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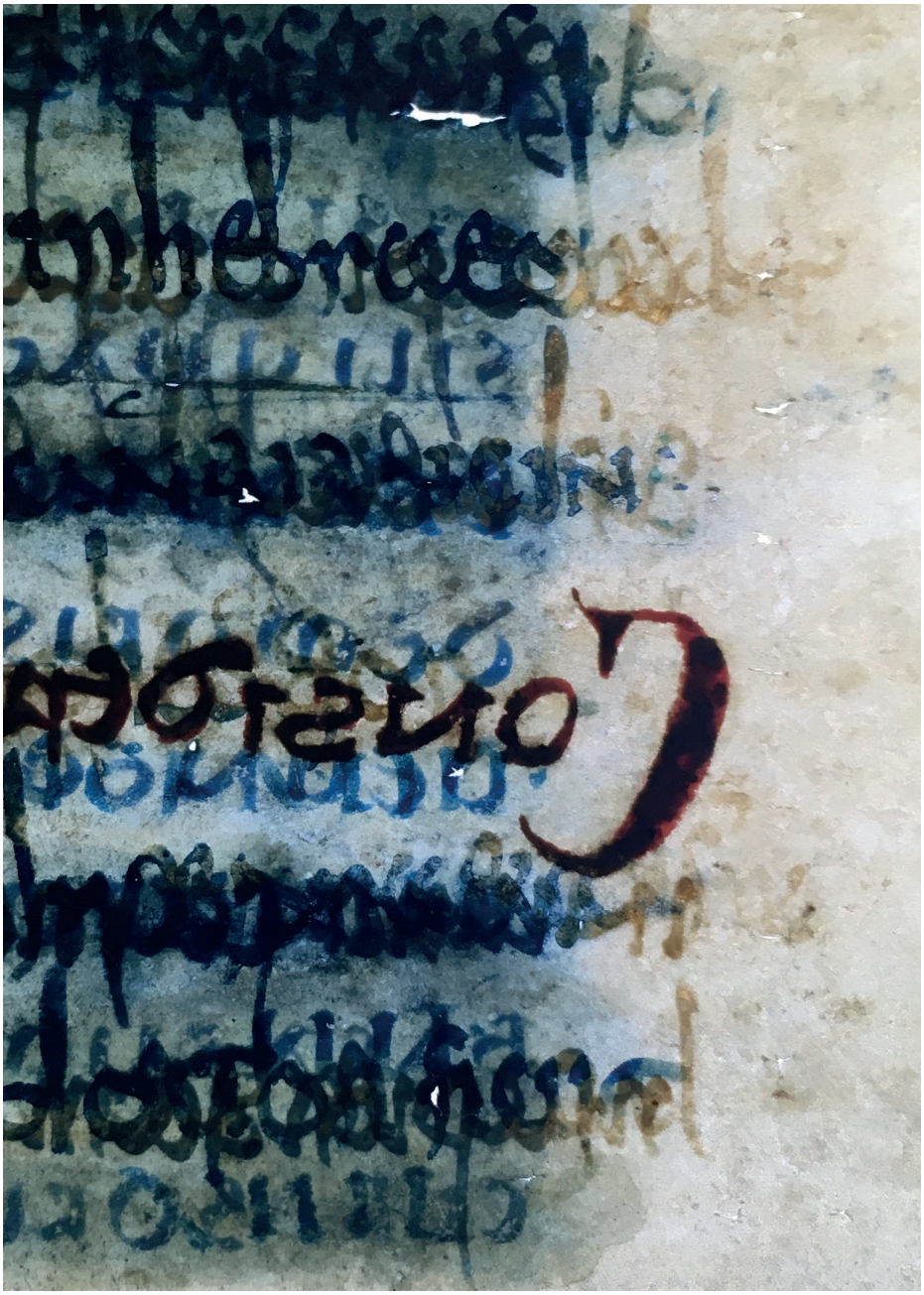

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Transmitted light image (detail) of Codex 3/1 (5th century Luxueil or 7th–8th century Italy), Benedictine Abbey St Paul in Lavant Valley, Austria. Hieronymus, *Commentarius in Ecclesiasten*; Plinius Secundus, *Historia naturalis*. Photography by Thomas Drechsler, Berlin.

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Article

Palaeography and X-Ray Fluorescence Spectroscopy: Manuscript Production and Censorship of the Fifteenth Century German Manuscript Cod. germ. 1 of the Staats- und Universitätsbibliothek Hamburg

Marco Heiles, Ira Rabin, and Oliver Hahn | Aachen, Hamburg, Berlin

Abstract

The manuscript Codex germanicus 1 (Cod. germ. 1) of the Staats- und Universitätsbibliothek (State and University Library) Hamburg[1] is a fifteenth-century German-language manuscript. It comprises two codicological units and has an especially complex developmental history. To trace this developmental history, neglected until now in the research literature,[2] the manuscript was investigated, for the first time not solely with classical codicological and palaeographical methods, but also with the aid of X-ray fluorescence spectroscopy, in order to determine the composition of the writing materials. These methods made it possible, first, to support and check palaeographic findings and, second, to gain information about the stratigraphy of the manuscript where palaeographic methods find their limits – in regard to short entries, rubrications, and non-alphabetical signs.

The Manuscript

Cod. germ. 1 of the State and University Library Hamburg is a 214-page, German-language manuscript in folio format (here 29 × 20 cm). It can be dated to the 1450s and 1460s based on scribe entries (fol. 98^{vb}: 'Deo gratias 1463', fol. 211^{r}: 'Anno etc. liiijdo jm mayen' [=1454]) and the analysis of watermarks.[3]

The codex consists of two codicological units. The first (fols 1–108) is the joint product of five primary hands (see Table 1 and Table 2). One after the other over several years around 1463, they entered medical texts (Hand I: fols 1ra– 47^{rb,} 51ra–51va, 62^{rb}–64^{vb}), household and garden recipes (Hand I: fols 47^{rb}–50^{vb}), wonder drug recipies, joke recipes, and damage recipes (Hand I: fols 51va–57^{rb}), a lapidary (Hand I: fols 57va–62ra), paint and ink recipes (Hand III and Hand V: fols 65ra–75ra), an encyclopaedia (Hand VIII: fols 75va–98^{vb}), and clerical maxims and prayers (Hand IX: fols 99ra–100^{vb}). The last pages of this part remained empty. The second part (fols 109–214) is an older transcription, completed by 1454, of the cycle of stories of the *Sieben weise Meister* (*Seven Wise Masters*, fols 109^{r}–211^{r}) by yet another scribe (Hand XII). But this part was clearly damaged, for which reason another scribe (Hand XI) replaced it with the outermost bifolio of the first quire (fols 109/120) and the first folio of the last quire of this part (fol. 205). Since the scribe used a kind of paper that had already been used for the rear quires of the first part, it must be assumed that he or she worked together with the first part's scribes and was able to use the same stock of paper. The codex was thus probably bound for the first time when the first part was produced, around 1463. This cannot be maintained with absolute certainty, because the original binding was not preserved. The comparatively large number of writing hands

[1] Images of this manuscript can be found in Wikimedia Commons: <https://commons.wikimedia.org/wiki/Category:Hamburg,_Staats-_und_Universitätsbibliothek,_Cod._germ._1>. All research data of this project including the images will be published in the upcoming *Hamburg Open Science Repository*.

