



The manufacture of parchment and vellum

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Modern parchment and vellum

In the last 1000-plus years little has changed in the manufacturing of parchment. The main differences between then and now is the use of certain chemicals and modern machines make it possible to flesh and split the skins mechanically.

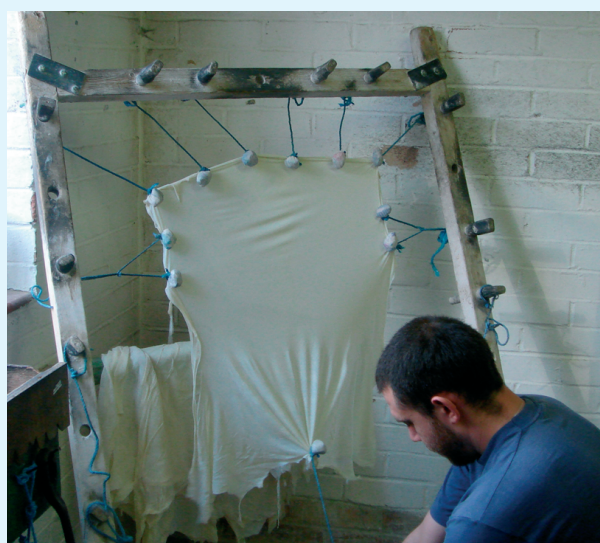
As in leather manufacture, selection of raw material is of paramount importance. The colour of the wool or hair must be considered, as this will be reflected on the final surface of the parchment and vellum. White sheep or cows will tend to produce white products, while coloured animals will tend to produce shadowy effects. This effect can be taken advantage of when producing certain types of vellum, especially for bookbinding.

Just as in the leather making process, insect bites, tick bites and natural scars undermine the final quality of the parchment and vellum. It is the skill of the parchmener in good selection of raw stock that determines the final product quality.

The manufacture of parchment

The sheepskins are unhaird and processed to the pickled state when they are sorted. They are then split, with the grain split going to the manufacture of thin leathers or skivers.

The flesh split or lining is then depickled, relimed and bleached. The skins are now ready for the parchmener.



"Tying in" sheepskin linings in preparation for filling process.



Manual scraping of flesh side to remove residual flesh and to squeeze out grease.

The skins are tied to wooden frames and attached at 21 points round the edge of the skin. The frame can be hoop shaped as in medieval times, or more or less rectangular as is used today.

The skin cannot be nailed to the frame as it shrinks during the drying process, and this would result in the edges tearing away. In addition, the frames are reused over and over again, and would become unusable if riddled with holes.

Every few centimetres around the edge of the skin, the parchmener pushes little pebbles, a smooth stone, or a small roll of newspaper into the skin. The skins are then folded over these nodules to form knobs, which are then looped around and secured with a chord.

The other end of the chord is then anchored into the slot of a revolving peg set in the frame. One by one these knobs and strings are tied around the edge until the whole skin resembles a small trampoline, then the pegs are turned to pull the whole skin tight.

As it stretches, any tiny gashes or flay cuts will be pulled out into circular or oval holes. It is not uncommon to see such holes in pages or margins of medieval manuscripts.

It will now take five to six days before the parchment is finished. During this time, the parchmener carries out cleaning, purifying and drying operations, and all the time the skin is held under the right amount of tension.

At this stage the skin is tight, wet and rubbery, and ready for the parchmener to start the filling process. First the skin is scraped vigorously using a blunt semi-circular knife or lunellum.



The handles of the knife are set at right angles to the crescent shaped blade, and skill is required to avoid making holes in the skin.

Throughout this process the skin is kept wet by ladling on scoops of hot water. As the work progresses the parchmener is constantly tightening the pegs to keep the parchment tight. It is the combined effect of the mechanical scraping and the effect of hot water that removes any flesh still adhering to the skin, as well as squeezing out grease embedded in the skin.

The grain side of the lining is also scraped to remove any grain still remaining. This process is most critical in parchment making, as any grease remaining in the skin will yellow with time. The parchment will also be susceptible to deterioration as the grease or fat is a source of nourishment for bacteria.

The parchment is then left to dry in a heated room or oven. When it is dry it is then shaved.

