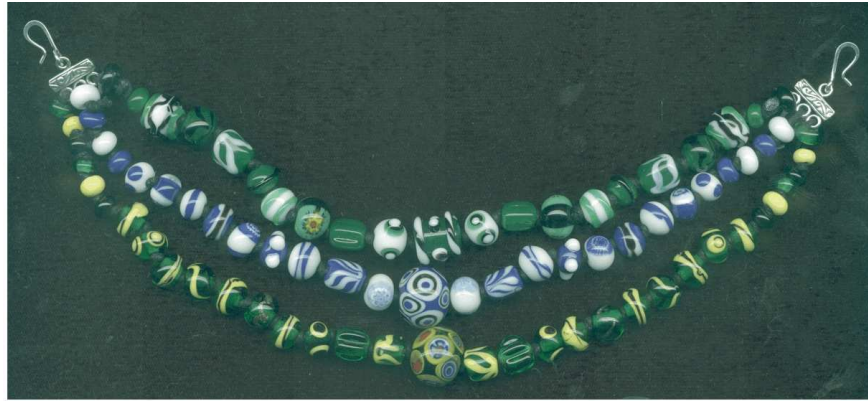


A Norse Glass Bead Necklace



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Introduction

Both men and women valued beads in the Norse world. Numerous grave finds and excavations in settlement areas have revealed an abundance of beads in glass, bone, amber and other semiprecious stones. Most women's graves contain at least one strand of beads. Raw materials and waste products from the production of glass beads have been found in several Norse trading centers to include, Ribe, Hedeby, and Frojel, which suggest that glass beads were manufactured in major Norse trading centers.

In this project I will look at the evidence of both glass beads and glass bead manufacture from several of the major Norse countries. I will then design a Norse necklace of glass beads that could have been created or obtained in 10th Century Denmark . Next I will explain my production method and how my method differs from the methods used in the Norse world. Finally, I will manufacture the necklace that I designed.

Definitions

Beads are made in three basic ways: wound, pierced, and cut.

- **Wound bead:** The glass is heated and then wound onto a prepared mandrel. The mandrel is prepared by applying bead separator to the mandrel to prevent the glass from adhering permanently to the mandrel. The hole in a round bead usually has smooth edges, the bead can be round or any other shape, and the decoration often wraps around the axis of the hole.
- **Pierced Bead:** The glass is heated and then dropped into a mold or just dropped onto a graphite surface. The molten glass is then pierced with a cold metal rod in order to make the hole. Pierced beads often are rounded in shape, and the hole in a pierced bead usually has one smooth edge and one sharp edge.

- **Cut bead:** Glass tubing is heated and then stretched to obtain the desired thickness of the bead. The Tubing is then cut with glasscutters to obtain the individual beads. Cut beads have a cylindrical shape, and the hole is sharp on both edges.

Stringer: A piece of glass is heated and drawn into a long thin stringer, which can then be used to make fine decorative details on beads.

Feathering: The bead is decorated with rows of thin stripes using stringers, then a sharp tool is dragged across the stripes while the glass is soft, to create a pattern that resembles a feather.

Eye bead: A bead is decorated with small dots within large dots, which resemble one or more eyes decorating the surface of the bead.

Foil bead: A molten bead is rolled is silver or gold foil, which sticks to the surface of the bead, for a decorative effect. Usually, transparent glass is applied over the foil to protect it.

Millefiori: An Italian word which translates to a "thousand flowers," it is made by bundling many rods (canes) of glass together in the desired pattern, melting the bundle, and pulling it out to create a thin cane which, in cross-section, preserves a miniature copy of the pattern. The cane is then cut into slices, which are applied to beads, so that the pattern decorates the beads.

