The Asymmetrical Japanese Longbow

The Japanese Longbow

(Yumi)

A short paper explaining its asymmetry

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Scope

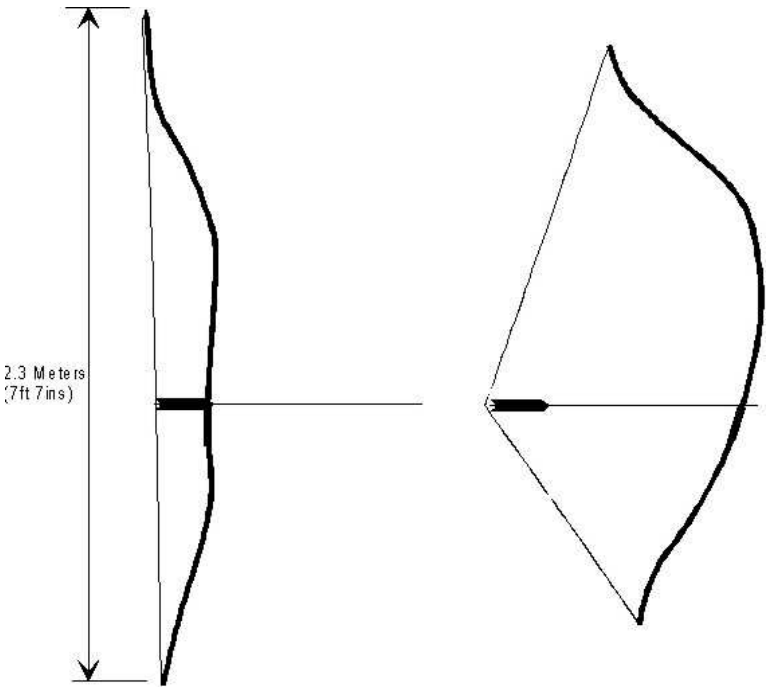
There are several different stories in current circulation that try to explain the asymmetry of the Japanese Longbow. It is the intention of this short paper to show that these stories actually offer incomplete or invalid explanations.

This paper will be more than a negative critique of current notions of why the Japanese Longbow is asymmetrical. It will present an argument that shows that the longbow has to be asymmetrical for optimum performance.

Introduction

The Japanese Longbow represents an amazing development of what has been a very common form of weaponry throughout the world. At some time or other most developing cultures have used bows and arrows for hunting and war.

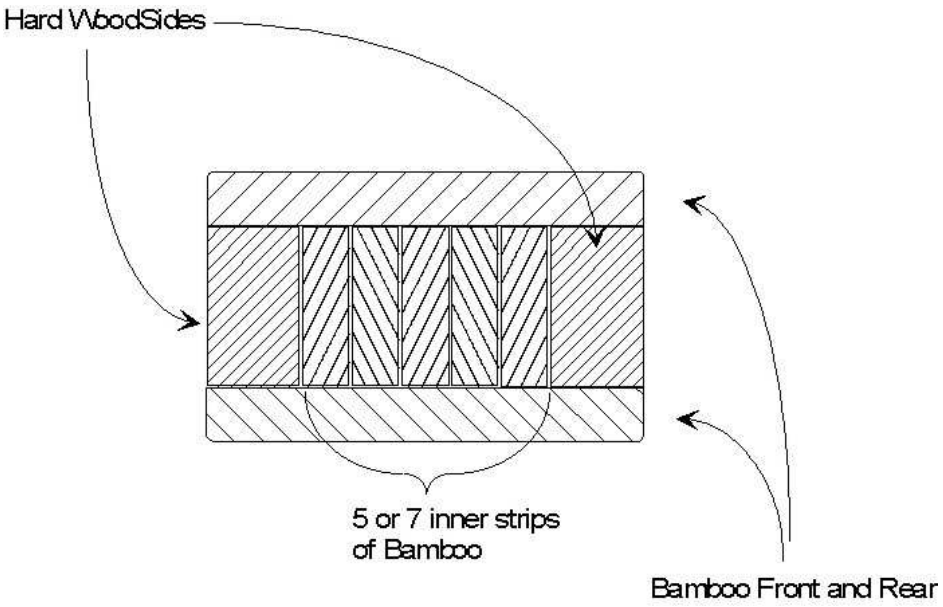
Bows from these cultures have always been symmetrical in construction except for the medieval Japanese longbow. Diagram 1 illustrates the shape of the Japanese Longbow in its un-drawn and drawn states.



