ADVANCED
THROWN WEAPONS INSTRUCTIONS
FOR
AXE, KNIFE, JAVELIN AND THROWING STICKS

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ACKNOWLEDGEMENTS

A study of thrown weapon types and throwing techniques is not possible without examples, insights and suggestions from many people. Consistently throwing an axe, knife or javelin accurately is a highly dynamic process that melds personally developed techniques and hard-won skills with a weapon that matches the thrower’s physiology and preferences. Compiling instructions that can help all styles and types of throwers is the goal of this study, and many throwers (both knowingly and unknowingly) have contributed to this goal.

Many thanks to the thrown weapons folks in the Society for Creative Anachronism (SCA) who have shared the insights and techniques they have gained from constant experimentation on the throwing range. Thanks also to the folks (total beginners and experts alike) who have shared without knowing it, as I observed your throwing techniques and styles during practices and competitions.

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Thank you ALL for giving me the insights that make up this study!
PREFACE

My experience as a thrown weapons marshal in the Kingdom of Artemisia suggests that most Society for Creative Anachronism (SCA) members are not interested in the finer points of the sport. Most do not want to invest the time it takes to become skilled with thrown weapons – they are satisfied to depend on natural talent and just have fun.

Some throwers, however, realize that consistent accuracy with thrown weapons (axes, knives and javelins) is a very subtle and difficult skill. These throwers are intrigued with the sport and strive to improve their skills, not only for better scores in competitions but for a sense of personal accomplishment. These throwers can benefit from a detailed analysis of throwing techniques and equipment, and that is the goal of this study.

I tell my beginning students that there is no one correct way to throw – you can learn to throw an axe, knife or javelin in any manner you like IF YOU ARE WILLING TO WORK AT IT. Students are told that there is no right way or wrong way to throw, but that there are going to be better ways or poorer ways. A ‘poorer way’ is usually going to be harder to learn initially, more difficult to be consistent with, and will be easier to forget without constant practice. Finding your personal ‘better way’ – accurate throws that fit your temperament, physiology and style – is the goal of a dedicated thrower.

The techniques described in this study are NOT the only way to throw, and they may not be the best way for YOU to throw, but a discussion of basic throwing concepts and how they inter-relate can benefit everyone’s throwing skills.
INTRODUCTION

These instructions are intended for Society for Creative Anachronism (SCA) thrown weapons marshals and SCA throwers who have moderate experience with thrown weapons. Beginning throwers who are interested in the details of the sport may also benefit from these discussions. These instructions are based on the author’s experiences and do not delineate SCA policy or regulations. These instructions are intended for throwers who have received a safety orientation covering thrown weapons range safety, safe weapon throwing procedures and safe weapon handling from a warranted Society for Creative Anachronism (SCA) thrown weapons marshal. **IF YOU HAVE NOT RECEIVED THROWN WEAPONS SAFETY INSTRUCTIONS FROM A SCA THROWN WEAPONS MARSHAL DO NOT USE THESE INSTRUCTIONS!!**

Skilled participants in any sport can easily develop the sense of being an ‘expert’. Many experts are satisfied with their abilities and may consider themselves teachers, not students. True experts, however, always consider themselves students. Every thrower they meet (including total beginners) has the potential of teaching them something they don’t know about thrown weapons equipment and techniques. True experts are always examining their throwing techniques and are open to change if a better technique is presented.

One problem with offering detailed instructions to experienced throwers is their natural response: “I don’t throw like that – are you saying I’m throwing wrong?” One of the few axioms in thrown weapons is that there is no one correct way to throw a weapon. You can learn to throw an axe, knife or javelin any way you like, but some ways are going to be better than others. We all start throwing using a mix of both better and poorer techniques. Personal improvement comes when a thrower is willing to change or modify a currently used technique that is workable, but intrinsically poor, and turn it into a technique that is easier to be consistent with and is less likely to be forgotten without constant practice.

When a thrower realizes that one or more of their current techniques are not allowing them to become a better thrower, they are faced with a choice – “Do I work to refine a complex or inherently poor technique because I am used to throwing that way, or do I abandon the old technique and learn a simpler or more technically correct technique that is easier and more accurate to use?” There is no easy answer to this question. Answering it requires weighing factors such as: “How much effort do I want to spend on this? What are my personal preferences? How difficult will it be to learn a new, better technique compared to modifying an old, poorer technique? Will modifying a poor technique actually do what I want it to do - improve my throwing?” The following discussion is an example of the evaluation process a thrower might go through:

There are two basic methods used to throw a weapon (a right hand throw is assumed):

- **Straight Delivery** - The thrower faces the target. The weapon is drawn straight back and then thrown straight ahead, with a slight forward lean of the upper body
and very little body rotation to the left. The throwing arm maintains a vertical arc throughout the throw and ends up pointing slightly below the target. This delivery method is popular with professional exhibition knife throwers, who are precision oriented, and is the method recommended in these instructions.

- **Across-Body Delivery** – There are many personal variations of this delivery. Typically, a thrower will start facing the target. As the weapon is drawn back, the head remains facing the target while the upper body rotates to the right until it is about 45-90° to the target. The weapon is thrown with a rotation of the upper body forward and to the left. The throwing arm (ideally) maintains a vertical arc during the initial portion of the throw but then may track across the body during the follow-through. At the end of the throw, both the throwing arm and the upper body are usually pointing to the left of the target. Some throwers may end the throw in a semi-crouch. This delivery method is popular with combat-oriented martial artists.

A straight delivery is the simpler of these two deliveries, as it has fewer and less complex moves to execute, but some throwers prefer an across-body delivery. The across-body delivery was developed to give a very forceful weapon strike to the torso and head of a human target. The human torso and head are relatively large targets that do not require precision accuracy, but the weapon is usually required to penetrate bone, so a forceful strike is mandatory. This delivery is also a good method for long-distance throwing (20 feet or more). Both of these situations are not a factor in typical SCA target throwing.

Why do some SCA target throwers use a more complex delivery instead of a more simple delivery? A thrower may use an across-body delivery because that’s the way they were taught, or they may have come to SCA throwing from a martial arts discipline. However, when an across-body thrower seriously starts developing their skills, they realize that the method has some built-in limitations that they must compensate for if they are to achieve precise and consistent accuracy. At this point, a thrower might logically ask: “Before I spent the time to improve this throwing technique, is there an easier way to throw?”

An across-body delivery is more complex compared to a straight delivery because:

- Instead of moving the throwing arm through a simple vertical arc as is done with a straight delivery, the thrower has to move the throwing arm through a complex arc that is compensating for the upper body’s rotation to the left. If this is not done, the weapon will be moving in a diagonal plane (from upper right to lower left) and will be more difficult to accurately aim.

- With an across-body delivery, the upper body and throwing arm are moving through both a vertical and a horizontal arc during the throw. This is a more complex aiming platform for precision throwing compared to the straight delivery, where the upper body and throwing arm are rotating only in the vertical plane.
The above discussion points out two difficulties with an across-body delivery, but they are not necessarily good reasons for YOU to switch to a straight delivery. You may have a martial arts background and prefer to throw that way, even though it is a slightly more difficult delivery to learn initially. You may have thrown with an across-body delivery for a long time and have worked through the problems built into the method. Finally, you may be satisfied with your performance. In any of these cases, there is no reason for you to switch to a straight delivery.

However, if you are having trouble with diagonally-trending throws, inconsistent weapon sticks and inconsistent strike locations, you might consider trying a straight delivery or some similar method that simplifies the throwing sequence.

This discussion is not to convince you that a straight deliver is ‘right’ and an across-body delivery is ‘wrong’, but to show that both deliveries are valid techniques which likely will appeal to two different types of throwers. If you are a precision-oriented target thrower, the straight delivery likely will be a better choice for you. If you are a combat-oriented thrower with a martial arts background, the across-body delivery likely will be the better choice for you. The choice is yours, as long as you are aware that an across-body delivery may take a little longer to become accurate with and you may need to practice a little more to retain it.

This example shows how the concepts discussed in the following instructions can help you analyze and improve your personal throwing techniques. They will also give you the tools to coach others to better throwing!
UNDERSTANDING WHAT HAPPENS
WHEN YOU THROW
A
KNIFE OR AXE

*If it has a sharp end and you have the strength to throw it, you can make it stick. However, some things are going to be MUCH easier to stick than other things!!*

(ANONYMOUS WEAPONS THROWER)

Why study the mechanics of knife and axe throwing? If you spend any time throwing weapons, you will have a session where you are sticking the weapon fairly consistently, and then all of a sudden, you can’t stick it at all. What changed? Obviously, you changed something about the way you are throwing, but what? Understanding the basic mechanics of weapon throwing will help you analyze this kind of throwing problem. It can also help you pick out a new knife or axe that is easier to stick than your old one.

We are trying to do three things when we throw knives and axes:

- Throw with motions that are both technically correct and that feel right for us;
- Control weapon rotation during the throw, so that it lands point or edge on;
- Throw with consistent, easily repeatable motions that foster accurate throwing.

This study will first describe the basic mechanics of knife and axe throwing and then discuss how you can develop a personal system of throwing.

CONCEPT OF WEAPON ROTATION

Throwing a knife or axe overhand, side-handed or underhand causes the weapon to rotate before it hits the target. There are techniques to limit this rotation, but they tend to be difficult and time-consuming to learn. Most recreational throwers simply learn to adjust the weapon’s rotation so that it will be point-on or edge-on when it reaches the target.

During the throw, the thrower’s arm imparts two separate velocities to the weapon - a forward velocity (linear velocity) and a rotational velocity (angular velocity). At the moment of release, the weapon begins to move forward and also begins to rotate around its balance point (center of gravity). The weapon rotates because: (1) the throwing arm is moving through the arc of a circle and the weapon continues moving with that circular motion at release; (2) the upper end of the weapon is moving slightly faster than the lower end at the moment of release; and (3) friction as the weapon drags across the throwing hand during release slightly retards the start of rotation of the gripped end, adding to the difference in speed of rotation between the top and bottom of the weapon. These three factors cause the weapon to tip over and start to rotate around its balance point (its center of rotation).
The forward velocity (how fast the weapon is thrown) has nothing to do with the rotational velocity (how fast the weapon rotates). At the throwing velocities humans are capable of, these are two separate things. A weapon’s rotation speed is important to a thrower because it has a strong influence on how easy the weapon will be to stick and how far from the target they will have to stand in order to stick it. Assuming a reasonably clean release and no exaggerated flipping of the weapon’s handle, the rotation speed of a thrown weapon is related only to the radius of the throwing arc used for the throw.

The radius of the throwing arc is the sum of: (1) the length of the thrower’s arm as employed during the throw; plus (2) the distance from the thrower’s hand to the weapon’s balance point, its center of rotation (figure 1).

Figure 1 - Schematic drawing of a weapon throw. (Adapted from Thiel, 2006, The Physics of Knife Throwing: http://www.knifethrowing.info/physics_of_knife_throwing.html - copyright 2006)

With practice, most throwers develop a fairly constant length of arm extension from throw to throw. The distance you select between your hand and the weapon’s center of rotation (either by changing your grip up or down the handle or by selecting a longer or shorter weapon handle) then becomes a method to refine the weapon’s rotation speed. The longer the distance from your hand to the weapon’s center of rotation, the slower the weapon will rotate and the further from the target you will have to stand in order to stick it in a single rotation. The shorter this distance is, the faster the weapon will rotate and the closer to the target you will have to stand in order to stick it in a single rotation. A single rotation of the weapon before it strikes the target is preferred for precision short-range (10-12 feet) throwing in the SCA, as multiple rotations require a very consistent and controlled throwing form for best accuracy.

As a thrown weapon approaches the target, its point or edge is rotating through a short sticking arc. The sticking arc is the range of rotation in which the weapon will stick in the target instead of bouncing off it. The duration of this arc is determined by: (1) the speed at which the weapon is rotating; and (2) the shape of the blade. The slower a weapon rotates, the more time this sticking arc will last, making the weapon more forgiving in regards to throwing technique and throwing distance. Short weapons have a
relatively fast rotation. With these weapons, the duration of the sticking arc is very short, so throwing distance variations of a few inches or a slight change in throwing technique can make the difference between a stick and a bounce-off. This is why short axes and knives tend to be harder to stick compared to longer handled, slower rotating weapons. Blade shape is also a factor. Axes have wider blades than knives and will have longer sticking arcs even when both weapons have equal rotation speeds. This is why axes are usually easier to stick compared to knives.

WEAPON RELEASE HEIGHT

A weapon thrown overhand begins to fall as soon as it is released. This fall requires the thrower to release the weapon above the height of the target point and outside his/her direct vision. At the mandated minimum SCA axe and knife throwing distance (10 feet), the thrower will never be able to ‘throw directly’ at a chest-high target. If a weapon is released when it is pointing at a target 10 feet away, as some knife throwing manuals illustrate, it will hit the ground in front of the target. For chest-height targets 10 to 15 feet from the thrower, a weapon thrown overhand will need to be released just forward and about even with the thrower’s forehead (figure 1, page 6; figure 2, below).

![Figure 2 – WEAPON RELEASE – The axe’s location in the upper right of the photo shows that the release point for the throw was just forward and about even with the thrower’s forehead. The thrower’s arm has continued down into the follow-through and is pointing just below the chest-level target (off photo-right). The axe has just tipped forward and begun to rotate. (Photo by Darius, 2010)](image)

The physical requirements of an axe or knife throw – the inability to ‘throw directly’ at the target, the inability to see the weapon prior to its release and the relatively fast rotation of the throwing arm at the moment of release – all require throwers to use their entire body to both aim the weapon and control its release point. This is what makes thrown weapons so interesting and so challenging!
HOW TO THROW A KNIFE OR AXE

In this section, we will take the basic mechanics of knife and axe throwing and discuss ways you can use them to develop personal throwing techniques. Throw only one style, length and weight of axe or knife while developing your throwing techniques (your form). Once your form is developed, you can throw whatever you like. In all of the following discussions, an overhand throw with the right hand is assumed.

The key to accurate throwing is **consistency** and the key to developing consistency is **simple techniques**. You will need to: (1) learn basic throwing techniques; (2) understand how each element of the throw helps control consistency and accuracy; (3) modify the basic techniques (as needed) to fit your weapon, your physiology and your throwing style; (4) train your mind to remember what your body did during the throw; and (5) analyze your throw afterwards, **not** during the throw. A good thrower sets up the throw using simple, consistent techniques, concentrates on the aim point, and then throws without thinking, letting their body’s learned muscle responses take over.

There are **SEVEN ELEMENTS** to a knife or axe throw. Modifying any of these elements will affect your throwing distance and the consistency and accuracy of your weapon strikes. Dividing the throw into separate elements will help you recognize and remember what you did during each part of the throw. During post-throw analysis you can use these elements to identify and resolve throwing problems and develop consistent throwing techniques.

The detailed discussions below might seem to imply that the seven elements of a throw are to be done in a slow, mechanical manner. That is erroneous. Any throwing style done in a mechanical manner will prevent the fluid body motions needed for accurate throwing. While a thrower is exploring which techniques work best for them, each of these seven elements will, at times, need to be done in a fairly methodical manner. The goal, however, is to meld all your throwing techniques into a quick, smooth delivery that gives consistent, accurate weapon sticks.

The techniques suggested here are for beginning and intermediate throwers who are looking for detailed guidance. These techniques can also help advanced throwers who are having problems with a specific part of their throw. These suggestions are specific and have worked for many students, but **they are not the only way to throw**! You can learn to throw accurately any way you want, if you are willing to work at it! You may have an underlying medical condition (arthritis, “trick” elbow, etc.) or a particular body physiology that makes some of these suggestions impractical for you. In the following discussions, the **elements** of the throw and how they are used to position your body for a consistent, repeatable and accurate throw are the key points, not necessarily the techniques suggested for each element. With practice, you will soon acquire the personal experience and skills to change, modify or even reject some of these suggested techniques.
SEVEN ELEMENTS OF A THROW

SETTING UP THE THROW -- The first four elements of the throw set up a consistent, easily repeatable relationship between your weapon, your body and the target. The goal is to eliminate variations in your throwing form from throw to throw. These techniques may seem overly complex because they are described in detail, but with practice they can be quickly and easily assumed. Remember, the elements are the key point, not the specific techniques used. These instructions assume an overhand, right handed, straight delivery throw. See the INTRODUCTION (page 2) for a summary description.

Element 1 – THROWING STANCE. The throwing stance is the platform for the entire throwing sequence, and a good stance is critical. The throwing distance used is also a critical parameter. Throwing distance depends on the type, length and weight of the weapon being thrown and your personal style of throwing. It is marked with a throwing marker (nail, golf tee, etc.). If you are a beginner and not using a throwing marker, you are wasting your time trying to learn weapons throwing! Throwing distance is one of the basic controls over weapon rotation. An experienced thrower may not need a marker, but if a beginner is not marking their throwing point, it will be difficult for them to identify which techniques need to be modified to get consistent sticks. USE A MARKER!!

The basic stance described below is for a right-hand throw using a left-foot forward stance, so the left foot is the leading foot and the right is the trailing foot. Which foot leads is not critical as long as you are consistent – try alternating the lead foot and then pick the one that feels the most natural. For a left leading-foot delivery, the throwing arm and trailing foot are aligned with the aim point and the chest is kept parallel to it during the throw. Otherwise, instead of a simple vertical throwing arm motion, a diagonal throwing motion is needed to align the weapon with the target—a more complex delivery!

To set your throwing stance, face the target at your throwing distance and center the aim point with the outer edge of your right shoulder. Your right foot will be about 6 inches to the left of the aim point. Set a throwing marker about 12-18 inches left of your right toe and center your left (leading) toe on it. Step straight back with the right (trailing) foot, placing the trailing toes about 12-18 inches behind the leading heel. Point the leading foot at about 12 o’clock and the trailing foot at about 1 o’clock, with the chest parallel to the target. With a slight forward lean, center your weight between the two feet. Adjust foot spacing for balance. The forward/back position of the leading foot is adjusted for throwing distance corrections and laterally to maintain balance during the throw. The lateral position of the trailing foot is adjusted for a straight-forward throw. See Appendix 4 – SETTING THROWING FORM for details.

Element 2 – GRIP STYLE. Grip style and how the fingers hold the weapon will affect throwing distance and weapon control. Experienced throwers sometimes change their grip if a minor throwing distance adjustment is needed and the target situation does not allow them to change their location. There are two basic, standard grips - which grip you use is personal preference. Beginners should first learn to throw using one of these grips. The basic grips are:
HAMMER GRIP – See Appendix 1

MODIFIED HAMMER GRIP – See Appendix 1. A modified hammer grip will generally slightly decrease needed throwing distance compared to the hammer grip. The weapon is both rotating quicker over the index finger and is pointed more directly at the target at release. Both will cause the weapon to impact the target sooner.

GRIP REFINEMENTS

Weapon Control – Weapon control is usually best when the hilt is strongly felt by the index finger’s 1st joint and the 2nd joints of the remaining fingers. This grip gives a strong feel of weapon orientation and a good sense of correct timing for weapon release. This grip is natural with the hammer grip, but adjustments are needed when using the modified hammer grip. When the finger joints are positioned correctly on weapons with no hilt scales, the back of the hand is nearly vertical. For weapons with rounded or slab-sided hilts, the palm is rotated to the top of the hilt with the back of the hand at about 30°.

Thumb Location – Thumb location when using the modified hammer grip can influence the start of weapon rotation and the throwing distance needed. The thumb can be placed either alongside the gripped end, or on the top of the gripped end. Placing the thumb alongside the gripped end has no effect on weapon rotation. Placing the thumb on the top of the gripped end will slow weapon rotation and will require a longer throwing distance. Use a consistent thumb placement and pressure on the weapon.

Weapon Release – It is usually best to use smooth, fairly straight hilts with no finger grooves or strongly textured hilts, which can drag on the throwing hand during release. Do not use highly polished hilts - they will feel ‘sticky’ if your hand is moist.

Element 3 – GRIP LOCATION. A consistent grip location (the anchor point) is important for both accuracy and reliable weapon sticks. Grip location up or down the weapon influences how fast the weapon rotates, because you are changing the distance between the throwing hand and the weapons’ center of rotation and thus the length of the throwing arc. Use the weapons’ pommel (or tip for a blade throw) as a reference point for setting the anchor point. A long-handled axe gripped near the pommel will throw from a slightly further distance than if the same weapon is gripped farther up the haft.

The easiest anchor point to assume for any weapon is to put the base of the gripped end at the lower edge of the little finger or palm of the throwing hand. This gives a solid, easily repeatable grip and eliminates the possibility of the protruding handle interfering with a clean release. For some weapon designs, placing the pommel at the upper edge of the little finger and then tucking the finger under the pommel gives a firmer grip.

Element 4 – PRESENTATION. Presentation is the ‘sighting’ a thrower does before the throw. For chest-high targets, the weapon arm is held horizontal and the eyes look down the arm and wrist at the target point. It is strongly recommended that the non-throwing arm also be used in presentation. There are three advantages to doing this: (1) it helps you consistently set the weapon’s starting height and position relative to both the target
and to your body; (2) it allows you to consistently set the angle at which the weapon is held in the throwing hand; and (3) it helps you to aim the throw and to make small elevation adjustments prior to throwing. Figure 3 illustrates weapon presentation.

![Figure 3](image-url) – Example of presentation – indexing an axe prior to throwing.

The key components of presentation are:

**SETTING WEAPON HEIGHT AND POSITION** – Consistently setting the weapon’s starting height and position relative to both the target and to your body is important for accurate throws. To set weapon height, stand straight and extend the throwing arm horizontal at shoulder level, with the throwing hand thumb held horizontal. The non-throwing hand is also extended horizontal at shoulder level (figure 3, above) with the hand open, the fingers together and extended and the palm facing to the right (right-hand thrower) or to the left (left-hand thrower). It is easier to consistently set both arms horizontal compared to some other angle. Don’t center the weapon on the chest but on the throwing arm side of the body. The throwing arm is extended straight from the shoulder, pointing at the target, and the non-throwing arm is positioned at a slight angle to it. Keep the chest parallel to the target.

**SETTING WEAPON ANGLE** – Consistently setting the weapon’s angle in the hand is important for good accuracy. This angle helps determine the starting point for the weapon’s rotation and whether the wrist is straight or bent during the throw. Both of these will affect the throwing distance needed. Without some method of indexing, it is very difficult to judge the weapon’s vertical angle just by looking at it from the throwing position. The thumb of the throwing hand and its position relative to the fingers on the non-throwing hand is an easy way to consistently set the weapon’s vertical angle from throw to throw.
To set the weapon’s angle in the hand, place the throwing hand thumb or the joint at the base of this thumb in the groove formed by the index and middle finger of the non-throwing hand (figure 4). Depending on throwing style, the throwing thumb may be placed in another finger groove or in the palm, and the throwing hand thumb may be angled up or down. The exact thumb position and angle are not critical; what is important is developing a consistent method of indexing the weapon’s angle in the hand from throw to throw. Indexing works best if after you have set your weapon’s position, you keep your throwing arm wrist mostly in the same position relative to the weapon throughout the arc of the throw, so only the arm joints are bending.

