

A Reproduction of the Smaller Tent from the Viking Age Ship Burial at Oseberg

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The Oseberg ship is a rich 9th century Viking age ship burial found at Oseberg in Vestfold, Norway, at the beginning of the 20th century. The burial probably took place around the year 850, and the contents of the grave date from the first half of the 9th century.

The ship and her contents were well preserved by the clay subsoil which provided near hermetic conditions. Thus, an extraordinary range of artifacts illustrating Viking age material culture was preserved. Included in the ship's contents were the wooden framework for two tents, one larger, one slightly smaller.



The Oseberg ship



Oseberg tent reproduction

We recently made a reproduction of the smaller tent. This document details our reproduction Viking tent in enough depth to allow others to duplicate the project.

We begin by describing the original find from Oseberg, and some of the confusion that exists about the tents. Next, we discuss some of the choices and compromises made in designing our reproduction. Finally, we list the materials and assembly processes used. Dimensions of the components are tabulated and shown in figures. Unless otherwise stated, all dimensions are in centimeters.

The Original Find. The tent is detailed in the three volumes of the original archaeologists' report¹. A later overview of the Oseberg and Gokstad ship finds² includes a nice summary of the tent frames from both ship burials.

¹ Brøgger, A. W., et al. *Osebergfundet*, 3 vols. Kristiana [Oslo], Universitetets Oldsaksamling, 1917-1927.

The Oseberg wooden tent frames do not survive today; they have decomposed since having been excavated³. As a result, the only information available about the tents comes from the original archaeological reports.

Nine wooden pieces made up the tent frame:

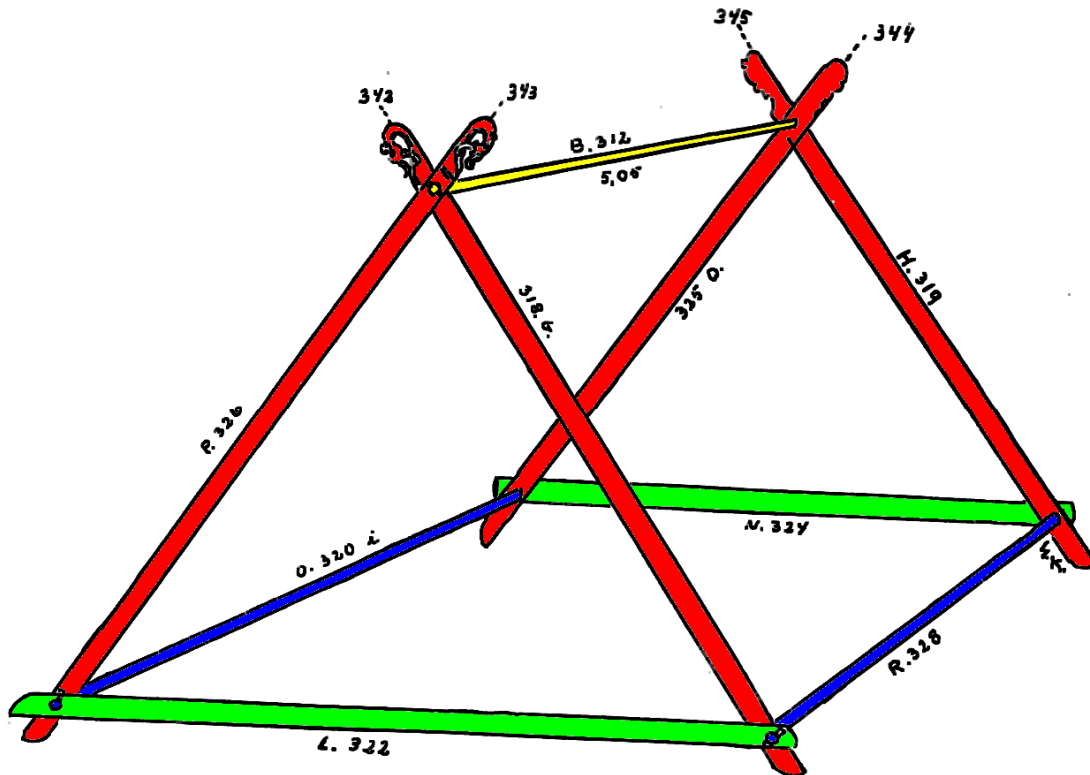
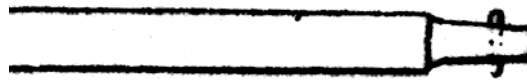


Fig. 162. Skisse av det lille telt med angivelse av de enkelte deles nummer.

The tent frame of the smaller Oseberg tent, taken from the archaeological report⁴

Each end of the tent was made up of two shear legs (red) and a transom (green) forming a gable end in the form of a triangle. The top of each shear leg was decorated with an elaborately carved and painted animal head. A ridge pole (yellow) ran between the two gables at the top, and two side ground poles (blue) at the bottom.



a pole from the Oseberg tent showing the tenon and peg⁵

² Brøgger, A. W. and Haakon Shetelig, *The Viking Ships: Their Ancestry and Evolution*, Katherine John, tr. Oslo: Dreyer, 1951.

³ Vegard Vike, personal communication, 8-August-2006.

⁴ Brøgger, A. W., et al. *Osebergfundet*, 3 vols. Kristiana [Oslo], Universitetets Oldsaksamling, 1917-1927. vol.2 fig.162

At both ends of each pole, the diameter reduced to form a tenon, as shown above. The tenon passed through holes in the shear legs and transoms and locked in place with a wooden peg or key, forming a solid, stable frame for the tent.