[2] On Cod. germ. 1, cf. so far: *Handschriftencensus: Eine Bestandsaufnahme der handschriftlichen Überlieferung deutschsprachiger Texte des Mittelalters* <http://handschriftencensus.de/4859>; Heiles 2018a, 244; Heiles 2018b; Heiles 2014; Ulmschneider 2011, 124–127; Brévart 2008, 37, n. 116; Di Venosa 2005, 40; Gottschall and Steer 1994, 13* (No. 24); Gerdes 1992, 1186; Gottschall, 1992, 95–102; Weißer 1987, 916; Weißer 1982, 47, 125, 436; Fechter 1935, 97–98; Henrici 1911; Schorbach 1894, 42–43 (no. 23); Paschke 1891, 7–8; Lambel 1877, III; Lappenberg 1834, col. 99–100; Petersen *c.* 1830; *Catalogus Manuscriptorum Codicum Bibliothecae Uffenbachianae*, 1747, 218; *Bibliothecae Vffenbachianae Universalis, Tomus III*, 1730, 554, no. LXXXV.

[3] A detailed description of the manuscript Cod. germ. 1 by Marco Heiles will soon be publishes in *Manuscripta Medievalia* <http://www.manuscripta-mediaevalia.de/dokumente/html/obj31593540>.

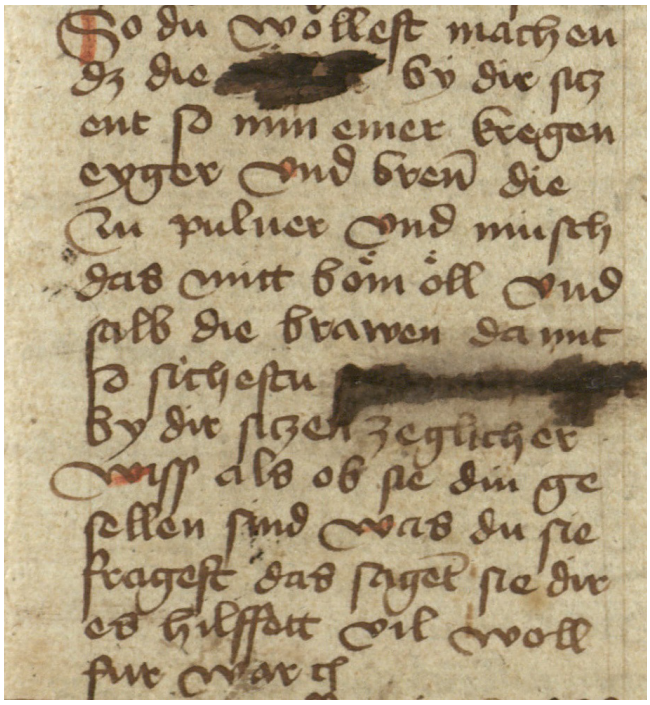


Fig. 1: Excerpt from fol. 57ra.

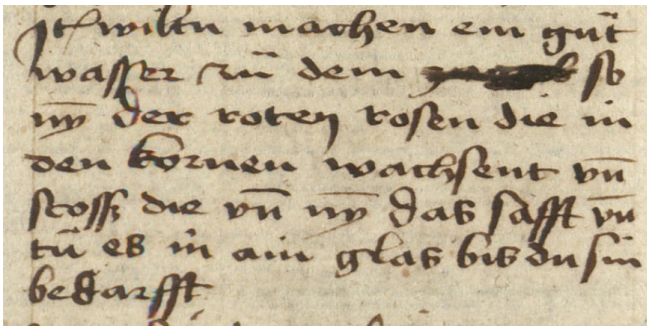


Fig. 2: Excerpt from fol. 64vb.

acting rapidly one after the other, which are supplemented by text sections (fols 64v, 75r, 101r, 211v, 212r) from six other hands, suggests that the manuscript comes from a cloister community. The dialectal character of the texts supports the assumption that the entire manuscript comes from the region of Swabia. Numerous subsequent supplements, remarks, and doodles in different handwritings in the margins and on empty pages show that the book was long (the date 1573 on fol. 1r) and intensively used.

The thematic spectrum of the texts contained in the book makes it equally suited for religious instruction, as a reference work for medical problems, or as an entertaining reader. It includes a cookbook, instructions in caring for trees, and medical recipes; in the encyclopedia, it explains the Christian worldview and thereby touches upon both natural-scientific and especially pastoral questions; and it gathers prayers to the Virgin Mary in the collection of sayings. From the perspective of German philology, the manuscript deserves special attention because of the encyclopedia, extant only here. This is a compilation of the German *Lucidarius* with selected independent translation, found only in this manuscript, of the Latin *Elucidarium* of Honorius Augustodiensis.[4] Of media- and cultural-historical interest is the parallel transmission of the recipe collection of the first codicological unit in the manuscript Augsburg, Staats- und Stadtbibliothek, 2° Cod. 572. This text collection is substantially more extensive in the Augsburg manuscript. The scribe of the Cod. germ. 1 or the *Vorlage* he or she used consciously left out some recipes. This goes, on the one hand, for all the Latin texts, but also, on the other hand, for those in which magical signs (characters) and forms of blessings were used. Thus, not only characteristics of language but also and above all theological arguments played a role in the transmission.[5]

Question and method

Our primary interest in the Cod. germ. 1 was initially in two recipe texts in which individual words important in understanding the text were crossed out and thus censored.[6] The first text on fol. 57ra – as the parallel transmission in Augsburg, Staats- und Stadtbibliothek, 2° Cod. 572 shows,[7] is a guide to summoning 'schwarcz tüfel' ('black devils') who can answer one's every question. Here, the words for 'devil' and 'black devil' (Fig. 1) were crossed out. The second censored text on fol. 64v is a recipe for 'ein gut wasser czu dem zagel' that can be obtained from poppies.[8] Here, the word

[4] Ulmschneider 2011, 124–127; Gottschall 1992.

[5] A detailed examination remains to be performed. Examples are named by Heiles forthcoming.

[6] Cf. Heiles 2014.

[7] Augsburg, Staats- und Stadtbibliothek, 2° cod. 572, fols 94vb–95ra: '[S]o du wellest machen das die tewfel bey dir sitzen so nim einer kregen eyr vnd prene die zepulfer mit bâmol vnd salb die brawen da mit so sihest du schwarcz tüfel by dir siczen zu yglicher wis als ob es din gesellen sein vnd was du si fragest das selb sagent si dir.' Translation: 'If you want to make the devils sit with you, take the eggs of a crow and burn them to a powder and mix this with olive oil and anoint [your] brows with it. In this way, you will see black devils sitting with you, as if they were your friends. Whatever you ask them, they will tell you.'