The grain side is shaved with a sharpened semi-lunar knife to remove any grain still remaining. Any remaining grain has to be scraped away to prevent a glassy shine that would be unsatisfactory as a writing surface.

The skin is then coated with a layer of dubbin. This is left to dry in a heated room. The dubbin has a whitening and further degreasing effect. If an excess of grease is left in the skin, it can cause running and poor adhesion of ink.

After drying, the skin goes through a process called scalding where the dubbing is thoroughly removed. In this operation the skin is laid horizontally across a trellis and hot water is ladled over it. The skin is drained using the same semi-circular knife that is used during the filling operation, and causes further cleaning and degreasing. The skin is then left to dry in the drying oven.

The parchment is then cut out. Only the clean prepared surface away from the edges can be used. The fixing points around the edges remain, so the skin is cut out of the frame along the edges, keeping as much area as possible.

The manufacture of vellum

Vellum making is similar to parchment making but there are several important differences.

While sheepskins are selected in the pickled state, calfskins and goatskins are selected before unhairing. The skins are selected for colour, thickness, finish and size. Darker coloured skins will give

rise to darker colourations and the shading of the hair and skin pigmentation can be visible on the vellum.

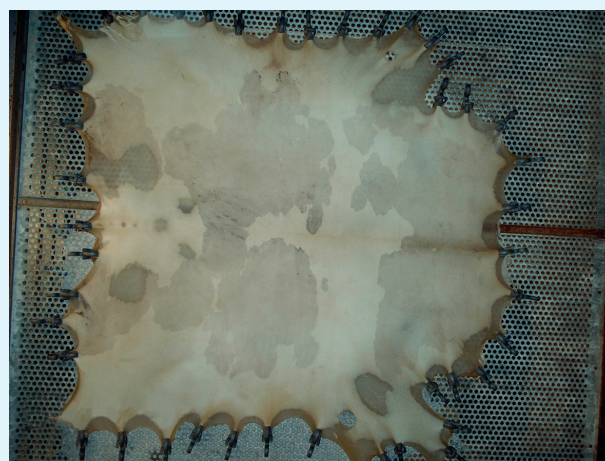
Following the removal of the hair there is a long re-liming process. The vellum is filled in much the same way as parchment, but more aggressively. This is especially so if both surfaces are to be used for writing on.

The shaving of vellum takes much longer than for parchment, and is the most skilful part of the work. It is easy to remove too much or too little, thus reducing the value of the finished vellum.

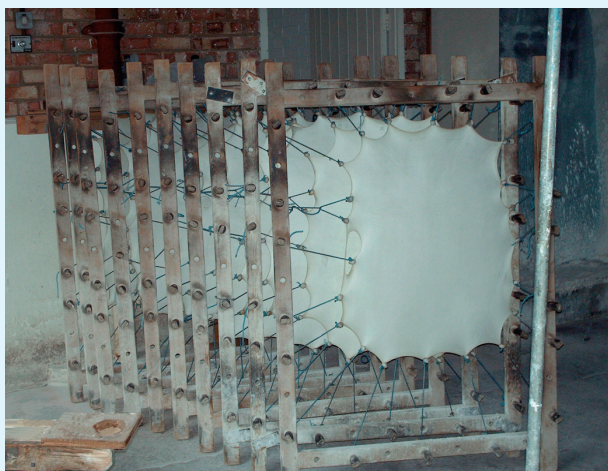
Vellum is also used for bookbinding and wall or furniture covering. The processes used are the same, except that the flesh side is not prepared as smooth as that for writing.

For both parchment and vellum making, good bleeding and drainage of the blood vessels is essential. This is to avoid the iron compounds present in blood reacting with the lime liquors to form darkly coloured pigments. For this reason the skins of animals which have been slaughtered by stunning and bleeding are normally used. In this way the blood vessels become colourless and difficult to detect.