WEAPON AIMING - Accomplished throwers develop techniques that allow them to precisely aim their weapon throws. One aiming method is to look down both arms and through the ‘U’ formed by the weapon handle, the top of the throwing hand thumb and the non-throwing hand index finger (figure 4, above). The top of the throwing hand thumb is then centered on the desired target point.

To develop your aiming technique, first learn to throw at a chest-high aim point with both arms horizontal at shoulder height, the throwing arm centered on target center, and the trailing toe placed about 12-18 inches behind and 12-18 inches right of the leading heel (left-leading foot assumed - see Element 1 - THROWING STANCE, page 9). This will develop a consistent release point in the arc of the throw for all your thrown weapons. Techniques to adjust the throw elevation will be noted briefly in Element 7 - THROW DELIVERY & FOLLOW-THROUGH (page 18) and discussed in detail in Appendix 3.
EXECUTING THE THROW -- The next three elements execute the throw. This is a highly dynamic process, with the body flowing quickly and smoothly from one element to the other. Although discussed separately, these three elements are always done in a smooth, continuous motion that takes only 1 to 2 seconds to execute.

Element 5 – ARM ROTATION. In the first section, we saw that throwing arm rotation is a primary cause of weapon rotation during a throw. How the arm rotates during a throw will have a significant effect on the weapon’s rotation speed, as the amount of arm extension used sets the radius of the throwing arc. Unintentionally changing the length of arm extension from throw to throw can be a cause of frustration for beginners, as this has a major effect on the weapon’s rotation speed and thus the throwing distance needed.

There are three basic ways for the throwing arm to move:

THROWING FROM THE ELBOW – Throwing from the elbow with only a slight rotation of the upper arm produces a very short arc of arm rotation and a relatively fast weapon rotation. This throw requires a relatively close throwing distance. Throwing from the elbow is not a particularly strong throwing method, but it works if the throw is done from 10-12 feet with sharply pointed weapons and end-cut, soft wood targets are used. This method of throwing may be more difficult to use at longer distances (15+ feet) or when throwing at harder targets like side-cut lumber panels. Throwing from the elbow is the quickest method to become consistent with, as the forearm motion is a simpler movement compared to the other two throwing motions (see descriptions below). Throwers who use other arm rotations may inadvertently start throwing from the elbow when fatigued or if their shoulder becomes sore. This may be why a thrower suddenly starts having difficulty sticking their weapon from its usual throwing distance.

THROWING WITH PARTIALLY EXTENDED ARM – Throwing with the arm partially extended is a more forceful method compared to the elbow throw. This method does take a little more practice than the other two arm positions, as the thrower needs to develop a consistent and repeatable amount of arm extension. It is a good method for longer throws (15+ feet), particularly if the thrower has minor physical conditions that prevent throwing with a fully extended arm.

THROWING WITH FULLY EXTENDED ARM – Throwing with a fully extended arm produces a long arc of arm rotation and a relatively slow weapon rotation. This throw requires a relatively far throwing distance. This is a strong throwing method that is easy to be consistent with. This method may stress joints and muscles slightly more than the other two throwing methods, which might be a concern for older throwers or for people with minor physical conditions like arthritis or ‘trick’ elbows.

Element 6 – UPPER BODY LEAN. Upper body forward lean is a main control of the weapon’s strike elevation, as it influences both the height of the throwing arm shoulder joint at the moment of release and the location of the weapon’s release point along the arc of the throw (see figure 2, page 7; figure 5, page 14).
Figure 5 – Example of slight forward lean into the throw. Note rotating ax, at right against the white fence, about to hit target. The left indexing hand was dropped when the axe passed out of sight during drawback. The thrower has transferred his weight onto his locked leading (left) leg and is using it to control upper body lean. Muscle and joint tension builds in the leading leg as weight is transferred onto it through the slightly arched foot, a locked-back knee and a pushing back on the toes of the foot. This tension controls upper body lean and is used to signal the timing of the weapon’s release. This system of leading-leg tension is one example of a throwing stop, used to tell the thrower when to release the weapon and to precisely control the weapon’s strike elevation.

The shoulder joint is the pivot point for the throw and its final height, along with the weapon’s release location along the arc of the throw, controls the weapon’s strike elevation. A stance that gives strong physical feed-back on the amount of upper body forward lean used during a throw will allow the thrower to accurately control the weapon’s release location. Transferring your weight onto the leading foot during the throw, with only a few inches of upper body forward lean, gives a strong physical feedback and is easy to repeat consistently. Although some very good throwers do it, a pronounced lean into the target is hard to do consistently without a lot of practice.

Upper body forward lean will also influence the distance you need to stand from the target in order to stick the weapon. If you are unknowingly changing the amount of forward lean you use, it will have the same effect as if you were stepping forward or back before each throw. For short weapons, a few inches difference in the amount of forward lean used may be the difference between a stick and a bounce-off.

Control of the weapon’s release point and its strike elevation is a subtle concept. Most beginning throwers think that the throwing arm controls the timing of the weapon’s release and the resultant hit elevation, but it is upper body lean that controls both. The throwing arm is rapidly moving through an arc above the head during the throw and it is almost impossible to sense the correct release point based on arm position alone.
Accomplished throwers use feedback from the tension building up in the lower body during the throw to set a consistent release point. They use this tension to develop a throwing stop—a combination of body position, arm position and increasing tension in the muscles and joints that tells them when to release the weapon. Everyone starts out doing this unconsciously but to progress, this aspect of the throw must be developed.

A throwing stop isn’t the abrupt stopping of the throw, but the use of tension building up in the bending hips, waist and in the leading foot and leg during the throw. This tension buildup is used to control the amount of upper body forward lean and to signal the arm when to let go of the weapon.

Defining a throwing stop is a personal matter, but the following illustrates the concept:

- With a straight back, lock both the leading foot and the trailing foot knee joints back. Lean upper body forward slightly to center your weight between the feet.

- Raise the leading heel slightly, lean slightly onto the leading toes, then re-center the weight. Don’t simply bend at the waist, but feel your weight transfer onto the toes. There is now a slight amount of tension developed in your lower body.

- As the throwing and indexing arms are raised to center the aim point, ‘reach’ slightly for the target - feel a slight transfer of weight onto the leading toes. Your upper body and arms are now ‘locked’ into a very controlled, repeatable stance. Throw while pushing back slightly from the leading toes and with the leading and trailing knee joints locked. Your body will rotate onto the locked leading knee during the throw, giving you a strong sense of how far forward you are leaning.

This is only one type of throwing stop, but it does give a strong physical feedback on how far forward you are leaning during the throw. This feedback is used to set a consistent release point for the weapon and a consistent shoulder height at the moment of weapon release. Both of these will give the thrower very precise control over the strike elevation.

Weak leading foot toe pressure and/or a bending of the leading knee during the throw are major contributors to poor vertical control, no matter what type of throwing stop is developed. A pronounced vertical stringing of the throws with no consistency in high or low hits is a key indicator that either leading toe back-pressure is weak or the leading knee is being bent during the throw. These two conditions will not give the thrower a strong, consistent signal of when to release the weapon, so the release point and the resultant hit elevations are erratic. Typical causes of weak leading toe pressure when using the system described above are: (1) too much leading foot heel lift, which does not allow the thrower to ‘throw over’ the locked knee joint without bending it; (2) bending of the leading knee, (3) leaning too far back prior to setting the throw; (4) a too close spacing between the leading and trailing feet; (5) rotating the pelvis back instead of transferring weight forward onto the leading toes; or (6) excessive forward lean from the waist after the throw has been set up. It is difficult to control and/or consistently repeat any of these poor techniques from throw to throw, and accuracy will suffer.
Locking the knees, a slight leading heel lift, weighting the leading toes by leaning slightly forward onto them as the arms rise and reach for the target is all that is needed to set a precise control of upper body forward lean and the weapon’s hit elevation. Although this method of controlling upper body lean may seem complex, with a little practice it can be quickly assumed and the throw completed in a near-continuous motion.

Another type of throwing stop is described in JAVELIN THROWING TECHNIQUES under flat-trajectory throwing (page 26). This technique uses anchored trailing foot toes to control upper body rotation and forward lean.

Again, there is no one correct way to throw, and the methods described above are just two examples of how to develop a throwing stop. The key point is that a thrower who develops a personal method to consistently control upper body forward lean and the weapon’s release point will quickly become an accurate, consistent thrower.

**Element 7 – THROW DELIVERY AND FOLLOW-THROUGH.** There are two basic throwing deliveries – the straight delivery and the across-body delivery. The simplest delivery is the straight delivery, and is the method described here. The basic across-body delivery is described in the INTRODUCTION (page 2), is critiqued under ALTERNATIVE THROWING STYLES (page 20) and described in detail in JAVELIN THROWING TECHNIQUES (page 26).

THROW DELIVERY – To execute the straight delivery (figure 6), the thrower faces the...
target. The lower body is set up as described under Element #6 - UPPER BODY LEAN (pages 13-16). The weapon is drawn straight back and then thrown straight ahead, with minimal forward lean of the upper body and no to very little body rotation to the left. The chest remains nearly parallel to the target during the throw and the throwing arm maintains a vertical arc throughout the throw, ending up pointing slightly below the target. As the throwing arm starts to draw back, the indexing arm is used as a reference to help maintain a vertical drawback. This helps prevent throwing with a cocked arm or rotating the chest, both of which will result in a hit to the left or right of the target. As the throwing arm passes out of sight, the thrower drops the indexing arm and totally concentrates on the aim-point. Don’t watch the hand drop! If concentration waivers or if the eyes follow the dropping left hand, the weapon will tend to go where you are looking.

Another drawback method is the windmill style. This method starts with the thrower aiming the weapon, then looking through the hands at the target. When the throwing arm starts to rise at the beginning of the drawback, the indexing arm also starts to drop, with both arms moving in synchronized but opposite motions. Concentration is focused on the aim point, not the arms, but the thrower does feel the two arms maintaining a balanced, synchronized motion that keeps the chest and shoulders nearly parallel to the target face during the throw. Keeping the shoulders parallel to the target helps prevent throwing to the right or left of the aim point.

A smooth, fairly slow drawback is recommended with any drawback method, as this gives the best aim and weapon control. A quick drawback tends to be inconsistent from throw to throw and adds nothing to the throw’s velocity. How fast and hard you throw is a personal matter, but an excessively fast delivery speed (the forward throwing speed) is not needed for target throwing and usually makes weapon aiming and control more difficult. Experienced throwers will adjust their delivery speed based on the weapon’s weight. Moderate-weight weapons (10 to 15 ounces) are typically delivered with a moderately-fast start and a moderately-fast finish. This delivery speed usually gives the best weapon control of relatively light weapons, as the thrower can better feel their position during the throw. Heavy weapons (16 to 32 ounces) should be delivered with a slow start followed by a moderately-fast finish. A slower start to the throw helps the thrower overcome a heavy weapon’s inertia, keeps the initial stresses on the joints lower and helps maintain accurate aim and consistent control. Both delivery styles should be executed in a smooth, seamless manner, with no pause in the delivery.

Some throwers want to lean back during the drawback. Even a slight backward lean is a complex motion that requires a lot of practice for consistency. Unless you habitually throw at extended distances and need all the weapon velocity possible, a back-lean is usually an unnecessary complication to the throwing sequence. It is not recommended.

FOLLOW-THROUGH – A smooth follow-through is vital to a consistent, accurate throw (figure 6, page 16). Slowing or stopping the throwing arm just before the weapon is released will cause inconsistencies in the release location and in the release of the weapon itself, resulting in poor accuracy and erratic weapon sticks. Lack of follow-through also encourages wrist-flipping. Wrist-flipping is the quick downward flipping of the weapon...
at the moment of release. A significant percentage of beginners seem to think that a thrown weapon is flipped at the target rather than thrown, so they tend to consider wrist-flipping a good technique. It is a very hard habit to break once a thrower starts using it! Wrist-flipping can be a problem with any style of throwing, but it is common when throwing from the elbow, as usually there is little or no throwing arm follow-through. You can learn to throw a weapon accurately using a wrist-flip, but it is strongly discouraged! Slight changes in the amount of flip used will have a large effect on the weapon’s rotation rate and the resultant throwing distances needed to stick it. Wrist-flipping is a complex technique that takes extensive practice for consistently but it gives no benefits in exchange. The most consistent release style is to simply let the weapon slide out of your hand while the arm continues down in a smooth arc to near waist level.

MAJOR ELEVATION ADJUSTMENTS – Once a consistent release point is established using a horizontal arm presentation (see Element 4 – PRESENTATION, page 10), the weapon’s strike elevation is adjusted by changing the weapon’s release location. Major elevation adjustments can’t be made by bending the arms alone – the release location along the arc of the throw also has to change. This is done by changing trailing foot placement and upper body lean. Techniques to do this are discussed in Appendix 3.

THROWING DISTANCE – The throwing distance needed for a weapon will depend on the personal techniques used in each of the seven throwing elements. Change how any of these elements are performed and the needed throwing distance will also change! Set your basic throwing distance by watching what the weapon does when it hits the target:

**Weapon Hits Handle Up** – The weapon is over-rotating. Move a few inches closer to the target or adjust your throwing techniques so that the weapon impacts sooner.

**Weapon Hits Handle Down** – The weapon is under-rotating. Move a few inches back from the target or adjust your throwing techniques so that the weapon impacts later.

**Weapon Hits Handle First** – The weapon is over- or under-rotating 180°. Change your throwing distance by one to possibly two feet.

**Weapon Sticks Canted At An Angle** – The throw was not in a vertical plane. Point the throwing elbow at the target when drawing back and don’t tuck the weapon behind the head. Canted weapon strikes are of no concern with end-cut target rounds, but are a liability with side-cut lumber target panels, as the canted weapon may not stick reliably in the vertical wood grain.

IDENTIFYING THROWING PROBLEMS

The discussions above show how dividing the throw into seven discrete elements can help throwers identify which of their throwing techniques need to be modified to improve accuracy or to eliminate problems. Identifying throwing problems are easier if about 15 to 20 throws are made at a clean test target. Test targets can be made by drawing a standard SCA Royal Round target on thick paper (construction vapor barrier paper, art
stock or opened manila folder) and tacking it to a target butt. Alternately, draw a single target on the target butt and record the weapon strikes on a reduced-size diagram of the target drawn on printer paper. The standard SCA Royal Round target consists of a 3-inch diameter bulls-eye, an 8-inch diameter inner ring and a 14-inch diameter outer ring.

The location and nature of any non-sticking strikes should also be recorded, as these ‘mistakes’ can help you identify throwing problems. Numbering the throws in sequence will allow you to see whether technique changes during the session has improved sticking consistency and accuracy.

The following discussion shows how a test target can be used to identify throwing problems. Figure 8 shows a test target panel with about 150 axe and knife strikes made during two throwing sessions. The strikes were thrown by two beginning throwers, each with about one year of experience. Both throwers are right-handed and were throwing with a straight delivery and left-leading foot. All throws were observed by the author.

![Test target panel with axe and knife strikes](image)

Figure 8 – Test target illustrating two types of throwing problems:
(1) A pronounced vertical stringing of the weapon strikes.
(2) A slight diagonal trend of the strikes from upper right to lower left.

The test target shows two distinct patterns: (1) a pronounced vertical stringing of the weapon strikes in a zone about 24 inches long and about 14 inches wide; and (2) a slight diagonal trend of the strikes from the upper right to the lower left.

The most conspicuous pattern seen in the test target is the pronounced vertical stringing of the weapon strikes. Both throwers exhibited very little consistency in controlling their strike elevations. One throw might hit high, the next might hit very low and the third might hit near the center.
The vertical pattern of weapon strikes shows that both throwers have poorly developed *throwing stops* (see Element 6 – *UPPER BODY LEAN, page 13*). Both throwers have developed enough elevation control to hit the target panel consistently, but have not yet developed a throwing stance with enough lower-body feed-back to accurately control upper body forward lean. Upper body forward lean controls both the throwing shoulder’s final delivery height and the weapon’s release location along the arc of the throw.

Both throwers bent their leading knees during delivery, but the depth of that bend was inconsistent from throw to throw. This inconsistent knee bending did not give the throwers a consistent shoulder elevation and amount of forward lean for each throw and thus their strike elevations were erratic. Bulls-eyes in Royal Rounds and high scores in competitions will be mostly accidental for both of these throwers until they develop personal throwing stops that consistently control their weapon's strike elevations.

The diagonal trend of the throws seen on the test target (*figure 8, page 19*) could have two possible explanations: (1) the throwers were not aligning the throwing arm and shoulder with the aim point when setting up the throw (see Element 1 – *THROWING STANCE, page 9*); or (2) they had the correct shoulder alignment, but were unknowingly throwing with a slight across-body component to their straight throw delivery (see Element 7 – *THROW DELIVERY AND FOLLOW-THROUGH, page 16*).

Both throwers were observed delivering their throws reasonably straight ahead, but both were using a *center-of-chest* alignment when setting up their stances. These throwers had been taught to align the outer edge of their throwing shoulder with the aim point, but both instinctively set up their throws with a center-of-chest alignment unless they consciously corrected themselves. A center-of-chest alignment placed the throwing shoulder of each thrower about 8” to the right of target center and forced both to throw along a slight diagonal line to strike the aim point. The resulting diagonal trend is clearly seen in the weapon strikes and adds one more complication to accurate aiming.

A similar diagonal trend is commonly seen with poorly controlled across-body deliveries. This pattern results when across-body throwers have not yet learned to keep the initial portion of the throwing arm's rotation in a vertical plane (see discussion below).

**ALTERNATE THROWING STYLES**

Alternate throwing styles commonly seen on SCA thrown weapons ranges are:

**ACROSS-BODY DELIVERY** – The across-body delivery is a fairly common throwing method in the SCA. Its execution is briefly described in the INTRODUCTION (*page 2*) and described in detail in JAVELIN THROWING TECHNIQUES (*page 26*). The across-body delivery is useful when throwing heavy weapons and for extended distance throwing, as the rotation of the upper body helps overcome weapon inertia and adds velocity to the throw. It is commonly used in some martial arts disciplines to deliver a powerful weapon strike, but this is usually not necessary in target throwing.
You can learn to throw axes and knives accurately using an across-body delivery, but it is not recommended unless you are interested in the martial arts. It is a slightly more complex technique compared to the straight delivery method, but except for distance throwing, it gives little target range benefit in exchange. It will require slightly more practice to achieve consistent precision accuracy. Throwing straight ahead, with the arm moving in a vertical arc, is the quickest way to develop a consistent weapon release point and is the easiest delivery to aim if the targets are at different elevations (see Appendix 3).

People who throw accurately with this delivery (and many very good throwers do) have trained their throwing arm to move through a complex arc that is continually compensating for the upper body’s rotation to the left (right-hand thrower). This keeps the weapon in a vertical plane prior to release. If this is not done, the weapon will be moving from right to left prior to weapon release, causing the weapon to fall into the target on a diagonal line instead of a vertical line. Figure 8 (page 19) illustrates the problems with diagonal throwing.

An across-body delivery usually requires developing a throwing stop different from the one described above under Element 6 - UPPER BODY LEAN (page 13). In contrast to the straight delivery method, an across-body delivery usually does not produce strong feedback from increasing muscle and joint tension in the lower body, because the upper body is rotating away from the leading foot. An effective throwing stop also must control the significant upper body rotation to one side that is inherent with this delivery method. A throwing stop technique for an across-body delivery is described in JAVELIN THROWING TECHNIQUES under flat-trajectory throwing (page 26). This technique uses anchored trailing foot toes to control both upper body rotation and forward lean.

FULL-CONTACT DELIVERY – Some throwers like to throw with what many thrown weapons marshals would consider excessive force. Excessively forceful throwing is termed a full-contact delivery in this discussion. The term full-contact delivery is adapted from certain martial arts disciplines, where the intent of the practitioner is to ‘seriously take down’ the opponent. A full-contact delivery is the throwing style you might use if you were seriously trying to kill your target with a thrown weapon. People using this style of throwing may take one or two fast steps toward the target and will typically throw with a fully extended arm, using the entire body to launch the weapon. During follow-through, the thrower may end up in a pronounced crouch. Throwers attracted to this style of throwing tend to come from the martial arts disciplines.

Full-contact delivery is discouraged because it is hard on the weapons, hard on the target butts and requires more practice to become skilled in its use. One hour of full-contact axe throwing can reduce a poplar-wood target round or a pine-wood side-cut target panel to pieces, and may result in a broken or seriously damaged wooden axe handle. A thrower using this technique is usually taking multiple steps during the throw and has poorly controlled upper body lean. Much more practice is needed with this technique compared to a more moderate throwing style in order to achieve consistent accuracy. Due to the potential for excessive damage to equipment and the emphasis in the SCA on precise target accuracy, many thrown weapons marshals will not allow this style of
throwing to be used in their events. Thrown weapons groups that condone this style of throwing will typically use very heavy-duty target butts and consider broken weapons part of the fun.

**SPORTSMAN’S THROW** – Some throwers using a reasonable delivery force will want to take a forward step into the throw. This style of throwing is called the ‘Sportsman’s Throw’. It is a recognized throwing method, but its use is usually discouraged in the SCA. Slightly more weapon velocity is obtained by stepping forward into the throw, but it is not enough to warrant the additional complications to the delivery. Most axes and knives need to be thrown from a fairly narrow range of distances for consistent weapon sticks. If the forward step misses the correct throwing distance, the weapon likely will not stick. Consistent upper body forward lean, a major control of weapon hit elevation, is also more difficult to achieve, as the entire body is moving forward during the throw. You can learn to throw accurately using this method, but it is a more complex delivery and will take more practice to perfect. It is not recommended.

**ULTRA-LITE DELIVERY** – An ultra-lite delivery is the opposite of a full-contact delivery. Throwers using this delivery generally will throw from the elbow with a very light, almost lofting throw. During the throw, they may first rock significantly back and may even rise up on their toes as the weapon is released. Wrist flipping of the weapon is common and typically the throwing arm is stopped abruptly at weapon release, so there is no follow-through. A pronounced upper body lean into the target during the throw is common. People attracted to this delivery style tend to be women and younger throwers.