[8] Hamburg, Staats- und Universitätsbibliothek, Cod. germ. 1, fol. 64v: 'Item wiltu machen ein gut wasser czu dem [crossed out word: zagel], so nym der roten rosen, die in den kornen wachsent vnd stosß die vnd nym das safft

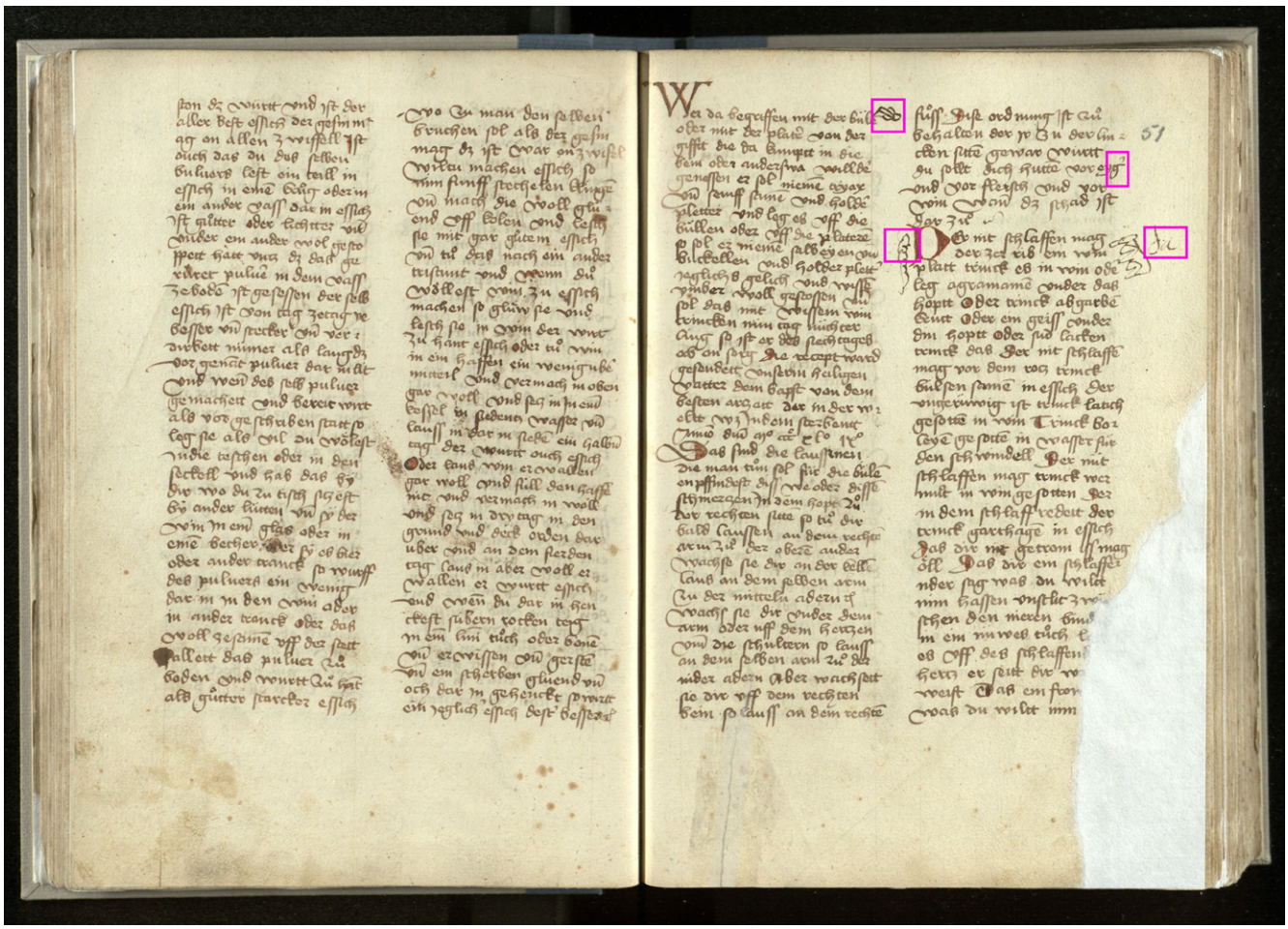


Fig. 3: Fols 50^{v}–51^{r} with measuring points.

'zagel' was crossed out; it means tail, but also penis (Fig. 2). While the censorship in the first recipe aims to prevent sinful communication with the devil, which would be an infraction of the First Commandment, the second censorship aims at a speech taboo, possibly fueled by the feeling of shame. The aim of our materials-scientific investigation was to find out more about these processes of censorship. Who carried them out? Did the scribes of the texts correct themselves, or are the deletions by a later hand? Can the ink be attributed to the hand of another scribe or to a hand that made some of the additions and marginal entries? Or could this be a much more recent intervention in the text with a modern, industrially produced ink?

We wanted to answer these questions with the aid of an X-ray fluorescence spectroscopic examination of the inks and the red decorative inks. To this end, measurements had to be made of each of the palaeographically differentiated scribes' hands (Hands I–XIV) and of the most important entries in the margins. Of the latter, entries were chosen that permit dating or attribution to a specific person, for example the year date on fol. 1^{r}; the pen test on the same page, in which Duke Ulrich of Württemberg (1487–1550) is mentioned; and the entries of names on fols 20^{r} and 108^{v}. In addition, we considered entries that supplemented or corrected the texts (fols 28^{v} and 75^{r}) or that follow a recurrent pattern (pointing hand, cloud, 'da', double virgule (||) [Fig. 3]) (see Table 3). At the same time, we took the opportunity to conduct additional measurements of the red and green inks used, as well of as the inks that mark the writing space and the quire numbering, which should further illuminate the developmental history of the manuscript. A total of 48 measurement points were selected, whereby on each page one additional measurement point on unwritten paper had to be examined as a reference for the substrate. In taking the measurements, we had to make sure that the reverse side of the page was not written on at the point of measurement, because otherwise the inks

vnd tu es in ain glas bis du sin bedarfft.' Translation: 'If you want to make a good water for the [crossed out word: tail/penis], take red roses that grow in the grain and pestle them. And take the juice and put it in a glass until you need it.'

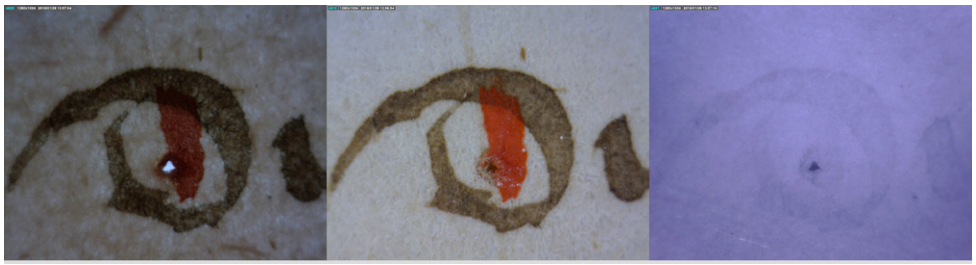


Fig. 4: Microphotographs of fol. 58va with transmitted, visible and near infrared light.

