

Aiglets: Medieval, Post Medieval, and Modern.

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(<https://www.facebook.com/groups/29374273995/>)

And the last mentioned but the first on the list.

My wife, who if she never heard me talk about little cones of brass ever again, would be happy.

Additional Information

Additional information may be found on my website: www.livingstonjewelers.com/aiglets.html

Errors, Omissions, And Questions

Please contact Gerald A. Livings at glivings@livingstonjewelers.com with any errors, omissions or suggestions. Questions are welcome as well.

Scope

This paper discusses mostly functional aiglets. Though some decorative aiglets are referenced in this paper, these are not covered in detail, as that discussion is more appropriate to a more general discussion of historical jewelry manufacturing techniques. The manufacturing of aiglets for use by re-enactors is discussed as a way to determine how aiglets may have been manufactured.

Aiglets, lace tags, chapes, are all terms describing items that are in some way used to finish the end of laces, thongs or cords. Aiglets still are in use today in the 21st century where they are utilitarian as well as decorative elements on laces for shoes, corsets and other clothing. Many people recognize the plastic and metal ends on the laces pictured in Figure 1 as modern aiglets. Aiglets from the medieval era would not be much different from the metal aiglets in Figure 1. Such a common item would have been manufactured in large quantities and as such would be made with a very efficient manufacturing process¹.



Figure 1: Modern aiglets

For the purposes of this paper, the following dates are used. The Medieval era is approximately from AD 600, the fall of the Roman Empire, to 1485. The post medieval era is 1485, the establishment of the Tudor Dynasty, to 1750, the start of the industrial Revolution. The Modern era is from 1750 and later. All dates in this paper are from the Julian calendar in the Common Era.

Definitions

Aglet (*ag let*). Metal sheath or tag at the end of a shoe-lace or ribbon tie, to facilitate threading. Much used in 16th and 17th century costume. Later any ornamental pendant; sometimes a small image. Also written *aiguillet*. From French word *aiguille*, meaning needle².

Aiglet (*aig let*) (plural aiglets) Alternative form of “*aglet*”.

Aglet-baby (n.) A line from the play “*Taming of the Shrew*” by William Shakespeare. This one line has no clear meaning. Possibly a small ornamental figure forming the tag of a lace.³ Could this mean a woman whose clothing has been covered with many decorative aiglets?

Aigrette A gold or silver hat ornament to support a feather, or made in the form of a jeweled feather or sometimes a brooch supporting a jeweled feather.⁴

Aiguillette (*ai gwi let* or F. *ai-gwee-yet*). Aglet or ornamental tag; also, trimming or looped cords, as on military and navel uniforms⁵.

Aiguillette (French, from *aiguille*, needle) A brooch or ear-ring decorated with a series of cascading gemstones of diminishing size, terminating in a thin, tapering, pointed stone. The style is also known as EN PAMPILLES⁶. Just for clarity, this word has been included to prevent confusion. The word “*aiguillette*” is a jewelry term and can be confused with the word “*aiguillette*”.

Aiguilletiers (French) A person who makes aiglets.

aygulet (n.) (plural aygulets) Alternative form of aiglet.⁷

Chape, Crampet. A metal tip that strengthens the end of a scabbard, or the termination of a belt or girdle. In Heraldry it is called a crampet. (Planche 89). From “*A glossary of the construction, decoration and use of arms and armor...*”⁸

Flugelbinder. Flugelbinder is actually a fictitious word originated in the movie “*Cocktail*”, during a discussion about the ordinary objects that can turn their inventors into millionaires. It has become an alternative form of aiglet.⁹

Lace Chape Alternative form of aiglet. Modern usage.

Lace tag Alternative form of aiglet. Modern usage.

Point 1. Tapering tip of something pointed; as, pin point.

2. Tie or lace, as of leather or ribbon, finished with metal tab or aglet at ends. Originally, used to fasten together parts of costume; later tied in bows for trimming.

Authors notes: Some authors separate the word “*aiguillette*” out as a purely ornamental item. “*Aglet*”, “*aiglet*”, “*aiguillet*” and “*aiguillette*” all describe the same type of object. The differences seem to be the language used, (English versus French) and the century the word is

being used. It is during the 16th leading into the 17th century aiguillette's became less functional and more decorative.

History Of Aiglet Manufacturing

The history of aiglets in England extends from the 6th century as a simple utilitarian item, to the late 17th century when they became mostly a decorative item. There are many different styles and types of aiglets. Some are tapered, some are hollow tubes, and some have the metal edges folded in to hold the cord. Some are meant to be used on everyday clothing and are plain in design while some are purely decorative.

On-line searches provided plenty of examples and images of extant aiglets from the 13th to the 18th centuries but yielded very little in the way of instructions on actual historical manufacturing processes websites provided instruction on modern tools and materials.

A video on You-tube shows a young man making a type 1 aiglet at his computer desk with basic tools¹⁰. For a very small amount of aiglets, his instructions using a hammer and smooth-jawed pliers produce aiglets that are useful but the process is very slow.

While he produced finished type 1 aiglets, his process was problematic because pliers leave many marks and dents that would be hard, if not impossible to remove from the thin metal after forming. Additionally since many aiglets are made from metal with a design stamped onto the metal before forming, craftsmen would have to remove a large portion of the design while trying to remove tool marks. Finally, the speed with which he made these would preclude making large numbers of type 1 aiglets every day.

A search to discover if there was any information available on the manufacturing processes for aiglets during the 14th century to modern times yielded almost no information at all. One woodcut shows men making leather points with metal aiglets but the detail is not enough to draw clear conclusions about the processes they are using¹¹.

Leather point makers would be able to purchase hides and cut them into thin strips to use for points. In the illustration above, the image seems to indicate the workers are making type 2 or type 3 aiglets. Were these done by the same craftsmen who made type 1 aiglets? Points made from linen, silk, or lace are more complicated to manufacture, the cord was likely made by specialists and then sold to the point manufacturers in bulk. In addition, Type 1 aiglets are manufactured and then attached



Figure 2: The Strap Makers

to the cord. These could be made in bulk before they were attached to cord or lace, while type 2 and 3 aiglets are formed around flattened lace tubes, ribbons, leather laces, or cords in one manufacturing step.

Manufacturing during the late medieval period was very much controlled by guilds and so there would be very little, if anything, published about actual processes and techniques. Documents from France in the 18th century show there were many guilds and extensive regulation of men and women who made aiglets¹².

Manufacturing of aiglets during the Late Middle Ages was different from modern methods in several ways mainly due to the availability of tools and the lack of mechanization. Keeping the nature of guild and trade information confidential would play a part also. We may never know for certain the true manufacturing techniques used in the late middle ages but by examination of aiglets from the 14th to 18th centuries as well as an examination of extant drawings and paintings, we can infer methods that are likely very close to actual medieval manufacturing methods¹³.

This paper will attempt to fill in this knowledge gap with a combination of research and experimental production of aiglets using such tools and processes as can be inferred from the finished forms of extant aiglets and any surviving tool marks.

Aiglets were generally made from base metals such as copper and its alloys (brass and bronze), pewter, or precious metals. Aiglets, from the number that are found during excavations in Great Britain, suggest these were common items made by craftsmen manufacturing them as a full time profession in the 16th century and later. It is reasonable they were also made by specialized craftsmen in earlier centuries as well. Were they never written about because they were such a common item, and, as many people were functionally illiterate, writing about such a common item would most likely not have been considered?



Figure 3: *The Strap Makers, detail*

Aiglets made from precious metals would most likely be made in a goldsmiths shop and as such be described separately in documents about goldsmithing. There are several descriptions in Queen Elizabeth's day books regarding accounts of aiglets being returned to goldsmiths for repair and replacement of lost aiglets.

One example of this is the following entry: "F 91 [381] Item delyvered to Mr Peter the vijth of October for to mend and to new trim vij per[e] of Agletes of gold emameled white. Item delyvered the xvij of October to him on[e] aglet to be mended and on[e] button of gold knotted with thre pearles in it. Reaceyved of Peter the xxiiijth of November ij Aglets which have new topes mad[e] to them."¹⁴

It is reasonable to also assume the jeweler "Mr Peter" mentioned in the passage above was also the jeweler who made the aiglets for Queen Elizabeth originally. And as such would be able to match the enamel colors to properly repair the aiglets.

Aiglet (Chapes) Terminology

Geoff Egan, Frances Pritchard have made some very clear and easily understandable diagrams to visually show what they describe when discussing aiglets¹⁵. I have proposed some additional images as well. The image with cut tabs at the end is based from an image in 'English medieval Industries',¹⁶.

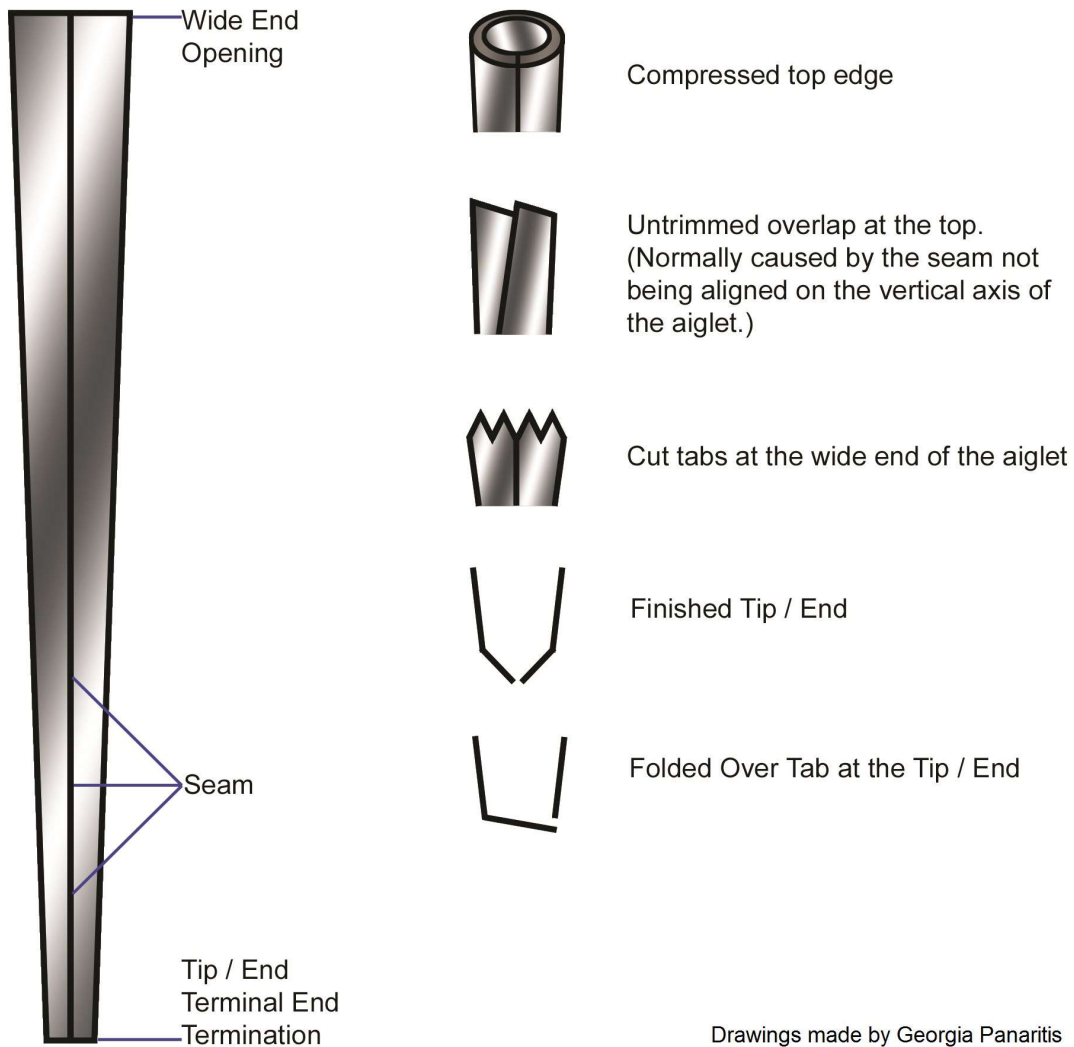


Figure 4: Aiglet (Chapes) Terminology

A Common Lexicon For Conversation

One thing that is needed is a common way to talk about a subject. Without words that have a common meaning, there can be little or no exchange of information. For example. The word "aglet". Does it mean a computer program? A type of airplane? Or the thing on the end of a shoelace?

Yes.

It means all three. So we must decide which type of "aglet" (aiglet) we are discussing and then find a common vocabulary so we may discuss them. That is why I chose to use the spelling that uses the letter "i" as it is less common and helps differentiates between the different types of "aglets".

In that mater, I am adding this small section to show the different definitions and words that may be used, and any information from other fields of interest that will have bearing on the discussion of aiglets.

Discussion About Metal Seams As It Relates To Aiglets

How do you talk about a piece of metal when the edge is folded over? There is not a uniform lexicon where metal seams are discussed in archaeological terms, so the system of speaking about metal meas from the HVAC industry seems to be the most relevant.¹⁷

A "seam" is defined by a line along which two or more pieces of metal meet along a common plane.

When the edge of a piece of metal is folded over, that is called a "hem".

Hems come in several varieties and the chart below shows a visual description of each.

How does this relate to aiglets?

First, these perfectly describe the edges of type 2 and type 3 aiglets. Second, by letting us discuss and convey with accuracy a verbal description of what we see.

We can most accurately describe the types of aiglets by also making sure we use precise terms in the description. While most often this precision of terminology is not needed, it is recorded here for when that precision is needed.

A quick tutorial of hems as they are used with sheetmetal

A flattened hem 

An open hem 

A tear drop hem 

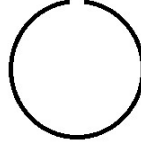
A rope hem 

Figure 5: Sheet Metal Hems

Before the descriptions were for type 1 aiglets “An edge to edge seam”, and for the three versions of type 2 and type 3 aiglets, “overlapping seams”. This is not very accurate and may cause confusion.

The following chart shows the first three types of aiglets with a description of their seams using language that is more precise.

Type 1 aiglets have a butted joint to define the seam.



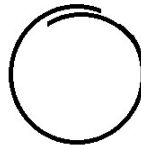
Type 1 aiglets have a butted joint to define the seam.

Type 2 aiglets have a butted joint of two hems to define the seam. The hems (open or teardrop) are used to secure the material of the cord.



Type 2 aiglets have a butted joint of two hems to define the seam. The hems (open or teardrop) are used to secure the material of the cord.

Type 3 aiglets have an overlapping seam.

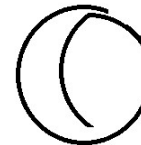


Type 3 aiglets have an overlapping seam.

or

or

Type 3 aiglets have an overlapping seam with the inner edge rolled into a hem (open or teardrop) to secure the material of the cord.



Type 3 aiglets have an overlapping seam with the inner edge rolled into a hem (open or teardrop) to secure the material of the cord.

Figure 6: Aiglet seam descriptions

Aiglet Types

This passage is the current definition of aiglet types used by scholars today.

Examples are found in huge numbers in late and medieval and early post-medieval contexts. The typology used here follows (and extends) Oakley 1979a, 262-3. Type I is of slightly tapering form with the lace secured by a transverse rivet at the top, and the edges overlapping only at the base (according to Oakley, mainly 15th century, with some of 16th and 17th-century date). Type II is cylindrical in form, securing the lace along its length, with both edges folding inward to grip the lace (according to Oakley, mainly 16th and 17th centuries). Type III (not Oakley) is cylindrical with edges overlapping along its entire length and is much less common¹⁸.

The above classification scheme is problematic as the descriptions are too inclusive and at the same time exclusive. For example, a tapered aiglet with a transverse rivet, securing the lace along its length, with both edges folding inward to grip the lace would count as both a type I and type II aiglet under this classification. And it is also excluded as a type I and type II aiglet under this classification.

The shape of the aiglet (I.E., whether tapered or cylindrical) is not clearly addressed and could be grouped together in the above scheme. This system also utilizes attachment methods to help define the types. While there currently does not appear to be evidence to support a discussion of attachment methods as a method of determining classification and provenance, additional research into the topic is warranted.

There is no simply logical way to classify the different forms aiglets take as the current system developed over time as researchers needed to extend the system of classification. While copper and copper alloy aiglets were very common, aiglets made from materials other than sheet metal, decorative, and non-metallic materials need to be addressed. there is little mention in print about aiglets made from materials such as wire, cast, or made from other metals or non-metallic materials.

Under the current system of defining aiglet types, there is too much overlap in the descriptions of aiglet types.

Therefore I propose the following definitions for types of aiglets.

- **Type 1** aiglets have a seam defined by the edge of the metal butting against each other along the majority of the seam. The edges may overlap for a short distance at the base and/or the top of the aiglet.
- **Type 2** aiglets have both sides of the seam folding inward to grip the cord or lace along the majority (75% or more) of the seam.

- **Type 3** aiglets have an overlapping seam where one side of the aiglet overlaps the other side along the majority (75% or more) of the seam. One side of the seam may, or may not, be bent in to hold the cord or lace.
- **Type 4** aiglets are cast, forged, or are made from solid metallic materials other than sheet.
- **Type 5** aiglets are manufactured from non-metallic materials. (bone, horn, stone, pottery, amber, etc.)
- **Type 6** aiglets are purely decorative and are not functional. They may be similar to any other style of aiglet in manufacturing.

Examples Of Extant Aiglets

The following three aiglets are from the authors collection.

Type 1

This aiglet is a type 1 and comes to a very fine point. The seam is almost perfectly straight and there is a rivet that would have held it to a cord. It was most likely attached to a round cord made of some sort of textile or leather. Documents where the cord material is noted seem to suggest that most aiglets being on some sort of textile cord with about 35 to 40% of them being attached to leather. Type 1 aiglets seem to be mostly found in the context of excavations dating to the the 15th and 16th centuries. Several different sources seem to agree with this.



Figure 7: Type 1 aiglet from the authors collection

Type 2

This is an unremarkable type 2 aiglet that tapers. It was during the mid to late 16th century type 2 aiglets became more popular. Most likely made by attaching to a flattened tube of textile or flat strip of textile. this is the aiglet type that became the most popular for general use entering the 17th century. More often than not, this was not used on leather cords.



Figure 8: A type 2 aiglet from the authors collection

Type 3

This is a type 3 aiglet where the entire length of the aiglet appears to have had one side of the seam folded down to hold the cord. The small end has been rounded and you can clearly see where one side of the seam has been folded down. Because it is a type 3 aiglet and has the end rounded, I would place this as having been made in the first to mid part of the 16th century.



Figure 9: A type 3 aiglet from the authors collection

Type 4

An illustration of a type 4 aiglet can be found in “Acton Court The evolution of an early Tudor courtiers house”, page 383, illustration 110. It shows a twisted aiglet that is described as a toothpick. I believe this is better described as a type 4 aiglet.¹⁹

Having spoken with people involved with European martial arts where they fight in armor, these work well as the aiglets used to connect parts of armor to gambesons.²⁰



Figure 10: Possible type 4 aiglet



Figure 11: Post-medieval, silver lace tag

Another type 4 aiglet found in Great Britain and made of silver.²¹ Currently in the British Museum, this lace-tag might have been worn on a fashionable hat or other clothing.

Type 5

Type 5 aiglets are a proposed type and as such, I am not aware of any extant examples at this time. They would have been manufactured from non-metallic materials. (bone, horn, stone, pottery, amber, and as such might be much more susceptible to decay or breakage, making them much harder to identify.

Figure 9 shows two sets of type 5 aiglets made by the author. As you can see, the one on the left is merely the ends of the cords tied to keep it from unraveling. Known as "Common Whipping", "A whipping knot", or a "Sailmaker's Whipping"

The aiglets on the right are made from cedar wood, filed into shape, drilled, and then glued to the ends of the cords.



Figure 12: Two sets of type 5 aiglets made by the author

Type 6

Figure 10 is a fine example of a gold type 6 aiglet.

It is 14.51 mm long, and flattened a bit with the width and thickness being 5.5 mm and 2.52 mm respectively. Rounded into a tube again this would be about 3.5 to 4 mm in circumference. So it is reasonable to assume from the size, and having been decorated with one or more colors of enamel in the cells defined by the filigree, this would not be used on the end of a lace used to pass through sewn eyelets. But would have been a purely decorative item.²²

Many more of type 6 aiglets can be found on the Portable Antiquities Scheme website:

www.finds.org.uk.



Figure 13: A gold post medieval lace tag recorded on www.finds.org.uk

Copper Alloys, Latten And Other Metals

Most people today understand the basic definition of an alloy²³. Basic science has led to very exact terms and formulas for making modern alloys where we can determine the ingredients down to billionths of a part.

Prior to the 18th Century in England, the science of metallurgy was in its infancy and without being able to test the content of metals mined for secondary metals, mixing alloys was more of an educated guess. Point in case, brass. Brass is a mixture of copper with Zinc, which was not discovered as an element until 1746 by Andreas Marggraf.²⁴ It is interesting brass was routinely made for thousands of years without knowing the exact alloying metals.

