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Colour Printing in Europe until 1700, an Overview

Colour printing and colour prints, including the start of trichromatic printing: the technical and stylistical base for the wave of colour prints in the eighteenth century

1. INTRODUCTION

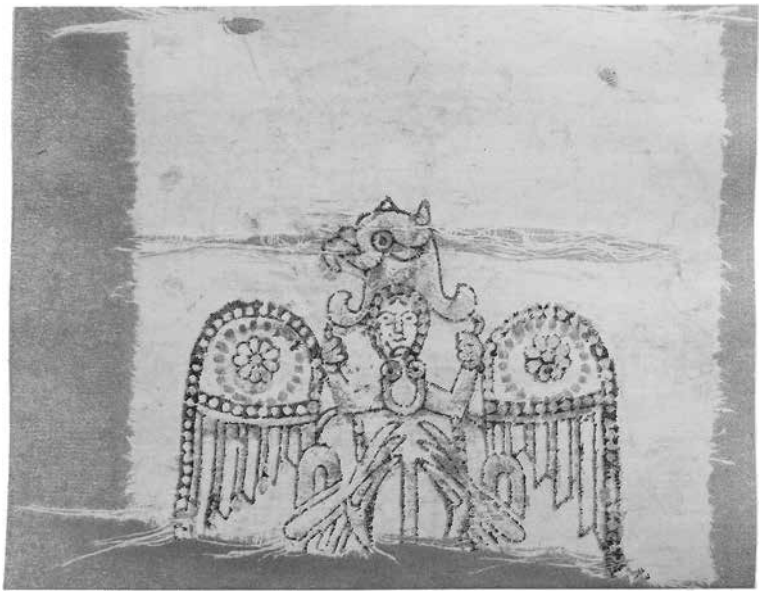
Interest in the history of colour prints and colour printing has been growing rapidly in the past two decades[1]. Many new materials have emerged and as a consequence insights into their history and context have greatly enhanced. The present article gives an overview of the various forms of colour printing in Europe until 1700, i.e. printing monochromatic in a non-black hue or printing in multiple hues including black. Included is a summary explanation on the early development of trichromatic printing, as invented by Jacob Christoff Le Blon in the early eighteenth century. It is based on the volume *Printing Colour 1400-1700*, edited by Elizabeth Savage and me, following the conference «Impressions of Colour» with the same theme we organised in Cambridge in 2011[2]. General references for images, further discussions and literature are therefore to this volume and its chapters. Additional information is referred to in more detail. Together this gives an updated survey of the subject. The figures are selected because they are less commonly known to print research.

2. HISTORIOGRAPHY

Adam von Bartsch (1757-1821) listed some 180 Italian *chiaroscuro* woodcuts in volume 12 (1811) of his series *Peintre-Graveur*[3], including impressions of the same woodblocks for the same print in different 'palettes' (colour combinations)[4]. Together with French and English colour intaglio prints of the later eighteenth century, Italian *chiaroscuri* were long considered the rare highlights of historic colour printing and other colour prints were seen as rare outliers.

Gradually more publications on other colour printed single-sheet prints, book illustrations and ephemera emerged in the course of the twentieth century[5]. Nevertheless, historic prints were still thought of as austere black ink on white paper, and impressions with colour were considered exceptional. It was only with the change of the century that print research started focusing on colour in prints. Interest was first on hand-colouring by brush and the use of stencils in colouring black-ink impressions[6]. Next, images printed in monochromatic colour ink and in combinations of different colour inks (including black) became the subject of research[7].

Overviews of the history of colour printing are rare and *Printing Colour 1400-1700* was the first publication giving more thorough discussions of stages in the history of early colour printing texts and images[8]. As a sign of the times it was preceded and followed by numbers of conferences, presentations, exhibitions and publications on the history of colour in printing,



1. *Eagle capturing infant*, Sassanidic, 6th-7th century AD, woodcut, stamping on cotton cloth in black and red with gold dust on a sticky layer, c.10 x c.10,5 cm, (trimmed irregularly), Berlin, Kunstgewerbe Museum, inv. no. 1878.449 (from J. Lessing, *Mittelalterliche Zeugdrucke im Kunstgewerbe-Museum zu Berlin*, in «Jahrbuch der königlich preussischen Kunstsammlungen, 1, 1880, p. 120).

including the present journal's special issue[9]. If anything, it teaches us that, although black was the common hue of printing ink indeed, colour has always been part of stamping, printing and printmaking in Europe, beginning with its earliest introduction and dissemination in the thirteenth and fourteenth century.

