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Casey Crompt

Annaliese Croasdale

Emma Pilmer

Lauren DiCiaula

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Do it by the Book - The Development and Manufacturing of Books in the Middle Ages

Annaliese Croasdale
Casey Crompt
Lauren DiCiaula
Emma Pilmer

Augustana College
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Abstract

This paper discusses the book-making progress in the Middle Ages that was used across Europe. This process includes the making of paper, the making of the inks used, bookbinding, and how books were printed. Each is an important aspect of how early manuscripts were created. Without these processes, there would not be written documentation of early literature or music. This paper provides a deeper understanding of the work that was implemented into creating early books, and gives insight as to what the book-making process consisted of before the development of present-day technologies.

At a time before information was at our fingertips through the world wide web, people used books for entertainment, educational, and political purposes. The making of books used to be significantly different from the fast and easy process that is present today in an age of machines that can accomplish whatever they are programmed to do. Humanity has developed exponentially from the Middle Ages that most of the population does not know how manuscripts were made. From the painstaking practice of making parchment and creating pigments for ink, to printing and binding the pages together: each of these age-old techniques led our modern society to where it is today in the way of producing books. It's important to dig deep in the past to learn about processes that used to be prevalent with book-making because these initial developments have led to an art that is now widely overlooked.

In the fourteenth century, the book-making process involved the development of making parchment. Today, paper is made out of materials such as trees, flax, bamboo, or other plants, whereas previously, it was made out of animal skin. This is referred to as Parchment or Vellum, and was created to be strong and durable, compared to modern paper which can be easily damaged. The parchment used in the Middle Ages was created from a variety of animals. In its earliest stages, the hides of donkeys, hogs, and wolves were used. As time progressed, rabbit, sheep, and goat skins were used to be made into paper. This transition was made to ensure a thinner piece of parchment.¹

The paper making process began with skinning the carcass. Then, the hair or fur would be removed. This could be accomplished in a variety of ways, but the most common method was to loosen the hair using lime solution and then to scrape the skin with a blunt knife. Once the hair had been removed, the skin was stretched by tying a cord through the ends of the hide and then pulling it tightly around a frame. These were made of wood, and were either shaped like a hoop or a rectangle. The hide would remain on the frame, being pulled until the desired stretch was attained. This stretching was done in order to thin the hide to a thickness just slightly larger than desired for making documents. The maker would then smooth out the skin with a sharp tool, which also made the hide slightly thinner. This process helped to remove imperfections that were there formed when the skin was removed from the animal, and to smooth out the side that hair grew from.

¹Michael L. Ryder. "Parchment - Its History, Manufacture and Composition." *Journal of the Society of Archivists*. 2 (9). (March 1964). 393.

Over time, paper makers were able to create thinner and smoother parchment by splitting the skin with a sharp tool. This would separate the skin and lead to it being slightly smoother than before. Also, it would make both sides of the skin similar in texture.² When looking at old manuscripts, one can see imperfections in the parchment due to damage made to the animal skin. This parchment was expensive and time consuming to create, so book makers often made do with what they had and tried to work around any imperfections. After the paper had been created, it was then transferred to receive text from a printing press.

After the parchment had been made, it was time to print. There were several ways to print books before the printing press was made. For example, block printing, also known as xylography, was used in Eastern Asia.³ A printing block is a slab of wood or copper where text and images are engraved in reverse. This way, when the paper was put on the top to print, the printed letters and images would come out in the correct order. Block printing was assumed to spread west to Europe by the late fourteenth century and had been in use for around fifty years before the printing press.⁴ Xylography would have been how music was printed at this time as well. This method of printing was particularly expensive and time consuming for the book-making process, so there was a need for a more efficient printing system.

Johannes Gutenberg (c. 1400-1468), invented the first practical printing press. His invention had advanced the book making process during the fifteenth century. Printing is easy and relatively inexpensive in this time and age because of the modifications made to Gutenberg's initial press. According to Putnam, the most important improvement of the printing press is its movable type. The movable type provided a sustainable way to print. There were multiple movable letters and symbols that could be rearranged for different products. There was less waste produced, and it was more efficient and cost effective.⁵ The printing block was already in use in Europe for around fifty years, but this device helped streamline the system.

