APPENDIX 1: TOWARDS A MORE MEDIEVAL ARCHER -Improving Your Recreation of the Middle Ages on the Range

***Philologus**: What is the chief point in shooting that every man laboureth to come to?*
***Toxophilus**: To hit the mark*
***Phi.**: How many things are required to make a man evermore hit the mark?*
***Tox.**: Two, shooting straight and keeping of length*
***Phi.**: How should a man shoot straight, and how should a man keep a length?*
***Tox.**: In knowing and having things belonging to shooting; and when they be known and had, in well handling of them; whereof some belong to shooting straight, some to keeping of a length, some commonly to them both, as shall be told severally of them in place convenient.*
***Phi.**: Things belonging to shooting, what be they?*
***Tox.**: All things be outward; and some be instruments for every sere archer to bring with him, proper for his own use: others be general to every man, as the place and time serveth.*
***Phi.**: Which be instruments?*
***Tox.**: Bracer, shooting glove, string, bow, and shaft.*
***Phi.**: Which be general to all men?*
***Tox.**: The weather and the mark; yet the mark is ever under the rule of the weather.*

Toxophilus, 1544

The most important points to be considered when trying to improve the recreation of medieval archery within an SCA setting may be grouped in a similar way to those described above in Ascham's treatise on the how's and why's of shooting (which was structured as a discussion between Philologus, a lover of learning, and Toxophilus, a lover of the bow). Firstly, many improvements may be made by choosing equipment which is more closely suited to a person's medieval persona, such as the substitution of a shooting glove or thumb ring for a leather or laminated finger tab or the use of a Mongolian or Arabic recurve or traditional English longbow rather than the more modern composite take-down recurve or 'American-style' flat bows. However, similarly significant changes may also be made, at little or no financial cost, by individuals adopting more medieval shooting techniques and by designing ranges that are closer in a style to those of the Middle Ages.

EQUIPMENT

One of the most tangible ways of moving towards a better recreation of the Middle Ages on the archery range is in the choice of more 'authentic' equipment. As mentioned above, such choices work best when they are fitted to the persona using them. It would have been equally incongruous for a Saracen noble to have been shooting a European longbow as it would have been for a Englishman to have shot a Arabic recurve, although both may be considered correct within the period of the SCA. In the following discussion, I shall concentrate on the equipment used by archers in Western Europe and particularly England. However, I would thoroughly encourage anyone with personae from other regions to look more closely into the equipment and techniques used in those cultures and make the effort to adapt their archery towards it.

Within most of the Middle Ages, bows in western Europe (and particularly in England) served a dual role as weapons of war (as which they developed a somewhat legendary status) and of peace (with uses both for hunting and amusement), with an accompanying difference in the equipment and techniques. By far the best information about archery during the time frame covered by the SCA comes from two distinct sources from close to the end of the period. From continuing studies of the wreck of the *Mary Rose* (Henry VIII's flagship which sank near Portsmouth, England in 1545 carrying soldiers to repulse a French invasion and 250 bows, 120 bowstrings and 8000 arrows) it is possible to form an accurate picture of the archer at war, whereas the contemporary (and at times highly verbose) account of recreational archery by Ascham informs us about both the equipment and methods of the gentry archer of the day. Although much of the romance of medieval archery is associated with its use in war, few modern archers have either the physique or training to shoot a war bow (whose pull is estimated to have often exceeded 120 lb.) and most archers tend to recreate the more peaceful aspects of shooting within the SCA, with a greater focus on accuracy at short range and the use of lighter equipment and more personal protection. Despite the change in emphasis, it should be possible to emulate either aspect of the archery of the Middle Ages with a little adaptation.

The Shooting Glove

Although Ascham describes shooting gloves as part of an archer's equipment and such items appear in a set of accounts for the English royal household following the purchase of archery equipment for Anne Boleyn (c. 1534), there are few references to shooting gloves in earlier documents and gloves are rarely shown in illustrations of archers at war, suggesting finger protection was not commonly used by the medieval archer.1 In the rare illustrations that show archers wearing hand protection, it almost always takes the form of a tightly fitting 'full' glove, which covers the entire hand and may have had additional leather pads sewn to the fingertips. Only one illustration of anything that resembles a 'skeleton' glove (similar to the modern shooting glove, which consist of pouches that cover the drawing fingers and are joined to a wrist strap via thongs) has been found to date (in the Zamorra Tapestry), suggesting that, although used, this type of glove was very rare. Curiously, despite its simplicity, the ubiquitous flat leather tab with holes cut in for the shooting fingers does not appear to have been used until much later (late-18th century), making it 'incorrect' for the SCA period.