The percentage of colour prints in relation to prints in black is still open to research. It may be considered that in general many prints surviving did so because they were collected early and kept well-protected in albums. Prints stuck or hung on walls for display had a short life-span and were discarded if they had lost their attraction. If they made it to the modern period, they show clear signs of discolouration, dampness and damage by insects, rodents and humans. This may have been even more true of colourful prints[10]. Colour printed ephemera such as labels, invitations, tickets, posters and New Year's greetings were made for temporary use only and are therefore rare by definition[11].

Prints bound into books had the best chances of survival – books being more sturdy than flimsy sheets of paper. In checking 30,000 volumes for my research into eighteenth-century colour intaglio printed book illustrations[12], I estimated that 1% of the total amount had between 1-50 colour figures per volume[13]. Because only one-third of all published books had figures, this rises to 3% of the illustrated books. It is an average number, and it differs per subject. For example, larger numbers of colour printed figures illustrate medical works, while works of devotion hardly ever contain colour prints. Nevertheless it shows that colour printed illustrations are not a rarity, but appear regular in book production. Colour printed single-sheets will therefore also not have been uncommon to the public.

3. COLOUR STAMPED FABRIC

Stamps for offsetting an ink or paint, in black or colour(s), onto leather, living skin, walls, crates, fabric and eventually paper were used around the globe from pre-historic times. Gradually, a kind of industry for stamping fabric developed in China, India, the middle-East (fig. 1, pl. I) and Egypt before crossing to Europe[14].

Cloth-printing was present in northern Italy in the middle of the fourteenth century, perhaps earlier[15]. The process spread further north to Austria, Bohemia, Germany, the Netherlands and England in the fifteenth and sixteenth century. This is apparent from the many recipes for colour relief printing inks for stamping fabric, occasionally leather, that were documented from c.1400 in dozens of manuscripts[16].

In all of these recipes 'colourants' (pigments, lakes) were ground with 'oil varnish'. Oil varnish was composed of linseed oil, or otherwise hemp or walnut oil that was boiled at temperatures around 300° C, usually with a resin such as

amber, colophony or mastic added for viscosity and lustre, and with litharge (red tetragonal PbO) added as a drying agent. After cooling, this created a syrupy fluid that was mixed and ground with a dry powder colourant to a paste: the 'printing ink'. Fabric printed with such oil-based inks could be washed with water and a mild soap, which is useful for garments. Recipes for relief printing inks made with a water-soluble binding medium, such as gum arabic or egg-white do exist, but fabric stamped with such ink may have been meant for other purposes.

Cloth was stamped with a 'printing block', i.e. a woodblock with a design cut into its surface that was held with a handle attached to its back[17]. The side with the design was coated with ink, placed on the fabric and pressed against it, thereby offsetting ink onto the cloth. Patterns were created by repeatedly stamping the same design next to and below each other laterally. Additional colour could be applied by hand-brushing paint over the stamped fabric.

4. COLOUR PRINTING IN RELIEF

This was the situation when Johann Gutenberg (1390/95-1468) developed his typographic printing process in the 1440s-1450s[18]. His inks were oil-based and thereby presumably a straightforward development of the oil-based inks for stamping fabric. The two big differences were that he used metal matrices (type) and had semi-mechanised the stamping process by offsetting the ink from type onto paper by means of a press, i.e. by 'printing'. Gutenberg also tried printing red phrases (rubrication) within black text, but seems to have given up after a few attempts, leaving spaces open for manual rubrication by pen and red (water-based) writing ink. His immediate follower in the printshop, Peter Schöffer (c.1425-1503) succeeded in printing text in black and red seemingly effortlessly. He also introduced bicolour-printed decorated initials (in blue and red) by means of two interlocking blocks for initial and decoration. Each was inked separately, the initial was placed within the decoration block and the two printed in one pull following the printing of the running text on the same sheet.

Colour was now established in the book printing shop: black and red text became a standard in book production and the rest of the fifteenth century was brimming with printing experiments. Illustrated books appeared in 1460 and soon the first book with colour illustrations also followed. The *Buch von der Astronomie* (given title), printed and published by Nicolaus Götz (fl. 1470s) in Cologne c.1476 had two paper instruments bound with it: a volvelle and a quadrant. They were printed in intaglio from copper engravings and were suited for use in astronomical observations and calculations[19]. The quadrant is in either monochromatic black or red. The volvelle has two moving dials attached with a string to a base plate and its three elements are inked in either red or black, with colour combinations differing per surviving copy.

