How to make a medieval manuscript

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Before the introduction of printing to Europe, all books were written by hand as manuscripts. The process of making a manuscript was carefully planned and thought out in advance.

‘*The beauty of this book displays my genius.*’
Eadwine, mid-12th century

The word ‘manuscript’ derives from the Latin for written (*scriptus*) by hand (*manu*). The most luxurious of these were illuminated, literally lit up by decorations and pictures in brightly coloured pigments and burnished gold leaf and gold paint (if it was used at that time).

Many scribes and artists were monks, particularly in the medieval period from 700 to 1200. From documentary evidence it is clear that many of these artists worked in a variety of media, but it is their painting in books that survive in great numbers, giving us a glimpse into the great artistry of the Middle Ages.

Quills and writing tools

Texts were written with quills made from the feathers of geese, swans or other birds. The Latin for feather is *penna*, giving the modern writing tool the name of ‘pen’. The first five flight feathers on the outer edges of the wing made the best quills because of the longer length of the barrel from which the nib is cut. Because of the way the feathers curve, those from the left wing of the bird are more suitable for right-handers, and those from the right wing for left-handers. The end of the quill was cut with a penknife to make a nib-shape. Knives were also used to scrape out mistakes made on the page and re-cut the nibs.

Did you know that left-handed pens were in use during the Middle Ages? Patricia Lovett demonstrates how to make quill pens from bird feathers.

The feathers that are used to make quills come from the wings of large birds like swans and geese. The feathers that are here, these white feathers, are from swans and the darker ones here are from Canada geese, which are large birds. We need large birds because we make pens from the barrels and they need to be of a reasonable size to be able to cut a pen nib shape into it. There are actually feathers for right- and left-handers. So, the feathers for a right-hander come from the left wing of the bird and the feathers for a left-hander come from the right wing of the bird. So, the feathers are first of all cut, using a knife or scissors, to about eight or nine inches, because this is the length of a pen. If they're not cut, then the whole length of a feather gets in the way. The tip is also cut off and then the outer waxy covering of a feather, which would get in the way of writing, is removed. And here, I'm removing it with my fingernail. It can be removed [with] the back of a knife or scissors in exactly the same way. The membrane that carries the blood supply to the tip of the feather then needs to be removed and nowadays we try and pull this out with a crochet hook, as here. It's sometimes quite difficult to get it out. Then the nib shape is cut into the tip of the feather. We use a curved bladed knife because traditionally this is a penknife. So, the first cut is the scoop cut and this is about just over an inch from the tip of the feather and it goes at an angle in and along the length of the feather, about halfway

through. Then the shoulders are shaped, and these are made either side, not quite as deep as a scoop cut obviously, along and out to the tip on both sides and you can see that these are shaping the shoulders of the nib. We trim the end off, so it looks a little bit like now the shape of an old-fashioned nib in a fountain pen. So, this pen won't write unless there is a slit which carries the ink through down to the tip of the nib. So, the slit needs to be put in next, and now that's that: a feather changed into a quill.

Oak Gall Ink

Soot, iron salts, or tannic acid from oak galls (swellings on oak trees formed around gall wasp eggs) were mixed with gum and water to make ink. Oak galls were crushed with a weight such as a hammer. Then the gall was mixed with *copperas* (iron sulphate), and covered with water and left in the sun for several days. During this time, tannic acid leached out, creating a purplish or brownish liquid when mixed with iron sulphate. Gum Arabic was added to this, thickening the ink and ensuring that it adhered to the writing surface.

Why were wasps so important for medieval scribes? Patricia Lovett reveals the complex process behind making ink for writing in manuscripts.

The ink that was used in medieval manuscripts was almost invariably made from oak galls. These are produced when the oak gall wasp lays its egg on an oak tree and, instead of an acorn being formed, it forms these hard, round balls which are called oak galls. They are really tough. To make the ink, they need to be smashed with a hammer to make these fragments, like this. These are then put in a jar and rainwater added on top to cover them and left just on the windowsill for a few days. Gradually, the tannic acid is leached out of the oak galls, and this is the crucial thing in the ink. The water gradually turns into pale brown, which over a couple of days turns into a darker brown. Then there needs to be some sort of glue-adhesive added to it to make sure that the ink sticks to the surface of the skin, and in this case, usually, gum arabic is used. These are these rather yellowy amber-coloured lumps which are dissolved in water to make a sticky solution. And also, copperas is added. Copperas is what

ferrous sulphate was called in medieval times, and this gradually turns that pale brown into a darker brown and eventually into a dense black. When in use, on exposure to air, it turns into that really deep rich black that we're used to in looking at medieval manuscripts.