It was not until the early part of the 18th century scientists began to discover many of the metals we know today. Many of these, in very small trace amounts can affect the properties of metals they are alloyed with. Unintentionally for the most part.

With the rising interest in science during the 18th and 19th centuries, it was during this time the first attempts to group and classify the elements together in a way that made it possible to predict and explain properties. This was the beginning of the discovery of the periodic table.

Through many centuries, copper alloys were loosely grouped together and called by various names. Depending on the time and place, the same word could mean copper, brass, bronze or any alloy of these. Latten was a very common name applied to alloys of copper that contained zinc (bronze) but it was also used to describe many different alloys. By the time of the 16th century, there was some consensus on the names of metals and their alloys. So when documents from the 16th century speak of brass, bronze or copper, it is fair to assume the metal alloy was reasonably correct for the description, even if the exact alloying metal were not known.

“The contract for the mid-15th-century effigy of Richard Beauchamp in St. Mary’s Church, Warwick, specifies ‘the best latten’ and analysis has shown this to be a copper-zinc-tin-lead alloy: 84.3 per cent copper, 9.4 per cent zinc, 3.3 per cent tin, 1.4 per cent lead, and the remaining c. 1.5 per cent nickel, iron, antimony, arsenic and silver²⁵.”

Many times, when an extant aiglet is described as being a “copper alloy”, what is meant is that the person recording the object, is making an educated guess as to the metal content. Until detailed testing is done, this is usually enough to satisfy most studies. Aiglets made by the author are from silver, brass and copper. Metal thickness was from 28 to 32 gauge.

Most aiglets are made of copper or one of its alloys. It is possible to find them made of silver or gold. When it is thought silver or gold was used, it is easy to determine the approximate amount of precious metal using a simple test by rubbing the aiglet on a touchstone²⁶ to leave a streak of metal, and then known metals are rubbed on the stone as well. A drop of acid is applied to the streaks dissolving the alloys leaving only precious metals. By

comparing the unknown streak from the aiglet, to the known streaks, it is possible to relatively accurately determine silver and gold content. This test is known as a stone, acid or streak test.

Many alloys were also contained lead while mainly used for bells and cooking pots, lead was commonly added to copper alloys to increase the amount of metal that was usable. This with the fact older metal objects were commonly recast, it is possible to say with some confidence aiglets can be made with many different alloys²⁷. Experiments with milling brass bar stock (1/8th inch thickness) containing 3% lead shows it was too brittle to flatten to 30 gauge metal. The lead content caused the metal to “hot-short”. This caused many breaks in the metal so it was not possible to make it thin enough to use for aiglets²⁸.

Extensive recycling of old metal items makes it likely some aiglets do contain more than trace amounts of lead and this could also contribute to them breaking and being lost. Detailed metallurgical analysis of extant aiglets has been hard to find but there is some information of this kind.

Ancient Monuments Laboratory report 89/90, “An Examination of the Copper Alloy Lace Tags from Acton Court”, by Sharon Strong talks about 2 aiglets with a trace of lead but I believe this was a trace from either recycled metal or contamination.

“The first 2 proved to be brass (copper-zinc alloy) with a minor trace of lead while the third was simply brass.²⁹”

Several of aiglets European origin found in Tipu, Belize were of metal that had only trace amounts of lead³⁰.

Experimentation with a 3/32” thick bar of navel (milling) brass with a lead content of 3% was done to determine a limit on the amount of lead that could be used to manufacture 30 gauge sheet shows it was probably not done. Brass with high lead content is very susceptible to cracking when cold worked with hammers. When heated over a charcoal forge and hot worked, it was very susceptible to cracking as well (Hot-shortening).³¹

More experimentation is needed but a lead content of 1% or more would more than likely make an alloy not usable for manufacturing sheet brass or bronze.

Textiles In Lace Ends

In “An Examination of the Copper Alloy Lace Tags from Acton Court” the material found in several cords is detailed quite well.³² Acton Court is a 16th to 17th century house dating from the Tudor era.

The following list is the text describing the images in Figure 9.65 of “An Examination of the Copper Alloy Lace Tags from Acton Court”.

Figure 9.65

- A Tabby-weave tape (on twelve warps)
- B Tabby cord. Circular, ?on tablets. Flattened out.
- BB Same as B, but weft pulled tight to make the cord.
- C Flat Plait. 5-thread.
- D Flat Plait. 8-thread.
- E Cord, 4-thread Plait.
- F Lucet cord.
- G Plait. 9-thread.

I have been using commercial cords made of cotton and cotton blends. I have also been using braided cords of flax. All of them work very well as points for type 1 aiglets. For type 2 and 3 aiglets, flat strips work much better.

Documents where the cord material is noted seem to tend to most aiglets being on some sort of textile cord with about 35 to 40% of them being attached to leather. Type 1 aiglets seem to be mostly found in the context of excavations dating to the the 15th and 16th centuries. Several different sources seem to agree with this. It was during the mid to late 16th century type 2 aiglets became more popular. Most likely made by attaching to a flattened tube of textile or flat strip of textile. this is the aiglet type that became the most popular for general use entering the 17th century.³³

Anglo Saxon Aiglets

Some of the earliest references to aiglets were in Anglo-Saxon England. Page 46 of “Dress in Anglo-Saxon England” shows a ferule from a possibly cosmetic brush³⁴.

The earliest mention of aiglets I can locate is in the following: “Apparently the only survival of pagan Anglo-Saxon footwear so far recorded is a lace-tag containing ‘worsted thread’ found in a sixth-century grave at Chessell Down, Isle of Wight.”³⁵.

I have not yet been able to locate a picture or drawing of this item. It is possible lace tags (aiglets) were used on drawstrings for necklines also. There is no extant evidence for this but two drawings do suggest this³⁶

The tweezers in figure 11 does show a similarity to aiglets. This item is clearly showing the concept of rolling tubes of metal was present. This is a set Roman Era tweezers found in Essex, Great Britain.³⁷



Figure 14: Roman Era tweezers

Depictions Of Aiglets In Art, Sculpture And Other Media

I am including several images of art showing aiglets as seeing them in art helps researchers to better understand written descriptions and to make sense of unfamiliar, archaic terms from written sources.

By using a wide range of sources we learn more as we can make logical connections between the different types of data presented, by materials objects that may have survived out of context to the way they were used. By also referring to visual sources, we see the items in context of how they were used. Every different type of informational source reveals a different interpretation of the same data. The absence of any one source increases our uncertainty.

If we have only the object, even its use may be extremely difficult to infer (e.g., the precise uses of some Bronze Age jewelry types is unclear -- earrings? nose-rings? hair-ornaments? dress-ornaments? Without written or painted / drawn / sculpted sources, we can't be sure.). Art will many times present a slightly different typological range of data than extant samples, extending the total known typological range. There may be surviving examples of aiglets that do not appear in pictures, and ones in pictures that have not yet been found (Type 5 aiglets for example).

In an exploration of material culture, it is necessary to connect the material being studied with the gender, age, occupation, and social class of the user so as to establish context. We can do this best through grave-finds and artwork which will present a commonality of use. A painter would not include such an insignificant aspect were it not an indication of value. We continue to use aiglets today, but how often do we actually see them in pictures? today aiglets are a mundanity, but here they demonstrate existence as a feature. It is not always a practicality, but repeatedly a practical decoration.

Portrait Of A Man With A Roman Coin

Man with a Roman Coin, Later identified as Bernardo Bembo, a Florentine humanist who spent some time in Bruges in 1473.³⁸ He was a fervent collector of coins and his emblem included laurel leaves and a palm tree. In this painting you can clearly see the aiglets on the lace holding his collar closed. This is one of the earliest images I can find of aiglets clearly depicted in art.



Figure 15: Portrait of a Man with a Roman Coin

The Peasant Wedding

When looking for paintings where aiglets are depicted, you probably can not find one with more than the “The Peasant Wedding” by Pieter Bruegel the Elder.³⁹ Painted in 1567, it has 46 aiglets easily seen. The majority of the points seem to be made from a flat tape, and they narrow right at the aiglet so it is reasonable these are mostly, if not all type 2 and type 3 aiglets.

Most of the points are white but there is the exception of the peasant sitting at the feast table (about the center of the painting) where we can see his points match his brown hose.



Figure 16: *The Peasant Wedding*, detail 1



Figure 17: *The Peasant Wedding*, detail 2

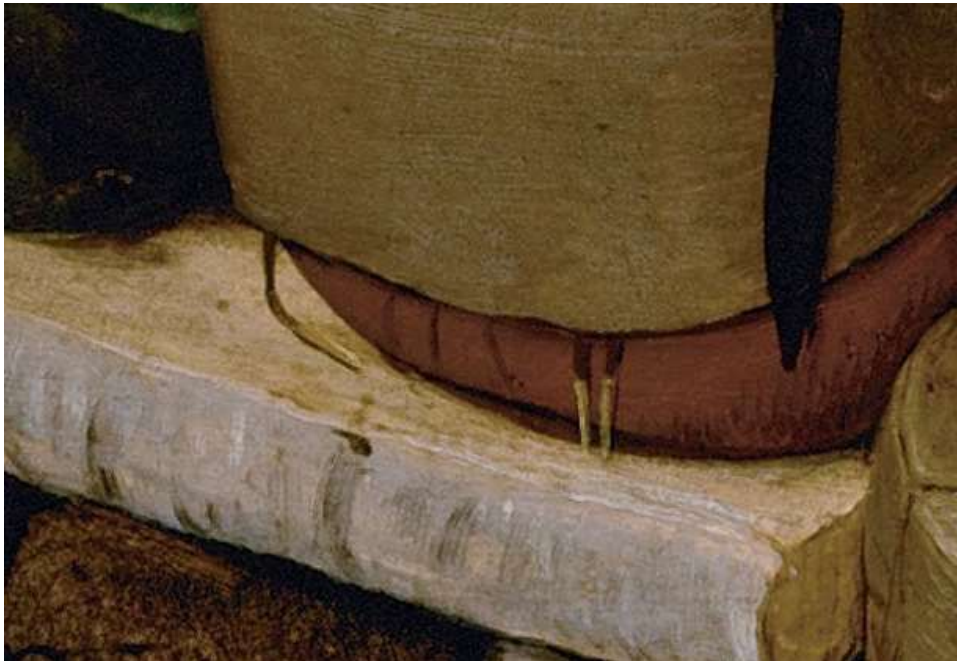


Figure 18: *The Peasant Wedding*, detail 3

Linen Burial Doublet

Linen burial doublet of Antonello Petrucci, ca. 1585.⁴⁰ Naples, Italy. You can clearly see this is a very large aiglet. Most likely not a type 1 aiglet, but as the seam is turned away, it is not possible to determine the type exactly. I am putting the length of this at close to 2 inches. It may be made of oxidized silver as it is very grey in color.



Figure 19: burial doublet of Antonello Petrucci

Portrait of a Bearded Man

Portrait of a bearded man.⁴¹ This gentleman drawn in chalk has several aiglets drawn as if they are strips of metal wound around a mandrel to form the basic shape. These are a fine example of an item that does not exist outside of art. These are very large so it is possible these were made by a jeweler out of silver or gold. While these are very unusual, I believe they could be easily made. I would classify them as type 1 aiglets.



Figure 20: Unknown Frenchman. Maybe by Clouet

In figure 18 you can clearly see the design of the aiglets in the detail pulled from the drawing. I interpreted these as being a type one aiglet made from a strip of metal wound around the mandrel, then soldered (figure 19).



Figure 21: Portrait of a bearded man, detail



Figure 22: Silver, wound, type 1 aiglets

In figure 18 you can clearly see the design of the aiglets in the detail pulled from the drawing. I interpreted these as being a type one aiglet made from a strip of metal wound around the mandrel, then soldered (figure 19).



Figure 23: Brass spiral decorated aiglets made by David Robb, Type 2

Figure 20 shows a set of brass aiglets based on the same image of the “Portrait of a Bearded Man”. It is interesting to note David Robb interpreted these as type 2 aiglets.⁴²

This is a wonderful example of how two craftspeople can look at an item and visualize different methods for fabrication. This difference of approach exemplifies experimental archaeology as it deepens the general pool of knowledge for future studies.

Portrait of Hector Van Bouricius

Portrait of Hector Van Bouricius.⁴³ In this image from 1599, you can see the young boy is wearing very large aiglets and they are a primary part of the image. About 2 inches long, these have a good chance of being made from gold to show the wealth of his family.



Figure 24: Portrait of Hector Van Bouricius, 1599

Baroness Dacre And Her Son

Mary Nevill or Neville, Baroness Dacre, and her son Gregory Fiennes, 10th Baron Dacre, 1559, by Hans Eworth. The heyday of decorative aiglets in pairs everywhere.

This portrait painted in 1559, of Mary Nevill(e), Baroness Dacre, and her son Gregory, 10th Baron Dacre, clearly shows how aiglets went from a functional item, to one more decorative. These are type 6 aiglets as they are not functional in any way other than to show the wealth of the owner.⁴⁴



Figure 25: Baroness Dacre, and her son Gregory Fiennes, by Hans Eworth

Could this be where the phrase “Aiglet-baby” came from that was used by William Shakespeare about three decades later?

Costanza Caetani

Painted probably about 1480-90, this painting of Costanza Caetani shows a type 4 aiglet on her lacing at the center of her dress.⁴⁵



Figure 27: painting of Costanza Caetani, detail of type 4 aiglet



Figure 26: painting of Costanza Caetani

The Manufacturing Of Aiglets

There are very few images showing what the inside of a workshop for the manufacturing of aiglets. There is one woodcut by Jost Amman showing men cutting leather laces and making aiglets but there is very little detail (Figure 2). As to shops from the medieval era, there are few to reference.

To rediscover how aiglets were made, we need to look to other trades that did similar work. Making small items from metal. Jewelry and jewelry workshops tend to be recorded more than other trades.

Before the 16th century, there are many extant items of jewelry which have survived intact. While there are few images of jewelers workshops before the 16th century, there are enough, that combined with extant items of jewelry, the writings of jewelers, sculptors, and others, it is possible to gradually rediscover how jewelry, and by extension, aiglets were made.

We start by examining several 16th century images of workshops that make jewelry, pins and needles. Many of the tools used in these shops could be found in any of them, as they are all for manufacturing small items of non-ferrous metals. As many of the tools would have been the same, the type of image providing the best information about what tools were available during the late medieval period detail would be either drawings, engravings or painting. For additional information, the following books are recommended. 'The Archaeology of York: Volume 17: The Small Finds' as well as 'Craft, Industry and Everyday Life: Finds from Medieval York'^{46 47}.

The discussion of what tools were used to manufacture aiglets needs to start here with what images can be found. A modern bench jeweler is in the unique position to look at these different paintings, engravings, illustrations, and images to determine which are accurate portrayals of tools and processes, and which are drawn simply for aesthetic value⁴⁸. The books recommended above have many tools that could have been used in the making of aiglets and jewelry.

Having knowledge of modern jewelry manufacturing processes and being well read in historical manufacturing techniques, and by experimentation using only the tools and methods of manufacturing that would have been available in the 16th century provide an accurate idea of what could have been done. Being able to examine a small item such as a piece of jewelry or an aiglet, and being able to interrupt the marks left by tools during the manufacturing process is very important. Marks and impressions left by the manufacturing process hint at the tools and techniques used.

Being able to look at the archaeological record and identify the tools used in the manufacturing of an item is helpful but it does not completely inform us about the processes used in the manufacturing of that item. This is where experimental archaeology becomes a useful tool. However, we must consider two important points from experimental archaeology.

First, modern anachronisms diminish the legitimacy of the experimental process.

Second, fully authentic equipment and materials are hard, if not impossible to document, further reducing the weight and substance of any arguments for a particular process.

By carrying out repeated experiments, we address the above points.

Each time we experiment, we narrow down the possible processes which might have been used. Each time, with each refinement in the process, we learn what works and what does not. Each time we raise new questions while we answer others. Eventually, by repeating this experimental process we reach a point where more questions are answered than raised. It is this experimental archaeology which leads to the statistically probable manufacturing processes we are looking to rediscover.

It is also important to remember, more often than not, there is no 'best way' to do a task. Differences in the interpretation of an image, or the way an extant item was formed can lead to different, but equally legitimate methods and manufacturing processes. Figure 20 above illustrates this point very well.

One important fact to remember is the processes of manufacturing jewelry have changed very little. The main development in the last five centuries is a better understanding of the properties of the materials being used. Also important is the advances in tools, again partially related to a better understanding of the materials used to make the tools. Wherein a 16th century engraver may use tools made from iron that needs to be sharpened every few hours, a process that can take a sizable portion of each day, the modern engraver has access to high quality tools that sharpen easily and hold a much better edge and stay sharp for extended periods.

While there are very few images of shops during the medieval era, there is evidence that can be interpreted by the examination of small hoards of jewelers tools and supplies.

Images Of Jewelry Workshops In The 15th And 16th Century

The engravings by Etienne Delaune are probably the best references we have from that era in history as to what the working conditions of metalworkers and jewelers were. His engravings are very detailed and as he would have used all of the tools he engraved images of, it is reasonable to assume his images are accurate. Delaune worked as a goldsmith in Paris during the middle of the 16th century. The differences between the English and French workshops would be minor and mostly dictated by the styles of jewelry preferred by clients in the area.

This engraving by Etienne Delaune is a Goldsmith's Workshop from 1576 and shows many tools still in use today by jewelers. There are several craftsmen seated at the center jeweler's bench and in the European style, they have leather aprons⁴⁹ to catch the fines of metal generated from their work to be refined again later and reused. On the walls of the workshop you can see a collection of tongs, saws, snips, drawplates, and various other tools. A young man, most likely an apprentice, can be seen drawing wire or he may even be drawing a flat sheet into a tube for later use. The Jewelers at the bench are doing various tasks while an older apprentice is doing something with a furnace⁵⁰. With the main difference being some tools are modernized and are much smaller, all of these tools are recognizable to a well-trained jeweler.



Figure 28: Engraving by Etienne Delaune, 1576 (1)

In this second view of a goldsmith's workshop, Also an engraving by Etienne Delaune, the master goldsmith looks to be doing repoussé on a large serving tray. On the walls you can see many tools are still in use today such as hammers, chisels, tongs and drills. On the shelf at the top right you can see several cones of borax waiting to be used as flux for casting and soldering⁵¹. One of the apprentices is working with the furnace while the youngest apprentice works the bellows. Another smith (or apprentice) sits at a stump with an iron stake, raising a hollow form.⁵²



Figure 29: Engraving by Etienne Delaune, 1576 (2)

This image of St Eligius in His Workshop is from the mid 15th century and while a bit fanciful, it still functions as a reasonably accurate image. Saint Eligius is the patron saint of goldsmiths, other metalworkers, and coin collectors. He is also the patron saint of veterinarians, of horses and those who work with them. He was a jeweler who became a priest and then a Bishop. While the images are meant to show the life of St Eligius, the images, over the centuries seem to be fairly accurate. The tools and processes are accurate enough for a jeweler to recognize them.

In this 1450 engraving by the Master of Balaam, the female apprentice is probably striking a coin. This is not a task done in the average jewelry shop but considering that Saint Eligius is the patron saint of coin collectors, this is not a surprising addition. On the table next to her are several tools and a belt buckle.⁵³ The worker next to her seems to be preparing a job for soldering on the jewelry hearth located to the left side of the image. At least that is the impression I get when examining the items in his hand. The young man standing is drawing wire. Any jeweler is familiar with this process. The man in the center is St Eligius. While he would not work in his robes, the image is accurately portraying the process of raising a form on a stake. With just these three images, we can be fairly sure the tools would be familiar to a modern metal smith.



Figure 30: Engraving by the Master of Balaam, 1450

With comparison, it is possible to then experiment with processes and eliminate those that are not effective, or take too long. The one constant between the metal workers of today and of earlier centuries is the metal worker themselves.

The body moves in the same way, regardless of when you were born. And this drives the design of tools and how they are used. The only difference I am aware of is the average person today is only a small amount taller than their medieval counterparts. The average sailor on the Mary Rose was 5ft 5in. There should be no difference in tool usage due to this.

It is interesting to note women were working alongside the men making jewelry. While most images only show men working in jewelry shops, there are a few images, as well as many documents describing women working in the trade.

Some of the information in “General History of Paris Collection of Documents published under the auspices of the Parisian city Trades of Paris”, speaks about how the “widows of doers of aiguillette” were allowed to continue that work. This shows women were, at least in France, working alongside the men⁵⁴.

In “Technological innovation and the decorative arts” page 85, a letter dated February 7th, 1775 was written to try and recruit a James Watt, a skilled silversmith, to come to work for Matthew Boulton in Birmingham. This letter lays out the promises to Watt, if he comes to Birmingham, he will have access to several workers and any materials he wants in his shop. “Including any women as long as they were acceptable to Mrs. Watt.” While this letter is about three centuries later than the image pictured, the lack of skilled workers would most likely have been have been as much a concern in 1450 as it was in 1775, or even in a goldsmiths shop today^{55 56}.