Ultra-lite throwing is discouraged because it uses (or encourages the use of) many poor throwing techniques, including excessive upper body forward lean, no follow-through, rocking back during delivery and wrist-flipping of the weapon. Ultra-lite throwing is also not as practical as a more forceful style. All wood target butts, and particularly side-cut lumber target butts, have small knots and areas of tight wood grain. These areas require a reasonably forceful weapon strike if the weapon is to stick consistently. Axes, in particular, vary in their sticking ability depending on whether the blade’s point or belly strikes the target. Target wood variations are not significant with a moderately forceful throw, but these variations may cause a non-sticking impact if a light throw is used. Reasonably forceful throws also allow throwing from the extended distances (15+ feet) required in long-distance events, like the SCA’s Thrown Weapons Inter-Kingdom Challenge. The ultra-lite styles of throwing are usually not forceful enough to reach the target from the distances required for this event.

If a thrower insists on using this style of throwing or needs to for medical reasons (e.g. arthritis or joint damage), they will need to concentrate on using good throwing techniques. Weapon selection is also critical. Heavier, very sharp axes or axes with strongly pointed tips like the francisca axe, and heavier, sharply pointed knives usually will give the best sticking potential with the weak strikes. The use of focused intent in throwing (*discussed in THE ZEN OF WEAPON THROWING, Appendix 10*) is also very important when a light throwing style is used.
CLOSING THOUGHTS

Understanding the seven elements that make up a throw and how they interrelate will help you become a better thrower. Problems that arise during training (and they will arise!) can be studied and resolved by examining how you are executing each of these elements. Many times, throwing problems are due to subtle technique changes in one or two elements that you are not initially aware you are doing!

Changes in technique are not necessarily bad. As your throwing skills improve and become more consistent, some techniques might need to be changed or adjusted to take advantage of the improvements. Most beginners start throwing using one or more poor techniques. These poor techniques usually require compensations in order to get the weapon to stick. As a thrower’s techniques improve, these compensations are no longer needed and they usually become impediments to accuracy. These earlier compensating techniques will have to be either eliminated or modified in order for the thrower to progress. Some of your worst throws can become some of your best teachers!

Once you have developed a personal throwing system, start a practice session by going through each of your throwing steps and motions in a fairly methodical manner. You are doing this to remind your body of the correct throwing motions – you are setting and practicing your form. If this is not done, it is very easy to inadvertently ‘lock’ one or two poorly executed motions into your delivery and then it may take 5 to 10 throws to sort things out and eliminate them! After 2 to 4 methodical throws, stop trying to consciously do each step and just throw, allowing your learned muscle memory to control the throw. Too much time spent practicing slow, methodical throwing tends to ‘set’ your form into a ridged, over-controlled delivery. Your throw should not be a series of technically correct but essentially unconnected motions spread over several seconds but a single, fluid delivery made in about 1 to 2 seconds, with your learned muscle memory, not your mind, controlling the throw. See Appendix 4 – SETTING THrowing FORM (page 47) for suggestions in setting a precise, consistent throwing form.

Finally, consistency is vital to accurate weapon throwing no matter what techniques or style of throwing you use, and simplicity is vital to consistency! The simpler your throwing techniques are, the easier it is to be consistent. Some of the throwing suggestions recommended above might seem overly complex because they are presented in great detail, but they are intended to simplify and make consistent your throwing style.

Remember, the elements of the throw are the key points to work with, not necessarily the specific techniques recommended in these instruction. These recommendations are NOT THE ONLY WAY TO THROW! They are intended to illustrate the importance of dividing the throw into discrete elements that can be better analyzed and to serve as examples of how you can develop personal throwing techniques for each of the elements. The suggested techniques are intended to highlight the key aspects of each element that you will need to work with and to show why they are important. Work to develop a simple, consistent personal throwing system and you will quickly become an accomplished knife and axe thrower!!
JAVELIN THROWING TECHNIQUES

Javelins in period were light-weight spears around 4 to 6 feet long that were designed to be thrown. Many SCA groups call javelins ‘spears’, but weapons historians tend to use the term spear for heavier, 7 to 9 foot-long stabbing weapons that were only occasionally thrown. The suggestions below are not the only ways to throw javelins and they may need to be modified to fit your physiology or personal throwing style. See Appendix 6 for suggestions on how to select and make javelins.

JAVELIN BALANCE POINT – The distance between your grip location and the javelin’s balance point is important for accurate throws. To find the balance point, place the javelin on an index finger or a knife edge and adjust until the balance point is found. Mark this point. Period methods of marking the balance point were small nails, paint, notching, burning or string (glued on or tied very tightly). Round-headed upholstery tacks work well and look good. Notching or burning the balance point is less desirable, as these marks are not easily erased if you decide to shorten the shaft or modify the point.

GRIP – There are a variety of ways to grip a javelin. Start with either grip ‘A’ or ‘B’ (shown below) which are the classic Greek and Roman grips and see which feels best. Another grip (not shown) is the ‘pencil grip’, where the javelin shaft is held only with the fingertips. The pencil grip is not a particularly firm grip and gives poorer control of the throw compared to grips ‘A’ and ‘B’, but some throwers like it. For all grip styles, grip the shaft about four inches behind the balance point for non-center-balanced javelins or about one inch behind the balance point for center-balanced javelins. A center-balanced javelin has a counter-weight on the butt the same weight as the javelin head. For both types of javelins, the exact grip distance, your anchor point, is found by trial and error.
If the javelin hits butt down when thrown, move your anchor point back. If it hits point down, move your anchor point forward. Another possibility for a point-down hit is that your fingers are not releasing the javelin shaft early enough and they are dragging the point down as you throw.

After you have found a grip style and an anchor point location that works for you, hold the javelin exactly the same way for each throw. Some throwers mark their preferred anchor point with a second tack or other mark on the shaft. They use this mark as a reference point for anchoring a fingertip, the thumb or the palm.

**THROWING STANCE** – The throwing stance is the platform that allows a straight and accurate launch of the javelin. A period statue (*figure 1*) clearly illustrates the classic javelin stance for a *flat-trajectory throw*. The stance for an *arching trajectory throw* is a slight modification of this stance. Both stances are discussed below. The following instructions assume a right hand throw, as demonstrated by the statue. Reverse the instructions for a left-hand throw. The statue is using grip ‘B’ (*page 24*).

![Figure 1 – Classic Greek and Roman javelin throwing stance. Bronze statue (ca. 460 BCE). Found in the sea off Cape Artemision, Greece. (www.anselm.edu)](image)
AIMING, THROWING AND FOLLOW-THROUGH – Two basic javelin throwing methods are typically used for short range throwing in the SCA: (1) flat-trajectory throwing; or (2) arching-trajectory throwing. The flat-trajectory throw requires more strength, but throwing from various distances is easier, as the javelin’s launch angle is not as critical. An arching-trajectory throw takes less effort and is easier on the shoulder joint but the javelin’s launch angle is critical for each distance used. Many youth, women and some men prefer this method of throwing, although it is less practical for long-distance throws (30+ feet).

Both of these throwing methods require an across-body delivery, where the upper body rotates to the non-throwing arm side during the throw. Upper body rotation is most pronounced with the flat-trajectory throw, but there is also minor upper body rotation with the arching-trajectory throw. In the discussion of knife and axe throwing (see previous sections), a straight delivery with little rotation of the upper body was shown to be the simplest, most-easily repeatable throw. However, javelins are thrown from 20 feet or more and are usually longer, heavier weapons with more inertia, so an across-body delivery is the most practical method of throwing them. Upper body rotation makes it easier to overcome the weapon’s inertia at the beginning of the throw and adds velocity to the throw for a reasonably flat trajectory.

**Flat-Trajectory Throw** – Figure 1 (page 25) illustrates the correct stance for a right-hand, left-foot leading, flat-trajectory throw. Face the target with the feet at shoulder width, the leading (left) foot pointed at about 12:00 o’clock and the right foot, shoulder and arm aligned with the aim point. This right shoulder alignment allows you to throw straight at the aim point instead of diagonally. Step straight back with the trailing (right) foot; the toes will be about 24-30 inches behind and about 8-12 inches to the right of the leading foot heel. Angle the trailing foot at about 3:00 to 4:00 o’clock. Try variations in the leading and trailing foot positions to find a balanced stance. Keep your back straight and the knees loose and slightly bent.

Extend the non-throwing arm to the front and level; use it to concentrate on the aim point. Extend the throwing arm and javelin nearly fully straight back while rotating the upper body about 90° to the right. The head remains facing the target. Hold the javelin with the shaft nearly parallel to the ground. Rotate the upper body to the left several times as if throwing to determine the correct location of the two feet and to ensure that the body will remain balanced at the end of the throw. When the feet are positioned correctly, the thrower will end the throw directly facing the target (no under- or over-rotation) and will not need to take a step to one side to maintain balance. Anchor the trailing foot toes in this final position; they may be at a shallower angle than the initial 3:00 to 4:00 o’clock setting.

To set up the throw, rotate the upper body to the right, with the chest at 90° to the target and the head facing the target. Extend the throwing arm and javelin nearly fully straight back, with the javelin shaft held fairly close to the head (see throwing arm location in figure 1, page 25). Keep the trailing foot anchored (no foot rotation) while the upper body rotates to the right prior to throwing. Upper body rotation is accommodated by
twisting the right leg hip and knee joints while the trailing foot toes remains anchored. Depending on personal preference, the trailing heel can be either: (1) lifted a few inches and held there during the drawback and throw (see trailing heel location in figure 1, page 25); or (2) the trailing foot heel can remain on the ground during the drawback and then lifted into the position seen in figure 1 as the upper body rotates forward during the throw. The firmly anchored trailing-foot toes and the lifted heel are critical components of an accurate javelin throw! The anchored toes and lifted heel allow the thrower to control the amount of upper body rotation and forward lean used during the throw.

Prior to throwing, look at the javelin point and make sure it is pointing straight at the target, with no sideways cant. Tilt the point up slightly. The degree of tilt will depend on the strength of the thrower and the distance to be thrown, and is determined by trial and error. Some throwers will lean back slightly onto the trailing leg prior to throwing to add velocity to the throw. This is a good technique as long as the trailing foot and toes are not rotated out of position. Check again that the javelin shaft is aligned straight ahead and then throw with a rotation of the upper body to the left. During the throw, the javelin should move from behind your head to the release point in a straight line along the long axis of the shaft. The throwing arm maintains this straight line motion by rotating slightly to the right during the throw to compensate for the upper body’s rotation to the left.

Note again the position of the trailing foot heel and toes in figure 1 (page 25). The trailing foot toes have been previously set to correctly anchor and position the lower body straight ahead at the end of the throw. During the throw, the upper body rotates forward onto (not around!) the leading foot while the trailing toes remains anchored; the thrower ends the delivery directly facing the target. The trailing foot heel either remains lifted during the setup and throw (option #1, above) or the heel rises several inches off the ground during the throw to accommodate the body’s forward rotation (option #2, above). This ‘toe lock/heel rise’ controls upper body rotation, allowing the body to stop rotating when directly facing the target. Toe control helps keep the body from under-rotating (javelin hits the right side of the target) or over-rotating (javelin hits the left side of the target). The anchored trailing foot toes also helps control upper body forward lean, which is a major control of the javelin’s strike elevation. The toe angle and amount of heel lift used are determined by trial and error and are set while doing the pre-throw rotation tests described above.

**Arching-Trajectory Throw** – The stance for an arching-trajectory throw is slightly different than illustrated in figure 1 (page 25). The body faces the target more directly, is rotated less to the right and the trailing foot is not set as far back.

To set up the arching trajectory throw, face the target with the feet at shoulder width, the throwing foot, shoulder and arm aligned with the bulls-eye and the leading (left) foot pointed at about 12:00 o’clock. Step straight back with the trailing foot; the toes will be about 18-24 inches behind and about 8-12 inches to the right of the leading foot heel. Angle the trailing foot at about 2:00 o’clock. Extend the non-throwing arm to the front and level; use it to concentrate on the aim point. Extend the throwing arm and javelin
nearly fully straight back while rotating the upper body about 30-45° to the right. The head remains facing the target. Rotate the upper body to the left several times as if throwing to check that the body will remain balanced at the end of the throw. When the feet are positioned correctly, the thrower will end the throw directly facing the target and will not need to take a step to one side to maintain balance. Anchor the trailing foot toes in this position. Keep your back straight and the knees loose and slightly bent.

To set up the throw, hold the javelin shaft fairly close to the head. Look at the javelin point and tilt it up - the degree of tilt is critical and will depend on the strength of the thrower and the distance to be thrown. This angle is determined by trial and error, but it will be steeper than that used for the flat-trajectory throw. Some throwers will lean back at the waist as the throwing arm is draw back. This is a good technique as long as the trailing foot and toes are not moved out of position.

To throw, check again that the tilt of javelin point is correct for the distance to be thrown, and then make sure it is pointing straight at the target, with no sideways cant. The javelin should move from behind your head to the release point in a straight line, with a feeling of lofting the weapon into a high, broad arc. Only a little effort is needed. The ‘toe lock/heel rise’ of the trailing foot is similar to that described for the flat-trajectory throw above. During the throw, the upper body rotates forward onto (not around!) the leading foot while the trailing foot toes remains anchored; the thrower ends the delivery directly facing the target. Toe control helps keep the body from under-rotating (javelin hits the right side of the target) or over-rotating (javelin hits the left side of the target). The anchored trailing foot toes also helps control upper body forward lean, a control for the javelin’s strike elevation. Toe angle and the amount of heel lift used are determined by trial and error and are set while doing the pre-throw rotation tests described above.

**COMMENTS – BOTH THROWING STYLES** – At the javelin’s release, you should be holding it only by your thumb and index finger, with your palm and wrist working as a pivot. Do not throw side-armed, as this will cause the javelin to hit the target sideways.

If the javelin hits low, tilt the point up more prior to throwing; if it hits high, tilt the point down. If the javelin hits significantly to the right or left of the aim point even with a straight-ahead throw, reposition the trailing foot slightly to the right (for a left correction) or the left (for a right correction). This re-aligns the entire body to the correct aim point. Many throwers will rotate significantly to the left during follow-through. This is not ideal, as it may make a straight-ahead throw more difficult and post-throw balance harder to maintain, but as long as the javelin’s initial delivery is straight-ahead, this is a personal matter.

Some people find it natural to raise the trailing foot completely off the ground during the throw and follow-through. This technique can be made to work, but it is not recommended. If the trailing foot is raised, you lose toe control over the body’s amount and direction of rotation and the amount of forward lean, so accuracy usually suffers.
INTRODUCTION

Throwing sticks and clubs are percussive weapons that were used in period by cultures that did not have an iron technology and in almost every culture by poor people who could not afford iron or steel weapons.

Many throwing sticks and throwing clubs were used solely as percussive weapons, but some from Africa and Australia have sharpened heads and/or butts. The sharpened end(s) of these weapons usually served a dual purpose - as a digging stick and as a penetrating weapon. The pointed end of a 9 ounce throwing stick will penetrate a straw bale target butt about 3 to 6 inches when thrown from 20 feet (figure 1).

Figure 1- Pointed Australian throwing stick (upper weapon) and Hawaiian bludgeon dagger (lower weapon). The throwing stick was thrown from 20 feet, the bludgeon dagger from 18-1/2 feet; both penetrated this tightly packed hay bale about 3 inches.

Not all clubs intended for penetrating strikes were sharpened. A researcher in Fiji noted that the ula, a knob-headed throwing club: “... capsizes in a vertical sense and the blow is delivered by......the haft end of the ula. The haft end of the club is not sharpened to a point; ... (it is) about the thickness of a man's finger or thumb, but such is its striking force .... that it will with no difficulty transfix the softer tissue of the trunk, despite the protection of the ribs. These ula are thrown with precision to a distance of 100 feet. In one case I saw a pig pierced through the flank until the flight of the club was brought up by the head and the haft came clear through on the other side; this at a distance of 65 feet.” (Churchill, W., 1917, Club Types of Nuclear Polynesia: the Carnegie Institution of Washington, Publication No. 255, Press of Gibson Brothers, Washington, p. 33, Internet copy at Online Books- GN498.C6 C4, extended shelves).
TYPES OF THROWING STICKS AND CLUBS

In the SCA, target penetrating throwing sticks and clubs are thrown at straw bale target butts and can be either single-pointed or double-pointed. Double-pointed weapons or single point weapons with heads narrow enough to be gripped are the most practical for SCA target use. These designs have a broader range of throwing distances in which they will stick compared to single-pointed weapons that can be thrown only from one end. Penetrating-throw targets are best made from cardboard; clay pigeons make excellent non-penetrating-throw targets with good visual appeal to both spectators and participants.

Both throwing sticks and throwing clubs should be made of a moderately heavy hard wood like oak, hickory or ash. Pine or fir will work, but the weapons will be lighter and less durable. Throwing sticks and throwing clubs are easily made using an electric drill motor with a rotary rasp bit. Alternately, they can be carved by hand with a knife and a wood-rasp file. They are finished with a fine file and sandpaper. All points are rounded, which is sufficient for penetrating straw bale targets. Coat the weapons with a paste-type hardwood floor wax to protect the wood and provide good grip friction.

THROWING STICKS – Basic Australian throwing stick designs are shown in figure 2. These throwing sticks can be either single pointed or double-pointed. All three will stick in a straw bale target when thrown from about 15 to 16 feet (head stick), 20 to 21 feet (butt stick) and 25 to 26 feet (head stick again).

Figure 2 - Australian throwing sticks (self-made). All sticks are 22” long. The upper stick is made from a 1-1/2” hickory sledge hammer handle and weighs 12 ounces. The lower two are ash and are made from a rake handle. The middle stick is 1-1/4” thick and weighs 9 ounces; the lower stick is 1” thick and weighs 7 ounces. (Author’s collection).
**THROWING CLUBS** – Throwing club designs from Australia and Oceania are shown in figure 3. The Australian flared club (*upper club, figure 3*) is a double-pointed, penetrating throwing club. The middle club (*figure 3*) is the combination of a Fijian melee club design and a rare Fijian pointed-head throwing club design (most Fijian throwing clubs had large rounded knob heads). The Hawaiian bludgeon dagger (*lower club, figure 3*) is a short, single-pointed melee weapon that was used either as a short club or as a stabbing dagger. This weapon can be thrown, but it is not known if they were used that way in period.

*Figure 3* – Australian (upper), Fijian and Hawaiian throwing clubs (self-made). The upper club is ash and was made from a rake handle; it is 22” long, the maximum head diameter is 1-1/2” and the weight is 9 ounces. The middle club is 20” long, weighs 11 ounces and was made from a hickory mattock handle. This club is a combination of two Fijian designs; it has a maximum head width of 2-1/4” and a grip width of 1”. The Hawaiian bludgeon dagger (bottom) is ash and was made from a shovel handle. This dagger has a length of 17”, a head diameter of 1-1/2” and weights 7 ounces. (Author’s collection).

The head of the Australian club (*upper club, figure 3*) will stick when thrown from about 15 feet and the butt when thrown from 21 feet. The head will again stick when thrown from about 24 feet.

The head of the Fijian club (*center club, figure 3*) will stick when thrown from 14 feet and the butt when thrown from 20 feet. The head will again stick when thrown from about 26 feet.

The Hawaiian bludgeon dagger (*lower club, figure 3*) is a weapon unique to Hawaii. The bludgeon dagger was always single-pointed, with a slightly flattened blade. The pointed end of this dagger will stick when thrown from about 15 feet (rounded head gripped) and from 18 to 19 feet (pointed end gripped).
Kerries (knobkerries or tyindugo) are African throwing and melee clubs. They are typically about 18 to 29 inches long with a rounded or square-shaped knob head. The other end is either pointed or blunt. Kerries are all-around tools that are still used in Africa. They are used as a walking cane, a melee club, a throwing stick, a digging stick and when intricately carved, as a status symbol. The upper kerrie (figure 4) will stick in a straw bale target butt when thrown from about 23 feet; the lower kerrie will stick when thrown from about 22 feet. Both weapons are very accurate.

**Figure 4** - African knobkerries (self-made). Both of these kerries were made from a single oak wheelbarrow replacement handle (Home Depot, about $12). The rounded square heads of both kerries are 1-1/2” by 2”. The upper kerrie is 24” long, has a shaft diameter of 3/4” and weighs 7 ounces. The lower kerrie is 22” long, has a shaft diameter of 7/8” near the tip and 1-1/8” near the head; weigh is 10 ounces. (Author’s collection).

**THROWING TECHNIQUES FOR THROWING STICKS AND CLUBS**

Throwing sticks and clubs are some of the easiest thrown weapons to use. They are relatively long, which makes them easier to stick, and are fairly light, so they can be thrown from extended distances. Penetrating throwing sticks and clubs can be thrown at javelin targets mounted at about waist height on single straw-bale target butts. Cardboard targets are recommended, as paper targets will tear VERY quickly. The standard dimensions for Kingdom of Artemisia javelin targets are 8.5 inches by 11 inches, with a centered, 3-inch diameter bulls-eye. Typical throwing distances are 15, 20 and 25 feet. Clay pigeons mounted on the straw butts can be used for non-penetrating club strikes. One-quarter inch diameter holes carefully drilled in the centers of the clay pigeons allow them to be mounted anywhere on a straw target butt using 6- to 8-inch long, 1/4” diameter wood dowels.

Like all thrown weapons, there is no ‘one way’ to throw throwing sticks and clubs. In the instructions below, a right-hand throw using a left-leading foot is assumed. Some of the techniques described are similar to those used for javelin throwing (see previous section).
INITIAL SETUP – To keep from throwing over a waist-high target, use techniques similar to those used to adjust the elevations of thrown axes and knives. The easiest technique for controlling the strike elevation is to adjust trailing foot placement. This technique is described in detail in Appendix 3 and also below.

To set up a throw:

- Face the target at the correct throwing distance for the weapon being used and with the throwing foot, shoulder and arm aligned with the aim point. This shoulder alignment allows you to throw the weapon straight at the aim point instead of diagonally.

- Step about 12-18 inches left with the leading (left) foot, place it at the correct throwing distance for the weapon being used and set your throwing marker in front of the leading foot toes. Leading foot placement forward or back is used to control the weapon’s basic sticking distance. Point the leading toe at 12:00 o’clock. The spacing between your feet may need to be slightly wider than you use for axe and knife throwing from around 10-12 feet, as more lateral stability is usually needed for the extended throwing distances.

TRAILING FOOT SETUP – Trailing foot placement to the right or left (always aligned for a straight-ahead throw) controls the basic strike windage, while its forward or back placement controls the basic strike elevation. The weapon’s strike elevation is adjusted by changing trailing foot placement and upper body lean. This technique also can be used when switching between weapons of significantly differing weights and lengths or when throwing the same weapon from different distances. For a detailed discussion of these techniques, see Appendix 3.