This clearly shows the "knocking point" to be approximate 1/3 of the way up from the bottom limb and not in the center, as is the case with all other developments of the bow.

This illustration also shows that the bow is "recurve" in design, i.e. the ends of the bow curve away from the archer.

Another feature worthy of note is that for a bow, unchanged since its medieval development, it utilises a very sophisticated compound construction. Diagram 2 is of a cross section through a limb of a typical bow and shows how no fewer than 9 pieces are used in its construction



Current Explanations

Three stories will be recounted here to serve as examples of current explanations. More detailed research would undoubtedly reveal more, but it is not the intention of this paper to present a definitive work on this aspect.

The Horses Neck

This story claims that:

Many of the samurai archers were also horsemen, therefore, it was important the bow had a short bottom limb to allow the archer to maneuver his bow to the left and right of the horse so that his direction of fire was not restricted. If the bow had a long bottom limb it could be fouled by the horses neck.

This as with other stories is a good explanation of why the bow has a short bottom limb but does not address why the bow has a long top limb. Indeed, the style of bow in use in the middle east, at a similar time, was very effective in the hands of their horseback archers and it had a bottom limb of a similar proportion to the Japanese long bow, but, had a matching top limb.

The Hunters

This story claims that:

In many cases the Japanese style of hunting involved lying in wait. The hunters did not chase their prey. As they lay in wait, the hunters would often sit concealed by trees and bushes. In this position a bow with a short bottom limb allowed them to shoot while sat or kneeling. Very good for not revealing their presence.

Again, a good explanation for the need of a short bottom limb but no explanation for the long top limb. In fact this story overlooks the problems that a long top limb would present to the hunter attempting to conceal himself behind and under trees. Surely under these circumstances the long top limb would be more likely to become fouled on overhanging branches.

Bamboo

This story claims that:

Bamboo grows like most plants such that it is stronger at the bottom than it is at the top. This forced the bowyers to make the bows asymmetrical to compensate.

This is plainly wrong! Anyone with a little knowledge of archery should know that a bowyer is quite able to adjust the strength of limbs ("tillering") so that if one limb is too strong relative to the other, then some timber is shaved off to weaken it until its strength balances the other limb. This is certainly how the Norman Bowyers made bows for their archers.

In fact, due to the advanced composite construction of the Japanese longbow, it is quite likely that the Japanese bowyers could control the manufacturing process so that tillering was not required, except possibly for the finest of adjustment.