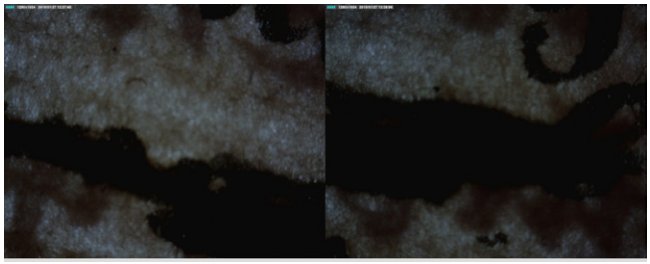


Fig. 5: Microphotographs of the censorship on fol. 64^{vb} with transmitted light.

on the reverse side would contribute to the measurement result, thereby falsifying it. To ensure this, microphotographs of each measuring point were taken with transmitted light (Fig. 4). In the case of the second censored area on fol. 64^{vb}, it thereby became clear that no reliable measurement could be made here, because the reverse side of the page, too, bears text in precisely this place (Fig. 5). The microphotographs and the X-ray fluorescence spectroscopic measurements were carried out on two working days in the manuscript laboratory of the Centre for the Study of Manuscript Cultures.[9]

The text of the Cod. Germ. 1 was written with iron gall inks. The red decorative inks contain mineral pigments like red lead and cinnabar. As also presented in the paper by Bosch et al. in this issue and confirmed by numerous contemporary recipes,[10] iron gall ink is produced by mixing iron vitriol (iron sulfate) with gallic acid and adding a binding medium (usually gum arabic) and a solvent (water).[11] The resulting ink is applied to the writing surface with a pen.

The iron vitriol was not produced artificially produced, but could have been quarried as a mineral in mines and purified. Despite this purification and depending on the deposit, it contains various impurities of other salts that contain, for example, copper (Cu), zinc (Zn), or manganese (Mn)[12]. Beyond that, sometimes other salts are mixed in to alter the characteristics of the ink.

A method that permits the determination of these traces or minor constituents and thereby to differentiate among iron gall inks is X-ray fluorescence analysis (XRF), which characterizes the elemental composition primarily of inorganic compounds. The examination consists of exposing the sample to X-rays, which interact with the material; the atoms thereby excited release their own characteristic radiation. With a suitable detector, the X-ray fluorescence is detected, providing information about the composition, since the energy of the X-rays emitted by each element is characteristic. The signal intensity permits conclusions about the amount of the element present. The method of 'fingerprints'[13] can be applied to the mineral components of the red decorative inks.

The black inks

Hands I, II, III, and IV, Addendum 01–13

We have presented the results of the examination of the black iron gall inks in a diagram showing the relative concentrations of zinc (Zn), copper (Cu), manganese (Mn), and potassium (K) in relation to iron (Fe) (Figs 6a–c). The first five measuring points already show that the selected method is suitable for our purposes. Not only do the values for the two subsequent entries on fol. 1^{r} differ markedly from the ink used by Hand I, which has a very similar composition on fol. 2^{vb} as a few pages later on fol. 15^{rb}; the inks of the two subsequent hands also differ

[9] We thank the State and University Library Hamburg and the former head of the Manuscript Division Hans-Walter Stork (currently Director of the Erzbischöfliche Akademische Bibliothek Paderborn) for providing access to the manuscript.

[10] No such recipe is found in the collection of paint and ink recipes in the Cod. germ. 1, but it is found in several other fifteenth-century manuscripts. Christoph Krekel offers an overview of the 32 different recipes for iron gall ink in the *Liber illuministarum* (Munich, Bavarian State Library, Cgm 821) 2005, 631–636. Three different recipes for iron gall ink are transmitted in the recipe collection 'Was du verwen wilt von sîden oder zendel' in the manuscripts Salzburg, Universitätsbibl., Cod. M III 3 and Codex Berleburg, cf. with Edition: <https://www.artesliteratur.de/wiki/Kategorie:Eisengallustinte>.

[11] Cf. Krekel 1999, 25–36, and Fuchs 1999.

[12] Hickel 1963.

[13] For further literature on determining the fingerprints of iron gall inks, see Malzer, Hahn, and Kanngießer 2004, and Hahn 2010.

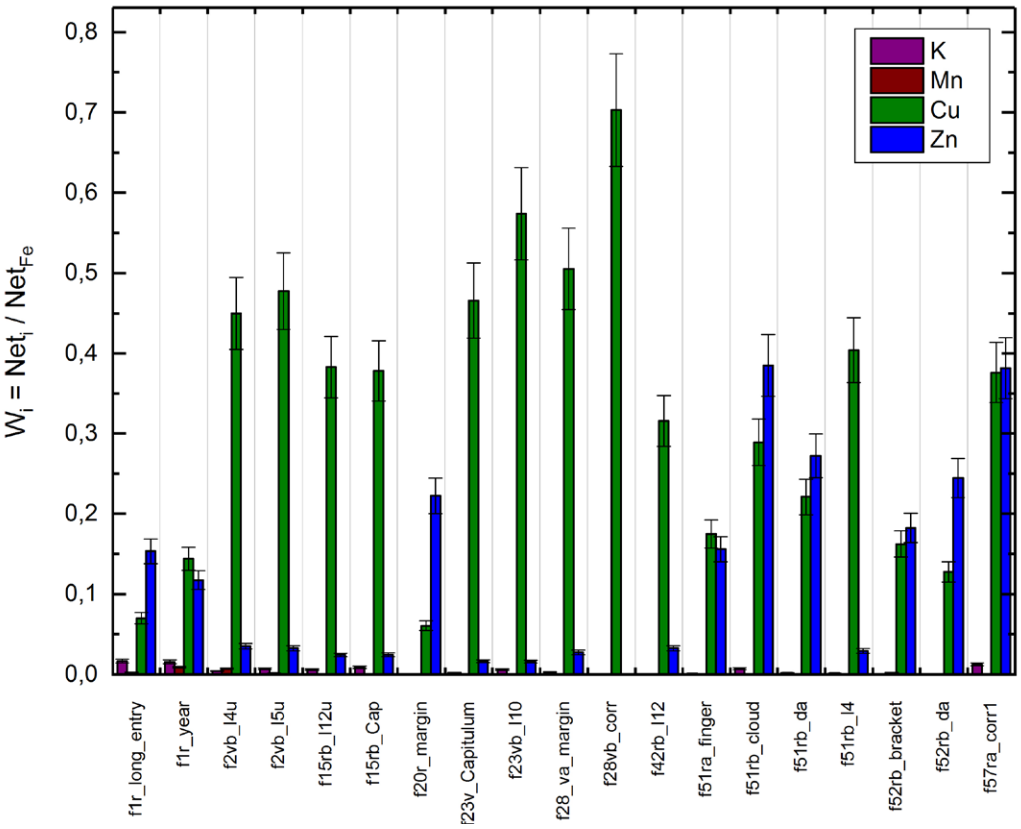


Fig. 6a: XRF investigation of the black inks. Fingerprint values W_i of different elements normalised to iron.