Parchment and vellum

Most medieval manuscripts were written on specially prepared animal skin rather than paper. Parchment is any type of animal skin, including sheep skin, or calf skin (known as vellum), the highest quality skin.

The skins were first soaked in a lime solution to remove the hair and any flesh, and then stretched on a frame so that it could be bleached and scraped to a relatively even thickness. After being dried, the skins were cut into sheets to create pages. It is still possible to see hair follicles in the pages of some manuscripts.

What material did scribes use instead of paper for the pages in their books? Patricia Lovett discusses how animal skins were selected and prepared for use in medieval manuscripts.

Animal skin was used to make the pages in medieval manuscript books, and the skin could be used from sheep or from calves, from goats or even from deer. This is a skin of vellum. This is calf's skin and it is a by-product of the meat and dairy industry. We can see, here, the shape of the vertebrae on this skin and this is where the haunches are. Coming up the spine, here, this is the neck. These parts of the skin are the thicker parts because this is the protection that the animal needs. Around the ribs are the thinner parts, because the animal doesn't need protection. When selecting a skin for setting out a book, care has to be taken to avoid the thicker parts, because this will mean that if it's used for the fold the book will be continually springing open. If it's used for the edges of the pages, the book won't close properly. There are two sides to the skin: the hair side and the flesh side. This is the hair side, which is more marked. Sometimes you can see a little spattering of black spots or brown spots, which are the hair follicles, and it has more tooth for writing. It's got a much better surface for writing. The other side, here, is the flesh side, and this is whiter, waxier, and smoother and is more difficult to get a good tooth with a pen for writing. They weren't too careful with skins in medieval manuscripts and quite often you can see these holes, here, which are called lacuna or lacunae and they either made it so that these were on the edges of the pages or they simply wrote around them or, in some cases, they actually sewed them up.

Preparing the page

After the skin was selected and cut to size, the page was prepared and laid out for the writing lines. A sharp pinprick mark was made using the tip of a knife or the points of dividers to show where lines should be ruled on the page. This was done in either dry point (without an ink line) or in graphite, lead or ink. The writing was usually completed first on unfolded pages because it is easier to write on the pages when they are flat, then gathered together in sections, leaving spaces for the decoration.

How did scribes prepare their pages for writing? Patricia Lovett examines the tools for ruling and line marking in medieval books.

A lot of care was needed to set out a page for writing and illuminating in medieval manuscripts, because guidelines were needed to indicate where lines started and ended, where the page started and ended, and indeed whether there were going to be any inserts for allowing larger initials in margins. Here, I'm using metal dividers to indicate the markings on the page. These are like compasses used in school, but there's a point at each end rather than a point and a lead point. I'm setting out the margins of the text block here, and now I've reset the dividers so that they're marking out the positions of each line. This was traditionally done at either side of the page, so it was quite easy for a straight edge to be placed such that the dots could be joined up and the lines were parallel. And now the page is ready for writing. Manuscript books were almost invariably made by having the pages flat. It's much easier to work flat, and it's certainly much easier to mark out the lines and the text blocks when the page is flat than in a bound book.

Pigments

The pigments to make paints came from minerals, such as minium (orangey-red, from which the term 'miniature' derives), lapis lazuli (ultramarine – blue), and cinnabar (vermilion – red). Pigments could also be made from plants such as woad (producing dark blue) and madder, (pink) or from animals such as sea molluscs (purple) and squid (dark brown/black).

How did illuminators make the brilliant colours in their manuscripts? Patricia Lovett uncovers the variety of pigments that were in use in the Middle Ages.

The wonderfully brilliant, jewel-like colours in many medieval manuscripts came from animal, vegetable, and mineral sources. Mineral sources to note are ultramarine, which is over the sea, coming from that brilliant blue of lapis lazuli, and that can often be confused with citramarine, this side of the sea, or azurite, which is a slightly greener blue. An iron-based compound was rubrica, a lovely red colour, and this was used for the headings or the instructions in books and from this we get rubrics. Minium comes from baking flake white to give an orangey-red, as here, and it was used to outline the medieval miniatures, and because they were outlined in minium, they were called miniatures. They weren't called miniatures because they were small,

as they weren’t always small. Dragon’s blood is a mixture, as everyone surely knows, between a dragon and an elephant fighting and is the intermingling of their blood. Vegetable and animal sources include carmine, here, from little insects; saffron, a yellow colour; blue, from indigo and woad; and pink, from madder.

