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The Craft of The Stringer

by Erik Roth

Nec habeo, nec careo, nec curo [I have neither property, want, nor care]

Motto of the Stringers

They shot so well in that tyde,
Theyr stringes wer of silke ful sure,
That they kept the stretes on every side
That batayle did long endure.

ADAM BELL

Originally archers made their own strings and some were also made by the archer's female relatives or lovers who could use their distaffs to advantage in spinning and twisting the strands. Women's hair might be used in emergencies, but after guilds came into being, most bowstrings were made by Longbow Stringers, and Stringers who made the strings for smallbows, stonebows, and crossbows. Bowstrings were variously made first of linen flax and later of silk or hemp though some crossbow strings were made of sinew.

Mediaeval bowstrings were probably usually of the single loop type, now known as the 'Flemish' string. LARTDARCHERIE refers to the single loop string tightly twisted of three strands of fiber or thread, the loop to be as small as possible and stretched with a stone weight. Ascham describes this type as consisting of a tightly twisted main portion with a reinforced rat tail at the lower end and a reinforced loop at the upper end. The lower end is affixed to the lower nock by a timber hitch that Ascham calls *the bending*, or perhaps in some cases by a series of half hitches as with Viking bows. The Susaaen bow had two holes in the bow tip in addition to a nock, and a Swiss wood sculpture of 1600 shows a string without loops or reinforcement bound through holes in the bow tips. Some American Indians used a similar method and Japanese traditional archery uses bowstrings

cut from a ball of uniform string tied at one nock by the same timber hitch used by early Europeans.

Crossbow strings of sinew or thread were made as double loop strings which may also have been used on handbows as pictured in the Luttrell Psalter. No ancient bowstrings have been preserved, even in the Danish bog finds.

Silk, the finest, strongest and most costly material came by the Silk Road through Rome or to Khazar trading posts in Viking Scandinavia although Viking bowstrings were normally of linen. Saracens preferred raw silk, the strongest natural fiber in the world. ROI MODUS specifies that the string should be of silk and nothing else for three reasons; because it is strong and endures a long time without breaking; because when the threads thereof are properly united together and well set on, it is so stiff and hard; that it will drive an arrow or bolt farther, and strike a heavier blow than any string made of flax or hemp: because it can be made of whatever strength and thickness the shooter pleaseth. Gaston de Foix tersely agrees that the string must ever be of silk. LARTDARCHERIE recommends strings of raw undyed silk and LA FACON found them especially suitable for flight shooting.

LA FACHON recommends carefully picked and well chosen female hemp, the coarse male hemp being worthless for this purpose. In England hemp was used from the mid 15th century and well chosen English hemp, not 'tubbed' hemp nor Colleyn [Cologne?] hemp was specified in 1499. English military archers were supplied with hemp strings for their yew bows. John Smythe in CERTAINE DISCOURSES writes; and the strings being made of verie good hempe, with a kind of water glewe to resist wet and moisture; and the same strings being by the archers themselves with fine threed well whipt, did also verie seldome breake. Surprisingly, although Chinese and Japanese stringers could easily obtain silk, they made bowstrings of hemp.

In deference to the guilds, Ascham expresses no personal preference. 'Now what a stringe oughte to be made on, whether of good hemp as they do nowe a days, or of flax, or of silke, I leave that to the judgement of stringers, of whom we must buy them.

Bowstrings throughout the world have commonly been about 1/8" in thickness, and the Mary Rose arrows have nocks 1/8" wide. The string must be strong enough not to break in use. Beyond that, mediaeval bowstrings were made thinner for distance shooting, thicker for slower but more dependable short range shooting. Thick strings are easier on the bow, absorbing some of the shock of the release. Let us consider the making of the 'Flemish' string of linen thread, as it was made by archers no longer able to get hempen 'Flemish' string of linen thread, as it was made by archers no longer able to get hempen ones from Belgium at the end of the nineteenth century. Old strings were taken apart to see how they were made. As the motto of the Stringers suggests, little equipment is needed.

Flax bowstrings had been used from the time of Edward I and into the Renaissance. Because flax has short fibers, it is best used in the form of thread. Barbour's linen shoe thread made in Ireland has been found convenient in sizes #10 or #12. If another size must be used, it should be tested for strength by tying the end to the hook of a spring scale and noting the reading when the thread is pulled to the breaking point. #10 thread breaks at about 10 1/2 pounds. Thirty strands make a string that, whipped, nicely fits a 1/8" nock and is strong enough for a 50 pound bow. It is advisable to make the string of strength three times the draw weight of the bow to allow for the stress of arrow release or for possible uneven tension of threads.

LARTDARCHERIE specifies a three strand string which is more nearly round than a two strand one, allowing a proper fit for each nocking. Cut three skeins of 10 strands each 15" longer than the length of the bow between nocks and six strands a foot long. Lay the ends flat and scrape with a knife to taper them, then, holding the skein and including the short strands, pull out the threads to form 8 inches of even taper and being sure the threads are all parallel. Lay in three additional threads 8" long in each skein, likewise tapered, to reinforce the nock and wax the skein ends heavily for about 20 inches. At this point it is helpful to lay in a coloured thread the length of each skein as a tracer, to aid in getting an even twist.