The two tents in the Oseberg find were quite similar in size, and there is some evidence to suggest that the two tents were conflated in the original archaeological study, with parts from the larger tent combined with parts from the smaller tent⁶. In addition, it's possible that some of these wooden parts may have been misinterpreted and may not have been a part of the tent frame at all.

The current belief is that the following pieces made up the tent frame for the smaller tent:

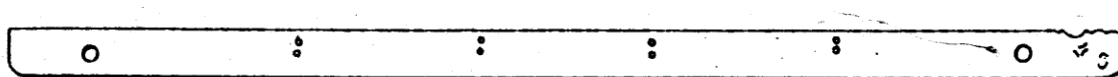
326	shear leg	ash	410cm long, approx 19cm wide, approx 4cm thick hole for ridge pole about 40cm below upper part of animal head hole for side ground pole about 20cm above lower end	animal head carving at top
318	shear leg	ash	410cm long, approx 18cm wide, approx 4cm thick no comments about hole placements	animal head carving at top
322	transom	ash	450cm long, 11cm wide, 4cm thick no comments about hole placements	corners are straight
325	shear leg	ash	410cm long, approx 18cm wide, approx 4cm thick hole for ridge pole about 36cm below upper part of animal head hole for side ground pole about 20cm above lower end	animal head carving at top
319	shear leg	ash	410cm long, approx 18cm wide, approx 4cm thick hole for ridge pole about 34cm below upper part of animal head hole for side ground pole about 27cm above lower end	animal head carving at top

⁵ Brøgger, A. W., et al. *Osebergfundet*, 3 vols. Kristiana [Oslo], Universitetets Oldsaksamling, 1917-1927. vol.1 fig.124

⁶ Vegard Vike, personal communication, 8-August-2006

322	transom	ash	450cm long, 13cm wide, 4cm thick no comments about hole placements	on one end, a small piece of the corner has been cut off. on the other end, the same corner is slightly rounded
320	side ground pole	ash	570cm long, round, about 8.3cm diameter tenons each 20cm long with 6.0-6.3cm diameter holes for wooden locking pins in each tap-end are 11cm from the end	
328	side ground pole	ash	560cm long, round, about 8.3cm diameter tenons each 14cm long with 6.0-6.3cm diameter no comment about placement of holes for wooden locking pins	
312	ridge pole	ash	505cm long, diameter 6.4cm in the middle and 6.1cm near the ends tenons are 15cm long with a diameter of 5.3cm no comments about placement of holes for wooden locking pins	Shetelig hypothesized that this pole originally had a greater diameter before being buried

Some of the beams and poles had pairs or triplets of small holes uniformly spaced along their lengths, possibly for securing the fabric covering to the wooden frame.

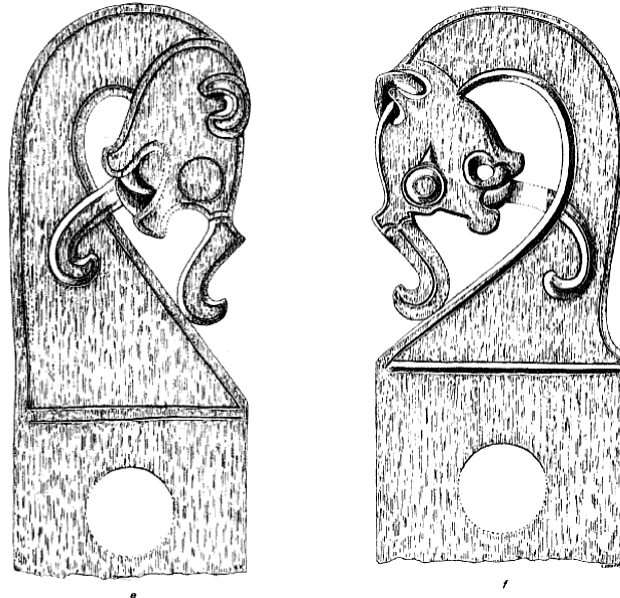


shear leg 318 from the Oseberg tent showing small pairs of holes⁷

A single wooden locking peg survived. It was 11cm long, but was found broken at one end.

The shear poles all had stylized animal heads cut and carved into one end. The animal heads on each pair were similar, but the two pairs differed significantly from one another.

⁷ Brøgger, A. W., et al. *Osebergfundet*, 3 vols. Kristiana [Oslo], Universitetets Oldsaksamling, 1917-1927. vol.1 fig.124



animal head carvings from the Oseberg tent⁸

One head from each pair is shown above. The heads were painted. While the original archaeological report describes the painting, there are no illustrations or photographs.

The head on shear leg 326 was painted bright yellow and decorated with black lines. The eye had an inner ring in black. The upper part of the neck had a line of triangles with a spiral finishing the upper tip of each triangle. The lower part of the neck had a double line of squares.⁹

The painting was destroyed when the wood was treated to preserve it.¹⁰

While fabric survives from the Oseberg grave, none has been identified as having been the covering for the tent.

Our Reconstruction – Practical Considerations. All the wood used to make the reproduction beams was taken from a single ash tree. The size of the tree limited the size of our beams. As a result, our reproduction beams are all 90% the length of the original smaller Oseberg tent beams.

