

**THROWN WEAPON TYPES
AND
THROWN WEAPON USE
500 BCE TO 1600 CE**

A STUDY
FOR
PARTICIPANTS
IN THE
SOCIETY FOR CREATIVE ANACHRONISM'S
THROWN WEAPONS PROGRAM

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This study is not a rigorous Arts and Science research project. It is a working document intended to help SCA members interested in thrown weapons to better understand period thrown weapon types. It also provides suggestions for the practical construction of many thrown weapons not currently used in the SCA, with proposals for their use in competitions. These suggestions and proposals are preliminary and are not intended to imply official Kingdom of Artemisia or Society for Creative Anachronism policy or guidelines.

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PREFACE

Thrown weapon use and events are becoming popular in the Society for Creative Anachronism (SCA). This study is intended to help SCA participants select authentic weapon types that could have been used by their persona. This study also discusses weapon types that are not commonly seen in SCA competitions.

This report discusses four main types of thrown weapons – (1) javelins and spears, (2) axes, (3) knives and (4) percussive weapons. Other types of thrown weapons were used in period, including slings, staff slings, etc., but these four categories cover the most common thrown weapon types that are reasonably practical for SCA use.

Except for javelins and certain types of hunting weapons, thrown weapons from about 500 BCE to 1600 CE were typically used as: (1) diversion weapons or (2) weapons of last resort. Thrown weapons can be lethal, but thrown clubs, axes and knives were used as much to distract and confuse the enemy as to kill. While the enemy was stunned or disoriented by pain, the thrower had an opportunity to either escape, attack with a more efficient melee weapon or attack from a better tactical position. Unless the thrower was highly skilled in their use, a thrown axe or knife tended to be an act of desperation, done when there were no other options. A person under attack usually does not throw away his/her weapon unless they are desperate or unless they have more than one!

Thrown weapons, particularly javelins, can kill quite well, but thrown weapons do not have the same force and penetration that the same weapon would have if used as a melee weapon, wielded by a strong arm. There are only a few, fairly small areas in the human body (the eyes, throat and portions of the abdomen and spine) where you can hope to quickly incapacitate your enemy with a thrown axe or knife. TV and movies to the contrary, a thrown weapon strike in the chest may or may not be effective; evolution has given the chest area a lot of bone to protect the vital organs, and only a weapon that slips between two ribs is likely to accomplish a stopping hit. Other hits to the human body may inflict a serious wound, but it will probably not stop your enemy!

A 6th century Frank warrior attacking his enemy's shield wall with *angon* (a thrown javelin) and *francisca* (a throwing axe), a 12th century samurai-class woman fending off an assassin with a thrown *tanto* (a knife) or a 16th century Sikh covertly dispatching an enemy sentry with a *chakram* (a steel throwing ring) all have one thing in common; they are gaining time to deploy a more efficient melee weapon or obtain a tactical advantage.

For the Frank, the *angon* hopefully will stick in his opponent's shield, weight it down and make it useless, and the *francisca* will gash his opponent's face – these thrown weapons open a gap in the enemy shield wall and render his opponent unprotected and confused when the battle lines close.

For the samurai women, the quick knife draw from her sleeve and its throw hopefully will allow her time to seize the spear lying next to the pillow and dispatch her assailant.

For the Sikh, the *chakram* thrown into the sentry's face from 10 feet hopefully will stop the sentry's sword draw long enough for him to be dispatched with a knife thrust.

SCA thrown weapon marshals should keep in mind the limitations of period thrown weapons and design realistic competitions that reflect these limitations.

THROWN WEAPON TYPES AND THROWN WEAPON USE 500 BCE TO 1600 CE

1. INTRODUCTION

Thrown weapons events in the Society for Creative Anachronism (SCA) are becoming popular, but the average participant knows little about the how the weapons were actually used in period or of the many different varieties that existed. This study will explore some of the different types of thrown weapons used in period by various cultures and discuss how they were used.

This study is an introduction to the more common thrown and throw-able weapons used throughout period but it is not an exhaustive overview. This is an ongoing study, with thrown weapons from Europe currently much better described than weapons from China.

This study will also discuss *percussive weapons*, a thrown weapon type that has not been previously used in Kingdom of Artemisia competitions. Percussive weapons include throwing sticks, clubs and boomerangs of various types that were used by cultures without an iron technology or by those who could not afford steel weapons. Some cultures preferred to use these weapons for specific activities, like bird hunting.

The purpose of this study is to present information that will allow SCA participants to:

- Select weapons that more closely resemble what their persona would have used;
- Have a starting point for additional research into a specific weapon type;
- Select weapons that they are interested in learning to throw, even if the weapon does not “fit” their persona’s culture;
- Learn to throw period weapons that are different from the thrown weapons types usually seen at SCA events.

SCA members who become interested in thrown weapons generally start throwing with loaner weapons. These weapons tend to be generic in both time and culture, with the local marshal selecting them because they are inexpensive, easily made and will take the abuse that a beginner will naturally inflict on them. Some of these weapons may be only vaguely period in design and some may not be period at all.

When a thrower’s interest in thrown weapons deepens, they usually will want to make or purchase personal weapons that match what their persona might have used. The purpose of this report is to give throwers the background information to make authentic weapon selections and to present suggestions for the construction of relatively inexpensive,

reasonably period correct weapons suitable for throwing. Information on weapon construction and suggested events using these weapons are presented in Appendix 2.

The selection of correct period weapons does not have to be limited to the common weapons found in the culture of a SCA member's persona. People raided, migrated, and traveled more in period than most people realize. The Roman Empire in 100 BCE to 400 CE encompassed many different cultures. The Northern European Vandals were invading North Africa in 450-500 CE and the Vikings were raiding and trading in the Mediterranean and throughout Eastern Europe, Russia and the Balkans in 700-1000 CE. Periodically throughout much of period, Central Asian tribes ("Mongols") invaded Eastern and Central Europe. The end of the First Crusade in 1099 opened up the Middle East to trade, travelers and pilgrims, and the later Crusades continued this interchange of ideas and materials until the late 1200's. The Muslim conquest of the Iberian Peninsula in early 700 CE and the long Spanish *Reconquista* of the area, which ended in 1492 CE, allowed much interchange of materials and ideas. Marco Polo's return from his travels to India and China in 1295 initiated a long period of trade between Europe and the Far East. Portuguese and Spanish trade with Africa, India, China, Japan and the Americas in the late 1400s and throughout the 1500s brought many new ideas and materials into Europe.

These historical trade and cultural interchanges allow a SCA member whose persona is European to reasonably use many weapons from the Middle East, the Far East, the Americas and Africa. It is not inconceivable that a 15-16th century Frenchman could buy and learn to use an Indian chakram (a circular knife) or a Japanese bo-shuriken (a small throwing rod) from a sailor in Lisbon, fresh from a trading voyage to the Far East. Neither is it inconceivable for a 9th century Viking to use a Middle Eastern jarid (a short, center-balanced hunting javelin) or a vaned javelin that he had acquired during a trading voyage to Alexandria. These weapons were not the traditional weapons of the appropriate European cultures, but people in period who were serious about developing their thrown weapon skills would very likely be looking for the most efficient and easily used weapons they could find. These exotic personal weapons would allow their user to give an enemy (who might not even recognize the object as a weapon) a very lethal surprise!

2. GENERAL DEFINITIONS AND LIMITATIONS

The term "period" used in this study encompasses world history from 500 BCE (Before Common Era) to 1600 CE (Common Era). Thrown weapon types and their use typically can not be tied to specific years - most of these weapons were used over a broad, usually poorly constrained period of time. Because of this limitation, the time-use ranges assigned to specific weapons are usually generalized to *early period*, *mid-period* and *late period*. For this study, "*early period*" is defined as 500 BCE to 1000 CE, "*mid-period*" as 1000 CE to 1300 CE and "*late period*" as 1300 CE to 1600 CE.

The term "Indo-Persian" as used in this study denotes the modern Indian subcontinent (including Turkey, Pakistan, Afghanistan and neighboring areas) and most of the Middle East, including Saudi Arabia. The many Persian (modern Iran and Iraq) and Indian kingdoms that rose and fell in period across this area allowed the rapid dispersal of

weapon types, so many similar weapons exist in these cultures. When used, the term “Indian” refers to “East” Indian.

The term “Oceania” as used in this study denotes all of the Pacific Islands including the Philippines, New Guinea, New Zealand and Indonesia.

WEAPON EXCLUSIONS -- Weapons which can be thrown but have design characteristics that would make throwing difficult or impractical are not discussed. Examples of these types of weapons are the 15th century Italian *eared dagger* and the middle to late period Middle Eastern *jambiya/khanjar dagger*. These dagger designs were very popular, but both have design features that make them undesirable for throwing. The eared dagger has a very large, flared pommel (the knife can be thrown only from the blade) and a pommel hit might break off the ears. The jambiya/khanjar is designed as a slashing weapon and typically has a strongly upward-curved blade, which would make a penetrating throw difficult to achieve. While it is possible to throw both of these daggers, their designs are not conducive to practical throwing, so they are not discussed in this study.

DATA SOURCES – Detailed information on thrown weapons and their use is very limited in early period Europe and Japan and throughout period in India, Africa and much of the Middle East. Information on the period use of thrown weapons by marginalized people in outlying areas (Australia, parts of Africa, Oceania, etc.) is essentially nonexistent. Many of our concepts about period use in these areas are inferred from epic poems and sagas, tomb or rock art, church or temple art, and post-period examples and observations. See Appendix 3 for a discussion on the source types used in this study.

3. THROWN WEAPON CLASSIFICATIONS

DEFINITION OF A THROWN WEAPON -- All weapons are classified either as:

- Melee Weapons – Weapon used at hand-to-hand fighting distances; or as
- Ranged Weapons – Weapons used at greater than hand-to-hand fighting distances. Thrown weapons, as used in the SCA, fall into this category.

For this study, the term *thrown weapon* is defined as:

- A ranged weapon launched only by the human arm or hand -- Archery is not a thrown weapon type because the arrow is thrown by the bow not the hand or arm.
- A ranged weapon that after launching, nothing is left in the hand – The sling and the blow pipe are not considered thrown weapon types because the sling rope or the blow pipe remains in the hand after the shot is launched.

Ranged weapons like slings, blow pipes or javelins launched by a throwing device (atlatl) are considered *specialized weapons*. Specialized weapons may be allowed on Kingdom

of Artemisia thrown weapons ranges: (1) at the discretion of the marshal-in-charge, and (2) if the range layout allows them to be used safely. These weapons do require special considerations in range layout and event scoring, so they are typically not allowed in most competitions, unless the event is specifically designed for their inclusion. See Appendix 1 for a discussion on the definition and suggested use of specialized weapons.

THROWN WEAPON CATEGORIES -- Thrown weapons can be divided into four basic categories. These categories are intended to help SCA thrown weapons marshals decide which section of an event a particular weapon should be allowed to compete in.

Weapons in the first category were not commonly used in period, so only weapons in the last three categories are discussed in this study. The four basic weapon categories are:

- Entanglement Weapons – Common entanglement weapons are throwing nets and bolas. In the regions where they were used in period, entanglement weapons were primarily hunting weapons.
- Percussive Weapons – The term *percussive weapon*, as used in this study, is a generic term for any weapon that usually does not have a cutting edge but may have a piercing point, and whose effectiveness depends in part on producing blunt force trauma - the stunning, shocking, crushing or bone fracturing of the target. Common thrown percussive weapons are throwing clubs, throwing sticks and boomerangs. Maces and war hammers are melee percussive weapons that were thrown in emergencies and they are considered thrown weapons for this study.
- Cutting Weapons – Cutting weapons are defined as weapons where the target penetration direction is at or nearly at right angles to the handle of the weapon. Weapons in this category include axes of all types. Weapons derived from sickles or picks, like the Japanese kama, the Chinese fang and the Indian zaghna are considered axes because their penetration directions are at nearly right angles to the handle, even though their main striking areas are piercing points. Cutting weapons are the weapon type allowed in the axe portion of SCA thrown weapons events.
- Piercing Weapons – Piercing weapons are defined as weapons where the target penetration direction is parallel to or nearly parallel to the handle of the weapon and the penetrating portion of the weapon is typically fairly narrow. Weapons in this category include spears, javelins, darts, knives, Japanese shuriken, the Indian chakram (and its close variations) and short swords. African circular-type knives, even though some of their points are at right angles to the handle, are considered piercing weapons. Full-size swords, pikes and other very long weapons can (and very likely have been) thrown in emergencies, but they are not considered common thrown weapons for this study. Piercing weapons are the weapon type allowed in the javelin and knife portions of SCA thrown weapons events.

Placement of thrown weapons into the categories listed above is necessary because many period weapons have characteristics that would allow them to be considered

either as an axe, a knife or a percussive weapon. See Appendix 1 for a discussion of suggested guidelines for marshals in defining which category to place a particular weapon.

4. THROWN WEAPONS USE IN PERIOD

Thrown weapons were used in period (500BCE to 1600CE) for: (1) Warfare, (2) Covert Operations, (3) Self-Defense and (4) Hunting.

WARFARE -- All forms of thrown weapons (percussive weapons, javelins, axes and knives) were used in period warfare. For thrown weapons to be practical in warfare, several conditions have to be present. Oakeshott (1960, p. 129) sums up some of these conditions when describing a 6th century Frankish army: *“During the next two centuries the composition of the Frankish armies, like their armament, remained much the same – a large mass of undisciplined and ill-armed, unarmored foot soldiery with a small guard of mounted men around the king.”* During this period, the Franks used thrown weapons extensively and were typically armed with a shield, the angon (a type of javelin) and the francisca (a throwing axe).

The practical use of thrown weapons in warfare in any culture and at any time is strongly influenced (but not totally dependant) on the following conditions:

- Limited, fairly unorganized warfare is the common way of fighting, and the demonstration of individual valor is the norm.
- Tribal societies led by petty kings, warlords or chieftains are the norm. Except for a small cadre of household warriors retained by the leader, there are no standing armies (they are usually too expensive for the society to maintain), and every freeman is a warrior at need.
- Infantry warfare is the norm and heavy cavalry is rare or non-existent. Thrown weapons require fairly close contact with the enemy, which is usually hard to do effectively when the enemy has significant numbers of heavy cavalry.
- Shield-wall tactics are common. Thrown weapons were usually thrown in volleys to break up the enemy's shield wall just before contact was made. In volley use, it is not necessary to kill your opponent with thrown weapons; an enemy soldier struck in the face or abdomen with a thrown weapon will usually stumble, lurch sideways and/or slow down (if the shield wall is moving forward). This destroys the integrity of the shield wall, and allows the other side to breach it.
- Steel or iron armor is uncommon or non-existent due to its very high cost or to environmental factors (high heat and humidity). Such armor is proof against most thrown weapons.

- Iron and steel is expensive and skilled swordsmiths are rare. Simple, blacksmith-made weapons are the norm. Spears, javelins, axes and knives use only a small amount of expensive steel or iron and are easily made by a blacksmith. These weapons were common implements that were used on the farm and for hunting and self-protection. They also could be used in war in place of very expensive, limited-use, hard to get and/or make swords.
- Archery had not been developed or because of cultural biases, was uncommonly used in warfare. In many early period Northern European cultures, the bow was considered a hunting weapon only, and was used in war only for special circumstances, like ship-to-ship battles.

Examples of how the above factors influenced the extent of thrown weapon use in warfare can be seen in both Europe and Africa:

- Thrown weapon use in Europe essentially stopped near the end of early period. This was likely due to:
 - Heavy cavalry became more common and dominated the battlefield.
 - Armor came into common use; it was proof against most thrown weapons.
- Thrown weapon use in Central Africa continued into late period. This was likely due to:
 - Tsetse fly disease and a jungle terrain over much of the area made horse raising and horse use impractical. Cavalry use was very limited to non-existent (Osadolor, 2001, p.114).
 - Kingdoms existed, but they were tribal based and most practiced “limited warfare” using shield wall infantry tactics.
 - Iron technologies had developed, but there was a very limited to no use of armor. This is likely due to the hot, wet climate and the limited warfare ethic common to tribal cultures.

COVERT OPERATIONS -- Espionage, assassinations and robbery require stealth and the target is usually not protected by armor, so concealable thrown weapons (primarily short javelins, knives and specialty weapons of various sorts) were effective tools. Most covert operation groups considered their activities a business. They were reluctant to have others know the details of their weapon techniques, so historical documentation of thrown weapon types and the techniques used by these groups is extremely rare. An exception is the techniques used by the ninjas of Japan, whose techniques were partially documented by several martial arts schools late in period and in post-period.

Three geographic areas in period had times when covert operations were fairly common in the predominate cultures:

- Japan – Ninja clans, guilds and families (mid to late period). The use of thrown weapons was common with the ninja.
- Middle East – A very secretive, covert operations group within Ismailism (a branch of Shia Islam) was active from about 1092 to 1265. One of the names given to this group gives us the root of our word “assassin”. The weapons used by this group are very poorly documented but the use of thrown weapons was apparently uncommon.
- Renaissance Europe – Assassinations by trained operatives in late period was not uncommon, but the use of thrown weapons was apparently limited.

Other groups that used thrown weapons in “covert operations” were criminals - outlaws, highwaymen, tavern brawlers and other rogues. These people would occasionally use thrown weapons, particularly knives, in their activities.

SELF-DEFENSE – Almost everything that is physically possible to throw has likely been used as a self-defensive thrown weapon at some time in period. This category covers a large variety of weapons, and is the “catch-all” category for authentic period thrown weapon designs and use in the SCA. Although most thrown weapons marshals will not forbid the use of obviously non-period weapons in SCA competitions, every effort is made to encourage participants to use weapons that at least have recognizable roots in period. The main groups using thrown weapons for self-protection in period were:

- Soldiers and Warriors – Thrown javelin use was common. Except for cultures that specialized in their use, thrown axes, knives and percussive weapons were mostly used in desperate battle situations, when other option were not available.
- Civilians – Thrown javelin use was fairly common and percussive weapons were commonly used in some cultures. For the average civilian, who was unskilled in their use, thrown axes and knives were usually not the first choice for self-defense, unless forced into throwing one by the circumstances. Armor was typically not encountered in civilian self-defense situations, so thrown weapons were usually effective.
- Marginalized People -- Percussive weapons (boomerangs, clubs, cudgels and throwing sticks) were used by almost everyone for self-defense in societies that had not developed an iron technology and in every culture by poorer people who could not afford iron and steel weapons.

HUNTING – Hunting, both for sport and for food, was common throughout period. This use category also includes livestock protection. The javelin was the premier hunting and livestock protection thrown weapon, and was used by almost every culture. Javelins

were used in sport hunting in many cultures into very late period, even when firearm use had become fairly common.

Percussive weapons were used for hunting throughout period by many of the more primitive societies and those societies that had not developed an iron technology. Although poorly documented, there are suggestions that percussive weapons were used by poorer peoples in some European cultures as poaching weapons throughout period.

Except for the poorly documented use of throwing axes and knives for hunting in West-Central Africa and in parts of India, thrown axes and knives were rarely used for hunting by most cultures.

5. PERIOD THROWN WEAPONS

The thrown weapons discussed in this section have been divided into three categories: (1) *Percussive Weapons* (Boomerangs, Throwing Clubs and Throwing Sticks); (2) *Cutting Weapons* (Axes, Picks and Sickles); and (3) *Piercing Weapons* (Javelins and Knives). These terms are defined in Section 3 of this report.

The classification of period weapons either as *ranged* (thrown) weapons or *melee* (hand-to-hand) weapons can be confusing, because many weapons designed primarily as melee weapons can be effectively thrown at need. Weapons designed primarily for throwing can also be used as melee weapons at need.

Because of their possible dual use as both melee and ranged weapons, the weapons allowed in SCA thrown weapons events are not limited to those with documented use as period ranged weapons. If a weapon can be thrown safely and does not unduly damage the target butts (in the judgment of a thrown weapons marshal), the weapon usually will be allowed. To compliment SCA policy, this study will examine the historic design and use of two types of weapons: (1) weapons designed as ranged weapons, with historical records documenting this use -- these weapons are indicated with a [#]; and (2) weapons designed primarily as melee weapons but with characteristics that allow them to be thrown effectively at need -- these weapons are indicated with an [*].

PERIOD PERCUSSIVE WEAPONS

Percussive weapons include boomerangs, throwing clubs, throwing sticks, war hammers and maces. Many of these weapons were made of wood, although some were made of stone, iron, or bone. Most percussive weapons were dual-use weapons that were either thrown or used as melee weapons at need.

Percussive weapons are typical of the pre-iron age cultures in Africa and India and of cultures where iron ore is not present and/or an iron technology was never developed in period (Oceania, the Americas and Australia). They were also used throughout period by

very poor people in all cultures. Percussive weapons usually became obsolete in most cultures when slings and archery use became prevalent.

Although considered primitive weapons by most people, subtle design features seen in many percussive weapons suggest that their developers had a keen understanding of basic rotational dynamics. The most sophisticated of the percussive weapons is the boomerang. Most examples world-wide are not designed to return to the thrower. Davidson (1936, p.90) in his study of Australian percussive weapons states: "*The [returning boomerang], which numerically represents an extremely small proportion of the boomerangs of the continent, is usually regarded by the natives as a toy which, with a few exceptions, seems to be used for neither hunting nor fighting.*"

Boomerangs and curved throwing sticks intended for hunting or warfare usually weighed about 10 to 14 ounce or more, while the lighter ones were around 7 to 9 ounces. They were significantly heavier than modern returning sport boomerangs, which usually weigh about 1.5 to 4 ounces (Bailey, 2011b).

Throwing sticks and throwing clubs have a very wide range of shapes, lengths and head diameters. In most cultures, many transitional examples can be seen between throwing sticks and throwing clubs. The difference between the two weapon types is likely more in the minds of the cultural anthropologists who described the weapons than in the minds of the actual users.

Many throwing sticks and throwing clubs were used solely as percussive weapons, but some from Africa, Australia and Oceania have sharpened heads and/or butts. The sharpened end(s) of these weapons served a dual purpose -- as a digging stick and as a penetrating weapon. Cultural anthropologists in Fiji noted that some clubs (apparently with pointed butts) "....were thrown to spin and to strike the target with the butt (one observer recorded having seen the haft of such a club penetrate the flesh of a pig to the club's head from a distance of 65 feet)." (Oliver, 1989, p. 450). Personal tests have shown that the pointed end of a 9 ounce throwing stick will easily penetrate a hay bale target butt about 3 inches when thrown from 20 feet.

The following section, divided by cultures, is a description of some of the percussive weapons (boomerangs, throwing clubs and throwing sticks) that were used in period:

AUSTRALIA, NORTH AMERICA AND OCEANIA

Boomerangs [#] -- Stone (1999, p.125-126) states: "*The boomerang is commonly supposed to be purely an Australian weapon and as always returning to the thrower when properly handled. Both of these ideas are entirely wrong..... most boomerangs used there [Australia] can not be made to return; and as weapons, boomerangs were quite common in ancient Egypt and are still used in many parts of Africa, India and other countries.*" The very light returning boomerang was

apparently used mostly to flush game (particularly birds) towards the hunter instead of as a killing weapon. In some areas, cultures constructed their traditional boomerangs out of iron after an iron technology was developed. Examples include the *singa*, the iron boomerang of southern India (Stone, 1999, p. 565). Although poorly documented, boomerangs are ancient weapons and were assuredly used in period for hunting and warfare.



Sharp-Angled Boomerang – Non-returning Australian boomerang. Total length 29.5 inches, weight 1.25 pounds. (Regan and others, 2006, p.210). Heavy boomerangs like this one were probably used both as melee weapons and as short range thrown weapons.



Curved Boomerang – Non-returning Australian boomerang from Queensland. This example is convex on both sides. Total length 28.5 inches, weight 12 oz. (Regan and others, 2006, p. 210)



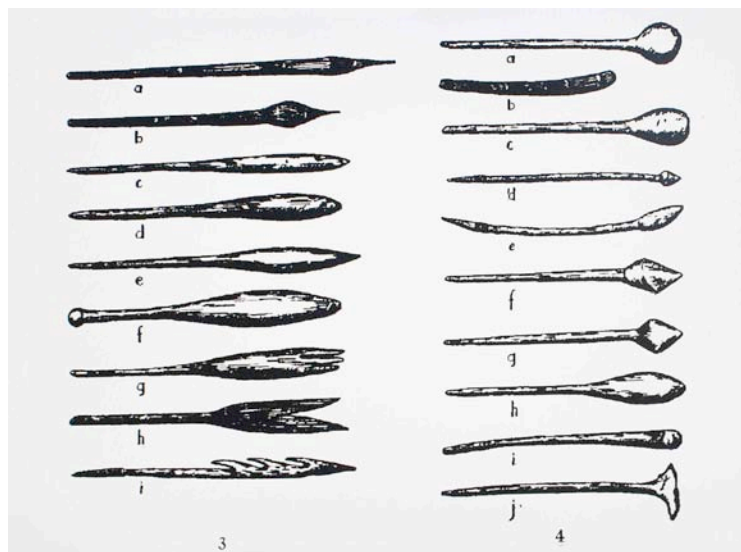
Watilikiri (Beaked Boomerang) –Used by the Warramunga tribe, Australia. Length 28.75 inches, weight 16 oz. It is thrown with the beak pointed forward; if the beak strikes, it will penetrate into the target. (Stone,1999, p. 664; Regan and others, 2006, p. 210).

Australian Throwing Sticks -- [#] Davidson (1936) illustrates several common types of Australian aboriginal throwing sticks. Most are from Western Australia. Throwing sticks are one of humanity's oldest weapons. Note the pointed end(s) on several of these throwing sticks and on the throwing clubs below.



Australian Throwing Sticks – Throwing stick (a), (b) and (c) are the basic throwing stick forms and are found wherever throwing sticks were used. Lengths are not given but most are likely about 18-30" long. (Davidson, 1936 p. 77, fig. 1)

Australian Throwing Clubs -- [#] Davidson's (1936) figures 3 and 4 (below) illustrate several common types of Australian aboriginal throwing clubs. All are from Eastern Australia. Throwing clubs were likely developed from throwing sticks. See Appendix 2 for the construction and use of throwing clubs and sticks.



Australian Throwing Clubs – Lengths are not given but most are likely about 18-30" long. (Davidson, 1936 p. 82, figs. 3 and 4)

Patshkohu (Rabbit Sticks) [#] -- A type of handled boomerang used by southwest Native Americans. The sticks were about 2 feet long, and about 1.5 inches wide at the handle and 1.75 inches at the middle. Average thickness was around 0.75 inches. (Stone, 1999, p. 522). Stone does not list the weight of these rabbit sticks but they are likely in the 12-16 ounce range.

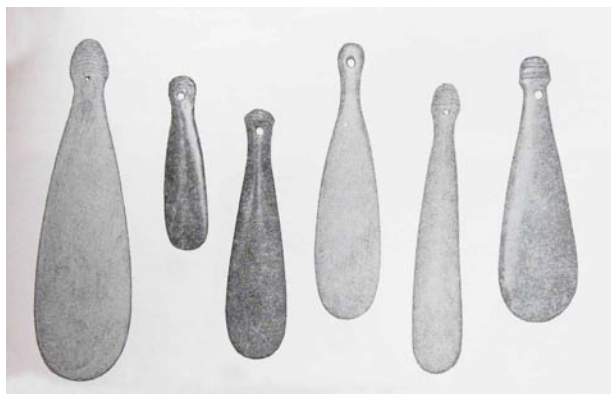


Patshkohu (Rabbit Sticks) – (Stone, 1999, fig. 669, p. 523)

Patu (Patuki) [*] -- Melee club made from wood, bone or stone and used by the Maori of New Zealand. Patu have rounded handles that transition into a flat, spatula-shaped blade. The edges of a patu may be fairly sharp. The design of the patu allows it to be thrown effectively.



Patuki – Ornately carved wood construction, total length 14.5 inches, weight 12 oz. (Regan and others, 2006, p. 202-203).



Patu – Patu to left is 20 inches long and 5.9 inches wide, made from the jawbone of a sperm whale; the second from left is 10 inches long and made from jade. The remaining patu range from 14.5 to 16.8 inches long

and are made from bone or stone. (Stone, 1999, fig. 626, p. 490). The Museum of New Zealand has several specimens similar to these that are dated from the 1500's. (<http://teapa.govt.nz>)

Ulas [#] -- Throwing club from Fiji, typically made from wood. Ulas were about 18 inches long and had heads up to about 6 inches in diameter (Stone, 1999, p. 647). Stone does not specify a typical weight.



Ulas – The lower club is a more traditional shape and is 16 inches long. (Stone, 1999, fig 822, p.646).

Li-Lil [#] -- A war club used by a few tribes of Victoria, Australia. The li-lil is a type of non-returning boomerang or throwing club made of wood, with one wide end. The middle of this end is the thickest, at about 0.5 inch, and the edges are sharp. Li-lil were about 27 inches long, with the width at the large end about 5.5 inches. The width of the handle was about 2 inches. The Li-lil was primarily a melee weapon, but it was also thrown. (Stone, 1999, p. 416).



Li-lil – Weight is about 14 oz. The large end has an incised carving. (Stone, 1999, fig. 523, p. 415).

Kauah (Kauas) [#] -- A cylindrical stone club used by the natives of Tanna, New Hebrides (Oceania). The club is 15 inches long and 2 inches in diameter. It is thrown with great accuracy for distances up to 20 yards. (Stone, 1999, p. 346).

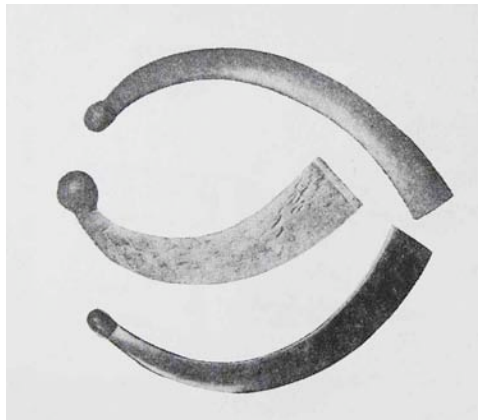
Wahaika [*] -- An irregularly-shaped Maori (New Zealand) war club made of wood or bone. It was one of the more elaborately carved Maori clubs. Stone (1999, p. 656) gives few details, but the wahaika is apparently similar to the *patu* (described above) but more elaborate.



Wahaika – Wahaika at left is made of sperm whale bone and is 17.25 inches long. The middle one is of wood and is 14 inches long. The right-hand wahaika is made of wood and is 16.75 inches long. (Stone, 1999, fig. 837, p. 655).

INDO-PERSIA

Katariya [#] – A non-returning, boomerang-type throwing stick with a ball-shaped handle, used by the Kols of Guzerat, India. Katariya are usually made of wood, but occasionally were made of iron or horn. (Stone, 1999, p.345). The ball adds weight to the weapon and helps it fly straighter.



Katariya – Katariya at bottom is polished horn with a carved end. Katariya at center is made of iron. The ball is hollow and 3 inches in diameter, the total length is 14.5 inches. The katariya at top is wood and is 17.5 inches long. Weights not specified. (Stone, 1999, fig. 435, p. 348)

AFRICA

Trombash [#] -- A flat throwing stick about 2 feet long, with one end turned up sharply at about 30°. Used by the Tookroori, an Abyssinian (Ethiopian) tribe

(Stone, 1999, p. 630). A similar design, the *watilikiri* (beaked boomerang) was used by the aboriginal Australians (*see description above and Regan and others, 2006, p. 210*)

Kerrie, Kyrie (Tyindugo) [#] -- Throwing stick of the Kaffir tribe and other tribes of South Africa. Most were made of wood, but the best were made of rhinoceros horn. The knobs varied greatly in shape and size. Weights are not specified. (Stone, 1999, p.350). The knob acted as a club head for melee use and its weight aided deep penetration of the target by the pointed end when the kerrie was thrown. It also served as a handle when the kerrie was used as a digging tool.



Kerries (Tyindugos) – Zulu and Masai kerries. The three on the left are rhinoceros horn, the remainders are wood. These kerries range from 18.5 to 29.5 inches long; the head of the third from left is 3.5 inches in diameter. Note sharpened end on several of the kerries. The sharpened end was designed to penetrate the target -- it could also be used for digging. (Stone, 1999, fig.442, p. 351).

PERIOD CUTTING WEAPONS (AXES, PICKS AND SICKLES)

In period, throwing axes had limited use in most cultures. Some early period European tribes (Franks, Anglo-Saxon and Scandinavians) used throwing axes in warfare. Some aboriginal Indian tribes and many West-Central African tribes used throwing axes in warfare throughout period. The predominate cultures in China and India rarely used the axe as a thrown weapon in warfare, and it was essentially unused in Japan either as a melee weapon or as a ranged weapon. Thrown axes were used for self-protection and hunting by some aboriginal tribes in India. In most cultures, the axe likely was thrown only in emergencies.

