Sunday, June 5, 2016

A Functional Scaled Down Warp-Weighted Loom

Introduction

Warp weighted looms were used throughout history beginning with the Greeks and continuing into modern times, but they are most associated with Scandinavians during the Viking Age, including Norway, Iceland, and Greenland and Vinland. History recreationists interested in Viking Age textiles are faced with with the difficult challenge of building a loom, and then learning how to weave on that loom where teaching situations consist of one day on a weekend while warping a loom takes several days even before you begin weaving. To get around the time limitations, we built this functional scaled down warp weighted loom in the hopes that we can build a loom in only several hours, warp the loom in another several hours, and begin weaving so that the total time commitment will fit into a long camping weekend. To my knowledge this mini loom has no archeological counterpart.

We begin with a full size loom shown in the Figure 1. This loom is set up as an Icelandic loom with the heddles supported by vertical posts, meiðmar in Icelandic, rather than horizontal heddle supports found in Norway. The weaving piece in the picture is rya on 2/2 twill so it uses 3 heddles. Warping twill typically takes 3 to 5 days. For our practice piece we will weave a simpler piece of tabby which uses one heddle. Note that vertical posts replace the separate heddle supports found on Norwegian and Sami warp-weighted looms. The Icelandic style is simpler to build and in our experience provides better separation of the sheds. Also, it can be adapted to the weaving of twill simply by adding more heddle rods with no changes to the loom itself.

Figure 1. A Warp-Weighted loom configured like those of Iceland for rya on 2/2 twill. This loom is portable, and fashioned after those used in classes at the Vesterheim museum.

The Mini Loom

The dimensions of the large loom cannot simply be scaled down because the space between the sheds would then be too small for the weaver's hands or the shuttle. The width of the beam determines the maximum width that can be woven. Most large looms allow for 1 to 2 meter widths but the scaled down version will weave 8 to 10 inches which is sufficient for a small piece such as a "Jorvik cap" or a pouch. The length on any warp-weighted loom is limited only by the amount of cloth that can be rolled on the beam and the length of extra warp tied to

the weights. Therefor the height of the loom is somewhat arbitrary, and can be made for comfort of the weaver. Our small loom is about 2 feet long so the weaver can work seated rather than standing at the large loom. The angle of the loom determines the separation of the natural shed (when the heddle rod is released), and ours was set by experimentation on an adjustable version. The separation of the shed with the heddles is determined by the length and placement of the vertical heddle support, also determined by experimentation on our first model.

The scaled down warp weighted loom we will build is shown in the next figure. This has one heddle allowing us to weave tabby.

Figure 2. The completed mini WW loom.

Loom Fabrication

The loom consists to 2 uprights, 2 back supports, 2 bases, one cross piece that also is the shed rod, one heddle, and one circular warp beam. These pieces are made out of 1" thick (3/4" actual) pieces of 2 ½" wide, 1 ½" wide, and ¾" wide wood.

The list of raw materials, that is 'What do I need to buy?':

- 1x2 ½" 6' long
- 1x1 ½" 8' long
- 1x3/4" 3'long
- 6 10-24 2 ½" long bolts
- 2 10-24 3" long bolts
- 8 wing nuts
- 1 ¼" diameter dowel 16" long
- 3/8" dowel 5" long
- ¼" dowel 5" long
- 16 3 oz lead fishing weights
- 1 piece of suede leather 8"x10"

The list of materials, that is the raw material fabricated into parts, is:

- 2 uprights
- 2 back supports
- 2 bases
- 1 cross piece that also functions as the shed rod
- 1 heddle
- 1 warp beam
- 6 2 ½" 10-24 bolts and 6 wing nuts
- 2 3" 10-24 bolts and 2 wing nuts
- one 3/8" diameter 9" long dowel
- one ¼" diameter 5" long dowel
- two ¾" thick spacers
- one 12" wide piece of suede leather

A 3D picture of the assembled loom is shown in the Figure 3. Generally, loom uprights are straight with Y shaped branches forming the heddle supports; however, to simplify the design of this mini loom the upright has a recessed region the functions as a heddle support. Also, this allows easier access to the weaving area. Usually looms have a beam crotch to support the warp beam. This loom does not have a beam crotch but uses the back support to form the beam crotch, thus simplifying the design and minimizing parts and construction.