This and all further examples in colour printing were carried out by book printers[20], with the exception of rarities like 'pasteprints' and casts of engravings in wax or fish glue[21]. Parallel to typographic printing, the production of 'blockbooks' (i.e. volumes of texts and images printed from woodcuts) developed in the fifteenth century, but they were always printed in black, and any colour was brushed-on manually[22].

The next major development in multiple colour relief printing came from the workshop of Erhard Ratdolt (1442-1528). Born in Augsburg he had

2. P. de la Vega, *Flos sanctorum: La vida de nuestro señor Jesu Cristo, de su sanctissima madre y de los otros sanctos, segun la orden de sus fiestas*, Zaragoza, 1521, frontispiece, woodcut, in black, blue, brown, (browned) green, red, yellow, 31,9 x 21,7 cm, Cambridge MA, Harvard University, Houghton Library, Typ 560 21.867.

moved to Venice c.1476, founded a printshop and produced books with ornamentation in red c.1480. Bicolour (black/red) printed woodcut diagrams of moon eclipses illustrated his astronomical publications from 1482 onwards, and in 1485 he produced a black/red/yellow diagram of a lunar eclipse. That same year he was called back to Augsburg, where he illustrated a number of books with astronomical diagrams, coats of arms, bishops and saints by over-printing an impression in black with up to four colours. His working manner involved filling in details of the black impression in colour and can therefore be seen as a mechanisation of hand-colouring.

Colour woodcuts printed in register from two blocks in red over black were produced by the hundreds in the German lands, with the manner disseminating throughout Europe, from England to Russia and to the Spanish colonies in Mexico in the sixteenth century[23]. Black/red printed woodcuts became the most common colour book illustrations until the early nineteenth century. They are most often found on title pages and are less used for illustrating text, but can also be found on broadsides, calendars and single-leaf prints. Prints in black/brown colour combinations were used as cheap alternatives to intarsia by pasting them onto furniture. A few prints were made in more colours, up to seven including gold (fig. 2, pl. II).

From the printer's workshop also came the technique of 'frisket printing'[24]. An elementary part of the common (book printing) press is the frisket, which holds a paper or parchment stencil that prevents the printing paper from falling onto the forme and masks the margins of the sheet in printing, preventing the paper from getting stained outside of the text blocks. In its simplest form for black/red printing, first the forme – without the parts to be in red – is printed in black for the full edition. The forme is then cleaned, and the letters to be printed in red are set in the forme; this is inked in red completely and printed on a new uncut sheet stuck to the frisket. The parts to be red are cut from the frisket leaving the rest masked, after which the forme can be printed through the frisket onto the earlier impressions in black. With every pull, the forme inked in red is covered by the frisket except for the text meant to be in red, which is printed over the earlier impression in black. A special application of frisket printing is using a forme that includes woodcut ornamentation. The forme is first printed in black, cleaned and positioned slightly out of register (up or down) in the press again. It is now inked in red, printed on the new frisket sheet, and openings for details of the ornamentation are cut from the frisket. In printing, red lines appear just above or below to and parallel to their originally black lines.

A particular case in European colour printing history is the series of prints that Lucas Cranach (c.1475-1553) and Hans Burgkmair (1473-1531) produced in 1507-1509[25]. Cranach started their friendly competition with a woodcut in black, the 'key block', printed on blue coated paper and over-printed with highlights in gold, with whites created by scratching off some blue coating locally. Burgkmair reversed this by over-printing the black key block, on white paper, with a block inked in an intermediate brown or grey hue: the 'tone block'. Highlights were cut from this tone block, giving the image a voluminous appearance. It made the white of the paper not just the background, but effectively the third colour of the print. Cranach followed suit with three more prints using this process. Burgkmair elaborated on his invention in the years following and developed a manner of 'interdependent' colour relief printing, by which three blocks, each inked in its own colour only together created the complete image.