The following section, divided by cultures, is a description of some of the throwing and throw-able axes, picks and sickles that were used in period:

EUROPE – Axes were used as a primary weapon (both ranged and melee) in warfare by some early period northern European tribes (Scandinavians, Franks and Anglo-Saxons). There is a suggestion of throwing axes being used by central Europeans in mid- to late period (Tarasjuk and Blair, 1979). Viking and Icelandic sagas only occasionally mention the use of thrown axes. However, many of these sagas record events that occurred late in early period, when the European use of thrown weapons (other than javelins) was ending. Following is an analysis of Icelandic sagas by William Short of *Hurstwic*, a modern Viking re-enactor and study group (Short, 2011):

“It seems unlikely that axes were routinely used as throwing weapons. One of the few example from the sagas where an axe was thrown is in chapter 33 of HARDAR SAGA OG HÓLMVERJA. In a battle, Þorvaldr drove a spear through Sigurðr, who had been fighting with an axe. Sigurðr threw his axe at Þorvaldr, hitting him in the head. They both fell down dead. The sense of the story is that the axe was Sigurð's normal battle axe, rather than a specialized throwing axe.

In chapter 64 of LAXDÆLA SAGA, Helgi Hardbeinsson received a serious wound in a fight. Turning to the others, he said, "This old fellow still dares to face others," and he threw his wood axe at Þorgils, causing a serious wound.

The battle at Stiklastaðir (which occurred on 29-July-1030) is described in chapter 226 of ÓLÁFS SAGA HELGI. The saga says that large numbers of armed men fought on each side. Men in the front rank used their swords, while those in the next rank thrust with their spears. Men in the rear shot arrows and javelins and threw stones and hand-axes (handöx) at the opposite side.”

Francisca [#] -- *“The francisca is a throwing axe used..... during the early Middle Ages by the Franks, among whom it was a characteristic national weapon at the time of the Merovingians from about 500 to 750 AD... is known to have been used during the reign of Charlemagne (768 - 814) (Tarasjuk and Blair, 1979). Although generally associated with the Franks, it was also used by other Germanic peoples of the period....”* (Wikipedia article corroborated from other sources).



Francisca – Very early period. (Regia Anglorum website <http://www.regia.org>).



Francisca – Modern reproduction. The francisca axe is designed for throwing, although it could be used for melee at need. It is strictly a war axe, and is a very poor design for doing chores around the farm. Handle length is 16 inches; the blade length is 7 inches. (Author’s collection).

Northern European Broad-Bladed Axes [*] – A popular axe design with the various Scandinavian tribes, as well as the Anglo-Saxons and other European tribes. This axe type is popularly known as “Danish or Viking axes”. Early versions of these axes were dual-use tools, suitable for war or for farm chores. Later versions were larger and thinner and were dedicated war axes.



Northern European Broad-Bladed Axes – One-handed, broad-bladed, early to mid period axes. These are four-lugged axes (note lugs or “ears” at axe eyes). The cutting edges range from about 3 to 6 inches.
http://www.hurstwic.org/history/articles/manufacturing/text/viking_axe.htm



Replica of a Small Northern European Broad-Bladed Axe – Axe head made by Cold Steel®. This design is commonly called a Danish or Viking axe. Haft is 14 inches long, blade width is 4.5 inches; axe head length is 6 inches. Grip area is copper sheathed. This is a compromise design, usable for both melee and throwing, as well as for chores around the farm. (Author's collection)



Replicas of Northern European Broad-Bladed Axes – Late in early period and in mid period, large melee axes (upper axe) were used two handed and the blades were significantly thinner and wider compared to earlier axes. The smaller lower ax is a bearded axe. Both of these axes are melee axes, but both could be thrown at need (the larger one needed a two-handed throw).

http://www.hurstwic.org/history/articles/manufacturing/text/viking_axe.htm

Northern European Narrow-Bladed Axes [*] -- This axe type was developed in the 7th century and was popular in Norway and Iceland (Bruk, 1994). They were used in early to mid period primarily as mortising axes to cut square holes for the mortise and tendon joints used in building construction prior to the wide-spread use of nails. They very likely were used in war at need. This axe design was also used as a throwing axe and horse axe in middle to late period Eastern Europe, where it developed into a distinctive Slavic design (Nicolle, 1999).



*Northern European Narrow-Bladed Axe – Age not specified, but likely it is early period.
http://www.hurstwic.org/history/articles/manufacturing/text/viking_axe.htm*



Narrow-bladed Axe – Drawing of a narrow bladed axe similar to the axes used in Scandinavia and Iceland from the 7th century on. (Bruk, 1994).



Modern reproduction, Northern European Narrow-Bladed Axe. This roofing axe has been modified for throwing by the author. (Author's collection).

Doloire [*] – An infantry weapon used in the 1400 and 1500's'; sometimes called a *Wagoner's axe* (Stone, 1999, p. 212). The doloire (*see below*) is a trowel-shaped, axe-like weapon with the cutting edge extended upward into a forward-facing stabbing point. Nicolle (1999, p. 319) notes that a 14th century Hungarian doloire in the collection of the Budapest Historical Museum is "... typical [of] Central or even Western European infantry weapons. This is particularly true of the example with an upwards-swept blade and a thrusting point" (his figure 871C). The design of the doloire makes it very good for throwing, but it is not known if they were habitually used that way.



Doloires – German, 16th century. Not to scale. Metropolitan Museum (Stone, 1999, fig. 262, p. 212)

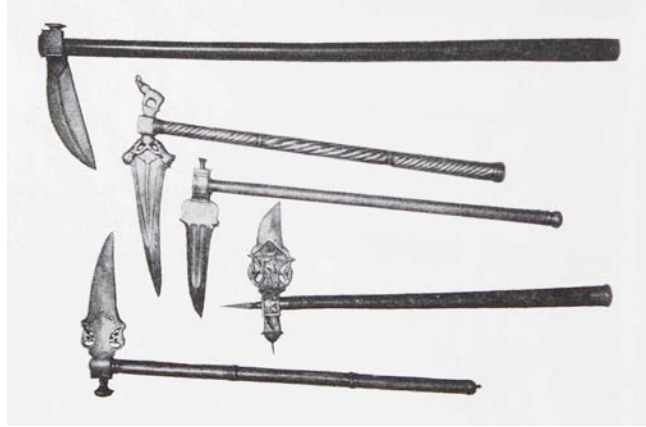
INDO-PERSIA

Lohar [*] -- A fighting pick around 16 inches long used by the Banochie, a Kyber tribe (Afghan/Pakistan area). (Stone, 1999, p. 419). The weapon is similar to the Japanese kama. Although primarily a melee weapon apparently intended to defeat mail, the lohar could be thrown at need.



Lohar – All steel, handle covered with brass.
Total length 16 inches. (Stone, 1999, fig. 528, p. 418)

Zaghnaal [*] – A narrow axe or pick-like Indian weapon very similar to the lohar (*above*). The blades were generally about 6 to 10 inches long and the handles about 20-21 inches long. (Stone, 1999, p. 684). Although primarily a melee weapon apparently intended to defeat mail, the knife-like blade would make the zaghnaal an effective and efficient throwing axe.



Zaghnaal – Steel heads; most of the handles are also of steel. These zaghnaals have blades between 6 to 10 inches long and handles between 20 and 21 inches long. These examples date from the 17th and 18th century, but it is very likely that similar weapons were used in period. (Stone, 1999, fig. 874, p. 684).

Tongia [#] – Axe of the Bygas tribe of central India. There is no illustration of this axe in Stone (1999, p. 622) but it is described as having “a semi-circular blade, like a battle axe in miniature.” This description suggests that the axe was similar to the smaller broad-bladed Viking-style axes described in the EUROPE section above. Stone (1999, p. 622) quotes another author as saying “This little weapon is also used as a projectile, and the Bygas will thus knock over hares, peafowl, etc. with astonishing skill.” This observation is one of the few found during this study that documents the use of thrown axes for hunting.

Tungi [*] – Khond tribe (India) fighting ax (Stone, 1999, p. 642). Apparently tungi were mostly used as a melee weapon, but its sharply pointed upper edge and slightly angled cutting edge would allow efficient throwing at need.



Tungi – The handle is about 14.5 inches long and the blade width is about 9.5 inches. No weight is given. (Stone, 1999, fig. 816, p. 642)

JAPAN

Axes were used as melee weapons in early period Japanese warfare, but were very rarely used in mid to late period, except by peasant farmers and by the Yamabushi, the mid-period warrior-monks (Ratti and Westbrook, 1999, p. 322).

Kama [*] -- The kama is a sickle used by farmers to harvest grain, but there are many well-made examples obviously intended for use as weapons only. Kama were used primarily as a melee weapon by peasants and occasionally by monks, priests and samurai. When the kama blade was mounted on a spear pole, it was called a *kama-yari*. Axe-type weapons were generally not popular with samurai, although some used the kama with an attached chain and weight (Ratti and Westbrook, 1999, p. 317). The kama's design allows it to be thrown at need.

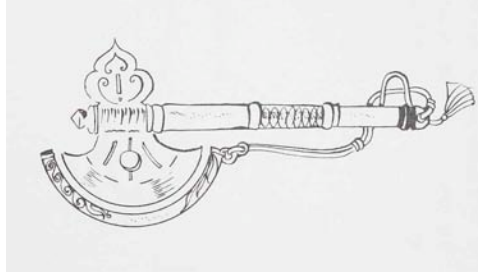


Kama – Left example is the blade only; blade length 8 inches, and is sharpened on both sides. Right example blade length is 5 inches (Stone, 1999, fig. 419, p.334)

Fuetsu, Masa-Kari, Ono [*] -- These Japanese battle axes were used in early period, but were very rarely used in mid to late period. The ono apparently ranged fairly widely in size; the longer ones were popular with the Yamabushi, the mid-period warrior monks. The masa-kari (*below*) could be effective thrown at needed; the longer onos (some with a handle length of around 5 feet) were too long for efficient throwing (Stone, 1999, p.439; Ratti and Westbrook, 1999).



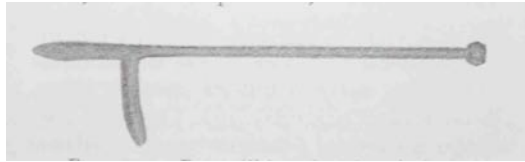
Masa-Kari – The heavy axe head is 15 inches long and the handle is 30.5 inches long (Stone, 1999, fig 558, p.439)



Short-handled ono – The ornate poll of this axe is typical of ono. The axe sheath is shown next to the blade (Ratti and Westbrook, 1999, p. 322).

CHINA

Fang [*] -- A weapon likely derived from sickles or picks. The fang was probably primarily a melee weapon, but its geometry allows it to be thrown.



Fang -- Iron handle; total length about 24 inches. The blades are each about 5 inches long. (Stone, 1999, fig. 279, pp. 225-226)

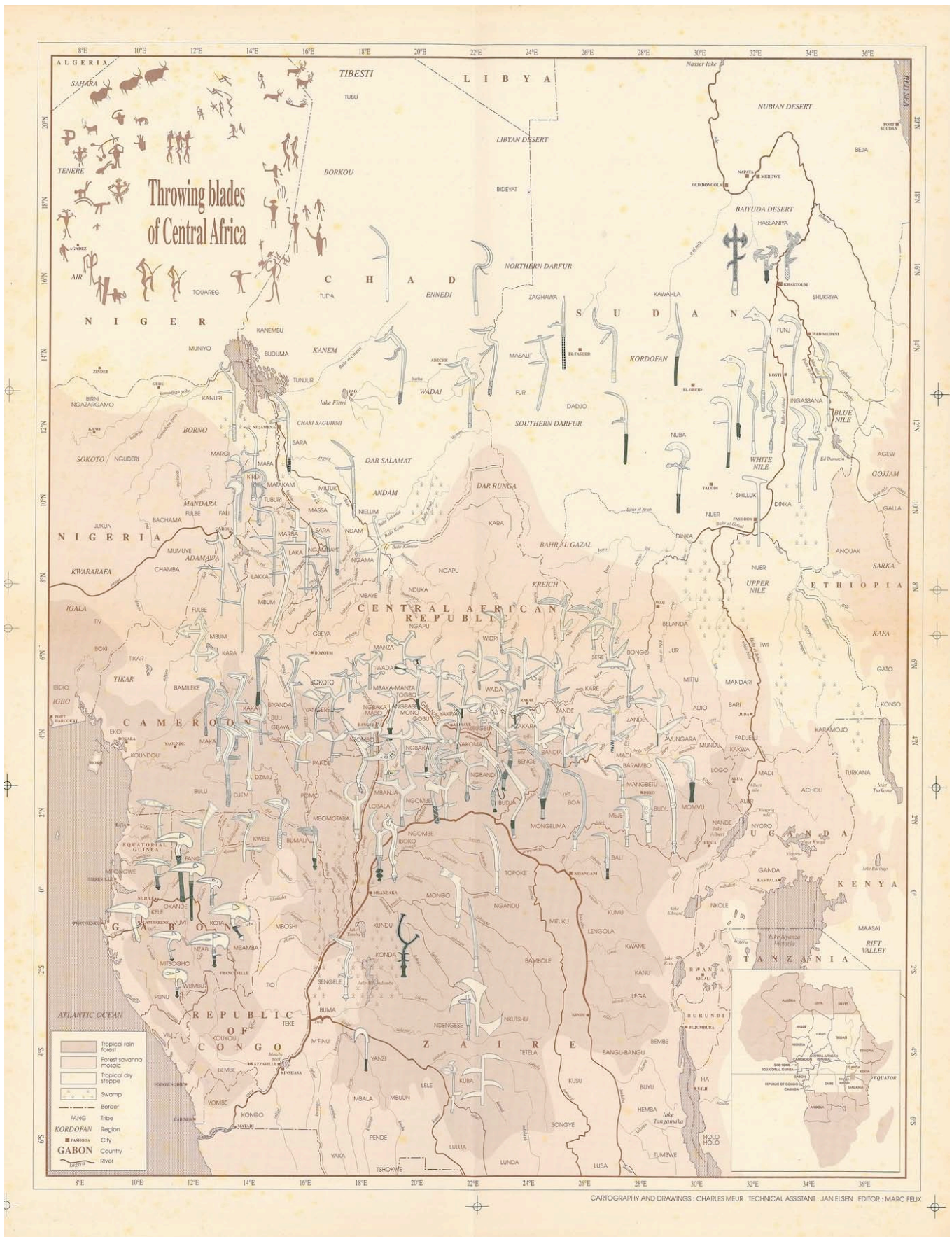
AFRICA

Central Africa developed a wide array of melee and ranging (throwing) axes. See the map by Meur, Elsen, and Felix, (date not stated), on page 24 for selected tribal designs and their distribution.

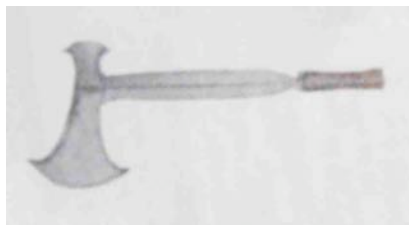
Silepe [*] -- A melee axe of the Basuto tribe (Stone, 1999, p. 564). This example has a long tang connecting the axe head to the club-like haft and is an “authority” axe, used as a status symbol (Author not Listed, 2011). Other African tribes had similar axes but with shorter tangs that positioned the blade closer to the haft, making it a more practical tool or weapon.



Silepe – Iron head on a 21 inch long club-shaped haft. The area around the tang is reinforced by wraps of copper wire (Stone, 1999, fig. 727, p. 564)



Double-Bladed Axe[#] -- West-central (Congo) African ax (Stone, 1999, fig. 786, p. 614). See map on page 24. The strongly curved upper edge of the main blade would give excellent piercing penetration if thrown. The smaller blade on the poll would allow good piercing penetration if the throw landed over-rotated.



Double-Bladed Axe – Note that the axe haft has a knife-blade-like profile to increase its effectiveness. Total length is not specified, but it is probable about 14-17 inches. (Stone, 1999, fig. 786/no.10, p.614)

Ondo [#] -- West-central African throwing ax of the Banda tribes (*see map on page 24*). Period use of the ondo is poorly documented, but it is obviously designed for war. The total length of this axe style generally ranged from about 13 to 18 inches. This is one of the most efficient throwing axe designs examined for this study.



Ondo – Throwing axe of the Banda tribes, West-Central Africa. Leather-wrapped handle. About 13.4 inches long. (Elsen, 2005, Item 556.)

Onzil (Bird-Headed Axes) [#] -- The bird-headed axes of West-Central Africa (*see map on page 24*) are very efficient throwing axes. The sharp point allows a piercing penetration, the most efficient type of penetration for a thrown axe and the bent handle maximizes the range of rotation that the weapon will stick in the target. If the back of the

blade is sharpened it will also stick in the target with a cutting penetration if the axe hits over-rotated.



Onzil – Bird-headed axe used by southern Fang tribe of Gabon, Equatorial Guinea. Handle is wood overlain with brass. About 21 inches long. (Elsen, 2005, Item 0035)

PERIOD PIERCING WEAPONS (JAVELINS AND KNIVES)

JAVELINS

The light javelin is a ranged weapon and was almost always thrown, although occasionally it was used as a thrusting weapon. Javelins are erroneously called spears by most SCA groups -- the spear in period generally was a heavier, broader-bladed thrusting and hewing (melee) weapon that was only occasionally thrown.

Several primitive or marginalized cultures in period used stone, bone or fire-hardened wood for javelin tips. These types of javelins are not discussed in this study.

The following section, divided by cultures, is a description of some of the javelins that were used in period:

- **EUROPE**

Angon, Pilum [#] – A javelin used in early to mid period warfare for both thrusting and throwing by the Romans, Franks, Anglo-Saxons and some Scandinavians (Oakeshott, 1960, p. 128). The angon is similar to the Roman pilum, having a barbed head with a steel tang and socket extending part way down the shaft to prevent cutting of the wood shaft by the enemy. The tang was easily bent, rendering the angon useless for throwing back by the enemy. Most

angon and pilum were about 4-7 feet long and some had weighted shafts for better penetration of armor. In use, the angon or pilum was thrown into an enemy's shield to weight it down, the barbs not allowing the javelin to be withdrawn by the enemy warrior. The weapon would then be stepped on to pull the enemy's shield down, exposing him to attack (Oakeshott, 1960, p. 128). Angon-type javelins can be used in kingdom events if the weapon does not have a sharpened and barbed head.



Angon – Iron head, shaft and socket of the angon, which was usually forged in one piece and was between 10-30 inches long. A wooden javelin shaft about 4-6 feet long would be attached to the socket (Oakeshott, 1960, fig. 55, p. 128). Total length of the angon was around 7 feet.

Generic European Javelins [#] – Javelins of similar design were used in early to mid period by the Greeks, Romans and most European tribes. These javelins all typically had small leaf-shaped heads on 4 to 6 foot long ash shafts about 0.75 to 1.0 inch in diameter (Swanson, 1973; Oakeshott, 1960, p. 119-120).

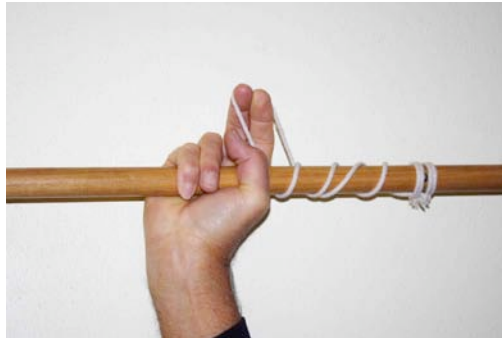


Common Javelin Head Shape, Self-Made – Javelin head is 7" long and 1-1/4" wide. It is mounted on a 5-foot long by 7/8" diameter shaft. The head is made from flat-stock fabrication steel, commonly found in large hardware stores. This head is allowed in SCA competitions if the edges are not sharp. (Author's collection)

Snoeris-Spjot [#] (string-spear) and Skepti-Fretta [#] (cord spear) – Scandinavian javelins with throwing strings or cords attached. The cord attachment and use was similar to the early period Greek and Roman *amentum*. String javelins were used in warfare by early period Greeks, Romans and many Northern European tribes. The spin imparted by the cord gave increased accuracy and more range compared to non-corded javelins. Javelins of this type with the cords still attached have been recovered from several of the bog burial deposits of northern Europe. Most of these recovered javelins had ash shafts and only a few had shafts greater than 1 inch in diameter. (Oakeshott, 1960, p. 119).



Cord or String Javelin – Modern reproduction (Author's collection)



Cord Javelin In Use – The raised fingers are placed on the shaft in front of the thumb prior to throwing. The wound cord spins the javelin shaft as it is released, aiding accuracy and increasing the range of the javelin. (Author's collection)

Plumbata, Martiobarbuli [#] – The plumbata is a lead-weighted arrow or dart. In use, the plumbata was grasped behind the fletching and lofted up, coming down at near-vertical angles with good striking power. It could also be thrown like a short javelin. It was used by regular soldiers in place of archers. The plumbata was used by early period Greek, Roman and Byzantine armies (Warry, 2001). The Roman historian Vegetius discusses the plumbata:

*The exercise of the loaded **javelins**, called **martiobarbuli**, must not be omitted..... Every soldier carries five of these javelins in the hollow of his **shield**. And thus the legionary soldiers seem to supply the place of **archers**, for they wound both the men and horses of the enemy before they come within reach of the common missile weapons. (Vegetius, 390).*



Head of a plumbata, 3rd century CE – The arrow shaft and fletching have disintegrated. The weight is cast lead (image from asterisk.apod.com)

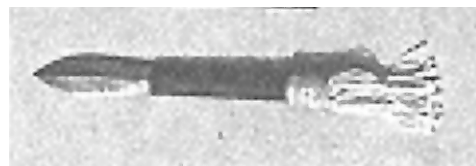
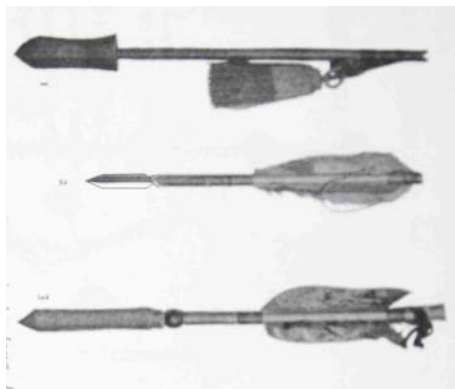


Plumbata, Self-Made – This plumbata is 25 inches long and weights 8 ounces. Weight consists of wrapped iron wire, which is safer to handle than lead. When thrown like a javelin, fairly accurate throws up to 40-50 feet (15 yards) are possible with this weapon. (Author's collection)

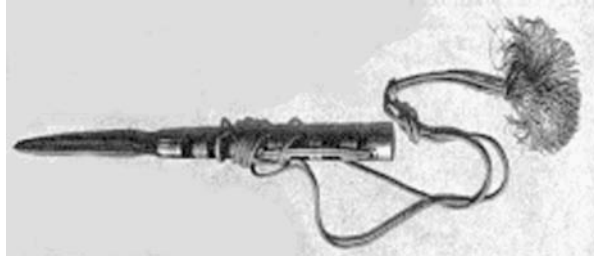
- JAPAN

Javelins were used from early to late period in Japan, but towards the end of period they were apparently used mostly for self-defense by civilians and samurai in non-warfare situations (Ratti and Westbrook, 1999, p. 244). In warfare, samurai in mid to late period generally preferred the heavier thrusting/hewing spear (various types of *yari*) over the javelin.

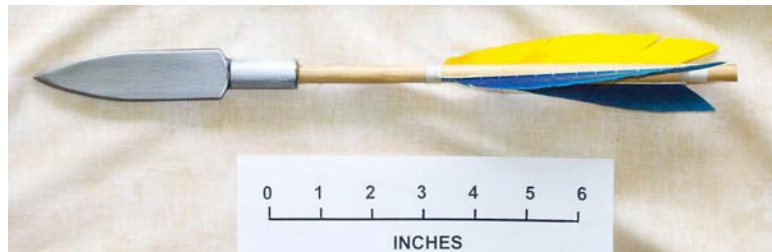
Uchi-ne [#] – A very small, dart-like javelin. The uchi-ne shaft was made either from an arrow shaft or a 3/4-1" diameter dowel. Uchi-ne were about 8-17 inches (0.7-1.4 foot) long, with a fairly heavy head. Uchi-ne used fletching or tassels for stabilization during the throw. “[Uchi-ne were]...*heavy for their length. Carried for defense when traveling in a litter.*” (Stone, 1999, p. 645-646).



Uchi-Ne – Left - Upper uchi-ne has a head 2.9" long, an estimated total length of 12" and a stabilizing string and tassel; a scabbard covers the head. The central uchi-ne has a head 3.5 inches long and is 12" long; the lower uchi-ne has a head 5.9 inches long and estimated to be about 17" long. (Stone, 1999, fig. 819, p. 644). Right – Tassel-stabilized uchi-ne estimated to be about 8" long. (Wotherspoon, 2004, fig.13)

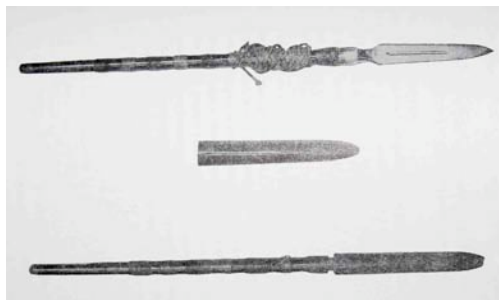


Cord-Stabilized Uchi-Ne – The shaft of this uchi-ne has metal fittings and a butt cap for decoration. The length of this uchi-ne is not specified but is estimated to be about 1.0 foot (Wotherspoon, 2004, fig. 13).



Traditional Uchi-Ne, Fletching Stabilized, Self-Made – Blade is 4" long, 1" wide and inserted into a 1-1/2 inch long, 1/4" diameter iron pipe. The arrow shaft is 11/32" in diameter. Total length is 13.5 inches. (Author's collection).

Nage-yari [#] – A short javelin for use in confined areas or possibly from castle parapets. Nage-yari are slightly longer, stronger versions of uchi-ne. Nage-yari typically had a total length of about 17-18 inches (1.5 foot), and a narrow 4.5-5.0 inch long triangular or quadrangular head (Stone, 1999, p. 462-463). Some nage-yari had long cords attached to the butt (*see figure below*). The cord was used to retrieve the weapon when thrown, either horizontally or down from a castle parapet at an enemy scaling the walls. Personal tests have shown that a 10-15 foot length of cord trailing behind the nage-yari sufficiently stabilizes the weapon during flight for accurate throws.



Nage-Yari – Upper nage-yari has a triangular head 5 inches long; total length is 17.8 inches. Note the stabilization and retrieval cord wrapped around the shaft. Lower nage-yari has a quadrangular head 4.5 inches long and is in a scabbard; total length is 17 inches. A scabbard is shown at center. (Stone, 1999, fig. 586, p.462).

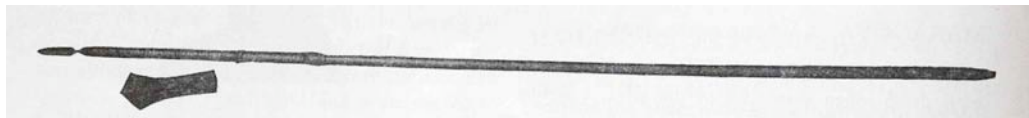


Nage-Yari, Tassel Stabilized, Self-Made – It is not known if period nage-yari were tassel stabilized, but it seems likely that some would have been. This easily-made nage-yari, suitable for SCA competitions, has a 5.75 inch long, 1/2" diameter steel rod head inserted into a 1/4" by 3/4" iron pipe reducer attached to a piece of 1" diameter broom handle. The tassels are 1/8 inch diameter cotton cording. Total length is 23 inches (1.9 feet). (Author's collection).



Traditional Nage-Yari, Cord Stabilized, Self-Made – Blade is 5" long and 1" wide; stabilizing/retrieval cord is 12 feet long. Total length is 1.5 foot (Author's collection)

Makura-yari [#] – A Japanese javelin with a total length of about 4 foot, with a small leaf-shaped head about 2 inches long. "... placed by the pillow." [when sleeping] (Stone, 1999, p. 432).



Makura-Yari – The head is 2 inches long and the shaft length is 4.3 feet. The scabbard is near the javelin's head. (Stone, 1999, fig. 549, p. 432)

- INDO-PERSIA

Fletched Javelins [#] – Fletching-stabilized javelins were used in period warfare in the Middle East. Documentation of these weapons is scanty, but they seem to have been full size (4.0 to 8.0 foot long) javelins that were fletched with large feathers for accurate long-range throwing. For a detailed description of fletched javelins, see Appendix 2.



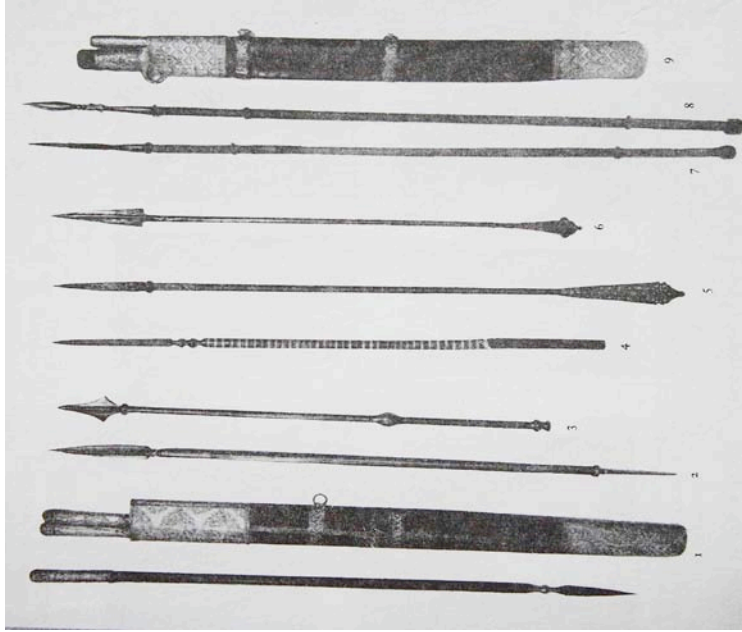
Detail of Painting – The Battle of Hattin, 1187 CE: Battle of Hattin was a decisive battle that marked the beginning of the loss of the Holy Land by the European Crusaders. Note use of fletching stabilized javelins by Saladin’s warriors. (Regan and other, 2006, p. 70).

Unfortunately, the details on this painting are not referenced, and its date and how authentic the depiction of the weapons might be are not known.



Vane-Stabilized Javelin, Self-Made –Javelin has a total length of 5 foot 4 inches; head is 9” long and cut from a SKS bayonet. The four-vane fletching is plastic, with each vane 3 inches wide. This javelin has been accurately thrown from 70-80 feet (25 yards) (Author’s collection).

Jarid (also Jered and Djarid) [#] – A light javelin used for hunting and occasionally for war. Total length typically is about 32-36 inches (2.7-3.0 feet) with a 7 inch-long, quadrangle-shaped steel head (Stone, 1999, p. 320). Most had thick metal butt caps as counterweights that allowed the javelin to be center-balanced, which aided accuracy. “*They are perfectly balanced and can be thrown with great accuracy.*” (Stone, 1999, p. 320). Typically, several were carried in a quiver-like case. Use of the jarid in period is poorly documented. Most current examples are from the 1600’s to the 1800’s.



Jarids and Quivers – Upper quiver is from Persia. Upper two jarid from central Africa; they have steel heads, wood shafts, and butts weighted with coiled iron wire. Lengths are not specified but they appear to be about 4 feet. Middle three jarid from Turkey; shafts are steel, 32-36 inches long, with steel heads. Lower two jarid (above the lower quiver) are from India; they have steel shafts and heads, with total lengths of about 32-36 inches. Lower quiver and jarid are from Armenia; the jarid length is 36.5 inches. (Stone, 1999, fig.402, p. 319).



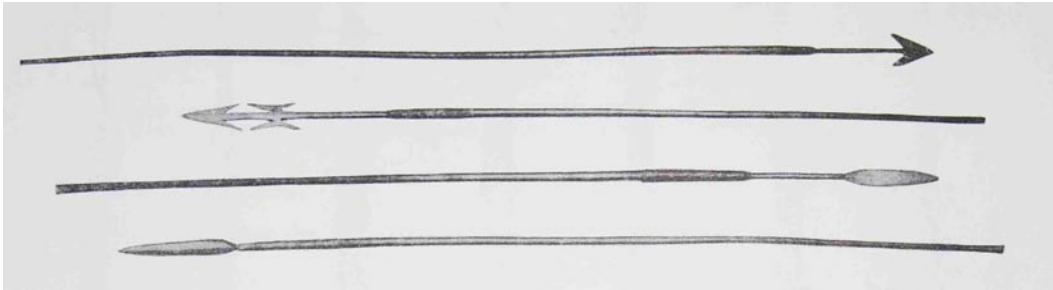
Jarid – Self-Made. Note iron pipe counterweight on the back of the shaft and the balance point mark at the center of the shaft. Head is a 7 inch-long cut-down SKS bayonet) and the shaft length is 3 feet. This is an accurate javelin. (Author's collection).

- AFRICA

Jarid (also Jered and Djarid) [#] – See the description above.