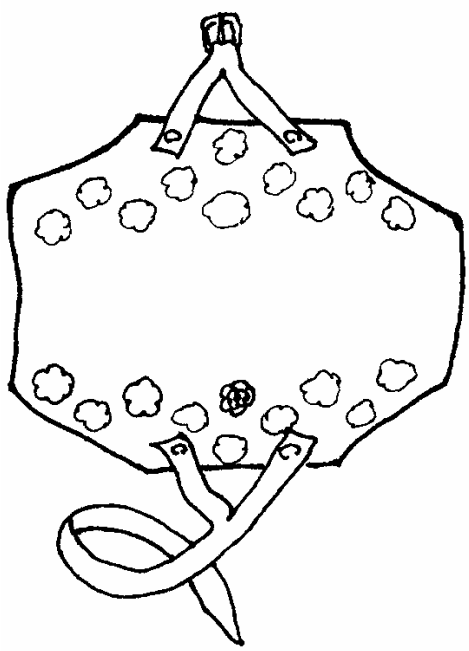

Figure A1.1 A bracer in the style of those found on the Mary Rose and typical of those used through much of the Middle Ages. Note the punched designs on either side of the central strap.

The Bracer

The bracer performs the dual task of protecting the bow arm from accidental blows from the string and keeping any loose clothing from catching on the string during shooting. Although there are many illustrations of archers dating from 1000 AD through to the end of the SCA period, most are of archers at war and commonly show the archers wearing plate armour on their both of their lower arms. The use of bracers may have been uncommon during the early Middle Ages, as evidenced by the absence of any depiction of arm guards on the archers in the 11th century *Bayeux Tapestry*. However, an illustration of men practising at the butts in the *Luttrell Psalter* (c. 1335) shows the archers wearing small rectangles of leather or horn strapped to their forearms.

Twelve bracers (eleven of leather and one of horn), which may represent the type common in the Middle Ages, were recovered from the wreck of the *Mary Rose*. Those of leather were basically rectangular, slightly longer than wide and frequently had the corners rounded off (Figure 1). All were decorated with heraldic designs ranging in complexity from elaborate engraved coats of arms to simple punch marks positioned randomly on either side of the centre of the bracer where the string passed. The bracers all fastened with a single strap and buckle, commonly with both tongue and buckle straps in a 'Y' shape, with the two arms attached to the main piece by rivets. The horn bracer was mostly similar to the leather variety, except that the elbow end was more rounded than the wrist end and it was rigidly set in a 'gutter' shape.

The String

John Smythe, writing in the mid to late 16th century, describes "strings being made of verie good hemp, with a kind of glue to resist wet and moisture and the same strings, being made by the archers themselves with fine thread well whipt, did also very seldom break". During the Middle Ages, hemp was the strongest and least elastic fibre available to ropemakers and was the standard material used for the rigging of ships. However, because hemp is a natural fibre and is therefore prone to rot, great care had to be taken to ensure it did not get wet. On ships this took the form of coating the fibres, then binding them tightly in thread. For bows, the string appears to have been simply soaked in glue. Although this afforded some protection against moisture, care had to be taken to prevent the string from drying out, when the glue would be prone to cracking. Although most medieval strings may have been made from hemp, Ascham also makes

1 The late appearance of shooting gloves appears to coincide with the change in the dominant use of the bow from a weapon of war to a leisure item, with an accompanying change towards a more gentile archer. Whereas before the mid-16th century most archers were soldiers (and as such may have been expected to have shot sufficiently often that they developed thick calluses to protect their fingers), over the last half of the 16th century the use of the bow as a weapon declined significantly and many archers shot for pleasure alone and required extra protection from the string.