Impressions with highlights cut from interdependent blocks presumably were the example for the Italian *chiaroscuro* printing technique developed by Ugo da Carpi (1468/70-1532) in Venice starting in 1516[26]. Early *chiaroscuro* practitioners were Parmigianino (1503-1540), Antonio Fantuzzi da Trento (1508-1550) and Giuseppe Niccolò Vicentino (fl. 1540-1550). Designing single-leaf *chiaroscuro* prints became fashionable and had its heyday in the sixteenth century. Italian art led the way and important northern artists, such as Frans Floris de Vriendt (1515/20-1570) and Hendrick Goltzius (1558-1617) found inspiration in the process, producing their own *chiaroscuri* in the second half of the sixteenth century[27].

Interest in *chiaroscuro* printing dwindled after 1600. Andrea Andreani (1558/9-1629) produced a number of restrikes of old Italian blocks[28], but few Italian artists created new ones[29]. Albrecht Dürer (1471-1528) is not known to have produced any colour prints, neither in woodcut nor engraving, possibly because the requisite technical skills were absent in his hometown Nuremberg. However, in Amsterdam in the 1620s Willem Jansz Blaeu (1571-1638) re-printed two old woodblocks by Dürer, over-printing their black impressions with newly cut tone blocks inked in green or brown hues[30]. He similarly produced restrikes in *chiaroscuro* of blocks by Goltzius that were intended for printing in black only[31].

3. W. Dietterlin, *Scenes from the Life of Abraham*, c.1590-1599, etching, jig-saw-plate printing combining three plates inked in red-brown, black and red-brown respectively, 43 x 32,3 cm, London (© The Trustees of the British Museum, 1973,0414.11).

Genuinely new seventeenth-century Italian *chiaroscuri* were four anatomical figures for Gaspare Aselli's *De lactibus sive lacteis venis* (Milan, 1627), making this the first and at once also the last time the process was used for medical illustrations[32]. To the north original *chiaroscuri* were created by German artist Ludolph Büsinck (1599/1602-1669) and by a group of Netherlandish artists after Abraham Bloemaert (1564-1651)[33]. Well-known are those produced by Bloemaert's son Frederick (1614/7-1690) for the so-called *Tekenboek* ('Drawing Book', Utrecht, 1650-1656), a volume of 166 reproductive prints after his father's designs, of which eight are *chiaroscuri*, all incorporating an intaglio keyplate[34].

5. COLOUR PRINTING IN INTAGLIO

Monochromatic printing of intaglio plates (engravings, etchings) began in 1465/67 with an engraving by Master E.S. inked in white and printed on black coated white paper[35]. Printing an intaglio copperplate in white on a dark support appeared occasionally through the ages, but this first experiment was special because the design was engraved to be in the negative, something not seen again ever after. Monochromatic impressions of 'normal' engravings in blue, brown, green or red, or even gold, appeared from then on more often and can be found through the ages continuously.

Several ways have been developed to combine multiple colours in one print. The black/red

4. Monogrammist P.S. (attributed), *Lovers in a Landscape*, 1538, iron-etching inked in black printed over woodblock tone block with cut-out highlights inked in yellow brown, 13,5 x 12,5 cm, Hamburg, Hamburger Kunsthalle, 32737.

volvelles by Götz have already been mentioned and these were composed of multiple elements bound together. Joining different printed elements – especially in astronomical, mathematical, medical and satirical illustrations – is something found often, but then all parts are in black only and not printed in colour[36].

Schöffer's above-described technique of interlocking matrices was also applied in intaglio printmaking and known as 'jigsaw-plate printing'[37]. One plate was prepared and the elements that were to be inked in a different colour were cut from this main plate, inked separately, all parts fit together again on the bed of the press and the whole printed in one run (fig. 3, pl. 3). Jigsaw-plate printing is efficient because the different elements always lock precisely. This is nearly impossible when plates of the same format are printed in register, due to the paper stretching in successive runs through the rolling press.

From the 1530s several attempts were made to combine intaglio printing with colour relief printing[38]. The background hues were printed from one or two woodcut tone blocks, which were over-printed with an etching, sometimes an engraving inked in black; already mentioned above are the colour prints for Bloemaert's *Tekenboek*. The combination of intaglio and relief printing had the drawback that it required two different graphic processes, which had to be carried out on two different presses. This required special attention to printing the intaglio plate in register over the relief impression(s). Another concern was that intaglio plates wore down faster than woodblocks.