Major elevation adjustments can’t be made by bending the arms alone – the weapon’s release location also has to change. Most target adjustments for throwing sticks and clubs are for lower strikes. To lower a weapon’s strike elevation, the trailing foot is moved back and upper body is bent forward. This modified stance coupled with throwing and indexing arm height adjustments, provides the release location changes necessary to hit a lower target while allowing the thrower to use the same throwing stop and weapon release point they use for axe and knife throws at chest-high targets.

The following suggested trailing toe placement adjustments likely will need to be modified depending on the height of the target, the specific weapon type used and your personal throwing style. From the initial foot placement (discussed above in INITIAL SETUP), step straight back with the trailing foot:

- For 15-18 foot throws at a waist-high target, place the trailing toe about 24 inches behind leading heel; the toes will be about 12-18 inches left of the leading heel.
For 20-23 foot throws at a waist-high target with short weapons or center-weighted weapons, place the trailing toe about 18 inches behind the leading heel; the toes will be about 12-18 inches left of the leading heel.

For 20-23 foot throws at a waist-high target with longer weapons (22-inches plus) or head-heavy weapons, place the trailing toe about 24 inches behind the leading heel; the toes will be about 12-18 inches left of the leading heel.

**FINAL SETUP** – The final setup for the throw is similar to that used for the axes and knives.

- Initially try throwing with a modified hammer grip. This usually gives the best grip control for most throwing sticks and clubs. A consistent anchor point can be set by gripping the weapon with about 1” of the point protruding from the base of the throwing hand.

- Lock both the leading and trailing knees back. Depending on personal preference, center the weight either between the feet or just in front of the trailing foot.

- Lift the leading heel slightly for trailing foot placements about 18 inches behind the leading heel. This heel lift gives strong lower body feed-back to help control forward lean. Heel lift is not needed for trailing foot placements about 24 inches behind leading heel, as the extended leading leg gives sufficient lower body feedback to control forward lean. Final setup position will end with a slight forward lean.

- Come up into throwing index position and rotate the throwing arm forward and back several times as if throwing to check the body’s balance, a straight-ahead alignment of the throwing arm at the weapon’s release point and the weapon's windage alignment. Adjust the leading foot to the left if needed to ensure that the body will remain balanced at the end of the throw and the trailing foot to right or left (always with the throwing arm aligned straight ahead) to adjust windage. Anchor the trailing foot toes in this position to control body rotation. When the feet are positioned correctly, the thrower will end the throw directly facing the target (no under- or over-rotation) and will not need to take a step to one side to maintain balance.

**THROWING** – The completed throw is similar to that done for axes and knives.

- Strike elevation is controlled by the *angle of the upper body* and not by moving the arms up or down! The final strike elevation is set by adjusting the upper body forward rotation angle to center the weapon on the aim point, using the aiming ‘U’. The throwing and indexing arms will not be horizontal, but at whatever angle is needed to center the aim point. As the throwing and indexing arms are raised, lean forward onto the leading toes and feel the weight transfer to them as the weapon is centered on the target.
• Make any needed minor elevation adjustments by raising or lowering the extended arms and then throw. There is no advantage to a fast drawback during delivery. A fast drawback tends to disturb a smooth, aimed throw.

• Depending on the elevation of the aim point and the distance thrown, the trailing foot placement may need to be adjusted for final elevation or windage control.

ALTERNATE THROWING STANCES – When throwing at extended distances (25+ feet), or for personal preference, a thrower might consider using either: (1) an across-body throw similar to that used for flat-trajectory javelin throwing; or (2) the Sportsman’s Throw. Both give a more forceful delivery, which can be useful at extended throwing distances. The flat-trajectory throw is described in detail under JAVELIN THROWING TECHNIQUES - AIMING, THROWING AND FOLLOW-THROUGH (pages 26 and 27). The Sportsman’s Throw is discussed briefly under ALTERNATIVE THROWING STYLES (page 22). The Sportsman’s Throw is discouraged for axe and knife throwing, but the lengths of most throwing sticks and clubs does make this delivery method more practical for these weapons.
HAMMER GRIP – The hammer grip is a basic grip used for turning throws of the axe or knife. All other grips are generally modifications of the hammer grip. The weapon handle is grasped as one would hold the handle of a hammer. This grip is suitable for blade throws of unsharpened knives, but not sharpened knives. (Author’s photo, 2012)

MODIFIED HAMMER GRIP – The modified hammer grip is a basic grip used for turning throws. The grip is similar to the hammer grip except the weapon is tilted forward. If the thumb is placed as illustrated, weapon rotation will be slowed. Alternately, the thumb can be placed alongside the handle or blade; this position does not influence rotation. A thumb placement alongside the handle is usually preferred for best weapon control. This grip is also suitable for blade throws of unsharpened knives. Blade throws of sharp knives can be done with this grip if the flat of the blade is gripped with the sharp edge to the left (right-hand thrower). (Author’s photo, 2012)
This section summarizes the key techniques and concepts discussed in the main report. You will need to read the main report before some of these concepts make sense.

**MECHANICS OF KNIFE AND AXE THROWING**

- Three ways to throw – overhand, underhand and side-hand. Most throw overhand.

- Two basic aspects of an overhand throw:
  
  - All weapons are released above the target point, and fall into the target. For chest-height targets, the weapon is released at about forehead level and slightly in front of your head.
  
  - A weapon thrown overhand will rotate vertically around its balance point (its center of gravity).

- Weapon Rotation
  
  - Weapons rotate because your throwing arm is moving in circular motion.
  
  - A weapon’s rotation speed is important - the faster a weapon rotates, the less forgiving it is of minor changes in throwing techniques.
  
  - How fast a weapon rotates has nothing to do with how fast you throw it. No advantage to throwing extremely hard; accuracy will usually suffer.
  
  - How fast a weapon rotates depends on the length of the throwing arc used.
  
  - The throwing arc is the length of your throwing arm (which depends on how much arm extension you use when you throw) plus the length of the weapon’s handle, measured from the base of the gripped end (handle or blade) to its balance point (center of rotation).
  
  - With experience, we all tend to develop a fairly consistent personal throwing arc. Our personal throwing arc depends on our arm length and what feels comfortable during the throw.
  
  - Weapon length then becomes a controlling factor for throwing distance and ease of sticking. Long axe or knife = slow rotation, easier to stick and
you need to stand further from target to stick it. Short axe or knife = fast rotation, harder to stick and you need to stand closer to target to stick it.

**HOW TO THROW A KNIFE OR AXE**

- No ‘one way’ to throw – throw any way you want if you are willing to work at it.

- Some techniques are going to be better than others. Look at throwing techniques not as ‘right or wrong’, but as ‘better or poorer’. A ‘poorer way’ is usually going to be harder to learn initially, more difficult to be consistent with, and will be easier to forget without constant practice.
  - Consistency – key to accurate throwing.
  - Simplicity – key to consistency.

- Throw only one length, weight and style of axe or knife while developing your throwing techniques (your form). Once your form is developed, you can throw whatever you like.

- The suggested throwing techniques discussed below are NOT the only way to throw! They are intended to show how the seven elements that make up a throw interrelate and are examples of how you can develop personal techniques for each of these elements. The elements of the throw are the key points, not necessarily the techniques suggested for each element.

- An overhand, straight delivery, right-hand throw with a left-leading foot and a right trailing foot is assumed in the all of the descriptions below.

**SEVEN ELEMENTS OF A GOOD THROW**

**FOUR ELEMENTS THAT SET UP THE THROW** – These elements are used to set a consistent, easily repeatable relationship between your body, the weapon and the target.

- **Element #1 -- THROWING STANCE**
  - **Leading Foot Selection and Centering on Target.** *Leading foot selection:* Lead with either foot as long as you are consistent. Try each foot; one will feel more natural to lead with. *Centering on target:* it is natural to center the chest on the target, but it is better to center the outer edge of the throwing arm shoulder on the target. This allows a simple, straight-ahead throw instead of a diagonal throw, which is a more complex method.
  - **Leading and Trailing Foot Placement**
    - Leading foot at throwing distance, pointing @ about 12:00 o’clock.
- Trailing foot pointing @ 1:00 o’clock, with toes about 12-18 inches to side and 12-18 inches behind leading foot heel. Adjust for balance and a vertical rotation of the arm during the throw.

- **Element #2 -- GRIP STYLE.**
  - **Hammer Grip**
  - **Modified Hammer Grip**
    - Thumb Beside Hilt or Blade - No effect on rotation
    - Thumb On Hilt or Blade - Generally retards rotation.
  - **Position Hilt Along Index Finger 1\textsuperscript{st} Joint and Remaining 2\textsuperscript{nd} Finger Joints.** Strongest tactile sense of weapon orientation and helps with the correct timing of weapon release.
  - **Weapon Release.** Smooth (not polished) grip that slides out of the hand.

- **Element #3 -- GRIP LOCATION**
  - **Consistent Location Up/Down Grip.** Changes in grip location changes the length of the throwing arc and the needed throwing distance.
  - **Anchor Point** - Set anchor point in relation to pommel (hilt throw) or knife tip (blade throw).

- **Element #4 – PRESENTATION**
  - **Non-Throwing Arm Aids Consistency.** The throwing arm and the non-throwing arm are held horizontal at shoulder height (chest-high target), with the non-throwing arm placed next to the throwing arm. This will:
    - Help set a consistent starting weapon height in the hand.
    - Help set consistent weapon angle in the hand and weapon aim.
    - Help set the initial elevation control of the throw.
  - **Weapon Height and Position.** Hold arms horizontal for chest-high targets. Don’t center the aim point with the chest but with the outer edge of the throwing arm shoulder. The throwing arm is extended straight from the shoulder, with the non-throwing arm positioned at a slight angle to it.
  - **Weapon Angle.** Locate the throwing hand thumb in the non-throwing hand palm or fingers to set a repeatable weapon angle. Use the ‘U’. The ‘U’ is the space between the weapon handle, the throwing hand thumb and the non-throwing hand index finger.
Aiming and Elevation Adjustments. Establish a consistent weapon release height by initially using a consistent target height with the arms held horizontal. When a consistent weapon release point is established, elevation adjustments are made by re-positioning the trailing foot either forward or back, then adjusting upper body lean forward or back.

THREE ELEMENTS THAT EXECUTE THE THROW – A highly dynamic process. These three elements are discussed separately, but they are always done as a smooth, continuous, integrated motion.

- **Element #5 -- ARM ROTATION**

  Strongly influences the throwing distance needed. Do not lean backward during arm rotation.

  - **Throwing From the Elbow:** Weak method. Usable, but normally results in a weak target hit. Common when fatigued or joints or muscles are sore.

  - **Throwing With a Partially Extended Arm:** Strong method, but requires developing a consistent arm extension length.

  - **Throwing With a Fully Extended Arm:** Strong method. Easy to develop consistency but may be harder on the muscles and joints.

- **Element #6 -- UPPER BODY LEAN**

  A straight delivery throwing method is described.

  - **Upper Body Lean is a Main Control of Weapon Strike Elevation.** Weapon strike elevation is determined by the amount of upper body forward lean used during the throw and the location of the weapon release point along the arc of the throw.

  - **No Excessive Forward Lean.** Excessive forward lean is a complex technique that is hard to repeat consistently.

  - **Controlling Forward Lean - Concept of a Throwing Stop** – You can’t consistently determine the weapon’s release point and thus the elevation of the throw by arm motion alone – your arm is moving too fast. The entire body is used to signal the weapon’s release point. The increasing tension building up in the joints and muscles of the waist, hips and legs during the throw is used to tell you how far forward you are leaning and to tell your arm when to let go of the weapon.

  - **Leading Foot as a Throwing Stop.** Allows precise control of the weapon’s impact elevation by setting up muscle and joint tension in lower body. Increase in this tension as the body leans slightly forward during the throw.
is easily sensed, giving strong physical feedback that tells the thrower when to release the weapon. Throwing stop techniques are a personal matter; description below is my personal system, yours may differ.

- **Initial Setup.** Place the trailing toes about 12-18 inches behind and 12-18 inches to the right of the leading heel. Lock the leading and trailing knees back and center weight between feet by leaning slightly forward onto leading toes. Lift leading heel very slightly.

- **Throwing Stance.** As the indexing and throwing arms are raised for the throw, lean slightly forward onto the locked leading knee and arched leading foot. Feel weight transfer onto leading toes as you “reach” slightly for the target; don’t simply bend at the waist. Drawback slowly and smoothly.

**Element #7 – THROW DELIVERY AND FOLLOW-THROUGH**

- **Don’t Think About It, Just Throw It!** If you mentally micro-manage the motions of the throw, it will be a bad throw. Replay the ‘mental video’ afterwards to analyze the throw.

- **Drop Indexing Arm as Weapon Passes Out of View During Draw-Back.**
  - Use indexing arm to help maintain vertical plane of throw
  - Don’t tuck the weapon behind the head or it will strike the target at an angle instead of vertically.

- **Concentrate on Target.** Don’t watch dropping index arm or the weapon will tend to go where you are looking.

- **Delivery Speed.** Medium-weight weapons (10-15 ounces): moderately fast start and moderately fast finish. Heavy weapons (16-32 ounces): slow start and moderately fast finish. Both delivery speeds executed in a smooth, seamless manner, with no pause in the delivery.

- **Throw Straight Ahead with A Smooth Release.** Keep shoulders and hips parallel to the target, with no twisting to right or left and with minimal upper body lean. No forward step, no diagonal throw, no knee-bending. Weapon slides out of hand with no wrist-flick. Smooth, continuous follow-through, with throwing arm stopping near waist level.

**CONCLUSION**

The entire body is used to aim the throw, so simplify your throwing techniques – the simplest techniques are the easiest to learn and be consistent with. These recommended
throwing suggestions might seem complex as they are presented in detail, but with
practice they are quickly assumed and executed in 1 to 2 seconds. The *elements of the
throw* are the key points to work with and not the specific techniques recommended. You
can throw any way you want if you are willing to spend the time learning how!
APPENDIX 3

THROWING TECHNIQUES
FOR
DIFFERENT TARGET HEIGHTS

Target bulls-eyes for official Royal Rounds in the Kingdom of Artemisia must be set between 40 and 60 inches high; this is about waist to chest height for most people. In many kingdom thrown weapons events, including Royal Rounds, target center heights are typically at chest height, about 50 to 60 inches (about 4.5 to 5.0 feet), and this is the height most throwers become accustomed to throwing at. In period, however, a skilled thrower would have trained to hit targets at many different heights, ranging from ground level (target center about one foot high) to as much as 8 feet high or higher. Different aiming techniques are needed to hit targets at these very high or very low heights.

A thrower using the stance they developed for chest-high targets can adjust their weapon strike elevation a few inches up or down by raising or lowering the throwing and indexing arms during sighting. To make larger elevation changes, the entire upper body must be re-positioned to change the weapon’s release location along the arc of the throw. The release location can be changed by leaning forward or back, but this will also change the location of the throwing shoulder joint, the pivot for the throw, and throwing distance will need to be adjusted for each elevation. An easier technique is to maintain the same throwing distance and weapon release point that is used for chest-high targets and adjusting the trailing foot placement and upper body rotation for the required elevation. Minor final elevation adjustments are then made by raising or lowering the throwing and indexing arms. This technique rotates the entire throwing arc either forward or back, changing the actual location of the release point along the arc of the throw (and thus the weapon’s strike elevation) while maintaining the same throwing distance and release location that is used for chest-height targets.

To lower a weapon’s strike elevation for waist to ground-level targets (around 1.0 to 3.0 feet high), the trailing foot is moved back and then the upper body is rotated forward onto the leading toes. To raise a weapon’s strike elevation for head-level targets (around 5.5 to 6.5 feet high), the trailing foot is moved forward and the upper body is rotated back. For extended height targets (around 8.0 feet high), the leading foot maintains the same position, but the trailing foot is brought forward (becoming the leading foot) and the upper body is rotated even further back. Some throwers find it awkward to reverse the leading foot and prefer to place the trailing foot just behind the leading foot and adjust their throwing distance forward slightly to compensate for the extended upper body back-lean needed for the high target.

These modified stances, coupled with minor throwing and indexing arm adjustments, provide the release location changes necessary for throwers to hit either very high or very low targets while retaining the same throwing stop, weapon release point and throwing distance they use for chest-high targets. The main purpose of the modified stance is to move the throwing shoulder position forward or back slightly compared to its usual
position. When the thrower then rotates their upper body to align the weapon with the aim point, the throwing shoulder will move back to the same relative location the thrower uses for chest-high targets. This stance rotates the entire throwing arc and either raises or lowers the weapon strike (depending on the direction the thrower stepped) while maintaining the weapon release point and throwing distance used for chest-high targets.

Keeping the same basic throwing stance and release point for all throws is important, particularly when the thrower needs to switch quickly between targets of several heights during a competition. If significantly different techniques or throwing distances are needed for each elevation change, the thrower can easily become confused and use the wrong technique for a specific elevation.

**BASIC TECHNIQUES** – First develop your throwing form until you can consistently hit near the bullseye on a chest-high target. This requires developing a consistent upper body forward lean and a consistent weapon release point using a horizontal arm presentation (see Element 4 – PRESENTATION, page 10, main report). Once this throwing form has been established, the weapon’s strike elevation is adjusted by changing trailing foot placement and upper body position to rotate the throwing arc either forward or back. This method is illustrated in figure 2 (below).

![Figure 1 - Stance for Chest-High Target](image1)

![Figure 2 - Stance for Ground-Level Target](image2)


The stance used for chest-high targets is illustrated in figure 1 and that for waist-to-ground-high targets illustrated in figure 2. Note that in both stances, the upper body geometry and the lower body feedback that defines the throwing stop are the same, but when the upper body is tilted forward (figure 2), the *actual* release location is significantly more forward and lower than the release location for the chest-high target (figure 1). The entire throwing arc has been rotated forward, resulting in a lower weapon strike. Figures 1 and 2 show that the shoulder joint, the pivot for the throw, is essentially at the same location in both stances, just behind the leading foot, so the same throwing distance can be used for each target height. This same basic relationship is also maintained for high elevation targets (7.0 to 8.0 feet), except the throwing arc is rotated back, raising the weapon strike.
The following are suggested techniques for various target height aim points. Throwers likely will need to modify some of these suggestions to fit their personal throwing form.

**GROUND-LEVEL TARGETS** – Typical trailing toe placements for ground-level targets (about 1.0 to 3.0 feet high) are about 24-28 inches behind the leading heel. A thrower who employs a slight leading heel lift as part of their throwing stop technique (see *Element 6 – Upper Body Lean, p.13-16, main report*) does not need to lift the heel when using this stance, as the extended foot placement will provide adequate lower body feedback on the amount of forward lean used.

**WAIST-LEVEL TARGETS** – Typical trailing toe placements for waist-level targets (about 3.0 to 4.0 feet high) are about 18-20 inches behind the leading heel. A thrower who employs a slight leading heel lift as part of their throwing stop technique (see *Element 6 – Upper Body Lean, p.13-16, main report*) should employ it with this stance.

**CHEST-LEVEL TARGETS** – Typical trailing toe placements for chest-level targets (about 5.0 to 6.0 feet high) are about 12-18 inches behind the leading heel. A thrower who employs a slight leading heel lift as part of their throwing stop technique (see *Element 6 – Upper Body Lean, p.13-16, main report*) should employ it with this stance.

**HEAD-LEVEL TARGETS** – Typical trailing toe placements for head-level targets (about 6.0 to 7.0 feet high) are about 6-12 inches behind the leading heel. A thrower who employs a slight leading heel lift as part of their throwing stop technique (see *Element 6 – Upper Body Lean, p.13-16, main report*) should employ it with this stance.

**EXTENDED HEIGHT TARGETS** – Extended height targets in the 7.0-8.0 foot-plus range (see *figure 3*) usually require a slightly different stance compared to that used for

![Figure 3](image-url) – Extended height target stand. The upper bulls-eye is at 8.0 feet, the lower is at about 7.0 feet. The target panel is raised or lowered by pulley and rope. This stand allows a target to be positioned at any height from one foot to eight feet off the ground.
lower height targets. Two options can be tried: (1) place the trailing toe about 6-12 inches behind the leading heel and move the throwing distance forward slightly; or (2) reverse the positions of the leading and trailing feet. Many throwers find that the trailing foot placements used for lower targets does not comfortably allow the extended back-lean required for very high targets and they prefer to switch feet (option #2). This technique is especially useful if a thrower wants to keep the same throwing distance they use for the weapon at all the other throwing heights. Other throwers find switching leading and trailing feet awkward and prefer to use a stance similar to that used for the other target heights and adjust their throwing distance slightly (option #1).

7.0 Foot High Targets – Either foot placement option (discussed above) can be tried for target heights around 7.0 foot high. If option 1 is used, typical trailing toe placements are about 6-12 inches behind the leading heel. A thrower who employs a slight leading heel lift as part of their throwing stop technique (see Element 6 – Upper Body Lean, p.13-16, main report) may or may not need to employ it with this stance.

The alternate option, reversing the positions of the leading and trailing feet, may be more comfortable for some throwers. The leading foot remains at the throwing distance used for the weapon, but the trailing foot is brought straight forward and placed with the heel either even with or slightly in front of the (now) trailing foot toe. The new leading foot is still set about 12-18 inches to the right of the new trailing foot. As the weapon is drawn back for the throw, the upper body rotates back onto the trailing foot while the leading heel is lifted slightly. During the throw, the leading toes remain anchored to the ground to help set and then to control the amount of back lean used.

8.0 Foot High Targets - To allow the back-lean required for very high targets (about 8.0 feet high or higher) the leading and trailing feet are usually reversed. This technique is described in the above paragraph. If a thrower does not switch the leading/trailing feet, the throwing distance may need to be moved forward slightly to compensate for the extended upper body backward lean required for the high target.

GENERAL COMMENTS - ALL TARGET HEIGHTS

FINAL ELEVATION ADJUSTMENTS - The final strike elevation for all target heights is set by rotating the entire upper body to center the weapon on the aim point, using the aiming ‘U’ formed by the indexing hand index finger, the top of the throwing hand thumb and the weapon’s side. The throwing and indexing arms are not horizontal, but at whatever angles are needed to center the aim point. Don’t simple move the arms up or down, but bend at the waist to rotate the entire upper body to the correct aim point.

UPPER BODY ROTATION PROBLEMS - All of the techniques discussed above require the thrower to change the actual location of the release point along the arc of the throw. First the throwing shoulder joint (the pivot for the throw) is moved either forward or back from the thrower’s standard throwing distance by changing the trailing foot position. The upper body is then rotated until the aim point is centered, which will reposition the throwing shoulder at the correct throwing distance. When using an extended
stance, it is easy for a thrower to inadvertently lean much further forward compared to their usual chest-high target lean. Don’t lean excessively forward or the needed throwing distance will be changed.

