From Gold Thread to Gold Lace
In January 2016 The School of Historical Dress arranged a study day around the remains of a mulberry velvet gown that is part of the Isham collection, now in the V&A (ref 178-1900), and featured in Seventeenth Century Women's Dress Patterns, Book 2 (V&A 2012, ISBN 978 185177 685 6, Editors Susan North and Jenny Tiramani). I had been asked to reconstruct lace that now only remains as small scraps in a shoulder seam, but would once have striped down the surface of the gown, also to provide a short talk about gold and silver lace of the period.

This is a PDF adapted from my talk.

The other contributors to the study day were: Susan North, Curator of Fashion at the V&A who gave us a brief survey of the Isham collection; Vicki Howlet, House Assistant at Lamport Hall, who provided information about the Isham family; Lisa Monas, textile historian, explained the making of the mulberry velvet; Christine Carr, conservator at the New York Met, used images taken with a microscope to give more information about the structure of velvet; Melanie Braun, one of the School's regular tutors, explained how the gown would have been cut and constructed; Johannes Pietsch, curator of textiles in Munich, gave an overview of women's gowns in high fashion from 1500-1650; costume maker Sebastien Passot, introduced a venetian gown from around 1600, then Karen Hearn, art curator and historian, showed the usefulness of the gown for pregnant ladies. Finally we had a brief demonstration by Jenny Tiramani and Hattie Barsby, principals of the School of Historical Dress, of the value of using authentic fabrics when making period dress, then fashion-designer Nabil El-Nayal presented some of his cat-walk pieces that take styles and techniques into the 21st century.
Above we have a portrait of 15 year old Mary Denton, commissioned by her father Sir Roger Martin in 1573. Sir Roger was a London mercer and with this portrait he is certainly making a strong statement about his status and the luxury fabrics in which he traded.

Mary has gold and silver lace edging her ruff, cuffs and lapels, also bands of three different laces applied as surface decoration to her overmantle.

All these laces are bobbin laces which have been worked with multiple threads, each thread wound on a small handle, known as a bobbin. Bobbins allow long lengths of precious threads to be plaited and woven without damage or tangling.

Bobbin lace was known as bone lace in the 16th century, which suggests small bones were used as bobbins.

Bones do work very well - these are leg bones from rabbit and game birds boiled in a stockpot and finished off in the dishwasher.

Most bobbins however are turned wood.
The first picture we have of bobbins in use comes from the frontispiece of the *Nüw Modelbuch*, printed in Zurich in 1561. The *Nüw Modelbuch* is one of only three 16th century pattern books devoted to bone lace. Most of the patterns in the book are intended for linen insertions and edgings, and it is likely that these ladies were working with linen. However some of the patterns such as the one at top left (below) are more suitable for working in metal thread.
The two other pattern books devoted to bobbin lace had been published in Venice a few years earlier; these were books 1 and 2 of *Le Pompe*. The *Le Pompe* books have a much greater proportion of patterns aimed at the high fashion market and intended for gold and silver thread.

All the elements of Mary's laces can be found in these three books, however there are no exact matches. This is not surprising as lacemakers at that time were more likely to be using the illustrations as a guide, rather than as a pre-pricked pattern as is usual today.

None of Mary's laces are difficult to work, however they were luxury items, made with gold and silver threads which were, and are, very expensive materials.

The earliest gold threads were made by gilding fine vellum, cutting this into narrow strips and winding the strips tightly around a core of silk or hemp. This type of thread appears in inventories as Venice, or Cyprus, Gold, since those were the places from which the thread was imported.

By the middle of the 16th century a different production method had evolved; a method which depended on the skills of the wire drawer.
The process of wire drawing has remained much the same since it was first recorded in 14th century Germany, although becoming increasingly mechanised.

Gold wire starts as a solid rod of silver, gilded all over with a layer of gold. The rod is heated then pulled through holes in a series of draw plates - each hole being slightly smaller than the one before - in this way the thickness of the rod, then the wire, is reduced in gradual stages.

If the initial rod is evenly gilded the wire will retain its gold colour throughout - the thickness of the gold layer determining the quality and colour of the finished wire. Technically the wire is silver-gilt although it usually referred to as gold.

