



Christoph Weigel 1698



Diderot, Encyclopédie, Paris 1751-1766

Early Manufacture of Gut Strings

Several 14th century sources give information about the manufacture of strings. The following is a general summary of the procedures, which were tasks largely left up to the musicians, who were both makers and players of their instruments.

The recommended material was the gut of sheep or lambs, which was soaked in water or a caustic solution for at least one-half day, until the outer skin and/or fleshy particles separate from the intestines.

The cleaned intestines were then placed for two days in a strong caustic solution or red wine, then dried with a linen cloth. Depending on the diameter of the strings required, two, three, or four processed intestines were twisted together while wet. The resultant gut string was then stretched out to dry.

It was suggested that the strings be stored in a room that is neither too wet nor too dry, since gut strings break more easily due to excessive moisture or dryness.

A French source describes the detailed and time-consuming process of making thin gut strings:

- Sheep's gut is preferred to goat gut.
- The gut is washed, dried, twisted, honed, polished, drawn, and stretched.
- For the lowest string 2-3 intestines are used, and the appearance enhanced through treatment with saffron or white dye.

Strings obviously were not very durable then, as an old source advises the troubadour to loosen his strings whenever he put his fiddle down in order to counteract the tendency to break. This must have adversely affected purity and constancy of tone.

From the rare mentions in the older literature it may be deduced that thinner strings were customary at that time.

Modern Manufacture of Gut Strings

A comparison of medieval methods of string production with the manufacturing techniques used today reveals that the principal steps are the same. Lamb or small sheep gut is still held to be the best raw material. An appropriate intestine is 25 - 30 meters long.

The best strings have been made from Italian lamb intestines. Why Italian lambs? Because of their balanced nutrition, sheep grazing on the open ranges of central and southern Italy have fine white intestines of consistent structure. The fine structure and uncompromised freshness of Italian lamb intestines allowed them to be processed without splitting, a step which was initially neither known nor practiced in Italy. Italian gut was chosen for those strings which are most difficult to make, namely, the violin e^{''}-string and the gamba high d-strings. For these strings, the intestines of lambs born in May and slaughtered in early summer are to be preferred.

Unfortunately unsuitable treatment in the slaughterhouse often reduced the value of the raw material for string-making. Intestines washed in hard water lose their elasticity and become too hard to be softened again. Delay in cleaning leads to spots, while sun-drying burns the gut, and insufficient lubrication of the drying frame and lack of care in removing the intestines causes holes.

Strings

In Italian production, the intestines are removed soon after the animals are slaughtered, then cleaned and sorted. The thick, unpliant ends of the large intestines are removed, the small ends tied together, and they are immersed in fresh water for 6 to 24 hours, depending on temperature. The water is changed several times. The intestines remain in the water until fermentation allows the removal of the skin and inner mucous membrane. A constant temperature, not too low, is necessary to promote the fermentation process, which is why the summer gut (May - June) is considered the best. The intestines are graded at this stage.

The intestine consists of three layers. The middle of the three layers is a tough, fibrous muscular structure, which is wanted for the manufacture of strings. To separate its layers, the intestine is pulled between the rounded back of a knife and an inclined board, thin end first, which causes the outer skin to peel off in long strips and simultaneously removes the mucous membrane from the interior. The result is a transparent membrane.

Then follows the production of the actual string blanks. The process involves the use of several caustic solutions. In Italy, different solutions of water and wine yeast are used, the weakest using 2 kg yeast per 200 liter of water, the strongest, 10 kg per liter.

Initially, ten (usually) string blanks (German *Saitlinge*) are placed in the weakest caustic solution. The solution is changed four times daily, during which time the blanks are removed from the liquid, shaken thoroughly, and hung outside for about an hour. Each day a stronger solution is used, until the strongest is reached on the eighth day. During this process the string blanks become cleaner and clearer, swell up more and more, and finally, optimally swollen, they float on the surface of the water. When this condition is reached, the blanks are rinsed clear of all caustic solution in pure water, then immediately twisted together.

Because lambs raised on the steppes were frequently slaughtered, Italy always had a source of fresh material. The intestines did not need to be dried and later softened up again, as was necessary for production sites far from the slaughter houses.

So long as Germany lacked suitable raw material¹, superior quality gut strings were made primarily in Italy (Rome, Naples, Padua, Verona). Strings were also made in England, although the strings from there were dark and uneven, albeit very strong. They were mainly used for double basses.

The German process differs from the Italian only in the use of potash (potassium carbonate, originally from purified beech ash) rather than wine yeast, and the quicker caustic softening and cleaning process. In the Italian process, the warmer climate brings with it a greater risk of decomposition, and the intestines easily become unusable. Italian gut strings in general have the advantage of being more durable, with greater purity of tone.

In German production, the intestines, which are dried when received, are restored to something approaching their natural slippery condition through softening in a solution of potassium before splitting.

¹. 1861 first import from Russia by A. Dürschmidt, Markneukirchen