Aiglets With Decorative Work Designs

Starting as purely utilitarian items in the 7th century, aiglets became by the 17th century an item of wealth and prestige as well as a basic item. With the increased usage of belts, buttons and hooks, they fell out of usage and became yet again, a simple utilitarian item. But not all aiglets with decorations were type 6. Many of the everyday aiglets were also decorated in some way.

This section examines aiglets with decorative designs and styles.

We start with the Portrait of a bearded man, an Unknown Frenchman, Maybe by Clouet, which was referenced earlier. A simple twisted piece of metal, soldered into a solid tube, is a simple but elegant way to add decoration to an otherwise mundane item.



Figure 31: Unknown Frenchman, Maybe by Clouet, detail.

A wonderful example of a goldsmiths work, this post medieval, gold cloisonné aiglet (lace end) has been slightly flattened and has lost most of the white enamel once covered it. This is a type 6 aiglet as it would not have been functional in any way.⁵⁷ It is 19.67 mm in length, and in its current shape, 8.12mm and 0.63mm wide and thick respectively. Rounded out into a tube once again, it would be approximately 5.5 mm diameter.



Figure 32: Gold cloisonné aiglet

Two possibly related copper aiglets.

The first has been recorded with the the Portable Antiquities Scheme ⁵⁸ while the second aiglet was found at a later time.

Copper Alloy type 2 aiglet (Lace Tag).⁵⁹ This early, post medieval tag has been decorated with very detailed designs. This would be a very nice useful and decorative aiglet to use to dress up a plain bit of clothing or for a special item to be worn on a special occasion.

The details are very deep so I believe this was probably done with repoussé'. A strike from behind, into a piece of lead could easily make a design deep enough to survive being rounded into an aiglet.



Figure 33: Copper Alloy type 2 aiglet

Now compare the copper aiglet above to this aiglet found during the last week of January, 2017, on the Thames Foreshore.⁶⁰ This one is more than likely brass.

Very similar. The design suggests they came from the same area, if not the same shop. I am not able to tell from the image if it is also a type 2 aiglet. But the area near the center where it was bent and the metal tore, there is a bit of possible metal from the opposite seam visible.

That might indicate this is a type 2 aiglet.



Figure 34: Brass Thames aiglet found January 2017

Review Of The Manufacturing Process

There is nothing to very little information available about manufacturing aiglets during the medieval and post medieval eras.

It is not until we get closer to the start of the industrial Revolution in 1750 that it is possible to find useful information about manufacturing processes. So we start with the modern manufacturing process' from the 19th century.

Many people are familiar with aiglets and do not even know they own many of them already. The modern aiglet, or lacing point, can be found on many of the shoes in your home. If your shoe has a lace, then it most likely has a thin plastic tip keeping the end from unraveling. That plastic tip is an aiglet. From what I can find, aiglets are normally made from thin plastic and are attached to the middle of a piece of long cord and then cut in half at this point. Repeating this process makes what is recognized as a modern shoelace.

Today it is rare to find any laces with metal aiglets with the exception of some very high priced athletic shoes. It is again becoming fashionable to purchase decorative aiglets and attach them to cords and laces again.

The earliest I can find a reference to modern manufacturing techniques for aiglets is a reference and two illustrations in the book "Cyclopædia of the industry of all nations" by Charles Knight, Printed in 1851.

On page 58 is the following entry about aiglets.

"AIGLETS is the French name for what in England are called *tags*, viz., the metal sheaths at the end of laces or points. These *points* are now out of date; they were ties or bows, adorned at the end with aiglets, and were used instead of buttons for fastening dresses. They were, in the 16th and 17th centuries, not merely for service, as the modern tag, but were profusely employed as ornaments, glistening like spangles. In some of the silk-mills of Derby, tags for silk boot laces are made in a curious manner. A little boy sits before a kind of cutting-machine, with which he cuts a strip of sheet-brass into small pieces, each large enough for one tag; the piece is at the same time bent into a kind of semi-cylindrical form. The pieces are then taken up by another boy, and dropped one by one into a recess in another machine; and the end of a silk lace being laid in the hollow of the tag, a lever is brought down with the left hand, by which the tag is made to embrace the lace firmly, enclosing it all around. These processes are conducted with astonishing rapidity: the fingers of the two boys moving almost as fast as the eye can follow them."

The above text is accompanied by illustration #29 on the bottom of page 1044:

“Fixing on tags” and “Cutting tags”



Figure 35: Cutting Tags



Figure 36: Fixing on tags

One aiglet that might have been made in the 19th century would be the one labeled “Thames Aiglet 18”. I believe this might be part of a lace-tag commercially tipped from the 19th century. But I think the cord, if it is synthetic, might put it later. This counts as a type 3 aiglet as it has the metal rolled around the lace. It is very likely it was made on a machine very similar to the ones above.

It is my only probable example of a 19th century aiglet. More information for this extant aiglet is available in the notes section after the tables.

This broke at one of the dimples made by the machine rolling the aiglet around the cord. This dimple would have helped secure the aiglet to the cord.

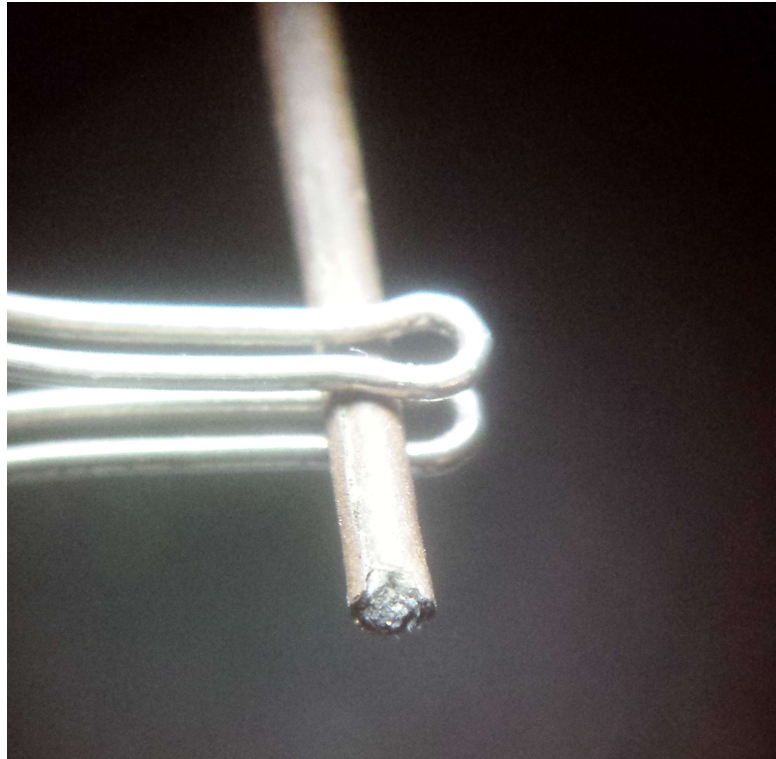


Figure 37: Thames aiglet 18, detail of broken end

Moving to the 20th century, the YouTube video “Fun with Aglets” shows a machine that forms the plastic aglets. This would be used most likely in a very small factory as it requires a person to operate and make every lace. It is a very good example of a non-automated process⁶¹.

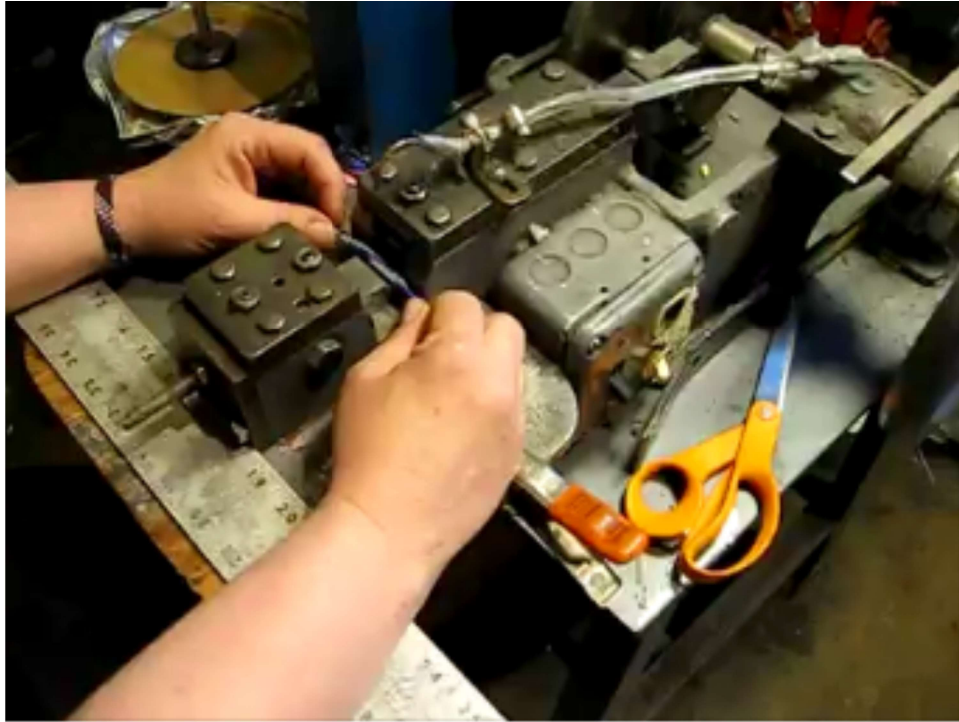


Figure 38: A modern machine for making and attaching plastic aglets

Contrast this with this video of a Fully Automatic Lace Tipping Machine from the Artur Mueller Company in Germany, you can see the process has for the most part, become fully automated.⁶²



Figure 39: A Fully Automatic Lace Tipping Machine

Tinkle Cones And Bola Ties

As many of the aiglets used in by reenactors are actually tips for Bola ties (sometimes called “bolo”, “bola” or “Western” ties), it is sensible to discuss how they are made.

First, the modern bola tie was invented by Vic Cedarstaff in the late 1940’s in Arizona⁶³. It was quickly found to be a popular new medium for artistic expression by Native Americans in the Southwest. Instructions on making bola ties, clasps, and tips quickly found their way into instructional books for silver smithing. The bola tie was made the “official neck wear of the great state of Arizona” on April 22nd, 1971⁶⁴. Most bola tips are equal to larger aiglets in size or larger.

With bola tie tips being readily available, it is easy to compare them to extant examples of aiglets manufactured during previous centuries. It is easy with a quick search on-line to see the wide variety of styles of bola ties tips.

Of the commercially made ones, there are many that are available but only a few styles. Most are made in a press and then plated to be either silver or gold toned. A very few are cast of a lightweight metal, then plated. If you search for handmade bola ties, you see a wider variety of styles.

“Tips are made from tubing filed and flattened and then filled on the end with solder, or by constructing a tapered tube from 26-gauge metal and later installing a bead at the base”⁶⁵.

“Bola tips and also necklace cones can be made by bending a V-shaped piece of 28 gauge silver sheet around the tapered end of a regular punch or nail set and then the joint soldered. A number of different bola tips can be made by soldering on different kinds of beads with a silver ball on the tip. These tips are easily held on even without glue (rubber cement) by cutting or filing notches in the top end and crimping securely around the leather cord”⁶⁶.

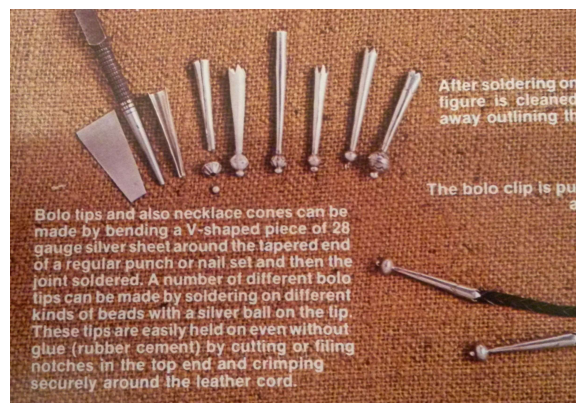


Figure 40: Information about making bola tie tips

Current Manufacturing Of Aiglets

While communicating with several artisans from the United Kingdom and the United States I have become aware of several people that use pliers and hammers for forming aiglets. Also, the one illustration we know shows points being made show an 'aigletmakere' holding a small hammer. Are the aiglets being formed before attachment to the leather laces, being formed around the leather laces, or are being attached to the cords, making the finished points? There is no way to tell. Forming the aiglets would be hard to see in an illustration. Hammers would be a common tool used and easily recognized by the people viewing the illustration.

It should be noted type 1 aiglets are not made with hammers, unlike type 2 and type 3 aiglets. but are riveted to cords with a small hammer. So any illustrations of people making aiglets are correct for tools used, but the process may not be depicted correctly.

We also have to remember many times books were made for a patron and as such would have been tailored to the wishes of the person paying for the work. Many times this included the addition of religious iconography. Hammers were used by carpenters and as such would draw a comparison between the 'aigletmakere' and Jesus. Many illustrations show tradesmen with some variation of tools that are also used in carpentry. IE: drills, rasps, files, saws, axes, adze. Many illustrations, in my opinion, tend to have some sort of religious iconography included in them. Hence this has to be considered when looking for documentary evidence of processes and techniques.

On page 228 of "Queen Elizabeth's Wardrobe Unlocked" by Janet Arnold, is a reference about the tools used for attaching aiglets.

"There is an entry in 1579 for gylberte Powlson for a bodkyn a Hammer a litell sythye and other tools to tagge points withall clenye wrought, These were tools for hammering metal tags on the ends of ribbons or laces used for various items of clothing"

I have not been able to determine what is meant by the description of a "litell sythye" but most people who have talked about it suspect it would be a cutting tool similar in form to a leather knife or even a small pair of shears⁶⁷. The few references that discuss the "litell sythye" all make the assumption it is a cutting tool. With the lack of information how the tool was used or even how it looked, it is a safe assumption to make.

I would like to put forward the idea the tool called a "litell sythye" is only called that because the general shape of the tool looks much like a full sized version of a scythe. What if the "litell sythye" was not a cutting tool at all? Possible uses for a tool shaped like a scythe could be as a hammer, a burnishing tool. A tool to score metal, punch holes. Make holes in fabric for eyelets, to hold something in place. Experiments suggest that a small sythe shaped tool works well to help shape type 2 and type 3 aiglets. Further experimentation is indicated before a definite use and form can be decided.

This German woodcut title was translated as “The strap makers”⁶⁸. The man in the front is cutting strips of leather for points.

Look at the tool the man in the front is using. Two more are hung on hooks over his head. Is it possible the tool he is using translates in English as “litell sythye”?

The man to the left of the image is cutting strips of metal to be made into aiglets for attaching to the ends of the leather points. The second man in the background is clearly attaching an aiglet to a leather strip. Whether he is forming the aiglet over the leather strip or merely riveting the aiglet to the strip, is not clear.

Point makers manufacturing points with lace or strips of ribbon would get their materials from lace makers or somewhere else. The making of lace was enough of a specialized skill it was unlikely aiglet makers would have done this in house.

Another valuable resource is a copy of regulations for the merchants in Paris France. While written in 1886, the book “Les métiers et corporations de la ville de Paris : XIVE-XVIIIe siècles...” has many regulations for the making of aiglets. Many of the rules and letters go back centuries. This is probably the best source of information about the industry centered around this item⁶⁹. A translation by the author is available of several pages from chapter 28 at www.livingstonjewelers/translations.html.⁷⁰



Figure 41: The Strap Makers, detail

Aiglets And The New World

Cuba and the Caribbean

There is much to be learned from the Indo-Hispanic contact between Europeans and indigenous peoples in the Caribbean.

Aiglets were an important part of the discovery of the Americas. They were used by Christopher Columbus and his crew as trade items to the natives in the New World^{71 72}. The use of metal cones as decoration and beads by Native American tribes is traceable back to those first voyages of Columbus and his trading of aiglets.

A report was published in 2006 supporting the writing of Christopher Columbus. In his journals, Columbus had written he and his men had traded brass aiglets to the indigenous people of the islands he was sailing among.

Excavations in the cemetery of El Chorro de Mai'ta, Cuba has provided brass lace tags (aiglets) that with metallurgical testing show they came from Europe.

Through analysis of metalwork found in indigenous graves near the east coast of what is now Cuba, it found many of the long, thin beads found were made of brass. Brass was not a metal the indigenous natives would have been able to make during that time. After analysis, it was determined they must have been aiglets traded by ships crews during the first few voyages to that area. It was determined the beads (aiglets) were made of brass that had probably made by brass workers in Germany. Somehow, this brass made its way to Spain. Whether as raw material or as finished goods, either way we know it had to have been made into aiglets, most likely for the crews and passengers of the ships that first made their way to the new world, only to be used as currency that had a greater value than gold⁷³.

The presence of lace tags (aiglets) of brass were called "Turey" and were considered extremely valuable. During the excavations in the cemetery of El Chorro de Mai'ta, 17 bodies were found with small metallic tubes as decoration. Several of these tubes were found to be brass, a metal that was almost unknown to the indigenous peoples in the Caribbean and what would come to be known as the "American continent".

A radiograph of an object found in association with Skeleton number 25 found 5 brass lace tags (aiglets). "A metal disc covered with cotton cloth forming a single ornament".⁷⁴ This burial did not have the same position as many of the burials dated to an earlier date and possibly indicates a change in funerary practices of the indigenous peoples after contact with Europeans.

I highly suggests purchasing the book "Beyond the blockade: New currents in Cuban archaeology" (2010), published by the University of Alabama Press. To learn more about Indo-Hispanic contact between Europeans and indigenous peoples of the Caribbean.⁷⁵

North America

Aiglets were either brought into or produced by settlers in the American colony of Jamestown Virginia. It is possible they were also used as trade items. Excavations in Jamestown have uncovered not only aiglets, but also beads of glass and of scrap copper alloy that may have been made into tubes for use in trade with the local indigenous populations.⁷⁶

The trade of small metal goods is well documented. The finding of aiglets hundreds of miles from the coast in what would become the State of North Dakota shows these trade items were traded among indigenous populations as well.

In June 1998, the remains of a very early 17th century native American Village, were found during a street renovation project in the City of Mandan, North Dakota. This brings us to the question of when the site was occupied. Evidence indicates Euroamerican trade artifacts found their way into the region starting right around AD 1600.⁷⁷

Native Americans

From a conversation with Michele Buzbee about native American dresses.

“Jingles for the jingle dance are made from snuff can lids, not tinkle cones, which were originally aiglets. Jingles are much larger and using them on dresses originated among the Great Lakes peoples around the last turn of the century, coinciding with the tinning of tobacco. The tinkle cones on clothing goes back to the earliest contact with Europeans, all along the Atlantic coast, coinciding with the Europeans pointing all their clothes together.”

Further research on the subject of aiglets as trade goods and their eventual evolution into decorative accessories used by the indigenous populations of America is a topic of study for later.

Extant Aiglets

This section discusses several extant aiglets from the Middle to Late Medieval Periods.

“Post-medieval Sites And Their Pottery”

This section also discusses several extant aiglets described in “Post-medieval sites and their pottery, Moulsham Street, Chelmsford”⁷⁸.

“Of the type 1 tags, 4 possessed a transverse groove decoration (AML no 876682) which Bayley (1985, 47) suggests may have been caused by the use of ridged pliers.”⁷⁹

This is notable for two reasons.

First, “Four of the type one lace tags may have been decorated with the use of “ridged pliers”. Decorated, not manufactured, but this is the first suggestion pliers of any sort may have been used in the manufacturing or decoration of aiglets (lace tags). The sketch of one of the aiglets do not show the decoration in detail but do show an un-remarkable type 2 aiglet.”

Second, this is the first evidence I had found type 2 aiglets were decorated. Since then I have found several examples of type 1,2 and 3 aiglets that are decorated.

A question I wanted to answer was “were pliers were used to make aiglets”?

In “Post-medieval sites and their pottery, Moulsham Street, Chelmsford” figure 30.73⁸⁰, This aiglet was noted as possibly being decorated with something akin to ridged pliers. The curator was able to locate the aiglets in the illustration but was unable to take detailed images. He was gracious enough to send them to me for examination but unfortunately, they were too fragile and most of them did not survive the trip halfway around the globe⁸¹.

Of the 9 aiglets sent, (Fig. 30.65, 30.67 to 30.73) only 4 made the trip intact. The aiglet in Figure in 60.73, was missing entirely, probably from being lost from the damage to the package in mailing.

But, like a phoenix rising from the ashes, information became available that would not have been apparent if the aiglets had arrived intact.

The aiglet depicted in Figure 30.65 from Cunningham, C. M., & Drury, P. J. (1985), had cracked down its length and had several smaller pieces break off, and some were lost, during the journey from Chelmsford, UK to Wisconsin, USA. When examined, the aiglet was determined to be a Type 2 aiglet where both sides of the metal is folded into the lace to securely hold it in place. Only one side of the seam made the trip. This inner part, having been protected from polishing, wear, and corrosion, clearly shows marks left by tools during the manufacturing process.