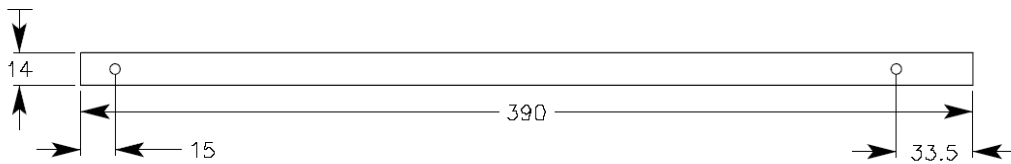
The length of our reproduction tent was limited by the available fabric. Three widths of 150cm linen fabric were sewn together to form the tent cover. The ground and ridge poles were cut to match the length of the assembled linen cover.

⁸ Brøgger, A. W., et al. *Osebergfundet*, 3 vols. Kristiana [Oslo], Universitetets Oldsaksamling, 1917-1927. vol.2 plate 19.

⁹ Private communication, Endre Rodstad, 9-August-2006.

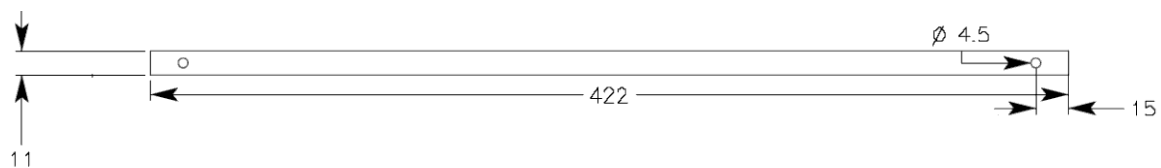
¹⁰ Brøgger, A. W., et al. *Osebergfundet*, 3 vols. Kristiana [Oslo], Universitetets Oldsaksamling, 1917-1927. vol.3 p.403.

Our Reconstruction - Details.



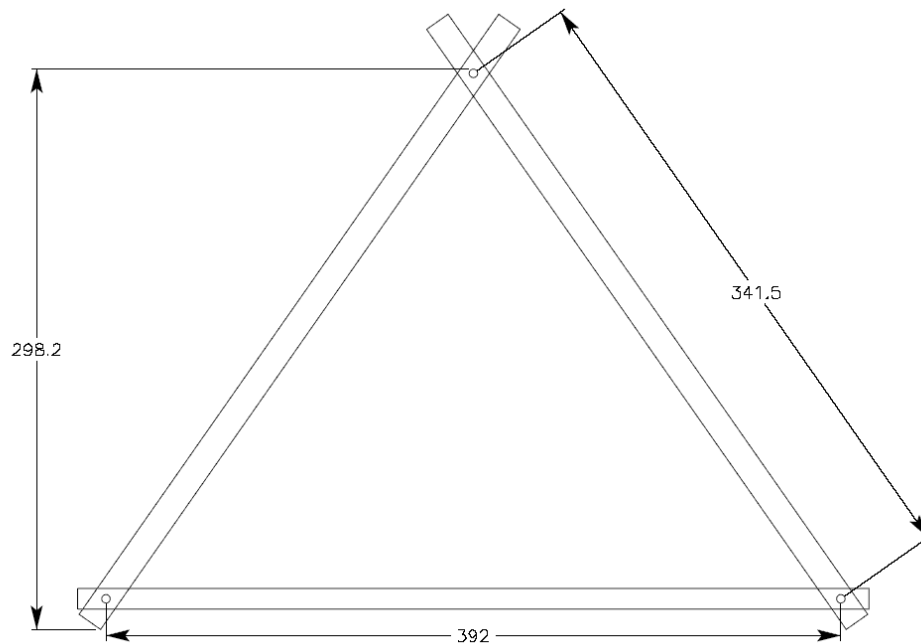
dimensions of reproduction shear leg

Shear legs (4) - American Ash. Saw cut and hand planed to smooth 3cm planks, 13-14cm width, 390cm length.



dimensions of reproduction transom

Transoms (2) - American Ash. Saw cut and hand planed to smooth 3cm planks, 10-11cm width, 422cm length.



dimensions of reproduction assembled gable end

Ground poles (2) - Red maple poles. 5-7cm diameter immature trees 450cm overall length. Round tenons 4.5cm diameter and 11cm length. A rectangular hole was cut for a

12mm key on each end located at a distance from the tenon shoulder to create a snug fit after the tenon passed through the holes in the transom and sheer leg.

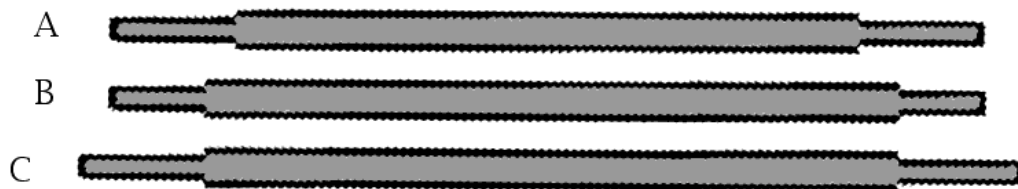
Ridge pole (1) - Hickory pole. 7-9cm diameter immature tree 450cm overall length. Round tenons 4.5cm diameter and 11cm length. A rectangular hole was cut for a 12mm key on each end located at a distance from the tenon shoulder to create a snug fit after the tenon passed through the holes in the two sheer legs.

The tools used included: A 9 tooth crosscut saw; 12mm and 4.5cm boring bits (1/2" and 1-3/4"); chisels; a scrub plane; draw knife; and a shaving horse.