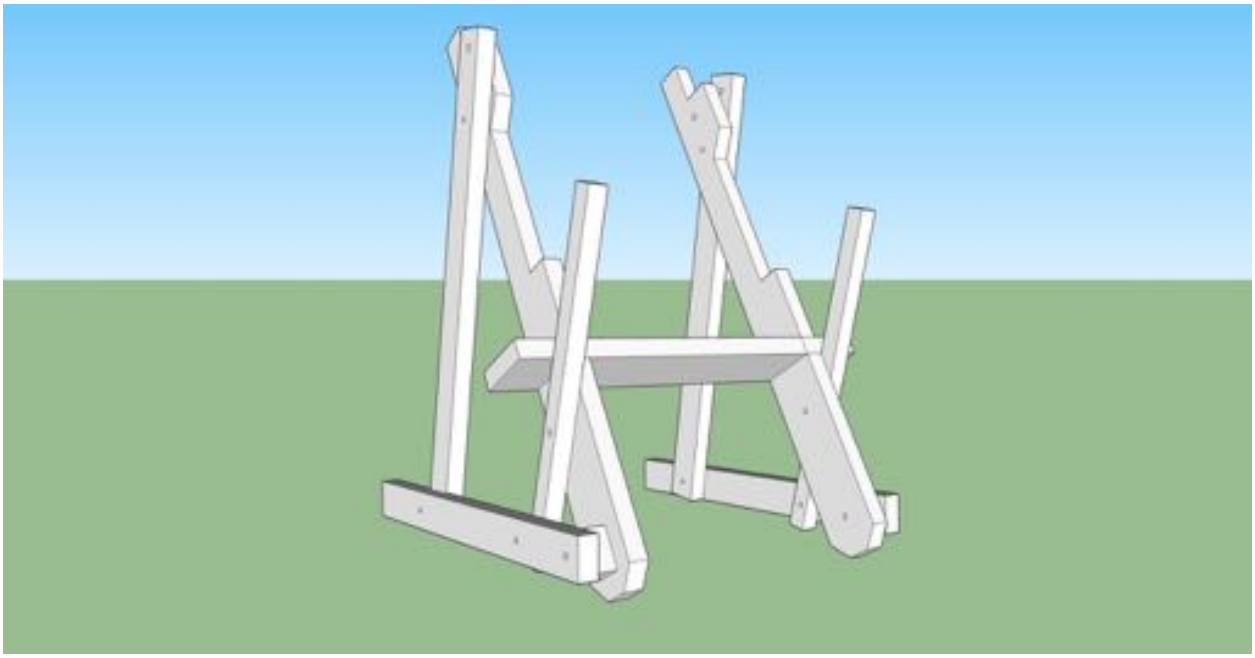

Figure 3. A 3D schematic of the mini loom.

Steps to fabricate mini loom:

1. Make upright.
    a. Cut the upright from the 2 ½" wide board, Cut to 24"
    b. Saw 2 slots for the cross piece. Take a chisel and knock out slot.
    c. Saw slots in recessed area about ¾" apart. Saw 45 degree slot at end. Take a chisel and knock out recess. Take a knife and smooth recess.
    d. Drill 13/64" diameter hole at bottom of the upright. Do not drill the other two holes at this point.
2. Make back support.
    a. Cut the back support from the 1 ½" wide board, Cut to 20"
    b. Drill 13/64" diameter hole at bottom of the upright. Do not drill the other hole at this point.
3. Make the base
    a. Cut the base from the 1 ½" board, Cut to 16"
    b. Drill the three 13/64" diameter holes.
4. Make the Cross Piece
    a. Cut the Cross Piece from the 2 ½" wide board, Cut to 16"
    b. Saw 4 cuts to outline the two ¾" slots. Use a chisel to knock out the slots.
5. Make the spacers.
    a. Cut from ¾" board.
    b. Drill 13/64" diameter hole.
6. Make the vertical heddle support rod.
    a. Cut to 13" from the ¾" board
    b. Drill 13/64" diameter hole at bottom of the upright.
7. Make the warp beam.

a. Cut to 16”
b. Drill 3/8” hole 1 ½” from end.
c. Sew the suede leather to the warp beam leaving a ½” tab.

