to steam it (just pulling is not always enough). Do NOT iron it, the iron should never touch the felt, instead let the steam do the work with some occasional pulling if needed.



After the crown tip is smooth, tie kite string (or other) at the height you want the crown to be. In a modern setting, a bungee cord can be used. To use string, wrap the cord twice around the block and tie in a bow or a slip knot, you want to be able to loosen and retighten as you progress. At this point there will be some folds in the felt.



Pulling as you did with the tip, in other words working always on opposite sides with the heel of your hand against the felt, distribute the folds evenly around the hat and pull to remove as much fullness as possible. Once that is done, steam the entire crown, working around the crown until the excess fullness is shrunk out and the felt is snug against the block.



Most people blocking hats will not have a full range of crown sizes. One way to manage is to make a duffer for your hat block. A duffer is a hat body pulled over the block and steamed down tightly. It is brimless, so trim off any felt that is below the end of the block. One layer should make your hat block one size larger.

Remove from the block, leaving the cord in place. Insert the hat size retainer so the bottom is even with the cord.



Place the felt into the hole within a brim block - that is on a brim stand. Smooth the felt against the brim block.



I am using hat hoods and trying to get as high a crown as possible, therefore I don't have enough material to be able to tie a cord in the channel on the block. This is also what will happen if you are trying to restore a hat that has gotten crumpled so it isn't wearable. Steam well then smooth with your hands, so it shrinks and snugs against the block. You may also find it helpful to lay damp flannel or other fabric across the entire brim block and tie it to the space on the block for cords, after most of the deep folds have been worked out.

For a flat brim, you can lay the crown flat on an ironing surface and steam it flat. For this step, you may have difficulty using just steam: if you feel that pressure of the iron will help USE A DAMP PRESS CLOTH. You do not want to create a shine on the felt that would happen if you put the iron directly on the wool felt, nor do you want to scorch the wool.

When using manufactured hat hoods or capelines, sizing has been added before you receive it. This may soften with the moisture you introduce, and appear as if they have chalk. Do nothing to remove until the hat has been blocked and you let it dry. If any still is visible, brush the surface.



Measure the brim and fold/steam the brim edge up, which is actually the underside of the brim as it is worn. This will be sewn in a later step. The hat should dry for 24 hours before you handle enough to sew, as will be described later. If possible let dry on the crown block or flat on the table.

I think it is important to emphasize these steps, so here is another version of these directions.

Steps to blocking a hat, using half size pieces I had made for demonstration purposes. The blocks measure 13" around the base of the crown, so will fit the 18" child dolls.

Round crown block, and crown stand

Crown block on stand

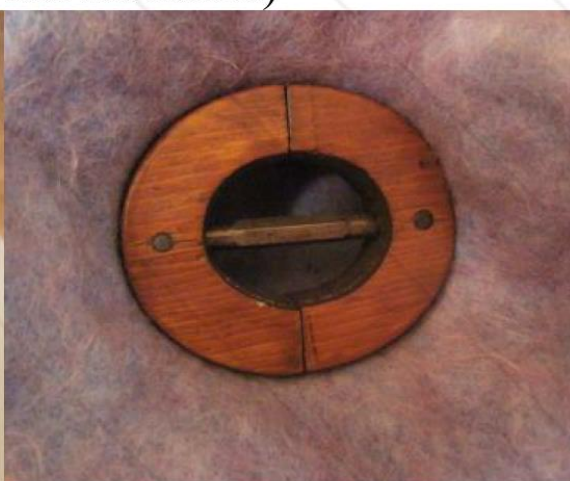
Hat hood soaked for a half minute, placed on crown block, string wrapped twice and tied with a bow.



Crown has been steamed and pressed

Hat size retainer placed inside the blocked crown (after removing from crown block)

Brim block stand (left) and brim block (right)



Cord tied around brim block and ready to steam. In this case, there is adequate felt to tie the brim.



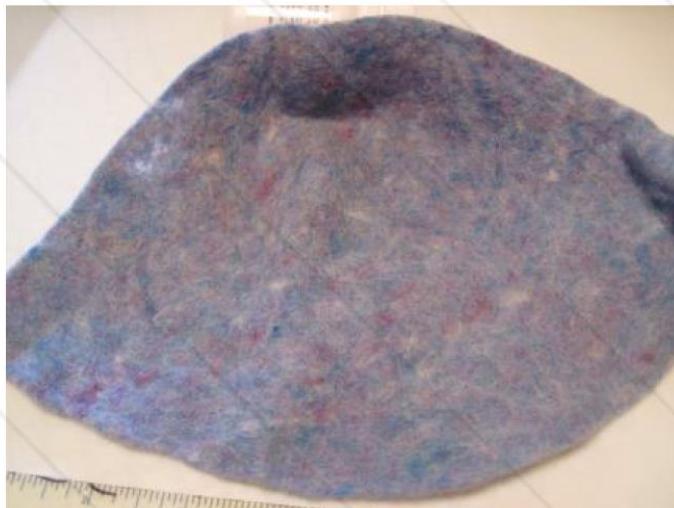
Blocking complete, removed size retainer and ties, left to dry on brim block



Blocked hat, trimmed edge of brim as it was uneven. The white center layer shows, so an edge trim will be desirable.