Paint

As the pages of medieval books were closed for most of the time, the pigments used to decorate medieval books kept their vibrancy and colour. Pigments were mixed with glair (egg white beaten to remove the stringiness, and the liquid under the froth then used) or yolk, both making egg tempera; egg provides the adhesion. Gum Arabic was also used to ensure the paint attached to the surface of the page.

What role did eggs play in illuminating manuscripts? Patricia Lovett explains how medieval artists painted the beautiful illustrations in their books.

The wonderfully bright colours used in medieval miniatures in manuscript books needed some sort of adhesive to make sure that they stuck to the surface of the animal skin. This was usually provided by eggs. Both the white of the egg and the egg yolk can be used, but rarely were they used together. Naturally, the white of an egg can sometimes be stringy or quite thick and gelatinous and this is difficult to work with. So, the egg is beaten to a light froth and then left for a while, and then the liquid underneath the froth is used, mixed with the pigment, and that makes it stick to the paper, or the egg yolk can be used. The white needs to be removed from the egg yolk – and I’m doing this by passing it from palm to palm and wiping my hands to get rid of all the excess egg white – and then we need to remove the yolk sac, so that the yolk itself remains on its own and can be used with the paint. This is then mixed with the paint and this makes the paint stick to the surface.

Gilding

Most luxury manuscripts were illuminated by the addition of gold, either as paint or gold leaf. The paint is known as shell gold, because it was typically kept in a mussel shell. Gold leaf was applied over gesso, which raises the gold from the surface and so it really catches the light, glair (beaten egg white), or gum. It was then burnished to a shine with a polished stone such as agate or an animal tooth and the metal still glows in manuscripts centuries after it was first applied.

How did medieval artists make their manuscripts shine? Patricia Lovett explores the work behind painting and embellishing manuscripts and reproduces a lavishly illuminated page.

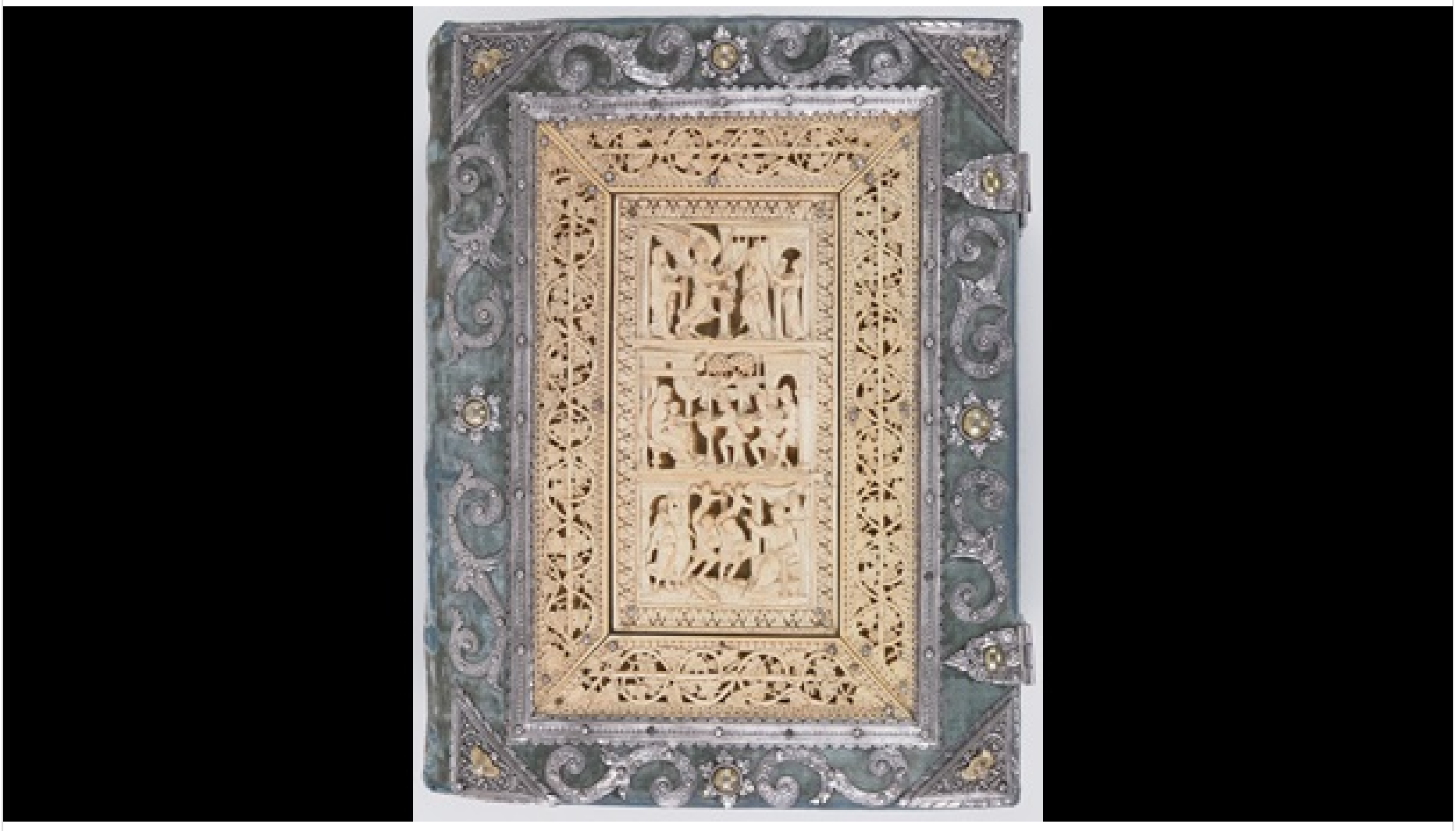
Creating a medieval miniature involves a number of processes. The design is transferred to the surface of the skin, and then often the outline is reinforced, gone over with minium. Because it’s gone over with minium, these were called miniatures. They weren’t called miniatures because they were small, but because they often are, this is the word we now use for 'miniature'. Then gesso – this pink compound, essentially plaster of Paris and various stickies – is layered usually with a quill wherever there is going to be gold in the finished design. This pink compound is then allowed to dry, is prepared, and then almost pure gold, beaten until it’s tissue-thin, is applied to the gesso which is breathed on and the moisture in breath reactivates the stickiness very slightly so that the gold adheres. A burnisher, which can be either a polished stone, as here, or in medieval times quite often a tooth, is used to ensure that the gold is sticking and also to shine it up so that it is a brilliant shine. Gesso raises the gold leaf from the surface of the skin and this reflects the light even better, so that when the book was used perhaps in a church service to be paraded around the church, it caught the candlelight, or it caught the glint of a sunbeam and it reflected from the book, looking as though the light was coming from the book itself. Lastly, the paints are applied, and this is done in a series of stages, with the base colours applied first, then the tints and the shades, the white highlights and finally the black outline which brings everything to life.