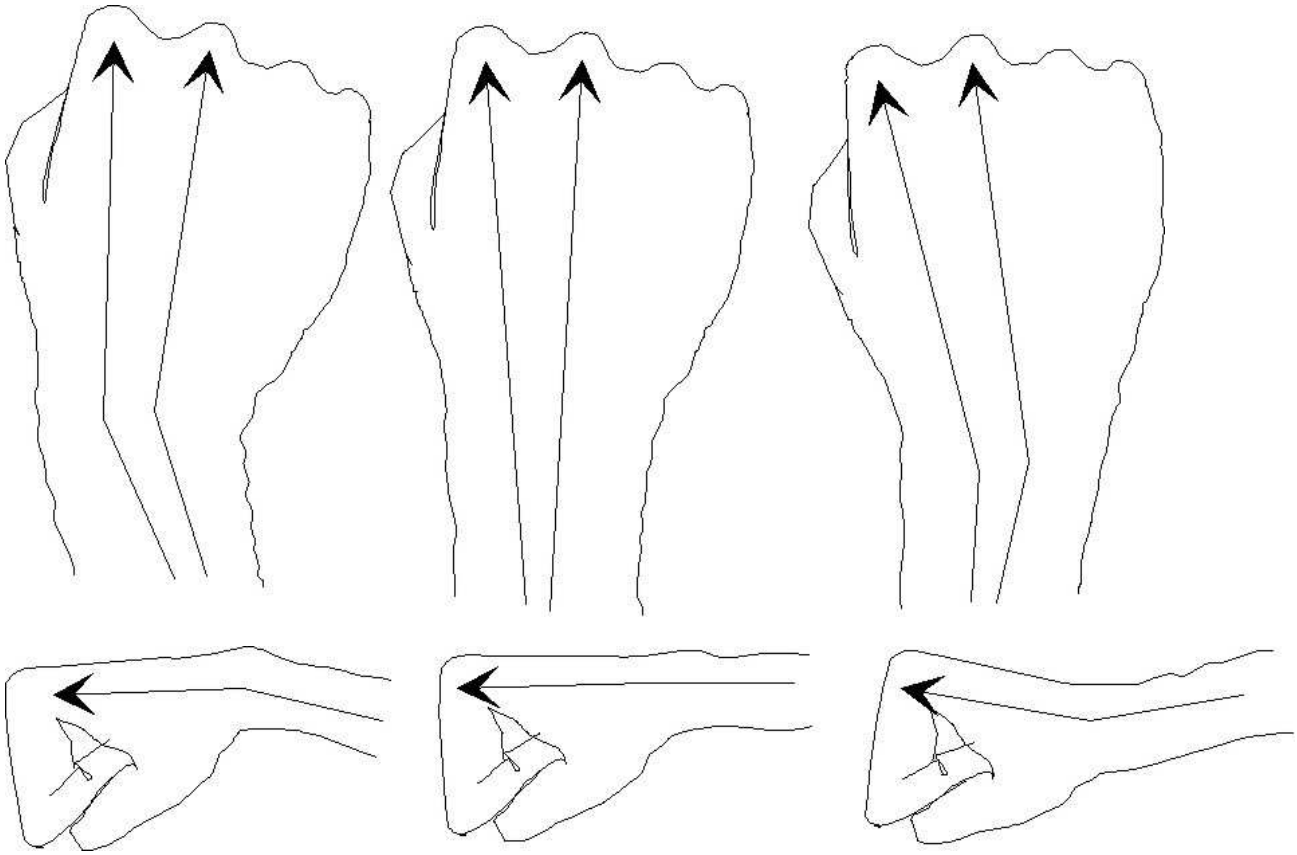
The Strong Wrist Argument

The following discussion sets out to show that at some point in Japanese history it was realised that to be able to hold the bow in a strong positive manner the bow had to be asymmetrical.

The argument stems from a comparison of the "mechanics" of two other completely different Japanese martial arts, namely, Karate and Iaido.

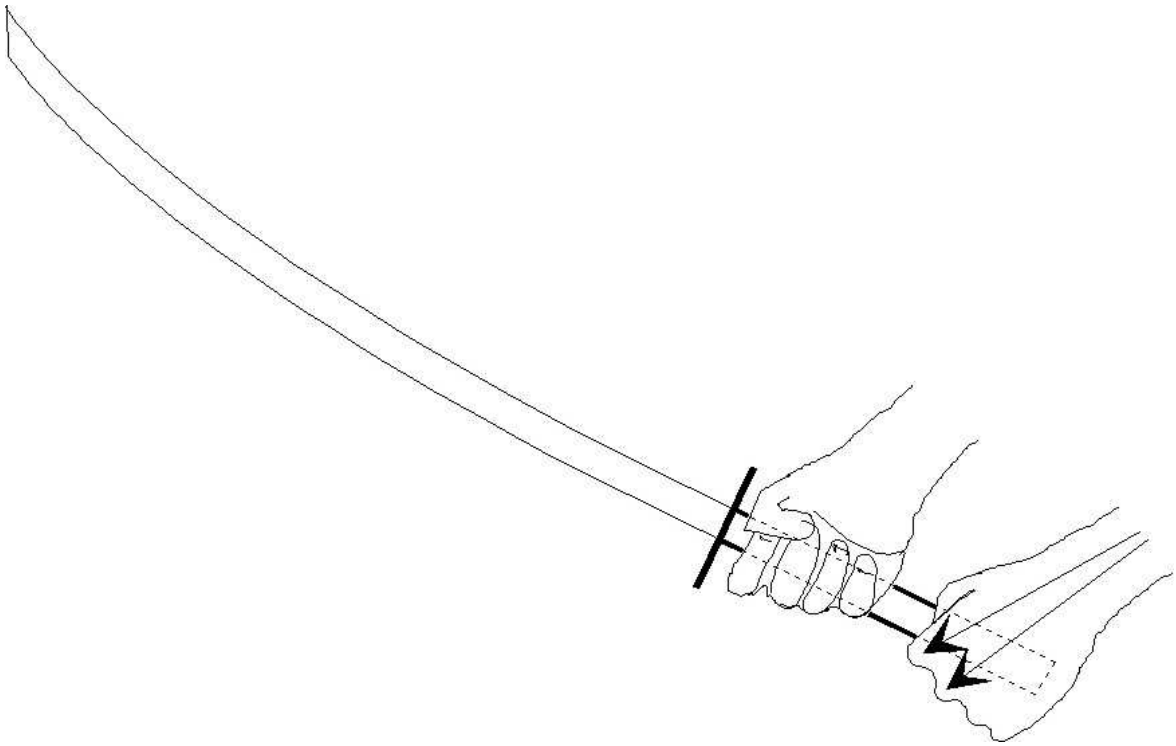
In both of these martial arts there is a lot of emphasis on the position of the wrist for strength. Diagram 3 below illustrates the difference between weak fists and the strong fist that is used in Karate.