8. Assemble.
    a. Position the back support to form the crotch, and drill 13/64” hole for the bolts.
    b. Position vertical support rod so it is touching the bottom of the cross piece, and drill the 13/64” diameter hole for the bolts.

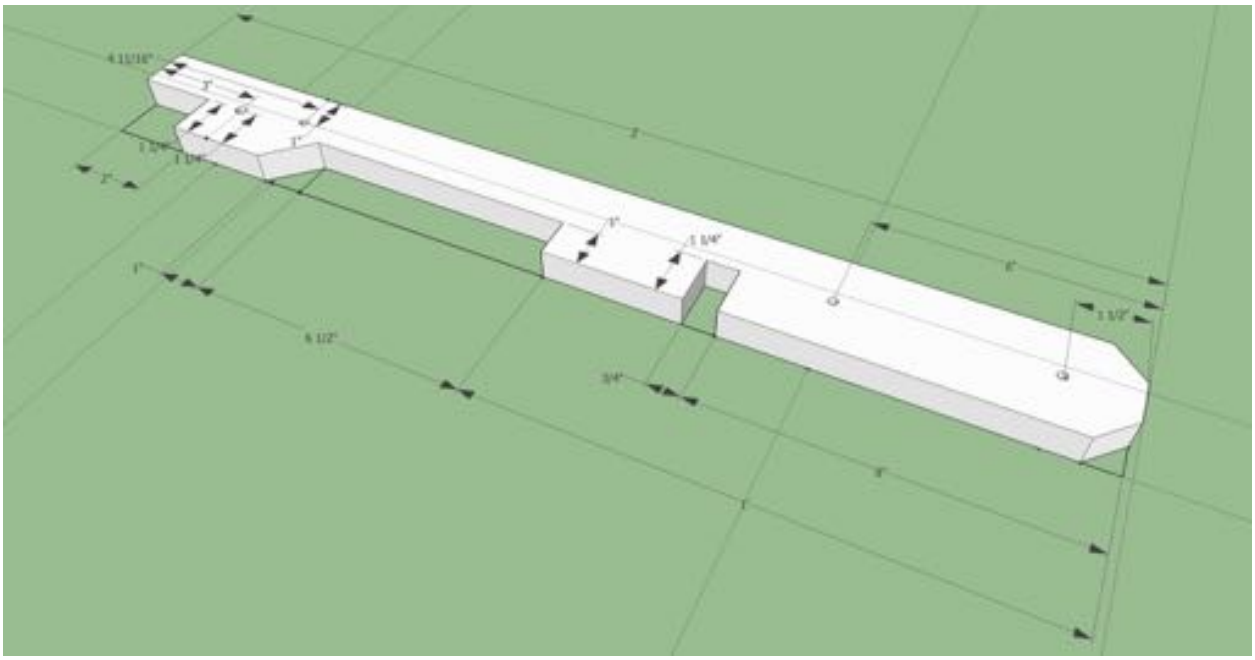

Figure 4. The mini loom upright.