In 1455, the two printing houses in Mainz, Germany, became two separate companies and subsequent competitors in the printing business. One of these companies had an advantage over the other. They housed six presses of different sizes to print on different sized sheets of paper. With this

²Ibid, Ryder p. 334.

³Childress, Diana. 2008. *Johannes Gutenberg and the printing press*. Minneapolis: Twenty-First Century Books.

⁴Putnam, G. H. (1896). *Books and their makers during the Middle Ages* (second edition, Vol. 1). G. P. Putnam's Sons. (350).

⁵Ibid, Putnam.

competition, Gutenberg sold the designs and the printing press spread outside of Mainz.⁶ After the text has been printed onto the manuscripts, they can be taken to artists for their illuminations.

Art historians classify illuminated manuscripts by their historic periods and types. These periods include: Late Antique, Insular, Carolingian, Ottonian, Romanesque, Gothic, and Renaissance manuscripts. Illumination was a complex, technical, and expensive process, usually reserved for only special books such as an altar Bible. At first, most books that included illumination were produced in monasteries but this process eventually grew in popularity as it spread throughout Europe.⁷ For any manuscript, the layout for the art and decoration was normally planned at the beginning and space was reserved on the pages for it. However, the actual construction begins with the writing of the text and then that leads to the illumination process.

This process can be described in twelve steps. First, graphite powder dots create the outline and then silverpoint drawings are sketched. Next, the illustration is retraced with ink and the surface is prepared for the application of gold leaf. When the gold leaf is laid down, it is then burnished to give it a glossy and reflective appearance and decorative impressions are made to adhere to the leaf. At this point, the colors and pigments are just starting to be applied. For paint or pigment application, the base colors are applied, then the darker tones are used to give the illustration more volume and further details are drawn. Next, the lighter colors are added for dimension and the illustration is finished off with the ink borders being traced.⁸ This process is complicated and shows how detail oriented illumination is. The materials that are used to create these pigments and inks have many layers of depth and detail.

Books were elaborately decorated with gold leaf and illustrated with a variety of inks and pigments that were derived from various minerals, plants, and chemicals. Each color required different ingredients and were generated through different chemical combinations. The selection of materials and colors were dependent on the personal preferences of the illuminator. The materials are best split into two categories: inks and pigments. There are three standard and different types of ink. The first type is a carbon ink which is made when charcoal, lamp-black, ivory, or even burnt bones combined with gum. The second type is called sepia which is derived from the ink produced by the cuttlefish. The third type of ink

⁶Ibid, Childress.

⁷Andrew Taylor. *Of the Making of Books: Medieval Manuscripts, Their Scribes and Readers*. Essays Presented to M. B. Parkes ed. by P. R. Robinson and Rivkah Zim (review). *Studies in the Age of Chaucer*, Volume 21, 1999, pp. 379-382 (Review).

⁸Doris, Oltrogge. "Illuminating the Print: The Use of Color in Fifteenth-Century Prints and Book Illumination." *Studies in the History of Art* 75 (2009): 298-315.

is called iron-gall ink and was made from iron nails. These nails were boiled in vinegar and mixed with an extract of oak apple (oak galls), which is a ball-like marble-sized tumour that grows on the leaves and twigs of oak trees. These inks are each chosen for a variety of reasons based on their adhesiveness, translucency, and shininess.