Diag. 3 - The Karate Fist



The same wrist position is required for a strong cut when using a katana, as illustrated in diagram 4.

Diag. 4 - The Katana Grip

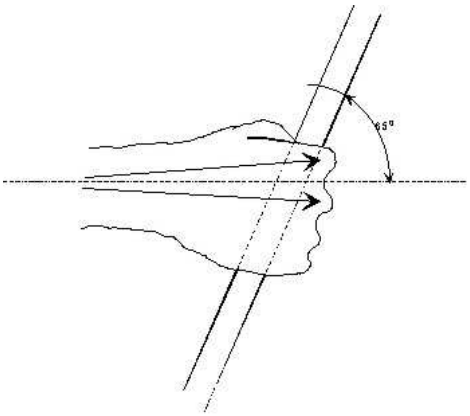


Acknowledging the importance of the relationship between the hand and the wrist for a strong grip, a grip able to "project" energy and power, leads to the question,

"What is the relationship between the position of the hand with respect to the wrist and the position of an item held in the hand with respect to the wrist?"

Diagram 4 attempts to illustrate this.

Diag. 4 - A Strong Grip



This shows that the gripped item has a very natural forward inclination of approximately 25cents # or a 65cents# inclination from the horizontal. From this it can be surmised that for an archer to have the strongest possible grip, the bow needs to pass through his hands at this 65cents#.angle It may be noted that the shape of the hand in diagram 4 almost represents "tenouchi"!, the way in which a Kyudoka (archer) grips his Yumi (bow).

#These numbers are meant to be illustrative not definitive

By way of contrast, diagram 5 below, shows the shape of grip required to hold an item vertically as is the case for a symmetrical bow like a Norman Long bow.