As interpreted, the original tent had a ridge pole shorter than the ground poles, resulting in the gable ends of the tent leaning inward. That interpretation of the ridge pole is open to question. The pole interpreted as the ridge pole seems too insubstantial to support the tent, although it is possible that the pole may have shrunk in diameter.

An alternate explanation is that a different pole was used for the ridge. Since the poles and beams were found in a jumbled heap, it's possible that parts have been misidentified.

Additionally, the poles have two important lengths: a total physical length, measured end to end, and an effective length, which determines the dimensions of the tent, measured from the shoulder of one tenon to the shoulder of the other.



Physical vs. effective length of tent poles

Poles A and B have the same physical length, but different effective lengths because of the difference in the lengths of their tenons. B and C have different physical lengths, but would create the same size tent frame, since the length between their tenons is the same. There is a possibility that when the original poles were cataloged, errors were made in distinguishing between physical length and effective length¹¹.

The advantage of a tent that leans in is that it is a stronger, more stable structure. The disadvantage is that making the holes in the planks to snugly fit a tenon in a leaning

¹¹ Vegard Vike, personal communication, 8-August-2006.

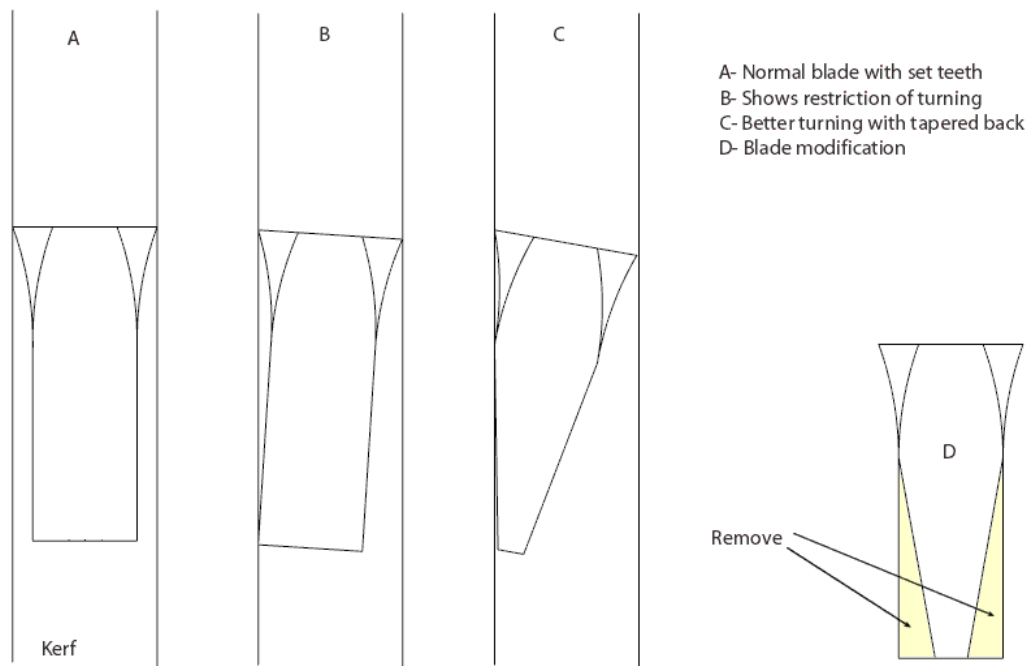
structure is considerably more difficult. A snug fit is necessary for a strong structure, regardless of the lean. Viking age carpenters are known to have been highly skilled and probably managed the task. Since the original tent planks do not survive, we can not examine them to measure the details of their holes, and the original report is silent on the matter. As a result, we can not know whether the original tent leaned inward or not. We chose to avoid the problem by making the ridge pole and ground poles the same length.



photograph of reproduction animal head carvings

The carving of the animal heads was done with a standard utility knife. The saw work on the animal heads was done with a slightly modified blade. The curves were bored through, then a modified coping saw blade was fed through the holes to finish the internal cuts.

The set on a typical production coping saw blade does not allow for tight cuts (smaller than 20mm radius). In order to get the clearance required for cutting the animal heads, the back edge of the blade is filed (or ground) to create a sweep on the blade. The modification slightly weakens the blade but provides much more clearance for turning.



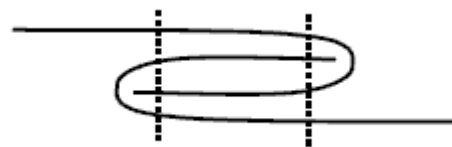
modified blade

In making the reproduction, the dimensions of the animal heads were modified slightly to fit them to the width of the shear legs. The original shear legs varied in width, while the reproduction legs were more uniform. The four animal heads were scaled, maintaining proportions, so that they fit onto the reproduction shear legs. Full-size images of the four animal heads are included at the end of this document.

The tent was made of linen, 50m of 210g/m², 150cm width (fabrics-store.com product code 4C22). Two colors were used, red and natural. The linen was washed and dried twice before cutting to pre-shrink the fabric. After shrinkage, the width of the fabric was approximately 144cm.