Until the thrower becomes skilled in consistently setting the correct foot placement and amount of upper body rotation for a specific target height, they may have difficulty in sticking the weapon or hitting the intended aim point. A good method to determine the upper body rotations needed for targets of different heights is to assume the foot spacing needed for the elevation to be thrown (see suggestions above) and then set up the throw as if a chest-high target was being thrown. The thrower looks down their horizontal throwing and indexing arms and sees the aiming ‘U’ in relation to the desired aim point. While keeping the indexing and throwing arms locked at the shoulder, the entire upper body is tilted forward or back on the feet until the aiming ‘U’ is at the correct aim point. DON’T simply raise or lower the arms! When a thrower becomes skilled in sensing how far they need to rotate their upper body for a particular target height, this tilt can be set directly, without going through the initial horizontal setup.

SAFE THROWING DISTANCES – Kingdom of Artemisia thrown weapons regulations state that for axes and knives, “The face of the target shall be 10 feet from the throwing line if it going to be considered for score.” (May 7, 2011, Kingdom of Artemisia – Missile Weapons Handbook Section II – Thrown Weapons, p.15). This requirement is intended to insure uniformity in conducting Royal Round testing while providing reasonable protection from weapon bounce-back.

The throwing techniques suggested above for target heights of 7.0 to 8.0 feet or more require a thrower whose throwing distance for a weapon is 10.0 feet to step over the standard 10-foot safely line with the leading foot in order to conduct the throw. Eight-foot high targets are not legal for Royal Rounds, so these extended height targets can only be used for non-Royal Round competitions. In these types of competitions, the Marshal-in-Charge can allow a slight step-over of the safety line as long as basic kingdom and SCA safety guidelines are maintained.

At the discretion of the Marshal-in-Charge, a modest step-over of the 10 foot safety line with the leading foot may be allowed IF THE THROWER’S TRAILING FOOT REMAINS BEHIND THE SAFETY LINE AND THE STEP-OVER DISTANCE OF THE LEADING FOOT IS NOT EXCESSIVE. A step-over of a foot or so will not increase the potential danger to the thrower from weapon bounce-back, as bounce-back from 8.0 foot high targets tends to either bounce up and away from the thrower or not bounce very far back towards the thrower. However, a step-over of 2 feet or more could create a potentially hazardous condition and is not recommended.
INTRODUCTION

Many SCA throwers do not set their throwing form prior to starting a practice session or competing in an event. If throwing form is not deliberately set prior to starting a session, it is very easy to start with one or two elements of your form slightly off. Five or more throws may then be needed to sort out the errors and establish a corrected form before you can start throwing accurately. A thrower who spends a few moments setting their form prior to starting a practice session will have a fair number of first-throw bulls-eyes.

Setting form is not only for precision target throwing. In a competition, not quickly setting your form may result in a non-sticking or poor scoring throw. When marshalling competitions, I have many times watched two skilled throwers approach the line - one will pause a second or two to set their form, and then make a scoring throw; the other will just throw. This thrower may make a slightly faster throw, but usually will not score or will get about 50% sticks! Two seconds spent setting form before throwing is ‘making haste slowly!’ There is little time to set throwing form in a timed competition, but having set it numerous times in practice will allow a thrower to quickly judge and assume their correct form if they recognize the value of setting form and then take the time to do it!

THROWING FORM CONCEPTS

Accurate weapon throwing consists of one-half geometry and one-half personal throwing form. If the geometry of the throw is off, form can be adjusted to compensate, but only if the thrower first recognizes the geometric errors. A skilled thrower will first assess the geometry of the throwing situation and then adjust their form to match it. A beginning thrower must first learn what correct geometry and form look and feel like for their throwing style before they can successfully improvise a non-typical throw.

Many throwers develop a fairly static style of throwing – one way of throwing for every target situation. These throwers are used to throwing Royal Rounds under ideal range conditions. In a competition, the ground may be uneven, or a quick throw from an unfamiliar position is required, or the aim point might not be straight-on to the thrower. A thrower who can not recognize these differences and quickly adjust their form usually will do poorly in a competition!

The elements of setting throwing form are:

- **GEOMETRY**
  - Throwing Distance, Throwing Angle and Target Center Location
  - Leading and Trailing Foot Throwing Line Placement
  - Throwing Shoulder Offset
Feet, Chest and Throwing Arm Indexed to Aim Point

- **THROWING FORM**
  - Centered Body Lean (Forward/Back Angle)
  - Centered Body/Target Angle (Right/Left Angle)
  - Throwing/Indexing Arms Set, Weapon Aimed
  - Slow Drawback and Smooth Throw
    - Control of Forward Lean (Elevation)
    - Control of Upper Body Rotation (Windage)

**PRECISION THROWING FORM SET**

A precision set of the throwing form is typically done before starting an extended practice session or when testing the accuracy of new weapons. Although these detailed steps may seem complex and time-consuming, with a little practice they can be done fairly quickly. The recommendations below are my personal system for a left leading/right trailing foot stance and a right-hand throw. These recommendations illustrate the concepts of setting throwing geometry and form; the details for your personal system likely will be different.

After setting throwing geometry, a throwing drill should be done to set your form (see page 51). If a throwing form drill was done but you are changing weapon types, throw the new weapon slowly about 2-3 times to establish correct muscle memory for the weapon, then about 2-3 times slightly faster to set muscle memory. Then just throw!

**SETTING THROWING GEOMETRY**

**Setting Throwing Distance, Throwing Angle and Throwing Line Target Center**

- The *throwing line target center* is a critical location. This point controls the rest of the throwing geometry and indexing off of this point insures that the throw delivery can be done straight ahead instead of diagonally.
- To set the throwing line target center, drop a plumb line from the target center. Put a nail in the ground at this point and attach a measuring tape.
- While standing on the safety line, verify or adjust the 10 foot throwing distance. Swing the tape from side to side until the tape appears to be perpendicular to the target face. This point is the *throwing line target center* on the safety line. Mark this point.
- Swing the tape to the right and left of the center point to establish or verify a square throwing line. Points 2 feet to the right and left of the throwing line target center point will be at 10 foot 2.5 inches if the safety line is square with the target.

**Setting Leading and Trailing Foot Throwing Line Placement, Throwing Shoulder Offset**

- Place trailing (right) foot toes at the throwing line target center point and then step straight back with both feet to the correct throwing distance for the weapon being used.
- The shoulder joint, the pivot for the throw, must be indexed on the throwing line target center point to allow straight-ahead throws. For most people, placing the trailing foot toe about 6” to the *left* of the throwing line target center point (right-hand thrower) will give the correct shoulder location.
• Move the leading (left) foot parallel to the throwing line and set it to the left of the trailing foot at about shoulder width. Rock slightly from side to side; the correct foot spacing will feel solid. Common foot spacing is about 12-18 inches.
• Verify that the leading foot toe is at the correct throwing distance for the weapon.

Setting Feet, Chest and Throwing Arm Indexed to Aim Point
• Step straight back with the trailing foot to your trailing foot throwing position; the trailing foot is still 6” to the left of the throwing line target center point. Typically, the trailing toes are about 12 to 18 inches behind the leading heel.
• Set two markers, one at the leading toe and another at the trailing toe.
• Set leading toes @ 12:00 o’clock, trailing toes @ 1:00 o’clock.
• With feet flat on ground, knees locked and weapon in hand, rotate upper body to the right, and left several times to locate and position the chest parallel to the target face.
• Raise throwing and indexing arms as if throwing, with the throwing arm set perpendicular to the chest and pointing straight ahead (throwing arm extended straight from the shoulder, indexing arm at an angle).
• Look down the throwing arm while it is held pointing straight ahead (arm perpendicular to chest and horizontal) – don’t move the arms to center the aim point! If the throwing arm is not pointing at the aim point, shift the feet until your body is at the correct angle to put the straight throwing arm on the aim point.

SETTING THROWING FORM

Set Centered Body Lean and Target Angles (Forward/Back and Right/Left Angles)
• Lock both knees with feet flat on ground; rock forward and back to find a centered balance point; rotate side to side to check that the chest is parallel to the target face.
• Set weapon grip. Lift leading heel slightly, lean forward to reestablish body’s center balance point. Feel weight transferring onto leading toes as the body comes back to the centered balance point on the locked knees.

Throwing and Indexing Arms Set, Weapon Aimed
• Raise throwing arm, adjust upper body lean as if getting ready to throw and re-check throwing arm and weapon’s windage (right/left) and elevation (up/down) location in relation to the aim point with throwing arm straight and the chest parallel to the target.
• If weapon and arm are not quite aligned with aim point, adjust windage by moving trailing and/or leading feet and elevation by changing the initial upper body forward lean until weapon is centered on target when it comes up to throwing position. Adjustments are done by re-positioning the feet and/or upper body lean, NOT by simply moving the arms! Weapon strike location is controlled by body position, not the location of the arms.
• Raise throwing and indexing arms and “reach” slightly for the target as the arms come up. Feel the slight weight transfer onto the leading toes.
• Set weapon on the aim point, verify that throwing arm is straight, indexing arm at an angle to it, weapon angle in the hand is correct and the upper body forward lean is correct for the elevation. Look through the throwing/indexing hands and see the aim point!

Slow Drawback, Smooth Throw, Controlled Forward Lean and Upper Body Rotation
• Drawback slowly. Use dropping indexing arm to help keep chest parallel to target.
• Throw straight ahead over a locked leading knee to control upper body forward lean.
• Feel the trailing foot locked to the ground, helping to control upper body rotation.
QUICK THROWING FORM SET

A quick throwing form set is done prior to starting a short practice session or during competitions, where there is no time or need for a precision set. The main steps discussed above are done more quickly and with less precision. With practice, the essential elements of your form set can be done in a few seconds.

THROWING DISTANCE AS AN INDICATOR OF CORRECTLY SET FORM

Inexperienced throwers will usually start a throwing session by noting their first weapon strikes as either over-rotated or under-rotated and then adjust their throwing distance until they start sticking the weapon. After a few more throws, they may again start getting either over-rotated or under-rotated strikes and will again adjust their throwing distance to compensate. Some inexperienced throwers may change their throwing distance every few throws throughout their entire throwing session! These throwers are unknowingly changing some aspect of their throwing form every few throws, which requires a compensating change in their throwing distance for reliable sticks.

Experienced throwers, using a weapon they are familiar with, will start a session standing at their correct throwing distance for the weapon. These throwers know from experience that when their form is good, they throw this weapon from a very short range of throwing distances. This distance may vary a few inches, depending on whether they have a sore shoulder joint or are less limber today. However, if their current throwing distance is about one-half foot or more from their normal distance, they immediately suspect that there is an inconsistency in their throwing form that will need to be sorted out if they expect to have accurate, consistent performance.

Setting good throwing form and sorting out throwing form inconsistencies before beginning serious throwing will allow a thrower to perform well throughout their entire session, whether they are throwing a practice session, a Royal Round or a competition. Many times while marshalling a competition or a Royal Round I have seen a thrower suddenly start not sticking their throws. It may take them 5 or more throws to sort this out (if they every do!), but the result is a final score much lower than they could have thrown. Sorting out throwing form inconsistencies and setting your correct form prior to starting an event will minimize this kind of problem.

The type of event may also influence a thrower’s approach to setting good throwing form. I have two sets of throwing distances for all my weapons. My first set is used for precision competitions like Royal Rounds, where the goal is to consistently strike a very small target at a fixed height. These events are usually not timed, so a very precise, consistent throwing form can be taken. My second set of throwing distances are used for combat competitions, where the goal is to strike a fairly large target that may be set higher or lower than typical, be a timed throw, or have to be thrown from odd locations (throwing around a wall, turn and throws, etc.). The main difference between the two forms is the amount of upper body forward lean I use. For combat events, I naturally
tend to lean slightly more into the throw compared to my precision form, as my combat form usually must be set quickly. To compensate for my natural forward lean into the target, all of my combat event throwing distances are 3 to 6 inches further from the target than the distances I use for precision events.

SUGGESTED DRILL TO SET THROWING FORM

Many SCA throwers prepare for a Royal Round session or a competition by doing about 10 to 15 “warm up” practice throws. When they start sticking the weapon, they feel ready to throw for score. Experienced throwers know that a few pre-throw warm-up exercises followed by a deliberate setting of their throwing form helps their performance. They have a deliberate warm-up system that uses the points discussed in PRECISION THROWING FORM SET (page 48). The following is an example of one such drill.

PRE-THROW WARM-UP – People who participate in sports that require good muscle control commonly do a short series of personal exercises to limber and warm up their muscles before starting. Thrown weapons are no different, as the entire body is used to aim, control and throw the weapon. Exercises to limber up the shoulders, upper body and legs can include: (1) side-to-side upper body rotations from the hips; (2) leg squats; (3) stretching arms over the head, to the front and to the sides; and (4) touching the toes.

THROWING FORM DRILLS – Each of the three drills below are done about 4 to 6 times or until your throws are consistent and accurate. If the throws and weapon strikes in a particular drill are not consistent or accurate after 4 to 6 throws, drop back to the previous drill or continue with the current drill until the problems have been resolved. For consistency, set a throwing marker for both your leading and tailing foot toes.

Drill #1 - METHOD THROWS. In this drill you are doing a slow, deliberate setting of each aspect of your throwing form. You are reminding your body of your correct throwing form. If throwing form is not deliberately set, it is easy to start a session with one or two elements of your form slightly off. There is no time limit for each throw in this drill; take the time to make sure each aspect of your form is correct.

Drill #2 - DYNAMIC THROWS. In this drill, you are transitioning your deliberately set form into a single, smooth motion. You are reminding your body how to execute the throw smoothly and not as a series of disconnected motions. Allow about 8 seconds for each throw. Start each throw by placing only your leading or trailing foot (your choice) on its throwing marker - start your count when the other foot hits its throwing marker.

Drill #3 - SPEED THROWS. In this drill, you are testing how well your throwing methods and your throwing dynamics are melded together. Allow about 4 to 6 seconds for each throw. Start each throw while standing about a foot from your throwing position. Step forward and start your count when your first foot hits its throwing marker (leading or trailing foot - your choice). This speed drill will hone your throw sequence down to its important essentials. This drill also tests whether your weapon truly fits your
physiology and style of throwing and may point out subtle inconsistencies in form that are important enough that a thrower will want to modify their throwing techniques!

These kinds of throwing drills prepare you to throw your best in an event. If a problem with your form develops during the event, you will be well prepared to quickly sense what you are doing wrong and make the necessary adjustments!
APPENDIX 5

HOW TO SELECT
A
THROWING KNIFE OR AXE

INTRODUCTION

Almost any thrown knife or axe can be stuck in a target, but some weapon designs, sizes and weights will be much easier than others for you to stick consistently and accurately. This discussion is intended to help beginning and intermediate throwers pick a suitable knife or axe design. If you intend to throw these weapons in SCA competitions, check your local kingdom regulations for any limitations or design requirements. Also check your state laws regarding possession and use of dangerous or concealable weapons.

Thrown weapons are no different than any other sport you are starting to learn – it is generally best to pick your initial equipment in the mid-range of suitability rather than at the extremes. The general ideal range for knives is about 10-16 oz. in weight and about 10-16 inches in total length (not blade length). For some knife designs, the total length may be increased to about 18 inches. For axes, the general ideal range is about 16-24 oz in weight (up to 32 oz for reasonably fit throwers) and about 14-18 inches in total length. Longer ax handles may be used for long-distance throwing (15 feet or longer). In general, weapons near the middle of the above range recommendations are best, as they will have reasonable weight and be less sensitive to poorer throwing techniques. However, personal throwing techniques, weapon preferences, and your physiology may allow weapons that fall outside the above recommended criteria to work well for you.

There are two approaches to buying a throwing knife or axe:

- Pick a weapon that falls within the recommendations listed above and learn how to throw it;
- Throw as many different weapons as you can and then pick the weapon style, weight and length that work best for you.

The internet is a good place to find discount cutlery companies – many have a large selection of reasonably priced throwing knives and axes. Inexpensive, good quality throwing knives and axes will range in price from about $15 to $35. Very inexpensive weapons (under about $15) may work for you, but they tend to have fragile wood handles (axes) and may be poorly tempered. Home-made throwing knives and axes made from mild steel flat stock purchased from large hardware stores like Home Depot or from a metal fabrication shop are a good way to get started. These weapons can be made with simple hand tools for about $2 to $4 each. Instructions for making basic throwing knives and axes are included in Appendix 7.

Some modern knives and axes can be very close in style to period weapons. An example is the modern roofing hatchet, which is very close in style to axes used in 7th to 9th century
Scandinavia (see Appendix 7). A good-quality, period-looking axe is the Cold Steel Norse Hawk®, at around $25-$30, plus shipping. Most high quality, period-correct axe reproductions will be in the $40 to $65 range. Good-quality throwing knives will range in price from around $20 to $35. High-quality commercial knives strong enough for extensive throwing can be expensive; from $40 to over $100!

Most people have two axes and two knives for throwing – this is not necessary, but it does give you something else to throw if your first one doesn’t stick. Some competitions will require you to throw two axes or knives before you are scored, so this is another reason for having several weapons. The main reason for having two matched axes or knives is to have a replacement if a weapon is lost or is too damaged to throw safely.

**WEAPON SELECTION**

The guidelines below are intended to help a person starting out in SCA thrown weapons competitions select weapons that will be reasonably easy to learn with. A more advanced thrower can use these guidelines to help define criteria that they already have experience with. Your ‘perfect’ throwing knife or axe probably does not exist. All weapons will be a mix of good personal fit and the thrower’s need to adapt their throwing techniques to the particulars of the weapon. Thrown weapons expertise is partially technical skill and partially art, with a lot of personal preference thrown in. These suggestions are not the final word on weapons selection - use this information as a general guideline only!

**KNIFE SELECTION**

Most knives used in SCA competitions are single pointed and fairly straight-bladed. Multiple-pointed knives like the Japanese shaken or Indian chakram are usually considered specialty weapons and allowed only in events intended for that type of knife.

**WEIGHT**

**Ultra-light knives (3-9 oz).** Ultra-light knives are difficult to throw, as they tend to ‘float’ (behave erratically in response to minor inconsistencies in throwing techniques). They also do not have the mass to resist strong side winds or to stick consistently when thrown with a moderate force unless they have very sharp, acute points. Ultra-light knives are usually short, so their very short sticking arc makes them harder to stick unless the thrower is very consistent. Knives in the upper portion of this weight range may throw well, depending on their overall design. With a lot of practice, ultra-light knives can be thrown well, but for beginners, a little heavier knife is usually a better choice.

**Moderate-weight knives (10-12 oz).** Knives in this weight range are usually a very good choice. They are easier on the arm than heavier knives and are more forgiving of inconsistencies in technique compared to ultra-light knives. Many of the larger commercial throwing knives are in this weight range. The heavier knives in this weight range tend to be a little easier to throw accurately, depending on style.
Heavy knives (13-16 oz). Knives in this weight range are solid stickers, and can be a very good choice, but they will require a little more arm strength to handle accurately for a long throwing session. A minor drawback to heavy knives is their slight tendency to ‘lever’ themselves out of the target with a less than solid, point-on stick, as their weight may keep them spinning slightly after sticking.

Ultra-heavy knives (17 oz or greater). Knives in this weight range are generally for experienced throwers or for those who need a period-correct knife. They stick with authority, but their weight may make them hard to throw accurately towards the end of a long session. A minor drawback to ultra-heavy knives is their tendency to ‘lever’ themselves out of the target with a less than a solid, point-on stick, as their weight will tend to keep them spinning slightly after sticking.

TOTAL LENGTH (not blade length)

Short knives (4-9 inches). Single-blade knives in this length range can be difficult to stick consistently because of their fast rotation - the rotation arc in which they can stick is very short. Throwers who successfully use knives in this length range tend to be very experienced throwers. Many inexpensive commercial throwing knives are in this length range. With a lot of practice short knives, particularly those in the upper portion of this length range may throw well. However, a longer knife is usually a much better choice for beginners.

Moderate-length knives (10-12 inches). Knives in this length range are usually very good throwers. They are easier to stick compared to shorter knives because of their moderate rotation speed. Many of the larger commercial throwing knives are in this length range.

Long knives (13-16 inches). Knives in this length range are usually very good throwers, particularly if they have point-heavy blades like the bolo or kukri designs. Some knife designs in this length range have very light and narrow blades – examples are period-design daggers, modern military fighting daggers and throwing spikes made from SKS bayonets. These relatively light-bladed knives may be challenging to throw!

Ultra-long knives (17 inches or greater). Knives in this length range can be good throwers, but need to be selected with care. Point-heavy styles like kukris are preferred by many throwers. The relatively slow rotation of these knives generally makes them very easy stickers. Excessive weight might be a concern for knives in this category. Ultra-long knives tend to be used by throwers who need a long, period-correct knife or who just want to throw something different!

STYLE

The style of knife you throw is your personal choice, but two basic style characteristics should be considered when selecting it:
**Point Shape** - Point shape and point weight influences how easily a knife will be to stick. Beginning throwers should pick fairly symmetrical blade shapes and avoid strongly curved blades that place the tip significantly above or below a line drawn through the center of the grip and main portion of the blade. Knives with strongly curved points like the kukri design can be good stickers, but it is usually best to start with a fairly symmetrical, straight-bladed design when first learning to throw. See Appendix 7 for suggested knife designs.

Point shapes that place some of the blade weight near the knife tip, like the spear-point and drop point designs (see page 74) generally will be easier to stick consistently compared to narrow, light-bladed dagger designs like the stiletto and Scottish dirk. Modern knives in this category include narrow-bladed fighting daggers. These knives can be good stickers, but the light blade usually doesn’t give a strong sense of blade position during a hilt throw and the thrower may have to work harder to achieve consistent accuracy. Many light-bladed knives are hilt-heavy and are best thrown from the blade.

**Grip Shape** – The shape of a knife’s grip will influence how consistently the knife can be released during the thrown. Ideally, a throwing knife should have a fairly straight, smooth grip (but not polished, which will feel ‘sticky’ if the hand is moist). A straight, smooth grip allows a clean and consistent release of the weapon during the throw. Grips with pronounced finger grooves, heavily textured, high friction surfaces (like rough leather) and/or large or strongly hooked pommels will be difficult to release consistently due to drag on the hand by these features. Knives with some of these features can be thrown well, but they will require a very consistent grip pressure and a clean release.

The basic style categories of knives are:

**Generic knives.** Generic knives are modern or home-made knives of no specific style. The thrower usually doesn’t care what a knife in this category looks like as long as it throws well. Most knives in this category tend to have no hand guards or grips, as these items break or fall off fairly quickly in use. Home-made versions tend to be made from mild steel flat-stock, military surplus bayonet blades or from partially-finished commercial knife blanks. Commercial knives in this category are usually made from the less-expensive, lower-carbon content varieties of stainless steel and some can be very futuristic looking!