Evidence of Glass Beads in the Norse Countries

Beads from Denmark

Lundeborg Denmark, Manufacturing Center: In 1987 Per O. Thomsen put forward the idea that there was local bead manufacturing in Lundeborg (Leirje 1995 p.20). His evidence consists of waste material from the workshops, which is scattered throughout the site. He also has found glass beads and pieces of broken glass that show indications that they were being worked into glass beads. The waste from this site has several characteristics that indicate wound bead manufacture, as shown in the picture. Several pieces show plier marks where the glass was pulled into stringers or held in order to manipulate the hot glass. Lundeborg also produced several small finds of broken glass and glass beads. Over 140 pieces of

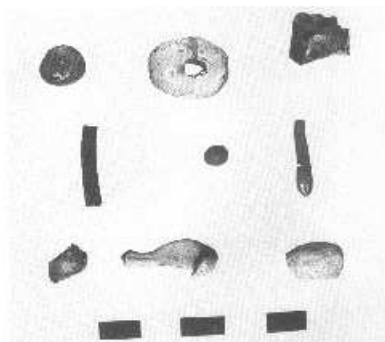


Fig. 4. Waste from glass-bead making.

Leirje p.21

broken glass have been found in the trading center which could suggest that the glass was deliberately brought to the site as raw material for glass manufacture (Leirje 1995 p.22). A total of over 360 glass beads were recovered from the settlement. This large number of beads for a small settlement, combined with the bead manufacture waste and broken glass found in the area, makes it likely that glass bead manufacture took place at this site.

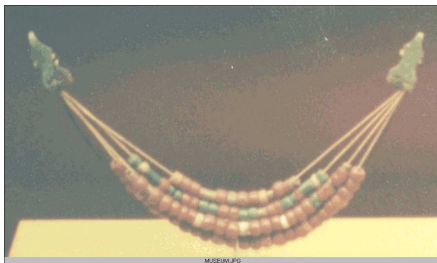
Iron Age Denmark: In Denmark well over 9,000 beads from the Iron Age were preserved well enough to be classified (Leirje 1995, p.25). The early Iron Age finds had only a few beads found in each grave. Approximately half of the beads found in the early Iron Age are metal-foil beads with an outer layer of amber-colored glass. The rest of the beads were small cobalt-blue beads. During the Viking age the silver-foil beads are also apparent. The majority of beads from the Viking Age in Denmark seem to be made of transparent or translucent glass, colored with bluish greenish or brownish shades by copper or iron compounds in the raw material. (Leirje 1995 p.28)



Wov 4775

Ribe Denmark: Ribe was known as a bead manufacturing site as early as the 8th century. The beads pictured to the left were found in Ribe (Wov 4775), and display characteristics typical of wound glass beads, such as smooth edges with no evidence of cutting (as with cut beads), and decoration that wraps around the bead's axis, sometimes with feathering.

The National Museum of Denmark: On a recent visit to Denmark, I visited the National Museum of Denmark in Copenhagen. Several displays in the museum showed how beads were worn in several grave finds throughout Denmark. The beads were strung on multiple strands connected to a hook that looked very similar to a clothing hook except the hook was bent forward instead of back. The hooks were then attached to the brooches. Most of the displays had several strands of beads attached to each set of hooks with multiple colors and sizes in each strand.



Beads from Finland



Latvia Glass Bead Finds: Nine major types of glass bead were found in Latvia from the 10th to the 13th centuries (Leirje 1995 p.33). See the figure to the left. Most of the beads are spherical beads in yellow and blue. The 10th to 12th century finds from Finland are smooth, indicating a wound or pierced origin, transparent, and between 6 and 10mm in diameter. (Lehre 35)

Approximately 1/5th of the beads found between the 10th and 13th centuries are foil beads. An excavation in

Riga in 1973 produced evidence that there was local glass manufacture at the end of the 13th century. The workshop produced melting crucibles and over 1,000 glass beads in various colors. Glass beads were consistently found in women's graves between the 10th and 13th centuries in Latvia. Up to the 12th century the quantity of beads were small, then in the late 12 and early 13th centuries, larger ornaments were found. Other ornaments, such as Arabic coins, were added to glass necklaces as ornamentation, such as WOV 4126 shown to the right. Åland, Finland produced several finds of beads in various colors and patterns to include eye beads, seed beads, segmented beads and cylindrical beads. (WOV 4188)



WOV 4126



WOV 4188

WOV 4188, to the left, shows another bead find from Finland. The diagram from Lehre to the right shows the many shapes in which beads were made.