Now hold all three ends parallel and close together with thumb and forefinger of the left hand eleven inches from the free ends which point right, and twist three inches of rope. This is done by taking the skein farthest from you with thumb and forefinger of the right hand, and twisting hard clockwise while bringing it across the other two skeins and tucking it under your left thumb. When you have three inches, bend the little rope into a loop. Wax the short ends point together with the corresponding long ones middle one first, and continue twisting the rope until the ends of the short strands have been twisted in. Tie a temporary piece of thread around this to prevent untwisting. If the loop is to be used with a round bow tip or horn nock with a side notch it will have to fit more closely as LARTDARCHERIE suggests, especially if the string is of silk, because it will stretch considerably with use. This must be allowed for or the loop will not remain in place.

Hang the loop on a hook or nail, and comb out the strands, first with the fingers, then with a coarse comb. Wax the three strands to the end. Beeswax or a mixture of beeswax and resin like that used by archers would have been used. Three parts wax to one part resin is good. No thread should cross another. Roll each strand between thumb and forefinger to get it round and twist all three clockwise. If the tracer thread is used it is easy to see if the twist is the same in all three strands. Now line up the three strands parallel, and twelve inches from the end, lay in another three 12 inch threads in each strand and begin another rope, the *bending*. When you get to the very end, tie an overhand or a wall knot. Put the loop back on the hook, give the string a good pull, and twist from right to left until it makes a complete turn on itself for every inch or so of its length. The string should now be set on a bow to stretch it, and a temporary thread tied where the end emerges from the timber hitch. Linen stretches very little.

Now with a piece of thin leather folded over the string, rub briskly to smooth the string and melt the wax into the fibers. After removal from the bow, the end beyond the bend can be untwisted, the strands tapered by cutting threads at intervals, retwisted and tied off. LARTDARCHERIE suggests an inspection. *And if you wish to know if a string is good, untwist the middle of it, and if the three strands are separate and distinct, it is a*

good one, provided always that when the string is twisted up again, it is hard and firm, for the harder it is, the better it will be.

A double loop string such as a crossbow string is made by winding a thread around two pegs until it reaches the desired thickness, then tying the two ends of the thread. The distance between the pegs is crucial as there is no way to alter the length of the completed string except by twisting the entire string, which is sometimes impractical. Crossbow strings had extra looped skeins added as reinforcement at the loops. These skeins were securely whipped to the string at both ends by a series of half hitches, the whipping thread then bound to form the loop and spiraled down the tautened string to the middle, at which point it was closely whipped in a long enough section to prevent chafing of the string against the tiller.

While linen strings are good and serviceable, I have found silk strings so much stronger and more pleasant to work with, that I would prefer to make them exclusively if silk were more readily available. They are stronger not only because silk has a greater tensile strength for its size and weight than linen, hemp, or any other natural fiber, but also because the smooth threads may be more effectively combed out to get equal tension and because the individual thread that may be under greater tension will stretch a little more rather than break. One must buy strong thread such as is used by shoemakers, and test its breaking point on the spring scale to determine the minimum number of threads necessary. The bowstring is made much as a linen one, but if thin and made for a strong bow, should have enough extra reinforcing threads at loop and tail to avoid unduly marking the bow and the loop must be made small enough to take stretching into account, if silk, about the size of a pencil for a sidenock on a slim tipped bow. It is also necessary to allow for string stretch which can be as much as 25 percent. I get about 10 percent. Simply form the string shorter but with a longer area of reinforcement in the tail. After a short period of use the string will have done its stretching and will retain its length. Then the part of the tail past the bending can be untwisted, shortened, tapered and retwisted. The drawback of silk strings is their noise. A thin string on a powerful bow twangs like a

great harp. I have also made strings of raw silk right off the cocoon, and that is more of a challenge.

The formula of the glue used on Flemish strings in the nineteenth century was lost upon the death of the last longbow stringer in Belgium who knew the secret. He took it with him to the grave. However, a thin solution of hoof glue which is more flexible than hide glue has been used to stiffen bow strings. This may be the *water-glewe* referred to by Smythe. As it is not waterproof, this could explain the need for archers to keep their bowstrings dry.

The composition of the gum and the *water-glewe* may have been similar to the mixture used on bowstring loops by the Turks, the silk bowstrings themselves being wound directly off the cocoon around two pegs to the thickness "of a goose quill," like the double loop bowstring. The loops were tied into the ends of this skein by a special knot. The recipe is given by Kani, author of an old Turkish book on archery.

5 parts beeswax

10 parts resin

20 parts fish glue

The fish glue could be used by itself if it had the right properties. Like the other ingredients the fish glue would also be waterproof if it were isinglass, made from the head of the sturgeon. A finish is applied to the main body of the string but not the loops or rattail. Mediaeval archers were concerned about their bowstrings getting wet. Elizabethan gun proponents claimed that rain made the strings slack and the Genoese crossbowmen at Poitiers were said to have had this problem, but linen and hemp are stronger wet than dry, and excessive dryness is a danger to bowstrings.

Some modern bowmen varnish their bowstrings while others find beeswax sufficient. The 15 th century Hastings manuscript advises that arming points made of *fine twine like that used to make crossbow* stringes, *must be wexid with cordeweneris coode*, so they would *neither recche nor breke*. The *coode*, used by leatherworkers to prevent stretching or breaking may have been used on bow strings. tt may have differed from *sowters code*.

Coode or code was made up of two or more of the ingredients: pine pitch, rosin, beeswax, oil. Wax was not always included but Drayton's poem says *well waxed strings*.

The string is now complete except for whipping which was done by the archer rather than the stringer.