The edge has a pattern of bends suggesting it was folded over the lace, then crimped several times along its length by a small set of needle nose pliers to tightly grip the lace before the aiglet was bent into a round shape. It is possible it may have been done with a punch but that would take longer and involve more tools.

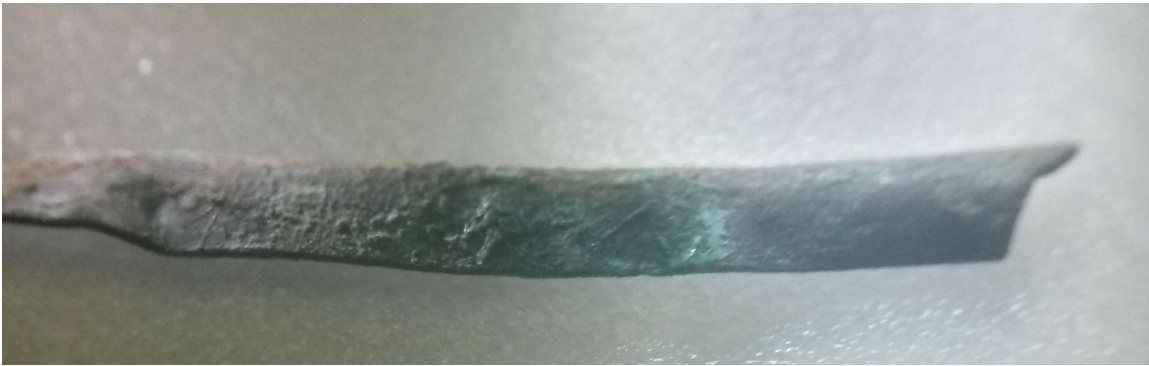


Figure 42: Aiglet from Fig 30.65

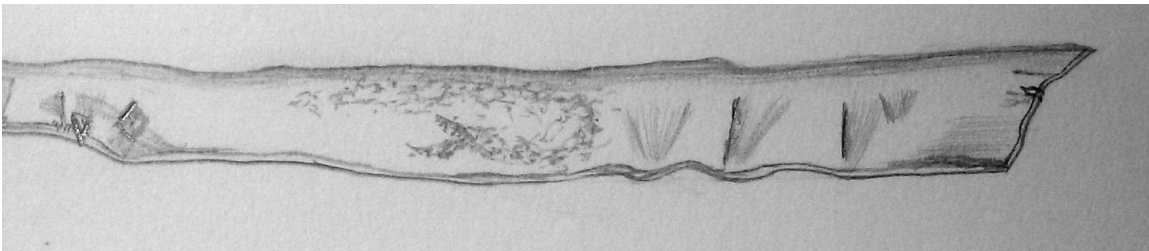


Figure 43: Aiglet from Fig 30.65, drawing for comparison

The top of the aiglet is on the right and the seam is at the bottom of the image. I believe the preceding image shows enough evidence to say pliers were used during the manufacturing of type 2 aiglets. It is possible pliers were also used in the manufacturing of type 3 aiglets.

Replica Aiglet Manufacturing

Tools For Manufacturing Aiglets

The tools used to make aiglets are quite minimal. A mandrel for each size of aiglet (type 1), shears, a bezel roller, a small piece of leather, a burnishing tool, a flat ended punch, a small riveting hammer, files, polishing supplies.

Most of the tools I used for manufacturing aiglets are commercially available. The shears and the bezel roller can be found in any catalog selling jewelry tools. The bezel roller can be steel, but during the late middle ages it might be made of brass, agate, jade, a dense wood species or anything else denser and stiffer than the metal being rolled. A considerable amount of force is placed on the mandrel and punches when manufacturing type 1 aiglets so it is conjectured the mandrels and punches were made of forged and case hardened iron.

The burnishing tool for aiglets would have had tapered grooves in it to be able to efficiently burnish the aiglet blanks onto the mandrel (type 1) or anvil edge (type 2 and type 3). The tool I made, after a few attempts, was found to be extremely efficient. So much so that barely any other tool is needed to form type 1 aiglets. Unless lost, hidden, or buried with the owner, most tools never make it into the archaeological record as they can be repurposed and the metal recycled. The chance to find a similar tool in a museum are slim at best.

When manufacturing type 2 and type 3 aiglets, a task specific anvil is not required, but it contributes a several-fold increase in efficiency. I created one patterned after several seen in several era specific illustrations showing shops where aiglets were being made.

Manufacturing Type 1 Aiglets

The classification of a type 1 aiglet: "Type 1 aiglets have a seam defined by the edge of the metal butting against each other along the majority of the seam. The edges may overlap for a short distance at the base and/or the top of the aiglet."

After correspondence with Theodore R. Lazcano about the procedures he uses to create aiglets for historical reenactment, he has sent two type 1 aiglets made by him for comparison in this research. His instructions are very clear and easy to follow. They include making a mandrel, a pattern for the blanks and a pair of smooth-jawed pliers for the manufacturing of the aiglets. He does not mention using dead-soft metal but he does at one place in his instructions, he suggests you hammer flat the blanks after you have cut them to size. This would harden the metal. To remove the marks left by the pliers he suggests sanding with a common paper fingernail file.⁸²

Probably the most referenced work by historical reenactors to learn the process to make aiglets would be the instructions found in "The Complete Anachronist, # 108" A publication of the

Society for Creative Anachronism. The section about making aiglets was contributed to by Theodore R. Lazcano, Lois Swales, and Zoe Kuhn⁸³.

Peter Adams in Tournaments Illuminated (another publication of the Society for Creative Anachronism), Winter 1993 Issue 109. Pens and Points: Medieval Copper Alloy Cones. Does speak about making aiglets as they are related to making pen tips.

Mr. Adams also shows a process wherein you use a hammer to form the aiglet over the mandrel. This is a very common step in making modern equivalents of late medieval aiglets. It is conjectured that this done as most aiglets are made by costume designers and historical reenactors completing costumes and they do not have the tools to properly anneal & clean their metal before making aiglets. With properly annealed metal, it is easy to form types 1, 2 and 3 aiglets.

To make a single type 1 aiglet, start to finish, takes about eight minutes for the entire process. This takes into account working with metal that has not been annealed and is either fully hardened or half-hard.

It should be possible to make one plain type 1 aiglet, start to finish, in two minutes in a manufacturing environment. This takes into account economies of scale including annealing the aiglet blanks.

Making aiglets with patterned metal adds time due to the process to imprint the metal which can vary depending on the method used.

The aiglets made by the author are brass, copper, fine silver, or sterling silver. Metal gauge varies from 26 gauge to 34 gauge.

Most of the extant aiglets in the collection of the author measure from about 32 gauge to 28 gauge. The larger and longer the aiglet, the thicker the metal can be. As the size of the aiglet decreases, the metal gauge is decreased.

Using the procedures set forth by several others, pliers and hammers were used to manufacture several type 1 aiglets. The process took about 2 minutes to roughly shape each aiglet. It took several additional minutes to remove the tool marks left by the pliers and hammers.

After examining several extant aiglets, It was determined that the process of making replica type 1 aiglets did not match the process for aiglets made before the Industrial era. Only a few were made using this process as I felt this was enough to show the inefficiency of this method.

The following process is descriptive but for a better understanding of the process, the video at the following URL will help with understanding the process of manufacturing type 1 aiglets.

It may be found at this address: <http://youtu.be/yq9wke1Ot5s>.

The Process

Start with sheet brass or copper. A jeweler in Tudor England might make their own sheet in silver and gold but would probably purchase base metals from a vendor of copper.

The first step in making aiglets is to scribe lines onto your metal sheet in order to cut strips as wide as the length of the aiglets, then use a small metal pattern of the aiglet blank to add the cutting lines to the strips.

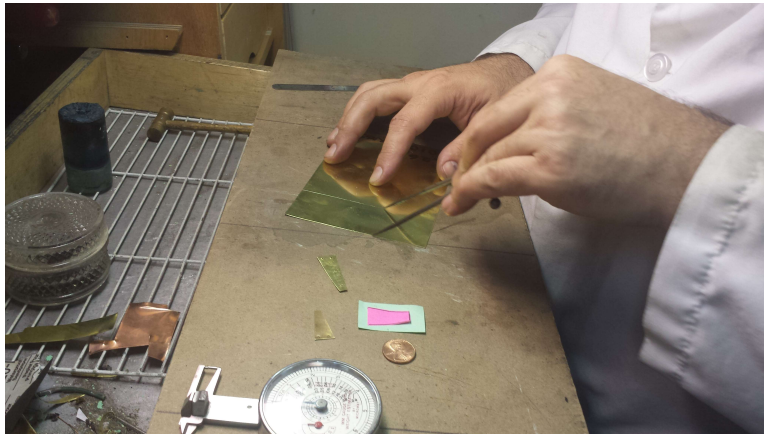


Figure 44: scribing the pattern onto the metal

At this point, decide how the aiglets are to be attached to your cords.

If the aiglets are to be sewn on (Most modern aiglets are sewn onto cords and laces), than holes are punched with a flat faced punch on the end grain of a dense block of wood.

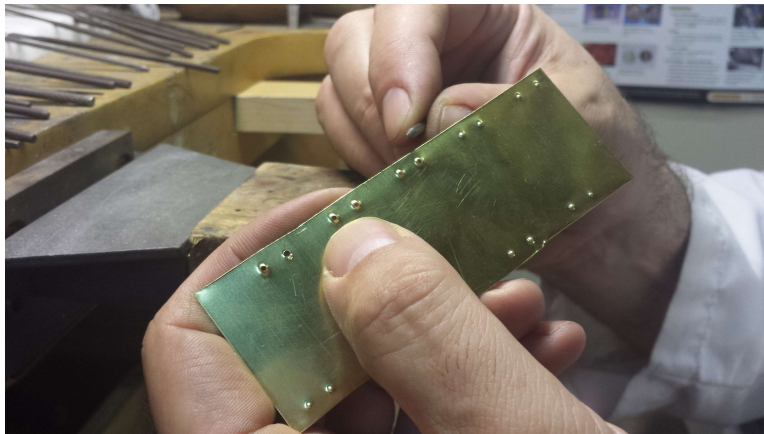


Figure 45: punching the holes

The reason this is done before cutting the individual aiglets from the strip is that it is much easier to handle one large piece of metal rather than many small ones. If you look at the holes after punching, burrs need to be removed by filing or rubbing with a small whet stone. Burrs on the inside of the aiglets interfere with attaching the aiglets to the cords.

If the aiglets are riveted, make a very light mark with a punch to make a small depression in the metal where the rivets will be, but do not punch through the metal.

If the aiglets are to have a tab cut at the lower end to close the end, or triangular tabs at the top to secure the aiglet to the cord, modify your aiglet blanks at this time by carefully cutting the shapes into the aiglet blanks.

If the tops will be cut or filed into triangular points in order to bend into the cord, this has to be considered when cutting the blanks and the position of the holes for riveting / sewing the aiglets to the lace. When bent, the diameter of the aiglet is largest where the metal is bent.



Figure 46: Cut tabs at the top end of the aiglet blank

There are one example of a garment with the triangular tabs at the top of the aiglets left sticking out, the aiglets are also sewn onto the cords very poorly. Whether this is a stylistic decision, or the aiglets were added later to the garment, these make it impossible to remove the points from the garment without damage to the aiglets, the garment itself, and the person attempting to remove the points.⁸⁴ It is my opinion that tabs at the top of aiglets sticking out without folding into the lace was never done on functional clothing.

I have made several aiglets with triangular tabs cut at the upper end with a square punch. The ends were folded into the ends of the cords quite easily with a bezel roller and with a small bit of adhesive, were enough to securely hold the aiglet on the cord. I have seen many with decorative shapes at the top edge but none that indicate that tabs were ever used to secure the aiglet to the cord.

Aiglets with small tabs cut at the bottom to close up the and are in the historical record and while it is possible to do this, it takes a lot of time and adjustment to get the ends to look presentable and not snag on fabrics. This process was more than likely not common.

At this point the individual aiglets can be cut from the strip. Both sets of shears used below are patterns that have been used for centuries and can be seen in many drawings from before, during, and after the Tudor era in England and Europe. These shears can be seen in the images of the jeweler's shops in the section about "Images of jewelry Workshops earlier in this paper.



Figure 47: Cutting aiglet blanks with bench mounted and handheld shears

Most commercial sheet metal purchased today is slightly hardened from the rolling process while being manufactured. This makes it more difficult to form the aiglets. After the aiglet blanks are cut they are coated with flux and heated until they are annealed. After a quick soak in a pickling solution (dilute acid), they are rinsed, dried and are ready to use.

Using a thin piece of leather slightly larger than the blank, making sure to keep the aiglet blank straight, roughly shape the aiglet over the mandrel using your fingers.

Place the aiglet into a groove on a bench pin or block and using the burnisher, start to burnish one side of the tip over the mandrel. Making sure you do not burnish the metal along the entire length, just the tip. It is important to burnish the tip down first. This and getting the first bend around the mandrel are the most important aspects needed to get the seam to be straight and to not have it overlap. If not adequately annealed, the brass will not want to bend down to have the seams meet. At this point, set the blank aside to anneal again.

Make sure the mandrel is pulled out enough to let the other side of the aiglet tip's metal bend down to touch the other side. Burnish the other side of the tip down making sure the seam closes along the first part of the tip.

Re-position the aiglet so you can use a bit more pressure to run your burnisher along the entire side of the aiglet to bring one side down to the mandrel. One side should be done with only one or two times burnishing the metal.

Re-position the aiglet so you can burnish the other side. Again making sure you have the mandrel pulled out so the metal of the aiglet burnishes down to the mandrel, use the aiglet tool to burnish the second side of the aiglet down. You might have to make a couple of fine adjustments to get the seam to close smoothly.

You should be holding a finished aiglet at this time. Ideally the seam is straight and the metal edges just touching, but you may find the metal overlaps slightly at one or both end, and possibly the entire length of the seam. Extant examples show all of these.

If you are making aiglets with a tab at the small end, this is the time to burnish this over. A bit of rubbing on a whet stone should be enough to remove the sharp points of the tab and gives you a smooth metal point.

On many of the aiglets I made I noticed the seams tended to curve just a little. Does this indicate handiness? The metal wants to slide on the mandrel as it is shaped and hardens. It is possible as the seam is made, it curves away from the hand of the person making it. This was much more pronounced on the aiglets made from slightly hardened metal.

Some of the type 1 aiglets have the seam curve. When that happens the ends become slightly uneven. When not rounded they made sharp points and would catch the laces put into them. Rounding the corners of the aiglet blanks before forming allows the aiglets to not snag. The ends of the seam may still be slightly uneven but the trade off is that they are not nearly as visually appealing and this takes a lot of time to do for each aiglet blank. It is much easier to file the top of each aiglet after forming to insure the metal did not have any points sticking up.

When making shorter aiglets it was more likely the seams curve a bit. Is this the reason the longer ones were more popular? At this stage of research, It seems that longer aiglets are more in evidence in the historical record than short ones.

Take your finished aiglet and with a file flatten the top to remove the sharp corners of the metal defining the seam. Do the same for the bottom tip of the aiglet. You may sand the surface of the aiglet to give it a uniform surface finish.

At this time you should be holding a completed type 1 aiglet.

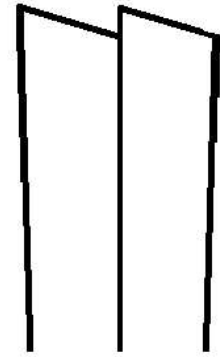


Figure 48: Uneven tabs due to burnishing the aiglet slightly crooked on the mandrel

Manufacturing Type 2 Aiglets.

"Type 2 aiglets have both sides of the seam folding inward to grip the cord or lace along the majority (75% or more) of the seam."

The next several figures demonstrate the authors attempts to manufacture type 2 aiglets. Manufacturing these to match extant type 2 aiglets is still an ongoing project. Experimental research is still at the stage where each attempt creates more questions to be answered rather than answers to questions.

It is yet to be determined if preforming the aiglet blank over a mandrel is a help or a hindrance to the process.



Figure 49: Type 2 aiglet, forming the blank around a mandrel

Most type 2 aiglets seem to have been on flattened cords or leather laces. I have been using flat leather strip cut from a belt. Thin and flat, it would work fine but the aiglets do not take shape easily or well.

The only part of the process so far documented is that pliers may have been used to crimp the metal to the cord or lace.



Figure 50: crimping the metal over flat leather lace

After trying many different methods to fold the aiglet in half, I finally uses a small dull knife to force the aiglet into a groove on my anvil. Then with careful blows I round the shape of it with a hammer. And failed miserably. My leather strip was too inflexible, the metal was too large, and, I suspect, my leather strip as well.

Question to be answered. A small curved blade would work very well for getting the initial bend in the aiglet before rounding it with a hammer. A small tool shaped like a small scythe or a head knife might be useful for this. This might be what a "little sythe" was for.



Figure 51: Manufacturing type 2 Aiglets, 3

Every time the seam was burnished or closed, it would open up from the pressure of the lace being folded. Causing the back of the aiglet to need reshaping. And this would open up the seam again.

Another attempt with a much smaller leather lace still exhibited the same problem.

At this time, I am still researching probable methods to manufacture type 2 aiglets.



Figure 52: Type 2 aiglet with a wide seam

Manufacturing Type 3 Aiglets.

"Type 3 aiglets have an overlapping seam where one side of the aiglet overlaps the other side along the majority (75% or more) of the seam. One side of the seam may, or may not, be bent in to hold the cord or lace."

Using the edge of a bench anvil to burnish one side of the aiglet blank over to crimp the cord. This aiglet blank is 32 gauge copper. Not a requirement for a type 3 aiglet as the metal only needs to overlap at the seam, this aiglet was going to crimp the cord with the edge of the metal.



Figure 53: Manufacturing type 3 Aiglets, 1

32 gauge copper is very soft and is able to bend the lip of metal over the cord with just my fingernail. The overlap was close to 2mm. When using very small cord, a set of pliers to bend the metal over the cord accurately will be needed.



Figure 54: Manufacturing type 3 Aiglets, 2

With some carefully placed blows, the rest of the metal is curved around making the completed aiglet.



Figure 55: Manufacturing type 3 Aiglets, 3

And the completed type 3 aiglet. This is strong enough to not slip off the cord with pulling on it. This is quite a large aiglet but with practice, it is should be possible to reduce the diameter of the aiglets by about 50%.



Figure 56: A completed type 3 copper aiglet

Attaching The Aiglets To Cords

One of the things suggested by modern reenactors is to place a bit of glue on the ends of the cords before inserting into the type 1 aiglets. It seemed reasonable this was done for extant aiglets as well but that information will have to wait for testing to find residues of adhesives within extant aiglets. In “A practical guide to Medieval adhesives”, Maya Heath provides many different recipes for adhesives⁸⁵. After examining all of the recipes for adhesives, the most likely choice for adhesives used in aiglets would have been the fish or cheese based glues. Somewhat water resistant as well as slightly flexible. After contacting the author, she thinks the cheese glue would work best for stiffening the ends of the cords for attaching aiglets with rivets⁸⁶.

Sewing Aiglets

I have not been able to conclusively find information about whether or not aiglets were sewn on during the 8th to 16th centuries. The only example I can find is an image with an extant aiglet that is sewn so badly, I suspect it was added or “repaired” at some point in the museum during conservation.⁸⁷

This aiglet due to the placement and condition of the holes at the top, does seem to indicate that some were sewn on. Note the rounded ends on the top. With four tabs, each with a drilled or punched hole.

This was done before the aiglet was formed around a mandrel. This is an indication of that some aiglets might have been sewn to cords. This might be closer to a modern aiglet due to a possible date of manufacture from 1600 to 1800.⁸⁸



Figure 57: A post medieval lace tag, or aiglet, made from a rolled triangular sheet

Rivets

Attaching the aiglets to laces and cords was normally done with soft iron, copper or brass rivets.

Experiments with different gauges of wire show 22 gauge soft iron and copper is a good size to make rivets with.

20 gauge down to 26 gauge soft iron wire works as well depending on the diameter of the aiglet. 26 gauge iron is fine for the smaller diameter of aiglets, but the width is too narrow with larger aiglets and it wants to bend inside the aiglet and not peen over properly. The 20 gauge iron wire is better for aiglets with a larger diameter at the top.



Figure 58: An assembled point ready to be riveted

The following shows the process for type 1 aiglets. It is very similar for type 2 and type 3 aiglets.

After the type 1 aiglets are made, the cords glued and inserted, they are placed on an anvil with grooves. A sharp punch is used to make a very small hole just smaller than the rivet wire. This is where the dimples punched into the blanks help. They allow the hole to be made without the point rolling off of the aiglet.