Another small hood, hand made felt finished in a washing machine.



Tied around an empty pill bottle



Steaming complete to make a flat brim.



Although this is not pertinent to 1830s styles, creases and indentation, and additional shaping, are pinched into a blocked hat by hand while damp, every hat maker or hat wearer could develop their own individual style. For a fedora crease, press the crown down, then pinch. For a telescope crease, press the crown down to the required height then push the center up. Once you have a shape you like, support it and use steam to permanently set the creases. Many later ladies styles were pinched or creased into fanciful shapes, and folds might even be stitched together.

Part 7 – Sewing in a sweat band

Purpose: A sweat band is sewn inside a hat for the obvious reason of keeping sweat from penetrating the felt. It also protects the head (skin and hair) from picking up felt fibers, and possibly causing an allergic reaction. A poor man in the 1830s might wear a country hat without a sweatband, and it was probably not professionally blocked either. However, for actors and re-enactors a felt hat without a sweatband is not desirable. A secondary purpose is to preserve the crown shape as the hat is worn, and a little adjustment can be made in the size as the sweatband material is sewn in place.

If a hat lining is used in more modern settings, particularly useful if makeup is used, the hat lining should be basted to the sweatband, and should not go through the hat itself. This makes it much easier to remove, wash, and re-insert.

Materials: Three materials may be used today:

A leather sweatband, which costs about \$10 to purchase in 2015, and repels more than absorbs moisture, but protects the felt better. The leather sweatband is made in an arc shape to conform to the head.

Millinery ribbon or grosgrain, aka Petersham, depending on place manufactured today can be cotton or rayon or synthetic. Obviously the cotton is more authentic and also will absorb better. This is not the same as dressmaker's grosgrain, which is woven lengthwise and if one edge is cut off it will fringe. Petersham is woven back and forth, and can therefore be shaped, but if one edge is cut off it falls apart. Sample of dressmaker's grosgrain (left) and millinery ribbon or Petersham (middle):



Modern two-layer sweatband material is probably a better choice for anyone working in a living history or outdoor theater setting, as the extra layers protect the hat better in the heat (right above).

Swirling: Millinery ribbon must be “swirled” to form a curve. First, let steam from an iron shrink the ribbon. Then, swirl or pull into a curve as you are using steam (not pressing down, let the steam do the work), to create a curve. This can be done again if the first time didn't create enough of a curve. You can work from the reel or use pieces longer than needed and end up with waste.



After Swirling, there is a curve in the Petersham, to better fit the head:



Pinning: Once the sweatband is swirled, measure (twice) with an extra inch for turning under, and cut. If custom making a hat, the sweat band material can be placed around the head to get a precise fit. Pin at about 2 inch intervals just inside the lower edge of the blocked crown. Pin within the felt, trying not to penetrate to the front of the hat. Start with the seam at the back, find the half way point of the ribbon and pin to the front. Continue halving the ribbon and hat until it is pinned. The ends do need to be brought together, shown separated for visibility.



Some people do not believe how important it is to pin in the sweatbands, but the two materials do not always match up if you try to sew in without pinning. You will have to remove stitches and start over.

Sew: Hand sew with a running stitch or with a pick stitch (where just a bit of the felt is picked up, doesn't go through the felt, and is done at a slight angle to better secure the sweatband), or use a sewing machine, about one-quarter of the way up from the lower edge of the sweat band. For hand sewing, try to keep inside the felt, not going clear through to the front. The beginning/end should be at the back of the hat.



If a hat label is used, it should be placed at the back also.

Traditionally, the beginning/end of a sweatband for a man's hat is seamed with a vertical seam, while that for ladies is on a diagonal.

Brim edges: For all hats of better quality, the brim edge must be finished. One method that is period and modern at the same time, is to trim the brim edge so it is 3/8 inch wider than the finished brim (or 3/8 inch from the crease placed in the



brim when you were doing the blocking), then stitch in place. On very wide brims for later styles of ladies hats, a length of millinery wire can be enclosed in the fold to help support and shape the brim.

A second method can be used for style (such as to add a different color to the edge), for a turned up brim (where the folded under edge will show), or when the felt for the brim is narrow (unable to turn under). A longer piece of millinery ribbon is sewn on the outer edge of the brim. To use, first fold almost in half lengthwise, then swirl as before. To sew it on, the narrower part goes on top, and be sure to stitch through both sides of the ribbon.



As long as the trim isn't too thick, unless that is the look desired, and will lay flat on a curve other materials can be used as brim edgings for modern hats.