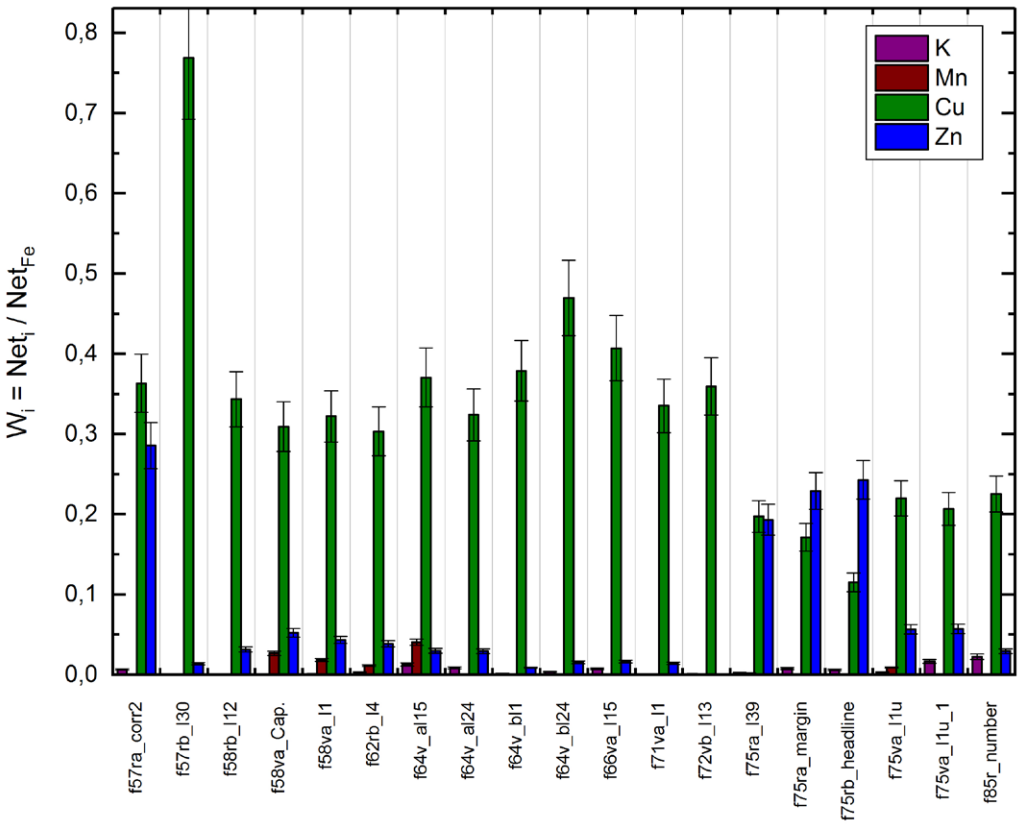


Fig. 6b: XRF investigation of the black inks. Fingerprint values W_i of different elements normalised to iron.

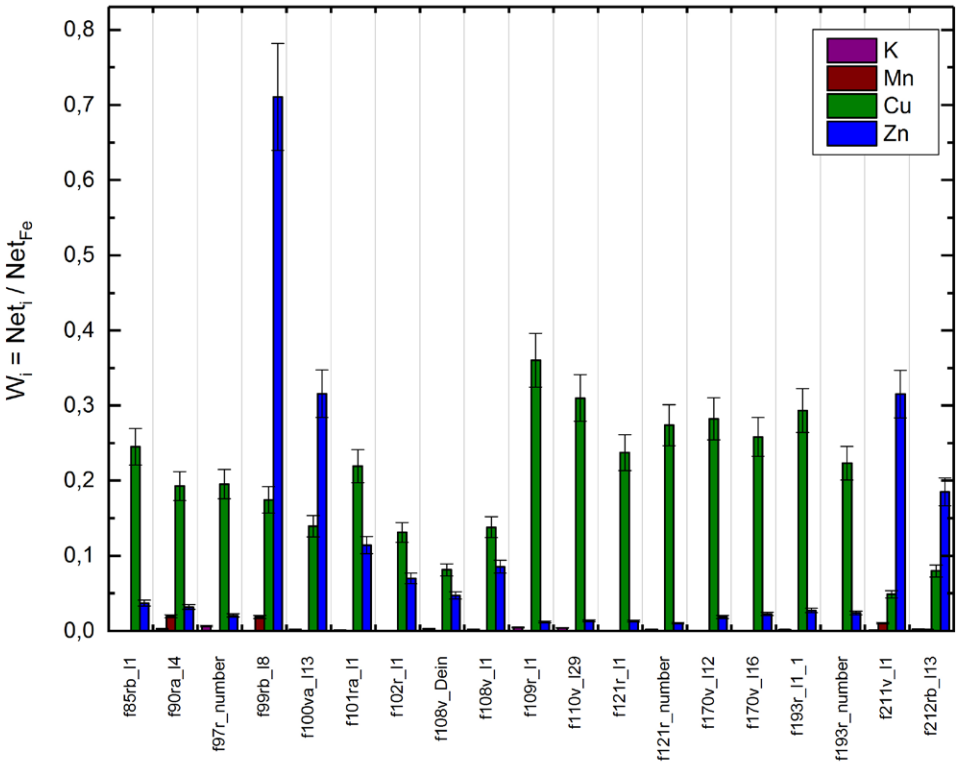


Fig. 6c: XRF investigation of the black inks. Fingerprint values W_i of different elements normalised to iron.

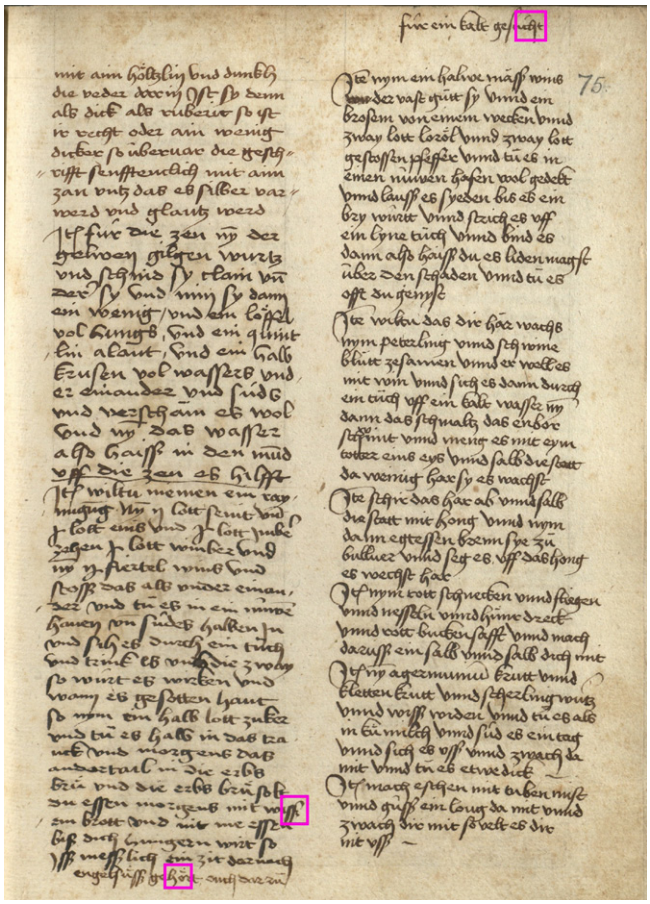


Fig. 7: Fol. 75^{r} with measuring points marked.

quite markedly from each other. The ink that Hand I used on the first pages is characterized by a quite high proportion of copper and a smaller but marked proportion of zinc. Hand I used this ink up to fol. 58^{rb}.[14] The double virgule (||) in the margin on fol. 23^{vb} and the supplements in the margin on fol. 28va were written with the same ink and are thus very probably from the same Hand I. This finding is interesting especially for the double virgule, which appears frequently in the manuscript and provides the occasion for a closer examination of this kind of paratext. The marginal name entry 'Johann' on fol. 20^{r}, the corrected strikeout on fol. 28^{vb}, the index finger, the cloud, the note 'da' (there) on fol. 51^{r} (Fig. 3), and the bracket and 'da' on fol. 52^{r}, in contrast, were certainly not written or drawn with the ink that Hand I used, but by other, possibly as many as six different hands.[15] From fol. 58va to fol. 64va, we measured a different ink for Hand I, one that also contains a little manganese.[16] During the inscription of Volmar's *Steinbuch* ('lapidary'), the scribe apparently shifted inks with the turn of

[14] Cf. in Fig. 6a: f2vb_5u, f2vb_4u, f15rb_12u, f23vb_l10, f51rb_l4. Cf. in Fig. 6b: f57rb_l30.