A wire is carefully inserted and cut so it is slightly protruding on each side. The rivet is then placed on the table of the anvil and pined over slightly with a very small hammer.



Figure 59: The iron wire inserted ready to be trimmed to length

After the rivet is pined over, the aiglet is placed in a groove of the anvil that is tight fitting and the rivet is pined over more.

At this point, the rivet on the lower part should be close to flush with the side of the aiglet. The top side of the rivet is then pined over with a punch to make a very small depression in the aiglet. When finished, the rivet should be in this small depression, just under the line made by the surface of the aiglet.

Note Thames Aiglet #16 has been decorated with approximately 31 circular punches 1.2mm in diameter that are consistent with being made by the same convex ended punch used to pin over rivets.

The convex ended punch in the above figure has an outside diameter of 1.3mm.

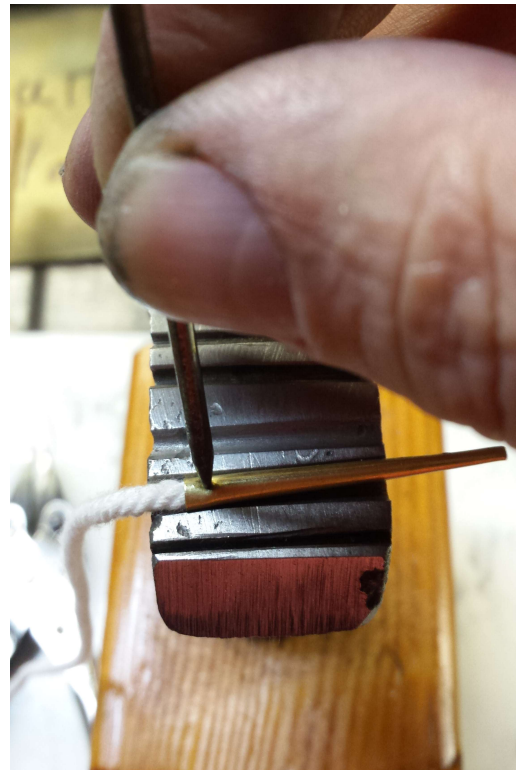


Figure 60: peening over the rivet with a small cupped punch

The reason the rivets need to be flush to the surface is so they do not catch on, and cut the threads of the eyelets. This method most closely duplicates the appearance of extant aiglets.

You can clearly see in this view of the bottom side of the rivet, where it was against the anvil, has come through the brass, has mushroomed, and the brass itself is tight against the rivet.

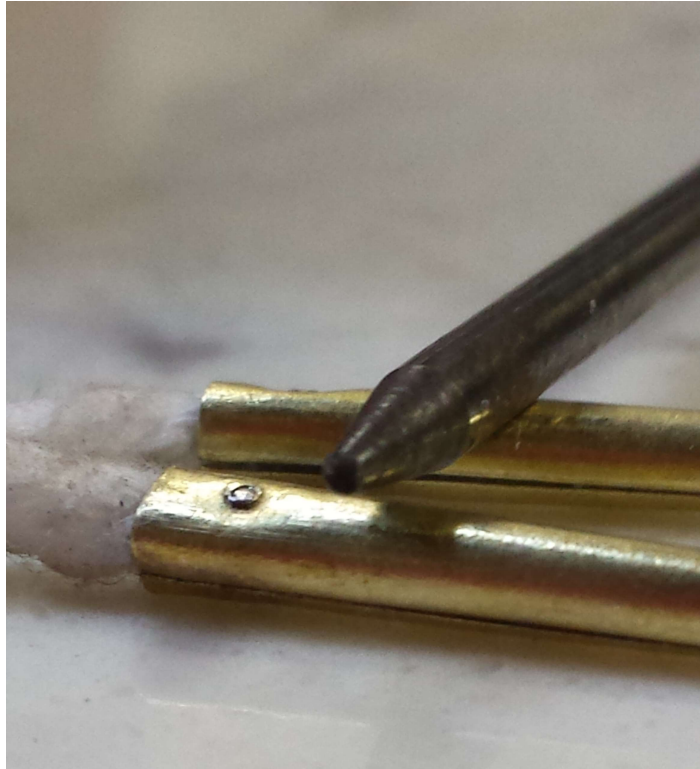


Figure 61: The bottom of the rivet and the cupped tool for riveting

The head of the rivet is also in a small depression made by the punch and will not snag eyelets during use.

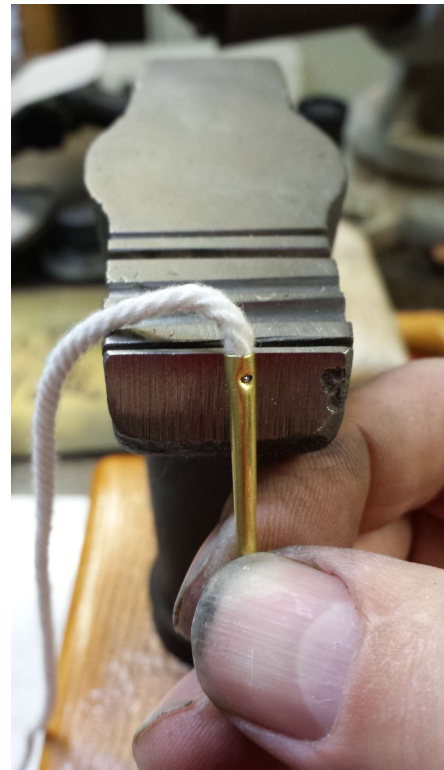


Figure 62: The finished rivet

Finishing And Polishing The Aiglets

Examining extant aiglets it is clear there is many different ways to finish the aiglets / points before they went to the person using them.

Starting with the finish of the metal, it is not possible for me to determine the polish level of extant aiglets. A standard to measure surface finishes does not seem to exist so the following section uses the terms most used by jewelers as listed below.

A List Of Common Surface Finishes Used On Jewelry

These are common terms used in the jewelry trade and most people are familiar with them.

Mirror Finish

Like it sounds. The surface is smooth and is highly reflective. This requires a lot of labor and is a very fragile finish.

High Polish Finish

A high Polish finish is one where the surface is very smooth and shiny. Depending on the metal type, you might be able to see a reflection of nearby objects. This is the most common finish on rings and jewelry. This type of finish is very shiny and reflective.

Satin Finish

A satin is smooth to the touch like like a high polished surface. However, you will not be able to see your reflection on the surface of the metal. After polishing to a high polish, the metal is again polished with a larger grit of abrasive to leave a uniform matte finish. The standard for a satin finish is that there is no discernible pattern or grain in the finish.

Brushed Finish

A brushed finish is similar to a satin finish. Both, the satin finish and the brush finish are not shiny. The difference is a brushed finish has a texture to it. This is normally done with fine brass brushes with different gauges of wire to leave fine lines closely spaced together.

Planished (Hammered) Finish

The texture of this finish is a dimpled look, by carefully using a small hammer to dimple the surface of the metal.

All of the above finishes are possible with non-modern tools and processes. While the tools might be different, a jeweler of the 15th century would clearly understand the above definitions and be able to produce them.

Abrasives have been known to civilizations throughout history but definitive documentation is elusive. Sandpaper was in use in China in the 13th century and that knowledge may have made it's way to Europe over the Spice Road and with the Vikings who traded all over the known world. It is known ray, dogfish, and sharkskin as an abrasive is known in many areas of the world. Glass paper (Sandpaper) was being manufactured by John Oakey's company in London

by 1833, and Isaac Fisher JR. patented the first process for mass manufacturing of sandpaper in the United States in 1834. but again, definitive documentation of their use in England previously to the start of the industrial era is lacking.

All references in this next section are from “On Divers Arts” by Theophilus and as such are from about the 11th century. These would have been the processes used up to the beginning of the modern era. The following section can apply to jewelry items as well as everyday items such as aiglets.

The first stage in polishing is to make sure there is nothing on the surface of your metal. If the item has been soldered, a soak in a weak, warm acid to remove any flux and surface oxidation is done.

A file, whetstone or scrapper is used to remove large marks and then some sort of powdered abrasive is used. With lubrication, this might be crushed sandstone, sand, or certain rushes. Polishing and buffing would be done with sifted ashes, charcoal, chalk, sand and fine sifted sandstone. Emery is also mentioned by Theophilus. A dampened piece of wool cloth or linen is used to pick up and apply the abrasive / polishing compound. It is also noted a rabbits foot as a tool for polishing is mentioned by Theophilus as well. I suspect this is a last stage as the hair on the rabbits foot would be very fine.

While a mirror finish is possible with non-modern tools and processes, it would have been very labor intensive and I suspect was done only rarely. A satin finish would most likely been the standard for most everyday items.

When finishing aiglets and applying a surface finish, a fine grain sanding stick creates a satin finish that is in my opinion, the most likely finish on items of that size. Rubbing with damp, fine powdered pumice with a small section of damp wool cloth achieves the same results.

Burnishing The Ends

On the aiglets that have the ends closed, such as is shown in “Dress Accessories”, page 286, I have found the instructions very close to correct. Frances Pritchard suggested rubbing the narrow end of the aiglet on a polished plate to burnish the end closed. After several attempts I found this only works if enough pressure is applied to deform the aiglet and in every instance the seam opened up and the aiglet bent. By first rubbing the end of the aiglet on a very fine grain whetstone, the metal can be thinned enough to then burnish closed with only moderate pressure on a polished plate. The seam still wanted to open slightly but it was minimal.

Compressing The Ends

One way of finishing the ends of aiglets after the cords have been attached is to compress the ends slightly.

A proposed tool based on the illustration of page 286 of "Dress Accessories" was made and in use, it worked very well for compressing the ends of aiglets on completed sets of points.

It is possible to get about 30 to 35% closure on the aiglets. At that small of a cord size, it is not enough to secure the lace to the aiglet by itself, but when combined with a rivet or an organic glue available at the time, it is very secure.

It is yet to be tried on leather laces and cords. Being leather can be quite resistant to compression, it is surmised this will work on leather cords as the sole means of securing type 1 aiglets. This might work well for leather points with type 2 and type 3 aiglets as well.

An attempt at using a brass hammer to close the end of an aiglet around a cord, even with thinning the metal, was not successful.

A smooth closure was not possible. By using the tool compression tool, I was able to close the ends around the cord quickly and easily.



Figure 63: Tool for compressing the ends of aiglets

Comparison Of Modern And Extant Aiglets

I have only been able to examine less than two dozen extant aiglets, and they have all been types 1, 2, and 3. The one notable property they all have in common is none of them are identical. While they can be grouped by type, they all show the individuality of the person making them. Some have straight seams and some have seams that curve, many are straight and many taper. Some are riveted and most are not.

With the exception of aiglets made for the upper classes, aiglets made during the middle and late-middle ages show function was more important than looks for the vast majority of them made during those centuries. It is important to remember they were a functional item.

Aiglets made during the end of the 16th century to the 20th are also purely functional. The advent of the mechanical age made them even more of a disposable item and the wide spread use of button, zippers and other closures for clothing let aiglets fall out of fashion.

It was only during the 20th century aiglets again are becoming a fashion item. You can easily find fancy and varied aiglets for laces on the internet. It is during this time as historical reenactors have worked towards making their costumes as accurate as possible there has been an increased demand for historically accurate aiglets. The reenactors demand a higher quality of product as the garb they are using is only occasionally worn and they have a higher disposable income. A few hobbyists are enough to fill this niche market. Many of the type 1 aiglets made by reenactors today would be considered a very expensive item as they are very carefully made and with very little variation, are practically identical.

There are very few type 2 and type 3 aiglets being made for the market today.

Most aiglets made today are very large by comparison to extant examples.

Tables

Table 1 Aiglets Length / Width Comparison

Name	Length	Top max	Top min	Bottom max	Bottom min	Weight	MM (gauge)	Type
Thames 1	28.02	2.15	1.96	0.78	0.58	0.222	0.19 (33)	1
Thames 2	25.84	2.62	2.21	1.91	1.60	0.258	0.28 (29)	1
Thames 3	21.29	4.45	---	2.35	---	0.122	0.06 (---)	---
Thames 4	25.83	3.08	2.73	2.45	2.19	0.392	0.19 (33)	2
Thames 5	28.74	3.07	2.61	1.82	1.71	0.3760	0.12-0.14 (35/36)	2
Thames 6	37.02	3.49	2.03	2.22	1.66	0.342	0.18 (33)	3
Thames 7	33.00	3.47	1.83	1.48	1.30	0.466	0.12 (36)	2
Thames 8	27.41	2.97	2.85	1.50	1.43	0.440	0.23 (31)	3
Thames 9	19.45	1.81	1.52	1.53	1.52	0.096	0.21 (31)	1
Thames 10	34.07	2.61	2.39	2.03	---	0.366	0.20 (32)	2
Thames 11	28.17	1.94	1.84	1.80	1.76	0.226	0.21 (31)	1
Thames 12	31.72	3.01	2.62	2.58	1.52	0.428	0.28 (29)	2
Thames 13	30.83	2.78	2.37	1.73	1.43	0.426	0.18-0.21 (33/34)	2
Thames 14	41.73	3.07	2.96	2.14	1.95	0.838	0.19 (33)	2
Thames 15	29.96	2.55	2.00	1.42	1.30	0.256	0.12 (36)	2
Thames 16	30.93	2.48	2.05	2.15	1.91	0.354	0.12	3
Thames 17	24.92	3.08	1.52	2.10	1.83	0.258	0.12	3
Thames 18	21.91	1.61	1.16	1.32	0.82	0.108		3
Thames 19	23.59	1.54	1.08	0.66	0.50	0.176		3?
Thames 20	39.84	2.75	1.52	1.64	1.13	0.396	0.17-0.26 ()	2
Thames 21	24.29	3.81	2.84	2.49	2.03	0.272	0.07-0.25 ()	

Name	Length	Top max	Top min	Bottom max	Bottom min	Weight	MM (gauge)	Type
Thames 22	26.83	1.87	1.77	2.11	1.91	0.308	0.12-0.14 ()	1
Thames 23	23.25	2.02	1.75	1.47	1.15	0.166	0.25 ()	1
Thames 24	21.26	4.09	2.33	1.64	1.52	0.210	0.13 ()	1
Thames 25	26.61	2.09	1.66	0.79	0.64	0.150	0.14 ()	1
Thames 26	21.59	2.55	2.38	2.19	1.75	0.236	0.22 ()	3
Thames 27	26.75	2.08	1.69	1.48	1.03	0.216	0.12 ()	3
Thames 28	23.97	2.62	2.45	2.21	2.02	0.364	0.00 ()	1
Thames 29	24.60	2.89	2.62	2.12	1.87	0.392	0.00 ()	2
Thames 30	22.97	2.78	2.35	1.83	1.21	0.290	0.00 ()	1
Thames 31							0.00 ()	
Chelmsford 30.65	30.65	--	--	--	--	--	0.28 (29)	2
Chelmsford 30.67	27.87	2.75	1.26	1.95	1.43	0.286	.025 (30)	1
Chelmsford 30.68	30.96	3.09	2.60	1.24	1.13	0.326	0.20 (32)	3
Chelmsford 30.69	25.64	2.66	1.78	2.15	1.61	0.274	0.16 (35)	1
Chelmsford 30.70	20.05	2.72	1.35	2.78	1.09	0.214	0.25 (30)	1
Chelmsford 30.71	31.45	3.39	1.86	1.66	1.50	0.344	0.25 (30)	2
Chelmsford 30.72	26.99	--	--	--	--	0.266	0.23 (31)	3
Historic Enterprises	34.69	3.80	3.69	1.48	1.23	0.480	0.23 (31)	1
T. Lazcano (1)	37.32	3.30	3.01	1.46	1.31	0.460	0.32 (28)	1
T. Lazcano (2)	37.53	3.37	3.09	1.20	1.12	0.490	0.32 (28)	1
Aluminum (India)	15	2.3	2.1	2.4	2.1	0.05	0.03	NA

Figure 64 Aiglet Width/Length Comparison

Notes For Tables

Thames Aiglets 1-13 were provided by Lara Maiklem (London Mudlark).⁸⁹ Gathered on the Thames Foreshore in the City of London approximately 2013 to 2014.

Thames Aiglets 14-15 were provided by from Irene Ten-Hove

Thames Aiglets 16-30 were provided by Lara Maiklem (London Mudlark). Received 2017/ 03/02

As soon as these were received, they were separated into numbered bags, photographed and then cleaned in an ultrasonic cleaner with only hot water and photographed again. Because provenance is not known, possible dates of manufacture are only be very broad time frames.

Thames 1

This aiglet is a type 1 and comes to a very fine point. The seam is almost perfectly straight and there is a rivet that would have held it to a cord. There is a very slight bit of overlap at the end above where the rivet is located. The rivet is still in place and looks to be made from a piece of small gauge wire. Testing will determine what the metal is. It did not react to being placed near rare earth magnets so if it is an iron rivet, it has little to no carbon content.



Figure 65: Thames Aiglet #1

One side of the aiglet where the rivet is visible has the top of the rivet flush with the metal of the aiglet. This indicates the aiglet was placed with this side down on a small bench block or anvil for riveting and was not turned over. The other side of the aiglet has the rivet again flush with the top of the aiglet but there is a depression that is vaguely oval shaped around the rivet.

Thames 2



Figure 66: Thames Aiglet #2

Thames aiglet #2, type 1. The transverse rivet that fell out when this was cleaned is not copper. It is either brass or bronze. The rivet itself is 0.64mm in width so it is very close to 22 gauge wire and weighs 0.006 grams .

It is also notable this is a type 1 aiglet where the small tip of the aiglet has been formed in such a way it looks like the end could be burnished on a smooth plate to close it up. It looks like there may have been some tabs but the metal has corroded away a little bit.

Thames 3



Figure 67: Thames Aiglet #3

The extant aiglet "Thames #3" in the authors collection was badly crushed. So it was carefully opened up to try and find any surviving tool marks. None tool marks were visible due to advanced metal degradation but it was easy to see the metal at the seam was only folded over about 1mm.

When flattened out completely, the blank is about 22mm long, 9mm wide at the top end, and 6.6mm at the narrow end. I am going to surmise this was on a very fine woven cord as the 2 sides were only folded in about 1 mm to hold the cord. There is no evidence of any method of securing this other than the crimped edges.

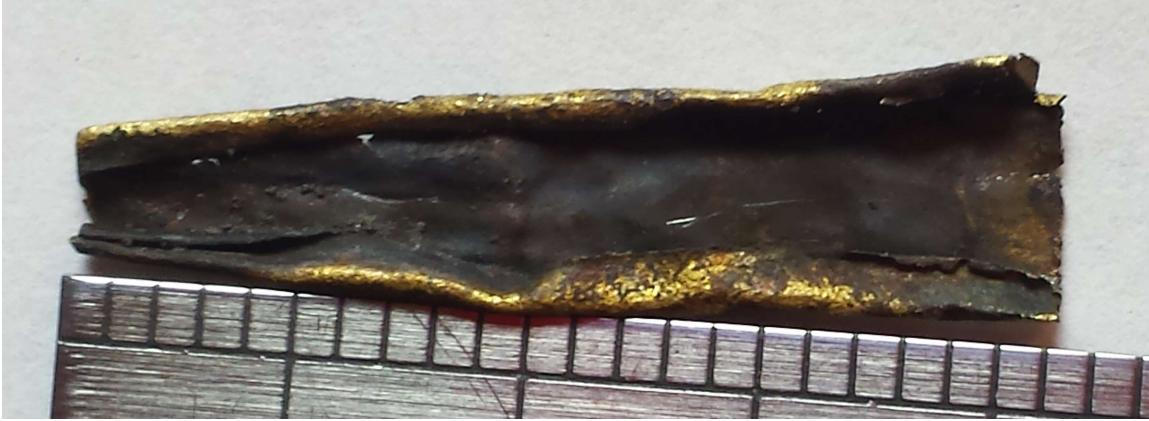


Figure 68: Thames Aiglet #3 partially opened

The metal, even considering thinning due to corrosion and abrasion during the last few centuries is very thin.

With some further work it was possible to completely open aiglet Thames #3 and flatten it to determine the size of the blank needed to make duplicates. When flattened out completely, the blank is about 22mm long, 9mm wide at the top end, and 6.6mm at the narrow end.



Figure 69: Thames #3 opened up and flattened

This aiglet will be the model for further experimentation making type 2 aiglets with metal of 30 to 34 gauge brass and copper.

Thames 4



Figure 70: Thames Aiglet #4

At first glance this looks like an unassuming type 2 aiglet. But really it tells us quite a bit. See the little spot on the seam where the metal came up just a bit? That indicates when this was folded around the cord, the material was a bit too stiff and it forced the metal up in that spot. It also kept the seam from closing tightly.