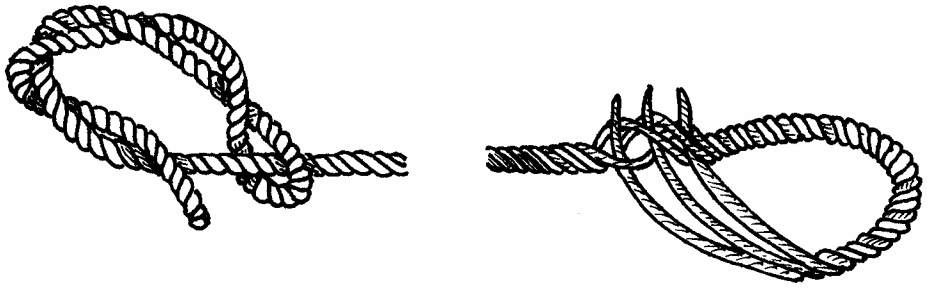

Figure A1.2 The upper laid-in loop and bowyers knot used to attach the bowstring to the nocks on the bow.

reference to strings of flax (linen) and silk, which may have been similarly strong, although the availability of the latter to most military archers may be doubtful.

Like all ropes, bowstrings are made by twisting together individual fibres into strands, then laying these strands together to form the string. Bowstrings were either made 'double-looped', with a loop at each end for the bow knocks, or 'single-looped', where one loop fitted over one of the knocks (normally the top) and the loose end was tied in a simple timber hitch, known as a 'bowyers knot' (Figure 2). Because the same single-looped string could be made to fit bows with a range of lengths by adjusting the position of the lower knot, it is likely that most of the mass-produced strings for use in war were of this design. For bows used by gentry for leisure, however, it is possible that the strings were double-ended and made for an particular bow because time and cost were not as important.

From the description by Smythe above, it appears that the modern practice of wrapping the central portion of the string (serving) with thread to prevent chaffing from the arrow knock or archers' fingers was in use during the Middle Ages. Although no strings have survived from the period, arrows from the *Mary Rose* indicate that they fitted strings that did not exceed 1/8" in diameter, and so would have resembled the thickness of many modern strings wrapped in serving thread.

The Bow

Although a variety of designs of bows may have been used in western Europe during the Middle Ages, including composite bows of an Eastern design used by mounted Roman archers and the relatively short bows that appear to have been used by the Norman archers in the Bayeux Tapestry, evidence from both archaeological finds and pictorial representations of archers from throughout the period suggests that the majority of the bows were longbows of a common design and similar to that prescribed by the British Longbow Society.[2] While many of these bows were cut from logs of yew, traditionally the best wood for the purpose (on account of its combination of heart- and sap-wood of contrasting properties to produce a natural composite of excellent strength and efficiency), many bows were also made from 'baser' woods, such as ash, elm or hazel for reasons of their greater availability. During the earlier parts of the Middle Ages (when the bow was still considered a country-man's weapon and most archers were either hunters or levied soldiers who supplied their own weapons), it is likely that native timber would have been used for the construction of most longbows for both war and peace. However, with the increasing use of powerful bows for war and the initiation of a more standardised ordinance in the armies of the 14th century, yew bowstaves started to be imported into England from continental Europe, initially from Spain and later from Venice (Italy), Salzburg (Austria), Basle (Switzerland) and Dansk (Poland). Whereas the staves from Poland were probably no better than those from England and sold for no more than £4 or £5 per hundred, being "of hollow wood and full of sap by reason of the coldness of [that] country", those from Switzerland and Austria fetched between £12 and £16 per hundred and those from Venice considerably more, being regarded as the "principle finest and steadfast woods by reason of the heat of the sun, which drieth up the humidity and moisture of the sap".

Contrary to popular opinion, the traditional longbow was not necessarily fashioned from a straight piece of wood, but may have been curved forward when new to produce a mild reflex owing to the natural tendency for the heartwood to expand during seasoning. This curvature would have initially worked to increase the efficiency of the bow, but over time it would have straightened as the heartwood became compressed and eventually the bow would have taken a curve in the

2 The BLBS defines a longbow as being of a length greater than 5' and having a stacked belly (i.e., a deep, 'D'-section rather than the rectangular section characteristic of traditional 'American' bows), with horn knocks and limbs made of wood only. The thickness of the limbs, measured from belly to back, should at no point be less than three-quarters of the overall width of the limb at the same point. At the arrow pass (where the shaft flies past the bow on release), the bow shall be no narrower than at any point along its length. There should be no arrow rest built into or attached to the bow.

opposite direction and 'followed the string'.[3] As the curve became more pronounced, the bow would have lost progressively more power until eventually it was too weak to be shot well enough and so discarded or passed on to a youth.

From numerous illustrations and the bowstaves recovered from the *Mary Rose*, it appears that no handle binding was normally used on the bow. Instead, in order to mark the arrow pass, the bowyer would often place his maker's mark at the centrepoint of the bow, which the archer would have used as a reference point by which to place their hand. At this time, both limbs of the bow appear to have been similar, with no recognisable upper and lower limb, enabling the bow to be shot either way up and with the left or right hand.