Assegai [#] – A light javelin mainly used for throwing. “Assegai” is the Portuguese name for this weapon, not the African name. This javelin is very similar to the azagai, a 15th century javelin used by the Spanish and Portuguese (Stone, 1999, p. 84) and is likely named for it. Used by Kafir tribe and allied tribes of South Africa. Assegai usually had a small leaf-shaped head on a long tang (total head length about 7-12 inches). The head was inserted into shaft and

the area wrapped in cording to prevent splitting. A barbed head was not uncommon. The total length of the typical assegai was about 4.5-5.0 feet. (Stone, 1999, p. 77)



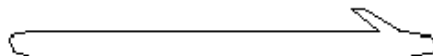
Assegais – Upper assegai has an iron head on a shank, the head is 7.5 inches long; total length 4.6 feet. Upper middle: the head is 12.5 inches long, and the total length is 4.1 feet. Lower middle: the head and shank is 12 inches long. Lower assegai: the head is 7 inches long. (Stone, 1999, fig. 97, p.77).

- AUSTRALIA AND NORTH AMERICA

Atlatl[#] -- The atlatl is a “spear” throwing device that was used by some cultures in period, mostly for hunting but occasionally for war. The atlatl “spear” is actually a light javelin or dart that is usually about 5-8 foot long, but may be as short as 4 feet or as long as 10-12 feet. The throwing stick is usually between 18 to 36 inches long, but it could be longer. Atlatls were used well into the 1500’s in North and South America and into modern times in Australia and parts of Mexico (Hrdlicka, 2003; Stirling, 1960). Hrdlicka, (2003) gives a basic description of the atlatl:

The atlatl, or spear thrower, is a very ancient weapon. Ones have been found dating back 18,000 yearsuntil the bow and arrow came along to replace it, it was the most effective weapon on earth.

In its earliest form, the atlatl (from the Nahuatl/Aztec word, pronounced "at LAT tul" today, but "AH tlaht" back then) was simply a long branch with a smaller branch coming off at an angle. Everything after that is just a refinement. Every atlatl has 3 main parts -- the handle (grip), the shaft, and the peg. After that, everything is variable.



Archeological evidence suggests that the atlatl was probably used nearly world-wide up to about 10-12,000 years ago, but its use died out in Europe, Africa and most of Asia when the bow became the premier long-distance hunting weapon. The atlatl was used in period mostly in North and South America, Australia, and Indonesia (Hrdlicka, 2003).

Atlatl designs are highly varied, with many different types seen, even within the same culture. The Northern Plains Atlatl Association, (2011) shows many different varieties as does Mason, (1890). The atlatl is considered a “specialized weapon” in the Kingdom of Artemisia, and there are some restrictions in its use (see *Appendices 1 and 2*).

KNIVES

Except for Africa and India, thrown knives in period were very rarely used in war except in emergencies. Thrown knives were used world-wide in covert operations, particularly in Japan. They were used occasionally for self-protection by almost everyone, but they were particularly used this way in Japan. Thrown knives were also used by rogues and criminals throughout period in robberies, tavern brawls, assassinations, etc.

The following section, divided by cultures, is a description of some throwing and throwable knives that were used in period:

- EUROPE

Pugio [*] -- A dagger issued to the Roman legions in the 1st century CE and withdrawn around 200 CE, although it was still used extensively. The blade of the pugio was typically around 5.9 to 13.7 inches long (Capwell, 2009, p. 22). The pugio was a melee weapon but could be thrown at need.



Pugio – Roman officer’s pugio, ca. 100-300 CE; blade length not specified but likely around 10 inches (Capwell, 2009, p. 121),

Cinquedea [*] -- The cinquedea dagger was popular with civilians in Italy around 1450 to 1550 CE. This dagger was carried horizontally at the small of the back. The blade many times was very elaborately fluted and engraved. Blade length varied from about 8 inches to almost sword-length (Stone, 1999, p. 181). Although a melee weapon, the cinquedea could be thrown effectively at need.



Cinquedea – Blade is about 10 inches long; note fluting on blade (My Armory.com)

Stiletto [*] -- A very late period dagger popular with civilians in Italy. Stiletos have a narrow, very stiff triangular or rectangular blade and were designed expressly for thrusting and for ease of concealment - it was called the assassin's weapon (Regan and others, 2006, p.131). Although designed as a melee weapon, stiletos could be thrown at need.



Stiletto – Late 16th century; total length 11.8 inches (Regan and others, 2006, p.131).



Modern Stiletto, Self-Made -- A stiletto-type knife designed for throwing. Blade length is 10.5 inches. The triangular cross-sectioned, fluted blade is made from a SKS bayonet, the grip is copper and brass pipe. Cross guards are not used on this knife, as they would break off or bend quickly when thrown. This self-made knife is also very similar to the Japanese Himogatana [see description below under JAPAN]. (Author's collection).

Ballock (Bollock) Dagger [*] -- “The bollock dagger or ballock knife is a type of dagger with a distinctively shaped shaft, with two oval swellings at the guard resembling male genitalia ("bollocks"). The guard is often in one piece with the wooden grip, and reinforced on top with a shaped metal washer. The dagger was popular in Scandinavia, Flanders, England and Scotland between the 13th and 18th centuries, in particular the Tudor period .” (Wikipedia article corroborated from other sources). The ballock dagger first appeared around 1300 and the hilt was typically carved wood (Capwell, 2009, p. 30). This knife was popular with soldiers (Regan, and others, 2006, p. 69). Although mostly a stabbing weapon, the ballock dagger could be thrown effectively at need.



Ballock Dagger – Blade is about 6 inches long. Blade lengths up to about 12 inches were common. (Photo by MyArmory.com)

Cross-Hilt Dagger [*] -- The cross-hilt dagger was first used in the 1100-1200's. It was one of the first daggers to be generally adopted by European cultures after the early to mid period sax was abandoned. These daggers tended to look like miniature swords. (Capwell, 2009, p. 28). Although mostly a stabbing weapon, the cross-hilt dagger could be thrown effectively at need.



Cross-Hilt Dagger -- Late 15th century German(?) cross-hilt dagger. (Capwell, 2009, p. 123)

Landsknecht Dagger [*] -- A late period German dagger with a distinctive “S” shaped hand guard and a moderately flaring pommel. The term “landsknecht” encompasses several related styles of daggers that were used by these European mercenary soldiers. (Capwell, 2009, p.33). Although mostly a stabbing weapon, the landsknecht dagger could be thrown effectively at need.



Landsknecht Dagger -- 16th century German. (Capwell, 2009, p. 131)

Scottish Dirk [*] -- The Scottish dirk is a very late period (about 1600 CE) adaptation from the earlier ballock and rondel daggers. A slightly earlier version of this knife was called the *dudgeon dagger*, named for the root of the box tree that was used to make its wood hilt (Stone, 1999, p. 213). The dirk was soon reduced to a small stocking knife, the modern *sgian-dubh*. The late period Scottish dirk had “a very heavy blade, thick at the back, single-edged and tapering uniformly from hilt to point. It has a barrel-shaped grip with a conical, flat-topped pommel and no guard. The hilts are generally decorated.....” (Stone, 1999, p. 209). Blade lengths varied, but were generally around 10 inches. Although primarily a slashing and stabbing knife, the Scottish dirk could be thrown effectively at need.



Scottish Dirk -- Blade is about 10 inches long



Dudgeon Dagger – English/Scottish, ca. 1603; total length 18.1 inches. Hilt is carved dudgeon (boxwood root) and the blade has a central spine along its entire length. (Capwell, 2009, p. 156).

Sax [*] -- *Regia Anglorum*, an Anglo-Saxon re-enactor group describes the early to mid-period Northern European sax as follows: “*The smaller examples range from about 7.5 - 35cm (3-14 inches) in blade length, and this is probably the knife referred to as the hadseax. These small examples were almost certainly just everyday tools: butchery knives, woodworking tools, eating knife, etc.. There are also a few very long examples whose blade lengths are in the 54 - 75cm (22" - 30") range. These larger knives are certainly weapons rather than tools, and were referred to as a langseax. Most blades were broad, heavy and with an angled back sloping in a straight line towards the point and this is the typical Saxon style*”

“The Scandinavian style had a more curving back and the Frankish style a more curving blade. Blades were often inlaid with gold, silver, copper or bronze wire beaten into fine channels carved into the iron blade. The grip was of wood, bone or antler and was sometimes carved or decorated. The hilt was usually without a pommel or crossguard, whilst the tang went all the way through the smaller seax handles and was clenched over at the end of the grip. The lack of a pommel or crossguard was probably because a scramseax was never actually meant as a 'fencing' weapon, and was more for stabbing and hacking.” (Regia Anglorum, 2005). Although a melee weapon, the sax could be thrown effectively at need.

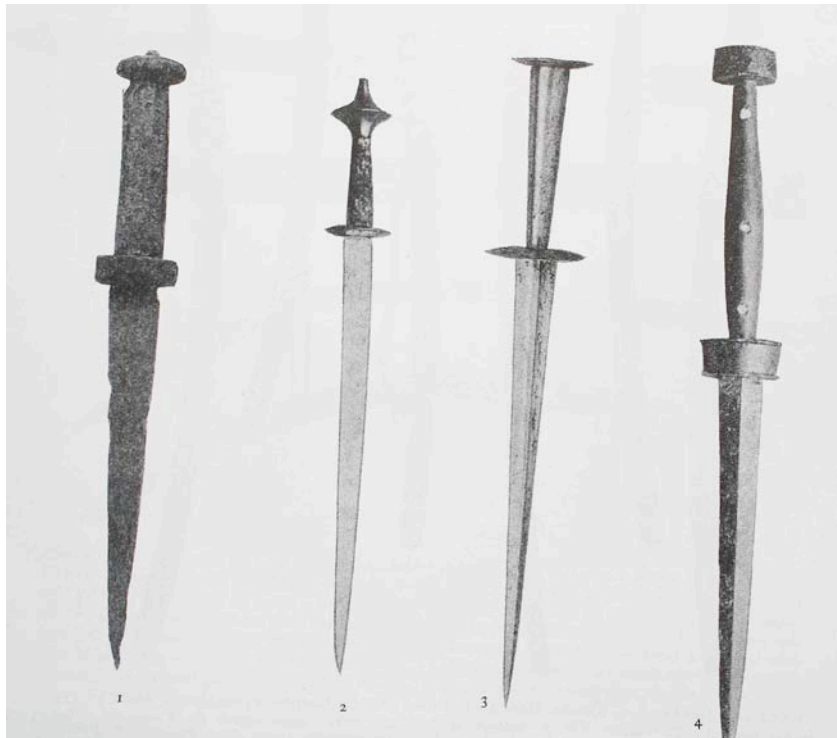


Sax -- A 7th century sax blade from Higgins Armory Museum, England



Variety of saxes -- From early period northern Europe and Britain (Regia Anglorum website <http://www.regia.org/warfare/seax.htm>).

Rondel Dagger [*] – A dagger with large rounded, disk-shaped hand guard and pommel. It was a popular dagger in the 14th and 15th centuries with both aristocracy and commoners. (Regan and others, 2006, p. 68-69; Stone, 1999, p. 199). This knife was primarily a melee weapon. If thrown, the large disk-shaped pommel would likely require the knife to be gripped by the blade.



Rondel Daggers – Dagger (1) is 14th century Italian; (2) is 14th century English(?); (3) origin is unknown; and (4) is 15th century Southern German. (Stone, 1999, fig. 248, p. 199)

Baselard (Basilard) Dagger [*] – A dagger with a unique H-shaped pommel that was popular in the 13th to 15th centuries, particularly with civilians (Regan and others, 2006, p. 68-69; Stone, 1999, p. 102). This knife was primarily a melee weapon. If thrown, the large H-shaped pommel would require the knife to be gripped by the blade.



Baselard Dagger – Europe, 15th century. The blade is original but the hilt is a modern reconstruction. Total length is 12 inches (Regan and others, 2006, p. 68)

AFRICA

Central African knives exhibit a wide range of designs (*see map on page 24*). African knives are single bladed or multi-bladed. Period use of multi-bladed knives is very poorly documented, but their sophistication suggests a long period of development. These sophisticated, highly functional throwing knives were apparently used in war and possibly occasionally for hunting as well as being status symbols. Some tribes also used them as a form of currency (Capwell, 2009, p. 73).

African multi-pointed throwing knives are usually classified into two very general groups: circular type and F-type (Capwell, 2009, p. 77) (*see map on p. 24*). Although speculative, these throwing knives may have developed from the iron boomerangs (kulbeda) used by some northern African peoples as described by Stone (1999, p. 399). Other designs seem to have their roots in the wooden throwing sticks used by many African tribes (Capwell, 2009, p. 77). Almost all designs share similar characteristics – either a multi-pointed, sickle-type weapon or a throwing stick/scythe-type weapon. Most have tribal or region-specific characteristics.

Dagger [*] -- Daggers of this basic shape were probably used by many African tribes almost as soon as they developed an iron technology or could trade with a tribe that did.



12-14th Century African Dagger – Total length 12 inches (Elsen, 2005, Item No. 0033)



African Dagger – Age not known, total length 13.2 inches. (Elsen, 2005, Item No. 0371)

Kpinga [#] -- Central African circular-type throwing knife. “Kpinga” is only one name for these weapons, with each tribe having their own names. Stone (1999, p. 615) states: “*They are thrown horizontally from right to left and may hit with any one of the branches. The trajectory is a curve that inclines towards the right of the thrower. The maximum range is said to be about 100 yards; at 40 to 50 it is quite accurate. Certain travelers relate that [some designs of] this arm thrown by a skillful hand can cut off a man’s leg at 20 meters. Trials showed that when thrown from a distance of 15 meters, some [designs] of these throwing knives would go through a board 15mm [about 1/2 inch] in thickness.*”

Stone’s description of this knife’s ability to penetrate 1/2” of wood or cut off a man’s leg likely refers to the heavier versions of the weapon, some of which weighed around 3 pounds.



Circular (Sickle-Like) Throwing Knife – Used by the Mbanja tribe West-Central Africa. Wicker-covered handle. About 19 inches long. Note the pointed pommel, which also could penetrate the target. This example is one of the most efficient of the central African throwing knife designs. (Elsen, 2005, Item 0486)

Mambeli [#] -- Example of a Central African F- type throwing knife likely based on throwing stick designs or scythe-type tools (*see below*).



***Mambeli** -- Scythe-like (F-type) throwing knife of the Bandia, Nsakara and Zande tribes, West-Central Africa. Wood handle. Knife is about 24.6 inches long. (Elsen, 2005, Item 0461)*

Chakarani [#] -- Flat steel throwing ring similar to the Indian chakram and used by the Jubba tribe of central Africa (*see description in Indo-Persian section below*). The name was probably given by an Indian traveler (Stone, 1999, p. 171).

- INDO-PERSIA

Kard [*] -- The kard originated in the Middle East, and was used throughout Persia and India. The point was often thickened to allow it to pierce mail (Stone, 1999, p. 336). The kard is a thrusting dagger, but its design allows it to be thrown effectively at need. The *charay* of Afghanistan is a variation of the kard, with lengths from about 14 to 30 inches (Stone, 1999, p. 354-355).



***Kard** – Total length 15.2 inches. This example is from 1710 CE but similar knives were used in mid-to late period. (Regan and others, 2006, p.134)*

Peshkabz [*] – This knife was used primarily in Persia, Afghanistan and northern India (*see next page*). The blade typically has a T- cross section, with the top of the “T” along the back of the blade. The blade is generally around 9 to 12 inches long and the hilt is many times made of walrus ivory. The very stiff, narrow blade was designed to pierce mail. (Stone, 1999, p.494; Capwell, 2009).



Peshkabz – Persian, c. 1800, but is likely very similar to period knives. Length is 16.5 inches. (Capwell, 2009, p. 230).

Bich’hwa [*] -- A bich’hwa (or bichwa) “is named for its resemblance to the sting of a scorpion, for which the Hindi name is bichawa. The weapon was based on the maru, or horn dagger created by the aboriginal Dravidians of south India, and many bichawa have blades which retain the shape of buffalo horns. Early examples of the bichawa come from the medieval southern empire of Vijayanagara” (Wikipeda article corroborated from other sources). The bich’hwa is a thrusting dagger, but can be thrown at need. There is essentially no documentation of it use in period, although it is a period weapon.



Bich’hwa – Total length 20 inches. (Regan and others, 2006, p.192)

Chakram [#] – Chakram are flat steel ring 5-12 inches in diameter and 0.5-1.5 inches wide with a sharpened outer edge (Stone, 1999, p. 171). Many have an airfoil shape. The chakram was used as a volley weapon throughout period. Written records of chakram use are essentially non-existent prior to its adoption by Sikhs in the 16th century. Rudnick (1997) states “*Historical references to the chakram go back to mythical and legendary times.... The earliest native references to arms are in the myths/histories/poems/epics of the Ramayana and the Mahabharata. Specifically, says Egerton [Egerton, 1880] citing Abbe Dubois, "The Hindus have 32 different kinds of weapons, and each of the 32 gods has his own weapon. Krishna and Ram are armed with a battle-axe and bow and arrow. Vishnu holds the chakram."* (see the 4th-6th century CE Vishnu figure below).

According to Rudnick (1997), the first written records are from “*about the 16th century onwards, [where] it seems to be a weapon exclusively used by the Sikh military. Used in volley fire fashion by trained footmen in the centuries before Britain imposed its rule, it continued to be a viable part of the Sikh inventory at least in part as late as the 19th century. ... in a description of a 16th century Indian army, it was noted that the warriors of Dheli and their array of weapons, included 'steel wheels' which they call 'chacarani' (chakram)... carried seven or eight on the left arm, and spun on the fingers of the right hand."*



Cast of Sardonyx Seal – Seal representing Vishnu with a worshipper, Afghanistan or Pakistan, 4th-6th century CE. Note chakram held in upper right hand (left side). British Museum.



Chakram – Steel. Outer diameter of 9.4 inches, inner diameter of 7.8 inches, width 1.6 inches. Chakram thickness is about 1/8", the weight is 8.4 oz. (Baily, 2011, Image #6)

The chakram was thrown side-handed from waist level using a wrist-flip at release. The throw was across the body, from left to right, like a modern Frisbee. An alternate method was to twirl it horizontally around the index finger (Stone, 1999, p. 171; Rudnick, 1997). Stone (1999, p. 171) reported accurate throwing of the chakram to 50 meters by Sikhs in the 1930's and the cutting of a green bamboo target stick 3/4" in diameter at 30 yards. A television documentary (Discovery Channel, 2008) shows modern Sikhs also throwing the chakram vertically. See Appendix 2 for a detailed discussion of the chakram.



Chakram, Self Made –Chakram and chakram-like weapons made from circular saw blades for use in SCA competitions. All are about 7 inches in diameter. Upper chakram is unsharpened and is intended for knock-down type target competitions. The lower two chakram are intended for use on wood target panels or rounds. (Author's collection)

Kukri [*] -- The national knife and weapon of the Gurkas of Nepal, who use it as a weapon and as a general utility knife. Blade lengths typically range from about 12 to 18 inches (Stone, 1999, p. 397) although smaller and larger lengths can be found. Period use is poorly documented, but the design likely has its roots in Alexander the Great's invasion of the region in the 4th century BCE (Capwell, 2009, p. 233). The blade shape is similar to the kopis, a knife/sword used by the early period Greeks (Oakeshott, 1960, p. 50). The kukri is a melee weapon, but it can be very effectively and accurately thrown at need.



Kukri – Total length 17.5 inches. (Regan and others, 2006, p.192)

Bhuj (Kutti) [*] – “A knife-like battle axe ... was used from earliest times in tribal India...” (Regan and others, 2006, p.196). “A short [about 8 inches long], heavy, single-edged knife blade mounted in line with a straight handle about 20 inches long. It was quite common in India, particularly in Sind [modern Pakistan] and in the north. It is sometimes called an elephant knife because there is usually an elephant’s head at the base of the blade. It frequently has a small knife concealed in the handle.” (Stone, 1999, p. 112). The blade has a broad, slightly curved point similar to a kukri. Although apparently the bhuj were mostly used as an axe-like melee weapon, thrown weapons marshals would likely judge this weapon a knife for SCA competitions. The design does allow for efficient throwing if needed.



Bhuj – A very ornate example of a bhuj. This is a 19th century example, but the design was apparently used for centuries. The total length is 27.8 inches. (Regan and others, 2006, p.196).

“Jungle Knives” (Parang, Golok, etc.) [*] -- The term “jungle knife” is a modern generic name for the large knives used for centuries in Southern Asia, India, Philippines, Borneo, and Indonesia by farmers and others for general chores, warfare and self-protection. There is a very wide range of sizes and shapes of these knives, with each culture having its own designs and names. Modern versions are most recognized by the names “bolo” and “machete”. Most examples are around 10 to 20 inches long. Although period use of these knives is poorly documented, it is very likely that these useful knives were designed and used by every southern Asian culture as soon as they developed an iron technology. These knives are melee weapons, but many, particularly the shorter versions with reasonably sharp points, can be effectively thrown at need.



Modern “Jungle Knife” -- “Kukri Machete” by Cold Steel®. Blade length is 13 inches; total length is 18 inches. The forward weighted blade makes this knife a very good thrower. (Author’s collection)

- CHINA

Piau (Fei Biao, Bi-Shou) [#] – According to Wotherspoon (2004), the piau or “air dart” was a small throwing dart used in China during the Song Dynasty (960 to 1127 CE). McNab (2010, p. 160) states that these weapons were used either as melee weapons (stabbing weapons) or thrown, with the tassels acting a stabilization device. They were often carried in pairs and were easily hidden. Typical lengths were about 7 inches and the weight was 7 ounces.



Piau – A modern interpretation of the piau or Chinese air dart. No dimensions are given. (Wotherspoon, 2004, fig. 5)

- JAPAN

Thrown knives were not commonly used in warfare in period Japan except in emergencies. A description of the use of a thrown short sword in warfare is given by Wotherspoon (2004): “*The Osaka Gunki (military record of Osaka) contains a passage that says: "Tadamasa saved himself from his foe by drawing out his wakizashi [short sword] and throwing it, as you would a shuriken".* No date for this military record is given. Thrown knives were used for self-protection by samurai and by ninja families or guilds in their covert operations. Many samurai were trained in knife throwing as part of their martial arts training. The study of the melee use of the knife and of knife throwing was called *tantojutsu* (Ratti and Westbrook, 1999, p. 23).

Japanese martial art practitioners also developed the *shuriken*, small knife-like thrown weapons used to wound or distract an enemy. The name “shuriken” can be translated as “hand-hidden blade” (Wotherspoon, 2004). Wotherspoon (2004) observes: “*During the pre-Meiji era [pre-1868] in Japan, shuriken design was largely determined by the shape of the item borrowed and adapted to make a weapon. Arrows, knives, needles, nails, washers and coins were all everyday items that were adapted by martial artists for a throwing weapon. In early times, metal was somewhat scarce as compared today, simply due to the lengthy and inefficient smelting process, and the low grade of iron sand found in Japan at the time.Shuriken-jutsu was an obscure and unpopular form of warfare; it was not a lethal art, it had a limited range and capability, and required great skill to actually be used effectively. So it can be understood that little metal was given*

over to a formalized production of shuriken blades as compared to that with the sword. Metal was basically scavenged in earlier times, to make shuriken, and this is why many old, authentic examples of shuriken betray their material origin”.

See Appendix 2 for a detailed discussion of the construction and use of shuriken.

Bo-Shuriken [#] – Short, straight-bladed throwing weapons. Bo-shuriken typically were cylindrical or square rods or short spear-shaped or knife-shaped blades. Bo-shuriken were usually made from iron, but occasionally were made from steel. Bo-shuriken were usually single-pointed, but some were pointed on both ends. Bo-shuriken were typically about 5.0 to 7.0 inches long. Bo-shuriken typically ranged in weight from about 2 to 5 ounces.



Bo-shuriken - Self-Made – Each of these bo-shuriken are about 7.0 inches long. Upper bo-shuriken is a 1” wide teppan shuriken (bo-shuriken made from plates); the middle one is a 3/8” diameter hari-gata (bo-shuriken made from a cylindrical rod); lower is a 1/4” wide kugi-gata (bo-shuriken made from a square rod). Hari-gata (middle) many times were wrapped with string to increase the friction against the fingers for better weapon control during release. The flat sides of the kugi-gata (lower) do not require this wrap. (Author’s collection)



Knife-Shaped Bo-Shuriken (Tanto-Gata and Hoko-Gata) -- Tanto-gata are bo-shuriken with knife-shaped points, while hoko-gata are bo-shuriken with spear-shaped points. The hoko-gata above has a triangular blade and a total length of 9 inches (Stone, 1999, fig. 726, p.546).

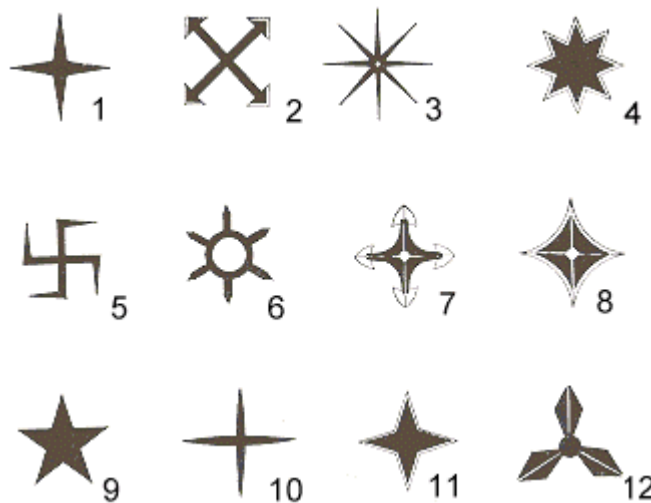
Shaken (Hira Shuriken) [#] -- Small throwing plates, disks or stars. The name “shaken” can be translated as “wheel-shaped blade” while the term “hira” refers to the multi-pointed nature of these shuriken (Wotherspoon, 2004). Wotherspoon

(2004) in discussing the origin of shaken noted: “it is possible that some types of shaken may also have been fashioned from construction materials, such as cross shaped brackets found in traditional timber architecture.... and from metal washers, used to sit under the heads of nails..... These would have been mass produced as flat plate metal (teppan) and cut to size and shape for particular building applications. They would then have the nail holes punched out, and then get hammered into the curve shape that suits the timber they are affixing. It is not difficult to see how an industrious person could take these blank pieces of metal, find that they are easy to throw and then sharpen the edges to make a dangerous weapon, at virtually no expense to themselves. Most people would recognize these plates of metal as construction items, and thus would not become suspicious if they were discover an individual carrying them. This way an assassin could hide the tools of his trade in plain view.”



Hira Shuriken -- Edo period (1600-1867)
shaken in Odawara Castle Museum, Japan
(Wikipedia Photo)

Hira-Shuriken-Self Made – Shaken made
from a 4-inch diameter circular saw blade.
See Appendix 2 for a description of its
construction (Author’s collection)



Examples of hira shuriken from various ninjutsu schools.
Time periods not specified (Wotherspoon, 2004, fig.49)

Tanto [#] -- Knife with a tsuba (hand guard); a variety, the *hamadashi*, has a very small guard scarcely larger than the grip. Stone, (1999, p. 314) lists the range of tanto lengths as between 11 and 16 inches. Tantos became popular in the Heian Period (794-1156 CE). Tantos were normally not thrown, but many samurai were trained in knife throwing and could throw it at need.



Tanto – Tanto is shown disassembled, with the grip at upper left, next to the scabbard mouth. The hand guard (tsuba) is at left, just below the hilt. Entire blade is about 12”long. The small knife in the lower right corner of the photo is a kozuka, sometimes called a kogatana (see the description below). Note the typically richly carved handle of the kozuka. The rod-shaped tool above the kozuka is a hair-dressing implement. British Museum.

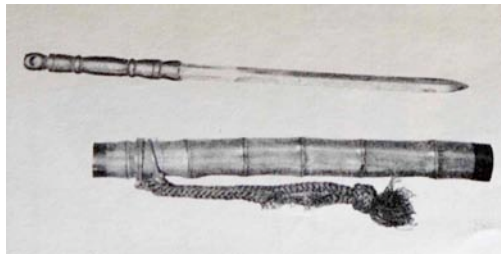
Kozuka (Kogatana) [#] – The small all-steel knife carried in a pocket on the side of the scabbard of the wakizashi (the samurai’s short sword) or the tanto (*see the kozuka in the tanto photo above and in the aikuchi photo below*). The blades are straight and fairly narrow. The handle scales are removable and usually very elaborate on one side, plain iron on the other. The total length of the kozuka is about 8 inches. Stone (1999, p. 382, fig. 477) shows several kozuka that have blades about 4.5 inches long and grips about 3.75 inches long. Stone (1999, p. 382) states: “it is said that every Samurai boy was expected to learn to throw a kozuka accurately before he was old enough to wear a pair of swords. For short distances it was laid flat on the hand and thrown underhand, point first. For longer distances it was held by one end and thrown overhand; for very long throws the handle was removed. The thrower should be able to hit a man in the eye at 20 feet. Sugimoto (1925) *A Daughter of the Samurai* (in Stone, 1999) states “The throwing dagger (kozuka) must speed on its way, true as an arrow, direct to forehead, throat or wrist”. It was not considered credible to hit a man by a thrown knife in any other part.

Aikuchi [#] -- An aikuchi is essentially a tanto (*above*) without the hand guard (tsuba). Aikuchi tend to have a slightly shorter blade than the tanto, but the key difference is the lack of the hand guard.



Aikuchi – The total length is 19.2 inches. Note the lack of a hand guard (tsuba). Note the black, richly decorated hilt of the kozuka (see description above) in the pocket sheath on the aikuchi scabbard. The blade of this aikuchi was made in 1625 but the remainder was assembled at a later date. (Capwell, 2009, p. 246)

Himogatana [*] – One piece steel knife (Stone, 1999, p.291), similar to the late period Italian stiletto. Himogatana likely were used by samurai to pierce armor or to give a killing thrust through a joint in the armor. Himogatana were probably normally not thrown, but it could be throw at need.



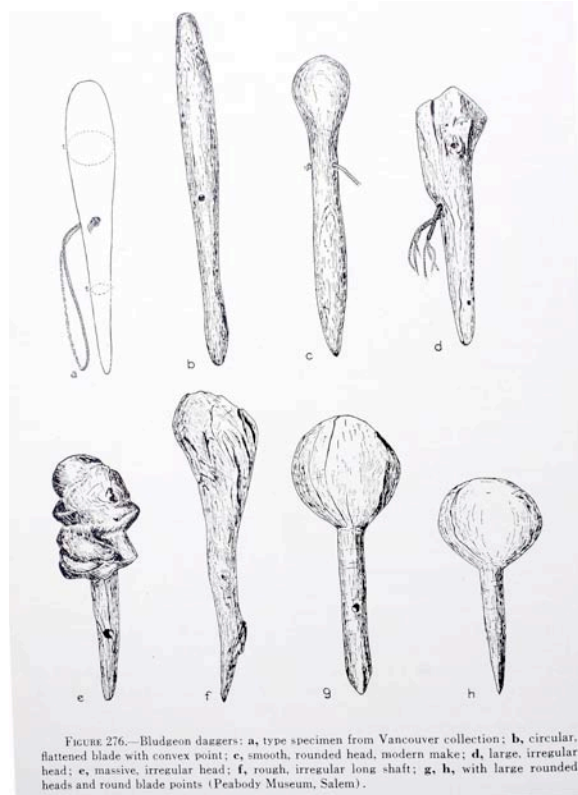
Himogatana – All steel construction. Diamond section blade, 6” long. (Stone, 1999, fig. 367, p.292). A similar knife is the stiletto in the EUROPE section (above).

- OCEANIA

None of the Oceania cultures developed an indigenous iron technology, but many did have wood, stone or bone analogues to many of the iron weapons made by iron-using cultures. One such analogue was the Hawaiian *bludgeon dagger*.

Bludgeon Dagger [*] – The wooden Hawaiian bludgeon dagger (a term proposed by cultural anthropologists) is a combination melee club and melee knife (Buck, 1964, 429-431). This weapon, with its central wrist thong, is unique to Hawaii, although other Oceania tribes and some African and Australian tribes used pointed throwing sticks and throwing clubs of similar shape and size. The weapon typically was 12-18” long with a bulbous head about 1.5” to 5.5” in diameter, although some had head diameters of about 7.25” (*see figure 276h below*). The shaft diameter was about 1.0-1.5” and had a rounded or spatula-

shaped knife blade which tapered to a rounded point. Bludgeon daggers can be thrown, but it is not known if it was habitually used that way.



Hawaiian Bludgeon Daggers – Dagger (a) is 17.5" long. Dagger (b) is 18.25" long with shaft diameter of about 1.25" and a head diameter of 1.75". Dagger (c) is "modern" (post-European contact), and is 11.5" long with a head diameter of 2.1" and a shaft diameter of 1.05 to 1.2"; weight is 10 ounces. Dagger (d) is 7" long. Dagger (e) is 11.25" long and weighs 25 ounces. Dagger (f) is 18" long and weighs 47 ounces. Dagger (g) is 13.3" long and weighs 54 ounces. Dagger (h) is 17.5" long and weighs 89 ounces. A bludgeon dagger typically had a wrist thong, which passed through a square hole in the center of the shaft (Buck, 1964, fig. 276, p. 430)



Hawaiian Bludgeon Dagger--Self-Made – This 17" long dagger is ash and was made from a shovel handle. It is modeled after daggers (a) and (c) of Buck (1964, fig. 276, p. 430) above. The head diameter is 1.5" and the weight is 7 ounces. (Author's collection).