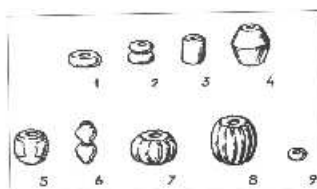


Fig. 1. The types of glass bead found in Latvia from the 10th to 13th centuries. 1-2, annular; 3, cylindrical; 4, domed, recessed; 5, barrel-shaped, with ribs; 6, lemon-shaped; 7-9, round or ribbed; 10, ring bead. Lehre

Beads from Sweden

Frøjel Sweden: Recently there was an extensive excavation in Gotland Sweden. This excavation produced numerous beads of high quality. The excavation was divided into the beads found in the settlement area and in the graves. Beads were made from bone, glass and metal. Several grave finds show a large number of glass beads in various colors, shapes and sizes. The glass bead sizes range from 5 mm to 20 mm in diameter.

The photograph to the right shows beads from the grave of a 15-year old female. These beads show decoration methods such as stripes, dots, feathering, and eye beads. Some of the beads are undecorated.



The beads collection shown is from a female grave from Fjellby, Gotland. The woman (around 17 years old) had a necklace of 132 glass beads of different colors and shapes. The grave is from the 9th-10th centuries.

It is not known the exact order in which the beads were originally strung, but I believe that the large disk-shaped bead formed the center of the necklace, because it is unique among the beads.



During the Iron Age in Sweden the beads were strung together and carried on metal plates with holes in them for the strings. Later during the late Iron Age the metal plates changed to hooks and were attached to the brooches. (Carlsson p.2) The pictures to the left are beads from Frojel (Carlsson). These beads show a large variety of color and decorating techniques. All of the beads shown are part of a large collection of beads excavated from this site.

Beads from Norway

Nordland Norway: This site produced a very complicated and highly decorated necklace. The beads are decorated with a variety of millefiori.

The presence of pairs of identical beads, each pair a slightly different size from the others, has led the archeologists to reconstruct it as shown in the photo.

Of all the Norse beads that I have documented, Norway seems to have the largest and most complex beads.



Production methods of wound glass beads

In the Norse world, the evidence from excavations in Ribe, Hedeby and Forjel indicate that glass was imported to the region in order to make the glass beads. Glass was imported in the form of broken glass fragments from drinking vessels and as manufactured glass rods from Italy. The glass was then worked in workshops in the major trading centers to produce the three main types of beads: wound, pierced and cut. Glass was heated in a flame, hence the term "flamework" or "lampwork." (Carlsson p.5)

The National Museum of Denmark conducted several experiments in the production of glass beads. In their experiments, the museum created a small clay furnace with a bellows attached. This small furnace looks remarkable similar to a small metal working furnace. The fire is heated to approximately 1200 F in order for the glass to melt. The glass rods are inserted into the furnace and then worked in the heat of the furnace to produce the wound bead. Once the glass was softened enough to work, it was wound onto a mandrel and then



decorated. They were able to produce beads using the small furnace shown here.

My production method and materials

I produce my wound beads using a modern propane torch. Other than the source of heat, all other production methods are the same as used in the Norse world in the 10th century. They heated their glass in a furnace and then wound the bead onto a mandrel. I heat glass in a torch and then wind

the glass onto a mandrel. I chose to use a modern propane torch instead of the clay furnace for several reasons. First, the torch is much safer than building a clay furnace outside and building a fire hot enough to work the glass. Second, the propane torch is more portable than building a furnace, for teaching lampworking at events. Finally, I do not have the space available to build such a furnace at my home.



When I assembled the beads into a necklace I choose to pattern the design of my necklace after the necklace displayed in the National Museum of Denmark. In the photo from the National Museum of Denmark, several short strands of beads are strung between two hooks. The hooks are then attached to the brooches. The end result is the beads being suspended between the two brooches and not worn around the neck. I designed my necklace to be a three-strand necklace attached to two hooks. The photo to the right shows how this type of necklace is worn.