Reproductions using the dimensions of the bows recovered from the *Mary Rose* suggest that the draw-weight of the bows normally ranged from about 100 to 140 lb, but occasionally may have exceeded 180 lb. Modern test have shown that the optimum draw weight of a longbow is approximately 120 lb, above which no significant advantage is gained. It appears that medieval bowyers were aware of this. In almost all cases, the longbow in use during the medieval period was considerably heavier than most used for either re-creation or sport today, which are mostly in the range 35 to 70 lb.

If you wish to make the move towards shooting a traditional longbow and either wish to make your own bow or purchase one from a traditional bowyer, then there are currently several experienced bowyers within the Kingdom of Ealdormere, as well as a number of useful books which will take you through the process (see Sources). Because traditional bows are in greater demand for re-creation (as well as recreation) in the UK, however, it may be worth looking there when considering your purchase (for a list of UK bowyers, see the section on suppliers elsewhere in this manual). In the long run, a traditional bow need not cost much more than buying a new modern recurve and will go a long way towards an appreciation of the archery in the Middle Ages.

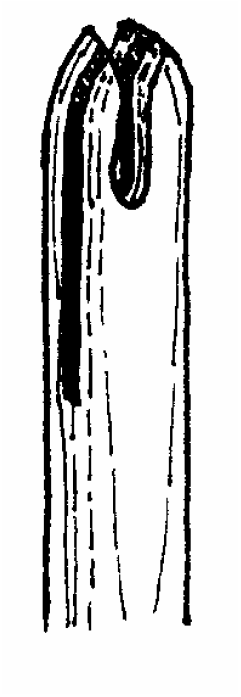

Figure A1.3 Horn reinforced half nock commonly used on war arrows

The Arrow

The final item mentioned by *Toxophilus* in Ascham's discussion of the ways to better shooting is the shaft (taken to mean the arrow, which comprises the shaft, nock (notch to go on the string), feathers and pile (arrow head)), the purpose of which was comparable to that of the modern armour-piercing missile: to carry a large and heavy warhead towards a metal object (man in armour), pierce that object and do the maximum damage possible.

In order that the maximum amount of weight could be carried at the tip, most arrows were constructed using large diameter shafts (up to 3/8"), which could carry the largest piles, and were normally made from light straight wood such as aspen or poplar. When grown in wet conditions, such woods are not only easily propagated but also grew extremely quickly. Although ash arrows also appear in lists of medieval ordinances, and Ascham actually recommends them for war arrows owing to their greater weight (supposing that this would make them hit the target harder), ash is not naturally as straight as poplar and the lack of suitable wood may have significantly limited their use. In addition to aspen and ash, Ascham also recommends alder, birch, elder, willow and the heavier hornbean as being suitable for the production or shafts, all of which were recovered from the *Mary Rose*.

Despite popular opinion, the length of a medieval arrow was not a 'clothyard' (a popular literary invention), but ranged from as low as 27" to over 32".[4] In order to ensure consistent shooting, however, most war arrows were probably made to a standard design and length, which may have been a legal standard, or may have just been to a government regulation. Because they were issued, these arrows were known as 'livery' arrows and were probably produced by the tens to hundreds of thousands.

Most arrows started off as roughly square billets of approximately the correct length, which were quickly made into cylinders by repeatedly planing off the corners to produce an 8-, then 16- and finally a 32-sided rod. The nocks were normally cut as parallel-sided slots into the shaft at right angle to the grain (Figure 3) and approximately as long as the width of the arrow. In

3 Because the amount of compression is proportional to the amount of time the bow spends drawn and the bow actually gets weaker with time when at full draw, most longbowmen spend as little time as possible at full draw in order to maintain consistency and preserve bow life.

4 The distribution of 2500 arrow lengths from the *Mary Rose* shows two peaks, one at 29.5", corresponding to a draw length of ~28", the other at 31.5", corresponding to a draw length of ~30", with the longer arrows outnumbering the shorter ones by about 3:1.

order to prevent the arrow splitting when shot, a sliver of cow horn would often be inserted into the end of the shaft parallel to the grain (i.e., at right angle to the knock) before the knock was cut.