This technique is first seen with the print *Saints Peter and John Healing the Sick at the Gates of the Temple* of c.1530, in which Parmigianino experimented with combining an etching, inked in black, with one or two tone blocks inked in greyish or greenish browns[39]. This was followed by other Italian artists such as Domenico Beccafumi (1486-1551) and Antonio Tempesta (1555-1630).

Soon enough, it appeared north of the Alps such as with the print *Lovers in a Landscape* (fig. 4, pl. IV), attributed to the German Monogrammist P.S. and dated in the etching plate '1538'[40]. For the black lines an etching on iron was used and the iron plate

would last a few thousand impressions, which for this kind of design would be more than enough. In all other examples a copper intaglio plate would have been used, limiting editions to a few hundred[41].

In Antwerp Hubert Goltz (1525-1583) used the technique to illustrate his *Vivae omnium fere imperatorum imagines, a C. Iulio Caes. Usque ad Carolum V. et Ferdinandum eius fratrem* (Antwerp, 1557), a book on emperors' portraits since Roman times, also published in French, German, Italian and Spanish with the same 155 images[42]. Many hundreds of copies of the prints were produced, and for the lines printed in black Goltz used etched copper plates, which wear much faster than iron. After a while the worn plates were therefore discarded and replaced by woodcut key blocks. For the editions of 1645 and 1708, now called *Icones imperatorum Romanorum*, Christoffel Jegher (1596-1652/3) cut new woodblocks for tone and key blocks, without further intaglio impressions. Other Netherlandish examples of this technique are found with prints by Crispijn van de Broeck (1524-c.1591) and Frans Floris de Vriendt from the 1570s, both printing etchings in black over single tone blocks in grey[43].

By applying two or more different colour inks to one matrix and printing it in one run through the press, a so-called *à la poupée* inked impression is made[44]. The manner is commonly known from intaglio printing, although the earliest example comes from typography. It is a large decorated initial D, printed in relief with the initial letter itself inked in blue and red in a *Psalterium* (Mainz, 1457) produced by Schöffer[45]. A few more relief blocks inked in multiple colours were produced afterwards, but it stayed rare for this graphic process[46].

À la poupée inking found better use in intaglio printing. It was occasionally tried for sixteenth- and seventeenth-century engravings and etchings, but was most effectively applied by the Dutch workshop organised by Johannes Teyler (1648-1709?) from c.1685-1697[47]. His plate printers

5. Workshop of Johannes Teyler, *Vase with Bachanalian Procession*, c.1685-1697, engraving, inked *à la poupée* in black, blue, brown, orange, red, yellow-brown, 51,2 × 33,7 cm, Amsterdam, Rijksmuseum, RP-P-1955-298.

6. Jacob Christoff Le Blon after Parmigianino, *Cupid carving the bow*, 1722-1725, first plate mezzotint in blue, second plate mezzotint with engraving and dotting in yellow, third plate mezzotint with engraving and dotting in red, 56,1 x 42 cm, Amsterdam, RP-P-1894-A-18314.

were skilled enough to ink a copperplate with up to ten different hues (fig. 5, pl. V). Teyler's invention of true multiple colour *à la poupée* inking became successful. It was adopted by a group of Amsterdam print dealers from 1695, and from them the process disseminated over Europe in the eighteenth century[48].

Inking two or more matrices each in a different colour and printing them over each other in register on the same sheet is already seen in fig. 1 and in Europe is found on stamped fabric in the fourteenth century[49]. It was practiced from the start of book printing by Schöffer in the later 1450s to become common for woodcut images afterwards, but in intaglio printing it is only seen from the early seventeenth century[50], with exception of the earlier combination with woodcut tone blocks. The first such works were certainly experimental: one etched title plate in black and red in Heinrich Zeising's (d.1613) book on mechanics[51], and two etchings by Hercules Segers (1595/6-1639?), in black and white ink on blue coated paper and in black and blue on white paper, respectively[52]. In both cases the process was not documented and had no direct followers.

François Perrier (1590-1650) developed a manner of *chiaroscuro* printing in intaglio with his series of etched designs printed in white over black on brown paper[53]. Abraham Bosse (1602/4-1679) described in his 1645 treatise on intaglio printmaking how he thought the process was carried out[54]. After its publication we see a few more examples of this, but in general, multi-plate colour intaglio printing remained a rarity until 1700.