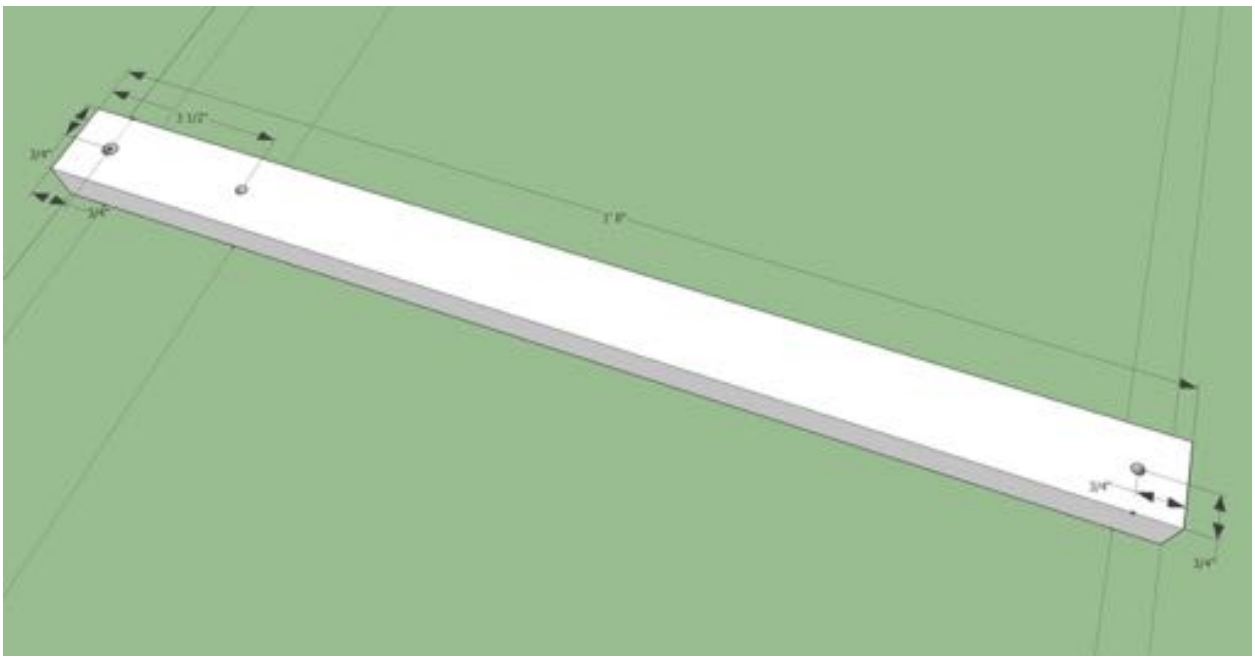

Figure 5. The back support.

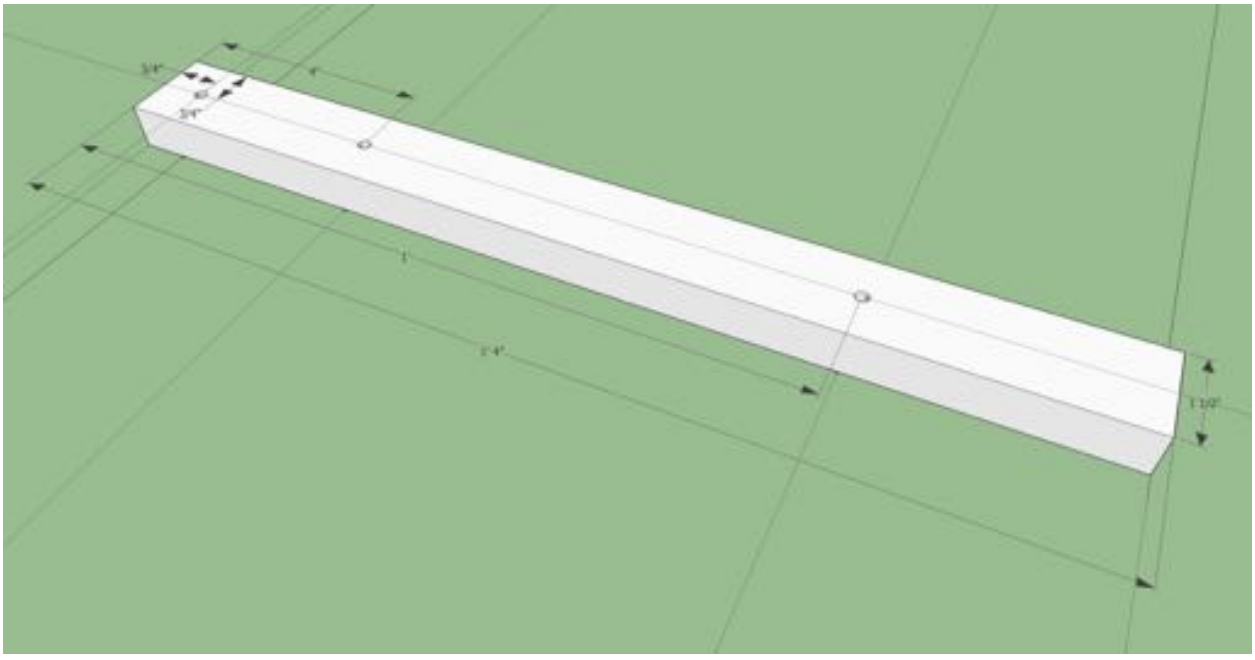

Figure 6. The base.