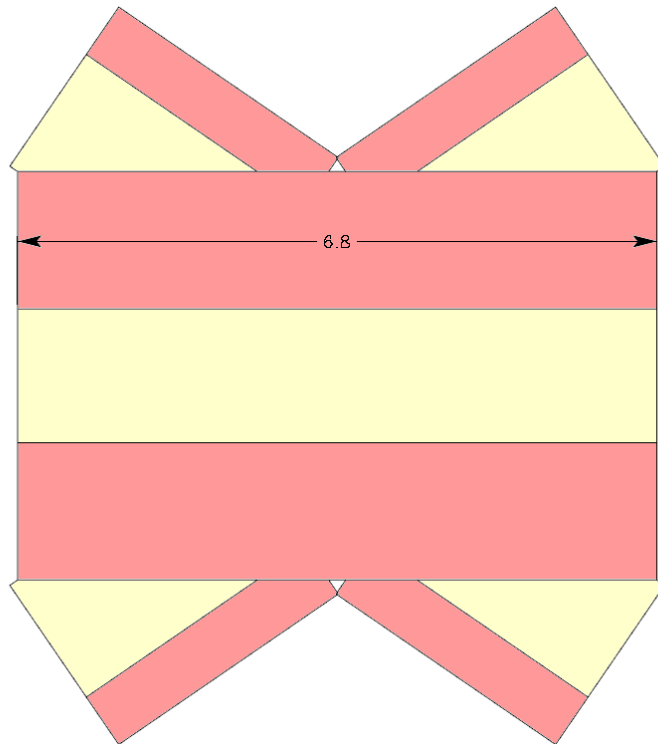
All of the hems are 12mm rolled with a single running stitch line.

All of the joining seams are 1/2 flat felled with two lines of running stitch (right).



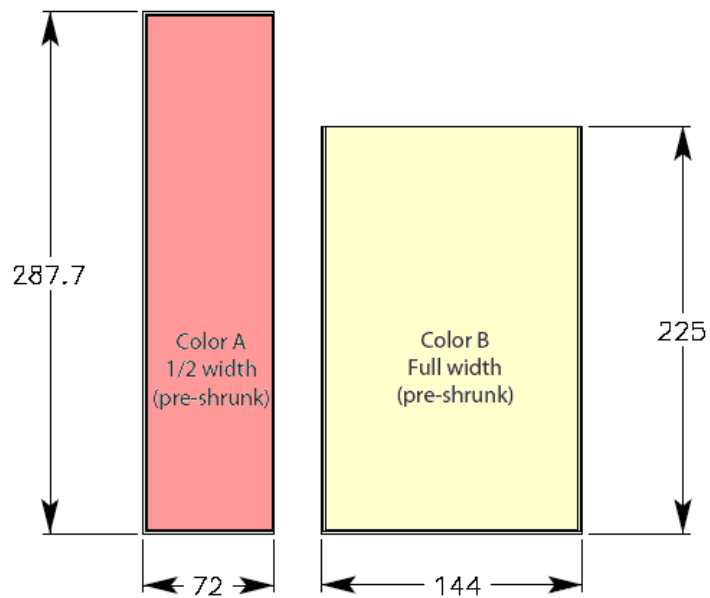
flat felled seam

Three widths of alternating color were joined to create the main panel of the tent. The overall length of the panel was 6.8m.



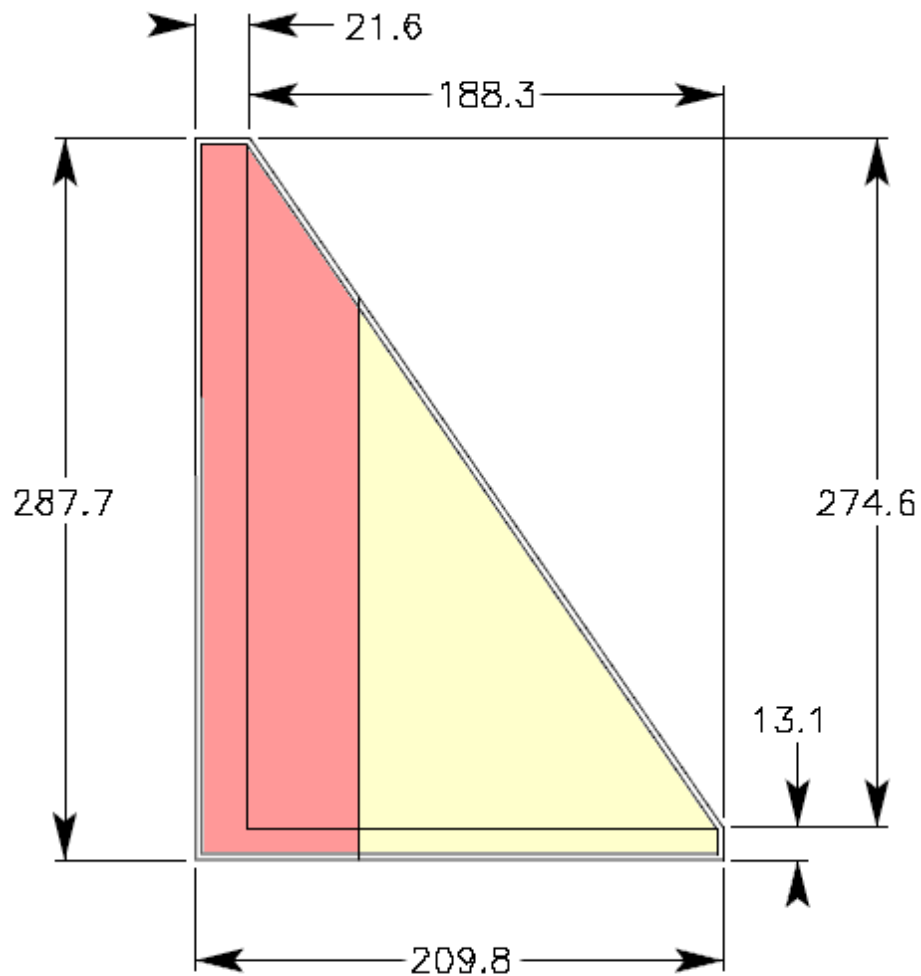
reproduction fabric tent cover
dimensions in meters