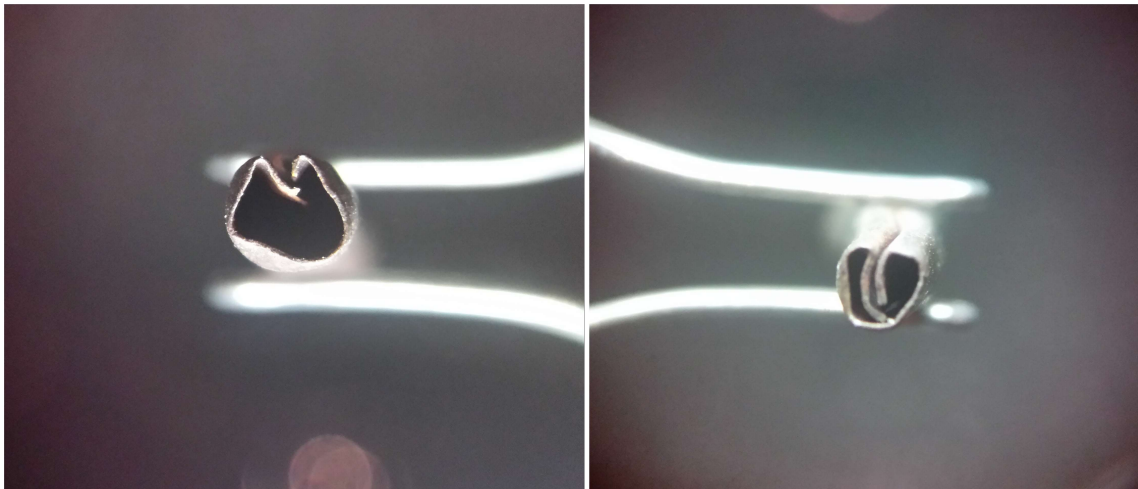


Figure 71: Thames Aiglet #4 Top and Bottom view

Also. Looking at the top of the aiglet (left) compared to the bottom (right) we can see the metal at the top is barely crimping the cord. While the bottom is folded very deeply.

This indicates this aiglet was more than likely on a flat leather lace. All of the noted items are the same as the type 2 aiglets attempted by myself.

Thames 5



Figure 72: Thames aiglet #5

I am surprised by the smooth taper of this aiglet. This shows the person making this aiglet was very skilled in the process. The metal is folded in on both sides to almost fill the aiglet. This aiglet would have been formed around the cord itself.

Thames 6



Figure 73: Thames Aiglet #6

I have classified this as a type 3 aiglet as that is what the majority of it is. The lower part, below the jog in the seam is type 3, the upper section is type 2. Was this done on purpose or not?

Thames 7



Figure 74: Thames Aiglet #7

A type 2 aiglet of thin brass or bronze. The small end shows evidence of filing to round the edge. The look is similar to faceting.

Thames 8



Figure 75: Thames Aiglet #8

This is a type 3 aiglet where the entire length of the aiglet appears to have had one side of the seam folded down to hold the cord. The small end has been rounded and you can clearly see where the one side of the seam has been folded down. Because it is a type 3 aiglet and has the end rounded, I would place this as having been made in the first to mid part of the 16th century.

Thames 9



Figure 76: Thames Aiglet #9

A type 1 aiglet, this was attached with one rivet. The lower end is partially missing but I am confident the length is correct. On one side, near one of the rivet holes, there is a crease that extends for about 40% of the length of the aiglet. Could this have been caused by a burnisher turned slightly wrong when making the aiglet? Possible. But metal degradation makes it hard to say for sure.

Thames 10



Figure 77: Thames Aiglet #10

This is a unremarkable type 2 aiglet that tapers. It was during the mid to late 16th century type 2 aiglets became more popular. Most likely made by attaching to a flattened tube of textile or flat strip of textile. this as the aiglet type that became the most popular for general use entering the 17th century. More often than not, this was not used on leather cords.

The small end is flattened but it is still easily apparent the end was rounded. At the upper end, under magnification, the faceting defined by Geoff Egan and Frances Pritchard is very clear even with metal degradation. The length is approximate due to aiglet being bent.

Thames 11



Figure 78: Thames Aiglet #11

A type 1 aiglet that was attached with 2 rivets. The length is approximate due to aiglet being bent.

The lower end of this aiglet was closed with a small tab of metal that has partially corroded away. You can see where the seam starts and how the tab was folded over. This was not a common way to close the ends of aiglets and was a bit more labor intensive to make.

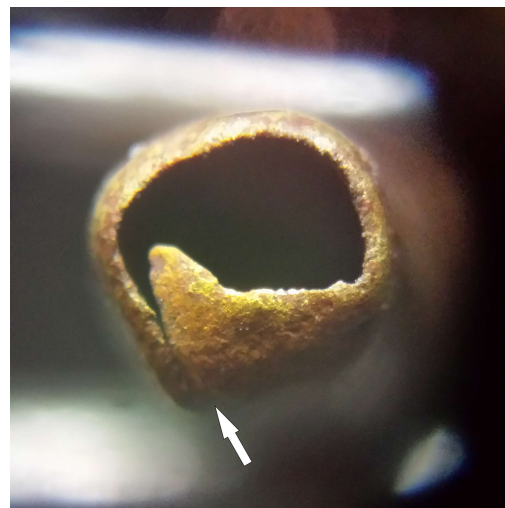


Figure 79: Thames Aiglet #11 detail of tab end

Thames 12



Figure 80: Thames Aiglet #12

A type 2 aiglet, this is made from fairly thick metal and is unremarkable. A very average aiglet. You can see where the top end is uneven as the aiglet was formed around the cord. This aiglet shows what could be marks from being compressed with a tool around the top edge.

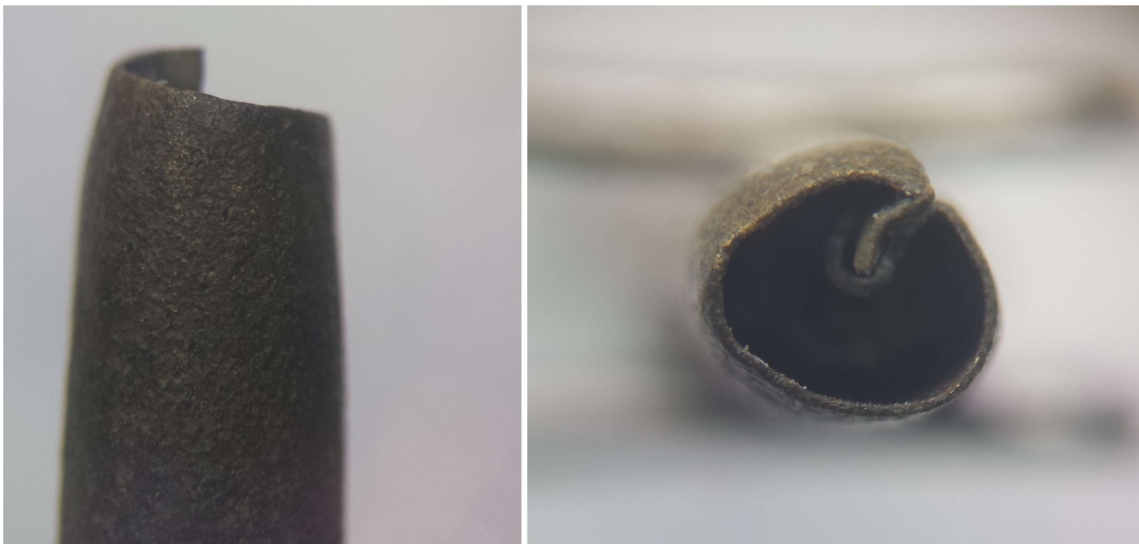


Figure 81: Thames aiglet 12, compressed top

Thames 13

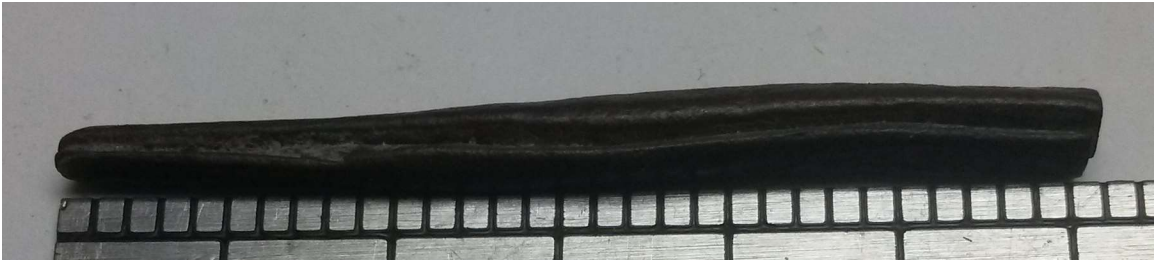


Figure 82: Thames Aiglet #13

A type 2 aiglet, this one is made from fairly thin metal and is unremarkable. A very average aiglet.

Thames 14

While recorded in the table above, this aiglet was lost at a presentation. No further information is available for this item.

Thames 15

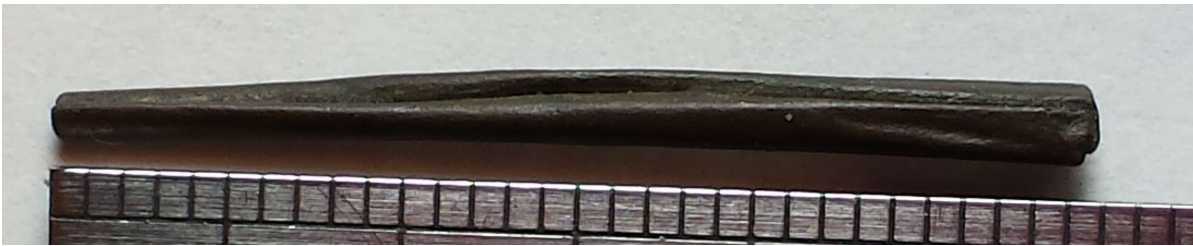


Figure 83: Thames Aiglet #15

A very normal type 3 aiglet at first glance, but it looks as if the metal seam was folded over to give it a bit of extra thickness on the outside edge of metal. I do not think this was done to secure the fabric.

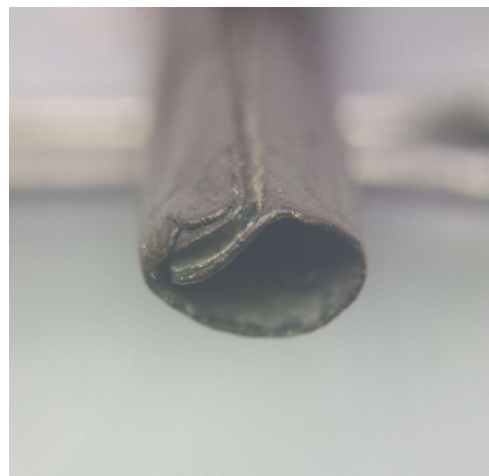


Figure 84: Thames aiglet 15, folded metal at the top.

Thames 16

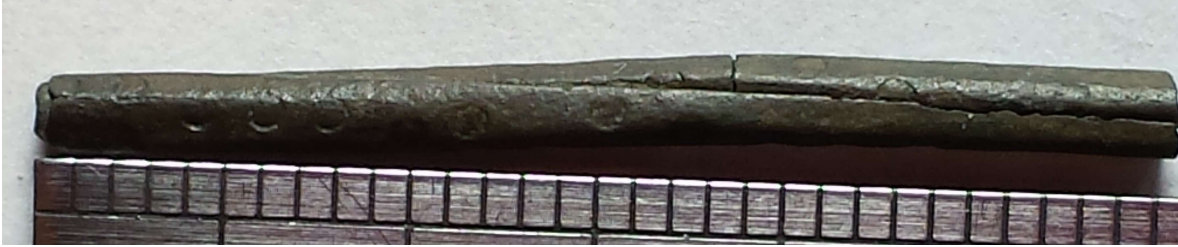


Figure 85: Thames Aiglet #16

The metal of this type 3 aiglet has been decorated with approximately 31 randomly placed dots of 1.2 mm in diameter. The center of each dot is raised meaning the punch used to add the decorations had a slightly concave end.

This aiglet was not riveted. This is a very normal type 3 aiglet in manufacturing. The stamps are, with one exception at the tip, are all placed within the borders of the metal. This shows the aiglet blank was cut, then decorated, The one partial punch at the end could be accounted for by burnishing and filing the end of the aiglet to prevent it from snagging on the eyelets. All of the punched designs are very well defined circles with sharp edges on the design and are raised in the center consistent with a case-hardened iron punch.

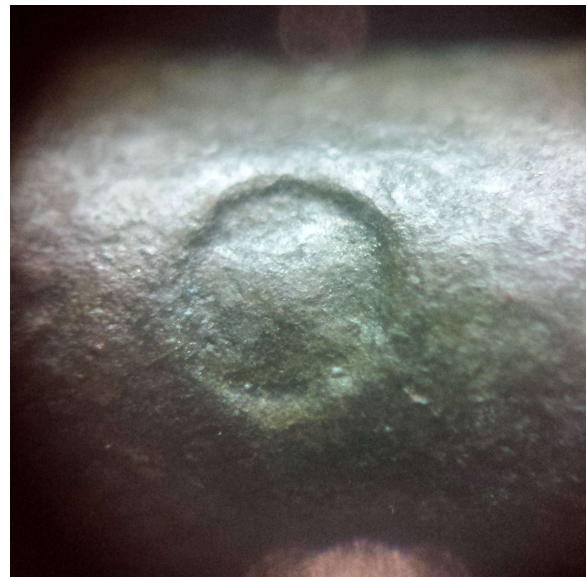


Figure 86: Thames Aiglet #16 detail of decoration

The aiglet is slightly bent and is missing a very small amount of metal. Within the aiglet there is what looks like under 40X magnification to be the remains of a cord. Possibly leather.

This aiglet raises the question of what tool was used to make the decorative design. It is likely it was done with an iron punch with a convex end due to the sharpness of the design.

The end of the punch I use to peen the ends of rivets is very close to 1.3mm in diameter. I propose the same convex ended punch used by the aiglet maker to rivet aiglets to cords, was also used to decorate this aiglet.

The comparison below shows the aiglet I decorated with the concave punch used to peen the rivets in aiglets. The lower aiglet is Thames aiglet #16.



Figure 87: Thames Aiglet #16 comparison of decoration

Thames 17



Figure 88: Thames Aiglet #17

Slightly bent and flattened. This type 3 aiglet has been decorated with a series of squares.

Direct measurement of the design reveals the stamp was approximately 15.02 mm long. Width of the punch working surface is approximately 0.78mm. Filed across to yield ten evenly spaced squares of roughly 0.75 to 0.80mm each. The aiglet was stamped 3 times. The one line of design near the seam can be seen to have either been punched twice, or the punch jumped from too aggressive of a strike. It has a deep impression and an offset lighter impression. As the design is very smooth and the aiglet is very uniform in shape, this design was probably applied to this aiglet blank, and then it was annealed to bring the metal to a dead-soft state. This was supported by the example of imprinting several aiglet blanks with this design and then forming them into completed aiglets. The aiglets that were not annealed after imprinting, did not form smooth tapering cones.



Figure 89: Thames Aiglet #17 Detail of Design

A very easy way to dress up an otherwise plain aiglet, this takes only a few seconds to stamp a design into the metal. The stamping process hardens the metal in the local area and it is hard to get a smooth uniform shape if the metal is not annealed.

The example below was stamped on a dead-soft type 1 aiglet blank and then formed around a mandrel. Due to localized work hardening of the metal, it took about an additional minute to shape the aiglet. The shape of the aiglet is also no longer a smooth tapering cone due to this

work hardening of the metal. Additional aiglets that were annealed after the design was imprinted were smooth tapers.

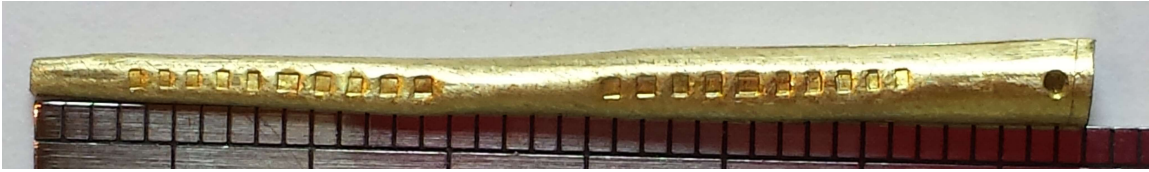


Figure 90: Sample type one aiglet with a stamped design.

The punch for the design would have been similar to the one pictured. The difference is the stamp that embossed the design on the extant aiglet more than likely would have been case-hardened iron.



Figure 91: A punch to emboss a line of 10 square dots on aiglet blanks

Thames 18

I believe this might be part of a lace-tag commercially tipped from the 19th century. Not able to measure metal thickness. It is very thin metal rolled around what looks to be a dark colored cord. The end appears melted. This aiglet broke in two during examination. I believe this might be part of a lace-tag commercially tipped from the 19th century.



Figure 92: Thames Aiglet #18, detail of broken area

But I think the cord, if it is synthetic, might put it later. This counts as a type 3 aiglet as it has the metal rolled around the lace. There are two spots right on the seam where the metal has been punched in to further secure the aiglet to the cord. Presumably from the tipping machine that made the aiglet (Aiglets were put on by a machine with that name in the later modern era. I do not have an exact time for when that term came into use.). The cord when measured under a microscope is composed of fibers that are not uniformly round. The width varies from about 0.01mm to as thick as 0.025mm.

Thames 19

The metal degradation on this makes it hard to classify accurately. I believe this may be a type 2 aiglet. As it was so corroded, I was not able to measure metal thickness. The aiglet is bent and curves off at about a 30 degrees from straight. Most likely brass. This is the smallest example of a type 2 aiglet in my collection.

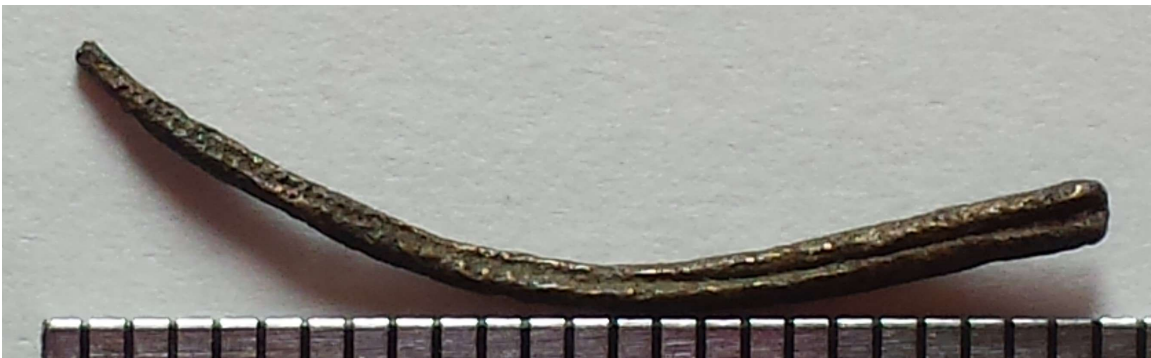


Figure 93: Thames Aiglet #19

Thames 20

Slightly bent. Metal gauge varies widely at the top. Might be a poorly made type 1. This was attached with 2 rivets.



Figure 94: Thames Aiglet #20

Thames 21



Figure 95: Thames Aiglet #21 with one rivet

This aiglet still has one of the two rivets. 3.18mm long, 0.58mm diameter, this is an interesting aiglet.

The top seems to be a type 1 but the bottom clearly is a type 3. This may have been made from a random scrap of metal and the wider end was rolled around the mandrel. The rivet holes are very large and you can see where the metal of the aiglet was pushed back and folded over where the rivet was peened over.

The end has been closed up not so much with a tab, but by what seems to be a random bending of the metal finishing the tip very poorly.



Figure 96: Thames Aiglet #21 detail of tip

Thames 22



Figure 97: Thames Aiglet #22

This aiglet still has one of the two rivets. I am not sure if the metal has been patterned or not. It looks gilded and may be from contamination from the river. The metal almost seems like a texture has been applied but the material covering the metal makes that hard to determine. Comparison to figure 126 in "Copper Alloy" (English medieval Industries) lends credence to the idea of this being textured metal.⁹⁰

This aiglet is currently out for analysis to determine the origin of the material giving it the look of gilding.

It is not possible to determine the metal used for the rivets without cleaning.



Figure 99: Thames Aiglet #22, detail of area around the rivets

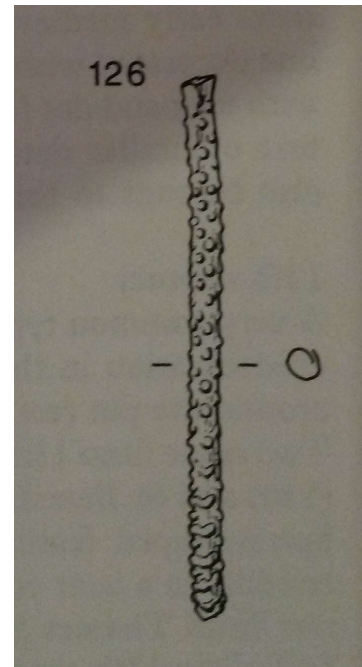


Figure 98: "Copper Alloy" in 'English medieval Industries', figure 126

Thames 23



Figure 100: Thames Aiglet #23

A very normal type 1 aiglet that was held in place with one rivet. The top shows evidence of filing to thin the metal and gives it a faceted appearance at the top.