6. PRACTICALITY OF PERIOD THROWN WEAPONS

How practical were thrown weapons in period? Thrown weapons require an initial training period to develop the skills, and then varying amounts of continued practice to maintain those skills. Even for people skilled in their use, thrown weapons can be difficult to use effectively. Three examples of some of these difficulties are: (1) distance judgments for the overhand throwing of axes and knives are critical for their successful use and many times conditions make it difficult to judge those distances accurately unless the thrower has had extensive training; (2) thrown axes and knives do not generate large amounts of energy and can be defeated or compromised by thick clothing or commonly encountered obstacles; and (3) thrown weapons require a fairly precise strike on a relatively small, usually moving target, many times in a stressful, life-threatening situation. This can be difficult to do, even for highly skilled throwers.

Javelins were the most practical thrown weapon in period, axes and knives less so. Almost every culture in period had people who threw axes and knives in emergency situations, but typically only a few spent the time learning how to do so effectively. Except for very specialized uses (e.g. Japanese ninja), many people, particularly in mid to late period, did not consider thrown weapon skills important enough to spend the extensive training time required and relied almost exclusively on melee weapons or ranged weapons like archery.

The general practicality of each category of thrown weapons is discussed below.

- Percussive Weapons – Percussive thrown weapons (boomerangs, throwing clubs and throwing sticks) were used extensively only by a few cultures in period; these were usually primitive cultures or cultures that had not developed an iron technology. Percussive thrown weapons were practical in non-armored warfare, for hunting, and for self-defense -- particularly by poorer people in every culture, who couldn't afford steel weapons. The skills needed to effectively use percussive thrown weapons are easily learned and are fairly easily maintained.
- Javelins – Javelins were the most common and practical thrown weapon used in period. Javelins were used by nearly every culture, at least in early period, and many cultures retained them into very late period, when firearms made javelins obsolete. Javelins were very practical in early period warfare, and throughout period for self-defense, hunting and livestock protection. The skills needed to effectively use the javelin are moderately easily learned and are moderately easily maintained.
- Axes – Throwing axes were used only by a few cultures in period. The most prominent users were several European tribes (early period Franks, Anglo-Saxons and Scandinavians), who used them in warfare and for self-defense. Some Indo-Persian and African tribes (mostly in west-central Africa) used thrown axes throughout period for warfare, self-protection and occasionally for hunting. The skills needed to effectively use the thrown axe are moderately easy to learn and are

moderately easily maintained, although the weapon is not as easy or as practical to use as the javelin.

Thrown axes have a few physical limitations to their practical use. To counter these limitations, some cultures designed axes specifically as ranged (thrown) weapons and these axes have some distinctive shapes and characteristics.

Most axes are handicapped for throwing use by their basic design – a broad melee-style cutting blade that tends to limit penetration when thrown. An axe designed specifically for throwing will have a moderately sharp to very sharp piercing point on the upper portion of the blade. The blade's cutting edge may even be angled 45° or more to the haft compared to axes designed for melee use, whose cutting edge is nearly parallel to the haft. Some throwing axe designs have a bent haft that positions the axe head back towards the thrower – this bend allows a longer penetration arc by placing the end of the haft further away from the target and also allows the axe to rotate into the target easier if it hits haft end first. A bent haft also enhances a thrown axe's ability to rebound off the ground and strike a target low if it misses its original target.

- Knives – Thrown knives were generally impractical for warfare, self-defense or hunting in period unless the practitioner was willing to make a very serious commitment to training in their use. The skills needed to effectively use the single blade thrown knife are moderately difficult to learn and require constant practice to maintain. Throughout period, thrown knives were used primarily in covert operations (assassinations, espionage, etc.) by dedicated, highly skilled people. They were occasionally used by outlaws and other rogues in tavern fights or robberies. Thrown knives were used in almost every culture by people in desperate war or self-defense situations, although favorable results were likely problematic unless the thrower had the skills to use the weapon effectively. Only three cultures made effective use of thrown knives in period: the Japanese, the Indians and the west-central Africans.
 - Japan – Japan in mid to late period had a small portion of its population (the samurai) dedicated to perfecting the warrior arts, and thrown knives were a minor part of that culture. Another mid to late period Japanese cultural segment that used thrown knives was the ninja clans and families, who specialized in covert operations. Throwing knives, shuriken (*see description in the knife section of this study*) and other thrown weapons were an integral part of the ninja's skills repertoire. See Appendix 2 for a detailed discussion of the various shuriken designs and suggestions for their use in the SCA.
 - Indo-Persia – Only one type of throwing knife was commonly used in warfare in Indo-Persia – the chakram. The chakram is a circular ring of sharpened steel (*see description in the knife section of this study*). The historical use of the chakram is very poorly documented, but it was likely

used throughout much of period. The successful use of this knife was due to its design – it is a circular ring of sharpened steel that was fairly easy to throw accurately without extensive training and could be used effectively in adverse conditions and at unknown distances. See Appendix 2 for a detailed discussion of the chakram and suggestions for its use in the SCA.

- Africa – West-Central Africans made extensive use of throwing knives in period. Historical records from Africa describing the use of thrown weapons in period are essentially non-existent, but it is very likely that these weapons were used in war, for self-defense and possibly for hunting. African throwing knives are unique in the world; they are typically multi-pointed sickle or scythe-type weapons (*see the descriptions in the knife section of this study*). Many exhibit a high level of sophistication, both artistically and in the understanding of rotational and target penetration dynamics. The successful use of these knives was due to their design – they are multi-pointed weapons that were relatively easy to throw accurately without extensive training.

In summary, this study illustrates that a very wide range of thrown weapons were used from 500 BCE to 1600 CE and some only became obsolete in very late period when firearms came into common use. Even then, for some specialized applications like sport hunting or covert operations, selected thrown weapons continued to be used in post-period.

Thrown weapon use was practical only in specific cultural and technological settings. As a culture developed steel armor, heavy cavalry, archery and more sophisticated weapons like firearms, thrown weapons were relegated either to specialized use by highly skilled practitioners or were abandoned entirely. Most thrown weapons required moderate to extensive training before they could be used effectively, and many individuals did not value thrown weapons skills highly enough to devote the training time to developing these skills.

A review of the types and uses of period thrown weapons shows that except for javelins and certain types of hunting weapons, thrown weapons were typically used as diversion weapons or as weapons of last resort. A person under attack usually does not throw away his/her weapon unless they are desperate or unless they have more than one! A thrown weapon that doesn't incapacitate your enemy also will give him another weapon to use against you. People usually threw a weapon only as a desperate last resort or for a very specific need, like during covert operations. Thrown clubs, axes and knives in period were used mostly to distract and confuse the enemy, and while he was disoriented by pain or shock, the thrower had an opportunity to either escape, to attack with a more efficient melee weapon or to attack from a better tactical position.

Thrown weapons in period, particularly javelins, could kill quite well, but there are only a few, fairly small areas in the human body (primarily the eyes, throat and certain parts of the lower abdomen and spine) where the thrower can hope to immediately kill or

incapacitate the enemy with a thrown axe or knife. Unless the thrower was highly skilled, a thrown axe or knife tended to be an act of desperation, done when there were no other options. The thrower hoped the thrown weapon would kill or disable his/her opponent, but they realized that this might be unlikely unless they were both very skilled and had some luck!

APPENDIX 1

**ALTERNATIVE THROWN WEAPONS USE
IN THE SCA**

APPENDIX 1

ALTERNATIVE THROWN WEAPONS USE IN THE SCA

This study has identified some of the thrown or throwable weapons used in period, many of which have never been used in SCA or Kingdom of Artemisia competitions. This appendix suggests specific criteria for the use of these weapons in Kingdom of Artemisia competitions. Official criteria for the use of weapons that become popular with kingdom throwers will be finalized by the Archer General after input from kingdom thrown weapons marshals.

1. DEFINITIONS OF STANDARD AND SPECIALIZED WEAPONS

DEFINITION OF STANDARD WEAPONS FOR ROYAL ROUNDS

Royal Rounds is a SCA target event that allows the ranking of throwers using “traditional” thrown weapons (javelin and single-bladed axe and knife). In the past, Royal Rounds in the Kingdom of Artemisia have been done with weapons of reasonably uniform sizes and weights, although these standards have never been specified.

Many of the weapons identified in this study have shapes, weights and lengths that differ widely from the weapons currently used in the kingdom, and their use would change the basic tenor of Royal Round rankings if participants were allowed to use them. Their use would also make comparisons of current Royal Round rankings with earlier rankings difficult. Accordingly, it is suggested that the weapons used in Royal Rounds in the Kingdom of Artemisia conform to the following parameters:

- JAVELINS – Javelins will be between 3.0 and 8.0 feet in total length and no stabilization devices (tassels, cords, fletching, vanes, etc.) are allowed. Javelins may be center-balanced or not. “Wings” at the head are allowed; the head will be without sharp blades or barbs. If a butt cap or counterweight is used, it will not be sharply pointed.
- AXES – Axes will be single bladed, and between 10.0 to 32.0 ounces in weight and 10.0 and 32.0 inches in total length. The axe blade must be at or nearly at right angles to the handle of the weapon and can be no wider than 5 inches. Spikes or other blades at any location or a sharpened or sharply pointed butt are not allowed.
- KNIVES – Knives will be straight bladed with single blades. Curved blades are permitted but they must not approach circular in shape. The knife will be between 7.0 to 20.0 ounces in weight and 7.0 to 20.0 inches in total length. Spikes anywhere or a sharpened or sharply pointed pommel are not allowed. Stabilization devices (tassels, cords, etc.) are not allowed.

The suggested weapon weight and length requirements listed above encompass most of the loaner weapons and most of the private weapons that are currently being thrown for Royal Rounds in the Kingdom of Artemisia.

With the permission of the marshal-in-charge, a thrower may throw Royal Rounds with an axe or knife that is lighter or shorter than that specified above, as long as the thrower is aware that they will be using a weapon that is may be more difficult to throw accurately, and that their scores may suffer.

ADDITIONAL STANDARD WEAPONS

An additional category of standard thrown weapons is suggested for use in Kingdom of Artemisia competitions -- *percussive weapons* (see main report). Percussive weapons are typically without cutting edges but may be pointed. Weapons of this type include war hammers and maces. Percussive weapons can be thrown in competitions at targets intended for those weapons, but they may not be thrown for Royal Round rankings. See Appendix 2 for additional discussion on the use of percussive weapons.

DEFINITION OF SPECIALIZED WEAPONS

The 2011 edition of the Kingdom of Artemisia thrown weapons handbook defines “specialized weapons” as multi-bladed weapons or blade-and-spike type weapons. These weapons are not allowed to be thrown for Royal Round rankings.

This study has shown that a wide range of thrown weapons were used in period. The kingdom’s 2011 definition of specialized thrown weapons is somewhat restrictive and is primarily intended to exclude “non-standard” weapons from being used in Royal Round rankings. The definitions (*above*) of the weapon types allowed for throwing Royal Rounds permit a broader use of other weapon types in non-Royal Round competitions. Accordingly, it is suggested that the following revised definition of “specialized weapons” be used:

- Specialized weapons include those in which part of the device remains in the thrower’s hand after the weapon is launched. This would include atlatls, slings and blow pipes.
- Weapons that exceed the upper weight and length limits for weapons used in Royal Round rankings are considered specialized weapons. These limits are 8.0 foot lengths for javelins, 32 ounces and inches for axes and blades wider than 5 inches, and 20 ounces and inches for knives. These weapons may be allowed for practice by the marshal-in-charge, but the thrower will have to demonstrate that they can throw the weapon safely and that the weapon will not damage the target butts.
- Weapons with very thick points are not allowed, as they typically cause excessive damage to wood target butts. Examples of such weapons are “crow-billed” war

hammers. Such weapons are allowed in competitions designed for percussive weapons.

- For older youth (16 to 17 years old), chakram, bo-shuriken, shaken and straight-bladed knives less than 7.0 inches in total length are considered specialized weapons (*see the main report for the identification of these weapons*). Older youth may throw these weapons if the standard youth waiver has been signed and the parent or guardian is present at the range at least during the youth's initial throwing. If the parent or guardian is satisfied that the youth can safely throw these weapons, they will so inform the marshal-in-charge and they then may leave the range. **THESE WEAPONS ARE NOT RECOMMENDED FOR 10 TO 15 YEAR-OLD YOUTH!** At the discretion of the marshal-in-charge, 10-15 year old youth may be allowed to throw such weapons if the parent understands: (1) *that such weapons are potentially more dangerous to younger throwers; and (2) the youth demonstrates a willingness to throw in a responsible manner*. Both the parent and the youth will be warned that for 10-15 year old youth there will be zero tolerance for the unsafe handling of these weapons. The **FIRST** time that they exhibits unsafe throwing with these weapons, permission to use them will be revoked. **THE MARSHAL'S DECISION ON THIS WILL BE FINAL!**
- Multi-bladed axes and knives (excluding circular-bladed weapons like the Indian chakram and Japanese shaken) are considered specialized weapons. The marshal-in-charge will judge whether a particular multi-bladed weapon can be used for practice. They will not be allowed in a competition unless that competition is specifically designed for their inclusion.

Multi-bladed axes and knives were used in period, but most of these weapons were highly specialized military weapons. Multi-bladed weapons were designed to maximize the striking potential of the weapon under adverse battle conditions, where throwing distances could not be chosen. These conditions are not present on SCA thrown weapons target ranges, where throwing conditions are excellent and throwing distances can be picked to fit a particular weapon's rotational characteristics. There is no advantage to the thrower (other than novelty) that would justify using a multi-bladed axe or knife in a SCA thrown weapons event, as the emphasis in the SCA is not on simply sticking the weapon in the target, but doing so in events that test the skills and precision throwing of the participant. In addition, multi-bladed axes like double-bladed axes and the African Ondo, or multi-bladed knives like African "circular" knives (*see main report*) are potentially too dangerous for inexperienced throwers to use, so loaner weapons can not be safely provided for general throwing. Exploring the use of these weapons by experienced throwers is strongly encouraged, but as specialized weapons only. Events can be designed to test the skills of experienced throwers using these weapons, but they should be special competitions, as these weapons are not suitable for general throwers.

The classification and use of a specific thrown weapon in competitions or for practice will always be at the discretion of the thrown weapons marshal conducting the event.

If there is enough kingdom interest in exploring the use of specialized weapons, loaner equipment can be made and competitions held for these weapons.

2. WEAPON CRITERIA FOR KINGDOM OF ARTEMISIA COMPETITIONS

Excluding the exceptions noted above, it is suggested that almost any weapon be allowed in kingdom competitions, but that the marshal-in-charge define fair rules so that some weapons do not have an undue advantage nor are some throwers handicapped.

To allow fair competitions, weapons with similar throwing characteristics should be grouped together. This will allow a fair test of the throwing ability, as all will be using weapons with similar throwing characteristics. See Appendix 2 for a detailed discussion of suggested weapon categories and their proposed criteria for use in Kingdom of Artemisia thrown weapon competitions.

Except for the weapon requirements for Royal Rounds and the general definition of “specialized weapons”, definitive regulations on the use of specific weapon designs can not be established at this time. The types of weapons allowed for specific competitions, how they can be used safely and how they are scored will need an on-going assessment by kingdom thrown weapons marshals for several years as people experiment with different weapon types. The guidelines proposed in this appendix and in Appendix 2 are suggestions only, and are intended merely to start the assessment process.

WEAPON TYPE IDENTIFICATION

Some of the weapons discussed in this study can raise this question for a SCA thrown weapon marshal -- *is that an axe or a knife?* There is some over-lap between cutting weapons (axes) and piercing weapons (knives and javelins) that require judgments by a marshal, who must decide if a particular weapon is to be allowed in the axe or knife portion of a competition. Two examples of this type of overlap are the European *doloire* and the Indo-Persian *bhuj*.

- Doloire -- The doloire (*see figure below*) is a trowel-shaped, axe-like weapon which has its main, striking area and penetration direction at or nearly at right



angles to the handle of the weapon. This geometry would usually place it in the axe category. However, the cutting edge flows smoothly forward and ends in a forward-facing point. If the weapon slightly over-rotates when thrown as an axe, it would hit on the projecting point and produce a knife-like hit. The doloire was called an axe in period and probably should be considered an axe for non-Royal Round competitions, even though it has some knife-like characteristics.

Another option would be to allow the weapon in both the axe and the knife portions of the event, but require the thrower to stick the broad cutting edge for the axe portion of the competition and the point for the knife portion.

- Bhuj -- The Indo-Persian bhuj is a knife-like weapon that apparently was used in period mostly as a melee axe (*see figure below*). The weapon consists of a heavy,



knife-like blade mounted on a shaft. The blade has a broad, slightly curved point similar to a kukri. If thrown, the penetration direction for this weapon would mostly be parallel or nearly parallel to the handle of the weapon. This geometry would usually place it in the knife category. If this weapon was thrown, it would likely stick as a knife, although it would be possible to stick it as an axe on the broad forward part of the blade. A SCA thrown weapons marshal would likely classify the bhuj as a throwing knife, even though in period it was apparently used mostly as a melee axe and the weapon could be stuck like an axe if thrown severely under-rotated.

Items for a thrown weapons marshal to consider when answering the question of whether a weapon is an axe or a knife are:

- *How was the weapon used in period?*
- *How does the thrower want to use it?*
- *If thrown, what will the likely strike be – point-one or edge-on?*
- *Will this weapon give the thrower an undue advantage over the other throwers?*

The thrower should be prepared to present most of this information to the marshal!

3. SAFETY AND TARGET CONSIDERATIONS

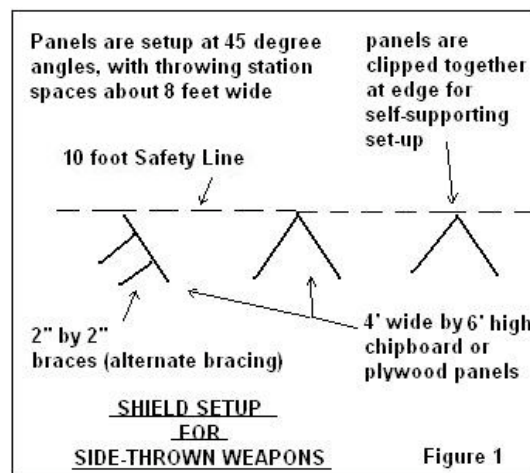
RANGE LAY-OUT FOR SIDE-ARMED THROWING

Some of the weapons used in period by various cultures were thrown side-arm. This would require modifications of a typical SCA thrown weapons range if these weapons are to be safely thrown in SCA practices or competitions. Alternately, the weapons can be

restricted to vertical throws only. Most of these weapons were used both ways, so this is not a real handicap. However, in the interest in exploring the actual period use of these weapons, setting up a range with one or two stations that allow safe side-arm throwing is encouraged.

CAUTION! THE FOLLOWING DESCRIPTION FOR SAFE SIDE-ARM THROWING ARE SUGGESTIONS ONLY! IT IS UP TO THE THROWN WEAPON MARSHAL TO TEST AND VERIFY THAT THESE SUGGESTIONS ARE SAFE ENOUGH TO BE USED IN THEIR EVENTS!

A suggested range set-up for side-arm throwing is shown in figure 1. The set up consists of a standard range lay-out with one or two stations surrounded by *throwing shields*. Throwing shields consist of 4 foot wide by 6 foot high panels of chip board or plywood set up on the throwing line to deflect a side-thrown weapon that is inadvertently released too soon.



The shields protect throwers standing adjacent to the side-throwing station(s) and the angled panels will deflect any mis-thrown weapons away from the thrower. Throwers using these stations would be required to stand between the shields in such a manner that any early weapon release will be deflected by the shield. In addition, the thrower must not release any side-thrown weapon from above chest level if 6 foot high panels are used. The 6 foot height for these panels is for setup ease, as they weigh a little less and are slightly easier to move compared to 4 foot by 8 foot panels.

An easy way to set up a trial side-arm throwing station for right-handed throwers is to set one throwing shield on the left side of the right javelin throwing station. Typically, javelin stations are set up at the ends of the throwing line, so if the farthest-right station was used for side-arm throwing, there would be no danger of a mis-throw hitting anything to the right, assuming there was enough safe clear space on the right of the range to accommodate an extension of the safety zone.

RANGE LAY-OUT FOR VANED JAVELINS AND CORD-THROWN JAVELINS

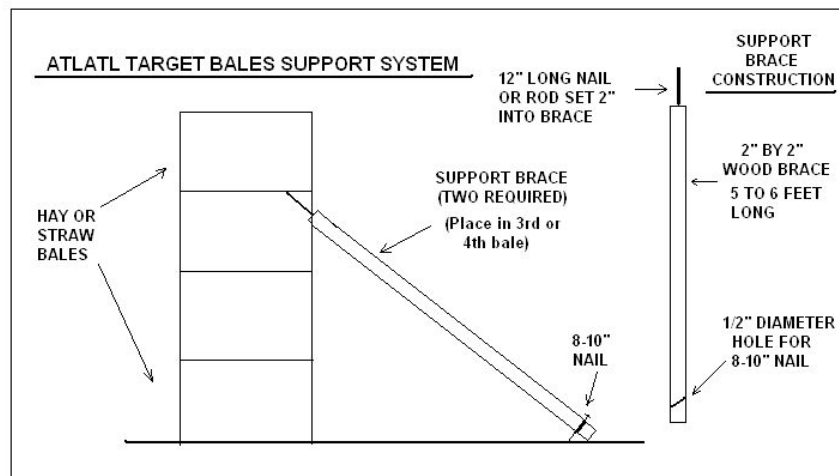
Vaned javelins and cord-thrown javelins are intended to be thrown about 30 to 80 feet (10-25 yards). If these weapons are to be used for practice or during a competition, the marshal-in-charge should lay out an extended range to safely accommodate these weapons. Alternately, these weapons can be used on a separate archery range. Most SCA events include an archery range for practices and competitions, so this should not be difficult to do.

RANGE LAY-OUT FOR ATLATLS

Atlatls allow a light, javelin-like dart to be thrown further than can be safely done on many kingdom thrown weapons ranges. A skilled and strong atlatl user can throw a dart up to about 150 yards (the world record is 284 yards), but the typical thrower will likely throw one at under 100 yards. If space is available or a safe backstop is present, an atlatl range can be included as part of the thrown weapons range. It is suggested that a single atlatl station be set up at one end of the throwing line and the 28 foot diagonal forming that side of the safety zone be extended a minimum of an additional 30 feet. The safety zone behind the targets should conform to kingdom archery regulations – either: (1) at a minimum, the safety zone equals the distance to the target; or (2) at a maximum, the safety zone is 150 yards. If space is not available at the thrown weapons range, atlatl practice and competitions can be held at a separate archery range. Most SCA events include an archery range for practices and competitions, so this is not difficult to do.

TARGET PANELS FOR ATLATLS

Hay or straw bales form an excellent target backing for atlatl practice and competitions, but due to the size of the typical targets (about 4 foot by 4 foot), a 4-bale stack is needed, with two support posts at the back to keep the bales from falling over. A suggested bale support is shown below:



If hay or straw bales are not available, atlatl target panels can be made from 2-inch thick, high-density foam insulation panels. The target panels are supported by two 2" by 2" support braces (*see diagram above*) that use shorter 2" long target pins. Two-inch thick high-density foam insulation comes in 4 foot by 8 foot sheets (*Home Depot or Lowes, about \$28 each*) and will make 2 target panels. This material usually will stop a dart after only a few inches of penetration. High-density foam is usually pink or blue in color. The more common white foam panels, while cheaper, are too loosely compacted to make suitable target panels and the darts will pass through them. They will also break down much quicker in use compared to the high-density foam panels.

The back of a high-density foam target panel will need to be backed with glued-on cardboard, otherwise the darts will break divots out of the back of the panel about 3 times the diameter of the dart. Contact cement is used to attach the cardboard. Paper or cardboard targets can be attached to the face of the foam target panel with short nails.

SAFE THROWING OF MULTI-POINTED CIRCULAR KNIVES

Multiple-pointed Indian chakram and Japanese shaken are thrown with the hand gripping the weapon near one or more sharpened teeth. These weapons, if gripped firmly, pose no risk to the users. However, they must be gripped firmly or a small potential exists for the thrower to receive minor hand cuts during the throw. Testing by two marshals using several different styles of grips has shown that IF THE WEAPON IS GRIPPED FIRMLY, THERE IS NO DANGER OF THE HAND BEING CUT. All of these weapon types leave the hand completely before they begin to rotate, so there is no potential for cuts if a reasonably firm grip on the weapon is used. However, if the weapon is gripped VERY loosely, there is a slight chance for the hand to slide over the weapon's teeth during release. The grip would have to be so loose that the weapon would likely hit the ground in front of the thrower. The photos below illustrate the correct grip for the chakram and shaken.



Basic Grip – Note position of index finger. The thumb is held to one side for clarity in this photo.



Gripping the Multi-Point Chakram or Shaken
The gap between two chakram teeth is tucked into the web between the thumb and index finger.



Photo Simulation Showing the Moment of Release of the Chakram or Shaken – The throwing hand index finger and thumb both open sideways to release the weapon and it has moved forward beyond the web of the thumb/finger joint before starting to rotate.

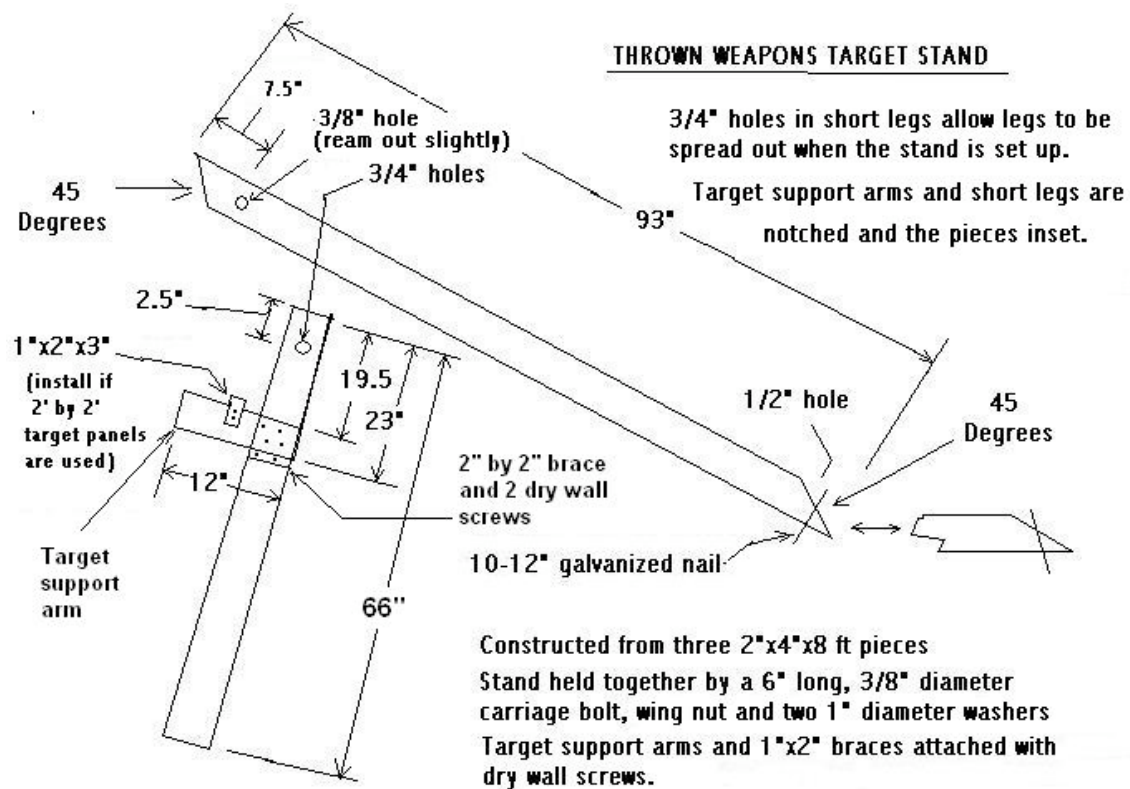
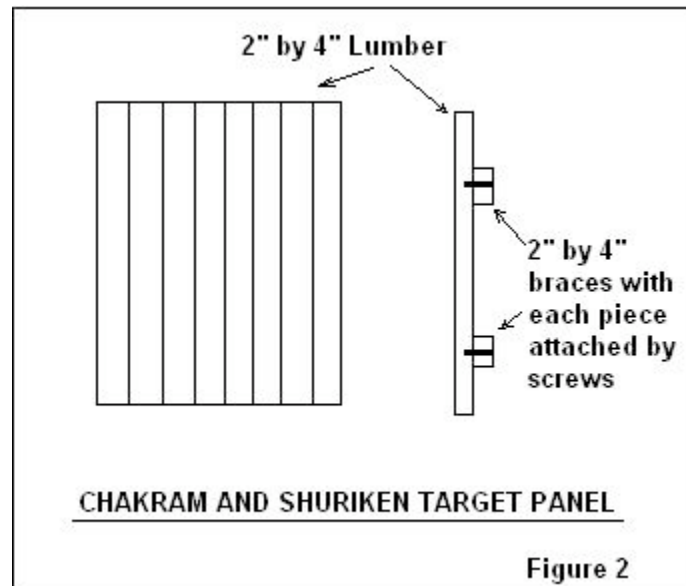
A thrower who is concerned about minor cuts when using these weapons may throw using a light glove to protect the hand. A few loaner gloves will be provided by marshals who have these weapon types available as loaner weapons.

These weapons will be used by throwers only after they have been given a brief instruction and demonstration of the correct grip by a knowledgeable thrown weapons marshal and have been warned about the possible danger of using a very loose grip.

LARGE WOOD TARGET PANEL CONSTRUCTION

Some axe and knife designs were thrown both overhand and side-arm in period; these include toothed chakram, shaken (hira shuriken), and African multi-bladed throwing knives and axes. Target butts for these weapons can be the same target rounds used for Royal Rounds or the 2 ft. by 2 ft. side-cut lumber target panels used in some competitions (*see drawing on page 12 below*). If a side-cut lumber target panel is used, the panel is rotated so that the grain of the wood is parallel to the penetration direction of the weapon.

An alternate target panel, particularly for chakrams, bo-shurikens and shaken consists of a 3 ft. by 3 ft. panel of 2" by 4" lumber constructed in a single layer (*see figure 2*). The wider target allows a wider "catch area" for the weapons while throwers are learning to use them and gives more room to hang several targets on one panel for competitions. These target panels do not have the inertia of the double-sided 2 ft. by 2 ft. side-cut target panels currently used in the kingdom and might not do well for the heavier weapons, but they are usually adequate for the lighter chakram and shuriken-type weapons.



2 FOOT BY 2 FOOT AXE AND KNIFE TARGET

FRONT

2 FT

2 FT

8-INCH WIDE

10-INCH WIDE

BACK

1-1/2" DRYWALL
SCREWS AND WASHERS

3-4 FOOT OF 1/8" ROPE - USED TO HOLD TARGET PANEL TO STAND

TARGET PANELS CONSTRUCTED FROM SIDE-CUT LUMBER

TARGET PANELS CONSTRUCTED FROM SIDE-CUT LUMBER

MATERIALS:

$$2 - 2'' \text{ by } 10'' \text{ by } 2'$$
$$4 - 2^m \mid 8^m \mid 2^r$$

20 - 2-1/2" DRYWALL SCREWS

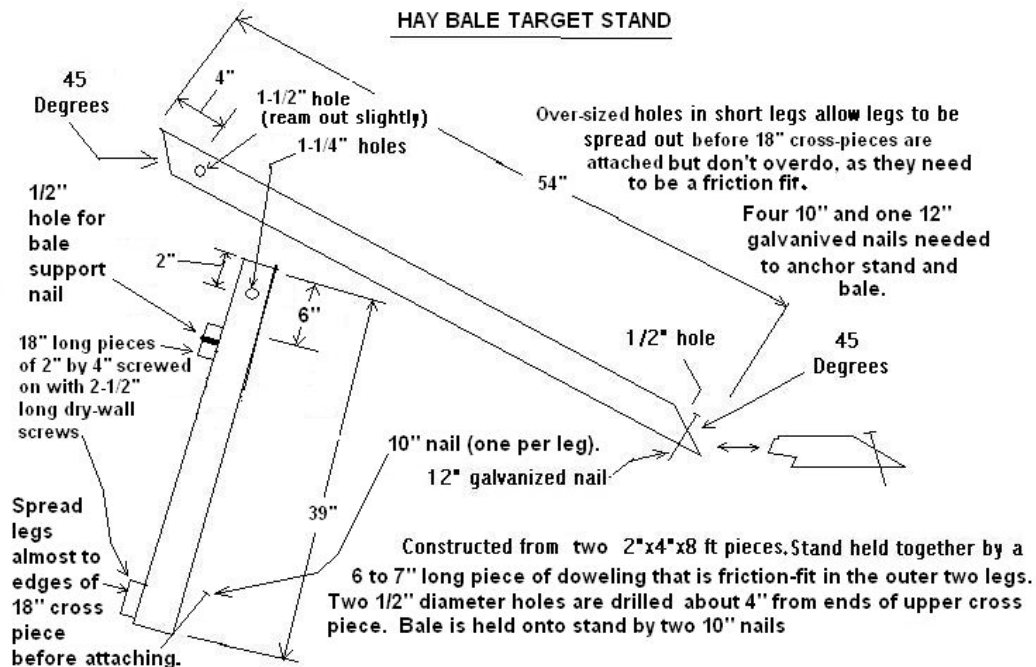
2 - 1-1/2" DRYWALL SCREWS

2' OF 1/8" ROPE

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.