6. TRICHROMATIC PRINTING

Working in Amsterdam, from 1708-1710 the German miniature painter Jacob Christoff Le Blon (1667-1741) developed 'trichromatic printing', i.e. over-printing layers of transparent blue, yellow and red inks (in that order) on white paper[55]. With Le Blon's process, the appearance and process of colour printing changed completely. Instead of mixing the desired colour inks in advance of printing, as Teyler's printers did, three super-imposed layers of primary colours printed in register from three mezzotint plates created every possible hue.

The new manner of colour printing was immediately recognised and Le Blon started looking for investors to finance the development of his invention. Because he was not successful in Holland he moved to London, which much boosted his carreer. In 1719 he was granted a royal privilege from King George I (1660-1727) for his invention, with which his supporters could raise joint stock and business started.[56] Initially he met with success. Prints were shipped oversea, even as far as Rome[57], and some 10,000 impressions from 47 unique prints were produced in a few years (fig. 6, pl. VI). However, the project went bankrupt in 1726.

Le Blon, being an inventive and enterprising man, applied for and was granted a new royal privilege in 1727, this time for a colour weaving process he had invented[58]. Despite the bankruptcy of his former business, people were interested in investing in it, but this project also failed and by the middle of 1735 he had to flee the country to The Hague to prevent prosecution[59]. He moved further to Paris in late 1735 or early 1736. His colour prints had already attracted public attention in France when they were produced in London, which was not forgotten, and the following year he again received a royal privilege for his trichromatic process, this time from King Louis XV (1710-1774)[60].

Production could start and in August 1738 Le Blon announced the publication of his first two prints, a portrait of cardinal André Hercule de Fleury (1653–1743) and a self-portrait of painter Anthony van Dyck (1599-1641)[61]. Unprecedented in the history of the print he offered sets of colour progress sproofs, thereby disclosing his manner of working[62]. Unfortunately he died before the project could progress further.

All of Le Blon's pupils made their own trichromatic prints. For example, the anatomical colour prints by his Dutch apprentice Jan L'Admiral (1699-1773) are generally seen as the most refined ones in their genre[63]. His French apprentice Jacques-Fabien Gautier-Dagoty (1716-1785) was the most prolific, publishing a few hundred colour prints. Due to the dissemination of the process Le Blon's invention contributed to the development of classical French colour printing in the second half of the eighteenth century. Its use disappeared before the close of the century, but was reinvented with the introduction of chromolithography in 1837[64]. Le Blon's manner eventually stood at the base of the present CMYK colour printing system used for offset printing, colour copiers and digital printers[65].

7. CONCLUSION

The majority of single-sheet prints, book illustrations and ephemeral graphic objects produced until 1700 was printed in black, but

colour printing and colour prints had a definite presence from the beginning. Although much is lost, from the fourteenth century to the early eighteenth century we see their constant development, with colour printing flourshing later that century. Most of the historic graphic colour processes are still in use, one way or the other, or developed to modern techniques.

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NOTES

1. A. Stijnman, *Western Colour Printing until 1920: A Bibliography*, http://www.printingcolourproject.com/western-colour-printing-until-1920/ (accessed 1 October 2020). I greatfully acknowledge Elizabeth Savage for her research of early modern colour prints and her dissemination of its results. Jun Nakamura is cordially thanked for editing and commenting my text.

2. *Printing Colour 1400-1700. History, Techniques, Functions and Receptions*, ed. by A. Stijnman and E. Savage (Upper), Leiden, 2015. Its succeeding volume *Printing Colour 1700-1830. History, Techniques, Functions and Receptions*, ed. by M.M. Grasselli and E. Savage, is in progress for 2021.

3. *Les clair-obscurs des maîtres italiens*, in A. von Bartsch, *Le peintre graveur*, Vienna, 1803-1821, 12 (1811), see especially the table on pp. 193-203.

4. For specific terms and their definitions see *Printing Colour 1400-1700...*, cit., pp. 224-227.

5. A. Stijnman, *Western Colour Printing until 1920: A Bibliography* (updated irregularly), http://www.printingcolourproject.com/western-colour-printing-until-1920/ (accessed 1 October 2020).

6. S. Dackerman, essay by T. Primeau, *Painted Prints. The Revelation of Color in Northern Renaissance & Baroque Engravings, Etchings & Woodcuts*, Baltimore (PA), 2002; T. Goedings, *'Afsetters en meester-afsetters'. De kunst van het kleuren, 1480-1720*, Nijmegen, 2015; T. Primeau, *Coloring within the Lines: The Use of Stencil in Early Woodcuts*, in «Art in Print», 2013, 3, no. 3 (http://artinprint.org/?s=primeau, accessed 1 October 2020); K.M. Rudy, *The Birgittines of the Netherlands. Experimental Printers and Colourists*, in *Printing Colour 1400-1700...*, cit, pp. 82-90.