**Modern military or civilian combat and utility knives.** Generally, these are knives made during or post World War One. Most of the knives in this category are: (1) military bayonets, either commercial versions or military surplus; (2) military general utility knives, either military surplus or commercial versions; or (3) true combat knives, of either civilian or military design. Combat and utility knives usually make good throwers, as they are designed and made to withstand the rigors of combat. Select knives with a fairly thick blade and those that do not have fragile hand guards or grips. Grips made from smooth leather or high-impact plastic are preferred. Bayonets may require the removal of various bits of hardware. This can be very easy to moderately hard, depending on the bayonet’s construction.
Military surplus knives can be inexpensive ($20-$30) while the better commercial examples can be fairly expensive ($50-$120). Make sure you buy a true military surplus or a military specifications version (if new) – cheap knock-offs that probably wouldn’t last a day of throwing are common! In general, avoid sportsman’s hunting knives – they are designed to cut up big game, not for throwing. Most tend to be too fragile to stand up to prolonged throwing. However, some heavy-duty hunting knives can be good (but expensive!) throwers. A basic rule of thumb in thrown weapons is to only throw weapons that you are willing (and can afford) to either see break when they hit the target or disappear forever in the grass!

Historic patterns. Typically, these knives are simplified commercial or home-made reproductions that are patterned after historic knives but are not exact reproductions. Knives in this category might have a blade that is a close reproduction of the original style, but will lack the hand guard or fancy grips, as these usually will not stand up to continuous throwing. Many of the knives in this category tend to be home-made, as the user will have specific ideas about what he/she wants. Avoid true reproductions, as they are usually too fragile and expensive for throwing. Consider this category if you want a knife that fits your SCA persona and time period.

CONSTRUCTION MATERIALS

Self-made throwing knives are typically made either from: (1) tempered steel; or (2) mild steel (fabrication steel). Tempered steel makes the sturdiest throwing knives but mild steel is very inexpensive, easily obtained and is the easiest to work using common tools. See Appendix 7 for suggestions on making throwing knives.

Tempered steel. Tempered steel knives are typically made from commercial, partially-finished knife blanks, military surplus bayonet blades or from flat stock obtained over the Internet or from a local metal fabricator. Partially finished knife blade blanks are an easy way to go if you can find the style you want. If you have a bench grinder, commercial blade blanks can be ground into a more desirable shape, but the blade should be water quenched frequently during grinding to preserve the temper. Most blade blanks from discount cutlery companies are in the $7 to $20 range. Full-tang styles are preferred, as rat-tail tangs tend to bend during throwing. If steel stock is obtained from a metal fabricator, tell them what you are making so they can pick the right steel. The blade will have to be tempered after you fabricate it. A springy temper is best; if the steel is tempered too hard, it will be brittle and the knife point might break in use. This is also a potential problem with knife blade blanks, unless the Rockwell hardness is known.

Mild steel. Mild steel, called fabrication steel, is sold by large hardware stores like Lowes and Home Depot or can be obtained from local metal fabrication shops. This material is commonly used in the SCA to make inexpensive loaner knives and personal knives (see Appendix 7). Knives made from mild steel should be considered semi-disposable. Cold-rolled mild steel is the best non-tempered steel to use for throwing knives. A durable, reasonable-weight knife can be made from 1/8 to 1/4-inch thick by 1 to 2-inch wide flat stock, but depending on blade shape, length and handle configuration,
expect some bending, especially if 1/8” thick flat stock is used. Generally, 3/16-inch thick by 1-inch to 2-inch wide stock is a good balance between strength and weight.

Many times, hot-rolled mild steel is the only fabrication steel available in some hardware stores. Hot-rolled mild steel bends easier than cold-rolled mild steel, but is usable. Expect the knives to bend occasionally, but bent knives are easily straightened by hammering them flat.

**AXE SELECTION**

The cheapest commercial axes suitable for throwing will cost about $15-$20. If the advertisement doesn’t say ‘hickory handle’, expect the wood handle to break after a few throws! Make sure that a wood handle can be easily changed – some inexpensive axes will only accept replacement handles similar to the one they were designed for. Well-designed and constructed axes are available for about $20 to $35 from discount cutlery companies. True reproductions of period axes are usually more expensive and are typically in the $45 to $65 price range.

Most axes used in SCA competitions are single bladed and without spikes on the head, haft or pommel. Some throwers are intrigued with multi-bladed axes, but their use in SCA competitions is not warranted, as their multiple sharp edges do make them a more dangerous weapon to handle safely. In most cultures that used them, multi-bladed throwing axes were specialty military weapons, intended to maximize the strike potential of the axe under adverse battlefield conditions. These conditions are not present on SCA thrown weapons ranges, where throwing distances can be picked to fit a weapon’s rotational characteristics. The emphasis in the SCA is not on simply sticking the weapon in the target, but doing so with precision and personal skill. There is really no compelling advantage or reason (other than novelty) to use multi-bladed axes in a SCA competition.

**WEIGHT (total weight, not axe head weight)**

Ultra-light-weight axes (less than 10 oz). Ultra-light axes can be thrown successfully, but they usually require a very consistent throwing form. Unless you have a reason for selecting an ultra-light axe, a heavier one would be a much better choice.

Light-weight axes (10-15 oz). Light weight axes may be a good choice for smaller throwers, but for many people they are still a little light for consistent performance, particularly with blade belly strikes. Axes in the upper portion of this weight range are usually a better choice, as they tend to stick better than the lighter ones. Axes in this weight range will demand consistent throwing techniques. With training and practice, light weight axes can be thrown well, but for beginners, a slightly heavier axe is usually a better choice.

Moderate-weight axes (16-24 oz). Moderate-weight axes are the best weight range for the average thrower. They have the heft to be forgiving of minor throwing technique inconsistencies and will usually stick with authority. Many period-correct axe
reproductions are in this weight range. A thrower may start out preferring axes in the lighter weights of this range, but move to heavier ones after gaining some experience.

**Moderately heavy-weight axes (25-32 oz).** Moderately heavy-weight axes are a good choice for many people if they don’t find the weight excessive. The extra weight allows these axes to stick with authority even when the blade angle is marginal or wood knots are hit. Many of the larger period-correct axe reproductions are in this weight range.

**Heavy-weight axes (heavier than 32 oz).** Heavy axes stick very impressively, but you will need to be in good physical shape to throw them accurately for long periods. Unless you have a need for a period-correct axe in this weight range, a lighter axe is usually a better choice. Heavy axes will destroy target butts with surprising speed, so check with the marshal-in-charge before using one on the throwing range!

**AXE HAFT CHARACTERISTICS AND THROWING DISTANCE**

Wooden axe hafts should be considered semi-disposable – they will break eventually! Axe handles of steel or synthetic materials are nearly indestructible, but except for a few steel-handled axes intended mostly for melee use, they are not period thrown weapon styles. Some kingdoms require axes used in their competitions to have wood hafts, others allow almost any material. Most people select a wood-hafted axe that allows a quick handle change. These hafts have an oversize section at the top that prevents the head from slipping off. A wedged haft works even better, particularly if the shaft has an oversize section just below the axe head, like that found on machinist or blacksmith hammer replacement handles. The lower, oversized section prevents the axe head from slipping down the haft and the wedge prevents the head from slipping up and off the haft. However, wedged hafts are harder to change out after they break.

Grip friction of unfinished wood axe hafts can change quickly during a throwing session if the haft alternately gets wet and then dry. An example of grip friction changing very quickly is a dry axe haft landing in wet grass. This effect can be reduced by oiling or waxing the handle or covering the grip area with copper pipe fittings.

Most of the weight of an axe is near the head, so selecting an axe haft length is mostly personal preference and the distance you want to throw from - the longer the haft the further from the target you will need to stand. Some people like the feel of short-hafted axes, while others prefer the feel of a long-hafted axe. The choice is yours! The listings below reflect my personal experiences using moderately to moderately-heavy weight axes thrown with a hammer grip. The throwing distances noted are approximate; the type of grip you use (hammer grip, modified hammer grip, or other style) and your personal throwing techniques can significantly alter these distances. Haft lengths listed are for the entire haft - depending on design, this may or may not be the location of the ax head tip.

**Very short-hafted axes (less than 9 inches).** Axes in this length range are usually more difficult to stick compared to longer-hafted axes because of their very fast rotation. Commercial throwing axes like the Gill Hibben Pro Thrower® are in this category.
Compared to a single rotation for longer-hafted axes, very short hafted axes may rotate several times when thrown from typical SCA throwing distances and will require very consistent form for best accuracy. With training and practice, very short-hafted axes can be thrown well, but for beginners, a longer haft is usually a much better choice.

**Short-hafted axes (9 to 13 inches).** Axes with hafts in this range tend to stick (for me) from about 10 to 11 feet from the target. Depending on the axe design and weight, hafts in this range may require a very consistent form to throw well. With practice, short-hafted axes can be thrown well, but for beginners, a longer hafted axe is usually a better choice.

**Medium-hafted axes (14 to 18 inches).** Axes in this length range are a good choice for most beginners. Axe hafts in this range tend to stick (for me) from about 11 to 14 feet from the target. This is a common throwing distance for axes in SCA competitions.

**Long hafted axes (over 18 inches).** Axes with hafts in this range tend to stick from around 14 to 16 feet or more (for me) unless throwing techniques are used to reduce this range. If you are throwing them in a short-distance event, you will be slightly handicapped, as you will be throwing with people standing 10-12 feet from the target.

**STYLE**

**Generic axes.** Generic axes are modern axes of no specific style. The thrower usually doesn’t care what an axe in this category looks like as long as it throws well. Inexpensive lighter-weight camping, carpentry and shingling hatchets work very well.

**Modern throwing axes.** Commercial axes specifically made for throwing (Gil Hibben Pro Thrower®, Cold Steel Norse Hawk®, etc.) are popular with some SCA throwers. Most are well-designed and made. Beginners may find some of these axes too short and light for consistent accuracy, but they can work very well for experienced throwers. Some of the commercial throwing axes in this category can be very futuristic looking!

**Historic patterns.** Sturdy reproductions patterned after historic axes are relatively inexpensive and easily obtained. Some modern axes can be fairly close to period designs and can be easily shaped with common hand and/or power tools to better resemble period axes. Consider this category if you want an axe that fits your SCA persona.

**CONSTRUCTION METHODS**

Unless you are a skilled blacksmith, making forged, eye-type throwing axes is not an option. However, modification of commercial axes to a more period design or construction of *single piece axes* and *tang-type axes* are fairly easily done by throwers who have basic tools and metal-working skills. The latter two axe types are period weapons in some cultures. The mild steel used to construct single piece axes and tang-type axes can be obtained from large hardware stores (Lowes or Home Depot) or from metal fabrication shops. Axes of these types are discussed in Appendix 7.
MATCHED KNIVES AND AXES

Most throwers initially pick axe and knife designs that appeal to them or that are inexpensive. After gaining some experience, a thrower may find a particular axe or knife design that they can consistently throw very well. This weapon just seems to fit their style of throwing. Throwers who have consciously developed or accidentally found such a ‘best fit’ weapon can select or construct a complimenting axe or knife that matches the characteristics of this weapon. The weapons of a **matched knife and axe set** may not look similar, but they will have nearly the same *feel* when thrown and usually can be thrown from about the same distance. This is a benefit in timed and alternating weapon events.

CONCEPT OF MATCHED KNIVES AND AXES

Assuming reasonably similar over-all weight and length, how the weights of two weapon’s *points* are felt by the thrower during the throw will have an important effect on their compatibility. A knife and an axe of equal weight and length but of **significantly different relative point weights** will ‘feel’ very different when thrown and most throwers will need a few throws to adjust to this difference when switching from one to the other. If two weapons have a **similar point weigh feel**, this is not necessary, as they will ‘feel’ very similar during the throw, and usually can be thrown from the same distance.

Matched weapons are not necessary when throwing Royal Rounds, as a thrower can practice with each weapon style before throwing for score. In competitions, however, the thrower may be required to throw one or two axes, followed by one or two knives at each target station before the station is scored. A thrower using matched knives and axes can switch from axe to knife and back again and throw each accurately without changing their technique or throwing distance. In a competition, these throwers will have a better chance for accurate weapon strikes compared to throwers using mis-matched weapons.

PERSONAL PREFERENCES IN WEAPON POINT WEIGHT FEEL

A weapon’s *point weigh* is felt as its *mass* in front of the throwing hand working through a *lever arm*. This lever arm extends from the top of the throwing hand to the center of the weapon’s mass in front of the throwing hand. For a given point mass, the longer this lever arm is, the heavier a weapon’s point will ‘feel’. A weapon is moving its fastest at the top of the throwing arc, so point mass coupled with the length of the lever arm it is moving through will strongly influence the ‘feel’ of the weapon just before it is released. Some throwers like a point-heavy ‘feel’ to their weapons during the throw, while others prefer a point-light ‘feel’. If the point feels too heavy to a thrower, their throwing shoulder or wrist will tend to ‘break’ slightly during the throw, causing lateral and vertical dispersion of strikes and difficulties in sticking the weapon. If the point feels too light to a thrower, they can not feel what the weapon is doing at the moment of release, so accuracy and the ability to stick the weapon usually suffers. The goal in matching personal knives and axes is to select weapon designs that have: (1) the point weight ‘feel’ preferred by the thrower; (2) the over-all weight preferred by the thrower; (3) nearly the same ‘feel’ when thrown; and (4) the same throwing distance.
EXAMPLES OF MATCHED KNIVES AND AXES

Initial weapon selection should be between weapons that have reasonably similar over-all weights and balance points. The weight difference should be no more than about 4-6 ounces (ideally under 4 ounces) and the balance point difference (measured from the pommel) should be no more than an inch or so. Weapons that differ more than this may be difficult to match.

Figure 1 illustrates a large knife and axe that look quite different but are actually fairly well matched. The kukri-style knife is 18” long and weighs 18 ounces. The Viking-style axe is 11” long, has a copper-clad grip and weighs 24 ounces. The balance point for both weapons is marked with the dowel. These two weapons have the same length from pommel to balance point and both throw from 11.2 feet. While the axe does feel slightly heavier over-all compared to the knife, the pronounced weight-forward design of the kukri and the short lever arm that the axe head moves through gives these two weapons a fairly similar ‘feel’ when thrown. When alternately thrown ‘back-to-back’ without interim practice throws, both strike fairly consistently near the same aim point.

Figure 2 illustrates a better axe match with the large kukri knife. Again, the kukri-style

Figure 1 – Fairly well-matched large knife and axe set.

Figure 2 – Well-matched large knife and axe set.
knife is 18” long and weighs 18 ounces. The francisca-style axe is 15” long, is made from 3/16” thick mild steel and weighs 18 ounces. The balance point for each weapon is marked with the dowel. These two weapons have different pommel to balance point lengths, but the grip shape of the axe forces the thrower to grasp it in such a way that both weapons have nearly the same distance from the top of the hand to the balance point. This distance determines the final throwing arc length of a weapon, so both weapons throw from 11.2 feet. The weights of these two weapons are identical and they have a very similar ‘feel’ when thrown. When alternately thrown ‘back-to-back’ without interim practice throws, these weapons consistently strike near the same aim point.

Figure 3 illustrates a knife and an axe that were specifically designed and constructed as

![Figure 3](image)

Figure 3 – Very well-matched medium knife and axe set.

a very well-matched set. The francisca-style axe is 12” long, weighs 12.4 ounces and is made from 3/16” thick mild steel. The dagger is 11-3/8” long, weighs 11.9 ounces and is also made from 3/16” thick mild steel. Although not obvious, both have the same grip shape. The balance point for each weapon is marked with the dowel. The weight and balance point of these two weapons are very similar and they have the same ‘feel’ when thrown. Both throw from 10.5 feet. When alternately thrown ‘back-to-back’ without interim practice throws, these weapons consistently strike near the same aim point.

SELECTING MATCHED WEAPONS

The three examples above illustrate that selecting matched weapons is subjective and can’t be fully analyzed. Weapons are best matched by simply picking them up and swinging them. Their comparative ‘feel’ will tell you how well matched they are for throwing. The key parameters that influence over-all ‘feel’ (in order of importance) are:

- Point weight and the lever arm the point moves through during the throw
- Over-all weight
- Grip shape

To compare two weapon’s point weight feel, grip the first weapon lightly with a modified hammer grip, the wrist held horizontal at waist level. Move the wrist and fingers slightly
up and down a few times to sense what the weapon’s point weight feels like. Repeat with the second weapon. With practice, a thrower can tell how closely matched in point weight the two weapons are. To compare the over-all weight difference between two weapons, weight them on a scale. If a scale is not available, place the balance-point area of the first weapon across the first finger joints of the throwing hand, thumb on top of the weapon. With the hand at about waist level, heft the weapon a few inches while allowing the fingers to flex slightly. Repeat with the second weapon. Again with practice, a thrower will be able to tell how closely matched in over-all weight the two weapons are.

Figure 3 illustrates weapons that were designed to have essentially the same over-all lengths, weights, point weights, pommel-to-balance-point lengths and point lever arm lengths. Even without testing, these two weapons should be a well-matched set.

In Figure 1, the kukri knife is an accurate and consistent thrower, so the axe was matched to the knife. This combination illustrates that while total point weight is important, the length of the lever arm the point moves through during the throw strongly influences point weight ‘feet’. In this example, the heavier axe head moves through a shorter lever arm length compared to the longer lever arm length of the kukri’s lighter point weight. This difference in lever arm length makes the weight of each weapon’s point ‘feel’ very similar during the throw even though there is a large difference in actual point weights. The axe was balanced to the kukri by shortening the haft, which moved the balance point closer to the head, shortening its lever arm. The haft was shortened until the balance, throwing distance and point weight ‘feel’ of the axe closely matched that of the kukri.

The weapons described in Figure 2 illustrate that while a similar grip shape is desirable, how a particular grip is grasped will also influence over-all compatibility. There is a 2-inch difference between the balance points of the two weapons in Figure 2, but when the best grips are taken on each weapon, there is only a 1-inch difference in the locations of the index finger. The distance from the index finger to the balance point is what determines the final throwing arc length for a weapon. Both weapons are also thrown with the same grip angle in the hand. These two factors reduce the effects that the differences in over-all weapon lengths and initial balance points would suggest. Both weapons throw from 11.2 feet, with essentially the same ‘feel’. The difference in grip shape does have a slight influence to the over-all ‘feel’ between them, but it is minor.

Taking the time to find a matched knife and axe set is worth the effort. The best way to have a matched set is to find or make two weapons that have nearly the same lengths, weights, point weights, pommel-to-center-of-balance lengths and point-lever-arm lengths, like the weapons described in Figure 3. Trying to ‘critically analyze’ the differences between two weapons is not worth the time, as there can be subtle differences that initially seem logical (or illogical), like the examples described in Figures 1 and 2. Additionally, a slight difference in over-all weight or point weight is not that critical to performance. Two throwers can also have very different opinions on what is a ‘matched set’, depending on their style of throwing! The easiest way to match weapons is to:
(1) pick up several axe and knife designs and compare their ‘feel’ by hefting them; and
(2) not assume an axe and knife combination is a poor match simply by looking at them!
JAVELIN SELECTION AND CONSTRUCTION

JAVELIN SELECTION

Beginning throwers will usually start with a basic javelin. Instructions for making these simple, inexpensive javelins are given below. When a thrower gains experience, they may want to construct a javelin that better fits their SCA persona and their style of throwing.

Criteria for selecting any javelin design include:

- Total length
- Over-all weight
- Point weight
- Balance Point Location (Forward Balance or Center-Balance)

Total Length – Most infantry javelins in period were about 4-6 feet long. Broom or rake replacement handles in these lengths can be found in most hardware stores and make excellent javelin shafts. Longer javelins, up to about 8 feet, were used by some cultures, particularly by light cavalry. Suitable shafts of spruce or hemlock (lighter woods than ash) can be found at many large lumber yards. These longer javelins are usually a little harder to throw compared to the shorter lengths, but some people like them.

Over-All Weight – Javelins in period needed to be light enough to be thrown about 25 to 30 yards but with enough weight to penetrate well, so they usually weighed around 1 to 2 pounds. Spears, by contrast, were longer, heavy-duty thrusting and hewing weapons that typically weighed 3-1/2 pounds or more. These weapons were only occasionally thrown. Some throwers can do well with a javelin lighter than 1 pound, but most throwers will prefer a slightly heavier javelin. Most SCA throwers do best with javelins in the 1-1/4 to 2 pound range.

Point Weight – Like throwing axes and knives, a javelin’s point weight will influence how accurately the weapon can be thrown. Some people prefer a relatively light ‘feel’ to their javelin’s point, while others prefer a relatively heavy ‘feel’.

Balance Point Location – The location of a javelin’s balance point in relation to its over-all length will influence its throwing characteristics. Some throwers do best with a nearly center balanced javelin. An advantage to a center-balanced javelin is that the balance point can be quickly felt by simply hefting the weapon. This can be a benefit during timed events. Other throwers prefer a forward balanced javelin. A forward balance puts a fair portion of the javelin’s weight in front of its center point, which helps smooth out minor throwing errors. Period javelins commonly used this type of balance. A javelin with the balance point behind its center point has poor stability and is usually difficult to throw accurately.
A javelin’s balance point is influenced by: (1) point and ferrule weight; (2) shaft length; (3) shaft diameter along the length (shaft tapered or not tapered); and (4) butt cap weight (if used). Examples of javelin lengths and balance point locations are shown below.

**Examples of Different Javelin Lengths and Balance Point Locations** – The black lines mark the balance point locations of the javelins. The upper javelin is center balanced; note the black counter-weight on the javelin’s butt that balances the point. This javelin is 45 inches (3.75 feet) long and weighs 1 pound, 11 ounces. The middle javelin is slightly forward balanced. Its length is 60 inches (5 feet), weighs 1 pound, 4 ounces and it balances 2 inches in front of the center point. The lower javelin is forward balanced. Its length is 64 inches (5 foot 4 inches), weighs 1 pound 4 ounces and balances 9 inches in front of the center point.

**LIGHT JAVELIN CONSTRUCTION**

**Materials**
- 5 foot by 7/8” to 1” diameter broom handle, threaded aluminum hexagonal head.
- 10 to 12 inch long, 3/8-inch diameter steel rod, nail (galvanized best) or SKS bayonet.
- 3/4” copper pipe end cap (if used for a butt cap)
- Upholstery tacks (if used to mark balance point and anchor point)
- Epoxy.

**Construction**

- Cut bayonet, steel rod or nail to desired length (point length plus about 1.5”). Use 8-10” length for straw bales, shorter for wood butts. Lightly sharpen with a file. Do not put a thin, sharp point on the head – it is not needed.

