

# *Historical Manufacture and Use of Blue Paper*

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The first recorded mention of blue paper appeared in northern Italy in the year 1389. Only around one hundred years later, blue paper started to be used by Italian artists, and its popularity for various purposes has continued over the following centuries. Its historical manufacture and uses have received some attention by paper historians, but have not been summarized in the recent English language literature. The information presented here covers the manufacture of blue paper until the introduction of aniline dyes in the late 19th century.

Their frequent occurrence in European drawings has in many cases ensured the otherwise less likely survival of blue papers. Therefore, the comparative study of blue paper relies strongly on the examination of such drawings, especially in cases when considering paper use over an extended time period or in one geographical region.

**Venetian Blue Paper:** This can be exemplified by the popular Venetian blue paper. Several factors contributed to the establishment of the Venetian paper production. A flourishing local fabric dyeing industry made the dyeing technology available for papermakers and the associated fabric trade probably provided colored rags in plenitude. Venice also imported indigo and other foreign dye goods, another facilitating factor. However, aside from these technical parameters, it took the particular interest of Venetian painters in the rendering of atmospheric phenomena and color to discover, at the turn of the 15th century, the suitability of blue paper for drawing. One of the artists of the era is Carpaccio, who left a substantial drawing oeuvre on blue paper. The Venetian artistic tradition of drawing on blue paper tradition continued at least until the 18th century.

**Bleue Hollande:** During the following centuries, northern European blue paper also acquired some recognition. Dutch 17th- and 18th-century papermakers were known for their production of finely crafted papers, especially those of a purplish color. French importers of Dutch paper coined the term *Bleue Hollande* or Dutch blue.

## MISCELLANEOUS USES OF BLUE PAPERS

**Mounts:** Blue papers have been popular as mounts for drawings, especially in 18th-century France. Collectors such as Pierre-Jean Mariette became well-known for their consistent choice of blue mounts, which

sometimes even employ more than one type of blue paper.

**Printmaking:** Hendrik Goltzius is among the artists who printed on blue paper. Blue paper was also used for 18th-century French crayon manner prints, often created in reproduction of chalk drawings.

**Book production:** The first book printed on blue paper was published in 1514 in Venice by Aldus Manutius. Throughout the 16th century, blue papers occur in Venetian special book editions. Also, blue papers have been used as book covers, as end papers, and as decorative interleaving papers.

**“Blued” paper:** Over time, the increasing public demand for white paper forced papermakers to seek out more efficient use of low quality white rags. Paper made from such discolored rags often turned out too yellowish for public taste. Papermakers therefore developed methods of lightly tinting white papers with blue pigments and dyes to visually neutralize their yellowish tonality. This method of “blueing paper” is said to have originated in Holland and was widely practiced in the 18th and 19th centuries. The difficulty of replicating the same blue tone in every batch of paper is evident in the comparison of book pages. Lighter colored signatures can sometimes be seen adjacent to more intensely blued signatures.- The intent and coloring methods associated with the production of blued paper places it in a category distinct from the more strongly blue-colored paper. Due to their discoloration, some of the papers, however, only retain a very faint greenish appearance.

**Sugar and other wrapping paper:** Especially noteworthy is the century-old tradition of wrapping sugar cones in blue or purple so-called sugar paper, provided by a specialized paper industry. This practice was continued in many European countries until the 20th century. In paper mills, blue papers were also manufactured as ream wrappers. Lace, linen, sewing needles and various other merchandise was frequently sold in blue paper wrappers. Such papers were occasionally used by artists such as Turner who employed it for water color drawing.

## MANUFACTURE

The manufacture of blue paper remained relatively unchanged before the introduction of aniline dyes. The coloring and sizing methods varied depending on the

intended purpose of the blue paper. For example, wrapping papers for iron sewing needles preferably did not contain corrosive ingredients such as alum.

**Colored rags:** The simplest and probably oldest method of blue paper production only required the processing of assorted blue colored rags. The fabrics were colored with various dyes such as: indigo obtained from the native European *woad* plant, *Isatis tinctoria*; imported indigo produced from Asian plants of the genus *Indigofera*; imported South American *logwood* or *campeachy*; and the native European *litmus* or *turnesol*. Indigo does not require a mordant, but the other dyes are fixed onto the fibers with the aid of metallic salts such as alum or copper sulfate.

The beating process did not always disintegrate all of the diverse pulp materials to the same extent and therefore one can often detect fabric remnants in paper.

Aside from the common blue and white rags other colored rags were introduced to increase the volume of the pulp and adjust the paper tone. Red fibers in particular are present in almost every blue rag paper.