HAY BALE TARGET STAND



Drawings by Lord John of York, Deputy-Thrown Weapons, Kingdom of Artemisia, September, 2012.
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APPENDIX 2

**PROPOSED
ALTERNATIVE THROWN WEAPONS**

APPENDIX 2

PROPOSED ALTERNATIVE THROWN WEAPONS

Seventeen new, alternative thrown weapons are proposed for possible inclusion in selected Kingdom of Artemisia thrown weapons competitions. The proposed weapons are not the only ones of their type, but were selected to give kingdom throwers a feel for how the general weapon types perform. If particular weapon types become popular, throwers can make and use examples that appeal to them and competitions can be designed for these weapons.

The proposed trial thrown weapons are:

LONG JAVELINS (length 4.0 to 8.0 feet or 48 to 96 inches)

- *Vane-Stabilized Javelin*

MEDIUM-LENGTH JAVELINS (length 2.1 to 3.9 feet or 25 to 47 inches)

- *Jarid*

SHORT JAVELINS

- *Nage-Yari* (length 1.5 to 2.0 feet or 18 to 24 inches)
- *Uchi-Ne* (length 1.0 to 1.4 feet or 12 to 17 inches)
- *Plumbata* (length 1.5 to 2.0 feet or 18 to 24 inches)

KNIVES – SINGLE POINT, STRAIGHT BLADED (length \leq 7.0 inches)

- *Hari-Gata* (cylinder-shaped rod)
- *Kugi-Gata* (square-shaped rod)
- *Tanto-Gata* (knife-shaped blade) or *Hoko-Gata* (spear-shaped blade)

KNIVES –MULTI-POINTED, CIRCULAR BLADED (diameter $<$ 5.0 inches)

- *Hira Shuriken*
 - *Cross* (4 pointed)
 - *Star* (3-6 pointed)
 - *Multi-Pointed* (more than 6 points)

KNIVES –MULTI-POINTED, CIRCULAR BLADED (diameter \geq 5.0 inches)

- *Chakram* (Toothed)
- *Chakram* (Smooth)

PERCUSSIVE WEAPONS

- *Hunting Boomerang*
- *Throwing Stick* (pointed butt or double pointed) --*Australian Throwing Stick or Hawaiian Bludgeon Dagger*
- *Throwing Club* (blunt or pointed) ----- *Fiji Ulas and Australian Flared Club*

ATLATL (*Specialty Weapon*)

A basic description of these proposed weapons is presented in Section 1 (*below*). Included in this section are the proposed criteria that could be used by kingdom thrown weapons marshals to place these weapons into equitable competition categories. Details on these weapons and suggested construction techniques are presented in Section 2. Almost every one of these weapons can be made by a thrower who has basic tools and craftsman's skills. The cost is usually less than about \$10-\$15 for each weapon.

1. PROPOSED ALTERNATIVE THROWN WEAPONS

AXES

Axes must be between 10.0 to 32.0 ounces in weight and 10.0 and 32.0 inches in total length. Two competition categories are suggested:

- **Single Bladed Axes** – Axes in this category must have only one sharpened edge that is at a right angle or nearly at a right angle to the handle and the blade can be no wider than 5 inches. Spikes at any location and sharpened or pointed butts are not allowed. This is the “standard” throwing axe currently used in kingdom competitions and is the only axe configuration allowed for throwing Royal Rounds. Discussions and examples of this axe type are not needed as this is the kingdom's commonly used axe style.
- **Multiple Bladed/Multi-Edged Axes** – Axes in this category are considered specialized weapons and are recommended for use only by experienced throwers. These axes may have multiple blades arranged in any order and of any shape. Included in this category are single-bladed axes that have a continuous sharpened blade. A spike or knife-like blade in the blade area or on the haft is allowed, but a sharpened pommel is not. Pommels may be pointed as long as they are not sharp.

Examples of axes in this category are the African Ondo (*see main report*). Axes of this type should be used only by experienced throwers, who understand the safe use of the weapons. Until a few kingdom throwers make up some personal weapons, this axe type will not be trial evaluated.

JAVELINS

Javelins must be between 1.0 and 8.0 feet long, excluding any stabilization device, and may be center-balanced (counterweighted). “Wings” at the head are allowed. The head will be without sharp blades or barbs. A blade-shaped head is allowed if the edges are dulled so that they will not cut the target butt (hay bale) twine. If a butt cap is used, it will not be sharp. Three competition categories are suggested:

- **Long to Intermediate-Length Javelins – Non-Stabilized** – Total length 3.0 to 8.0 feet; stabilization devices (cord, tassels, fletching, wood vanes, etc.) are not allowed. The javelin may be center-balanced but this is not required. Javelins of this type are allowed for throwing Royal Rounds. Only discussions and examples

of the intermediate length javelin type is needed here, as the longer javelins are the commonly used kingdom javelins. Proposed trial intermediate length javelin is the:

- *Jarid* -- A 3.0 foot long, center-balanced Indo-Persian hunting javelin. Total length 2.1 to 3.9 feet (25 to 47 inches), center-balanced by the addition of a weight at the butt. Stabilizing devices (cording, tassels, fletching, etc) are not allowed.
- **Long Javelins – Vane Stabilized** -- Total length 4.0 to 8.0 feet. Stabilizing vanes (two to four) are required; vanes must be feather fletching or a material that mimics fletching, like stiff leather. Non-period materials like flexible plastic may also be used. There are no restrictions on vane sizes. If the vanes extend beyond the javelin's butt, they are not considered part of the weapon's length. Vane stabilized javelins are not allowed for throwing Royal Rounds. A proposed trial weapon is the:
 - *Vane-Stabilized Javelin* – A 4.0 to 6.0 foot-long, vane-stabilized Indo-Persian (Middle Eastern) war javelin.
- **Short Javelins** -- Total length 1.0 to 2.0 feet (12 to 24 inches). Short javelins are not allowed for throwing Royal Rounds. Three proposed trial weapons are:
 - *Nage-Yari* – A 1.5-2.0 foot (18 to 24 inch) long Japanese javelin used for self-protection in confined spaces. Stabilization devices (trailing/retrieval cord, fletching or tassels) are not required but are recommended. The stabilizing device is not considered part of the weapon's length.
 - *Uchi-Ne* – A 1.0 to 1.4 foot (12 to 17 inch) long Japanese javelin used for self-protection in very confined spaces. Stabilization devices (trailing/retrieval cord, fletching or tassels) are required. The stabilizing device is not considered part of the weapon's length.
 - *Plumbata* – A 1.5-2.0 foot (18 to 24 inch) long weighted Greco-Roman javelin used for warfare. Fletching stabilization is required. Iron wire is recommended for the weight; if lead is used it must be covered (Duct or electricians tape, cloth, leather, etc.) to prevent lead contamination.

KNIVES

Knives must be no more than 20.0 ounces in weight and no more than 20.0 inches in total length. Knives are divided into suggested competition categories by whether its blade is straight or circular and by the knife's total length or diameter.

Length is a key factor in how easily a single point, straight-bladed knife can be stuck. Generally, the shorter a knife is, the harder it is to stick consistently unless the thrower is highly skilled. In period, the Japanese appear to have had the most experience of any

culture with throwing knives of all sizes. Small, short Japanese throwing knives and rods (bo-shuriken) were used as concealed or semi-concealed weapons and most had total lengths under 7.4 inches, with many at or under 6.5 inches (Wotherspoon, 2004). This length is also significant in that knives with total lengths around 8.0 inches long or longer tend to be easier to stick consistently compared to shorter knives. Accordingly, 7.0 inches is proposed for the division between short and long, straight bladed knives for Kingdom of Artemisia thrown weapons competitions. There is no restriction on how short the small knives can be.

NOTE: A thrower always has the option of competing in an event with a shorter or lighter weapon than what is stipulated in these suggestions. The marshal-in-charge will inform the thrower that he/she will be using a weapon that may be more difficult to throw accurately and they may be handicapping themselves, but choice is theirs. A longer weapon may not be used in an event that stipulates short weapons, as this would give an undue advantage to the thrower with the longer weapon.

Two main competition categories (single point or multiple points) are suggested for thrown knives in kingdom competitions, with each category divided into two sub-categories based on weapon length or diameter:

- **Single Point, Straight Bladed Knives**

- Short Knives -- Total length ≤ 7.0 inches. A curved blade is allowed but it must not approach circular in shape. Stabilizing devices (cording, bristles, tassels, etc.) are allowed, but are not required. The stabilizing device is not considered part of the weapon's length. Other than the 20 ounce maximum weight restriction imposed on all knives, there is no other weight restriction. Proposed trial weapons are:
 - *Hari-Gata* –Straight bladed, cylindrical rod-shaped Japanese throwing knives. Many times hari-gata had string-wrapped shafts to provide more friction for the thumb.
 - *Kugi-Gata* –Straight bladed, square rod-shaped Japanese throwing knives.
 - *Tanto-Gata or Hoko-Gata* – Straight bladed, knife-blade shaped (tanto) or spear-blade shaped (hoko) throwing knives. This category includes short throwing knives of all types and from all cultures in period. The hoko-gata shape is the typical large loaner knife shape in the Kingdom of Artemisia.
- Long Knives -- Total length > 7.0 inches to 20 inches. Knives will be straight and single-bladed. A curved blade is allowed but it must not approach circular in shape. The knife will be between 7.0 to 20.0 ounces

in weight. Spikes or a sharpened or sharply pointed pommel are not allowed. Stabilization devices (tassels, cords, etc.) are not allowed. This is the typical throwing knife currently used in kingdom competitions and is the only knife configuration allowed for throwing Royal Rounds. An exception may be granted by the marshal-in-charge to throw short, straight bladed knives for Royal Rounds if the thrower understands that they are slightly handicapping themselves. Further discussions and examples of this knife type are not needed.

- **Multiple Point, Circular Bladed Knives**

The diameter of a circular knife has an effect on the ease with which it can be stuck. Large diameter knives are relatively heavy and are less affected by airflow over their surface when thrown at less than truly vertical or horizontal angles. This adverse airflow can cause lighter, smaller diameter circular knives to veer to one side and drop when thrown. This phenomenon requires the thrower to have very good throwing control in order to make accurate throws with these small knives. Preliminary trials suggest that this airflow phenomena becomes markedly less when circular knives (particularly the solid disk types) reach about 5 inches in diameter or larger. In addition, small circular knives in period needed to be concealable, also suggesting that they should be less than about 5 inches in diameter. Accordingly, 5 inches is proposed as the division between large and small diameter circular knives for Kingdom of Artemisia thrown weapon competitions.

- Small Diameter Knives - Total diameter < 5.0 inches. Other than the 20 ounce maximum weight restriction imposed on all knives, there is no other weight restriction. This category consists primarily of the Japanese hira shuriken. Proposed trial weapons are:
 - *Hira Shuriken - Star-Shaped* – A Japanese 3- to 5-pointed, star-shaped throwing disk.
 - *Hira Shuriken - Multi-Pointed* – A Japanese circular, multi-pointed throwing disk. Hira shuriken typically had 6 to 8 points.
 - *Hira Shuriken - Cross-Shaped* – A Japanese 4-pointed, cross-shaped throwing knife. In period, these weapons, particularly the self-made ones, were typically constructed from two square rods, two narrow plates or from a metal sheet.
- Large Diameter Knives - Total diameter ≥ 5.0 inches to 20 inches. The knife will be between 7.0 to 20.0 ounces in weight. This category includes the Indian chakram and the African circular-type, multi-bladed throwing knives. Although they are included in this category, the African circular knives are considered specialized weapons and will not be evaluated by general kingdom throwers. African circular knives should be used only by

experienced throwers who understand the safe use of the weapon. Until a few throwers makes up some personal weapons, this knife type will not be trial evaluated. However, the chakram is recommended for trial evaluations. Proposed trial weapons are:

- *Multi-Point (Toothed) Chakram* – An Indian and African circular throwing knife. Period examples were steel rings and this is the preferred shape. However, for ease of construction, kingdom chakram may be disk-shaped. Multi-point chakram will be thrown at standard kingdom wood target butts.
- *Smooth Chakram* – Similar to multi-pointed chakram except smooth edged. Period examples were steel rings and this is the preferred shape. However, for ease of construction, kingdom chakram may be disk-shaped. Smooth chakram are considered percussive weapons. They will be unsharpened and will be thrown only at breaking or knock-down targets.

PERCUSSIVE WEAPONS

Percussive weapons typically have no cutting edges, although they may have penetration points. Some of these weapons are designed to break or knock the target down, while others are designed to either break or knock the target down or to penetrate it, depending on which end of the weapon strikes. Blunt percussive weapons used in kingdom competitions will be thrown only at breaking or knock-down targets. Pointed percussive weapons can be thrown either at breaking or knock-down targets or at soft targets (hay bales, cardboard, etc.) as penetrating weapons. Stabilization devices are not allowed on any percussive weapon. Three competition categories are suggested:

- **Boomerangs and Curved Throwing Sticks** – Non-returning boomerangs and curved throwing sticks were used for hunting in Australia, Africa, North America and India, and for warfare in Australia. These weapons were thrown both overhand and side-armed in period. A proposed trial weapon is the:
 - *Australian Hunting Boomerang* – A non-returning, about 2.0 foot long by 1/2" thick plywood boomerang. Width is about 2 inches. The weapon will be used only for breaking or knock-down targets.
- **Straight Throwing Sticks** – Straight throwing sticks were used primarily for hunting in Africa, North America, Oceania, Australia and India. The weapon was thrown both overhand and side-armed in period. The butts and/or heads of some period throwing sticks were sharpened for target penetration or for use as a digging tool. Two proposed trial weapons are the:
 - *Australian Throwing Stick* – A throwing stick with a straight wood shaft about 2.0 feet long by 0.75-1.0 inch in diameter. At least one end will

come to a rounded (not sharp) point to allow penetrating strikes on hay bale or cardboard targets. The other end may be either pointed or not pointed. The weapon can be used both for percussive targets (breaking or knock-down targets) and for penetrating soft targets.

- *Hawaiian Bludgeon Dagger* -- A short throwing stick with a wood shaft about 14.0-16.0" long by 0.75-1.0" in diameter and a rounded wood head about 1.5-3.0 inches in diameter. The butt end comes to a flat or rounded (not sharp) point to allow penetrating strikes on soft targets. The head end is rounded and unsharpened. The weapon can be used both for percussive targets (breaking or knock-down targets) and for penetrating soft targets.
- **Throwing Clubs** - Throwing clubs were used for hunting in Oceania, Australia and India, and for warfare in Oceania and Australia. The weapon was thrown both overhand and side-armed in period. In emergencies, European and Indo-Persian maces and war hammers were thrown and they are also included in this category. Many styles can be made and used, but the two proposed trial weapons are the:
 - *Fiji Ulas Throwing Club* – The Fiji Ulas throwing club has a straight, about 16" long, 1" to 1-1/4" diameter rounded wood handle and about a 6" diameter rounded wooded head. The butt is unsharpened.
 - *Australian Flared Throwing Club* – An about 2.0 foot long wood club with a 2 to 4 inch diameter pointed head and a 0.75-1.0 inch diameter handle that tapered down to a rounded point.

ATLATL (SPECIALTY WEAPON)

Atlatls are considered specialty weapons in the Kingdom of Artemisia and can be used on a kingdom thrown weapons range only with the permission of the marshal-in-charge and only if the range can safely handle the extended throwing distances possible with the weapon. See Appendix 1 for a discussion on setting up a safe atlatl range. The atlatl throwing system consists of two components; a throwing stick and one or more darts.

- **Atlatl Throwing Stick** – Throwing sticks are usually about 18-36 inches long, but some period examples are longer. They can be of any shape the thrower desires (*see references*). A thrower using a throwing stick longer than 36 inches will have to demonstrate to the marshal-in-charge that they can throw safely with it.
- **Atlatl Dart** – The light javelin (dart) used for kingdom atlatl competitions will be between 4.0 and 8.0 foot long. If a thrower wants to use darts longer than 8.0 feet, they must demonstrate to the marshal-in-charge that they can throw the dart safely. Darts less than 4.0 foot in length (including arrows) may be used for practice.

2. WEAPON HISTORY, CONSTRUCTION AND PROPOSED USE

The details of weapon history, construction and use of the seventeen proposed alternative weapons are discussed below in the order presented in Section 1 (*above*). Many weapon discussions include instructions for both a traditional weapon design and an easy-to-made practice weapon design. The traditional weapons may take more effort to make, but that is what the SCA is all about!

JAVELINS

5.0 FOOT-LONG, VANE-STABILIZED JAVELIN

A vane-stabilized javelin uses broad fletching or vanes at the butt to stabilize the weapon for accurate, long-distance throwing.

PERIOD USE OF VANE-STABILIZED JAVELINS

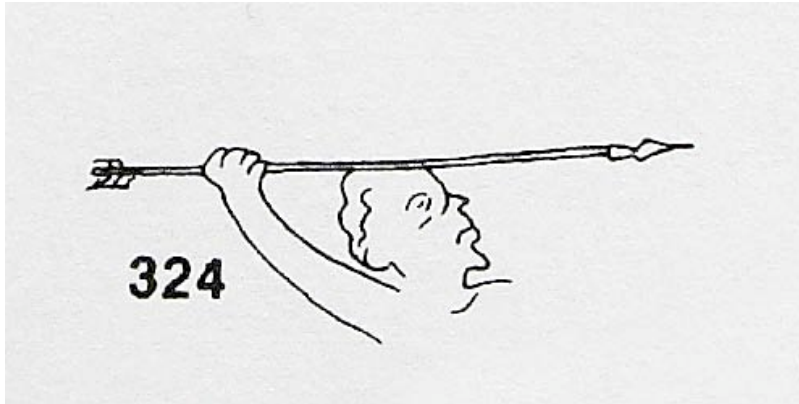
The use of vane or fletching stabilized javelins in period appears to be limited to Indo-Persian cultures. The detail of a painting of the 1187 CE battle of Hattin (*below*) shows a portion of the Islamic forces using fletching-stabilized javelins.



Detail of Painting – The Battle of Hattin, 1187 CE: Battle of Hattin was a decisive battle that marked the beginning of the loss of the Holy Land by the European Crusaders. Note use of fletching stabilized javelins by Saladin’s warriors. (Regan and other, 2006, p. 70).

Unfortunately, the details on this painting are not referenced and its date and how authentic the depiction of the weapons might be are not known.

Nicolle (1999, fig. 324, p. 415) illustrates a vane-stabilized javelin judged to be Middle-Eastern in origin. Quoting Nicolle: ““*Demon*”, painted panel from the apse of Sant



Quirze de Pedret, Aatalonia, 1075-1100 (Diocesan Museum, Solsona, Spain). This damaged painting might show a javelin with arrow-like flights at the rear end. Such weapons seem to be mentioned in written sources and are shown in 14th or 15th century Egyptian manuscripts, but do not appear elsewhere in 11th or 12th century European art."

Nicolle (fig. 322, p. 129) also notes that it was not uncommon in 11th century Catalanian (Iberian) religious artworks to illustrate the "wicked" (Pharaoh, demons, pagans, etc.) in Islamic costumes and using Islamic weapons. This also suggests that the fletched javelin shown in figure 324 is a North African or Middle Eastern weapon.

CONSTRUCTION OF VANE-STABILIZED JAVELINS

The head of a vane-stabilized javelin is constructed in a manner similar to regular javelins (*see head construction details under the jarid discussion below*). If feather fletching is used, a 4-vane configuration using very large feathers (e.g. fu-fu feathers or turkey wing feathers) is suggested. The feathers are glued onto the shaft using standard archery fletching techniques.

An alternate fletching material is thin, stiff leather. Thin, flexible plastic (plastic storage boxes from Wal-Mart) makes good but non-period vanes when painted. Use plastic that is not too brittle, or it will break if the javelin hits on the vanes. Plastic is easiest cut with scissors (very thin plastic) or a small soldering iron with a thin point. Two, three, or four-vane configuration can be used, but a 2-vane or a 4-vane configuration is the easiest to make if the vanes are not feather fletching. To construct, cut out the desired vane shape following the suggestions in figure 1 (*below*). The vanes will need to be wide enough to control the weight of the javelin's head -- the heavier the head, larger or more vanes are needed. Period examples appear to show individual vanes about 3 to 4 inches wide (6 to 8 inches total width for a 2- or 4-vane configuration).

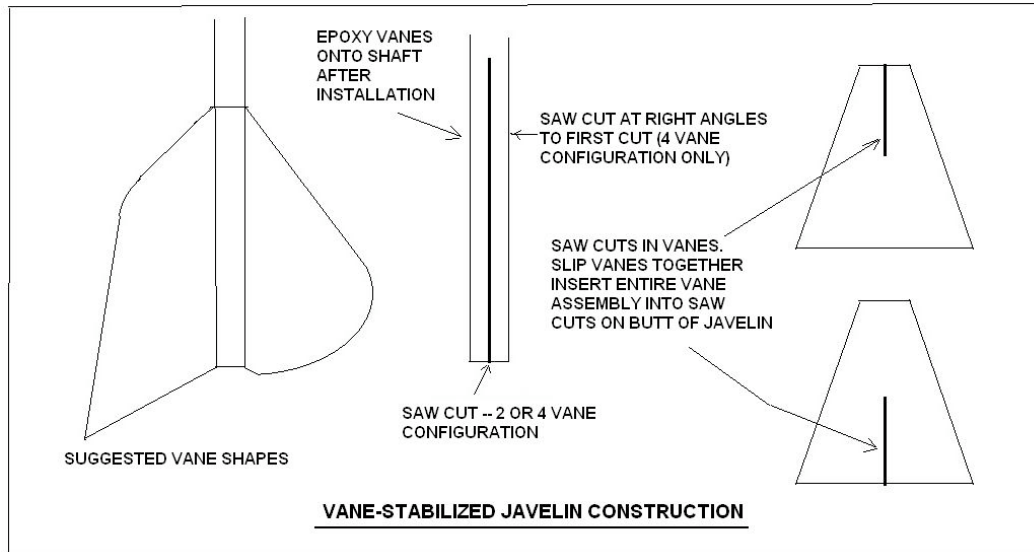


Figure 1 – Construction of Javelin Vanes



Vane-Stabilized Javelin, Self-Made – Total length is 5 foot 4 inches; head is 9" long and cut from a SKS bayonet. The four-vane fletching is plastic, with each vane 3 inches wide. This javelin has been accurately thrown from 70-80 feet (25 yards) (Author's collection).

SUGGESTED USE IN KINGDOM THROWN WEAPONS EVENTS

After some experimenting with vane size, vane stabilized javelins can be very accurate weapons. Although any javelin competition can be thrown with a vane-stabilized javelin, personal tests suggest that there is no advantage to using a vane-stabilized javelin at 20 feet, the standard distance for Kingdom of Artemisia javelin competitions. These weapons were intended to be accurate when thrown at extended distances and personal tests show that these weapons typically start to out-perform non-stabilized javelins when thrown from around 30 feet. Competitions designed to test the accuracy of vane-stabilized javelins should be thrown from 30 feet or greater. Personal tests suggest that throwing from 40-45 feet (15 yards) may be about the limit for some women and older throwers. Stronger throwers likely will be able to throw from 60 to 80 feet (20 to 25 yards). Hits anywhere on a hay bale at this distance would be good throwing! A scoring system with scoring rings around the hay bale, similar to that used for an archery clout, is suggested for long-distance vane-stabilized javelin events. The larger atlatl bulls-eye target also may be used for vane-stabilized javelin events. See a description for these types of competitions and the targets used under the atlatl discussion below.

A HISTORICAL DIGRESSION – CENTER-BALANCED JAVELINS

A variation of the typical javelin was the center-balanced javelin. These javelins had a counter weight attached to the butt that was the same weight as the head. The added weight and the central balance produces accurate, deep-penetration throws, but the additional weight does somewhat reduce the javelin's range.

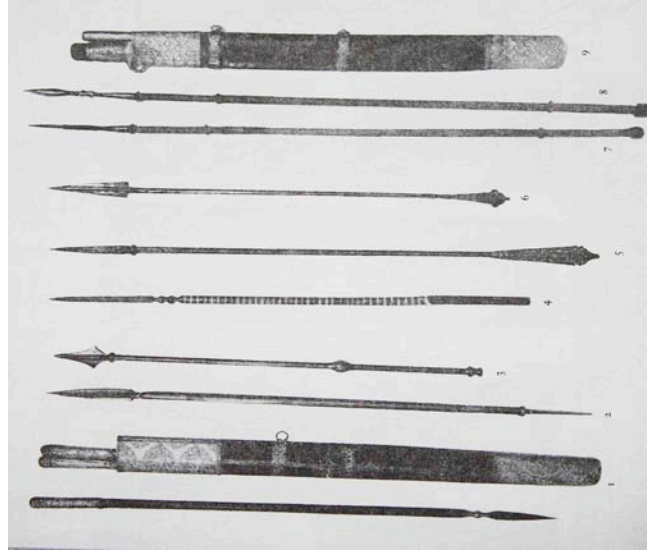
The use of counterweighted/center-balanced javelins in period appears to be limited to Indo-Persia and Africa. Nicolle, (1999, fig. 356a, p. 423) presents an example of this type of javelin/spear (see below) in a Mozarab missal figure from 10-11th century Castile. This figure shows a javelin or spear-armed, turbaned man with baggy trousers, clearly a Muslim warrior. Nicolle notes that Mozarab manuscripts (manuscripts by “Arabized”



Christians in the Muslim-conquered portions of the Iberian peninsula) although “*highly stylized and lack pictorial detail, ...contain a wealth of information.*” The works of these Arabized Christians “*probably illustrate the traditional military technology and costumes of the Iberian peninsula, both Christian and Muslim...*”

Nicolle's figure 356a clearly shows a large object on the butt of a spear or javelin estimated to be around 5-6 foot long being carried by a Middle-Eastern warrior. Although the drawing lacks detail, the butt device seems to be the correct proportion for a counterweight. This device is much smaller than the fletching seen at the butt of the javelins in the painting of the battle of Hattin (above).

Counter weights were also used on some African javelins estimated to be about 4.0 foot long (see upper two javelins in the photo below). Counterweights were also used on the jarid, a short Indo-Persian hunting javelin (Stone, 1999, fig.402, p. 319, below). The turnip-shaped counterweight shown in Nicolle's figure 356a (above) is strikingly similar to that seen on the Turkish jarid (third from top, below) shown in Stone's figure 402 below.



Center-Balanced African Javelins and Indo-Persian Jarids – Note counterweights at the javelin butts. Upper two javelins are from central Africa; steel heads, wood shafts, butts weighted with coiled iron wire. Lengths are not specified but appear to be about 4 feet. Middle three jarids are from Turkey; shafts are steel, 32-36 inches long, with steel heads. Lower two jarids (above the lower quiver) are from India; steel shafts and heads, total length about 32-36 inches. Lower quiver and jarid are from Armenia; jarid length is 36.5 inches. (Stone, 1999, fig.402, p. 319).

These javelins are balanced at the center of the shaft's length. Stone (1999, p. 320) notes: “They [center-balanced jarids] are perfectly balanced and can be thrown with great accuracy”.

The center of balance for most Kingdom of Artemisia javelins, particularly loaner equipment, is wherever it winds up after construction. This balance point is usually in the upper quarter of the weapon. Historic data suggests that this was probably the common balance point location for javelins used in warfare. Precise accuracy was not needed in these javelins -- they were considered expendable weapons for volley use, with the throwers many times throwing at a shield wall instead of at individuals.

For hunting or target use, accuracy is paramount. Hunting javelins were almost always retrieved after the throw, so some effort could be made in designing them to throw well. A javelin balanced at the center of the shaft was found to give very good accuracy. This is likely due to two factors: (1) the thrower can better feel whether the javelin is aligned straight ahead when setting up the throw; and (2) the weapon flies straighter because its center of mass is near the throwing hand rather than at a distance from the throwing hand. When throwing a center-balanced javelin, the front edge of the throwing hand is typically only about 1 inch or so behind the balance point.

See Section 3 at the end of this appendix for a description of center-balancing a javelin.

JARID

The jarid is a short to medium-length center-balanced javelin that was used for hunting in the Indo-Persian cultures.

PERIOD USE OF THE JARID

There is very little information describing the use of center-balanced javelins in period. The rich construction and finish of many of the surviving examples and the use of quivers (Stone, 1999, fig. 402, p. 319) suggest that they were used for hunting from horseback.

CONSTRUCTION OF JARID

Counter-weighting was the typical jarid configuration. A simple jarid suitable for SCA competitions (*see below*) can be made from 32-36" of 15/16" diameter broom handle that has an aluminum head. A SKS bayonet, shortened to 7" or an 8" long, 3/8" diameter nail forms the head. Cut off the threaded portion of the aluminum broom head and use a 3/8" drill (if a nail point used) or 1/2" drill (if a SKS bayonet used) to drill out the head of the broom handle so it will accept the nail or bayonet. Drill the hole about 1-1/2" deep and attach the point with epoxy. The counter weight on the back of the shaft consists of a 3/4" iron pipe connector, an about one inch length of the threaded portion of a 3/4" iron pipe and a 3/4" iron pipe end cap. Galvanized fittings look best and are rust-proof. The center of the shaft is the balance point, and weight should be added to the butt until the javelin balances at that point (*see Section 3 for the details of center-balancing a javelin*). To install the counter weight, use a pipe wrench or large pliers and screw the fittings onto the shaft as far in as it will go, then unscrew, coat the joint with epoxy and re-attach.



Jarid - Self Made – This example is 3.75 feet long, and has a center-balanced shaft 0.9 inch in diameter with a 7-inch long triangular head formed from a shortened SKS bayonet. The weight is 1.6 pounds. Note center-balance point marked with a tack. (Author's collection)

For a more period-correct weapon, the jarid head (or the head of any SCA javelin) can be a blade (*see photo below*). A bladed javelin head is made from 1-1/4" wide by 1/4" thick flat-stock fabrication steel (Home Depot or Lowes). The back end of the blade is cut down into a tang about 1/4" wide by about 1-1/2" to 2" long, and then epoxied into a 3/8-1/2" diameter hole drilled in the javelin shaft. A ferule of some sort is recommended to reinforce the shaft near the head. Do not sharpen the blade edges, as this will cut the twine on the straw bales typically used for SCA javelin target butts.



Bladed Javelin, Self-Made – Javelin head is 7" long and 1-1/4" wide. It is mounted on a 5-foot long by 7/8" diameter shaft. This head can be used on any SCA javelin and is allowed in SCA competitions if the edges are not sharp. (Author's collection)

SUGGESTED USE IN KINGDOM THROWN WEAPONS EVENTS

Center-balanced jarids are very accurate weapons and can be accurately and easily thrown from the standard 20 foot distance specified for javelin competitions in the kingdom. Any kingdom event designed for the longer javelins, including Royal Rounds, can be thrown with a 3.0 foot long or longer jarid.

A HISTORICAL DIGRESSION -- JAPANESE SHORT JAVELINS AND THROWING KNIVES

Many of the small javelins and knives suggested below for consideration in Kingdom of Artemisia thrown weapons competitions are of Japanese origin, and a brief overview of Japanese culture in period will be helpful in understanding the origins and use of these weapons.

Warfare was endemic in feudal Japan, particular between 794CE (the beginning of the Heian Period) and the final consolidation of political and economic power under the Tokugawa shogunate in 1600 CE (Ratti and Westbrook, 1999). Seligman, (quoted in Ratti and Westbrook, 1999, p. 41) states that "*fighting came to [the Japanese] so naturally that when....there was no outside enemy, clan fought against clan and district against district, so that the greater part of Japanese history, at least up to the Tokugawa times [1600 CE] is a series of civil wars.*" During this period, a warrior's skills were highly valued and many of the samurai's weapons and techniques have their roots in this turbulent period. The samurai class (which had its origins in the 10th and 11th centuries) and Japanese society in general was not as rigidly stratified during this period as it was to become after 1600 CE. In the clan based society of the time even the farmers and merchants associated with a clan were trained in weapon use and were expected to defend the clan interests at need (Ratti and Westbrook, 1999, p. 27; 140-141). The teaching of weapon skills were a clan- or guild-oriented endeavor in mid- to late period, with the training concentrated on giving the student a broad range of weapon skills. The ninja

families and clans also arose during this turbulent period; these specialists in covert operations became masters of thrown weapons of many sorts.

Large-scale warfare was suppressed by the Tokugawa shogunate in the early 1600's CE and martial arts skills coalesced into the samurai class and into martial arts schools, both private and public. Renowned weapons masters began to refine and perfect the techniques that were used in early to late period, and taught these techniques to selected students. Many of these schools specialized in a certain weapon or group of weapons and tended to produce specialists instead of widely-proficient warriors (Ratti and Westbrook, 1999, p.164). Much of the current documentation describing Japanese weapons and techniques are post-period, although the weapons and many of the techniques were clearly used in period.