- Hacksaw off the threaded section of the aluminum broom handle fitting. Cut flush with the main portion of the fitting.

- Mark center of the shaft head using circle template and small straight edge. Prick center with awl, then center punch. BE AS PRECISE AS POSSIBLE!

- Place the shaft in a vise and level it with a bubble level. Pre-drill through the wood shaft and aluminum fitting with a 1/8” or 5/32” drill, taking care to keep it centered and parallel to the shaft. Counter sink (by hand) with a 1/4” drill.
• Drill out shaft with a 3/8-inch drill, taking care to keep the drill motor straight. If a SKS bayonet is used, follow with a 7/16-inch drill bit and then a 1/2-inch drill bit. The total drilling depth is about 1-1/2” inches. Test the straightness of the drilled hole by inserting the rod or nail to be used for the javelin head.

  o The rod or nail can be bent slightly in a vise if needed for a straighter installation. Rotate the shaft while looking down the shaft at the temporarily installed point. Note the location and direction of any needed bend and mark it with a permanent marker. Place the point in a vise to the depth of the drilled hole, and carefully bend, using a long piece of pipe as a lever – it usually does not take much of a bend! Test frequently.

  o The SKS bayonet is asymmetrical in shape and will need to be placed in the hole at the best angle possible – it won’t be perfectly straight. The hole can be reamed out on one side to correct a crooked drilling operation.

• File the edges of the aluminum fitting round (if desired). Cut spear shaft to desired length (if you want it less than 5 feet) and round the butt end with a knife and file. Reduce shaft diameter at the butt to accept the copper end cap (if used).

• Drill out pressed-in crimp dimples on aluminum fitting with a very small drill and epoxy on upholstery tack ‘rivets’ to cover dimples up (if desired). Wait until the epoxy had almost set up – rivets will stay in place better until epoxy sets.

• Epoxy javelin point to shaft. Epoxy on the butt cap (if used).

• Place javelin on a knife-edge and find the balance point. Mark with an upholstery tack (best), sting (glue on or tie tightly) or burn the location with a hot nail.

HEAVY JAVELIN CONSTRUCTION

Materials
• 5 foot by 1-1/4 inch diameter rake handle (handles with a steel ferrule are best).
• SKS bayonet or 10 to 12 inch long by 1/2 inch diameter steel rod.
• Epoxy.

Construction
• Cut 1/2” steel rod to desired length (10” to 12”) or disassemble and degrease SKS bayonet. Sharpen steel rod with a file or on a bench grinder. Do not put a thin, sharp point on the rod – it is not needed.

• Rake handles usually come pre-drilled. Place shaft in vise and level it with a bubble level. Carefully drill out the shaft hole with a 3/8-inch drill bit (if not
already that size), taking care to keep the drill motor straight. Follow with a 7/16-inch drill bit and then a 1/2-inch drill bit. The drilling depth is about 1-1/2 inches.

- Test the straightness of the drilled hole with a rod or dowel of known straightness.
  - The 1/2" rod can be bent slightly in a vise if need be for a straighter installation. Rotate the shaft while looking down the shaft at the temporarily installed point. Note the location and direction of any needed bend and mark it with a permanent marker. Place the rod in a vise to the depth of the drilled hole, and carefully bend, using a long piece of pipe as a lever – it usually does not take much of a bend! Test frequently.
  - The SKS bayonet is asymmetrical in shape and will need to be placed in the hole at the best angle possible – it won’t be perfectly straight. The hole can be reamed out on one side to correct a crooked drilling operation.

- Epoxy spear head to shaft. A centering jig can be made to keep the point aligned straight while the epoxy is setting. This jig is made from a piece of pipe that fits the shaft tightly (use Duct tape or a pipe insert if needed). A large fender washer whose center hole fits the javelin head tightly is taped to the other end.

- Javelin scabbards can be made from leather or from copper or PVC pipe and caps. Use a leather thong to keep the pipe-type scabbards on during transport.

**PERIOD-CORRECT JAVELIN CONSTRUCTION**

Typical SCA javelins have narrow heads made from steel rods, large nails or SKS bayonets, but most period javelins had 1-1/2” to 2” wide, leaf-shaped blades. Bladed javelins in period were sharp-edged, but a sharp-edged blade will quickly cut the twine on straw bale target butts, so their use is not allowed in some kingdoms.

Unsharpened mild steel flat stock can be used to make an inexpensive, more period-correct javelin that doesn’t cut straw bale twine. A 1-1/4” to 1-1/2” wide by 7” to 8” long piece of flat-stock about 3/16” to 1/4” thick is shaped into a tang-type javelin head (see figure below) and attached to a shaft with epoxy. Basic construction is similar to that
described above for light and heavy javelins. Installation of a shaft ferrule is recommended to strengthen the joint (see photo below). Excellent steel ferules can be found on some replacement rake handles.

Bladed javelins may not be suitable for use on wood target rounds as the tang may bend or break, but they work very well on straw-bale target butts. Depending on the size and thickness of the blade, the finished javelin will be slightly heavier to significantly heavier over-all than the typical rod or nail-headed javelins and will likely be forward balanced unless a matched-weight end cap is used. Some throwers feel these point-heavy javelins are more accurate, as a forward balance design better overcomes and controls minor shaft wobbles during the throw.
SELF-MADE THROWING KNIVES AND AXES

SELF-MADE KNIVES

Throwers with basic metal-working skills can make very adequate throwing knives from fabrication steel. Fabrication steel is an inexpensive mild steel that is easily worked with common hand or power tools. A thrower can make and try many different lengths and styles of throwing knives for around $3-$5 a knife, plus his/her labor. By contrast, good-quality commercial throwing knives cost about $15-$30 per knife, and unless the thrower has an acquaintance who owns the knife, a commercial knife must be bought untried.

Mild steel flat stock is sold in the hardware section of the larger hardware stores like Lowes or Home Depot or can be purchased from local metal fabrication shops. Suitable throwing knives can be made from 1” to 2” wide by 1/8” to 1/4” thick flat stock. Mild steel flat stock from hardware stores usually comes in 3 foot and 4 foot lengths and costs around $8 to $12 per piece, depending on length, width and thickness. Cold rolled mild steel (usually marked with blue paint on one end) is preferred for throwing knives, but many stores carry only hot-rolled steel (marked with red paint on one end). Hot-rolled steel bends easier than cold rolled steel, but it is usable.

Mild steel has two minor draw-backs when used for throwing knives – it is very malleable (it bends easily) and it cannot be tempered (it does not contain enough carbon). Malleability can be an asset, as mild steel throwing knives will bend but they will not break, chip or crack like tempered knives. No matter how wide a mild steel throwing knife is, it will eventually bend. Bending usually occurs when the knife hits hard and flat on the edge of the wood target. A knife with a minor bend can still be thrown accurately. When the bend becomes too severe, the knife is placed on a hard, flat surface (concrete sidewalk, etc.) and hammered flat.

Mild steel can’t be tempered, so thin-bladed knives (1/8” thick) may bend excessively, depending on the design. Mild steel throwing knife blades can be sharpened, but it won’t be a durable cutting edge. This is usually not a problem, as sharp edges are a cutting hazard to the throwing hand and most throwers prefer to use dull blades. Only the last 1/4” to 1/2” of a throwing knife’s tip needs to be sharp for effective sticking.

Large iron knives (which is similar to mild steel) were used during the early Migration Period (around 300-600 CE), so throwing knives made from this material is period correct. Steel (made by the pattern welding of iron) was expensive and usually reserved for high-quality swords and for small utility knives that needed a sharp blade. The typical warrior rarely used his large war dagger, so it could be made from cheaper iron.

Mild steel throwing knives are most easily made with power tools. A 4-1/2” angle grinder or a die cutter (both using a thin cut-off disk) and a 6” or 8” bench grinder are ideal tools. Unless a very intricate design is made, most throwing knives can be
completed with these two power tools in 1/2 to 1-1/2 hours. If power tools are not available, mild steel throwing knives can be cut out by hand with a hacksaw. If a hacksaw is used, simple knife patterns with mostly straight lines are recommended to minimize the construction time and effort. Alternately, a metal fabrication shop can cut out the knife for a nominal fee. All knives are finished with a file and sandpaper.

Mild steel flat stock is usually coated with *mill scale*. Mill scale is a natural oxide coating that forms after mill rolling; it is very hard and is difficult to sand off. Mill scale can be left on as a rust-proof coating, but eventually it will abrade or flake off and the underlying steel will begin to rust. Mill scale is easily removed by soaking the steel in inexpensive white vinegar for about 12 hours, then rinsing and lightly scrubbing the surface under running water with steel wool, fine sandpaper or a scouring pad. A short piece of capped PVC pipe set vertically makes a handy, inexpensive soaking container. Bare mild steel will eventually rust, so throwing knives should be painted or wax coated. Flat black or flat grey automotive primer works well, but metal paint of any color will work. Hardwood floor paste wax or other metal preservatives can also be used.

**EXAMPLES OF SELF-MADE MILD STEEL THROWING KNIVES**

Mild steel throwing knives can be patterned after a commercial throwing knife or they can be a personal design that the thrower wants to try out. The simplest and easiest to make mild steel throwing knife is the straight blade, flat-stock knife described below.

![Diagram of construction of simple throwing knives](image)

1. Buy a 3 to 4 ft. long piece of cold-rolled flat stock steel (Home Depot). Hot-rolled will work, but will bend more. A 1/2” knife is a good starting length, so a 4 ft. piece will make 4 knives. 1/8” thick flat stock will make 6 oz. knives (not recommended – too light and easily bent), 3/16” flat stock will make 9 oz knives (probably best) and 1/4” flat stock will make 12 oz knives. 1” wide stock works best.

2. Using a ruler and a fine-point felt-tip pen divide the flat stock into 1 foot lengths, then draw the points at about 20 to 25 degrees. Make all cuts with a hacksaw. See pattern below.

3. With a file or a grinding wheel, slightly thin and round off all cut edges on the tip (except for the actual point). Thin the tip slightly more on both sides of the flats for about 1/2” back. File a sharp point on the knife, but keep the point edges rounded. They do not need to be sharp to stick well.

Two knife point options are shown in the pattern above – a spear point (#2, right) and a straight point (#2, left). Throwers with large hands may want to make their knives from 1-1/4” wide by 3/16” flat stock for a better grip. These simple knives are easily made with a hacksaw and a file in about 15 minutes and cost about $3 to $4 each. They are very accurate throwers, being well balanced both laterally and longitudinally. An
example of a finished straight point throwing knife is shown in Figure 1. The black ‘hilt’ shown on this knife and on several of the following knives is painted on using flat-black automotive primer. The mill scale has been removed from these knives.

Figure 1 – Simple straight-point knife. This knife is made from 1” wide by 3/16” mild steel flat stock and has a cosmetic, unsharpened ‘edge’ filed on the point for a more knife-like look. The knife is 12” long and weighs 9 ounces.

Examples of other mild steel throwing knife designs are shown in figures 2, 3 and 4. All are made from 3/16” thick flat-stock; weights range from 12.1 to 12.7 ounces. The knife in figure 2 is made from 1-1/2” wide flat-stock and is 12-3/8” long; the knife in figure 3 is made from 2” wide flat-stock, is 11-3/8” long and 1-7/8” wide. Figure 4 (page 72) is a
throwing knife design for a Middle Eastern persona. Upswept point dagger designs are common in the Middle East (called Persia in period) and in India. The knife is made from 2” wide flat-stock and is 15-1/4” long and 1-1/2” wide near the center of the blade. This design can be thrown with the point either up or down and is an excellent performer.

Inexpensive mild steel throwing knives also can be patterned after commercial throwing knives. The lower knife in figure 5 is a Gil Hibben Pro-Thrower®, a stainless steel, tanto-pointed commercial knife made by United Cutlery. The upper knife is a self-made, mild steel copy of the Hibben knife. The copy is made from 3/16” thick mild steel flat-stock and has the same dimensions as the commercial knife except it lacks a finger cut-out at the blade heel and the weight reduction holes in the hilt. The copy is painted with flat-black automobile primer for rust protection. This knife weights 1.5 ounces more than the commercial version but throws to the same point of aim and is as accurate. The mild steel versions cost about $4 each or about $12 for a set of three knives. The commercial knives cost about $12 to $15 each and are sold only in sets of three, for a total cost (with shipping) of about $35 to $45.

**Figure 4**

**Figure 5** - Commercial stainless steel throwing knife (bottom) and a self-made mild steel throwing knife (top) patterned after the commercial knife.
DESIGNING YOUR THROWING KNIFE

Throwing knives come in a bewildering array of sizes and shapes, reflecting the individual thrower’s ideas of what works for them and what they think looks good. Some examples are shown on page 76 and a dagger pattern is shown on page 81. The following discussion will help you get started designing your own knives.

KNIFE DESIGN PARAMETERS – Many experienced knife throwers recommend that for best performance, throwing knives should be around 11 to 14 inches in total length and weigh about 11 to 14 ounces. Five parameters should be considered when designing a mild steel throwing knife: (1) knife thickness; (2) knife length; (3) knife width; (4) knife weight; and (5) knife balance.

Knife Thickness – For the average thrower, bare hilt mild steel knives should have a minimum thickness of 3/16” for best grip and resistance to bending. A long knife of reasonable weight can be constructed from 1/8” thick flat-stock but some throwers may want to put grips on these knives, as the thin material is hard to grasp. Some knife designs if made from 1/4” thick flat stock may be too heavy for some throwers when made in the recommended 11” to 14” lengths.

Knife Length – Most people find that knives shorter than about 10” to 11” and longer than about 14” to 18” are difficult to throw accurately. Some experts recommend designing your knives for about 1.0 to 1.2 ounces of weight for every inch of knife length. Using these recommendations, a 12” knife weighting about 12 to 14.5 ounces should work well for most people. Many knife designs will meet these recommendations if they are made from 1-1/4” to 1-1/2” wide by 3/16” thick mild steel flat stock.

Knife Width – Owing to mild steel’s malleability, a throwing knife width or any portion of the knife’s width that is less than 1” will usually bend too easily for practical use. A 1” width is usable if the knife is a simple, straight piece of flat-stock, but a minimum width of 1-1/8” to 1-1/4” is usually better for any wider-bladed design.

Knife Weight – For medium-length knives (11” to 14” long), 3/16” thick stock will give acceptable weights for most designs. Throwing knives that weigh at least 11 ounces and are no heavier than about 14 ounces (15 to 18 ounces for throwers who like a heavy knife) are ideal. If 1/4” thick mild steel stock is used, knife weigh may be excessive, depending on the design and the length. Mild steel flat stock usually can be found in widths up to 3”, but knife widths over 2” usually result in quite heavy knives.

The cutting areas of tempered blades are usually thinned and beveled for easier sharpening. Mild steel can not be tempered and the knife can not have a usable edge, so thinning bevels are not necessary unless the blade needs to be lightened to center-balance the knife or the thrower does it for cosmetic reasons. Unsharpened blades are preferred for throwing knives, as they are safer to grip and throw. A cosmetic bevel can be ground into the blade, if desired, to make it look more like a practical knife (figure 1, page 71),
but most people don’t bother. Only the tip of a mild steel throwing knife needs to be beveled, sharpened and pointed for adequate sticking (see figure 6, below).

Figure 6 – The most durable point for a mild steel throwing knife is diamond shaped. The diamond’s edges are thin and sharp; the central spine prevents point bending.

Knife Balance – If you intend to throw at extended distances (over about 12 feet), the knife should be designed to throw equally well from either the hilt or the blade. These knives will have about the same feel and rotation arc during the throw, irrespective of which end is gripped. Ideally, a knife designed for both hilt and blade throwing should have hilts and blades of similar basic shapes and be center balanced. A knife is considered center balanced if the difference between the center of the knife and its balance point is 5/8” (1.5 cm) or less. Center balancing a knife that will be thrown only by either the hilt or the blade is desirable, but it is not a critical factor.

BLADE AND POINT DESIGN – Mild steel is not strong enough for knife designs that have very narrow blade tips, so the following point designs are recommended:
The ‘Turkish clip point’ and the ‘California clip point’ designs as drawn above may be too fragile to be made from mild steel but the upper edge of the clip point can be straightened a little to make a more sturdy point. Very thin, narrow spear points like the stiletto and some dagger designs are not practical when made from mild steel, as they will bend excessively. These very narrow-bladed knives must be made from tempered steel. Unless you want a point design to match a specific period knife pattern (see Figure 4, page 72) one of the three symmetrical point shapes (drop point, spear point or recurved blade) is recommended. These points give the knife good lateral balance (side-to-side balance), a desirable feature on a throwing knife. The symmetrical point designs also give a firmer, more consistent grip for blade throws. Asymmetrical shapes like the clipped and upswept points can be good throwers, but most throwing knives will have symmetrical or near-symmetrical points (see examples on page 76). Asymmetrical points usually reflect the uses the knife blade was originally designed for (skinning animals, stabbing through armor joints, etc.). Most of these uses don’t include throwing the knife!

Experienced throwers usually prefer a knife’s total weight to be within a personal comfort range. However, a throwing knife’s point weight can also have an important effect on the knife’s performance. Two knives of equal length and total weight but of differing point weights will feel different when thrown. Some throwers like a point-heavy ‘feel’ to their knife, while others prefer a point-light ‘feel’. This concept is discussed in Appendix 5 in the section on MATCHED KNIVES AND AXES.

DRAFTING YOUR DESIGN – When you find a knife design or concept you like, draw and cut out a pattern from thin white cardboard or stiff paper stock. A thin cardboard mock-up will allow you to check the knife’s center-balance and what the finished knife will feel like in your hand. The hilt, blade length and over-all shape of the cardboard mock-up can be easily modified or re-done. When you are satisfied with your design, trace the pattern onto the steel with a felt-tip pen and start cutting.

KNIFE GRIPS – Many throwers do not bother putting grips on their mild steel throwing knives, as grips add cost, weight and construction effort to what is supposed to be an inexpensive, easily made knife. It is also easy to break most grip scales with a bad hit! Pick a full-tang hilt design when adding grips, as thin rat-tail tangs will bend too easily. Leather scales attached with epoxy to a full tang hilt and bolstered with two or three rivets makes a durable, period correct throwing knife grip (see examples on page 76). If thicker leather is needed, epoxy two thinner pieces together. Cut the grip scales slightly narrower than the hilt, particularly at the pommel, to protect the scales during a hilt hit. Roughen the leather and the hilt area, apply epoxy and clamp until the epoxy cures. Drill the hilt holes and install double-headed rivets (obtained from an internet cutlery supply shop) or use regular rivets. Sand the scales smooth (but not polished) and apply a leather preservative.

Simple, durable (but non-period grips) can be made from 5/8” or 7/8” ID washing machine pressure hose (about $8 to $11 for 10-foot lengths, Home Depot or Lowes). This material gives very consistent grip friction and holds up well. Knife hilts using hose grips should have two 1/8” to 3/16” steps in front of the hose section to keep it from
sliding forward during use (see axe pattern on page 81). Cut the hose about 1/2" longer than needed and heat hose in boiling water to make it more pliable. Press hose over an oversize hilt (7/8” oversize for 5/8” hose, 1” for 7/8” hose). As the hose cools, it forms a very tight friction fit to the hilt (5/8” ID hose grip shown below). Trim hose grip to fit the pommel and round off the pommel edges. Sand the grip with 150 grit sandpaper to remove the smooth surface. If left on, this surface will feel “sticky” when used with moist hands. The pommel area can be filled with epoxy and painted flat black to match the grip or left open to make the grip easier to replace if it is damaged.

Unless you have very large hands, 5/8” ID hose makes the best grip. A hose hilt can be custom fit to your hand by cutting short pieces of doweling in half or quarter sections and inserting them into the hilt from the pommel area to add slight palm or finger swells.

Ricochet's Collection - From Tim Jester
(Copied from http://www.throwzini.com/ricochet.htm)

43 - Randall Thrower
44 - Tru-bal Bowie Axe
45 - Tru-bal Model 1 (long distance 1st place trophy)
46 - 3-Bob Karp
47 - BFC Throwing Dagger
48 - Jeff Koch Sport Sticker
49 - 3-Tru-Thro mini knives
50 - Koch Diamond Head 14"
51 - Koch Diamond Head (3rd Place Netcong Trophy)
52 - Koch SS Diamond Head
53 - Diamond Dave thrower
54 - The Koch Bowie
55 - Koch Hawkeye Bowie
56 - Koch Catalina Bowie
57 - Ted Frizzell MMHW throwing knife
58 - Sheffield England?
59 - Olsen
60 - Olsen
61 - Case
62 - BFC Variation of Phillipino Thrower
63 - Gil Hibbens
64 - Edge Mark 13", Germany
65 - Edge Mark 13", Germany
SELF-MADE AXES

MODIFIED COMMERCIAL AXES - One option for making a reasonably period-correct throwing axe is to modify a modern commercial axe. An example is shown below. This modern roofing axe costs about $26 and is very similar to a pattern used in 6th to 7th century Scandinavia. The rubber grip was removed and replaced with 3/4” and 1” copper pipe and pipe fittings with a core of wood doweling and PVC pipe, then epoxied together. The under portion of the axe head was ground into a more period-correct shape.

Example of a modern roofing hatchet with a rubber grip converted into a more period-correct throwing axe. (Author’s collection)

Another way to construct a fairly period-correct axe is the stock removal method. With this method, a modern axe head is reshaped into a more period-correct design. Although it is possible to modify a commercial axe using only hand tools, an angle grinder and a bench-mounted grinding wheel will do a much quicker job. Below is an example of the conversion of a modern hatchet to a more period-correct axe (Author’s collection).
Two other easily-made axe types are: (1) single piece axes and (2) tang-type axes. Both axe types are made from mild steel flat stock (fabrication steel) using the tools and techniques discussed above for constructing mild steel throwing knives. The wide pieces needed for these axes sometimes can be found at large hardware stores (Lowes and Home Depot) but are usually cheaper if bought from a metal fabrication shop. Simple shapes can be cut out with an angle grinder or a hacksaw and finished with a bench-mounted grinder or a file. If you don’t have basic hand and power tools or want to construct an intricately-shaped axe, most metal fabrication shops will cut out your design for a nominal fee.

SINGLE-PIECE AXES –Single-piece axes are easily made from 3/16” or 1/4” thick mild steel plate. The two examples below are based on the early period francisca throwing axe used by the Franks, but single-piece axes can be cut in any shape that the thrower desired (see page 81 for patterns of slightly modified versions of these axes).

Two single-piece axes modeled after the early period francisca bent-haft throwing axe. Both axes were cut from a 3/16” thick by 18” long by 4” wide piece of mild steel flat-stock bought from a metal fabrication shop for about $6. Blade widths are 3-1/2” and hilts are styled after the Gil Hibben 1st generation throwing knife hilts. The upper axe is 15” long and weighs 18 ounces. When made from 1/4” thick stock, this axe weighs 25 ounces. The lower axe is 12” long and weighs 13.2 ounces. (Author’s collection).