[15] Cf. in Fig. 6a: f20r_margin, f28vb_corr, f51ra_finger, f51rb_cloud, 51rb_da, 52rb_bracket, f52rb_da.

[16] Cf. in Fig. 6b: f58va_l1, f62rb_l4, f64va_l15.

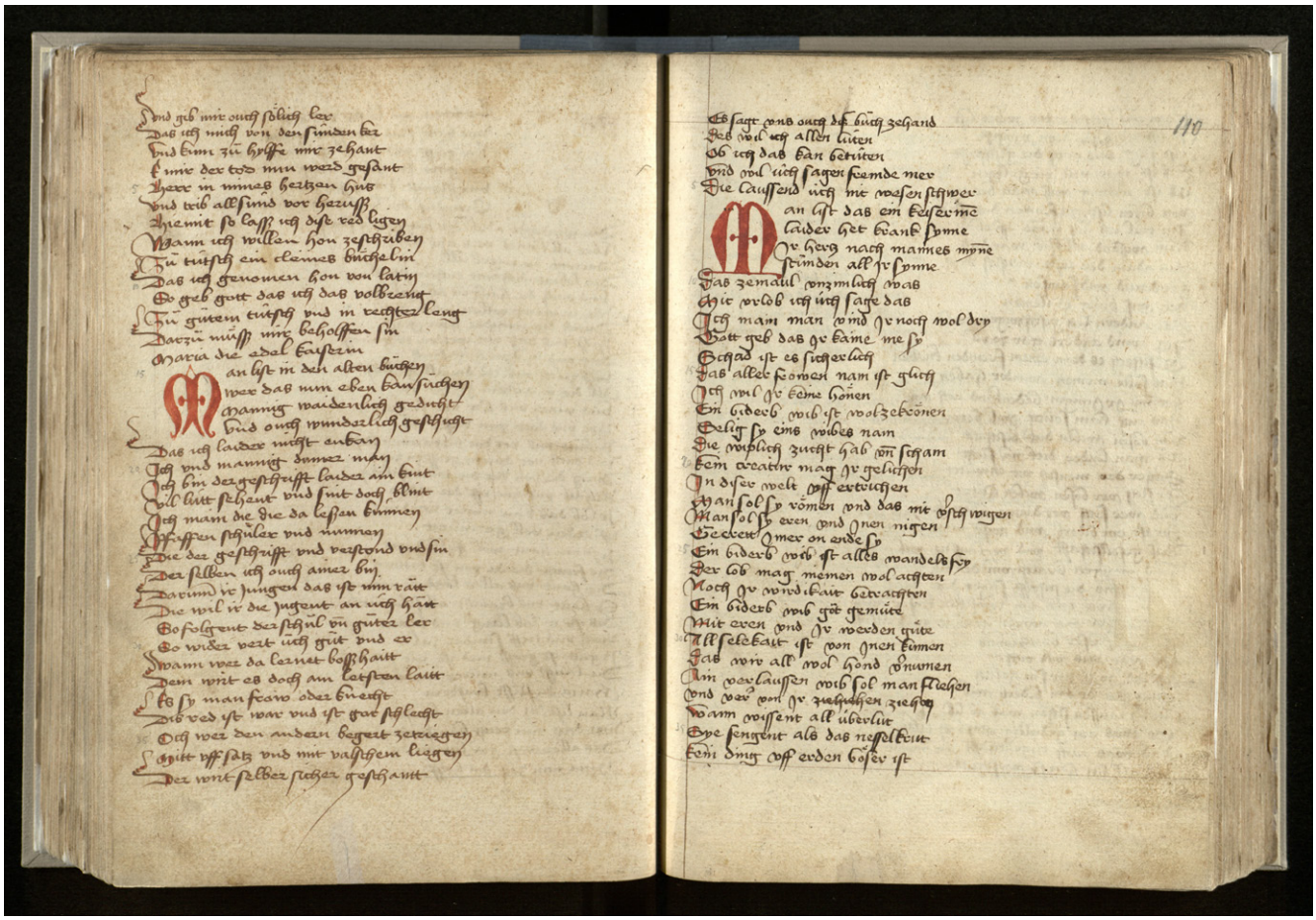


Fig. 8: Fols 109^{v}–110^{r}.

the page from fol. 58^{r} to fol. 58^{v}. This is not recognizable with the naked eye; nor are there palaeographic signs of a possible change in scribes. The *capitulum* sign placed next to the text on fol. 58^{v} was written with this ink containing manganese and thus very probably comes from Hand I like the preceding double virgule. On fol. 66va, we measure for Hand I once again an ink resembling one of the first inks without manganese. Such an ink was also used for the subsequent entries by Hands II, III, and IV on fol. 64^{v}, and Hand III also writes the paint recipe on fol. 71va with a comparable ink. It is possible that they all took recourse to the same stock of ink or the same raw materials to produce the ink.

Hand III and Hand V

The collection of paint and ink recipes of the Cod. germ. 1 extends across fols 71ra–75ra and can now be ascribed to two scribal hands. Hand III wrote the first part of the paint and ink recipes with an ink similar to that used by Hands I, II, and IV. The second part of the paint and ink recipes following fol. 72^{v}, in contrast, was written by Hand V with another ink containing only copper, but no zinc, manganese, or potassium. These clear differences in the composition of the inks helped specify the palaeographic distinctions between the hands. Hand III and Hand V have a very similar writing ductus and they form most letters in the same way. In addition, the change in scribes from fol. 72^{r} to fol. 72^{v} shows no difference in the text's content or in the layout. Only the few empty lines at the lower edge of the column fol. 72^{rb} initially indicate that a production step ended here; this was the reason for choosing the two measuring points f71va_l1 and f72vb_l13. When the results of the X-ray fluorescence spectroscopy indicated a possible change of scribes, it was possible to palaeographically determine this unambiguously. Hand V shows a broader and more right-leaning ductus than Hand III and fits fewer lines (35–38 as opposed to 41–45 lines) into the same writing space. The clearest differentiating trait, however, is the writing of the ſʒ ligatures: Hand III writes ſʒ while Hand V writes ſʒ (see also Table 1). There are also clear differences in the writing of the <d>: while Hand III writes twelve (of 47) <d> with a loop in column 71^{rb} alone; in more than ten