The end panels were made from two colors of linen: a full width and a half width, minimizing waste.



material required for each end flap

After cutting, the panels were joined and then cut to the pattern.



pattern for the end flaps showing cut dimensions prior to hemming

The two long edges and the two short edges were hemmed, and then the panel was joined to the body starting from the bottom and working upwards. There is a gap of about 24cm where the body drapes over the ridge pole, allowing the end flaps to wrap around the point where the two shear legs meet and allowing the two animal heads to stand proud of the tent.



detail showing the end flaps wrapping around the shear legs

The question of whether the tent fabric should be placed on the outside or the inside of tent frame has vexed many researchers. Brøgger and Shetelig¹² suggest that the tent fabric covers all of the frame except for the exposed animal heads, although their justification seems weak. Regardless, that was the approach used for this reproduction since it would seem that this approach does a better job of sealing out weather.

The bottom edges of the tent cover are fastened to the ground poles by 7-14mm wide leather thongs riveted through the hem with 2mm copper rivets and burrs. Unlike the sewn sleeve used in some reproduction tents, this approach allows the cover to be put on the tent after the frame is fully assembled. Seven ties were equally spaced on each side of the tent.

The tent is attached to the shear legs with linen ties sewn to the inside of the tent at the seam between the tent body and the end flaps. Three equally spaced ties are used on each of the four seams.

A single linen tie centered at the bottom of each end flap secures the end flap to the transom.

Linen ties and loops were sewn to the edges of each of the end flaps at regular intervals to permit the end panels to be tied shut. At each end, equally spaced loops were sewn to the hem of both end flaps, eight on the left flap and eight on the right. On the right flap at each end, corresponding ties were sewn to the outside of the flap, offset from the hem, so the flaps can be overlapped and tied shut from the outside. On the left flap at

¹² Brøgger, A. W. and Haakon Shetelig, *The Viking Ships: Their Ancestry and Evolution*, Katherine John, tr. Oslo: Dreyer, 1951. p.138.

each end, corresponding ties were sewn to the inside of the flap, offset from the hem, so the flaps can be overlapped and tied shut from the inside.

The tent frame seemed to lack the desired strength, and so we have chosen to brace it with two ropes that form an "X" in each side panel. Each rope has an eye splice, which is looped over one ground pole tenon. The rope travels up and around the opposite shear leg crossing at the ridge pole and back down to the other ground pole tenon. It is cinched with a bowline take-up. A second rope is applied to the other end. In addition to stiffening the frame, the ropes also help to support the linen hanging over such a large area.



Tent frame showing the rope braces

Erecting the Tent. Assembly of the tent is extremely simple, and typically takes only a few minutes. It can be erected easily by two people, and it has been erected by only one.

To start, the two transoms are laid in position on the ground. A ground pole and two shear legs are pegged into position connecting the two transoms at one end.

Next, the two shear legs are pegged to the ridge pole and the remaining two shear legs. The remaining ground pole is fitted to the shear legs, which, lying on the ground, extend well past the end of the transom.

Two people can easily pick up the loose ground pole and walk it toward the transom, raising the ridge pole and forming the gable ends as they do so. The ground pole is inserted into the holes in the transom and pegged in place. The frame is now erected.



photograph of reproduction tent frame

The rope reinforcements are attached to the tenons of the ground poles, thrown up around where the shear legs cross, and brought back down to the other tenon and cinched tight.