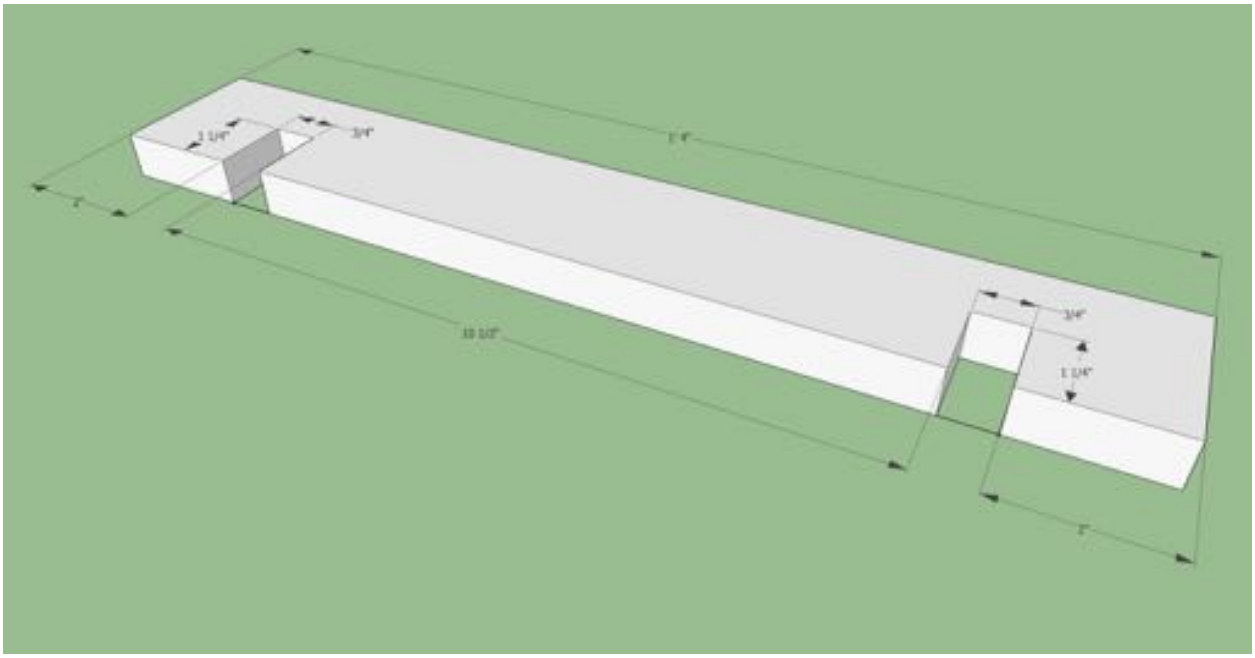

Figure 7. The cross piece and shed rod.