The feathers were cut from the pinion (flight) feathers of a goose, with shapes that ranged from simple wedges to more rounded outlines that approached the parabolic fletches common today (see the famous illustration in the *Luttrell Psalter*). Although Ascham praises the virtues of a cock feather (a feather of alternate colour to the others, used to "give a man warning to nock right"), most illustrations of medieval archers show all three feathers as being of the same colour and mostly white. It is not clear whether this is because grey goose feathers were most abundant or that feathers of different colours, but similar stiffness, were hard to match up. Feathers were both glued and then tied onto the arrow, with the whole shaft below the feathers coated with glue such that both the thread and base of the feather lay in the glue and were effectively waterproofed. The lengths of the fletches were considerably greater than they are today. One 1475 supply list contains entries describing 350 sheaves of arrows with 9" feathers, 1,750 sheaves with 8" feathers and 7,990 sheaves with 7" feathers (each sheaf is 24 arrows). The different lengths of feathers may have been related to different types of heads, with larger feathers being required to stabilise arrows with heavier piles.

Medieval arrowheads ranged in both size and design depending on the use to which they were to be put. Hunting arrows were made using broadheads with wide cutting blades and barbs (Figure 4a) and were designed to remain in a wound (once they had entered a sufficient distance) until they brought down the animal. In contrast, thin needle-like bodkins (Figure 4b) were used for war, where an arrow needed to possess lower wind resistance and a sharper point in order to penetrate the armour. It is likely that many arrows would have been produced without heads and the heads were only loosely attached at the time of use by being jammed on or held with wax. In such a way, an arrow may be easily dislodged from where it was embedded, or (should the arrow penetrate armour beyond the back of the head) the heavy head may become detached from the shaft and continue further into the target to inflict greater internal damage (a process comparable with that of modern anti-tank weapons). For harassing the enemy at a longer range, an archer may have used lighter barbed war-heads (Figure 4c). Such war-heads would have been very effective against both lightly armoured men and horses and appear to have been the most common type of war-head produced.

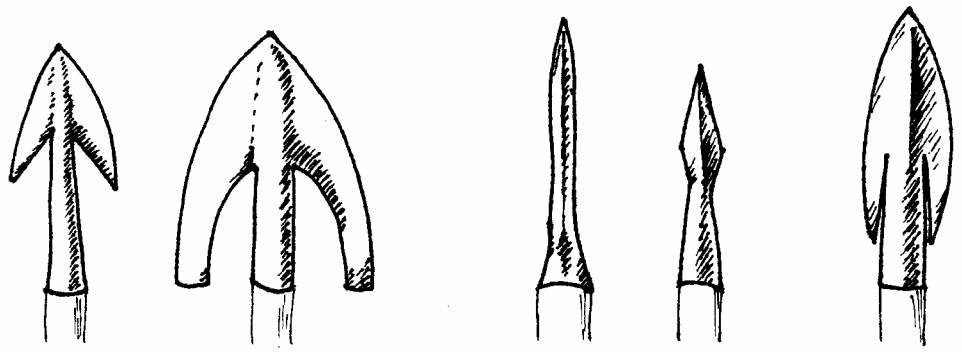

Figure A1.4 Medieval arrowheads typed according to the Museum of London catalogue: a) broadhead arrows used for hunting, b) long and short bodkins for use against metal armour, and c) a lighter barbed war head for use against light armour or for harassing an enemy at longer ranges.

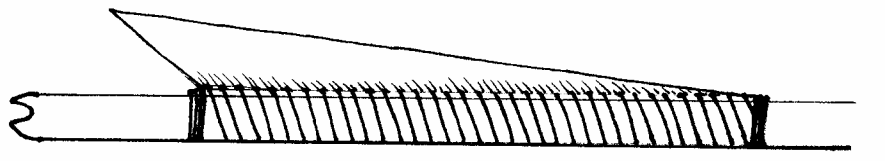

Figure A1.5 Detail of a tie-down fletch (other fletches not shown for clarity). The fletch is securely tied down at each end, as well as along its length, with approximately ¼" between windings.

There are a number of ways to make arrows that more closely approach the look and feel of medieval arrows, including: (1) using only natural coloured feathers (white, grey, black or brown); (2) using longer feathers bought as uncut full-length feathers (normally about 10" long) and cut down to the desired length and profile; (3) after gluing down the feathers, tying them down using strong thread and whipping them front and back, as shown in Figure 5; (4) replacing

colourful plastic knocks with ones of a more natural colour, or better yet, cutting self-knocks into the ends of the shafts. It is advisable to do this before the shafts are cut to length, so that if it goes wrong the failed nock can be cut off and another nock made. If anything, the nocks should initially also be cut slightly narrower than the string, so that they can be made wider if necessary.