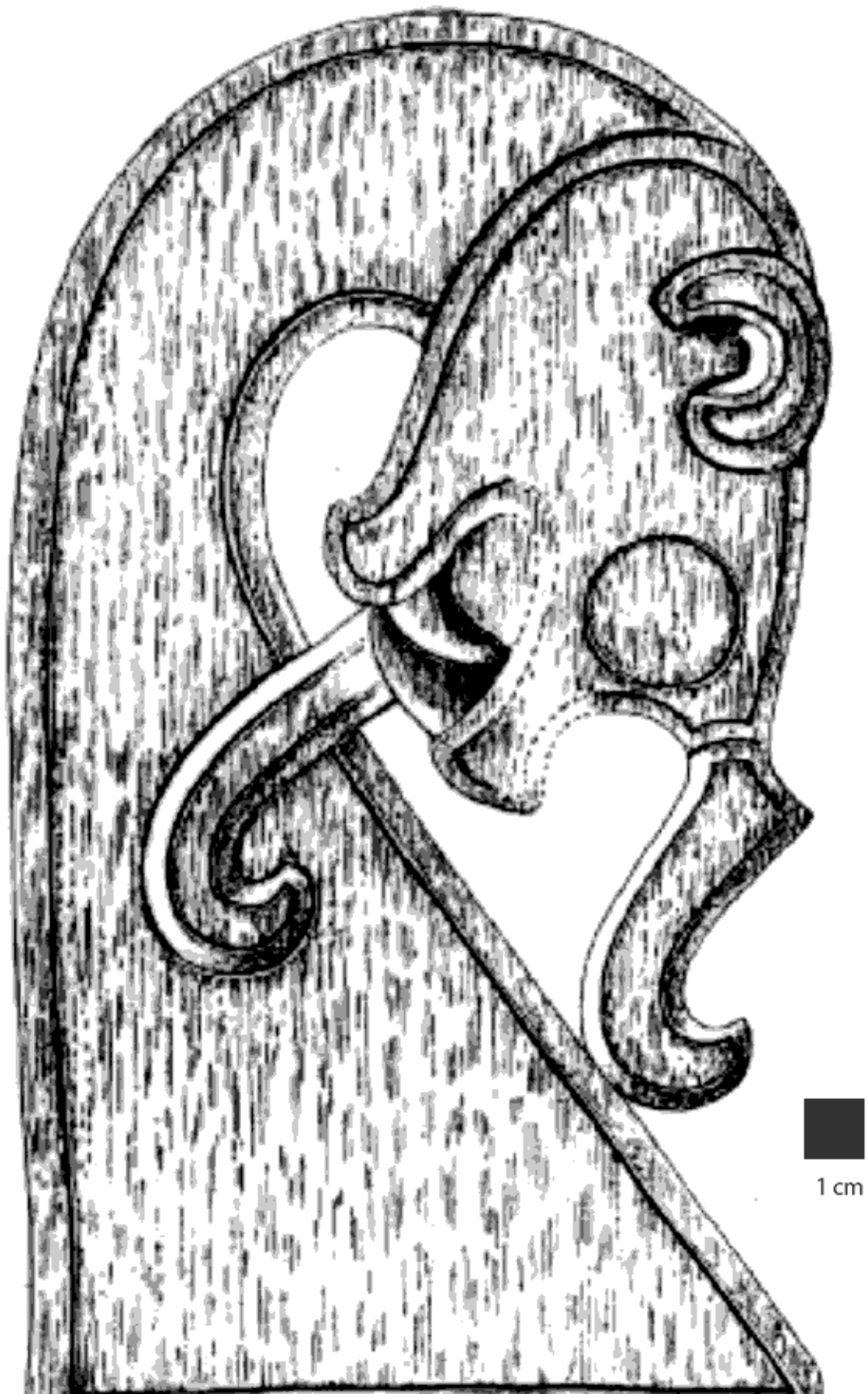
Detail showing ground pole passing through the shear leg and transom, with rope brace and peg

Lastly, the linen tent is thrown over the ridge pole and pulled side to side and back and forth to get it in the proper position. Standing on a sea chest to gain some additional height makes this step go more smoothly. The ties and thongs are then tied to the ground poles, transoms, and shear legs to fasten the tent covering in place.

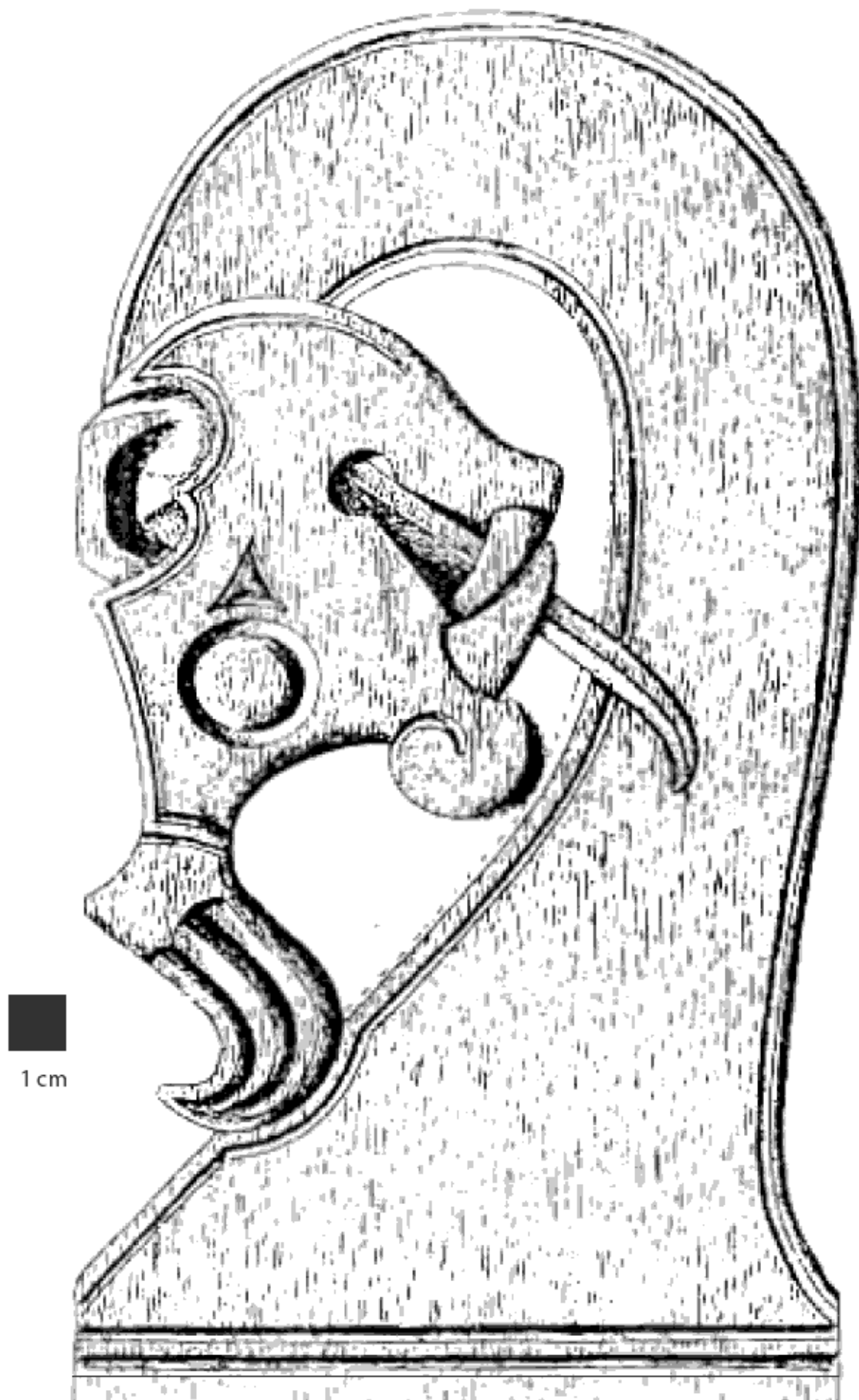
Comments on the Use of the Tent. The tent is surprisingly large and commodious, with enough room to accommodate a ship's company. It's surprisingly tall, allowing one to stand upright throughout much of the interior. It's solid in wind and snow. While it hasn't yet received a thorough test in a multi-day deluge, it seems to be reasonably weather-tight.