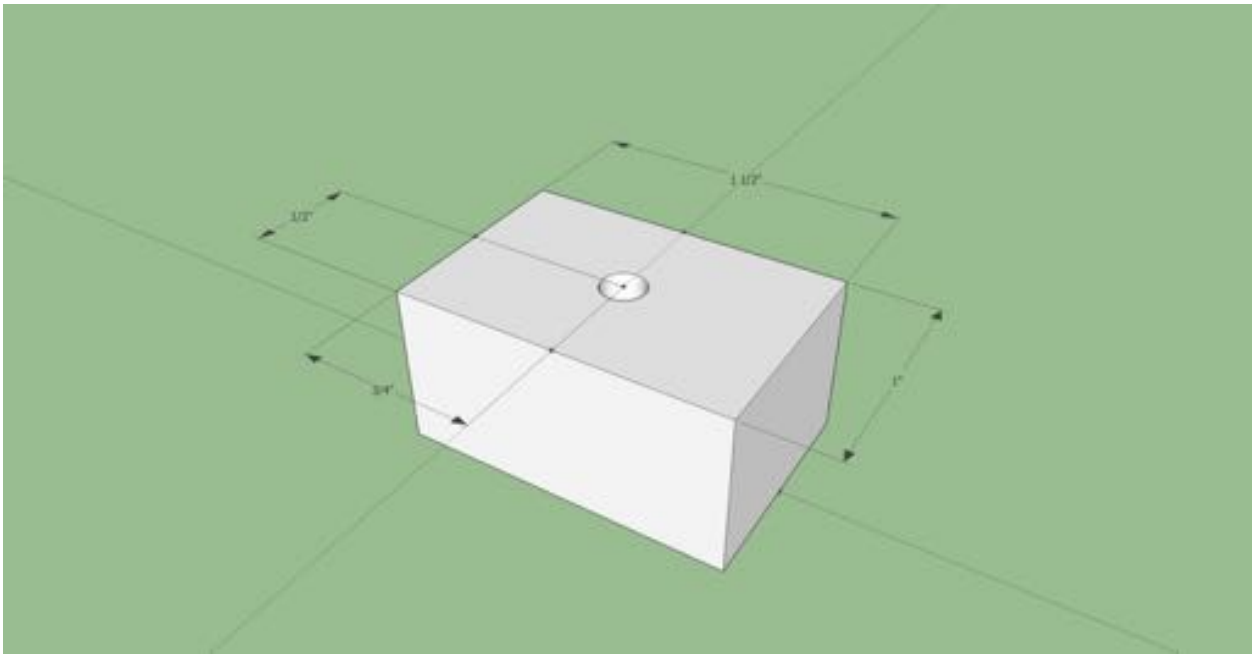

Figure 8. A spacer between the upright and base.

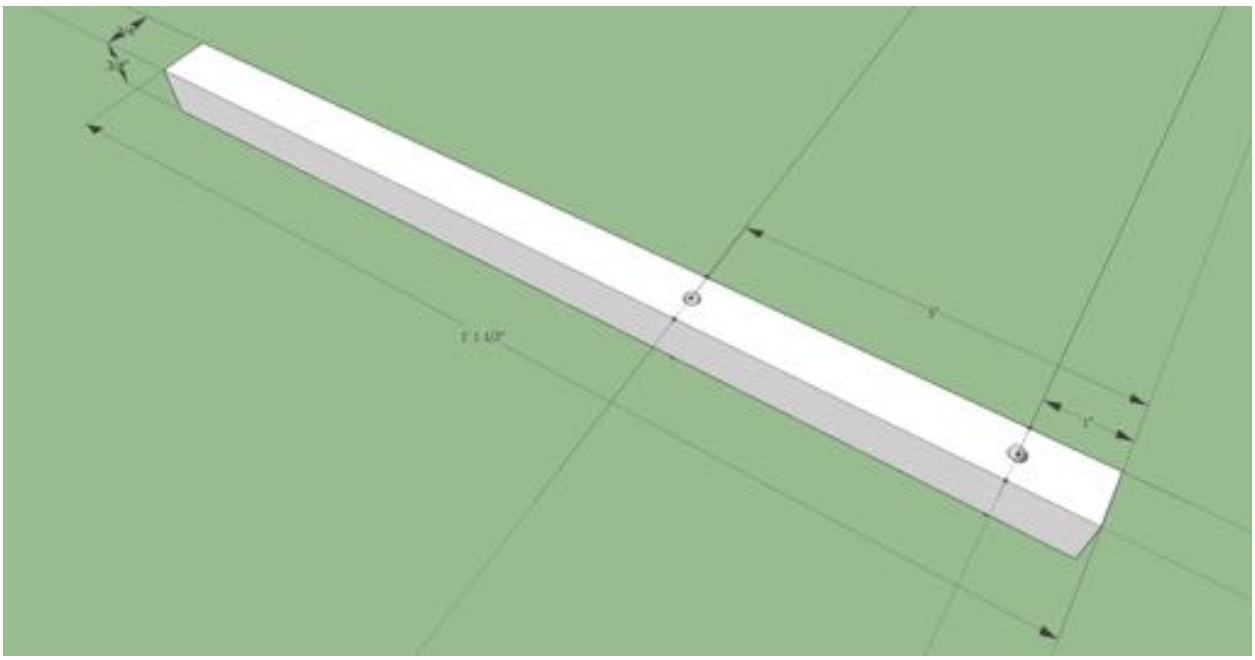

Figure 9. The vertical heddle support rod.

These pieces are cut to length with a hand saw. Slots are made with saw cuts into the body of the board and a chisel removes the wood in the slot. The recessed region on the upright is made with multiple saw cuts and removed with a chisel, then smoothed with a knife.

The loom is assembled with six 2 ½" long 10-24 bolts and two 3" long 10-24 bolts and 8 wing nuts.