Gold wire is turned into gold thread by wrapping it around a core, a process known as gold-spinning. For the best thread, fine wire is first flattened by passing it between rollers, then spun smoothly around a bundle of silk fibres. The exact method used in the sixteenth and seventeenth centuries was a 'mystery' or trade secret, but the result was a flexible thread composed of a flat gold strip smoothly wrapped around an invisible core.

The thread always has an S-twist; ie the line of the twist is in the same direction as the diagonal line in a capital S.
In a few surviving examples the core of the thread is entirely hidden and magnification is necessary to show the wrapping. An example is this lace on a nightcap in the Nottingham collection (above). This is in almost perfect condition.

More often the outer covering is damaged and it is possible to see the fibres of the inner core as in this detail of lace from Hardwick Hall (above). Here the inner fibres can be seen in several places; orange fibres indicate the thread was once gold, white or grey that it was silver. Silver threads were made by the same process as gold, without the gilding, and copper threads were also produced.
Silver tarnishes easily, so surviving examples are usually a dark grey, as in this example which is the full width of the lace shown in close-up on the previous page. This is a section of one of eleven 4-inch wide bands which almost certainly started life on bed hangings at Hardwick Hall. The original lace with the double threads of bright gold and silver would have had enormous impact.

A thriving gold thread industry was established in London by the middle of the sixteenth century and as the century progressed an increasing proportion of the thread was going into bobbin lace.

In 1551 Bess of Hardwick, when Lady Cavendish, recorded paying 6 shillings for an ounce of silver thread and 12 shillings for two ounces of gold thread, to work bone lace within her household. The textile skills learned in any large household could easily be adapted to working the simpler bone laces. Three ounces of gold and silver thread would have been enough for a small project. My short copy of the Hardwick lace weighs half an ounce.
The makers of metal threads would have been specialists, but it is less clear who was making most of the metal lace.

The more complex lace was probably made in either specialist workshops, or ones such as that run by embroiderer Josine Graunger, where Margaret Daris, a surgeon’s daughter was apprenticed in 1597 to learn 'to work all manner of cutworks, bonelaces, needlework edgings; and also all manner of networks and network edgings with flourishing and all manner of black works; and also to work with gold and silk and all manner of plainworks, and whatsoever else belongeth to a workwoman'.

In the early years of the 17th century enormous quantities of metal thread lace were passing through the hands of the silk men and women who were the main suppliers of luxury goods. In 1613, the year of the marriage of James I's daughter Elizabeth, the Great Wardrobe accounts record that Christopher Weaver, a silkman, had supplied, among many other items, 1,698 ounces of silver bone lace with spangles.

Spangles were a feature of many 17th century laces, these are small tear-drops stamped out of sheet metal, threaded on as the bobbins are wound and pushed into place as required. The shape of the spangles - with a large hole at the narrow end - means that they dangle freely and would have twinkled magically as they moved in candlelight.
This example of spangled lace is in the Draper's Company collection; it is part of Jane Lambarde's mantle which is displayed in their hall alongside a 1620s portrait of Jane herself with the mantle draped across her arm. There must be thousands of spangles on the 3-inch wide band of lace, every one still bright and shiny. They appear to be silver, but are not tarnished so were probably cut from sheet tin.
Few pieces of gold and silver lace have kept such a high proportion of their spangles but it is often possible to see where they would once have been. One example is the edging of Margaret Layton's waistcoat -- it is likely that each of the scallops would originally have carried three spangles, since there are only three places on any repeat where spangles can be seen.

In some places it is possible to see where the thread of the picot has been cut through by the rough edge on the inside of the spangle hole (see small image); where the picot is intact it is likely that the spangle itself had broken - spangles were punched out in two stages - the outer shape and the hole - and the two are not always perfectly aligned.

Also in the upper right image are small gold discs, called oes. Oes are formed from single rings of coiled wire hammered flat. The unsealed join across the radius of an oe makes it unsuitable for use in lace since in time a single thread can wriggle through the gap; in embroidery oes are usually attached with at least two stitches and are more likely to stay in place.
Metal strips in addition to metal threads have been used for these panels, which are also part of the Hardwick Hall collection. Describing these panels as lace might be stretching the definition a bit, however the main part can certainly be worked on a pillow with bobbins.