In a similar fashion, the pigments also involved a variety of materials such as organic minerals, plants, and chemical compounds. Artists chose to exhibit a bold selection of these pigments because it added multiple layers of dimension to the illumination. The components for pigments differed based on the color, the shade, and artist preference. Some colors were much easier to create than others because their ingredients were much more common.⁹ For example, the colors red and yellow can be readily made compared to the color blue, which is the most difficult to produce. Pigment materials can be sorted into three basic categories: plant-based, insect-based, and chemical or mineral-based colors. Other materials that were used were earwax and crushed bones. The standard colors included red, yellow, blue and green in addition to a common use of gold and silver leaf. The color red could be made from insects and were developed into materials called carmine, crimson, and lac. Red could also be made with chemical or mineral sources like red lead, vermilion, and rust.¹⁰ Yellow can be produced from plant based sources such as weld, turmeric, and saffron or mineral based materials like ochre and orpiment.¹¹ As stated before, blue was the most difficult color to produce due to the lacking amount of source material available. Blue can be made from plant sources such as woad, indigo, and turnsole or chemical and mineral-based colors like ultramarine or smalt.¹² Green, also difficult to produce, was made from either verdigris or a mineral called malachite. Verdigris was originally made by hanging copper plates over hot vinegar in a sealed pot until a green crust formed on the copper. Another method was to gather copper strips and attach them to a wooden block. Then, acetic acid was poured over the strip and that block was buried in dung which was later dug up and the verdigris was then scraped off.¹³ These four colors and their described materials only cover a fraction of the standard medieval artists palette. Even though this a small

⁹Boorman, Stanley. 1. The nature of manuscripts, 2. The function of manuscripts, and 3. Preparation and copying. "Sources, MS." Grove Music Online. 2001; Accessed 27 Oct. 2021.

¹⁰Kandy Vermeer Phillip . "Color in Medieval Manuscript Painting." *The Botanical Artist* 13, no. 1 (2007): 8–10.

¹¹Ibid.

¹²Ibid.

¹³Ibid.

amount, it still demonstrates just how much time and dedication was needed to make manuscript illustrations come to life.

The last stage of making a book is bookbinding. In short, this is the process of collecting the manuscript into a book and sewing it together into a book cover. Of course, this process has many details and materials that need to be recognized as being important. The entirety of the bookbinding process begins with the bookseller, or stationer, who would be in charge of gathering all of the manuscript, putting it into its correct order, and inserting it into a dependable binding.¹⁴ These stationers were the people who had facilitated the buying process of the book in the first place. After gathering the different pieces of manuscript that were sent to illuminators, the stationer cleaned up its different parts by erasing guide words and potential smudges leftover from the many different manufacturing stages. Finally, the book would be assembled in the correct sequence and then bound for the client.¹⁵

The stationer bound the book, but how was this done? The process is certainly not a short one. In the *Oxford Companion to the Book*, Pearson outlines the bookbinding process by stating “The leaves are folded into gatherings which are sewn through the central folds onto a number of supports running horizontally across these folded edges. The projecting ends of the supports are laced and secured into stiff boards, which are then covered with an outer skin (typically leather or parchments, but possibly paper or fabric); this is decorated to create the finished product.”¹⁶ The pages are grouped into larger amounts called gatherings. These gatherings are then sewn together through their folds onto horizontally placed supports. Then, the two ending gatherings are bound on boards that are later covered (See Ex.1). These books could have either been softbound or hardbound, depending on what the buyer wanted. A softbound book could have been covered in parchment, vellum, or stiffened leather, while a hardbound book was bound in stout boards with a pigskin, leather, or similar material covering.¹⁷ After being bound with a cover, the stationer would either give the book to the buyer, or decorate the cover and binding.

If the book were to be decorated, there were many different devices used to embellish and ornament the cover. These different decorations were up to the discretion of the stationer, but they had

¹⁴Vladimir Baranov, et al., “9. Bookbinding,” in *Medieval Manuscript Manual*. (Central European University - Department of Medieval Studies, 2015).

¹⁵Ibid.

¹⁶David Pearson, “Bookbinding,” in *Oxford Companion to the Book*, ed. Michael F. Suarez and H. R. Woudhuysen (New York: Oxford University Press, 2010), 147-148.