The advantages of single-piece axes are similar to the advantages of mild steel knives:

- Single-piece axes are inexpensive, typically costing about $3 to $5 each. A thrower can have 3 or 4 mild steel axes for the same cost as one high-quality commercial axe. If one of these axes is lost, another can be inexpensively made!

- Single-piece axes are fairly easy to make, are almost indestructible and can be made in any shape the thrower wants. A thrower can economically test several designs or make an inexpensive copy of a high-priced commercial axe.

- The mild steel used for these axes won’t chip, crack or break like tempered axes.

- Rubber hose or wood or leather slab-type grips can be added if a grip is wanted.
These axes do have some limitations:

- Mild steel axes can’t be tempered, so a very thin blade edge is usually not practical, as it will eventually bend. The blade edge can be sharpened, but the slightly thicker edge typically used with these axes makes blade-belly sticks slightly harder to do reliably. Blade-belly strikes will usually stick well in willow or poplar wood end-cut target rounds but are slightly less reliable compared to tempered, very thin-bladed axes when thrown at side-cut lumber target panels. However, axe weight also influences belly sticking ability – the upper ax design in the photo on page 78 will do belly sticks much more reliably when made from 1/4” thick mild steel (axe weight = 25 ounces) compared to the same axe made from 3/16” thick mild steel (axe weight = 18 ounces).

- Single-piece axe designs that have a sharp upper point nearly in-line with the haft work best (see photo on page 78), particularly if the thrower relies on sticking the point instead of the blade-belly. Point sticks are best for any throwing axe design! Axe designs with light heads and long head-length (back of head to blade-belly length) and/or hafts perpendicular to the head are not recommended. Axes with these characteristics do not have the head weight to drive the blade deeply into the target and their head and haft geometry causes them to rotate out of the target after the strike. These designs will usually have a very narrow rotation zone in which the weapon will stick well.

- Like all mild steel weapons, these axes will bend if they take a bad hit. However, they can be easily straightened by hammering flat.

- Except for West-Central African throwing axes and the desperation use of late period European melee axes, all-metal throwing axes were not used in period.

**TANG-TYPE AXES** – Tang-type axes consist of a blade and integral tang, which is inserted into a slot cut into a reinforced haft (see photo below). Tang-type axes are

![African tang-type axe](image)


usually a little more difficult to make compared to modifying commercial axes or making one-piece axes. The tang-type axe (above) is an ‘authority axe’, and is a status symbol weapon. To prevent bending during throwing, a tang-type axe should have the head
positioned close to the haft and have a moderately wide tang. Tang-type axe heads can
be of any shape, keeping in mind the design limitations discussed above.

Tang-type axe heads are cut from a single piece of mild steel plate. A minimum thickness
of about 3/16” to 1/4” is recommended. A shoulder on the blade side of the tang is used
to keep the blade from moving back into the haft. The tang many times was tapered
down to about 1/2” wide or so and the tang end bent over the shaft to lock the head in.
The bent tang is just visible in the axe above. Other tang axes use a wire or leather wrap
over a rectangular-shaped tang. The tang area on a tang-type axe haft is highly stressed
and will need to be reinforced in order to stand up to continuous throwing.

A more practical tang-type axe for SCA use is shown in the figure below. It can be made
from 3/16” to 1/4” thick mild steel plate; the hickory wood haft is 1” to 1-1/4” diameter.

![Diagram of tang-type axe construction](image)

Self-made, tang-type throwing axe.

Ash replacement rake handles can be used for the haft, but ash is not as tough as hickory
and may break sooner. These axes are fairly inexpensive and can be made in whatever
shape the thrower desires. They can be constructed in a couple of hours with an electric
drill, an angle grinder and a bench grinder for under $10 per ax. If hand tools are used
(hacksaw and files), construction time will be longer. Mild steel can not be tempered, so
a very thin blade is usually not practical. Tang-type axes made from mild steel should
have a fairly acute, sharp upper point to insure good sticking.

To construct, cut a slot in one end of the haft the same width as the axe head thickness
and insert the axe head. Drill two 1/8” diameter holes through both the haft and the axe
head, and then ream them out with a 1/4” diameter drill. The head is attached with two
1/4” diameter bolts. The iron pipe support is recommended for 3/16” thick axe heads as
it adds needed weight to the axe. This support piece will also strengthen the joint and
hide the bolts on any axe. If the support piece is used, the bolt heads and nuts should be
filed down and counter-sunk into the handle to allow the pipe to slip over them. The
bolts and support pipe should be epoxied together to keep the joint from working loose.
SUGGESTED MILD STEEL KNIFE AND AXE DESIGNS

Knife pattern can be expanded up to about 16" by increasing the length in front of the balance point; axe lengths can be increased slightly. Use hilt dimensions below for a 5/8" ID rubber hose grip on any weapon.

FABRICATION DRAWING
11-3/8" by 1-3/4" by 3/16" MILD STEEL WIDE SPEAR POINT DAGGER

FABRICATION DRAWING - 14" x 3/16" MILD STEEL FRANCISCA AXE

12" x 3/16" MILD STEEL FRANCISCA AXE
INTRODUCTION

Scabbards are not needed for thrown weapons if they are used for Royal Rounds and simple competitions, as the weapons will not need to be carried any distance. For period authenticity and for competitions that require the thrower to move from target to target, some sort of weapon carry system is recommended.

Weapons in period were carried either tucked into a belt or carried in a belt, neck, arm or boot scabbard. In some cultures (e.g. Norse), axes were tucked unsheathed in the belt or carried in the hand; scabbards were rarely used. For SCA competitions, a scabbard is the safest and most secure method of carrying thrown weapons and scabbards may be required for some events. A scabbard used primarily for court wear or Royal Rounds can be of any design the thrower wants, but for competitions the scabbard and its carry position should be secure but allow a reasonably quick and consistent weapon draw. This is usually best done with a waist-belt scabbard. Scabbards designed for competitions will have slightly different requirements compared to general wear scabbards.

Most long weapons can be simply tucked in the belt. This open belt carry is a good method for axes, as the head will keep it from sliding off the belt, but it is not as desirable for knives. Minor cuts are possible with an open belt carry of any weapon and the draw angle may change from throw to throw depending on how the weapon rides in the open belt. Four belt-carry methods can be used: (1) hip carry, (2) small-of-back carry; (3) kidney carry (weapon is positioned half-way between the hip and the small of the back); and (4) cross-draw carry.

DESIGN AND CONSTRUCTION

COMPETITION SCABBARDS – The easiest and quickest weapon carry for competitions is the cross-draw scabbard carry. With this carry, as the hand draws the weapon, the throwing arm will be moving through a smooth, short arc that naturally flows into the aiming position. Competition scabbards also should be designed to carry two weapons, as the more realistic competitions will allow two weapon throws before scoring, but will not allow retrieval of the first-thrown weapon for the second throw (a real enemy wouldn’t give you that opportunity!). A simple cross-draw scabbard has a single belt slot on the scabbard’s outside edge - the belt is passed through the slot from the back and crossed over the front of the scabbard. This design gives very secure weapon retention, precise positioning of the weapons on the belt and a fairly quick draw.

TOOLS AND MATERIALS – Thrown weapons scabbards are best made from 1/8” thick split leather (one side is smooth). Tools and materials include:

- Leather pieces of suitable size;
- Heavy paper to lay out and test-fit the scabbard pattern;
- Soft-lead pencil to trace the pattern;
- Utility razor knife or box cutting knife;
- 1/4” long double-headed brass or nickel rivets (“rapid rivets” – both sides dome-shaped);
- 1/16” diameter leather punch or an awl;
- Medium-weight hammer;
- Small block of wood or plywood;
- Medium-cut file;
- Leather preservative (Hubbard’s shoe oil or hardwood floor paste wax);
- Leather dye (or you can leave the leather its natural color).

**SCABBARD DESIGN** – Thrown weapon scabbards can be of any design, especially if the thrower is a skilled leather worker. For unskilled leather workers, two easily constructed designs are the **two-piece scabbard** and the **folded scabbard**. Both designs are put together with double-headed rivets, which are simpler and easier to use than sewing. Rivets were occasionally used on early period scabbards, so they are period-correct. **Tandy Leather®** is a good source for leather supplies, rivets and tools.

Three basic scabbard designs are shown below. For clarity, these scabbards have been set slightly more to the front than they would be during use. Figure 1 shows a two-piece scabbard hung from two belt slots. This design is good for large knives and large single-piece axes; the scabbard mouth can be made wide enough that most weapon handles can be set in a cross-draw position even though the scabbard hangs straight down.

![Figure 1](image)

**Figure 1** – *Two-piece vertical scabbard with large knives in a cross-draw position. The upper hilt is tilted up slightly so it rides above the lower hilt (a high/low carry). This allows a clean grasp of the higher knife, which will be the first thrown. The upper knife is*
drawn first to minimize hilt interference during the draw. The very wide points of these kukri knives require a wider than usual scabbard (see Figure 4). Figure 2 shows a cross-draw folded scabbard, a good design for small to medium knives.

Figure 2 – Folded cross-draw scabbard for small to medium length knives. The outer knife’s hilt protrudes slightly more from the scabbard mouth compared to the lower hilt (a side-by-side carry). This allows a clean grasp of the outer knife hilt, the first thrown.

Figure 3 shows a cross-draw folded scabbard that is a good design for small to medium single-piece axes. Eye-type axes are usually too bulky for this design and will require either an open belt carry or a belt loop carry.

Figure 3 - Folded cross-draw scabbard for small, single-piece axes. Note that the upper hilt is tilted up slightly so it rides above the lower hilt (a high/low carry). This allows a clean grasp of the lower (outer) weapon, which will be the first thrown. This scabbard is
designed so that the upper axe will drop down into the first axe’s position after the first is drawn. This gives the same draw angle for both weapons.

**SCABBARD CONSTRUCTION** – Leather is bulky and tight folds are not possible without damaging the leather, so lay out your paper pattern with generous allowances for any fold. Place your weapon(s) on the paper and decide how you want the finished scabbard to look and function. In all cross-draw designs for two-weapon carry, the weapon hilts need to be separated slightly to allow a clean grasp of each weapon. This is done by: (1) making the scabbard a little tight (front to back) so that the weapons can be set one on top of the other, with one hilt protruding slightly more from the scabbard (a side-by-side carry); or (2) making the scabbard wide enough so that the upper hilt can be tilted up slightly to ride above the lower hilt (a high/low carry);. A high/low carry is a good method for weapons with grips, as grip interference is minimized. Size the belt slot(s) wide enough to fit your preferred belt when setting the scabbard in the cross-draw position. Typically, this slot will be slightly wider than your belt. Cut, modify and/or start over until you have a paper pattern that will fit your weapon(s).

Trace your paper pattern on the smooth side of the leather and cut out. Mark the rivet hole locations. Depending on weapon point shape, rivet spacing between 3/4” and 1-1/2” work well; make sure rivet locations and spacing look artistically “balanced”. Use a leather hole punch (ideal) or an awl to punch a rivet hole in one side of the leather. Position the other side of the leather in its correct location and mark through your first hole to locate the second rivet hole. Punch out the other hole, insert the rivet’s shank, cap it and place the base on a block of wood. Smartly tap the cap end with a hammer to set the rivet. Repeat until the scabbard is done, taking care to keep the edges aligned.

**Two-Piece Scabbard** – A two-piece scabbard consists of two leather pieces laid rough-side to rough side and then riveted together. This is a good design for large weapons (see Figures 1 and 4).

![Figure 4 - Two-piece vertical scabbard for large knives (see Figure 1). Scabbard is 11-1/2” by 6-1/2” wide. Rivet spacing is 1-1/2”, adequate for wide-point knives. The rivets](image-url)
on the central portion of the scabbard and in the upper corners are decorations only. The scabbard was dyed dark brown before a leather preservative was applied.

**Folded Scabbard** – Folded scabbards are the best design for a true cross-draw carry (Figures 2, 3, 5 and 6). Some adjustment of your pattern likely will be needed to insure that friction on the weapons is adequate to hold the weapons in the position you want to use (high/low carry or side-by-side carry). Friction will be a little tighter in actual use when the belt is tightened over the scabbard. Make sure that the scabbard will allow positioning the weapons so that there will be no hilt interference between them during the draw. It is usually best to design your scabbard a little over-size and then trim as needed.

First cut out your pattern, then fold the leather over your weapons and test how tight they are held. The fold can be tightened a little by lightly hammering the fold. Don’t make an excessively tight fold or surface tears or cracks may form in the leather. A tighter fold can be made if the leather is soaked in water to make it more pliable. Let the leather dry completely before continuing construction - this may take several days.

![Folded cross-draw scabbard for small to medium knives. Knife is shown in its scabbard carry position. Scabbard is 10” long by 4-1/2” wide and will hold two knives at least 11-1/2” long. The upswept point mild steel knife shown is 14-1/2” long. Rivet spacing is 3/4”. This scabbard will hold two upswept-point, bare hilt daggers in a side-by-side carry (see Figure 2) or two straight blade daggers, either bare hilt or with grips, in a high/low carry. A scabbard used only for the side-by-side carry of two straight blade, bare-hilt daggers would not have been made this wide. The scabbard was dyed dark brown before a leather preservative was applied.](image)
Figure 6 – Folded cross-draw scabbard for two small to medium size, single-piece francisca-style axes set in a high/low carry (see Figure 3). Axe is shown in its scabbard carry position. Scabbard is 8-1/2” long; the bottom is 3” wide and the widest part is 5”. These last two dimensions are sized to fit your particular axes and whether you want to use a high/low carry or a side-by-side carry. Rivet spacing is 3/4”. This scabbard will fit axes with head lengths (the blade belly to back of head length) between 3-1/2” to 4”. The head length on the axe show is 3-1/2”; total length is 12”. This design can be used with axes up to about 16” to 18” long. The scabbard is the natural tanned leather color, which was slightly darkened by the leather preservative.

FINISHING THE SCABBARD – Trim all scabbard joints flush with the utility knife. Carefully bevel and file smooth all leather edges and joints. If the utility knife is used, be careful not to over-trim! If the scabbard is to be dyed (Figures 4 and 5), wipe off any oil with rubbing alcohol or a leather cleaner, let dry and then dye (use rubber gloves!) After letting it dry about 24 hours, coat the leather with a leather preservative. If not dyed, (Figure 6) coat scabbard with a leather preservative, let dry 24 hours and then re-coat.

WEAPON DRAW – There are two basic weapon draws from a cross-draw scabbard or cross-draw open belt or belt loop: (1) throwing-hand draw; and (2) alternate-hand draw.

Throwing-Hand Draw – This is a good draw method for small to medium axes and knives. The weapon hilt(s) are carried in the correct orientation for throwing when the hand grasps and draws them.

Alternate-Hand Draw – This is a good draw method for the open belt or belt loop cross-draw of large axes and the scabbard cross draw of large knives if their hilts can not be positioned across the body. The weapon blade edge(s) are carried facing forward (axes in open belt or belt loop) or to the back (knives in a scabbard). The throwing hand is held straight ahead in the throwing position while the alternate hand draws the weapon, rotates it into the correct position and pushes it forward into the waiting throwing hand.
APPENDIX 9

TARGET STAND AND TARGET PANEL CONSTRUCTION

THROWN WEAPONS TARGET STAND
(SUITABLE FOR END-CUT ROUNDS OR SIDE-CUT PANELS)

45 Degrees

45

2.5*

1"x2"x3"

(Install if 2" by 2" target panels are used)

12" galvanized nail

66"

2" by 2" brace and 2 drywall screws (one on each leg)

2 3/8 holes

3/4" holes in short legs allow legs to be spread out when the stand is set up. Target support arms and short legs can be notched and the pieces inset together. Notching is not necessary if the braces are used.

Constructed from three 2"x4"x8 ft pieces
Stand held together by a 6" long, 3/8" diameter carriage bolt, wing nut and two 1" diameter washers
Target support arms and 2"x2" braces attached with dry wall screws.

2 FOOT BY 2 FOOT AXE AND KNIFE TARGET

TARGET PANELS CONSTRUCTED FROM SIDE-CUT LUMBER

MATERIALS:

2 - 2" by 10" by 2'
2 - 1-1/2" DRYWALL SCREWS
4 - 2" by 8" by 2'
2 - 1/8" ROPE
20 - 2-1/2" DRYWALL SCREWS
2 - SMALL WASHERS

When the center panel becomes too damaged for use, loosen the 4 screws on the panel back and reverse the panel. When the second side becomes damaged, replace the panel.
Target stand and side-cut target panel set up for use. Attachment rope not shown.

Two-foot by two-foot axe and knife target panels made from finished pine lumber can be used when suitable end-cut tree trunk sections are not available. They also provide a larger target area for competitions. However, the side-cut grain of the wood and the occasional small knot do require the thrower to throw with at least moderate force. Side-cut lumber is less forgiving of poor weapon strikes compared to soft wood, end-cut target rounds. In the Kingdom of Artemisia, target panels are not allowed for Royal Rounds but they are used for selected competitions, where they better mimic real-life conditions.

APPENDIX 10

THE ZEN OF WEAPONS THROWING

The Japanese samurai were a warrior class in medieval Japan that blended extraordinary
weapon skills with an ability to use those skills in a focused manner, no matter how
chaotic the situation. This focused sense of detachment in many instances came from
practicing Zen Buddhism. The three points below are adaptations of several Zen
Buddhist concepts to thrown weapons. Similar concepts have been adopted by many
martial arts disciplines:

1. Seek perfection in throwing, knowing that it can not be reached.

2. Become detached from competition score or a comparison with others. YOU are
your ONLY competitor. Seek to surpass your previous best effort and ignore the
efforts of others, except as lessons to help you throw better.

3. The essence of the throw is two-fold: RIGHT FORM and FOCUSED INTENT.

   • **RIGHT FORM** – Right form is your personal, refined stance and throw. It is
   simple, easy to repeat consistently, and in balance with your particular body and
   mind. Right form allows you to flow smoothly from one part of the throw to the
   next without disturbing your body's balance or your mind's focus. There is no
   single, right form or way to throw but there will be a right form for you – find it.

   • **FOCUSED INTENT** – Focused intent is the gathering of your entire essence –
   mental, emotional and physical – into a single point that is the target point. Intent
   is released at the target the same moment the weapon is released – the thrower
   WILLS the weapon into the target point with full, focused INTENT to strike it.

Some throwers might read the above ‘philosophy’ and think: “Why is he talking about
this stuff – I just want to learn to throw better!”

We live in a highly competitive society. Some throwers want to learn to throw better so
that they can beat their friends in the next competition or rank higher than them in Royal
Rounds. However, the study of martial arts, of whatever type, is ultimately about self-
discovery and self-improvement – it is not about winning all the time. Your ultimate
competitor is not your friends but yourself!

RIGHT FORM is the distillation of throwing techniques into a style that works best for
you. You might simply want to perfect your axe, knife and javelin techniques for bulls-
eye throwing. However, a well-rounded warrior in period also would be accomplished in
throwing these weapons under more and different conditions than found in a bulls-eye
competition. They would train to hit small targets several feet above, below and to the
right or left of the standard bulls-eye target and from different positions. They would
train to change weapons and throw each accurately with the first throw, instead of having
a pre-competition warm-up for each weapon as we do on the target range. RIGHT FORM encompasses all of these differing situations!

The other ‘philosophical point’ is the concept of FOCUSED INTENT. Many times while instructing beginners I have seen a very real and noticeable lack of intent by the thrower to really hit the target. Their entire body language during the throw is similar to what you would expect to see if they were handing someone a book! Lack of focused intent is occasionally seen even in skilled throwers, but I see it most often in older women and in younger throwers who do not have much experience in competitive sports.

When asking for help, unfocused throwers generally say “my throws aren’t sticking – should I throw harder?” Intent has not so much to do with how hard you throw, but what you intend the weapon to do. Focused intent is the thrower’s complete concentration with sticking the weapon into the target point. When a throw is done with focused intent, the thrower’s body motions, mental concentration, and breath are gathered and then focused onto the weapon’s strike point as it is thrown. To help concentrate their focus, some throwers may even forcibly expel their breath with a nearly audible HUH at the moment the weapon is released. Focused intent works by melding a thrower’s techniques into a single, smooth, focused throwing motion instead of a series of mechanical motions that may be technically correct but are essentially unconnected.

A light throw done with focused intent will generally stick with authority because the thrower really intends to strike the target. A light throw done without the intent or desire to really strike the target many times simply will not stick!

RIGHT FORM AND FOCUSED INTENT - A FURTHER DISCUSSION

For those interested in further exploring the concepts discussed above, the following is a very brief, very simplified introduction to the Japanese concept of HARAGEI, the core of many martial arts systems in feudal Japan. In its simplest form, HARAGEI is the use of internal energy and will (ki) centralized (hara) into the desired external action.

BALANCE (HARA) -- Hara is centralization and integration. The body, mind and emotions are calm and in balance. The essence of balance in any martial art is the absence of unnecessary tension.

RIGHT FORM -- Right form is the balanced use of correct technique for the particular weapon used and for your particular body. A good teacher demonstrates right form and then helps the student determine which of the many variation of right form can be best used by that particular student for that particular weapon. The teacher also defines and helps the student understand the differences between the variations of right form (any of which are desirable) and poor form (which is not desirable). The student is responsible for doing right form, not their uninformed, personal interpretation of what they think right form should be. Valid changes to right form can be done by the student only after they have gained experience and can understand how to make meaningful changes.
**SKILL** -- Skill is the trained physical ability to use right form. The student must physically train their body and mind to do right form until it becomes second nature and their body can flow through the correct motions of the throw effortlessly and *without* conscious control.

**INTENT (KI)** -- Ki is centralized, extended energy, or intent. Intent is what the thrower wants the weapon to do. Intent in thrown weapons is a focused willing of the weapon into the aim point. Intent in thrown weapons delivery is LINEAR, the extension of coordinated internal energy and power (ki) in a straight line from the hand to the target. For thrown weapons, even though the hand motions are circular, the intent is linear. If the intent is circular, the delivery is usually weak, unfocused and the weapon may be lofted during the throw -- and the resulting weapon strikes will be all over the target!

In summary, a good thrower faces the target with a calm, balanced mind and body and sets up the throw using their particular right form and correct technique. They then pause for a moment to release unnecessary body tension, retaining only the tension needed for a good throw. They focus intently on the aim point, and while maintaining that intense focus, throw without thinking or conscious control, letting their learned muscle memory and the skills developed from many throws control their motions. They see the weapon strike the aim point, then pause a moment to mentally re-play the throw (both its good and bad aspects) to help them set up the next throw.