The violent nature of Japanese society during period made weapon skills a matter of life or death for many classes of people, including women and children. Although the bow, sword and the various melee spears (yari) were the preferred weapons of war for the samurai, an attack could come at any time and place. Compact and/or easily concealed weapons were needed in Japanese society and they were used extensively by many classes of people. Some of these weapons didn't even look like weapons -- examples are the various small, knife-like thrown weapons called shuriken. Many of these weapons were self-made from common household items, like nails and metal plates (Wotherspoon, 2004).

The endemic and violent conflicts prevalent during period in Japan fostered the development of thrown weapon types and techniques that were unparalleled elsewhere in the world. Javelins and knives of many types and sizes were used, with each weapon designed for a specific use. Just like the West-Central Africans might be considered the world experts on the design and use of throwing axes and large throwing knives, the Japanese might be considered the world experts in the design and use of small javelins and small throwing knives.

The weapons suggested below are a selection of some of the many types of small javelins and throwing knives used in period Japan.

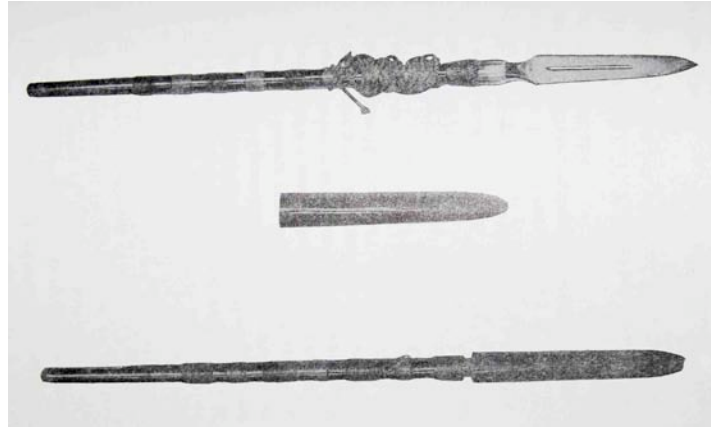
NAGE-YARI

Nage-yari were short javelins, typically about 1.5 feet (18 inches) long, occasionally with shafts that tapered towards the butt, and with a heavy triangular or quadrangular head (Stone, 1999, p. 462-463). They may or may not have been tassel or retrieval cord stabilized in period, but some form of stabilization is recommended for SCA use.

PERIOD USE OF NAGE-YARI

Javelins of this length were specialty weapons that were used only in Japan. They were used for self-defense in confined spaces (sedan chairs, very small rooms, etc.) when a full-length javelin could not be carried or easily deployed.

Nage-yari were longer and heavier than uchi-ne (*see discussion below*) and possibly were used at somewhat longer range. These short javelins can be thrown without any stabilization attachments (and many apparently were) but the thrower has to be skilled in order to get consistent target sticks. Many period nage-yari used a trailing cord, both for stabilization during the throw and for retrieval of the weapon. For SCA use, thin rope or heavy string tassels are recommended, as they are easier to use compared to a trailing cord and provide excellent stabilization.



Nage-Yari – Upper nage-yari has a triangular head 5 inches long; total length is 17.8 inches. Note the stabilization/retrieval cord wrapped around the shaft. Lower nage-yari has a quadrangular head 4.5 inches long that is cased in a scabbard; total length is 17 inches. A scabbard is shown in the center of the figure. (Stone, fig. 586, p.462).

CONSTRUCTION OF NAGE-YARI

Nage-yari lengths are up to the individual thrower, but in period their total lengths were probably in the 1.5 to 2.0 foot range. The maximum length recommended for SCA use is 2.0 feet. A longer weapon apparently was too difficult to manipulate in the cramped space of a period sedan chair.

TRADITIONAL CORD STABILIZED NAGE-YARI, SELF MADE –The blade is a 5-inch long, 1-inch wide by 3/16-inch thick piece of cold-rolled flat stock steel (Home Depot or Lowes) with unsharpened edges. The back end of the blade is cut into a tang about 1/4" wide by 1-1/2" long. The handle, a 13-inch piece of 7/8-inch diameter walnut-stained broom handle, is drilled out with a 1/4" diameter drill to accept the blade's tang. Two 3/4" diameter copper pipe end caps form the ends. The front of the shaft is wrapped with red hemp string to mimic traditional colored cane wrappings. All parts are epoxied together. The nage-yari is stabilized during throwing by a 12 foot-long, 1/8-inch diameter cord and small tassel (a fancy drapery pull bought at a craft store). The cord can also be used to retrieve the weapon for another throw.



Traditional Cord-Stabilized Nage-Yari –The length of this self-made nage-yari is 18” (1.5 feet). (Author’s collection)



Method for Throwing a Cord-Stabilized Nage-Yari or Uchi-Ne –The cord is lightly tucked into the bottom of the thrower’s sash, allowing him to move around prior to throwing without getting tangled in the cord. The left hand is holding the end of the cord so that the weapon can be retrieved after throwing. (Wotherspoon, 2004). When used on a target range, the cord can be strung out on the ground next to the thrower.

TASSEL STABILIZED NAGE-YARI, SELF MADE – A, simple nage-yari (see below) suitable for SCA competitions can be made from a sharpened 4-6-inch long, 1/2” diameter cold-rolled steel rod, a 1/4-1/2” iron pipe reducer, and 14 to 16 inches of 15/16” (0.9”) diameter broom handle. A slightly heavier head results if a 1/4-3/4” pipe reducer is used. A 1/2” drill is used to open the pipe reducer up to accept the end of the steel rod point. Trim one end of the shaft to accept the pipe reducer (not necessary if a 3/4” fitting is used) and with a pipe wrench or large pliers, screw the reducer onto the shaft as far in as it will go. Unscrew it and coat the threads with epoxy. Wrench the reducer onto the shaft, partially fill it with epoxy and insert the rod. Work it around to coat it and to let the air escape. A 1-inch long section at the back end of the shaft, about 1-inch from the shaft end, is filed down to about 7/8” diameter. This diameter reduction forms a secure bed for the tassels as they are wrapped and keeps them from slipping off the end of the shaft. The tassel is made from 11 or 12 twelve-inch long strands of 1/8” cotton cord whose ends are whipped with thread to prevent fraying. The 12-inch strands are doubled (total tassel

length equals 6 inches) and are attached with many wraps of high breaking strength string.



Medium-Weight, Tassel-Stabilized Nage-Yari – Nage-yari is 1.9 feet long, and tassel stabilized; weight is 12 ounces. (Author's collection)

SUGGESTED USE IN KINGDOM THROWN WEAPONS EVENTS

Nage-yari with some form of stabilization are very accurate weapons and can be accurately and easily thrown from the standard 20 foot distance specified for javelin competitions in the Kingdom of Artemisia. Any event designed for the longer javelins can be thrown with the nage-yari. Their light weight and stabilizing devices generally makes them easier to throw compared to the longer javelins (including jarids), so they are not allowed for throwing Royal Rounds. It is recommended that nage-yari be allowed only in events that specify their use, so as not to handicap throwers using the longer javelins. A suggested event is to have each participant throw both a long, non-stabilized javelin and a nage-yari for score.

A challenging event for nage-yari would be long-distance throwing. Personal tests have shown that with practice, tassel-stabilized nage-yari can hit a hay bale target fairly regularly from 45 feet (15 yards).

Period descriptions of nage-yari use are essentially non-existent, but their design suggests that they were likely used at fairly close-range. Nage-yari do not have the mass and lever arm of the longer javelins and do not bounce back as violently or as far. Personal tests indicate that nage-yari can be thrown safely from as close as 10 feet from the target, but a minimum distance of 15 feet is recommended. Kingdom competitions that allow nage-yari use might consist of a set of timed throws from 15 feet and a second, un-timed set thrown from 20 to 25 feet.

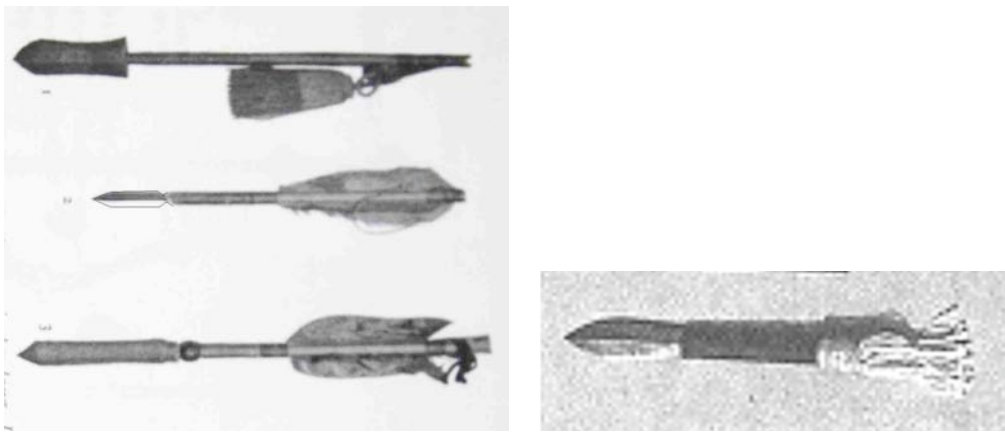
UCHI-NE

Uchi-ne were very short, dart-like javelins, typically about 1.0 to 1.4 feet (12 to 17 inches) long, and with a heavy triangular or quadrangular head (Stone, 1999, p. 644-646). The uchi-ne shaft was made either from an arrow shaft or a 3/4-1" diameter dowel. Uchi-ne used fletching (similar to an arrow) or tassels for stabilization during the throw. Some used a trailing/retrieval cord for stabilization similar to nage-yari (Stone, 1999, p. 644-646; Wotherspoon, 2004).

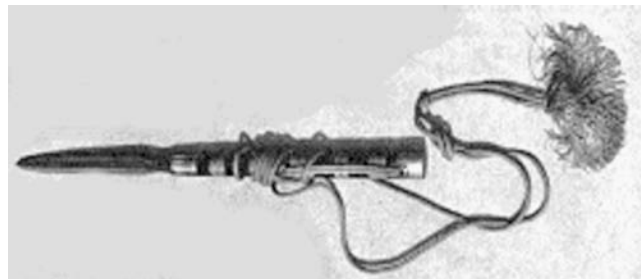
PERIOD USE OF UCHI-NE

Javelins of this length were specialty weapons that were used only in Japan. They were used for self-defense in very confined spaces when a full-length javelin could not be carried or easily deployed. They were carried when traveling by sedan chair (Stone, 1999, p. 646).

Uchi-ne lengths are up to the individual thrower, but in period the total lengths of fletching and tassel stabilized uchi-ne seemed to be mostly in the 1.0 to 1.4 foot range. Shorter weapons can be seen in collections (*see right photo below*), but they seem to be more related to shuriken than javelins (*shuriken are discussed in the knife section*). It is suggested that 1.0 foot be the minimum length allowed for uchi-ne in competitions.



Period Uchi-ne – Left - Upper uchi-ne (in scabbard) is tassel stabilized, the lower two are fletching stabilized. All use arrow shafts. The upper uchi-ne has a head 2.9 inches long and is about 12 inches long; the central uchi-ne has a head 3.5 inches long, and a total length of 12 inches. The lower uchi-ne has a head 5.9 inches long and appears to be about 17 inches long (Stone, 1999, fig. 819, p. 644). Right – A Tassel-stabilized uchi-ne estimated to be about 8” long. (Wotherspoon, 2004, fig. 13).



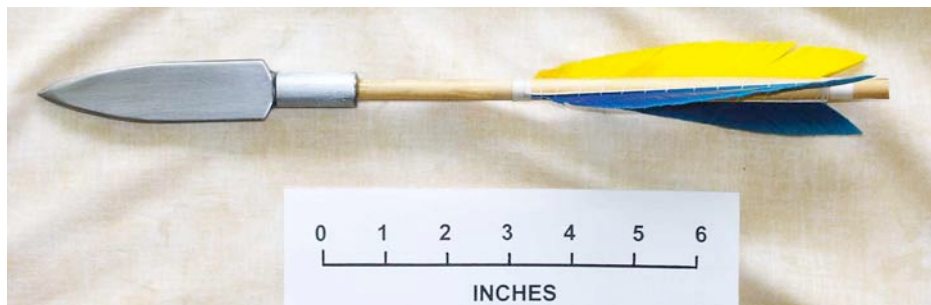
Cord-Stabilized Uchi-Ne – The shaft of this uchi-ne has metal fittings and a butt cap for decoration. Length is not specified but is estimated to be about 1.0 foot (Wotherspoon, 2004, fig. 13).

CONSTRUCTION OF UCHI-NE

UCHI-NE – FLETCHING STABILIZED – A fletched uchi-ne suitable for SCA competitions (*see upper photo below*) can be made from a 4-inch long, 1/2" diameter cold-rolled steel rod, a 1/4" iron pipe connector with a 3/4" long piece of threaded 1/4" iron pipe screwed into the back end and 7 to 12 inches of the fletched end of a of 11/32" diameter broken arrow. If a broken arrow is not available, an arrow shaft can be fletched just for the uchi-ne. The front portion of the pipe connector is drilled out with a 1/2" drill to accept the rod, and all sections are epoxied together. The arrow nock can be either removed or left on (period uchi-ne are seen both ways)



Fletching-Stabilized Uchi-ne – This self-made uchi-ne has a total length of 17 inches; the weight is 6 ounces. (Author's collection)



Traditional Fletching-Stabilized Uchi-ne – The blade is 4 inches long and 1-inch wide; the fletched arrow shaft is 9-inches long and the total length is 14 inches. (Author's collection)

A traditional uchi-ne can be made from a broken arrow and the blade from 1-inch wide by 3/16" to 1/4" cold-rolled flat-stock steel. This self-made uchi-ne is constructed in a manner similar to the uchi-ne discussed above, except a pipe connector is not used. The flat-stock steel blade end had been ground down to fit into a 1/4-inch diameter by 1-1/2-inch long piece of galvanized iron pipe. All joints are epoxied together. The fletched arrow shaft is 9-inches long and the total length is 14 inches.

UCHI-NE – TASSEL STABILIZED – Traditional tassel-stabilized uchi-ne can be made similar to the traditional nage-yari discussed above. The example below has a blade



Traditional Tassel-Stabilized Uchi-ne – This self-made uchi-ne has a total length is 15 inches (excluding tassels) and weighs 11 ounces. (Author's collection)

6-inch long by 1-inch wide cut from 1/4" thick flat-stock steel (Home Depot or Lowes). About 1-1/2" of the back end of the blade was cut to 1/4" wide and fit into a 5/16" diameter hole drilled in the 1-inch diameter by 9-inch long broom handle. The ferrule is a 3/4" copper end cap and half of a 3/4" pipe connector. A 1-inch long section at the back end of the shaft, about 1-inch from the shaft end, is filed down to about 7/8" diameter. This diameter reduction forms a secure bed for the tassels as they are wrapped and keeps them from slipping off the end of the shaft. The tassel is made from 10 twelve-inch long strands of 1/8" cotton rope whose ends are whipped with thread to prevent fraying. Each strand is doubled (total tassel length at completion is 6 inches) and the tassels attached with many wraps of high breaking strength string. Red hemp string (obtained at craft stores) is used to protect and decorate the tassel joint and the white cotton rope was dyed red to match.

A non-traditional but easy-to-make tassel-stabilized uchi-ne can be made from a 4 to 5 inch long, 1/2" diameter steel rod, and either a 1/4"-1/2" iron pipe reducer (or a 1/4"-3/4" reducer) and 7/8" diameter broom handle (*photo below*). The 1/4" end of the pipe reducer is drilled out with a 1/2" drill to accept the point and the reducer is threaded onto the shaft. Disassemble after threading the reducer on, coat all joints with epoxy and re-assemble. The tassels are constructed like the traditional uchi-ne described above. Duct tape is used to decorate the tassel joint in this example, but is not really needed.



Uchi-Ne, Tassel Stabilized, Self-Made – The point is a 4" long, 1/2" diameter steel rod. The shaft is a 7/8" diameter broom handle with a 1/4"-1/2" pipe reducer (a 1/4"-3/4" reducer could be used if more weight is desired). The uchi-ne tassels are 6" long, 1/8" diameter cotton cords. The tassel ends are thread wrapped (whipped) to prevent fraying. The total length of the uchi-ne (less tassels) is 15". (Author's collection).

SUGGESTED USE IN KINGDOM THROWN WEAPONS EVENTS

Like the nage-yari, uchi-ne with some form of stabilization are very accurate weapons and can be accurately and easily thrown from the standard 20 foot distance specified for javelin competitions in the kingdom. The larger shafted, tassel stabilized uchi-ne also do very well at long-distance (45 feet/15 yards). Any event designed for the long javelins can be thrown with the uchi-ne, but with their light weight and stabilizing devices, they are generally more easily and accurately thrown compared to the longer javelins (including jarids). It is recommended that uchi-ne be allowed only in events that specify their use, so as not to handicap throwers using the longer javelins.

Period descriptions of uchi-ne use are essentially non-existent, but their design suggests that they were likely used at fairly close-range. Uchi-ne do not have the mass and lever arm of the longer javelins and do not bounce back as violently or as far. Personal tests indicate that uchi-ne can be thrown safely from as close as 10 feet from the target, but a minimum distance of 15 feet is recommended. Kingdom competitions that allow uchi-ne use might consist of a set of timed throws at 15 feet and a second, un-timed set at 20 feet.

PLUMBATA

PERIOD USE OF PLUMBATA

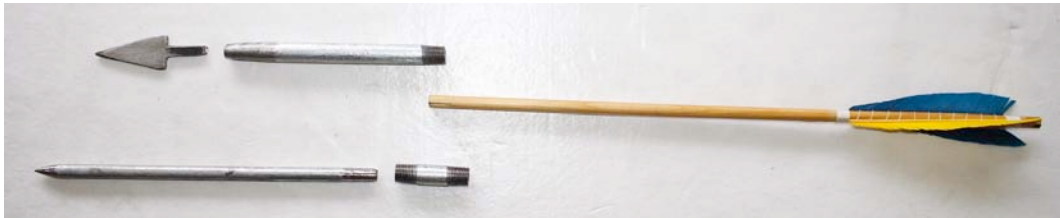
The plumbata is a lead-weighted arrow or dart that was grasped by the shaft behind the fletching and lofted up at high angles. Used this way, it came down at near-vertical angles with good striking power. Alternately, the plumbata could be thrown like a short javelin and this is the recommended method for SCA use. The plumbata was used by early period Greek, Roman and Byzantine infantry as a substitute for archers (Warry, 2001).



Head of a plumbata, 3rd century CE – The arrow shaft and fletching have disintegrated. The weight is cast lead. Note the iron arrow shaft behind the point. (image from asterisk.apod.com)

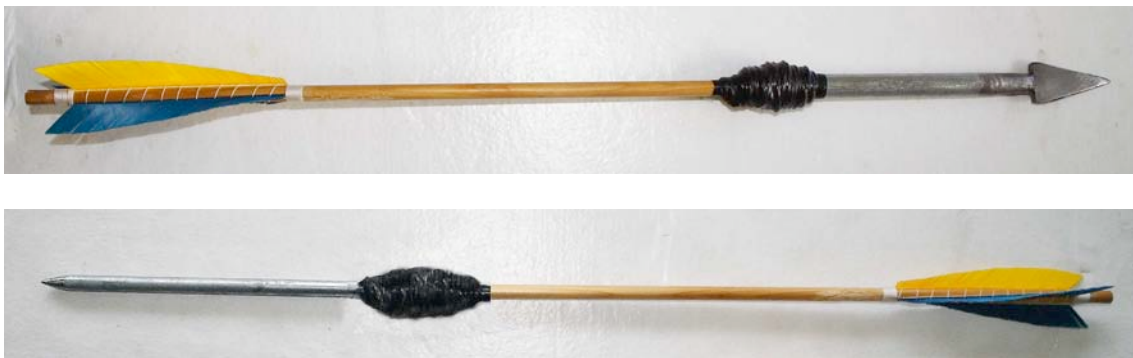
CONSTRUCTION OF PLUMBATA

A simple plumbata can be made from a wood arrow wrapped with iron wire for a weight, but this construction method is not durable. The arrow shaft will eventually break just in front of the weight when the weapon hits the target at an angle. Period examples (*see figure above*) were constructed with a metal shaft from the arrowhead to the weight, with a fletched wood shaft behind the weight. Two methods are suggested for the metal shaft portion of a plumbata: (1) an 8-inch long, 3/8" diameter nail inserted into a 2" long by 1/4" diameter iron pipe nipple (easily constructed but not quite period) or (2) an 8-inch long, 1/4-inch diameter galvanized iron pipe nipple (grind the threads off on the head portion) with a small arrowhead cut from 3/16" thick by 1 inch wide steel flat-stock. The arrow tang is cut 1" to 2" long by 3/8" wide. All joints for both options are epoxied. For the arrowhead option, place small wads of tissue or foam rubber in the pipe to keep the epoxy near both joints. For the other option, file the nail down slightly to fit into the pipe nipple. Both options are shown below before epoxying and before the iron wire weight is wrapped on.



Plumbata Construction-Two Options – Upper portion of figure shows the galvanized pipe and arrowhead option; lower portion shows the 3/8" nail option. (Author's collection)

The length and weight of the plumbata is up to the user; apparently many different lengths and weights were used in period. The two examples below are each 25" long and weigh 8 ounces.



Assembled Plumbata with Wrapped Iron Wire Weight – The iron wire is wrapped tightly around the arrow shaft and pipe nipple joint; it can be covered with electrician's tape for easier handling. If lead is used (wrapped soldering wire or a large fishing weight), it should be covered with leather, cloth or tape to prevent lead contamination of the hands. (Author's collection)

SUGGESTED USE IN KINGDOM THROWN WEAPONS EVENTS

The Plumbata is a very accurate weapon when thrown like a javelin and can be accurately and easily thrown from the standard 20 foot distance specified for javelin competitions in the kingdom. They are fletching stabilized and are also accurate at extended throwing distances. Initial tests show that the plumbata can be accurately thrown from 30 to 45 feet (10 to 15 yards) and has reasonable accuracy out to about 80 feet (25 yards).

Plumbata do not have the mass and lever arm of the longer javelins and do not bounce back as violently or as far. Personal tests indicate that plumbata can be thrown safely from as close as 10 feet from the target, but a minimum distance of 15 feet is recommended. Kingdom competitions that allow plumbata use might consist of a set of timed throws at 15 feet and a second, un-timed set at 20 to 40 feet.

SINGLE POINT, STRAIGHT BLADED KNIVES (Length \leq 7.0 inches)

BO-SHURIKEN AND SHORT THROWING KNIVES

This category includes small throwing knives from all cultures and all times in period. The Japanese were the most prolific users in period of small throwing knives. The generic Japanese term for short, straight bladed, single or double-pointed throwing rods and knives is *bo-shuriken*. They are further sub-divided depending on their shape. Bo-shuriken were weapons of surprise and stealth. Most were short (generally under 7.0 inches long) and concealable in the palm of the hand (Wotherspoon, 2004). Bo-shuriken were considered disposable, so little attention was paid to finish; many were made out of common household metal items (Wotherspoon, 2004).

PERIOD USE OF BO-SHURIKEN – Bo-shuriken were used mostly by Japanese ninja clans in covert operations and by samurai and others to distract an enemy. The weapon was intended to confuse and distract the enemy so that either a better tactical position could be taken or a more effective weapon brought into use. Bo-shuriken were thrown singly or as volley weapons. The weapon was rarely lethal, but could be if a major artery was severed or an eye was penetrated. Bo-shuriken require extensive practice before they can be used effectively. Bo-shuriken were sub-divided by their basic shape:

- *Hari-Gata* - Cylinder-shaped rod.
- *Kugi-Gata* - Square-shaped rod.
- *Tanto-Gata* - Knife-shaped blade.
- *Hoko-Gata* -Spear-shaped blade.

CONSTRUCTION OF BO-SHURIKEN

Three types of self-made bo-shuriken are suggested for SCA use: hari-gata, kugi-gata and tanto-gata or hoko-gata. All can be made from cold-rolled flat-stock steel, commonly found at Home Depot or Lowes for about \$6 to \$8 for a 3 foot length. In addition, hari-

gata can be made from 3/8-inch diameter nails. Construction of bo-shuriken are simple; the desired length is cut with a hack-saw and a sharp point is filed or ground on one end.

Hari-Gata – These cylindrical, rod-shaped Japanese throwing knives were originally made from needles or nails.



Hari-Gata, Self Made – Made from 7.0" of 3/8" diameter galvanized nail; weight is 4 ounces. *Hari-gata* many times are wrapped with string or varnished paper to increase the friction against the fingers and thumb during release. This gives better control of the flight. The flat sides of the square-shaped *kugi-gata* rods (discussed below) usually provide sufficient friction and do not require this wrap. (Author's collection)



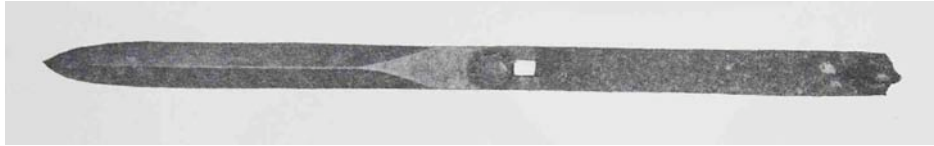
Hari-Gata, Tassel-Stabilized, Self Made – Made from 7.0" of 3/8" diameter steel rod; weight is 4 ounces. *Bo-shuriken* are difficult for beginners to throw; a tassel helps stabilize the weapon while the student is learning to throw it. Tassels were traditionally made from hog bristles (found in Home Depot as cheap Asian paint brushes) and secured with string. This tassel is made of 2.5" lengths of Dacron bow string attached with black hemp string. (Author's collection).

Kugi-Gata – These square-sided, rod-shaped Japanese throwing knives were more common in period than the cylindrical-shaped *hari-gata* (above), as square-shaped rods are easier for a blacksmith to make.



Kugi-Gata, Self Made – Made from 7.0 inches of 1/4 inch steel square stock; weight is 2 ounces. (Author's collection)

Tanto-Gata and Hoko-Gata –Small, knife-shaped throwing weapons. This category also includes small throwing knives of all types and styles from all cultures in period. Tanto-gata have knife-pointed blades, while hoko-gata have spear-pointed blades. The hoko-gata shape is the loaner knife shape used at many kingdom thrown weapons events.



Hoko-Gata -- Triangular spear-pointed blade; total length 9 inches (Stone, 1999, fig. 726, p.546). Most hoko-gata were shorter than this example.



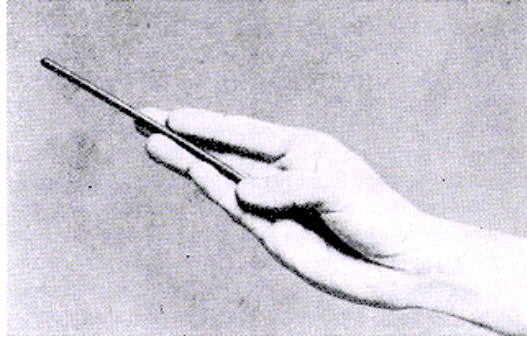
Tanto-Gata, Self-Made – Tanto pointed blade, 3/4" wide, 3/16" thick and 6-7/8" long. Weight is 4 ounces. Hoko-gata and tanto-gata are easily made from 3/16" thick, 3/4" to 1" wide, cold-rolled steel flat stock in whatever point shape the thrower wants. The "grip" of this tanto-gata is painted on. (Author's collection)

GRIPPING THE BO-SHURIKEN FOR THROWING – TRADITIONAL METHODS

Like all thrown knives, bo-shuriken need to be thrown to strike the target point-on from various distances. For larger knives, this is done by changing the gripped end and possibly the throwing technique. For bo-shuriken, which are close-range weapons, this has traditionally been done by using a non-rotational throw. A grip method coupled with either a non-rotational delivery or a partial rotational delivery was developed to enable the thrower to control the bo-shuriken's strike. Two traditional grips are shown below.



The Koso-No-I Grip –A general throwing grip. (Wotherspoon, 2004. fig. 26)

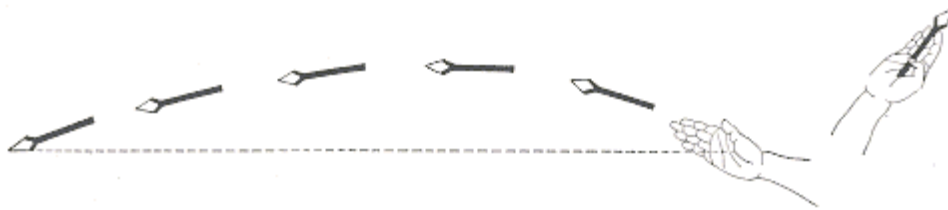


Shirai Ryu Style of Grip – (Wotherspoon, 2004, fig. 1)

The placement of the thumb of the throwing hand is critical for controlling the flight of a bo-shuriken (*see thumb locations on the two photos above*). Thumb friction as the bo-shuriken leaves the hand gives the stabilization needed for a point-on hit. Thumb friction is controlled by the thumb location, the amount of pressure used, and the length of time that pressure is applied.

THROWING BO-SHURIKEN

There are three basic ways to throw bo-shuriken: (1) Direct Hit Method; (2) Turning Hit Method and (3) Multiple Turning Hit Method (Wotherspoon, 2004). The Multiple Turning Hit Method is simply a variation of the Turning Hit Method where the weapon rotates 360° instead of 180° and may rotate one or more times. This is the technique used to throw larger knives. Each thrower had to determine his/her personal throwing distances with each throwing method and this traditionally was done by stepping a set number of steps backwards. The Direct Hit Method (*see diagram below*) is usually used at shorter distances, with the weapon controlled and released to rotate a few degrees for close targets to a maximum of a little more than 90° for further targets.



Direct Hit Method of Throwing (Wotherspoon, 2004)

The Turning Hit Method of throwing (*see diagram below*) is an alternately blade gripped throw or a hit-gripped throw; which end is gripped depends on the distance being thrown. The weapon will rotate 180° during the blade gripped throw. Multiple rotation throws allow the weapons to be used at even further distances, but with the very short, light-weight shurikens this becomes more and more difficult to do at longer distances unless the thrower is very skilled.



Turing Hit Method of Throwing (Wotherspoon, 2004)

Both of these techniques are difficult to master and require extensive practice!

GRIPPING AND THROWING THE BO-SHURIKEN –ALTERNATE METHOD

The traditional methods for throwing bo-shuriken were developed because the weapons needed to be thrown to strike point-on at distances from point-blank to 10-20 feet. The traditional, Japanese-developed throwing methods are the best way to do that. For SCA use, however, the weapons can not be thrown at targets closer than 10 feet, so many of the benefits of the traditional throwing methods do not apply. An alternate grip and throwing technique similar to that used for larger throwing knives is suggested. This technique may be easier for many throwers because the thrower is already familiar with the techniques from throwing the larger knives and it is not necessary to learn a different (and more difficult) throwing technique. The suggested grip is shown below.



Placement of Bo-Shuriken in Hand – The placement in the upper part of the hand increases the length of the weapon's arc of rotation, which increases the throwing distance. This is usually needed so that the weapons will stick from the minimum safety distance of 10 feet. (Author's collection)



Grip on Bo-Shuriken – The angle the wrist is held at will need to be adjusted for personal throwing style (Author's collection)

Bo-shuriken (cylindrical rods, square rods or knife-blade shapes) that are about 7.0 inches long usually can be thrown and stuck from about 10.0-10.5 feet, using the techniques for larger thrown knives. Some adjustment of wrist angle and weapon placement in the hand may be required to find a personal set-up. Due to the shortness of these weapons, a throwing distance adjustment of only an inch or two may make a big difference. These weapons are short, light and have very small grips, so more practice is required to become proficient with them compared to the larger knives.

SUGGESTED USE IN KINGDOM THROWN WEAPONS EVENTS

See the hira shuriken discussion (*below*) for suggested bo-shuriken competitions.

MULTI-POINTED, CIRCULAR BLADED KNIVES (Diameter < 5.0 inches)

HIRA SHURIKEN

The Japanese term for small diameter star-shaped, cross-shaped or circular, multi-pointed thrown weapons is *hira shuriken* or *shaken* [shaken = “wheel-shaped blade”] (Wotherspoon, 2004). Hira shuriken are typically constructed from flat plates or square rods. Hira shuriken were weapons of surprise and stealth. Most were small, less than 5 inches in diameter, and many were concealable in the palm of the hand (Wotherspoon, 2004). Hira shuriken/shaken were considered disposable, so little attention was paid to finish; many were made out of common household items (Wotherspoon, 2004).

PERIOD USE OF HIRA SHURIKEN

Hira shuriken were used mostly by Japanese ninja clans in covert operations and by samurai and others to distract an enemy. The weapon was intended to confuse and distract the enemy so that either a better tactical position could be taken or a more effective weapon brought into use. Hira shuriken were thrown singly or as volley weapons. The weapon was rarely lethal, but could be if a major artery in the throat was severed or an eye was penetrated. Hira shuriken were further sub-divided by their basic shape:

- *Hira Shuriken - Star-Shaped* – A 3 to 5-pointed, star-shaped throwing disk.
- *Hira Shuriken - Cross-Shaped* – A 4-pointed, cross-shaped design constructed from square rods, straight plates or cut from a metal sheet.
- *Hira Shuriken - Multi-Pointed* – A circular, 6 to 8-pointed throwing disk.

