

# More Wool Gatherings: Felt

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*Irish Legend - A pilgrim was traveling in Ireland, a long weary walk and his feet were sore and blistered. To ease the pain he gathered a handful of sheep's wool that was caught in a bramble bush. He packed it inside his sandals. When he arrived at his destination he removed the padding and found it felted. The friction, heat, and sweat had matted the fibers together.(1)*

Felt is made from wool

Cream turns into butter

Dough turns into bread.

Wool turns into felt.

These things just happen with help from our hands.

Felting is an ancient craft going back to 3000 BC and beyond. Being originally a non-woven material, it may predate woven textiles. Early people discovered that felt offered protection against weapons and weather. Capes and hats made of felt were not only warm, but also impervious to water and wind. The very earliest evidence of felt craft has been found in central Asia and dates to the Neolithic era. (2) Romans learned felt making from the Greeks. Roman soldiers made felt armor and dipped it in vinegar to make it resistant to fire and iron weapons. There is also evidence they wore felted boots and stockings, and caps. There is a strong Nordic tradition of felted boots, socks, hats, and mittens. The felting tradition on the Nordic countries evolved through need for simple utilitarian objects for life in a cold damp climate, often in a stringent economy. Through the Viking influence in the British Isles with years of trade, conquer and plunder there is evidence of similar felted items such as carpets, saddle blankets, clothing, headwear, and artwork.

The Anglicized word felt is likely to have had its origin in the word filz from the Old High German. Researchers believe that felt was one of the earliest forms of textile, but because it decomposes easily artifacts are seldom found intact. One of the earliest hand-knitted felted garments recorded was found in Coventry, England. This is labeled the Monmouth Cap and is attributed to the 13th Century. (3)

The term felting refers to taking an animal fiber (most often wool), shaping it in some way, then, through a process of very hot water and agitation, converting it into a tightly cohesive fabric. Most of us have experienced accidentally felting a sweater or other hand knitted item. And thus that significant hard learned lesson - Felting is NOT reversible. Animal fibers felt, plant fiber do not. For these purposes 100% wool will be assumed. Even though other animal fibers can be used they tend to be more expensive, not as readily available, and may require a different process to predict consistent results. Wool is certainly the most commonly used fiber in western European culture.

The first stages of felt-making involve laying down of a web of woolen fibers. They could be hand teased or carded and the wool is laid down in layers at right angles in a batting. In modern terminology there are two distinct stages: felting and shrinking. Felting is the initial addition of soap and water with pressure. This allows the fibers to interlock. Shrinking is the rolling action, which completes the process. The two operations may occur simultaneously.

Either acidic or alkaline solutions can cause the wool fiber to swell and the scales to open, thereby encouraging the felting process. At a pH 4.9 the wool is most stable and tolerant of chemicals. The fibers are least likely to swell and felt in the pH ranges 3-6. The best pH conditions for felting occur in acidic solutions between pH 1-2 or in basic solutions with the pH 10-11. (4)

## pH Scale from Acidic to Alkaline with 7 being neutral

Strong acid			Neutral							Strong Basic			I		
0	1	2	3	4	5	6	7	8	9	10	11	12	Wool	Water	Soap

Water temperature will determine how quickly the fiber will felt. In practical terms, you should use as hot a water as practical 104 –122 F. Some felt makers shock the fiber by alternating it between warm and cold water. This causes the scales to spread out on the fibers making them harsh. While this technique produces a fabric suitable for carpets, it is not recommended for garments. (5)

Agitation is the final ingredient. Pressure forces the air out of the fleece so the fibers can come in contact with one another. Beginning with careful massage and circular motions this allows the fibers to slowly migrate to produce a thin stretchable felt. This is a slow process and can't be rushed.

The terms felting, fulling and boiled wool all describe a process which takes an animal fiber yarn and by application of heat, moisture and mechanical action cause an interlocking or matting of the fiber to create a more dense fabric. What makes fibers suitable for felting is their surface structure or overlapping scales. These possess a high degree of crimp or waviness. When placed in hot water and rubbed together, these scales mix and glide over each other intertwining to create that dense fabric we call felt. Finally, the fabric is dried often under tension to retain a particular shape or density.

Boiled wool is another descriptive term for felted cloth. It is the characteristic of fabric we most often think of the fashion those chic Tyrolean jackets that are embellished with matching braids and pewter buttons. The basic method is the same as felting and fulling. For reference in this article all of these will be referred to as felting.

Felting is the compaction of wool fibers through pressure and movement in the presence of heat, moisture and soap. The scale, structure elasticity and strength of the fiber are clearly important factors in causing these irreversible changes, but chemical factors also play an important part. Under appropriate conditions when a fiber is entangled in a fabric the root end of the fiber moves backward through the fabric. Since it is elastic the fiber stretches, but leaves the tip entangled. When relaxation takes place the fiber contracts to its natural length, but the scales prevent the root end from slipping thus compaction takes place. The closeness of the scales is important and fine fibers whose scales are very close together felt more readily than coarse ones. (6)

It is generally believed that wool shrinks in too hot a water. Wool can be simmered, as during the dyeing process, without harm, provided that there is no agitation and temperature is reached slowly. The textile is to be wet but not soaked. Continue to work the article by folding, rolling and kneading. The item will shrink in the direction it is worked. The textile becomes thicker, denser as it is worked. But felting is not an exact technique. There are no strict rules. Each project is the function of the type of fleece used, the thickness of the batting or textile to start with and the degree of fulling.

The word fulling stems from the Medieval Latin word fullare meaning to walk on or trample. (7) Fulling is the term most commonly used in the Scottish Highlands. If your family name was Fuller or Walker it is likely that this was what your ancestors did. (8) From time immemorial, trampling the cloth in a bath, was a long difficult wet and tedious process, to accomplish the fulling. Many women complained that felting was heavy heard work that caused the hands and back to ache. Few enjoyed doing such hard work for hours with their hands in water. This was one of the first processes in the textile making to be mechanized. This occurred about the 12th century. (9)

Walking the cloth or waulking is the more common Celtic term. This process is used in the northwest of Scotland for fulling a length of woven tweed. It developed a social nature when about ten women of the locality met to waulk the cloth. A barn door was taken down and laid on supports as a table and they worked and

pounded a soapy length of cloth. As they rhythmically passed it from hand to hand they sang songs to keep the pace, these waulking songs have survived long after the actual process has been done by machine. (10)

“In Scotland the cloth was thickened with soap and lye (stale urine gathered in special tubs for the purpose) and then trampled or pummeled in various ways. In the Highlands this process was known as waulking and was performed by the womenfolk who pounded the tweed back and forth on a long trestle table to the accompaniment of waulking songs and port a’ beul (mouth music). Afterward the cloth was immersed in the running water of a clear stream to remove the fulling materials. Nowadays the tweed is dispatched to the fulling mills for finishing by mechanical means and the ceremony of waulking the cloth is performed solely for tourist attraction.” (11)

This humble technique has been used over the years and in many cultures worldwide. Something so simple as felt has been used on horseback, in lumber work, underfoot, covering ears, or even on our feet as we now as we watch television. Perhaps this symbolizes felt-makers who have lived before us, who helped their people to survive a cold damp climate, and who still give us the foundations to appreciate well-felted items and personal expression.

#### FOOTNOTES

1. Belgrave, p.7
2. Belgrave, p.9.
3. Cranley, p23.
4. Sjoberg, p55.
5. Sjoberg, p55.
6. Ross, p.75.
7. Cranley, 23.
8. Hochberg, p31
9. Cranley, p23.
10. Ross, p 90.
11. Mackay, p 135.

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