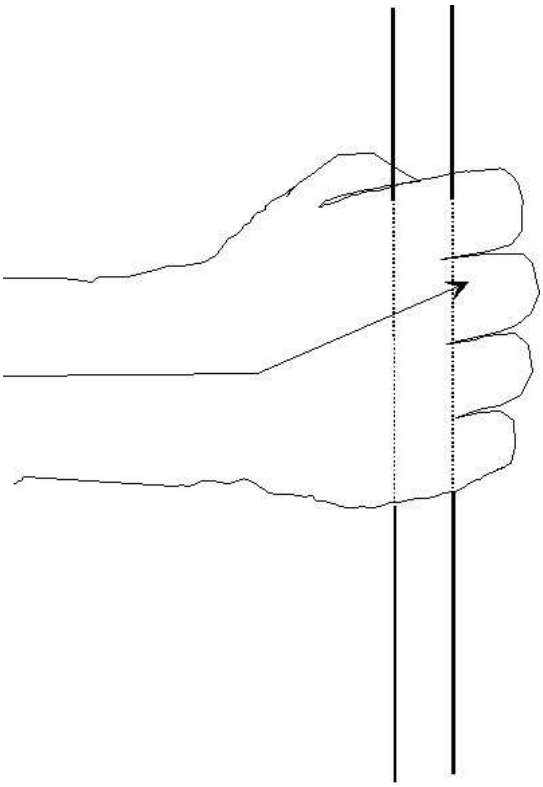
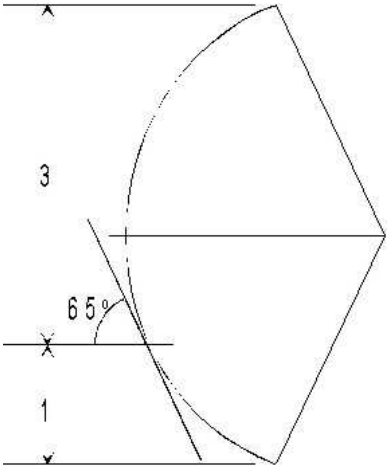
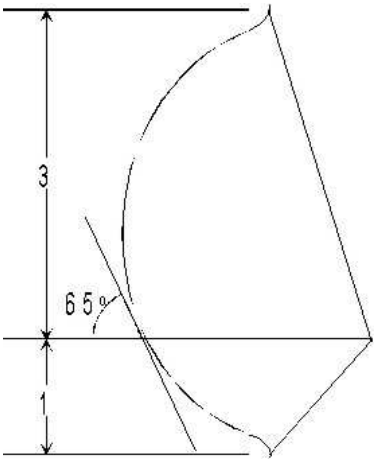


Diagram 6 shows what a symmetrical longbow, typical of Norman archers, looks like at full draw. This diagram shows that at a point approximately 1/4# of the way up from the bottom, the bow has a forward inclination of approximately 25cents # or a 65cents # inclination from the horizontal

Diag. 6 - A symmetrical bow at full draw

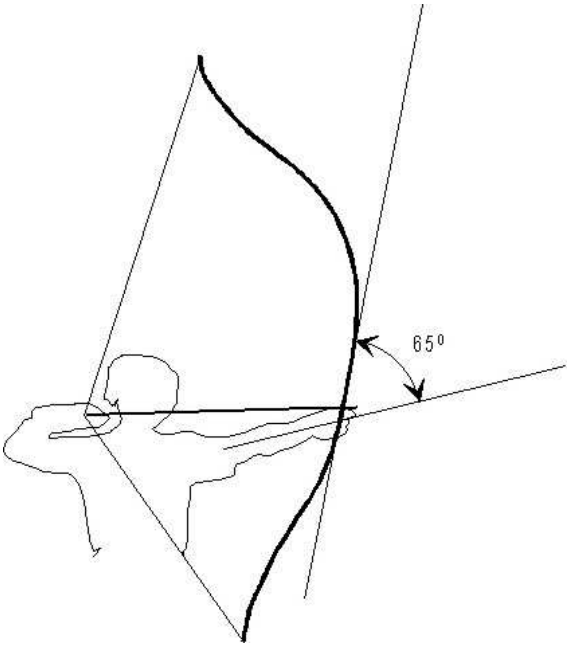


Looking at diagram 6 it is not a great leap of the imagination to arrive at an image as shown in diagram 7.



Not quite a Yumi, but, with a little adjustment of the proportions, sufficient tillering of the limbs and an image as per Diagram 8 can be reached. This is of a Yumi at full draw and shows the angle between the arm and the part of the bow passing through the hand is indeed approximately 65^{cents}.

Diag. 8 - The Yumi at full draw showing the 65^{cents} relationship between the arm and the bow.



It will never be known if the shift from a symmetrical construction to the present day asymmetrical construction occurred in one major intuitive leap or occurred over a period of time from a series of "fortunate accidents" or incremental discoveries. Either way, the conclusion of this paper is that the asymmetry in the Yumi is there purely to allow the archer to adopt a very strong grip while shooting.

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