¹⁷Richard W. Clement, “Medieval and Renaissance book production.” *Digital Commons @ USU: Library Faculty & Staff Publications*, (1997), https://digitalcommons.usu.edu/lib_pubs/10

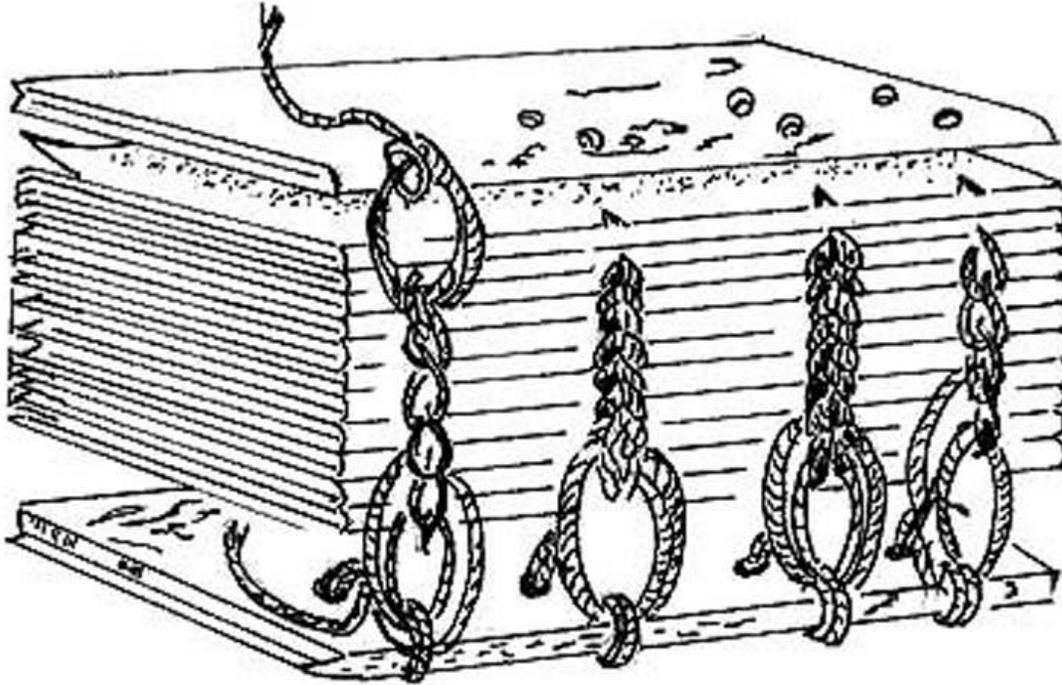
different design choices to pick from. At the early age of bookmaking, only simple designs were included on the outsides of books. There were few books that would receive decoration on their cover, but if they did, it was of a simple stamped pattern directly placed on the leather binding.¹⁸ This soon changed as more stationers decided to decorate the bindings of their books, which led to new ideas. An evolution of the stamps developed into impressions of floral pieces or animals which began to be placed in lattice rows upon the covers of books. As time progressed, the fitting of metal bosses, or protective corner pieces, were attached to books, as well as some kind of clasp to make sure the book stayed shut. The work of decorating a book's binding was eventually moved from the stationer to the jeweler or enameller because of the implementation of many different precious metals or jewels.¹⁹ These decorations eventually became important in helping people identify which book was which, and were no longer just for aesthetic pleasure.

All in all, the creation of these old manuscripts was a long and complicated process that was filled with a lot of time and required serious dedication. To this day, there are still hundreds of existing books that have been able to withstand the trials of time. One can truly see how elaborate these pieces of work were through their detailed writings, illustrations, colors, and gildings amongst the lines of music. These manuscripts served as a way to display music for several monks within many monasteries and they were artifacts of time and of a musical era that has evolved. The time and attention to detail within these books only hints to the values and passions these people had within the arts and these aspects are what has allowed this information to survive throughout the centuries.

¹⁸Christopher de Hamel, *Scribes and Illuminators* (Toronto: University of Toronto Press, 1992), 67.

¹⁹*Ibid.*

Example 1



Baranov, Vladimir, Kateřina Horníčková, Elena Lemeneva, Dóra Sallay, and Gerhard Jaritz. "V'vedenie v slavyanskata kodikologiya. Vizantijskiyat kodeks I retseptsiyata my sred slavyanite (*Introduction into Slavonic Codicology. Byzantine codex and its reception among the Slavs*) (Sofia: Cibal, 1997), 65." *Medieval Manuscript Manual*. Central European University - Department of Medieval Studies, 2015

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