A certain percentage of wool and silk fibers was usually allowed in the paper. These fibers were also effective in making paper of a softer, more felt-like texture, a desirable property for pastel paper.<sup>1</sup>

The microchemical testing of some 18th- and 19th century papers confirmed the presence of indigo in all of them.<sup>2</sup> That may seem at first surprising. However, indigo, the most widely used fabric dye, also has a better chemical stability than the other blue dyes mentioned. It was therefore more likely to survive the rigors of pulp processing and the also paper aging processes.

In general, papermakers curtailed the fermentation or retting of the pulp in order to preserve the pH-sensitive rag colors. Subsequent disintegration of the rags was then more difficult, which may partly explain the frequent occurrence of unmacerated fiber knots in blue papers.

The appearance of various indigo-dyed fibers, viewed at 100 times magnification, differs widely. These differences may be attributable to the variable dyeing procedures, the varying nature of the fibers, and their response to pulping.

**Dyes:** Papermakers probably started early on to dye the paper pulp during processing in order to achieve more intense colors. The blue textile dyes *woad*, and especially *logwood* and *litmus*, were commonly used in paper coloring. *Brazilwood* and *cochineal* were red dyes used in combination with blue dyes to make purple paper. All of these dyes, except *woad*, require mordants to be fixed onto fibers. As in fabric dyeing, a variety of mordants were used interchangeably or in combination. Verdigris and alum are most frequently mentioned in some 18th-century recipes, but copper sulfate, zinc sul-

fate, and other metallic compounds were also employed.

Paper dyeing was a complex procedure, which required the specialized knowledge of mill workers, and sometimes even the expertise of hired fabric dyers. Dyeing was carried out during the final stages of pulp beating in the stamper troughs or in the hollander beater. In any case, the drain valves of the equipment were closed and the mordant and dye solution were introduced. The continuation of beating then helped to distribute the dye evenly throughout the pulp.

**Pigments:** The pigments *smalt*, *Prussian blue*, *indigo*, and *synthetic ultramarine* were added to the pulp during beating. Their retention in the pulp is due to their physical rather than chemical interaction with the fibers.

*Smalt*, a finely ground cobalt glass was reportedly first used for blueing white paper in Dutch paper mills. The Dutch also introduced uncooked starch as a suspension agent for the heavy smalt particles in the pulp. By the 18th century, smalt was widely used in Europe. Very little smalt was needed to tint the paper. Therefore, the detection of even very small amounts of the cobalt responsible for the blue color of the pigment can be indicative of smalt in a paper.

*Indigo* was added as a pigment to paper pulp. Indigo was often mixed with a red dye such as *Brazilwood*, because it otherwise made the paper color appear too dull.

*Prussian blue* quickly became an indispensable paper colorant after its invention in 1704. The insufficient distribution of the pigments in the pulp was observed in several 19th-century papers examined at low magnification.

*Synthetic ultramarine*, finally, was much favoured for its pleasant bright color during the latter half of the 19th century. However, it is possible that, in many cases, it has undergone irreversible decolorization due to the common presence of acids in many papers.

**All of the above coloring agents can occur in combination with each other.**

**CONSERVATION CONSIDERATIONS:** It is possible to gain much information on the make-up of blue papers from their close visual inspection, supplemented through microchemical testing for certain colorants such as indigo, Prussian blue and ultramarine. Further dye identification, on the other hand, is complicated by none of the mordants being specific to one particular dye, and by the minute size of samples that may be available for testing.

The treatment of blue paper will depend more on individual circumstances than general recommendations. Although the aqueous removal of acidic, colored degra-

dition products from blue paper often restores some of its original appearance, one has to be aware of the possible presence of alkali sensitive dyes or pigments in the paper. Most generally, all blue papers have to be considered very susceptible to light fading and should be protected as much as possible from light exposure.

**Acknowledgments:** Hessisches Landesmuseum, Darmstadt; Städelsches Kunstinstitut, Frankfurt; Dr. Frieder Schmidt, Deutsche Bibliothek, Leipzig; Roy Perkinson, Museum of Fine Arts, Boston; Margaret Lawson, Metropolitan Museum of Art, New York; Heinrich Grau, Herzog-August-Bibliothek, Wolfenbüttel; Christa Gaehde, Arlington, MA; Peter Bush, Biomaterials Instrument Center, State University at Buffalo; Dan Kushel and Christopher Tahk, Art Conservation Department, State University College at Buffalo.

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#### **NOTES**

<sup>1</sup> Incidentally, the name pastel originates from an ancient provençal term for pigments made from the dye woad.

<sup>2</sup> The indigo in these fibers was identified using a modification of a microchemical test developed by J. H. Hofenk-de Graaff suitable for use with a single colored fiber.

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