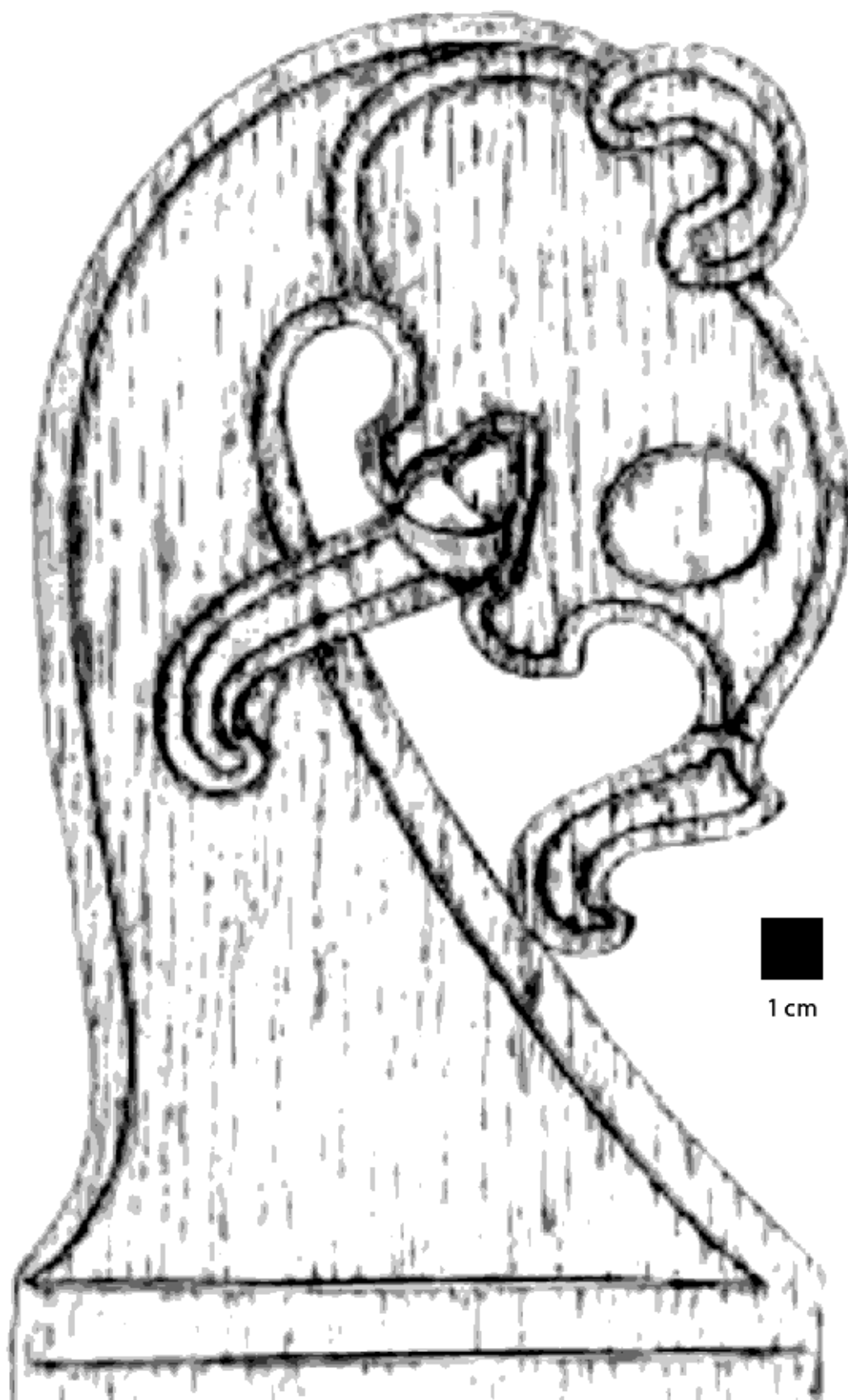


the reproduction tent at a Hurstwic winter event



Full size sketches of the four animal heads on the Oseberg tent







1 cm