Other passementerie skills are needed to construct the stitched and knotted toggles and make the hollow beads which are each composed of a narrow metal strip worked into a Turks-head knot.
The panels may have been part of a set of bed hangings, but were more likely to have held down the corners of a table covering as in the portrait above of Philip of Spain - the Hardwick record says there were 56 'oak leaves', this would have given 7 pairs of frogging panels for each corner.

Frogging was also found on clothing.

I had seen many reproductions of this portrait of Queen Elizabeth, but it wasn't until I saw the actual painting that I realised the frogging on her bodice was probably bobbin lace.

And at last I had the answer to a question that had puzzled me for years.
What was the purpose of the pattern on the left - the only one of this shape in *Le Pompe*? It makes a very good bookmark, but I knew that was not its true purpose.

Bobbins can be wound in pairs so there are continuous threads to give a neat start to a shape, however at the finish there are always numerous thread ends to deal with and the easiest way is to tie them off as a tuft or tassel.

This appears to be the way the frogging panels were worked and I was able to produce a reasonable interpretation in red silk and gold thread.

One puzzle solved, but how and where did they use these star motifs also from *Le Pompe*?
To date the most comprehensive research into early gold and silver lace has been undertaken by Lena Dahrén for her PhD, awarded by Uppsala University in 2010.

Lena's lavishly illustrated thesis provides masses of visual information, unfortunately the text is in Swedish and Lena has been unable to secure funding to allow the English translation which would provide access to the rest of her research including extensive information on trading and use and re-use of metal lace.

In Sweden Lena could study surface decoration on ecclesiastical vestments - a resource barely available in the UK, however we do have surviving metal lace mainly in the form of narrow edgings or wider borders.
Many of the edgings are on gloves: pairs and single gloves turn up in a variety of places and there is a large collection belonging to the Worshipful Company of Glovers, now in the care of the Fashion Museum in Bath, and available online. Several waistcoats with gold and silver edgings are in museum collections and there are many caps and coifs.

Cap from the Middleton Collection, Nottingham
Coif, Burrell Collection, Glasgow
The widest borders are on shoulder sashes - this from the Nottingham collection - is particularly impressive.

Men and women wore expensive shoe roses composed of gathered spangled lace and men also wore sashes around the knee. As far as I know neither knee sashes nor shoe roses have survived in the UK, however both appear on full-length portraits such as these by William Larkin. Luckily for researchers these portraits are usually hung at a height where sashes and shoe roses can be studied at more-or-less eye level.
Having work at eye level is no guarantee that you see all there is to see. I had been so surprised by the discovery of the frogging on Queen Elizabeth's bodice that I failed to look properly at the rest of the portrait. And it was only on my second visit that I noticed the gold and silver lace laid along the sleeve from the shoulder seam to cuff.

Which brings us to the velvet gown we are discussing, where X-rays show a few fragments of metal lace trapped in a shoulder seam.
A photo of the exposed end of one of the fragments provides some information about the threads used. In the foreground is a remnant of flattened silver wire, now tarnished to a dark grey; this has been S-wrapped around a bundle of white fibres which also has a very slight S-twist. There are other bundles of fibres which are yellow-gold in colour; this was a colour used as the core for gold thread, so it is fairly safe to assume that the wire twisted around these fibres was originally bright gold.

One X-ray of the gown shows that the largest lace fragment is very similar in design to lace on a cushion in the Glasgow collection. That was worked with six pairs silver thread and two pairs gold, so that is the combination I chose for my samples of the gown lace.
The X-rays show that spangles were part of the original lace, however it is unclear which picots would have held spangles so a variety of possibilities were tried.

Proper, tear-drop spangles are almost impossible to find and those that are made are extremely expensive - hand punched ones sold by Thistle Threads in America cost 1 dollar 50 each. The ones I used were hand-cut from aluminium shim.

The stitching lines on the gown indicate that two widths of lace were used. Unfortunately the X-rays give no clear idea of a pattern for the narrower lace.

My first attempt (right) was not narrow enough and was much denser than the wider sample.

However the two pieces actually work quite well together (below).
After some thought and experimentation I worked a second sample of the wider lace - the same width but with a shorter repeat.

Also a narrow lace worked with just 4 pairs that has the same repeat length.

These two laces together would have made a spectacular - and expensive! - finish to the velvet gown.