Quivers, Bow and Arrow-Bags

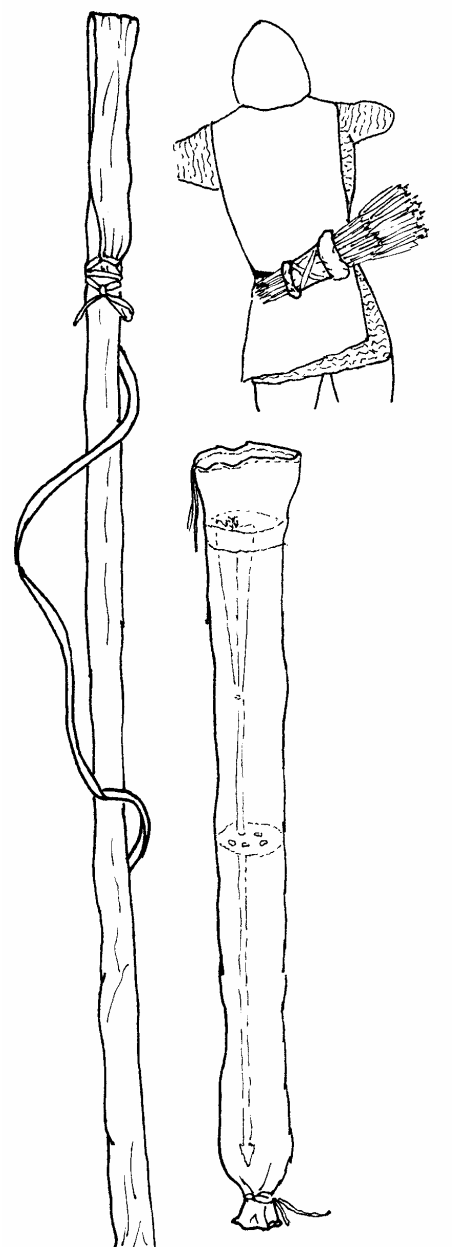

Figure A1.6 Cloth bags for carrying bows and arrows. Note stiffening at each end of the arrow bag and central leather spacer holding the arrows apart. The top of the arrow bag may be rolled down to allow rapid access to its

The final thing an archer may need to complete their equipment is a way to carry the bows and arrows when not in use and a holder for the arrows during shooting. In general both these problems were solved in the simplest way. Through most of the medieval period, bows and arrows would have been carried in plain linen or canvas bags that were slightly longer than the items they contained and were secured at the top with a draw string (Figure 6). To ease carrying, the bow bag may have had a shoulder strap added; in most cases the archers would have carried their bows with them into battle. Arrows, on the other hand were carried into war by the wagon load and supplied to the archers in the field. The archers would not have carried quivers, but would have either tucked the arrows into their belts behind them (either in the cloth bags or loose), or stuck them in the ground ready for use. It may be that the dirt rubbed into the war heads by this latter method was cause of the rumour that the English poisoned the tips of their arrows so as to prevent the wounds from healing. In the rare examples of medieval quivers in use (e.g., the Norman archers in the *Bayeux Tapestry*), they appear to have also been cloth or soft leather bags attached to the archers belt and about 2-3" shorter than the arrows. Only during the 16th century did quivers as we know them start to be seen in illustrations of archers, and then predominantly among the gentry shooting for pleasure. The back-quiver so beloved of television and film makers is *never* seen in medieval illustrations.

SHOOTING TECHNIQUE

The needs of archery in the Middle Ages were significantly different from those of the modern target archery, leading to marked differences in both the stance and technique. Great importance was placed on strong shooting and long range, leading to the use of powerful bows and the need for considerable practice with such weapons to achieve the strength and skills necessary for war. In order to ensure this, numerous English kings passed laws to promote the practice of archery, with accompanying attacks on dice and other games which distracted men from archery. In 1512, Henry VIII passed an Act that "under penalty on default of 12d per month, all subjects under 60, not lame, decrepit or maimed, or having other lawful Impediment....to use shooting in the longbow", followed by a second Act in 1542 which stated that "no man who had reached the age of 24 years might shoot at any mark at less than 11 score distance (220 yards)".