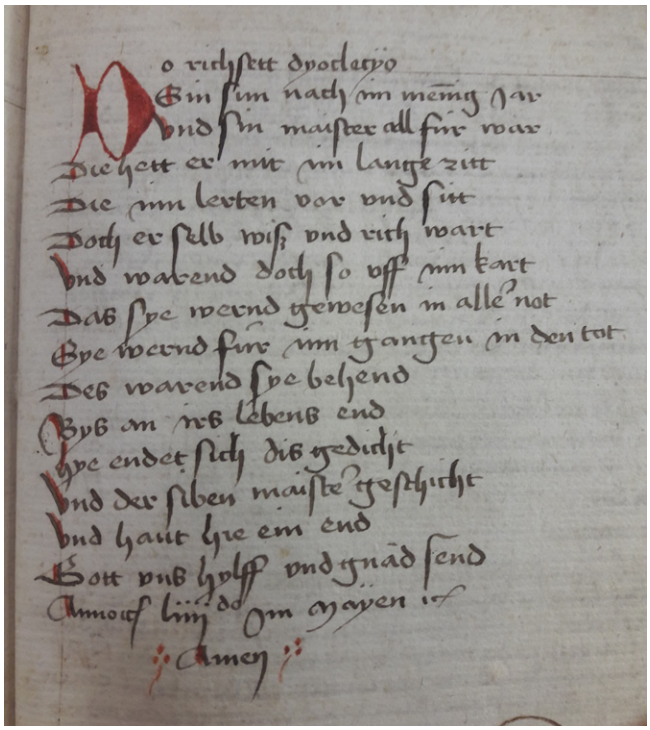


Fig. 9: Excerpt from fol. 211r.

columns, we counted only eleven forms with a loop for Hand V.

Hand VI, VII, VIII, IX, X, and Addendum 14–17

On fol. 75, after the eight lines of Hand V's last ink recipe, Hands VI and VII used the rest of the space to enter more recipes, but this time medical ones. On this page, too, the composition of the inks clearly differs, and the marginal entry supplementing the content under the left column was written with a different ink (Fig. 7).[17] On the following page begins the text of the *Lucidarius-Elucidarius* compilation written by Hand VIII. The measured values of the ink or inks Hand VIII used on fols 75va, 85rb, and 90ra all show comparably high proportions of zinc and copper.[18] In terms of the presence of small amounts of potassium and manganese, however, they differ. Here it is unclear where the intermittently appearing manganese and potassium impurities come from. A greater density of measuring points might make it possible to recognize a pattern. The quire numbers on fols 85r and 97r show a ratio between zinc and copper similar to that in Hand VIII's inks surrounding them as well as a small amount of potassium, so that they cannot be attributed to Hand VIII with certainty.[19] Behind that, on fol. 99r, not only does a recognizably different hand begin in a markedly darker ink (Hand IX); the measured values on fol. 99rb also display a marked difference from the other inks and a very high proportion of zinc. On fol. 100va, as well, Hand IX's writing shows even higher proportions of zinc and copper.[20] The last pages of the first codicological unit have only subsequent entries. On fol. 101r, Hand X entered some recipes in a sixteenth-century *Kurrent* script. Other recipes from this hand are found also on the last page of the second codicological unit. There, on fol. 212r, however, the ink has a different composition.[21] The scribe probably did not write the two pages immediately one after the other, but possibly after some time. Additional subsequent entries from the sixteenth century in the form of pen tests are found on fol. 102r (in *Fraktur* and *Kurrent*) and 108v (*Kurrent*), where the name entry 'angnes kellerin' is also found in what seems to be a fifteenth-century cursive script. All three entries were written in ink with a similar composition containing high proportions of copper and zinc.[22]

Hand XI, XII, and XIII

The second codicological unit of the manuscript contains the collection of exemplars, the *Sieben weise Meister*, to which several recipes were subsequently added. The codicological finding of the manuscript showed that here a probably defective codicological unit dating from 1454 was repaired around 1463 by someone who had recourse to the same supply of paper as used in the first codicological unit.[23] The first double sheet of the first quire was replaced, just like the first sheet of the last quire. These pages (fols 109r/v, 120r/v, 205r/v) were written by Hand XI, the rest of the text of the *Sieben weise Meister* by Hand XII. But the results of the X-ray fluorescence spectroscopy depicted in Fig. 6 do not show this yet. Very similar values were measured on fol. 109r, as on fols 110v, 121r, 170v, and 193r. Only the recipes

[17] Cf. in Fig. 6b: f75ra_l39, f75ra_margin, f75rb_headline.

[18] Cf. in Fig. 6b: f75va_l1u, f75va_l1u_1. Cf. in Fig. 6c: f85rb_l1, f90ra_l4.

[19] Cf. in Fig. 6b: f85r_number. Cf. in Fig. 6c: f97r_number.

[20] Cf. in Fig. 6c: f99rb_l8, f100va_l13.

[21] Cf. in Fig. 6c: f101ra_l1 and f212rb_l13.

[22] Cf. in Fig. 6c: f102r_l1, f108v_Dein, f108v_l1.

[23] Precise information on the dating and distribution of watermarks and on the structure of layers is offered by the manuscript description by Marco Heiles, which will be published in *Manuscripta Medievalia* <http://www.manuscripta-mediaevalia.de/dokumente/html/obj31593540>.

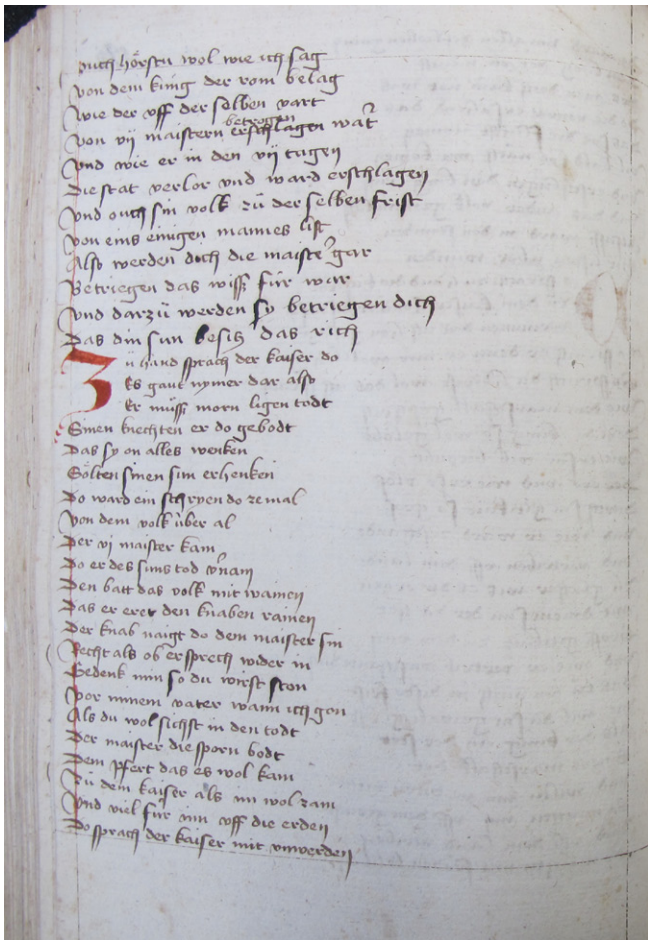


Fig. 10: Fol. 170v.