Binding

Folded sheets of parchment or vellum were grouped into booklets or ‘gatherings’. These were placed in order and sewn onto leather cords running horizontally across the spine of the book. These cords were then attached to the wooden boards of the book cover.

The leather- or textile-covered boards of the finished book were sometimes further decorated with ivory insets or embroidery. Precious stones and metals ornamented the bindings of the grandest of books, but few of these ‘treasure’ bindings survive.

10th-century Gospel-book, produced in Metz



The lower cover of an 11th-century Gospel-book depicting the Crucifixion (BnF, Latin 9391)

Written by **Kathleen Doyle**

Dr Kathleen Doyle is the Lead Curator of Illuminated Manuscripts at the British Library. She received her PhD in Medieval Art History from the Courtauld Institute of Art, University of London, where her thesis focussed on 12th-century Cistercian manuscripts and the use of images in monastic art. Her latest publications are with Charlotte Denoël, *Medieval Illumination: Manuscript Art in England and France 700–1200* (2018), also available in French, and with Scot McKendrick, *The Art of the Bible: Illuminated Manuscripts from the Medieval World* (2016), which has been translated into Dutch, French, German and Italian.

Dr Doyle was the co-curator, with Dr Scot McKendrick, of the AHRC-funded exhibition, *Royal Manuscripts: The Genius of Illumination*, and the Lead Investigator for the Royal Manuscripts follow-on project, editing with Dr McKendrick the volume *1000 Years of Royal Books and Manuscripts* (2013).

and **Patricia Lovett**

Patricia Lovett MBE FRSA is a British scribe and illuminator from Kent. She is the author of over a dozen books including the *Art and History of Calligraphy* published by the British Library, teaches calligraphy, illumination and manuscript skills in the UK and worldwide, and has been featured in a number of TV programmes about manuscript skills. Since 2017 she has been the Chair of the Heritage Crafts Association, having been Vice-chair since it was set up, and in 2013 was awarded an MBE for services to calligraphy and the protection of heritage crafts.

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