The large amount of force required to pull the average medieval longbow and the emphasis on longer ranges lead to at least three two notable differences between the medieval style of shooting and that used today. Firstly, in order to draw back the bow, the archer did not use the strength of his arms, but the greater strength of his back and shoulders, and laid his body into the bow while shooting. Although this should be how any archer shoots, it is commonly not the case for many modern archers learning to shoot or practising without tuition. Secondly, whereas most modern archers draw their arrows back to a constant 'anchor-point' on their face or chin, in illustrations of English archers painted by their contemporaries, the helmets worn by the archers are forcing them to draw back to a point that is further away from their face and located between their ear and chest (so-called drawing 'to the ear'). In order to offset the movement of the anchor point away from the face, the bow hand would have had to move in a similar direction. This difference in anchor point would have prevented the archer from using a the modern 'point-of-aim' technique for aiming the arrow (i.e., sighting on the tip of the arrow

when fully drawn and lining this up relative to the target), but must have been shooting far more instinctively, much as a person would throw a stone without having consciously made calculations of the necessary distances, weights and angles. Finally, whereas most modern archers are trained to shoot with both feet at right-angles to the target, medieval archers are commonly drawn with their leading foot towards the target, which brings the shoulder of their string hand around and increases the clearance between the string and chest, which may have been especially important if the archer was wearing padded clothing or a breast plate. Because these changes in stance would have had the effect of decreasing draw length, the eventual length of the archers draw may have not been significantly greater than that of a modern archer, despite drawing 'to the ear', resulting in the use of similar arrow lengths (as described above).

Although the three finger release was used during the Middle Ages (and Ascham instructs in its use), it appears considerably more common for archers to use two fingers to draw the bow. While such a grip gives a sharper release, it also requires greater strength of the archer. Recognising the importance of these two fingers to the English archers, during the hundred years war of the 14th and 15th century, the French threatened to cut off the drawing fingers of any archer they captured.

Finally, it needs to be pointed out that an archer (whether medieval or modern) always 'shoots' or 'looses' his bow, he never 'fires' it (which would happen if someone were to put a match to it). Despite the growing use of cannons during the later Middle Ages, the idea of any combustion when a weapon was discharged would have been uncommon at the time and the verb 'to fire' would certainly not have held the same meaning it has today.

RANGES

Three forms of archery practice appear to have been used during the Middle Ages. Probably the most common of these was 'shooting at the butts', in which the archers shot at a target of some kind (the mark) that was fixed to a mound of earth (the actual butt), most of which were probably located close to the local church in order to facilitate regular practice on Sundays (as proscribed by law). An example of this is illustrated in the *Luttrell Psalter*, in which one of the archers has just placed an arrow in the centre of a white circlet or garland placed on the butt as a target. Another popular method of practice was wand shooting, in which the aim was to hit a narrow piece of timber located in front of the butt and apparently padded in some way, possibly to prevent damage to the arrows. An example of a typical wand shoot may be seen in the mid-16th century painting of the *Fair at Hoboken* by Breugel (in which the archers appear to have scant regard for the safety of the spectators and livestock). Each of the forms of practice described above are two-way shoots, in which the archers would shoot at one butt, recover their arrows, then shoot back at the other. Although this may imply that the targets were fairly distant from each other (remember that by law an adult archer should not be shooting less than 220 yd), the archers are shooting at a nearly vertical target and appear to be aiming at a relatively low angle to the horizontal, consistent with the high poundage of the bows. The third form of practice was the clout shoot, in which the aim was to hit or come close to a mark on the ground at a specific distance (the prick), simulating an advancing enemy. For clout, the archer would be expected to be shooting further and at a considerably higher angle.

While it is not possible to construct earthen mounds at most event sites, with a little imagination it should certainly be possible to produce variants of all three methods of practice used during the Middle Ages and make them part of the shooting at an event. In order to reproduce the simple shooting at the butts all that is required is a ring or mark that may be attached to (cardboard) butt on the ground. Similarly, a wand shoot may easily be recreated by either sinking a plank in the ground, or placing it on a base at suitable distance and having the archers aim to hit it.

Although none of the standard traditional methods of practice are as spectacular as some novelty shoots that may be devised, by the use of natural materials and traditional designs by the marshal in charge and a little effort on the part of the archers to improve their equipment and technique, it should be possible to re-create a scene that resembles that of an English village green on a Sunday afternoon in the Middle Ages at many SCA events.