7. A. Stijnman and E. Savage, *Foreword*, in *Printing Colour 1400-1700...*, cit., pp. IX-XI; A. Stijnman and E. Savage, *Introduction. A Historical Overview of Printed Colour before 1700*, in *Printing Colour 1400-1700...*, cit., pp. 1-7.

8. R.M. Burch, *Colour Printing and Colour Printers*, London-New York, 1910; M. Grimm, C. Kleine-Tebbe and A. Stijnman, *Lichtspiel und Farbenpracht. Entwicklungen des Farbdrucks 1500-1800. Aus den Beständen der Herzog August Bibliothek*, Wiesbaden, 2011.

9. Stijnman, *Western Colour Printing*, cit., scroll down to Part II, pp. 55-68.

10. *Printing Colour 1400-1700...*, cit., p. 176, fig. 15.2.

11. A. Stijnman, *Colour Letterpress in Europa in the long 18th Century*, in *Printing Colour 1700-1830...*, cit., chapter 5.

12. Cf. https://tulip88x.wixsite.com/ad--stijnman/announcements (accessed 1 October 2020), see under *Current research*.

13. A. Stijnman, *Anatomy to Embroidery. Colour Intaglio Printed Illustrations in European Books and Periodicals. 1700-1850*, in *Printing Colour 1700-1830...*, cit., chapter 4.

14. L. von Wilckens, *Der spätmittelalterliche Zeugdruck nördlich der Alpen*, in «Anzeiger des Germanischen Nationalmuseums», 1983, pp. 7-18.

15. D. King, *Textiles and the Origins of Printing in Europe*, in «Pantheon. Monatschrift für Freunde und Sammler der Kunst», 1962, 20, pp. 23-30.

16. D. Oltrogge, *Colour Stamping in the Late Fifteenth and Sixteenth Centuries. Technical Sources and Workshop Practice*, in *Printing Colour 1400-1700...*, cit., pp. 51-64; M. Clarke, *'To stayne with molde'. Fifteenth-century English Recipes for Block Stamping*, in «Zeitschrift für Kunsttechnologie und Konservierung», 2018, 32, no. 2, pp. 226-232.

17. A. Stijnman, *Of Furm and Mulde. A Bibliography of Primary Sources on the Production of Stamping and Relief Printing Woodblocks 1400-1700*, in *Printing Things. Blocks, Plates, and Stones 1400-1900*, London, in progress for 2021, see the item in the bibliography under 'pre-1400, Italian'.

18. M. Ikeda, *The Fust and Schöffer Office and the Printing of the Two-colour Initials in the 1457 Mainz Psalter*, in *Printing Colour 1400-1700...*, cit., pp. 65-75.

19. A. Stijnman and E. Upper (now Savage), *Color Prints before Erhard Ratdolt: Engraved Paper Instruments in Lazarus Beham's 'Buch von der Astronomie' (Cologne: Nicolaus Götz, c.1476)*, in «Gutenberg-Jahrbuch», 2014, 89, pp. 86-105.

20. E. Savage, *Colour Printing in Relief before c.1700. A Technical History*, in *Printing Colour 1400-1700...*, cit., pp. 23-41.

21. A. Uhr, *Colour-Printed Pasteprints, 1460s-1480s*, in *Printing Colour 1400-1700...*, pp. 76-81; A. Stijnman, *Engraving and Etching 1400-2000. A History of the Development of Manual Intaglio Printmaking Processes*, London, Houten, 2012, pp. 328-331.

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Colour Printing in Europe until 1700, an Overview

by Ad Stijnman

Interest in the history of colour prints and colour printing has been growing rapidly in the past two decades. Many new materials have emerged and as a consequence insights into their history and context have greatly enhanced. The present article gives an overview of the various forms of colour printing in Europe until 1700, i.e. printing monochromatic in a non-black hue or printing in multiple hues including black, with additional information on the start of trichromatic printing in the early eighteenth century. It is based on the volume *Printing Colour 1400-1700* (Leiden, 2015), including information on the latest research in this field. Together this gives an updated survey of the subject.