CONSTRUCTION OF HIRA SHURIKEN

Three types of self-made hira shuriken are suggested for Kingdom of Artemisia use: (1) star-shaped hira shuriken; (2) cross-shaped hira shuriken, made either from square steel

rod stock or flat stock; and (3) multi-pointed hira shuriken, made from 4 inch diameter power saw blades.

Star-shaped hira shuriken can be self-made with a cutting torch from inexpensive, 6-1/2 to 7-1/2 inch diameter circular power saw blades (about \$6 at Home Depot) or other suitable metal. Star-shaped hira shuriken also can be cut from power saw blades using a hand grinder with a small-diameter cut-off wheel (a 1/16" thick cut-off wheel is recommended). If 7-inch ring-shaped chakram are also being constructed (*see the following discussion*), the center portion of the chakram can be used for a star-shaped or multi-toothed shaken. For many people it is easier to purchase commercial throwing stars – one of the best is made by Cold Steel® -- the cost is around \$7-8 (plus shipping) from internet cutlery companies.

Examples of the three types of hira shuriken recommended for kingdom use are shown below:



Hira Shuriken –Cross Shaped. Made from 1/4 inch square steel rod stock. 5" arms are notched, tied with hemp string. Weight is 3 ounces (Author's collection).



Hira Shuriken – Multi-Toothed. Made from a 4-inch diameter power saw blade. Saw blade originally had 24 teeth. Weight is 2 ounces (Author's collection)



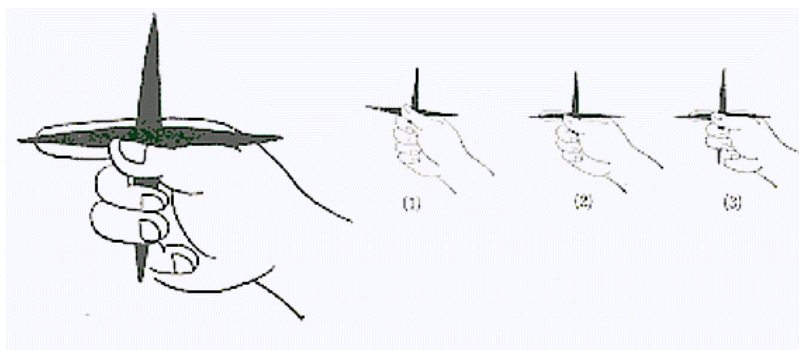
Commercial Hira Shuriken -- Four-point hira shuriken made by Cold Steel®. Total width is 5.6 inches. This hira-shuriken is a very good thrower.

Hira shuriken can be made of almost any steel stock; it depends on how much effort the thrower wants to put into their manufacture. User-made hira shuriken were common in period Japan, typically made from common house-hold materials (Wotherspoon, 2004).

- *Cross-Shaped Hira Shuriken* – Cross-shaped hira shuriken can be made from 1/4 inch square steel rod stock (Home Depot or Lowes; about \$5 for 3 feet). Each arm is usually between 3 to 5 inches long and is sharply pointed on both ends (*see photo above*). To construct, the center of each arm is notched about 1/16th to 1/8th of an inch deep with a file or a grinder, with the notches wide enough to accept the other arm. The arms are then welded or braised together. A non-welding method of joining the arms is to cut the notches slightly undersize, nest the arms together, tap with a hammer to seat them and then wrap and tie them tightly together with thin hemp twine (obtained at Craft stores) or strong string. If the arms are carefully fitted, there will be no motion between the two arms in use.
- *Multi-Pointed Hira Shuriken* – Multi-pointed hira shuriken can be made from 4-inch diameter, 18-24 toothed circular saw blades (*see photo above*). These saw blades are used in cordless power saws and cost about \$6 to \$10 each from Home Depot, Harbor Freight or Lowes. The hira shuriken is formed with a bench grinder or hand file. Before grinding, break off carbide saw tooth tips with pliers, as carbide causes excessive wear on grinding wheels or files. For the best sticking potential, particularly in side-cut lumber target panels, grind off every other tooth, then grind these areas down below the bases of the remaining 9-12 teeth. Multi-pointed hira shuriken are sharpened like toothed chakram (*see discussion below*).
- *Star-Shaped Hira Shuriken* – Star-shaped hira shuriken similar to the Cold Steel® model (*above*) can be cut from circular saw blades (*see chakram discussion below*) using a hand-held grinder and a small cut-off grinding wheel.

THROWING THE HIRA SHURIKEN

Multi-pointed and star-shaped hira shuriken are thrown in a manner similar to the disk-shaped Indian chakram (*see chakram discussion below*). Cross-shaped hira shuriken are gripped as shown in the figure below.



Suggested Grips for Cross-Shaped Hira Shuriken – Grip (1) shows an incorrect method. (Wotherspoon, 2004, fig. 53)

SUGGESTED USE IN KINGDOM THROWN WEAPONS EVENTS

Suggested events that use the bo-shuriken and hira shuriken include:

- *Surprise Attack* – Timed throwing at the upper torso of a human-size target, with 3 throws in 5 to 8 seconds from 10 feet. A hit in the 2-inch diameter eye, throat or wrist areas (your “opponent” is attacking you with a sword) scores 3 points and a hit anywhere else counts 1 point. In period, the face, throat, feet and wrists were the preferred targets for these small thrown weapons.
- *Precision Throw* – Single throw at a human-size head target with a hit in the eye or throat areas (2-inch diameter circles) scoring 3 points and a hit anywhere else counting 1 point.
- *Japanese Sedan Chair Throw* –A multi-weapon event, with a wood target panel set next to a hay bale target. The targets on both butts are a human upper torso and head area. The initial throw is a hira shuriken or bo-shuriken, thrown at 10 feet from a sitting position (you are sitting in a sedan chair) at the wood target panel, with only a head, throat or wrist hit counting. The thrower then stands and throws a nage-yari at a similar target mounted on a hay bale 15 feet away, then moves forward 5 feet and throws an uchi-ne at the same target. A scoring hit with the hira shuriken or bo-shuriken awards 1 bonus point for each small javelin hit.

Additional suggestions for hira-shuriken or bo-shuriken competitions are presented under the chakram description below.

When scoring a hira-shuriken throw, the thrower may select any portion of the weapon that sticks in the target for scoring, but the scoring portion must be a CUTTING EDGE OR POINT THAT HAS PENETRATED THE TARGET BUTT. A non-cutting edge between two teeth may not be used for scoring.

Most bo-shuriken and hira-shuriken are small and easily lost if the target butt is missed. “Catch panels” of braced 4 ft. by 8 ft chipboard or tarps strung behind the butts are recommended to stop missed throws; this will eliminate lost time looking for weapons.

MULTI-POINTED, CIRCULAR BLADED KNIVES (Diameter ≥ 5.0 inches)

CHAKRAM

Chakram are flat rings of sharpened steel, and were used as thrown weapons in period by Indians and some Africans.



Chakram – Steel. Outer diameter of 9.4 inches, inner diameter of 7.8 inches, width 1.6 inches, thickness about 1/8", weight 8.4 oz. (Bailey, 2011, Image #6)

PERIOD USE OF CHAKRAM

Chakram were apparently used in period almost exclusively as weapons of war or in covert operations. The Indian chakram is more of a cutting weapon (like axes) than a piercing weapon, but historically it was considered a type of knife. Chakram were thrown singly or as volley weapons. The weapon was intended to confuse and distract the enemy so that either a better tactical position could be taken or a more effective weapon brought into use. The chakram could kill an opponent if the throat was hit, but typically they were used to confuse and distract an enemy, allowing an attack by a more efficient melee weapon.

Chakrams were typically about 5 to 12 inches in diameter with ring widths of 1.2 to 2.4 inches (Bailey, 2011; Rudnick, 1997). The most common chakram design has a smooth, knife-sharp edge, although there are suggestions that saw-toothed weapons were also used. A TV documentary (Discovery Channel, 2008), interviewed a sect of Sikhs in India who consider weapons a part of their religious culture and have preserved chakram designs and battle tactics since the 1500's. A Sikh in this documentary demonstrated the techniques used to covertly remove an enemy sentinel with a saw-toothed chakram. Stone (1999, p. 171) reported accurate throwing of the chakram to 50 meters by Sikhs in the 1930's and the cutting of a 3/4" diameter green bamboo target stick at 30 yards.

When thrown at distant targets, chakram were typically thrown side-handed from waist level using a wrist-flip at release. The throw was across the body, from left to right, like a modern Frisbee, so that the air-foil shape would help stabilize the flight. When thrown at close targets they were thrown either over-handed or side-handed. Personal tests indicate that a vertical throw will usually generate more force.



Vertical Throwing of a Chakram – (Madra, 2008)

CONSTRUCTION OF CHAKRAM

Ring-shaped chakram are preferred as the most period correct design, but disk-shaped chakram are easier to make and are acceptable in SCA competitions (*see photo below*). Ring-shaped chakram can be made from circular power saw blades with a cutting torch or with a hand grinder and a small cut-off wheel (use a 1/16" thick cut-off wheel). Inexpensive saw blades cost about \$6 to \$11 at Home Depot or Lowes; select blades without relief cuts or holes. Chakram are best finished with a bench grinder; but they can be finished with a hand file. Saw blades around 5 to 8 inches in diameter are good throwing sizes. Larger size saw blades can be used, but their weight may be detrimental to throwing ease unless they are ring shaped. If a ring chakram is made, the center portion of the saw blade can be used to make a Japanese shaken (*see discussion above*). Use 18 to 24 toothed blades for saw-toothed chakram and plywood cutting blades for smooth chakram. Before grinding, break off any carbide saw tooth tips with pliers, as carbide causes excessive wear on grinding wheels or files.



Large Self-Made Chakram –Chakram and chakram-like weapons made from circular saw blades for use in SCA competitions. All three are about 7 inches in diameter. The

chakram at top was made from a 100 tooth circular saw blade intended for plywood and is unsharpened. The center was cut out with a cut-off wheel on a hand grinder. This chakram is used for target knock-down competitions. The chakram at bottom-left was made from a 24-tooth, coarse-cut circular saw blade; the center was cut out with a cut-off wheel on a hand grinder. The chakram at bottom-right is the same type of blade except the center has not been cut out. Both toothed chakram are intended for use on typical SCA wood target butts. (Author's collection)



Small Chakram, Self-Made – This small chakram was made from an 18-tooth 5-1/4 inch diameter power saw blade. Final diameter is about 5 inches and the weight is 3.5 ounces (Author's collection).

Grind off the rounded portion of each saw tooth, making each tooth triangular in profile. With a hand file, sharpen the edge of each tooth. To sharpen (right-handed people), place the saw blade in a vise or hold it in your lap and sharpen the left side of each tooth. Turn the saw blade over and again sharpen the left side of each tooth. File each tooth edge to about a 45° angled knife edge. Reverse this procedure if you are left-handed.

SUGGESTED USE IN KINGDOM THROWN WEAPONS EVENTS

Multi-pointed (toothed) chakram are thrown at standard kingdom wood target butts and smooth chakram are thrown at breaking or knock-down targets, as they will not stick dependably in the wood target butts. Chakrams are ranged weapons and were traditionally fairly light, about 5 to 9 ounces (Bailey, 2011a). The smaller diameter chakram-like weapons designed by the author for use in SCA competitions are light (around 4 to 5 ounces), but the larger ones are slightly heavier (8 to 11 ounces).

Some throwers may be concerned that throwing a multi-pointed chakram might cut the throwing hand. Extensive personal throwing experience and observations of beginning throwers using toothed chakram for the first time indicate that this is highly unlikely unless the grip used during the throw is extremely loose. For throwers who are concerned about the possibility of hand cuts, a light glove can be used. See Appendix 1 for a discussion on the safe throwing of a multi-pointed chakram.

The following competition scenarios are suggested for chakram:

- Multi-Pointed Chakram -- Painted or paper bulls-eye or other competition targets are placed on side-cut target panels or end cut rounds. Braced plywood or chipboard panels are too flexible for consistent chakram sticks and are not recommended. Saw-toothed chakram are used on wood targets because smooth chakram will not dependably stick in typical SCA wood target butts. The smooth-edged, sharpened chakram was originally designed to inflict slicing wounds in flesh.

As with the Japanese shaken (*discussed above*), the thrower may select any portion of a multi-pointed chakram that sticks in the target for scoring, but the scoring portion must be a CUTTING EDGE OR POINT THAT HAS PENETRATED THE TARGET WOOD. A non-cutting edge between two teeth may not be used for scoring.

Suggested event scenarios for multi-pointed chakram are:

- *Accuracy Competition* – Any competition designed for single-bladed knives can be thrown with multi-pointed chakram.
 - *Sentry Take-Out* – A target the size of the human head is used; multi-pointed chakram are thrown vertically from 10 feet.
 - *Melee Attack* – Two human-torso sized paper targets on wood target butts are used; two multi-pointed chakram are thrown vertically from 10 feet, one at each target.
 - *Surprise Attack* – Timed throwing at a human-size torso paper target, with 3 throws in 5-8 seconds from 10 feet. A hit in the 2-inch diameter eye, throat or wrist areas (your “opponent” is attacking you with a sword) scores 3 points and a hit anywhere else counts 1 point. The face, throat and wrists were the preferred targets for these thrown weapons.
 - *Precision Throw* – Single throw at a human-size head target with a hit in the eye or throat areas (2-inch diameter) scoring 3 points and a hit anywhere else counting 1 point.
- Smooth-Edged Chakram -- Knock-down targets with a war or hunting motif are suggested for competitions. For a discussion of these targets, see pages 46-47 in the percussive weapons section below.

PERCUSSIVE WEAPONS

Percussive weapons (boomerangs, throwing sticks, throwing clubs, war hammers and maces) and non-toothed chakram are not designed to penetrate a hard target. For these weapons, knock-down targets, breaking targets, soft targets or hanging targets are

suggested. Throwing sticks and clubs with pointed heads and/or butts are designed to penetrate soft targets, and these weapons may be used on hay bale-mounted paper or cardboard targets.

BOOMERANGS AND CURVED THROWING STICKS

Heavy hunting boomerangs and curved throwing sticks (12 to 20 ounces or more) were commonly used in Africa, India, Australia and North America (*see below*). Curved



Curved Boomerang – Non-returning Australian boomerang from Queensland. This example is convex on both sides. Total length 28.5 inches, weight 12 oz. (Regan and others, 2006, p. 210)

throwing sticks differ only slightly in shape from boomerangs; they are typically less aerodynamically shaped and a little rounder in cross-section (*see the Indo-Persian katariya below*).



Katariya – Katariya at bottom is polished horn with a carved end. Katariya at center is made of iron. The ball is hollow and 3 inches in diameter, the total length is 14.5 inches. The katariya at top is wood and is 17.5 inches long. Weights are not specified. (Stone, 1999, fig. 435, p. 348.)

PERIOD USE OF BOOMERANGS AND CURVED THROWING STICKS

Hunting and war boomerangs and curved throwing sticks are ancient weapons. Although poorly documented (they were used primarily by illiterate people), they were likely used

throughout period. Very light (less than 5 ounces) returning boomerangs were rarely used in period, and when used, they were usually thrown to flush game towards the hunter rather than as a killing weapon.

Hunting and war boomerangs were thrown both overhand and side-handed, but many times they were thrown side-handed, as this usually gave the hunter or warrior the best opportunity to connect with a small target.

CONSTRUCTION OF BOOMERANGS

War and/or hunting boomerangs are easily made from 1/2 inch thick plywood. Suggested shapes are presented in Section 5 of the main report. A coping saw, scroll saw or jig saw is used to cut out the desired shape. See figure 2 (*below*) for suggested dimensions.



Self-Made Boomerang – Non-returning, hunting-style boomerang constructed from 1/2 inch thick plywood. Boomerang is 25 inches long, center is 2.3 inches wide, ends are 1.9 inches wide. Weight is 10 ounces. This example has non-beveled edges and is sealed with hardwood floor wax. (Author's collection).

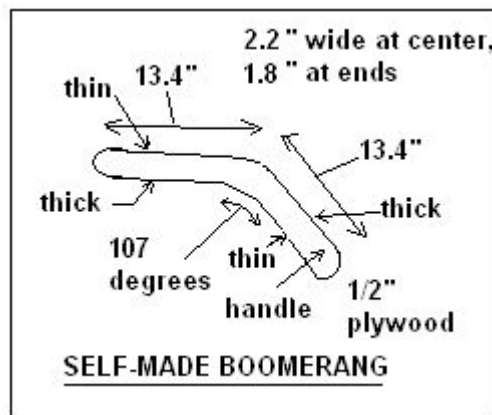


Figure 2 -- Suggested dimensions for a self-made non-returning boomerang. Actual dimensions are not critical.

The edges of self-made boomerangs can be left un-beveled or beveled on both sides like the Australian example above. The beveled edges can be re-enforced and protected from

breaking with a thin coating of construction adhesive (e.g. Liquid Nails). The wood can be sealed with paint or varnish if the weapon is to be used in wet conditions.

SUGGESTED USE IN KINGDOM THROWN WEAPONS EVENTS

All boomerangs are thrown with the convex part of the boomerang pointing forward (*left end forward in figure 2*). If thrown the other way, the flight will be very erratic. When throwing, best results are usually obtained when the weapon throw is set-up truly vertical (horizontal if side-arm throwing) and the arm swing and release maintains this geometry. If thrown at an angle, the boomerang tends to veer to one side or will strike the ground short of the target. Many of the techniques used when throwing a returning boomerang do not apply to hunting or war boomerangs used at fairly close range (20-30 feet).

CAUTION! BOOMERANGS MADE FOR USE IN KINGDOM OF ARTEMISIA THROWN WEAPONS EVENTS MUST BE NON-RETURNING. A RETURNING BOOMERANG IS TOO DANGEROUS TO USE ON SCA THROWN WEAPONS RANGES!

Boomerangs are a non-penetrating weapon, and must be used on breaking targets (balloons, clay pigeons, etc.) or knock-down targets. See the descriptions of these targets and their use on page 47-48 (*below*). Boomerangs were typically used at moderated throwing distance. For percussive weapons competitions, throwing distances of at least 15 feet is recommended and throwing distances of 20 to 30 feet are probably more period correct.

THROWING STICKS

Throwing sticks were commonly used in Africa, India, Australia, Oceania and North America. Throwing sticks can be made in almost any shape, but most consisted of a straight 18" to 30" long shaft about 3/4" to 1.0" in diameter. Throwing sticks may or may not have a knobbed end for weight.



African Throwing Sticks (Kerries) -- These club-like kerries range from 18.5 to 29.5 inches long; the head of the third from left is 3.5 inches in diameter. Note sharpened end

on several of the kerries. These sharpened ends were designed to penetrate the target; the point could also be used for digging. (Stone, 1999, fig.442, p. 351).



Australian Throwing Sticks – Sizes are not given but most are likely about 18-30 inches long (Davidson, 1936, p. 77, fig. 1)

PERIOD USE OF THROWING STICKS

Throwing sticks are ancient weapons, likely one of the first fabricated weapons made by humanity. Throwing sticks used for hunting and war were thrown both overhand and side-handed, but many times they were thrown side-handed, as this usually gave the hunter or warrior the best opportunity to connect with a small target. Although poorly documented (they were used primarily by illiterate people), throwing sticks were undoubtedly used throughout period.

Throwing sticks and clubs intended for target penetration are either single-pointed or double-pointed. A single-pointed throwing stick or club allows the thrower to choose either a percussive or a penetrating strike on the target, depending on which end is gripped for the throw.

CONSTRUCTION OF THROWING STICKS

Simple throwing sticks for use in Kingdom of Artemisia thrown weapons competitions can be made in two ways: (1) from a wooden axe handle, rake handle or hammer handle; or (2) with a 2.0" to 3.0" round or square wooden head with a handle hole drilled in its base, into which a 3/4" shaft (the throwing arm) is attached with epoxy. For authenticity, head shapes and handle lengths should be similar to period weapons (*see figures above*).



Single Pointed Australian Throwing Stick (upper weapon) and Hawaiian Bludgeon Dagger (lower weapon) – The throwing stick was thrown from 20 feet, the bludgeon dagger from 16 feet; penetration in hay bale is about 3 inches. (Authors' collection)

Throwing sticks and throwing clubs are easily made using a hand-held grinder with a rotary rasp bit. Alternately, they can be carved by hand with a knife. All points are rounded, which is sufficient for penetrating hay bale targets. These weapons ideally should be made out of a hard wood, like hickory or ash. Pine or fir will work, but the weapons will be lighter and less durable. A light coating of a paste-type hardwood floor wax will give the weapons a protective coat and provide a good grip friction.

The figure below show several styles of easily made throwing sticks that are suggested for kingdom use. If you are making only one throwing stick or club, a double pointed configuration is recommended, as they are more versatile.



Australian Throwing Sticks--Self-Made – All are 22" long and made either from a 1-1/2" hickory sledge hammer handle (top) or an ash rake handle (lower two). The middle stick is 1-1/4" thick and the lower is 1" thick. (Author's collection).

SUGGESTED USE IN KINGDOM THROWN WEAPONS EVENTS

Some throwing sticks are percussive, non-penetrating weapons, and can be used only on breaking targets (balloons, clay pigeons, etc.) or knock-down targets. See the description of these targets and their use on page 47-48 (*below*). Pointed throwing sticks may be used either as percussive weapons or as piercing weapons, if hay bale target butts and paper or cardboard targets are used (cardboard lasts longer). Throwing sticks are thrown over-hand in a manner similar to axes, but the lighter weight of the throwing sticks allows them to be more easily thrown at extended distances.

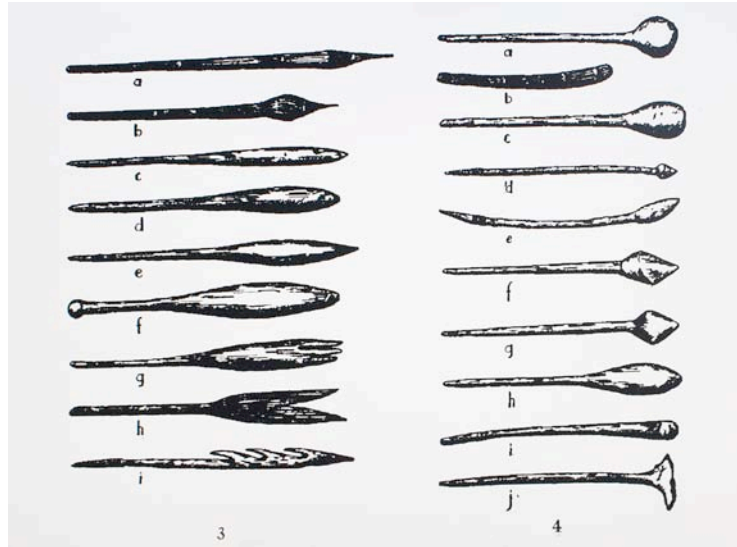
Throwing sticks of all types were typically used at moderated throwing distance. For percussive weapons competitions, throwing distances of at least 15 feet are recommended and throwing distances of 20 to 30 feet are probably more period correct. Throwing sticks can also be thrown in long-distance competitions. Personal tests have shown that with practice, these weapons are capable of sticking in a single hay bale target fairly regularly when thrown from 45 feet (15 yards). The throwing dynamics of a throwing stick and a throwing club (*see discussion below*) are very similar, and these weapons can be thrown in the same events.

A throwing stick competition for double-pointed throwing sticks can start at about 15 feet (a 22" weapon will usually stick head-first at this distance) for the first throwing round. The second round will be from about 20 feet (butt sticks) and end at 25 feet (head sticks again). Each contestant may throw from their correct throwing distance as long as it is not excessively different from the designated throwing distance. These personal throwing distances may be ± 1 to 2 feet from the designated throwing distance.

THROWING CLUBS

Throwing clubs are similar to throwing sticks except that they usually have a larger head. The distinction between throwing sticks and throwing clubs appears to be more of a classification artifact of the anthropologists studying these weapons than a distinction made by the peoples who used them. For example, the African kerrie (*discussed above*) has a typical throwing club shape, but the weapon has traditionally been called a throwing stick, so it is described in that section above.

The heads and butts of throwing clubs may or may not be sharpened to allow penetrating strikes. Throwing clubs were commonly used in Africa, India, Australia, Oceania and North America. Throwing clubs can be made in almost any shape, but most consisted of a straight shaft about 14-30" long and about 3/4" to 1.0" in diameter, with a head about 4"-6" in diameter. The head typically was rounded, square or irregular and some were pointed.



Australian Throwing Clubs – Sizes are not given but most are likely about 18-30 inches long (Davidson, 1936, p.82, figs. 3 and 4)

PERIOD USE OF THROWING CLUBS

Throwing clubs, like throwing sticks, are ancient weapons. It is likely that the throwing club was developed from the throwing stick, as there are many transitional examples in most cultures that used them. Although poorly documented (they were used primarily by illiterate people), throwing clubs were undoubtedly used throughout period. Throwing clubs used for hunting and war were thrown both overhand and side-handed.

CONSTRUCTION OF THROWING CLUBS

Two types of throwing clubs are suggested for kingdom use – non-penetrating clubs and penetrating clubs. The non-penetrating clubs will be used only for breaking or knock-down targets, while the penetrating clubs, which have one or both ends pointed, can be used either on breaking/knock-down targets or soft, penetrating targets, like hay bales.

Two suggested types of non-penetrating clubs are: (1) a 16-18 inch-long Fiji Ulas throwing club with a 5-6” rounded or square-shaped head; (2) a paddle-shaped Maori Patu (Patuki) club about 12-15” long with a head width of about 3-5”. If desired, the ulas club could have a rounded (not sharp) pointed butt, to allow penetrating strikes on hay bale targets, but the patu apparently did not have pointed butts.

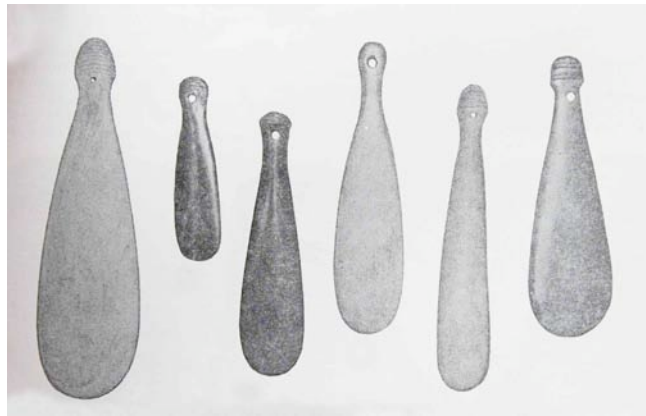
To construct the ulas, make a 4.0” to 6.0” rounded or square-shaped wooden head from a piece of 4” by 4” lumber, then drill a handle hole in its base, into which a 3/4” to 1” shaft (the throwing arm) is attached with epoxy (*see period ulas in the photo below*).

To construct the patu, saw the club from a 2” by 4” or a 2” by 6” piece of hardwood lumber (with a coping saw or jig saw) and carve to a pear or paddle-shape with a handle.

The edges of the club head are beveled as desired (*see period patu in the photo below*). For other options, see the main report.



Ulas Throwing Club -- The lower club is a more traditional shape and is 16 inches long. (Stone, 1999, fig 822, p.646).



Patu – Patu to left is 20 inches long and 5.9 inches wide; the second (from left) is 10 inches long and made from jade. The remaining patu range from 14.5 to 16.8 inches long. (Stone, 1999, fig. 626, p. 490).

The Australian Flared Throwing Club (*see Davidson, 1936, fig. 3, p.82, above*) is an easily made penetrating throwing club for use in soft target competitions (*see upper two clubs below*). They can be either single-pointed or double pointed. The Hawaiian bludgeon dagger (*lower club below*) was always single pointed.



Throwing Clubs--Self-Made – Upper club is 20” long and was made from a hickory mattock handle. The shaft diameter ranges from 2-1/4” (top) to 1-1/4” (bottom). The weight is 14 ounces. The center club is 22” long, weights 9 ounces and was made from an ash rake handle. The Hawaiian bludgeon dagger (bottom) is 17” long and was made from an ash shovel handle. It is modeled after daggers (a) and (c) of Buck (1964, fig. 276, p. 430) [see main report]. Head diameter is 1.5” and weight is 7 ounces. (Author’s collection).

The two Australian throwing clubs (*above*) will stick in a hay bale target when thrown from 14.5-15.5 feet (head stick), 20.0-21.0 feet (butt stick) and about 26.0 feet (head stick again). The bludgeon dagger will stick when thrown from 20.5 feet.

SUGGESTED USE IN KINGDOM THROWN WEAPONS EVENTS

Throwing clubs that are percussive, non-penetrating weapons can be used only on breaking targets (balloons, clay pigeons, etc.) or knock-down targets. See the description of these targets and their use on pages 47-48 (*below*). Pointed-butt and/or pointed-head throwing clubs may be used either as percussive weapons or as piercing weapons, if hay bale target butts and paper or cardboard targets are used (cardboard lasts longer). Throwing clubs are thrown over-hand in a manner similar to axes.

As discussed above under throwing sticks, the throwing dynamics of a throwing club is very similar to that of a throwing stick, and these weapons can be thrown in the same events. A throwing club competition for double-pointed throwing clubs like the Australian flared club can start at about 15 feet (a 22” weapon will usually stick head-first at this distance) for the first throwing round. The second round will be from about 20-25 feet (butt sticks) and end at about 30 feet (head sticks again). Each contestant is allowed to throw from their correct throwing distance as long as it is not excessively different from the designated throwing distance. These personal throwing distances may be ± 1 to 2 feet from the designated distance.

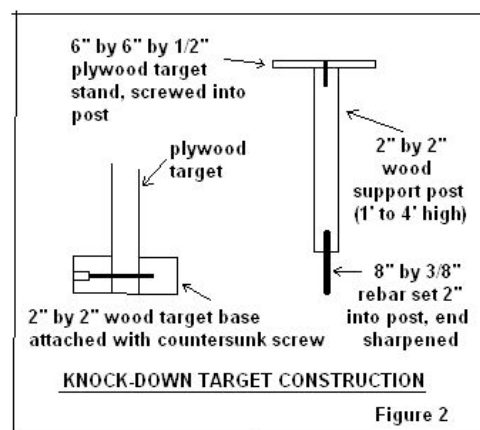
Throwing clubs can also be thrown in long-distance competitions. Personal tests have shown that with practice, these weapons are capable of sticking in a single hay bale target fairly consistently when thrown from 45 feet (15 yards).

SUGGESTED TARGETS FOR PERCUSSIVE WEAPONS IN KINGDOM THROWN WEAPONS EVENTS

Percussive weapons (boomerangs, throwing sticks, throwing clubs, war hammers and maces) and non-toothed chakram are not designed to penetrate a hard target, so typical SCA axe and knife wood target butts can not be used. For these weapons, knock-down targets, breaking targets, soft targets or hanging targets are suggested. Throwing sticks and clubs with pointed heads and/or butts are designed to penetrate soft targets, and these weapons may be used on hay bale-mounted paper or cardboard targets (cardboard targets will last much longer). Hay bales, hanging tarps or 4 ft. by 8 ft chipboard “catch panels” behind the percussive weapon target butts might be considered to catch missed throws.

Knock-Down Targets – Knock-down targets are as varied as the marshal’s imagination. Two suggested variations are ground targets and pedestal or hay-bale mounted targets.

- *Ground Targets* -- Ground targets rest on the ground. They can be of any size or shape, but tend to be larger sized. Targets can be outlines of game animals (birds, boar, etc.) or enemy heads (enemy warriors sneaking into the encampment), but any shapes (including simple geometric shapes) can be used. The targets are constructed from plywood, chipboard or shelving lumber and are set on a base of 2” by 2” lumber (*see figure 2*). Don't make the target so heavy or the target base so stable that it is difficult to knock over with a solid hit.
- *Pedestal or Hay-Bale Mounted Targets* – Hay-bale or pedestal-mounted targets are similar in construction to the ground targets discussed above, but are usually smaller. Again, game animals, enemy heads or geometric shapes can be used. The target base and the pedestal construction are shown in figure 2 (*below*); rebar length will depend on the firmness of the ground expected. Suggestions for scoring pedestal-mounted targets are 1 point if the pedestal is hit and the target falls and 3 points for a target hit that leaves the pedestal standing.



Breaking and Soft Targets – Breaking and soft targets can have strong spectator appeal. Suggested breaking targets include clay pigeons (used for shotgun targets) and air or water-filled balloons. Soft targets include toy balls, pumpkins and small plastic bags filled with grass or leaves. Some soft targets (pumpkins, watermelons, etc.) may allow weapons like chakram, shuriken and the smaller boomerangs to penetrate and stick.

Hanging Targets – Any type of target can be hung from a long, springy pole set at an angle using a "portable hole" so that the target hangs vertically. This is a particularly challenging target for competitions the require timed multiple throws at the target – once the target is hit and starts swinging it will be tough to hit! The target can be weighted with a little sand to keep the degree of swinging down.