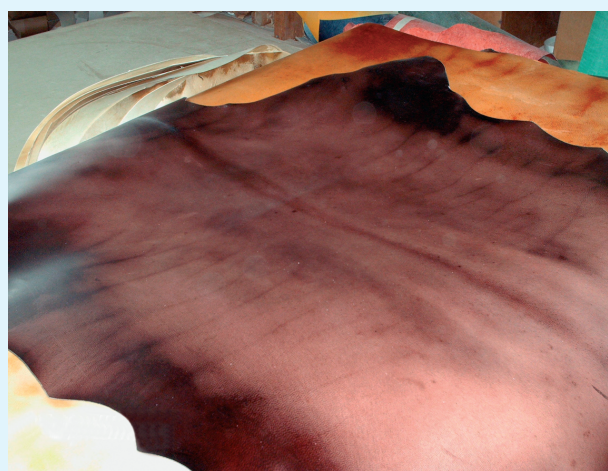
With animals, which have died through natural causes, the blood remains in the vascular system during processing, so that a



The effect of residual pigmentation on dried vellum.



The drying of parchment.



Dyed vellum for bespoke uses.



Technology

coloured pattern of arteries, veins and capillaries is left on the final vellum. In the last 200 years such veined vellum has been used as a covering skin in bookbinding. The colours and depth of shade attainable vary with the animal species and processing.

The preparation of parchment and vellum for writing

Further preparation of the writing surface must not alter the overall character—apart from possibly modifying the tonal quality—but it can, and is intended, to change the surface qualities.

When skins have been stored for some time, especially if they have been stored in a warm atmosphere, any grease or soluble protein still residing in the skin tends to come to the surface. This must be removed, as a greasy surface is extremely unpleasant to write on and cannot give crisp writing. In addition, pigment will not bind to it securely. Pumice powder is usually used to do this being mildly abrasive.

For ink, or colour, to flow evenly, the surface needs to have a fine nap. The colour or ink is more likely to adhere if it can slightly penetrate the nap, than colour which is merely sitting on the surface. This fine nap also helps colour to lie evenly over the surface.

This nap is prepared either by the parchment maker, or the scribe, or both. The degree of nap is developed by using a series of increasingly fine abrasive papers. The level of this nap is a personal preference of the scribe but is also determined by the medium to be used for writing.



Bookbinders snap up such skins for their unique character and beauty.

Panel 1: The properties of parchment.

Good parchment must be fine, that is, thin, strong and flexible and it must have a smooth or velvety surface if it is to be used for writing on. Parchment must be durable, of even opacity, relatively inelastic and of uniform thickness. It must be able to take pigments, inks and dyes in a suitable manner for writing. The grain side is usually darker in colour, creamy or more yellow. The flesh side is usually written on but both sides can be used. When a scribe is arranging the pages, he usually puts the flesh sides on facing pages and the grain sides on facing pages in order to achieve the same appearance.

Ideal storage conditions for parchment are temperatures between 0°C and 20°C with a relative humidity of 50–65%. Under no circumstances should parchment be allowed to become saturated with water, neither should it be allowed to dry out.

Panel 2: The major difference between parchment and leather.

Apart from not being tanned, the major difference between parchment or vellum and leather lies in the changes in the triple helix of the protein structure. Parchment manufacture, which subjects the three dimensional fibre network of the skin to the simultaneous action of stretching and drying, causes changes in the skin very different from those which take place in the manufacture of leather.

The dermal fibre network is reorganised, and then permanently set in this new and highly taut form by drying the protein of the skin to a hard glue-like consistency. The fibres of the skin are thus fixed in a stretched condition parallel to the grain. This results in very low or zero angle of weave, and involves a certain extent of breakage of fibres in the dermal network. This gives a taut, highly stressed sheet that is relatively inelastic, and has a stiff handle as well as being susceptible to cracking. As long as the skin remains more or less dry, these fibres will not revert to their original three-dimensional network.

It is this variation in processing that results in the fundamental difference between parchment and leather, and the extent of the fibre orientation depends on several factors. This includes the species of the animal, the age, the sex, the diet, as well as the intensity of the liming process and the tension and rate at which the wet, stretched skin is dried.

The fibre orientation of parchment is such that it tends to tear fairly easily into a number of thinner sheets. In comparison, leather cannot be torn in this manner because it retains its three-dimensional fibre network.

Contrary to leather manufacture, the lime used for unhairing is not subsequently removed. The presence of a large alkalinity may explain why parchment is not affected as much as leather is to the action of acid deterioration.

Parchment, as it is not tanned, is readily adversely affected by water. This very easily permits bacterial growth, which can degrade and even destroy the parchment.