Figure 101: Thames Aiglet 23, faceted appearance at the top.

Thames 24

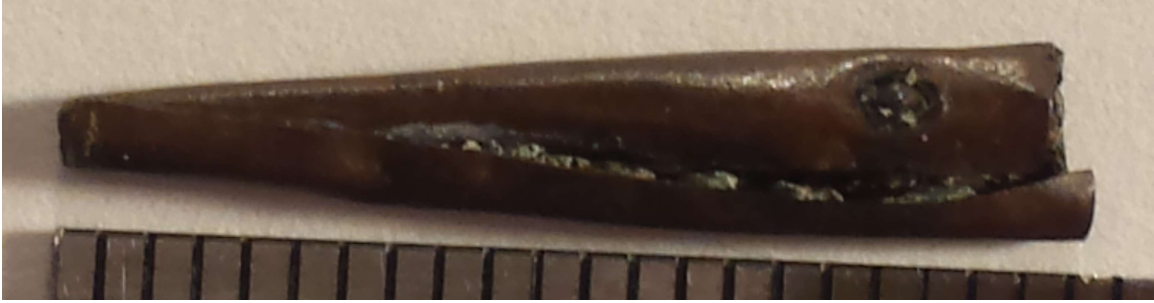


Figure 102: Thames Aiglet #24

This aiglet has been flattened quite a bit. You can still see the aiglet is in place and this is unusual as it is very short but very wide at the top end. The metal at the tip may, or may not have overlapped when it was in use before being lost.

Thames 25



Figure 103: Thames Aiglet #25

Very thin type 1. The rivet was placed too close to the seam and has broken out the edge. I suspect this is the reason the aiglet was lost. Part of the upper seam is folded in. Possibly from trying to secure the rivet. Brass most likely.

Thames 26



Figure 104: Thames Aiglet #26

Probably brass. Type 3. The rivet is intact and the condition of the aiglet is such that it is possible to clearly see the end of the rivet as it is pined with the metal of the aiglet. It is still standing straight and you can see where the top of the rivet was pined slightly. And the space around the top was uniformly pressed into the center of the aiglet.

Thames 27



Figure 105: Thames Aiglet #28

No rivet. Finished end. Slightly bent about 15 degrees. Dark. Probably copper alloy. This looks like it has a faceted appearance at the top but that is only some of the metal edge being pressed in a bit. There is no way to determine if this was done during manufacturing or is incidental damage that happened later.

Thames 28



Figure 106: Thames Aiglet #28

This aiglet looks like the blank was not cut well on one side. It caused the person making it to overlap one spot in the center of the seam and they flattened that one spot with a single hammer blow while the aiglet was still on the mandrel. The metal shows this single blow. This is not surprising as when cutting out several hundred blanks it is inevitable a few are not cut

perfectly. This also seems to show a very thin coat of a black substance around the top edge and in places along the seam. After cleaning this residue is also inside the aiglet. Is it a residue from the Thames or is it an adhesive used when the aiglet was attached to a point?

Thames 29



Figure 107: Thames Aiglet #29 seam

This is a type 2 aiglet. It is badly corroded copper so it is not possible to get an accurate gauge on the metal thickness.



Figure 108: Thames Aiglet #29 showing the crease in the back

It is possible to see on the back edge of the aiglet a crease that is visible on some, but not all type two aiglets. Whether this was done as part of the manufacturing, or it developed with usage of the point this aiglets was part of is not possible to tell. There might be some filing on the top of the metal edge that gives the appearance of faceting but the state of metal degradation makes it hard to determine.

Thames 30



Figure 109: Thames Aiglet #30

Very normal, mass produced aiglet. Still has the rivet. Probably the most average aiglet documented so far.

Thames 31



Figure 110: Thames Aiglet 31

This aiglet is in very fine condition. It is a very normal type 1 aiglet with filing at the top which gives it a faceted appearance.

The part of the metal on the bottom lip of the faceted area is bent inwards towards the cord of the aiglet about 0.2mm. With the metal being filed to a thinness at the top of about 0.1mm, it will not secure the aiglet to the cord with only this method.

The following comment was made by a fellow metalsmith when discussing the faceting on the tops of aiglets.

“I see what you mean by faceted and that they are filed too thin to have any strength to act as a gripping method to hold onto the fiber.

Most likely filed quickly and with little care since they are made quickly.”⁹¹

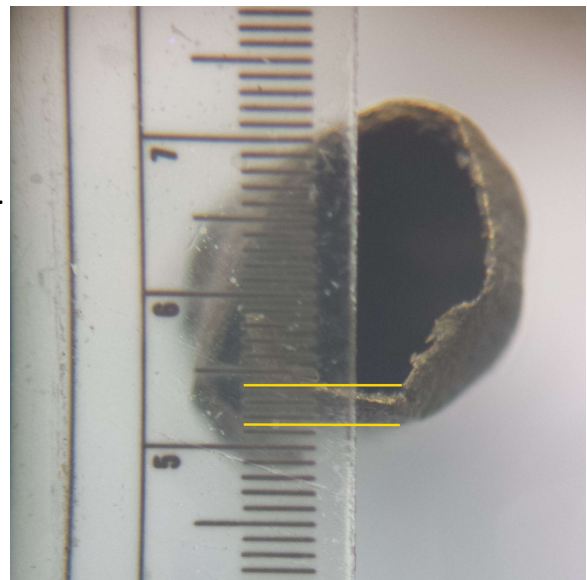


Figure 111: Thames aiglet 31, faceting at the top.

Chelmsford Aiglets.

The following aiglets are all referenced on page 48 of “Post-medieval sites and their pottery, Moulsham Street, Chelmsford”.⁹²

All of the Chelmsford aiglets have a waxy substance on them. I think this was done during conservation as there are fine brush lines in this layer of material. This makes it hard to see possible marks on the metal and any remaining fibers. All of the Chelmsford lace ends (aiglets) are most likely dated from 1550 to 1630.

The aiglets that were sent from the UK are the aiglets in the following figures:

30.65, 30.67, 30.68, 30.69, 30.70, 30.70, 30.72, 30.73.

Aiglets 30.67 and 30.69 arrived intact.

Aiglets 30.65, 30.68, 30.71, and 30.72 were damaged in transit.

Aiglet 30.73 did not arrive and was probably lost due to damage to the packaging.

Chelmsford 30.65



Figure 112: Chelmsford 30.65

This aiglet is discussed in detail in the section “Extant Aiglets” above as it is important because of surviving tool marks that show the use of pliers during its manufacturing.

Chelmsford 30.67



Figure 113: Chelmsford 30.67

Intact with the iron rivet still in place, this is a very normal type 1 aiglet.

Chelmsford 30.68



Figure 114: Chelmsford 30.68

A type 3 aiglet, this aiglet broke during transit allowing a good look at the remaining textile inside. The rivet is still in place.



Figure 115: Chelmsford 30.68, detail of textile

Chelmsford 30.69



Figure 116: Chelmsford 30.69

A type 1 aiglet with 2 rivets. Both rivets are still in place. Inside there is what I believe is a piece of leather cord.

Chelmsford 30.70

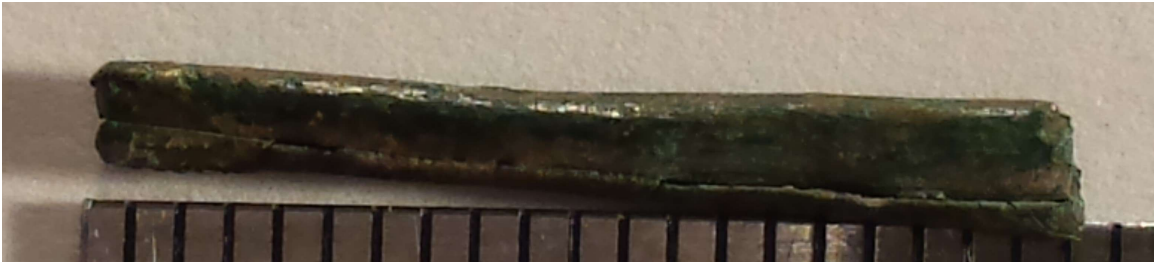


Figure 117: Chelmsford 30.70

This type 1 aiglet is intact and shows faceting at the top.

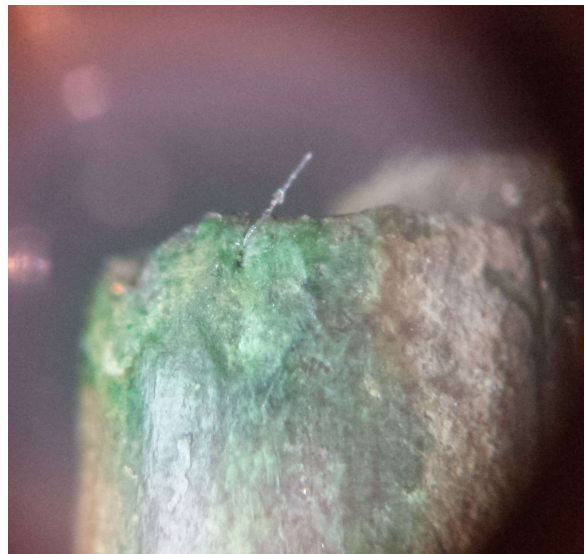
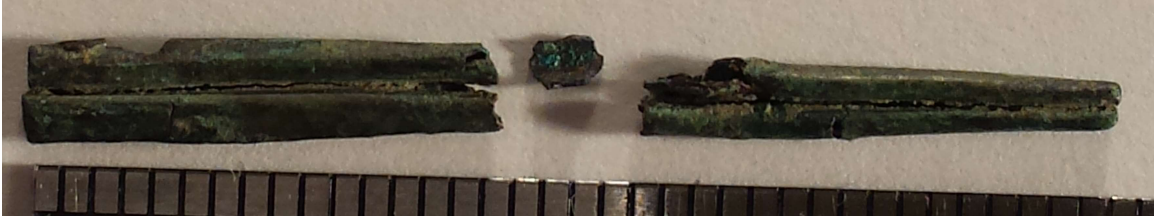


Figure 118: Chelmsford 30.70 , detail of faceting at top.

Chelmsford 30.71



A broken type 2 aiglet, this shows clearly the bending of the metal where the rivet was peened over.



This also clearly shows the crease on the back that is common with many type 2 aiglets.

Chelmsford 30.72



Figure 119: Chelmsford 30.72, seam side



Figure 120: Chelmsford 30.72, reverse side

dated 1560- 1590. this aiglet was classified as a type 3 aiglet. The following was written about this aiglet. "Figure 30.72 (S328; XI:3) is decorated with punched rings,...."⁹³

This is a type 1 aiglet. This aiglet is broken, but mostly intact with one small fragment. Decorated with 35 to 40 randomly placed impressions of 0.65mm to 1.1mm. The stamped

pattern, under 10 power magnification does seem to show many of them as circular, but that is due to the blurring of the design edges under the waxy substance applied to the aiglets during conservation.

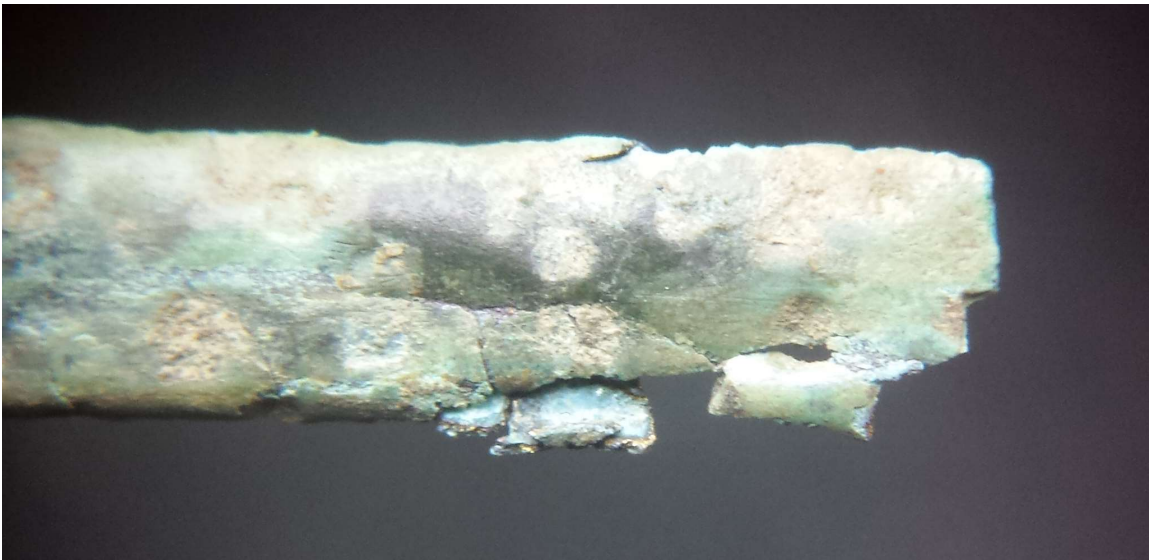


Figure 121: Chelmsford 30.72, detail of stamped design

40 power magnification allows the designs to be seen and they are mostly squares with some rectangular shapes as well. I suspect these were applied one by one and the rectangular shapes were impressions that overlapped.

Chelmsford 30.73

This aiglet was lost during transit from the UK to the USA. The following passage is what made me request images of these aiglets that eventually resulted in them being sent to me for research purposes.

“Four of the type one lace tags may have been decorated with the use of "ridged pliers".

Decorated, not manufactured, but this is the first suggestion I have found pliers of any sort may have been used in the manufacturing or decoration of aiglets (lace tags).

While this aiglet is gone, there was plenty of other information that could be found from the others that did arrive, intact and in fragments.

Brass by Historic Enterprises

Purchased from Historic Enterprises.

Not pictured. A very normal type one aiglet made for the reenactment community.

Brass by T. Lazcano (1)

Made by Theodore R. Lazcano (Sent to me by Theodore R. Lazcano (Master Bedwyr)).

Not pictured. A very normal type one aiglet made for the reenactment community.

Brass by T. Lazcano (2)

Made by Theodore R. Lazcano (Sent to me by Theodore R. Lazcano (Master Bedwyr)).

Not pictured. A very normal type one aiglet made for the reenactment community.

Aluminum (India)



Figure 122: Aluminum (India)

This is a CHAMPION brand cotton shoe lace from India made by the Hindustan Industries Company in Bombay.

The aiglet was wound on and two stamps were applied to the side to secure the aluminum to itself to keep it from unrolling and to secure it to the lace. I would class this as a type 3 aiglet.



Figure 123: Aluminum (India), detail of end

¹ Dress Accessories, c. 1150- c. 1450 (Medieval Finds from Excavations in London) [Paperback] by Geoff Egan, Frances Pritchard instructions about making aiglets. Page 286.

² The Fashion Dictionary, Fabric, Sewing, and Apparel as expressed in the Language of Fashion”, by Mary Brook Pickens, copyright 1957, 1973 ISBN 0-308-10052-2, Pages 2,3, 285.

³ The Taming of the Shrew (1593-1594) Act 1, Scene 2, Line 78, By William Shakespeare.

http://www.shakespeare-online.com/plays/taming_1_2.html.

[Grumio to Hortensio, of Petruchio] "Give him gold enough, and marry him to a puppet, or an aiglet-baby; or an old trot with ne'er a tooth in her head, though she have as many diseases as two and fifty horses; why, nothing comes amiss, so money comes withal."

⁴ Aigrette: A gold or silver hat ornament to support a feather, or made in the form of a jewelled feather or sometimes a brooch supporting a jewelled feather. Shaped like the tufted crest, or head-plumes of the egret (from the French for egret, or lesser white heron), it was often almost entirely set with small gemstones, and sometimes also enamelled; it might be further adorned with light, vibrating, vertical metal stalks. A slide or vertical pin was occasionally provided, enabling the ornament to be worn in the hair or attached to a woman's headdress. Aigrettes were in use from the 17th century until the late 18th, and again became popular in the late 19th and early 20th centuries. Aigrettes, studded with diamonds, rubies and opals also decorated the turbans of Ottoman sultans or the ceremonial chamfron of their horses. Several of these aigrettes are on display in the Treasury of the Topkapi Palace in Istanbul, Turkey. An aigrette is also worn by certain ranks of officers in the French army. <http://www.opalsinformation.com/index.php/articles/terminology/113-jewellery-glossary>

⁵ "The Fashion Dictionary, Fabric, Sewing, and Apparel as expressed in the Language of Fashion”, by Mary Brook Pickens, copyright 1957, 1973 ISBN 0-308-10052-2, Pages 2,3, 285.

⁶ An illustrated dictionary of jewelry: 2,530 entries, including definitions of jewels, gemstones, materials, processes, and styles, and entries on principal designers and makers from antiquity to the present day by Harold Newman, New York, N.Y.: Thames and Hudson, 1981. Page #

⁷ <http://www.luminarium.org/renascence-editions/queene2.html>. 1590, Edmund Spenser, The Faerie Queene, II.iii: "a silken Camus [...] Which all about besprinkled was throughout, / With golden ayglets, that glistred bright"

⁸ Stone, George Cameron. 1961. A glossary of the construction, decoration and use of arms and armor in all countries and in all times. New York: Jack Brussel. Page 173. (Planche, James Robinson. A Cyclopedia of Costume or Dictionary of Dress, New York, 1877.)

⁹ "Cocktail" Director: Roger Donaldson, Writer: Heywood Gould (screenplay), Stars: Tom Cruise, Bryan Brown, Elisabeth Shue. Release date: 29 July 1988 (USA)

¹⁰ YouTube <http://www.youtube.com/watch?v=9CQF8BtuLXU>

¹¹ This is from the book above in German but it is of men making aiglets. Not a lot of detail but you can see the shears and the anvil they are working on in the background.

http://www.wenner.net/suche/G/Nestler_Holzrahmen_Stuck_Leder_Holzschnitt_Jost_Amman;00021229.jpg

"The Nestler." A piece of leather stretched on a wooden frame. Woodcut by Jost Amman 1568. 12.5 × 6 cm. With Latin text. http://www.digitalis.uni-koeln.de/Amman/amman_index.html

Source: de:Eygentliche Beschreibung aller Stände auff Erden, hoher und nidriger, geistlicher und weltlicher, aller Künsten, Handwercken und Händeln ..." from Jost Amman and Hans Sachs /Frankfurt am Main / 1568 / thanks to www.digitalis.uni-koeln.de

¹² General History of Paris Collection of Documents published under the auspices of the Parisian city Trades of Paris. Page 570 to 579. www.livingstonjewelers/library/TITLE_XXVIII.pdf. The translation was done by the author and may not be completely accurate, as he does not speak French.

¹³ Dress Accessories, c. 1150- c. 1450 (Medieval Finds from Excavations in London) [Paperback] by Geoff Egan, Frances Pritchard instructions about making aiglets. Page 286.

¹⁴ Arnold, J. (1980). "Lost from Her Majesties back": items of clothing and jewels lost or given away by Queen Elizabeth I between 1561 and 1585, entered in one of the day books kept for the records of the wardrobe of robes. [London]: Costume Society. Page 82. "

¹⁵ Dress Accessories, c. 1150- c. 1450 (Medieval Finds from Excavations in London) [Paperback] by Geoff Egan, Frances Pritchard. Page 283.

¹⁶ Claude Blair and John Blair, "Copper Alloy" in 'English medieval Industries', ed. J. Blair and N. Ramsey (London, Hambleton) figure 124

¹⁷ HVAC - Wikipedia. (n.d.). Retrieved June 13, 2017, from <https://en.wikipedia.org/wiki/HVAC>. Heating, ventilation and air conditioning (HVAC) is the technology of indoor and vehicular environmental comfort.

¹⁸ (Margeson, Sue. 1993. Norwich households: the Medieval and Post-Medieval finds from Norwich Survey excavations, 1971-1978. Norwich: The Norwich Survey/Norfolk Museums Service, Centre for East Anglian Studies, University of East Anglia, in conjunction with The Scole Archaeological Committee, page 22-24)

¹⁹ "Acton Court The evolution of an early Tudor courtiers house", page 383, illustration 110. "Twisted loop, possibly an ear scoop/toothpick of Egan and Pritchard (1991, 378- 90) Type 4. It would have had one end of the wire slightly longer than the other to act as a toothpick."

²⁰ <http://www.revivalclothing.com/article-armingsequence.aspx>. How a Man Shall be Armed at His Ease when He Shall Fight on Foot, Hastings MS. [f.122b], Modern English Spelling by Greg Mele.

²¹ Post-medieval, silver lace tag, Easton, Wiltshire, Treasure, 2008T276, Silver type 4 lace tag. http://www.britishmuseum.org/research/collection_online/collection_object_details.aspx?objectId=3325433&partId=1 Portable Antiquities Scheme Database: WILT-F492B5.