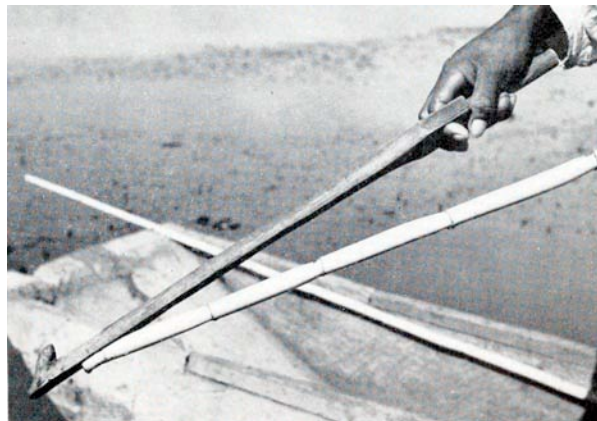
SPECIALTY WEAPONS

ATLATL

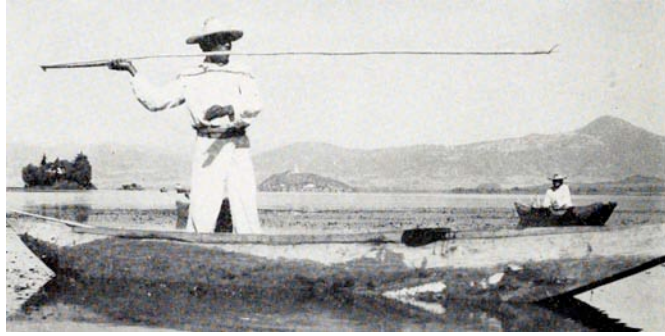
PERIOD USE OF ATLATLS

The atlatl (*pronounced at-LAT-tul or ott-lottle*) is an ancient weapon system, dating from at least 18,000 years (Hrdlicka, 2003). The atlatl system consists of two components; a throwing stick and one or more light javelins, called darts.

- **Atlatl Throwing Stick** – Throwing sticks in period were usually about 18-36 inches long, but some examples were longer. About 24" is a good length for a beginner. They can be of any shape the thrower desires.
- **Atlatl Dart** – In period, the atlatl darts were usually around 5.0 to 8.0 feet long. Children typically used shorter darts when learning. Some aboriginal peoples used darts up to about 10 to 12 feet long, but darts longer than 8.0 feet are not recommended for beginners. Short darts (4.0 feet long and shorter) tend to be difficult to throw accurately.



Atlatl Used for Bird Hunting in Mexico, Late 1950's – Photo shows a two-finger-hole atlatl throwing stick and a cane dart. Note fingers in finger holes and the small peg at the back of the stick which is seated into the back of the dart. The larger upper hook is used to help retrieve a thrown dart from the water. (Stirling, 1960, plate 39, p. 269)



Atlatl Used for Bird Hunting in Mexico, Late 1950's –Photo shows the atlatl dart ready to be thrown. (Stirling, 1960, plate 40, p. 270)

CONSTRUCTION OF ATLATLS

THROWING STICK – There are many different designs of atlatl throwing sticks and any design may be used in SCA competitions. The best way to select a throwing stick is to study the designs used in period and select one that appeals to you. Throwing sticks of various designs are shown at the Northern Plains Atlatl Association's website at <http://www.thudscave.com/npaa/designs/> and in Mason, (1890); an internet copy of this reference is at Gutenberg E-Books, file #17606.

Anthropological studies (Nelson, 1896) and modern researchers like Bob Perkins (<http://www.atlatl.com/mechanics.php>) have shown that a throwing stick length to dart length ratio of about 1:3 gives the best accuracy and efficiency. Perkins uses π (3.14) as the ratio. A dart length similar to the thrower's height is a good place to start. A 4-foot long dart, suitable for children and possibly smaller adults, can be used with a 15-18 inch long throwing stick. A 6- to 7-foot long dart requires a 22-28 inch throwing stick.

Three self-made throwing sticks are shown below. The upper two are non-period designs that were selected for ease of use by beginning SCA throwers. Both are 24-inches long and have a dart rest. The lower sticks is 22 inches long and is a very simple, traditional design that uses a leather thong to form two finger loops, one for the index finger and one for the thumb. The dart in this design is held between the index finger and the thumb.



Self-Made Throwing Sticks. (Author's collection)

The upper throwing stick (*above*) is cut from 3/4" thick by 6" wide oak shelving to allow for a higher dart rest. It has a hand-fitting grip wrapped in leather and a peg-shaped thumb rest for better control of the stick during throwing. The dart peg is made from deer antler. The inexpensive middle throwing stick is cut from 3/4" thick by 2-1/2" wide pine shelving (\$1.50 for an 8 foot long piece at Home Depot). Throwing sticks made from pine shelving are more easily broken at the dart rest compared to oak but the shelving is much cheaper. The dart peg is cut from a large nail. The lower, traditional stick is made from pine doweling and has a hardwood dart peg (*at right, facing viewer*).

The dart-rest type throwing sticks can be cut out with a coping saw or power scroll saw. Lumber of this size also can be used to make flat-style atlatls similar to the two-finger design used by the Mexican hunter in the first photo above. Try to pick lumber as knot-free as possible, although if a curved design is used, some knots can be worked around. An 8 foot length of clear lumber would make 4 two-foot long throwing sticks. A 1-1/4" long piece of deer antler forms the dart peg of the upper stick and was epoxied into a 1/4" diameter hole drilled into the stick at an angle. Bone, ivory, teeth, antler and hard wood were used for pegs in period, but any hard material can be used, including a short length of nail (middle stick). The peg should be rounded (not sharp) as it needs to act like a ball and socket joint with the dart. Cut shallow 1/2" diameter grooves in the tops of the two dart rests for the darts. The throwing sticks are coated with hardwood floor paste wax for weather protection.

DARTS – Atlatl darts consist of three parts; the shaft, the point and the fletching. Typical darts weigh around 4 to 8 ounces, depending on length, with darts in the 4-6 ounce range generally preferred by modern target throwers. Hunting darts tend to be heavier, around 8 ounces. The Northern Plains Atlatl Association's website at <http://www.thudscave.com/npaa/> has very good information on the construction of darts. Epoxy can be used for many of the dart joints – this is actually fairly traditional, as many darts in period were held together with tree gum or resin.

Shaft – A long dart is generally more accurate than a short dart. Most throwers do best with 6-foot to 7-foot darts, but youth and smaller adults may want to start with 4-foot to 5-foot darts. Two easily made dart shafts are: (1) a 4.0 foot dart made from 3/8" to 1/2" diameter hardwood doweling (about \$2 each at Home Depot); or (2) a 5.0-7.0 foot dart made from a light-weight, straight-grained wood like cedar or hemlock. Home Depot sells good-quality hemlock molding by the foot in 3/4" by 3/4" or 1/2" by 3/4" sizes and in lengths up to about 14 feet. This material makes excellent darts. To make accurate darts, spend time selecting reasonably straight doweling or molding. Straight doweling in particular can be difficult to find – you may have to examine 10-12 dowels to find a straight one! Select molding with grain as straight and continuous as possible; if the grain trends sharply out of the molding, the resulting dart will be more easily broken.

The mechanics of dart release and flight make a tapered dart (thicker to the front, thinner to the rear) more accurate than a non-tapered dart. To construct a tapered dart from hemlock molding, rasp and file the back two-thirds of a 6-7 foot long shaft to about 7/16" diameter and the front one-third to about 5/8" diameter. If 1/2" by 3/4" molding stock is

used, slightly round the edges of the front one-third of the shaft. The tapered transition zone between the two diameters is about 7-12 inches long.

The back end of all darts are wrapped with string or synthetic sinew and coated with epoxy to strengthen it (*see fletching figure below*). They are then cupped slightly with a 3/8-1/2" diameter drill to accept the dart peg. The cupped end should look like a deepened golf tee and be drilled to match the diameter of the throwing stick peg. If the hole is too deep, the dart will not release smoothly; if it is too shallow, the peg will slip off during throwing. All dart shafts are coated with hardwood floor paste wax for weather protection.

Point – Period atlatl points were typically made from bone, hard wood or flaked stone (usually flint or obsidian). Points were usually attached to a 6-8" long tapered wood dowel called a foreshaft. The foreshaft was lightly friction-fit to the dart shaft. This was done so that the entire dart would not be lost if an animal ran off with it during the hunt. Foreshafts also make it easier to replace a broken point (a common occurrence with stone points) or to change a point shape to fit the animal hunted. A common traditional dart shaft material was cane, so the tapered end of the foreshaft dowel was simply pressed into the hollow shaft when a point needed to be replaced. Limited archeological evidence suggests that a socket construction also might have been used for solid shaft darts. The dowel used for these socket-type points had a hole drilled in the end to accept the solid dart shaft. This method of construction is a good way to extend the length of darts made from 4.0 foot long doweling. Both of these friction-fit foreshaft types are acceptable for SCA use, but if non-traditional steel points are used, foreshafts are not really necessary except to lengthen the dart. They are a good way to quickly repair broken darts, however!

Point designs varied in period, but for ease of construction and use, steel pointed darts are recommended. The weight of the point is critical to the construction of a balanced dart (*see discussion below on the tuning of atlatl darts*). Two point types are suggested – socketed points or inserted points (*see figure below*).



Simple Atlatl Points – Upper socketed point is made from 1/2" diameter steel rod and CPVC pipe. The lower inserted point is a 300 grain screw-in arrow point with the shaft wrapped with iron wire for re-enforcement and for additional weight. (Author's collection)

- Socket Points – Socket points consist of a 3/4" to 1-1/4" piece of 1/2" diameter steel rod (Home Depot or Lowes) set into a 1-1/2" long piece of 1/2" ID CPVC pipe. One end of the short rod length is ground into a rounded point. CPVC pipe is recommended; it has a smaller inner diameter compared to regular PVC pipe and will provide a tighter fit with the point. The front and back edges of the CPVC pipe are beveled to allow easy withdrawal from the target. The point and pipe connector may be epoxied to the head of the dart, but if they are not, the point can be re-used when the dart shaft breaks (they will all break eventually!).
- Insert Points – Insert points are set into a hole drilled into the head of the shaft. If a 4-foot dowel dart is being made, a slip-on arrow field point may be preferred, as the wood is too thin to be easily drilled. For 5/8" diameter darts, the point can be a short section of 3/8" diameter nail or a screw-on arrow field point. If a nail is used, about 1" of the nail shaft is ground down to about 3/16" diameter to reduce the diameter of the drill hole needed. The point is epoxied into the shaft and for added strength, the dart shaft behind the point area is wrapped with synthetic sinew, string or iron wire (if weight is needed) and coated with epoxy.

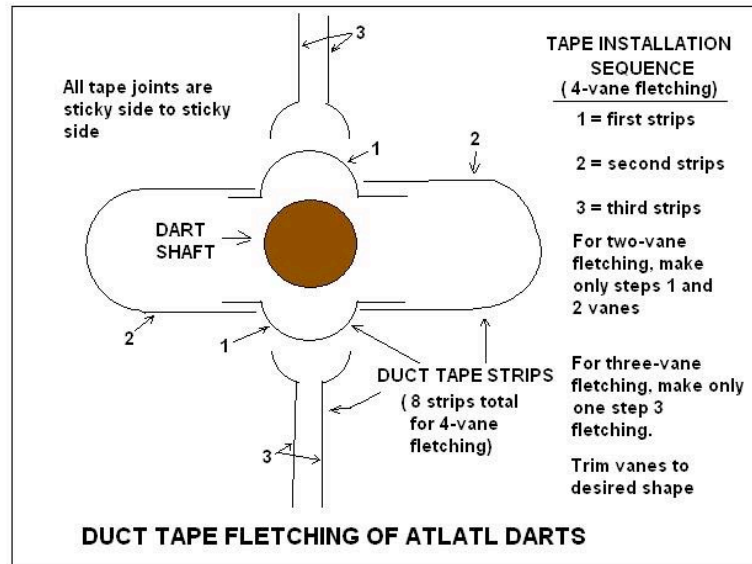
Fletching – The length and width of an atlatl dart's fletching depends on the weight of the point – the heavier the point, the less fletching is needed. A very heavy point needs no fletching at all. However, a very point-heavy dart is unbalanced and will not be as accurate as a balanced dart (*see discussion below on tuning atlatl darts*). Traditionally, atlatl darts in many cultures were two-vane fletched with large feathers, as this is the easiest to do, but a 3- or 4-vane fletching is usually more accurate. The Northern Plains Atlatl Association website (<http://www.thudscave.com/npaa>) has very good information on traditional dart fletching using feathers.

A quick and easy way to fletch a dart is to use thin Duct tape for 3- or 4-vane fletching, or Gorilla® tape for 2-vane fletching (*see figure below*). The Gorilla® tape is preferred,



Duct Tape Fletching of Atlatl Darts – The upper dart is two-vane fletched with Gorilla® tape; the lower dart is 4-vane fletched with light-weight duct tape. Note the string-wrapped and epoxied nocks. Wrapping is done to reinforce the dishednock area. (Author's collection)

as it is stiffer and more sturdy, but it usually weights too much for the 3 and 4-vaned fletching of 7 foot darts. If used, the heavy fletching will require a heavy point (resulting in 7-8 ounce darts) in order to create a well-balanced dart (*see tuning discussion below*). Two layers of tape are used (sticky side to sticky side) for all fletching and the tape trimmed to the desired shape (*see fletching diagram below*). Install the fletching so that its back end is about 2" from the nock and trim to the desired shape. The vanes on both darts in the photo above are about 2-3/4" wide by 7" long.



TUNING THE ATLATL DART

Atlatl darts need to flex as they are thrown, but if they are too flexible, they may break if thrown too hard! How much flex a dart needs depends on the strength of the thrower – a strong thrower will need stiffer darts than a gentler thrower.

Atlatl darts need to flex during the throw to produce a clean release of the nock from the peg – if this doesn't happen, the peg will drag the dart end down or sideways and accuracy will be poor. The dart's center-back section flexes up (or down, depending on dart weight and throwing style) at the start of the throw, then straightens out at the point of release. This straightening action pushes the dart away from the peg, allowing a clean release of the nock from the peg.

A common test of dart flexibility is done by placing the dart tip on a scale and then pushing down on the nock with a finger. If the dart starts to bend at around 5 pounds (gentle thrower) to 10 pounds (stronger thrower), the dart is usable. When a thrower gains experience, they will prefer a certain range of dart stiffness, which will depend on their throwing style and personal preferences.

Atlatl darts are similar to arrows in that how the weight is distributed along the shaft will influence how accurate it is. For best accuracy, the balance point of a dart should be in front of its center point – this produces a weight forward configuration, which acts like sand in the toe of a thrown sock. The ratio between a dart's balance point and its overall length is called the Forward of Center (FOC) ratio. A dart with a poor FOC ratio can be made to work by adjusting the fletching, but darts with a FOC of around 7% to 10% will usually show the best accuracy. The Forward of Center (FOC) ratio is determined by taking the difference between the balance point and the center point (both measured from the nock end) and dividing it by the total dart length.

To balance a dart, complete the dart (including the fletching and nock wrapping) and determine its balance point with various weights of points until a FOC of 7% to 10% is obtained. If a socket-type 1/2" diameter steel rod point is used, the point length likely will be between 3/4" and 1-1/4". If a light-weight arrow point is used, iron wire can be wrapped around the point (if needed) until a good FOC is obtained. It is better to have some of the forward weight distributed along the foreshaft (by using a reasonably large enough diameter foreshaft) rather than having it concentrated at the point. The front of an overly point-heavy dart will drop quickly when throw at distances beyond about 15 yards.

EXAMPLE OF DART TUNING: A 7-foot (84") long dart will have a center point at 42". A piece of 1/2" diameter steel rod 3/4" long is cut and rounded to a point and then installed on the dart using a 1-1/2" long piece of CPVC pipe (*a socket-type point - see point discussion above*). With this point installed, the dart balances at 46" (measured from the nock), so the difference between the balance point and the center point is 4". The Forward of Center ratio (FOC) of this dart is 4" divided by 84" (the total dart length), or 5.5%. This FOC ratio is somewhat low for an accurate dart, although depending on the fletching size, its accuracy may be acceptable. The 3/4" long point is replaced with a 1" long point of the same material, and the balance point is re-measured. The dart with the slightly heavier point now balances at 49" (again, measured from the nock), so the difference between the balance point and the center point is now 7". The Forward of Center ratio (FOC) of this dart is 7" divided by 84" (the total dart length), or 8.3%. This would be a good ratio for dart accuracy.

HOW TO THROW THE ATLATL DART

The atlatl dart can be thrown in many different ways, but as with the thrown axe or knife, there are better and poorer ways to do it. The Northern Plains Atlatl Association's website (<http://www.thudscave.com/npaa/>) has good information on how throw the atlatl; refer to this website for basic instructions. In simple terms, the atlatl dart is thrown in three inter-connected steps: (1) the throw set-up; (2) the initial forward throwing motion, including either a pronounced backward lean with no forward step (a typical European method) or a slight backward lean and a step forward (a typical American method); and (3) the wrist flick, which gives the dart its velocity. The start of the

throwing motion is similar to a javelin throw, but when the throwing hand passes the head, the hand flicks the throwing stick upward into a vertical position.

SUGGESTED USE IN KINGDOM THROWN WEAPONS EVENTS

Suggestions for the layout of a safe atlatl range are discussed in Appendix 1.

Atlatls are long-range weapons and the minimum throwing distance suggested for kingdom competitions is 15 yards (45 feet). With practice, many atlatl throwers should also be able to throw well from about 20 to 30 yards (60 to 90 feet).

Two types of atlatl competitions are suggested: (1) accuracy competitions and (2) distance competitions. In all events, the weight and length of the dart is at the discretion of the thrower, as long as they are within the 4.0 to 8.0 foot criteria specified for Kingdom of Artemisia atlatl competitions. However, 5.0 to 7.0 foot darts weighting around 4 to 6 ounces are recommended for general use, as these are generally more accurate and easier to throw. Darts longer than 8.0 feet may be used at the discretion of the marshal-in-charge, but the thrower will have to demonstrate that they can throw them safely.

- Accuracy Competitions – Competitions to test accurate atlatl dart throwing are similar to those used for javelin events, and can be thrown either at bulls-eye targets or at hunting or warfare-type targets (game animals, enemy warriors, etc.). For bulls-eye contests, the World Atlatl Association's International Standard Accuracy Contest (ISAC) is preferred, as it is designed for atlatl use. Atlatl targets used in this event are similar to the FITA 60cm archery target, except the outer ring is 108 cm in diameter (with the inner rings also proportionally larger) and is worth 6 points. The ISAC is a world-wide event and is set up in a manner similar to the SCA's Inter-Kingdom Challenge for thrown weapons. A description of this event, its scoring sheet and the target dimensions is at <http://www.worldatlatl.org>

Recommended throwing distances are 45 and 60 feet (15 and 20 yards). If Royal Round targets are used (not recommended), scoring can be more generous, as the distances thrown are longer – for example, if throwing at 15 yards, 5 points can be assigned for any hit on the 8 by 11 inch paper target sheet and 3 points for a hay bale hit. Many native Australians could consistently hit a 2 foot by 2 foot target when throwing from 110 to 130 feet (37 to 43 yards), but their hunting blinds were typically set up for maximum throws of around 30 yards (Gould, 1970).

- Distance Competitions – Distance competitions test both accuracy and distance thrown. Examples include:
 - Line Throwing – This is a good beginner's event, as most beginners are intrigued with finding out how far they can throw the atlatl dart. To set up the event, a tape measure is laid out as a centerline to an extended distance. The tape can start at around 45 feet/15 yards (mark the tape end

with a stake) and extends out to 150-210 feet (50-70 yards) or farther, depending on the abilities of the throwers. Intermediate stakes can be set along the line to help throwers see the line and for use as intermediate measurement reference points if a 200 foot tape is not available.

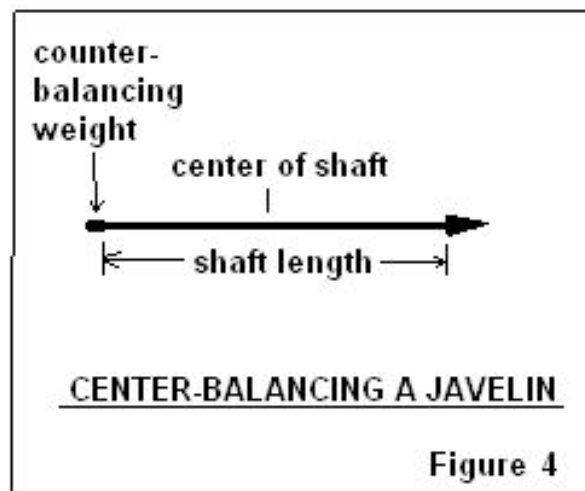
During the event, a participant will throw as far down and as close to the line as possible. A thrower's score is the down-field distance hit minus three times the lateral distance that the dart hits from the centerline. Five bonus points are awarded for a hit within 1 foot of the line. The largest score wins.

The atlatl was primarily a hunting weapon, so this event awards accuracy first and distance second. For example, thrower #1 may throw 90 feet, but hit 15 feet from the centerline – his/her score would be $90 - (15 \times 3) = 45$. Thrower #2 may throw 60 feet but be only 3 feet from the centerline – his/her score would be $60 - (3 \times 3) = 51$.

- Atlatl Clout – A single hay bale target butt is set up at a distance selected by the marshal-in-charge -- usually a minimum of at least 90 feet (30 yards). Two rings are laid out around the hay bale, one with a 5-foot diameter and the other with a 10-foot diameter. A hit on the hay bale or within the 5-foot diameter ring counts 5 points (a hay bale hit earns 3 bonus points); any hit within the 10-foot diameter ring counts 3 points.

3. CENTER BALANCING A JAVELIN FOR ACCURACY

Center-balancing a javelin is simple. First measure the center point of the shaft, exclusive of the head and about 1 inch of the butt (*see figure 4 below*). The last 1 inch of the butt is excluded because this is where the counterweight will be screwed on.



Place the javelin's center-of-shaft on a knife edge and add weight to the butt until the weapon balances. Attach the weight to the butt. If a 0.9-inch diameter wooden javelin shaft is used, 3/4 inch iron pipe fittings can be screwed onto the butt with minimal effort. A 3/4 inch cap, 1 inch long pipe nipple (cut as needed) and a 3/4 inch pipe connector make a good-looking butt cap when all screwed together with the cap flush with the connector. If additional weight is needed to balance the javelin head, lead shot, lead fishing sinkers, scrap metal or other small weights can be put into the cap before it is screwed onto the shaft. A small wad of cloth or plastic can be inserted to keep the additional weights from rattling. Screw the counterweight snugly onto the shaft with a pipe wrench or large pair of pliers, then remove it, coat the threads with epoxy and re-assemble. The most durable pipe fitting for the counterweight are galvanized fittings (they will not rust), but black iron fittings can be installed and then painted, if desired.

Occasionally, the javelin head will be slightly lighter than the 3/4 inch pipe fittings. Either 1/2 inch pipe fitting can be used, or if only a little weight is needed, iron wire can be wrapped around the base of the javelin head. African javelins in period commonly used tang-type points reinforced with iron wire instead of the cap-type point commonly used in Europe. Tang point javelin construction is also used on most SCA javelins because they are much easier to make. African tang points were inserted into a hole drilled into the wood shaft and iron wire was wrapped around the javelin shaft near the head to re-enforce this area. This will also add weight to the head, if it is needed for balancing. For durability, the iron wire can be coated with epoxy.

APPENDIX 3

THROWN WEAPON DATA SOURCES

APPENDIX 3

THROWN WEAPON DATA SOURCES

1. INTRODUCTION

This study is not a rigorous Arts and Science research project. It is a working document intended to help SCA members interested in thrown weapons better understand period thrown weapon types.

The researching of any subject requires all sources to be used with caution and cross-checked with other sources. Unfortunately, information on the actual use of thrown weapons in period is very limited. Museums and collectors may have the weapons (a good primary source) but they usually have limited information on how the thrown weapons were actually used in period.

Weapons like swords captured the imagination of both period and modern scholars but thrown weapons generally did not. Thrown weapons were typically used by warriors in desperate situations, by lower-class soldiers, by people involved in secretive covert operations (including assassins, spies, criminals and other rogues), by the lower classes of societies (who were generally illiterate), or by aboriginal peoples with oral traditions.

It is very likely that thrown weapons were used at some time by almost all classes of a society when they were caught in desperate war or self-defense situations, but there are very poor records of such use. The weapons themselves are the main primary source for thrown weapons research, but almost every source for how these weapons were used in period is secondary at best and usually is tertiary or completely lacking. Only a very few primary sources are available. Sorting out the details of weapon design and possible use many times requires the researcher to throw period-correct examples and then form personal conclusions – not a research method usually recognized by historical scholars!

Much of the best information available on the actual use of thrown weapons is very dated. Although this type of references may be considered undesirable by some researchers, such references can be excellent sources for thrown weapons. Many of these weapons are primitive and were used by illiterate peoples, so older references many times include brief field observations by traders, explorers and later by early cultural anthropologists and historians. These records many times give insight into how these weapons were used by peoples who still had their tribal traditions intact.

An example of a very useful older reference is Stone (1999). This reference is an excellent source for introductory information, and is considered by some to be the “bible” of primitive weapons research. However, this reference must be used with caution. Stone was a collector and apparently had no or only limited throwing experience with many of the weapons he describes. This is very understandable, given the encyclopedic nature of his work. His work is also dated - it was originally printed in 1934 - and newer research has shown that the work contains both minor and major errors. Additionally, there seems to be occasional interpretation errors as to how a particular weapon was used.

Other very dated sources are Egerton (1880) and Guppert, (1880), both of whom categorized early Indian weapons. These sources are very valuable, however, because during the modernization of India in the late 1800's and early 1900's many obsolete weapons that dated from period were destroyed. These older references are still some of the best information we have on some of these weapons as well as weapons types and techniques used by aboriginal Indian tribes.

One of the best sources of thrown weapons data are the weapons themselves. The study and use of historic and historically accurate reproductions of weapons currently found in modern collections can help researchers understand how they were used in period. With a tool or weapon, "use defines form" – weapons are tools that were designed for specific uses, so a weapon's physical shape can tell the researcher much about how it was intended to be used and suggests the best ways to use it. From the perspective of practical thrown weapon use in the SCA, probably the best way to understand the various, sometimes subtle, differences in period thrown weapon design and use is to make or purchase historically accurate examples and throw them!

2. WRITTEN AND VISUAL SOURCES

Written accounts by users of thrown weapon use in period are very rare. Many thrown weapons were used by primitive or illiterate people with oral histories only. Some general limitations in thrown weapon documentation include:

- The oral histories of many cultures are lost or were incompletely recorded.
- Written records by actual users in period are rare.
- Occasionally, thrown weapon use was recorded by contemporary or nearly contemporary historians or observers from other countries. These are some of the best records available.
- Thrown weapons and their use many times were recorded by clerics, artists, merchant or others with limited to no experience in warfare. Where thrown weapons are depicted in tomb or religious art, many times vital details are missing or are only sketched in. Many times the artists of these works may not have actually seen the weapon they were drawing, but were sketching from verbal descriptions given by others. All of these observations need careful scrutiny.
- The most significant users of thrown weapons in many cultures were people involved in espionage, assassinations and other covert operations, where the users didn't want their methods known. Typically, their methods were not recorded or were recorded in very late period or post period, when these techniques had become mostly obsolete.

European Historical Data

- Early period written observations by Greek, Roman and other historians and soldiers.
- Weapon descriptions and use by Roman auxiliaries and heavy cavalry.
- Early period histories by clerics, traveler and merchants.
- Archeological evidence and grave deposits, including the sacrificial deposits (bog burials) in northern Europe. In early period, many grave deposits are mostly of nobles and the wealthy, so they tend to be biased when used to define an entire society. This material also may be an incomplete record due to the burial environment, which many times will result in a selective preservation of grave materials.
- Visual records -- Paintings, cameos, statues, tomb art, tapestries, church art, grave markers, frescos and triumph monuments, various carvings, and memorial stones. These visual records may or may not have been drawn by artists with experience in warfare or of the actual arms used by the people being portrayed. These works also may have been done many years after the actual events took place. These visual records all need careful scrutiny.
- Forensic evidence from skeletal remains.

Indo-Persian, Chinese and Japanese Historical Data

- Asian and Mid-Eastern countries typically were not interested in writing detailed histories in period. Guppert, (1880, pp.1-2) succinctly states the problems:

“Our knowledge of the history of the ancient Hindus is very limited, and there is not much hope of our becoming better informed, as the most important factor for providing such knowledge, i.e., a historical literature or a sufficient number of authentic records is not existing in India, in fact seems never to have existed. The combined influences of climate, geographical position, political circumstances, education, religious belief, and habit have conspired to destroy any taste for historical researches, even if such had existed formerly.

- The basic histories of these cultures are known, but historical data detailing the types and uses of thrown or throw-able weapons is very scarce to non-existent. Types of weapons and their use in period for these countries are mainly inferred. For example, Egerton (1880) focuses primary on 17th to 19th century Indian weapons, but many of these weapons likely had roots in similar weapons in period. Many of the basic weapons in use by these cultures in the 17th to 19th are inferred to have also been used in period. Egerton also discusses the weapons of primitive

tribes. Fortunately, many of these primitive societies had fairly static cultures, so some extrapolation to period use and styles is reasonable.

- Paintings, government records, temple art, tomb art and other visual records can be excellent reference sources, but these materials need careful scrutiny.
- Pre-contact tools and weapons currently found in modern collections can help researchers understand how they were used in period.

Australian and Oceanian Historical Data

- These cultures had oral histories only; many of these traditions have been lost, but when recorded in the 17th and 18th centuries by European explorers and colonists, can be very good sources if used with caution.
- Eighteenth through twentieth century explorers and cultural anthropologists are the main source of written materials on the tools and weapons of these cultures. While they are excellent and sometimes the only sources of some cultures (e.g. some natives of New Guinea), these records are at best extrapolations of period culture and materials. Fortunately, many of these primitive societies had fairly static cultures, so some extrapolation to period use and styles is reasonable.
- Pre-contact tools and weapons currently found in modern collections can help researchers understand how they were used in period.

African Historical Data

- Many kingdoms and cultures rose and fell in Africa in early through post-period. Like most Asian countries, while the broad histories of these cultures are known, historical data detailing the types and uses of thrown or throw-able weapons in period are very scarce to non-existent.
- Archeological studies are just beginning to shed light on the sophistication of a number of African cultures. Much of Africa had an iron technology by at least by the beginning of the Common Era or slightly later. West-central African cultures (modern Nigeria, Congo and the surrounding countries), in particular, were using iron weapons almost throughout the study period of this report.
- African thrown weapon types and use in period are mostly inferred from the artifacts themselves and from very late period to essentially modern recorded observation by European explorers and merchants. Capwell (2009, p. 72) states: *"It is very difficult...to date particular African weapons precisely or to identify their place of origin positively."* Areas of North Africa and Nigeria had iron technology cultures by the 3rd century BCE (Capwell, 2009, p. 72) and African thrown weapons show a sophistication that implies a long design development.

These two factors suggest that many of these weapons had been developed and were being used at least by mid to late period and very possibly before.

- Visual records, like paintings, cameos, bronze plaques, statues, tomb art and rock art. These visual records may have been drawn by artists with limited or no experience in warfare or of the actual arms used by the people being portrayed. These works may have been done many years after the actual events took place. These visual records all need careful scrutiny.
- Pre-contact tools and weapons currently found in modern collections can help researchers understand how they were used in period.

3. ORAL AND CULTURAL SOURCES

Epic poem, sagas and cultural stories can be used for insights into the types and uses of period thrown weapons, but they must be used with caution.

Northern Europe

- Icelandic/Norse sagas – these events mostly occurred in 9th to 11th centuries but were not written down until the 13th to 14th centuries.
- Details of weapons and their use are many times lacking.
- These poems and stories are fairly good sources if used with caution.
 - These poems and stories are not history but were meant to entertain; some “poetic license” is to be expected. This is countered by:
 - The original tales were told to people who knew the historical events and locations that formed the basis of the story. Significant errors are probably unlikely, as the tales were told to people who knew what the weapons and tactics of the day were like.

India

- Sagas – Primarily the Mahabharata and Ramayana, and epic/religious poems and stories. Guppert, (1880, p.2) succinctly identifies the problems with relying on these epic poems:

The two great epics (the Mahabharata and Ramayana) and the puranas are the works which mainly represent the historical branch of Indian literature. But woe betide him who would look up to them as authentic and trustworthy sources. However important and interesting in many other respects, historical accuracy is not a quality they aim at; for they are rather a depository of legendary myths,

which are enlarged by an imagination morbidly fond of wonders. Nevertheless they must not be quite thrown away as useless, for they may contain here and there some grains of historical truth, as a rock may contain some dispersed grains of gold, though they can with difficulty only be separated from their less precious surroundings.

- Cultural Preservation – As part of their religious and cultural tradition, some people have preserved portions of their culture for extended periods. Examples are some Australian aborigines and the Akali-Nihang sect of the Sikhs. This particular Sikh sect has preserved its thrown weapons traditions since the 1500's as a part of its religious heritage. (Discovery Channel, 2008).

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