The beam or warp beam is 1 ¼" diameter dowel 16" long allowing a working area of 12". There is one large hole 3/8" in diameter at one end which allows you to roll the beam wrapping the weaving around the beam as you weave down. A 3/8" dowel is inserted into that hole. An additional ¼" diameter 5" long dowel inserted into the back support is used as a stop so the beam does not unroll.

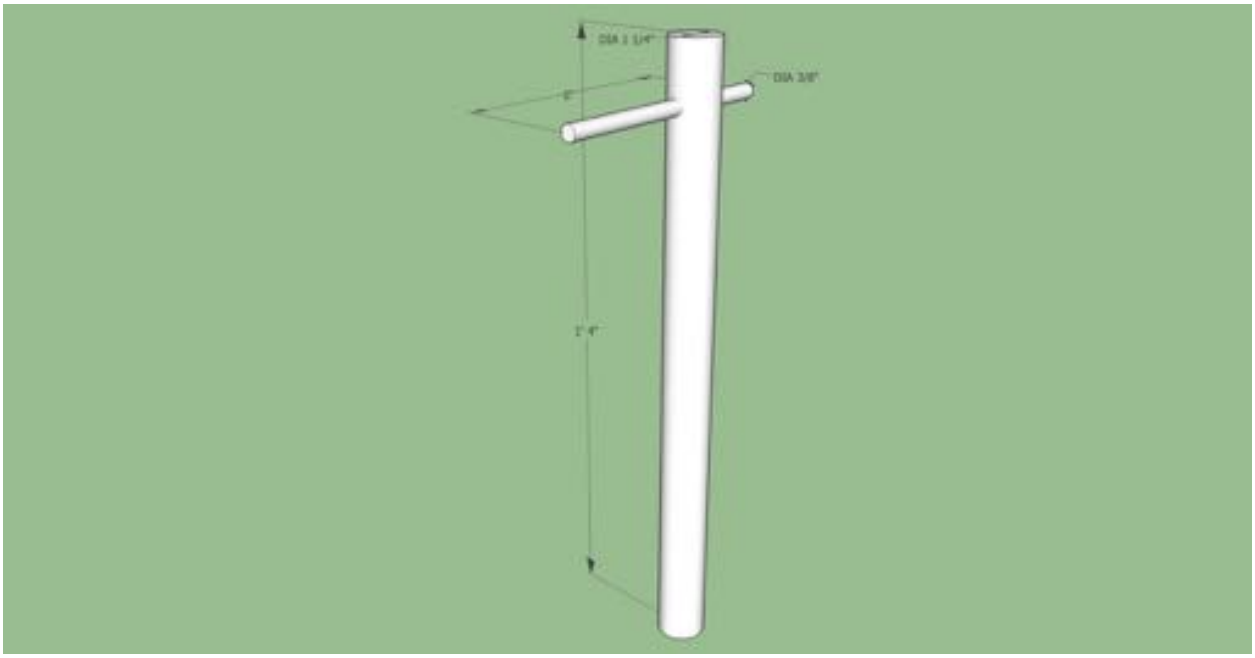

Figure 10. Warp beam with roller rod.

The tablet weaving warp starter strip is attached to the warp beam. My favorite configuration is a tear shaped beam with hole drilled in the point. For this mini loom we sewed a piece of suede leather to the warp beam leaving a tab of leather hanging from the beam. Holes are punched in the tab, and the tablet weaving and warp is sewn onto the tab.

The heddle consists of a 5/8” in diameter 16” long dowel. The heddle strings are tied to the heddle and then loop around the warp threads.

The finished loom is shown in the next picture.

Figure 11. The finished loom with warp and weaving installed.

Summary

This mini loom is a functional scaled down warp-weighted loom. It has no corollary with archeological items. Rather it is a teaching aid used to reduce the time and expense in making a warp-weighted loom and learning how to weave on it. Hopefully, in the period of two days people will make a loom, tablet weave the warp starter strip, and begin weaving a project on the loom. With experienced gained on this scaled down loom, the next step is making a full size warp weighted loom to hold larger projects.

References:

Marta Hoffmann, “The Warp-Weighted Loom,” ISBN 82-00-08094-3, Hestholms Boktrykkeri A.s, Oslo, Norway 1974.

Anna Østerbø Kåstad, “Oppstadveven,” Osterøy Museum 2000.