²² Parol, J (2013) LON-FE3341: A POST MEDIEVAL LACE TAG Web page available at: <https://finds.org.uk/database/artefacts/record/id/583165> [Accessed: Mar 2, 2017 4:47:34 PM]

²³ Untracht, O. (1968). *Metal Techniques for Craftsmen: A Basic Manual for Craftsmen on the Methods of Forming and Decorating Metals*. Garden City, N.Y: Doubleday. Pg 4. "All metals are fusible, that is, they can be brought to a liquid state by the application of heat and therefore be united to other metals. This quality, not confined to metals, allows them to be smelted or separated from their impurities and combined with other metals to create alloys. It also allows metals to be cast and to be joined by soldering, brazing, and welding. "

²⁴ <https://www.webelements.com/zinc/>. Zinc: historical information: Zinc was discovered by Andreas Marggraf in 1746 at Germany. Origin of name: from the German word "zink". Centuries before zinc was recognized as a distinct element, zinc ores were used for making brass (a mixture of copper and zinc). A brass dating from between 1400-1000 BC has been found in Palestine. An alloy containing 87% zinc was found in prehistoric ruins in Transylvania. The smelting of zinc ores with copper was apparently discovered in Cyprus and was used later by the Romans. Metallic zinc was produced in the 13th century in India by reducing calamine (zinc carbonate, ZnCO₃) with organic substances such as wool.

²⁵ Blair, John, and Nigel Ramsay. 1991. *English medieval industries: craftsmen, techniques, products*. London: Hambledon Press.

²⁶ touch-stone. 'təCH, stōn/. Noun. noun: touchstone; plural noun: touchstones. a piece of fine-grained dark schist or jasper formerly used for testing alloys of gold by observing the color of the mark that they made on it.

²⁷ Claude Blair and John Blair, "Copper Alloy" in 'English medieval Industries', ed. J. Blair and N. Ramsey (London, Hambleton)

²⁸ Marks, L. S., & Baumeister, T. (1916). *Mechanical engineers' handbook*. New York: McGraw-Hill.

²⁹ An Examination of the Copper Alloy Lace Tags from Acton Court. 88/1990 - AN EXAMINATION OF THE COPPER ALLOY LACE TAGS FROM ACTON COURT, Report Number: 88/1990, Series: AML Reports (New Series), Page: 4, <http://research.historicengland.org.uk/Report.aspx?i=4466&ru=%2fResults.aspx%3fn%3d10%26p%3d48>, PDF.

³⁰ Cockrell B, Martínón-Torres M, Graham E, 2013. Negotiating a colonial Maya identity: metal ornaments from Tipu, Belize. In: RH Tykot (ed.), *Proceedings of the 38th International Symposium on Archaeometry – May 10th-14th 2010, Tampa, Florida*. *Open Journal of Archaeometry* 1:e24.

³¹ What is Hot Shortness? - Definition from Corrosionpedia. (n.d.). Retrieved May 27, 2017, from <https://www.corrosionpedia.com/definition/638/hot-shortness>. "Corrosionpedia explains Hot Shortness. Hot shortness is a condition of metal at excessively high working temperatures characterized by low mechanical strength and a tendency for the metal to crack rather than deform. Hot shortness is caused by a low-melting constituent, often present only in minute amounts, that is

segregated at grain boundaries. . . “

³² Rodwell, K. A., Bell, R., & Bertram, J. (2004). Acton Court: The evolution of an early Tudor courtier's house. London: English Heritage. <http://www.worldcat.org/oclc/260044364>

³³ 88/1990 - AN EXAMINATION OF THE COPPER ALLOY LACE TAGS FROM ACTON COURT, Report Number: 88/1990, Series: AML Reports (New Series), Page: 4, <http://research.historicengland.org.uk/Report.aspx?i=4466&ru=%2fResults.aspx%3fn%3d10%26p%3d48>, PDF.

³⁴ Owen-Crocker, G. R., & Crocker, G. R. O. (1986). Dress in Anglo-Saxon England. Manchester: Manchester University Press. Image on page 46. Probable cosmetic brush.

³⁵ Owen-Crocker, G. R., & Crocker, G. R. O. (1986). Dress in Anglo-Saxon England. Manchester: Manchester University Press. Page 53.

³⁶ Owen-Crocker, G. R., & Crocker, G. R. O. (1986). Dress in Anglo-Saxon England. Manchester: Manchester University Press. Page 158, 162.

³⁷ PAS record number: ESS-7186D3. Object type: TWEEZERS. Broad period: ROMAN. County of discovery: Essex. Stable url: <https://finds.org.uk/database/artefacts/record/id/105916>

³⁸ Portrait of a Man with a Roman Coin. Hans Memling, c 1480. Oil on oak panel, 31 x 23.2 cm. The Royal Museum of Fine Arts Antwerp , Antwerp. http://www.kmska.be/en/collectie/highlights/Man_munt.html?_language=en.

³⁹“The Peasant Wedding” by Pieter Bruegel the Elder. Painted in 1567, Medium: Oil on panel, Dimensions: 114 cm × 164 cm (45 in × 65 in), Location: Vienna, Kunsthistorisches Museum.

⁴⁰ Detail of the collar from the pinked linen burial doublet of Antonello Petrucci, ca. 1585, from his tomb in St. Domenico Maggiore. Naples, Italy.

⁴¹ The artist might be Clouet. M. Lecurieux is the name of the collector. He collected several unidentified drawings. Unknown Frenchman maybe by Clouet from the collection of LeCurieux.

<http://www.getty.edu/art/collection/objects/219835/attributed-to-l'anonyme-lecurieux-portrait-of-a-bearded-man-half-length-wearing-a-slashed-doublet-french-about-1575/>, Provenance, January 22, 2003, Christie's (New York) (New York), lot 58.

Title: Portrait of a bearded man, half-length, wearing a slashed doublet, Artist/Maker: Attributed to L'Anonyme Lécurieux (French, active 1555 – 1581), Culture: French, Date: about 1575, Medium: Black and red chalk, Dimensions: 33 × 22.2 cm (13 × 8 3/4 in.), Alternate Titles: Portrait of a Bearded Man, Half-Length, Wearing a Slashed Doublet (Display Title), Object Type: Drawing, Object Number: 2003.10, <http://www.getty.edu/art/collection/objects/219835/attributed-to-l'anonyme-lecurieux-portrait-of-a-bearded-man-half-length-wearing-a-slashed-doublet-french-about-1575/>, The J. Paul Getty Museum, Los Angeles

⁴² David Robb , <https://paradise.gen.nz/galleries/aglets>, Spiral decorated aglets. Description: Aglets in the style of those from this image: <http://www.getty.edu/art/collection/objects/219835/attributed-to-l'anonyme-lecurieux-portrait-of-a-bearded-man-half-length-wearing-a-slashed-doublet-french-about-1575/?dz=0.5000,0.6961,0.78>

⁴³ Hans de Clercq (attr.), Portrait of Hector van Bouricius, 1599 - Leeuwarden, Fries Museum
[Hans_de_Clercq_\(attr\)_Portrait_of_Hector_van_Bouricius](#)

⁴⁴ Mary Nevill or Neville, Baroness Dacre, and her son Gregory Fiennes, 10th Baron Dacre, 1559, by Hans Eworth. The heyday of decorative aiglets in pairs everywhere.

⁴⁵ Date: probably about 1480-90. Medium: Tempera and oil on wood. Dimensions: 57.2 x 37.5 cm. Acquisition credit: Salting Bequest, 1910. The sitter, identified in the inscription as a member of the Medici family, was born in about 1469 and by 1489 had married a prominent Florentine citizen. The flowers and jewels (a pendant and three finger rings on a bolster) may well refer to her betrothal. The painting has in the past been attributed to the young Fra Bartolommeo, when he was much influenced by Domenico Ghirlandaio. <https://www.nationalgalleryimages.co.uk/imagedetails.aspx?q=NG2490&ng=NG2490&&frm=1>

⁴⁶ Mainman, A. J., Rogers, N. S. H., York Archaeological Trust, & Council for British Archaeology. (2000). Craft, industry and everyday life: finds from Anglo-Scandinavian York. York: Published for the York Archaeological Trust by the Council for British Archaeology.

⁴⁷ Ottaway, P., Rogers, N. S. H., York Archaeological Trust, & Council for British Archaeology. (2002). Craft, industry and everyday life: finds from medieval York. York: Council for British Archaeology.

⁴⁸ http://en.wikipedia.org/wiki/Bench_jeweler. Accessed 10/16/2014. A bench jeweler is an artisan who uses a combination of jewelry-making skills to make and repair jewelry. The jewelry making arts can be subdivided into a very great many categories of specialized skills. Some of the more common skills that a bench jeweler might employ include antique restoration goldsmithing, stonemasonry, engraving, fabrication, Wax Carving, lost-wax casting, electroplating, forging, and polishing. In order to understand how a bench jeweler fits into the process of jewelry making, it is important to understand the process itself.

⁴⁹ Authors note: Leather aprons are common on jewelry benches in Europe. In America, jewelry benches tend to have a pull out drawer (sweeps drawer) to catch metal filings and dust.

⁵⁰ Artist: Delaune, Etienne, armourer (1518-1583(?)) Goldsmiths Workshop., https://www.britishmuseum.org/explore/highlights/highlight_objects/pd/e/etienne_delaune_goldsmiths_wo.aspx. Etienne Delaune, Goldsmith's Workshop, an engraving, France, AD 1576. This pair of signed and dated engravings by Delaune (1519-1583) document the practice of sixteenth-century goldsmithing. The walls of the workshop are lined with the tools of the craft: pliers, files, drills, gravers, and hammers. The boy turning the winch on the left appears to be drawing wire. The worktable is placed perpendicular to the large window, in order to provide maximum natural light to the craftsmen. On the right a youth holds a pair of tongs in a small forge, with a bellows and an anvil

by his side. Each workman sits with a leather apron tucked into his belt and attached to the table to catch filings of precious metal.

⁵¹ Cones of borax. Agricola, G., Hoover, H., & Hoover, L. H. (1950). *De re metallica*. New York: Dover Publications. Book 12, page 560.

⁵² The second print shows the older man with spectacles serving a client through the window. He is possibly a self-portrait by Delaune. A display of chains and pendants hangs from the ceiling in full view of the street but out of reach of passers-by. Delaune is recorded working as a goldsmith in Paris in 1546 and briefly in the royal mint six years later. His first dated prints were made when he was 42 years old. As a Calvinist, he left Paris at the time of the St Bartholomew's Eve massacre in 1572, and moved first to Strasbourg and later, according to the inscription on this print, to Augsburg. The French Renaissance in Print (Grunewald Centre for the Graphic Arts, University of California, Los Angeles, 1994) http://www.britishmuseum.org/explore/highlights/highlight_image.aspx?image=ps249953.jpg&retpage=21466.

⁵³ St Eligius in His Workshop, c. 1450, Engraving, 115 x 185 mm, Rijksmuseum, Amsterdam. This engraving provides a detailed description of the goldsmith's workshop. The patron saint of gold and silversmiths is seated in the centre, chasing a metal cup. An assistant on the left is drawing wire through the die he is standing on. A die contains holes of different sizes, with the wire being drawn through even-smaller holes until it was a slender thread. Behind the wire drawer is the bellows of the furnace in which metal was melted, soldered and gilded. An assistant at the workbench on the far right is vigorously hammering a sheet of metal. The man beside him appears to be adding detail to the crude chasing with a pointed chisel known as a punch. Behind them is a rack with a wide assortment of the hammers, files, metal shears, chisels and punches or gravers used in metalworking. The attribution is not certain, this engraving has also been attributed to the Master of the Weibermacht and the Master of the Garde of Love. http://en.wikipedia.org/wiki/Goldsmith#mediaviewer/File:Saint_Eligius_in_his_workshop.jpg.

⁵⁴ Lespinasse, R. de. (1886). *Les métiers et corporations de la ville de Paris: XVe-XVIIIe siècles* (Vols. 1-3). Paris: Imprimerie nationale. Retrieved from <http://gallica.bnf.fr/ark:/12148/bpt6k5823044k>
Endnotes: "1422, 7 février. — Arrêt du Parlement permettant aux veuves de faiseurs d'aiguillettes, remariées à un homme d'autre métier, de continuer le métier de son premier mari. (Coll. Lamoignon, t. IV, fol. 179; mention d'après le 2e livre des Métiers.)" Translation: "1422, February 7. - Judgment of the Parliament allowing for widows of doers of aiguillette, remarried to a man of another profession, to continue the business of her first husband. (Coll. Lamoignon, t. IV, fol. 179; Reference to after the 2e book of the trades.)"

⁵⁵ Earl, Polly Anne, and Ian M. G. Quimby. 1974. *Technological innovation and the decorative arts*. Charlottesville: Published for the Henry Francis du Pont Winterthur Museum [by]. Page 85.

⁵⁶ Earl, Polly Anne, and Ian M. G. Quimby. 1974. *Technological innovation and the decorative arts*. Charlottesville: Published for the Henry Francis du Pont Winterthur Museum [by]. Boulton and Fothergill to Watt, ca. Feb 7, 1775, Letter Book, 1774-77. (Reference # 40 on page 100.)

- ⁵⁷ Tyrrell, R (2011) BUC-E33633: A POST MEDIEVAL LACE TAG Web page available at: <https://finds.org.uk/database/artefacts/record/id/476293> [Accessed: Mar 2, 2017 4:46:08 PM]
- ⁵⁸ Museum, T. B., & Street, G. R. (n.d.). Welcome to the Portable Antiquities Scheme website. Retrieved May 27, 2017, from <http://finds.org.uk:443/>
- ⁵⁹ Creed, K (2011) LON-BAD2C1: A POST MEDIEVAL LACE TAG Web page available at: <https://finds.org.uk/database/artefacts/record/id/471329> [Accessed: Mar 2, 2017 6:06:15 PM]
- ⁶⁰ Posted by Liz Friend to the "London Mudlark" FaceBook group on February 6th, 2017. "My pal Johnny found this brass decorated aglet last week on foreshore." Used with permission.
- ⁶¹ The YouTube video "Fun with Aglets" shows the machine that forms the plastic aglets. <http://www.youtube.com/watch?v=P9CXOVygdTw>.
- ⁶² Shoe Lace Tipping Machine Fully Automatic. (n.d.). Retrieved May 27, 2017, from <https://www.youtube.com/watch?v=UfxyjmatXU8>
- ⁶³ Kramer, Bola Bill. 1978. Bola tie, new symbol of the West. Flagstaff [Ariz.]: Northland Press. Page 44. (Amendment to Title 41, Chapter 4, Article 5, Arizona Revised Statutes. A new section 41-797, entitled "State Neckwear," States: "The Bola tie shall be the official state neckwear.")
- ⁶⁴ Hunt, W. Ben. 1960-1973. Indian Silver Smithing. New York: Collier Books. Page 152.
- ⁶⁵ Creative Gold and Silversmithing by Sharr Choate, Other authors: Bonnie Cecil De May (Editor), Crown Publishers, Inc. (1976), Hardcover, pages 108-9, 120-1
- ⁶⁶ Indian Jewelry Making: Volume I by Oscar T. Branson, Treasure Chest Publications (1977), Spiral-bound, page 46
- ⁶⁷ (Arnold, Janet. 1988. Queen Elizabeth's wardrobe unlock'd. Leeds: Maney.) Page 228
- ⁶⁸ Panoplia Omnium Illiberalium Mechanicarum Avt Sedentariarum artium genera continens. (n.d.). Retrieved February 3, 2015, from <http://digital.slub-dresden.de/id266129870>. <http://digital.slub-dresden.de/werkansicht/df/12703/171/0/>.
- ⁶⁹ Lespinasse, R. de. (1886). Les métiers et corporations de la ville de Paris: XVe-XVIIIe siècles (Vols. 1-3). Paris: Imprimerie nationale. Retrieved from <http://gallica.bnf.fr/ark:/12148/bpt6k5823044k>
- ⁷⁰ www.livingstonjewelers/translations.html
- ⁷¹ Columbus, C., Casas, B. de las, Dunn, O. C., & Kelley, J. E. (1989). The Diario of Christopher Columbus's first voyage to America, 1492-1493. Norman: University of Oklahoma Press. Page 138-9.
- ⁷² Thacher, J. B., Morison, S. E., Knickerbocker Press, & Jay I. Kislak Collection (Library of Congress). (1903). Christopher Columbus: his life, his work, his remains as revealed by original printed and manuscript records, together with an essay on Peter Martyr of Anghera and Bartolomé de las Casas, the first historians of America. New York and London: G.P. Putnam's Sons : The Knickerbocker Press.

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⁷³ Martínón-Torres, M, Cooper, J, Rojas, R.V. and Rehren, T 2007. Diversifying the picture: indigenous responses to European arrival in Cuba. *Archaeology International* 10:37-40, DOI: <http://dx.doi.org/10.5334/ai.1008>

⁷⁴ Kepecs, S., Curet, L. A., & La, R. C. G. (2010). *Beyond the blockade: New currents in Cuban archaeology*. Tuscaloosa: University of Alabama Press. Pages 113, "Tury Treasure in the Caribbean".

⁷⁵ Kepecs, S., Curet, L. A., & La, R. C. G. (2010). *Beyond the blockade: New currents in Cuban archaeology*. Tuscaloosa: University of Alabama Press. Pages 106 – 125, "Tury Treasure in the Caribbean".

⁷⁶ Field Report 1994, Lucchetti, Nicholas M., Kelso, William M., Straube, Beverly A.. May 1994, Jamestown, Virginia. Page 27.

⁷⁷ NDDOT - Scattered Village Report. (n.d.). Retrieved February 3, 2015, from <http://www.dot.nd.gov/public/education/scatteredvillage.htm>

⁷⁸ Cunningham, C. M., & Drury, P. J. (1985). *Post-medieval sites and their pottery*, Moulsham Street, Chelmsford. London: Chelmsford Archaeological Trust and the Council for British Archaeology.

⁷⁹ Ancient Monuments Laboratory Report 88 / 90. An examination of the copper alloy lace tags from Acton Court. <http://services.english-heritage.org.uk/ResearchReportsPdfs/088-1990.pdf>

⁸⁰ Cunningham, C. M., & Drury, P. J. (1985). *Post-medieval sites and their pottery*, Moulsham Street, Chelmsford. London: Chelmsford Archaeological Trust and the Council for British Archaeology.

⁸¹ Thanks to Nick Wickenden, Museums Manager, Leisure & Heritage Services, Directorate of Community Services, Chelmsford City Council. Nick.Wickenden@chelmsford.gov.uk for the loan of these aiglets. www.chelmsford.gov.uk

⁸² Workshop notes. Theodore R. Lazcano.

⁸³ Compleat Anachronist, # 108. March 2000. Swales, Lois, Kuhn, Zoe copyright 2000 Society for Creative Anachronism. Additional content by Theodore R. Lazcano. (Lois Swales (Mistress Rhiannon y Bwa), Zoe Kuhn (Lady Azza Al-Shirazi), Theodore R. Lazcano (Master Bedwyr).)

⁸⁴ Date: ca. 1580, Culture: European, Medium: silk, metallic thread, brass, Dimensions: Length at CB: 22 ¾ in. (57.8 cm), Credit Line: Catherine Breyer Van, Bomel Foundation Fund, 1978, Accession Number: 1978.128. <http://www.metmuseum.org/collections/search-the-collections/83202?img=7>.

⁸⁵ Heath, Maya. 2007. *A practical guide to Medieval adhesives*. Milpitas, CA: Society for Creative Anachronism.

⁸⁶ FaceBook private message from a conversation on 8/13/2014: Maya Heath to Gerald Loosehelm, 8/13, 7:51pm. "If it were me, I would use a cheese glue as it dries rigid and is somewhat waterproof. A small rivet would hold in it and provide a fairly sure attachment."

⁸⁷ Date: ca. 1580, Culture: European, Medium: silk, metallic thread, brass, Dimensions: Length at CB: 22 ¾ in. (57.8 cm), Credit Line: Catherine Breyer Van, Bomel Foundation Fund, 1978, Accession Number: 1978.128. <http://www.metmuseum.org/collections/search-the-collections/83202?img=7>.

⁸⁸ LACE TAG Unique ID: SUR-91CC76. A post medieval lace tag, or aglet, made from a rolled triangular sheet. In the wider end are four securing holes. Chronology Date from: Circa AD 1600 - 1800

⁸⁹ <https://www.facebook.com/LondonMudlark>

⁹⁰ Claude Blair and John Blair, "Copper Alloy" in 'English medieval Industries', ed. J. Blair and N. Ramsey (London, Hambleton) page #, figure 125 – 126.

⁹¹ Messenger. (n.d.). Retrieved June 11, 2017, from <https://www.facebook.com/messages/t/gaeira.aggadottir>. FaceBook Messenger conversation with Georgia Panaritis. Montréal, Canada.

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