Step-by-step method of producing the beads:

- 1. Prepare the mandrels. The mandrels must be coated in bead separator to prevent the bead from sticking to the mandrel. In period they would have used high quality clay.**
- 2. Prepare the work area. The work area needs to be well ventilated and fire proof. It is also a very good idea to have a fire extinguisher available. Tools and glass are laid out so that the beadmaker need not reach around or over the torch and flame.**
- 3. Light the torch. The torch can be lit with either a striker or a match.**
- 4. Heat the glass. I am currently using Moretti glass. The glass is passed in and out of the flame to heat it slowly until it starts to turn color. The initial color change is different for different colors of glass. This prevents thermal shock that can shatter the glass. Once the glass is warm it is then heated up in the flame until a round ball of molten glass is formed.**
- 5. Form a bead. Once a round ball of molten glass forms on the end of the rod, touch the glass to the prepared mandrel and turn the mandrel away from you. Keep the mandrel turning in the heat until you have the desired amount of glass on the mandrel then wind off the glass from the rod. Winding off is accomplished by slowly pulling the glass rod away from the bead and then burning off the stringer that connects the bead and the glass rod. Next keep the bead in the heat and continue turning the mandrel until the bead is round. Hot glass acts like honey. Knowing this, the beadmaker can turn and manipulate the bead using gravity to shape and form the bead.**
- 6. Decorate and form the Bead. Once you have a basic round bead the bead can be decorated with stringers or formed using a marver or graphite paddle. A marver is a small metal plate that is smooth on one side and has a pattern on the reverse side. The beadmaker can use this plate to shape the bead and add texture. The graphite paddle is a small block of graphite with a wooden handle designed to help the beadmaker shape and form the bead. (In period the graphite paddle would have been made from cheery or apple wood and kept wet to avoid charring the wood when the paddle was used to shape the hot glass.) Graphite is used because it will not stick to the hot glass and does not absorb the heat from the glass therefore increasing the amount of time the beadmaker has to shape the bead.**
- 7. Anneal the Bead. Once the bead is formed and decorated it must be annealed in order to keep the bead from cracking later. I anneal my beads in a bead-annealing kiln for at least 30 minutes at 950 degrees Fahrenheit. In period the beads were placed on the edge of the furnace or kiln. The beads were left at the edge of the furnace or kiln throughout the bead making session annealing the beads as the beadmaker worked.**

My Necklace Design

I decided to produce a necklace that has design elements from throughout the Norse world. I constructed a three-strand necklace using purchased hardware. The overall design of the necklace will resemble the necklace in the photograph from the National Museum of Denmark found on page three of this document.

When you look at the necklace artifacts pictured above, and the archeologists' concept of re-stringing the necklaces, some necklaces show symmetry in their design and others do not. Some necklaces have color themes and others do not. It seems that the design of the necklace was dependent on the personal tastes of each individual woman. Therefore I will design my necklace to my individual tastes, taking into account the decoration methods used in the Norse world.

I started the design of each strand with a center bead. Once the center bead was designed, the rest of the beads were produced to compliment the center bead. I chose color themes to honor the important people in my life.

Top Strand:

Color Theme: Green, White, and Black, in honor of the arms of my lord.

Center Bead: Complex striped bead.

Other Beads: Feathered beads, millefiori beads and simple stripes.

Center Strand:

Color Theme: Blue and White, in honor of the arms of my Laurel.

Center Bead: Multiple eye bead as in WOV 4188.

Other Beads: Simple eye beads, millefiori beads and beads with simple stripes. See WOV 4188 and Carlsson p. 2. Undecorated blue and white beads.

Bottom Strand:

Color Theme: Green and Gold, in honor of the arms of my mentor.

Center Bead: Multiple millefiori as in the strand found in Norway.

Other Beads: Undecorated green and gold beads. Feathered beads, eye beads, simple dots, layered dots, and simple stripes.

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