Trim: Another piece of millinery ribbon can be sewn on the outside of the hat crown as a trim. Some people believe the hat bands developed both to hide the stitching of the sweatband and to cover up sweat.

Some of the early country hats appear to have leather cords, but since the information I've found indicates for less affluent men they may not have been blocked or had sweatbands, this was probably the method that was used to adjust fit.

Brim Shaping: Brims can be hand curled, to achieve results similar to the hats shown in the paintings and drawings of the period. Steam the brim and while it is still hot shape in the hands. Support the hat as the brim is cooling and drying. Further shaping can be done by wetting the brim and working without steam, and will remain as long as the hat stays dry.



Stiffener: If the hat is not stiff enough to hold its shape (and remember the stitching will help) hat stiffeners can be used. Follow the directions of the product if using purchased hat stiffener, or use a more diluted compound if only a light effect is needed. Top hats need to be stiffer than country hats, different hat styles require different stiffness.

Turn the hat inside out and flip the sweatband away from the crown, apply the stiffener, then while still damp turn back right side out but leave the sweatband flipped away until it is completely dry. With most hat stiffeners, steam should be used again to set the stiffener.

Millinery wire is used on women's hats but is seldom found in men's hats.

Part 8 – Care of a felt hat

With proper care, a felt hat can last for many decades. Most of the information is applicable to straw hats as well.

Size: The first step is to wear the correct hat size. If necessary, select one slightly larger rather than smaller. Wearing one too small will stretch and possibly damage the sweat band, or break the sewing threads, besides not being comfortable.

There is today a foam material that is adhesive on one side and can be used to make a large hat fit. Use about 2 inch pieces at sides first, if still too large use 2 inch pieces at front and back. Remove before storing for any length of time so the adhesive doesn't get gummy.



Picking up or Carrying a hat: Always lift and carry a hat by the sweatband. Do not use the brim edge, as unnecessary stress is put on the brim. If a flat brimmed hat is laying flat on a table or shelf, pull the crown towards you until you have the crown opening visible, reach under the brim, and pick up by the sweatband. You can also cradle the hat under your arm. With later styles with a crease in the crown, you can also carry by the crown.

Sweat: Obviously the most important thing for hats worn in the village is drying a sweaty hat. First, flip the sweatband down, to get most of it away from the felt. Occasionally use a damp cloth to rinse off the sweaty salty accumulations. If the felt is also very damp, if possible dry with a hair blow dryer to speed up the drying.

If the sweat band accumulates too much salt from sweat, it may need to be removed, washed and also rinse off the inside of the hat. If the sweat band is in good enough shape, it can be sewn back in after the band and hat are completely dry. Keeping it washed helps keep salt from the felt.

Storage: Store with lavender sachets, which help keep moths away.

Hats with rounded or curved brims (up or down) should NEVER be placed flat on a table, as there will be gaps in what touches the table. The preferred storage method is to be hung on a peg or hat rack, or use a hat stand, but if there isn't one available, store upside down, on the crown tip (top of the hat). If a hat box is used, there should be something inside for the hat to rest on that supports the brim: the brim should never sit on the bottom of the box unless the brim is flat. Another good storage method is in a muslin bag, large enough not to pinch the hat, that is hung from the ceiling, which also keeps them cleaner than a peg or hat rack would.

Storage can be a particular issue for later styles of ladies hats, or 1830s ladies poke bonnets of straw or fabric-covered-buckram, when feathers/flowers are taller than the crown. In these cases, support either the brim or the crown so that the trims are not bent and the curves of the brim do not flatten. Alternately, remove the trims so the hat can be stored on its tip, particularly if the hat will be stored for some time.

Rain: If you get caught in the rain, obviously extra maintenance is needed. Use fabric or crumpled up tissue paper to fill the crown, to keep it from sagging as it dries. Shape the brim as needed and support it also. Placing over a hat block or a crock or other item to help support it as it dries may result in needing less tissue paper. Remember that a blocked felt hat has “memory” so can be shaped back to the original appearance with just a little effort.

Dust Etc.: Hats may occasionally need to be brushed, especially if there is a lot of dust blowing around or it has been stored uncovered. Use a hat brush if available, or use a lint-free cotton or wool cloth. Do not use paper towels, as they have too much lint.

A small vacuum cleaner could also be used to suck dust off, but this can only be used if there are no trims. A brush is better.

Etiquette or Social Code: Please enjoy wearing a hat, it is important to the public perception of proper 1830s etiquette. The original hat social code - way back in 1100 - was that lower orders must bare their heads before their betters, which by the 1830s meant tipping your hat as a sign of respect when meeting someone or starting a conversation, and to always raise or tip your hat to ladies. Hats not only protect the head from sun and rain, but have other purposes such as style and etiquette. It will take a major mental adjustment for many 21st century people, as hats today are not worn for the same reasons. Think Fred Astaire but not Clint Eastwood or Dr. Seuss.