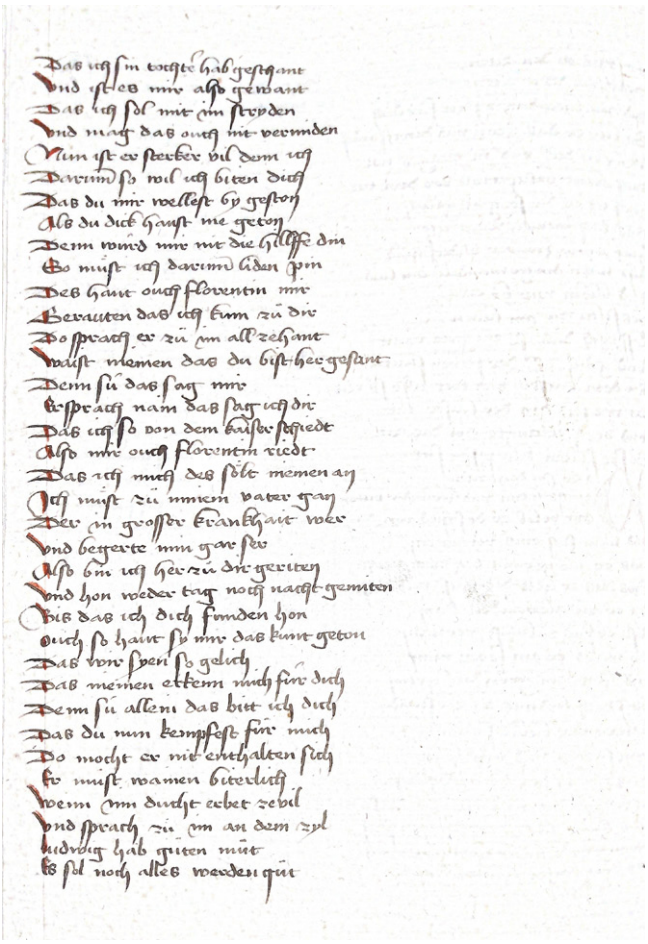


Fig. 11: Fol. 201v.

subsequently entered by Hands XIII and X show once again a markedly different ink composition. Palaeographically, the distinction between Hands XI and XII is unambiguous and is also supported codicologically. On the double page fols 109v/110r, this is clearly recognizable (Fig. 8). On the left side (Hand XI, fol. 109v), the versals <v> and <d> are always written with characteristic adornments – which research calls 'elephant trunks'[24] – that are not found on the right side (Hand XII, fol. 110r). The two hands clearly differ also in the formation of the ſʒ ligatures (compare Table 1). Particularly palaeographically fascinating is the handwriting of Hand XII, namely because if the first page written by this hand, fol. 110r (Fig. 8), is compared with the last, fol. 211r (Fig. 9), it is easy to gain the impression that these are two different handwritings. On fol. 110r, the hand writes a *Bastarda* with open loops – i.e. b, h, k, and l with loops at the right of their ascenders – and the same hand writes a *Bastarda* on fol. 211r without loops – b, h, k, and l (compare also Table 1). In Lieftinck's terminology – which, however, was not developed based on southern German, but on Dutch scripts – this would even lead to a differing categorization of the two handwritings: the first would be a cursiva libraria, the latter a hybrida libraria.[25] There are additional differences. Thus, the <d> at the beginnings of verses on fol. 110r always shows a closed loop, while those on fol. 211r never show a loop. But no point can be pinned down where the one hand stops and the other begins. There is a point on fol. 170v where the writer once skipped down and began again more concentratedly and cleanly (Fig. 10). But the form of the letters changes here as little as does the composition of the ink (Table 4).[26] Instead, the appearance of Hand XII's writing changes gradually. While Hand XII on fols 110r and 110v still writes all <d> at the beginnings of verses with a loop, starting on fol. 111v a few individual <d> without loops appear, which, starting with fol. 112r,

[24] Cf. Schneider 2014, 77–79.

[25] Cf. Derolez 2006, 130, 163.

[26] Cf. in Fig. 6c: f170v_l12, f170v_l16.

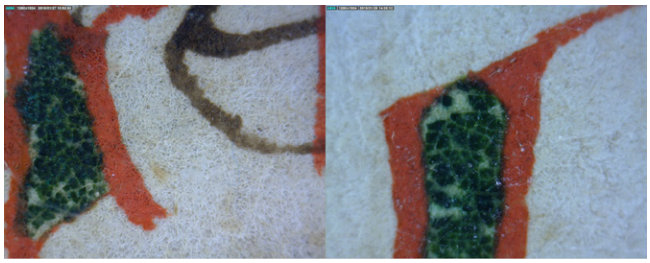


Fig. 12: Microphotographs of lombards with cinnabar and copper green on fols 2[r] and 62[r].

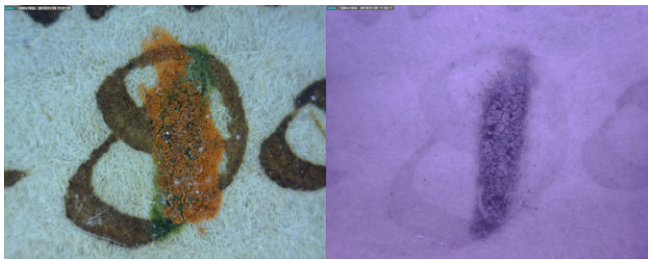


Fig. 13: Microphotographs of a dotted<d>with cinnabar and copper green on fol. 54[va] under visible and near infrared light.

provide most of the versal <d>. By fol. 113[v], only a few <d> show loops at the beginnings of verses, and on the following folios there are none whatsoever. The shift from a *Bastarda* with loops to one without loops proceeds more quickly and can be observed on fol. 201[v] (Fig. 11), where initially forms without loops appear intermittently from line 24 on and finally only these are used. In this case, X-ray fluorescence analysis supports the palaeographic finding, but without the palaeographic examination would not be unequivocal, like the similar measured values of the inks from Hand XI and Hand XII show.

The red and green inks

In the Cod. germ. 1, red and green color was used along with black iron gall ink. The texts entered by Hand I were adorned with black, red, and green lombards (decorative initials) (see Fig. 3); capital letters and the beginnings of verses were furnished with red and green strokes (see Figs 1, 3, and 4); and in some cases titles were underlined in red. A red hatching is also found in Hand IX's entry, and Hands XI and XII also display red lombards and strokes (see Figs 8, 9, 10, and 11), whereby here several pages were skipped – as with Hand I.[27]

The green pigment used is copper green. The production of such copper green inks with verdigris, vinegar, and saffron (Recipe 5) and optional with the addition of winestone (potassium bitartrate), gum arabic, egg yolk, and honey (Recipe 18) is described in the collection of paint and ink recipes of Cod. germ. 1.[28] This kind of ink is recognizable with the naked eye and is especially marked under the microscope (Fig. 12) due to its metallic luster and its characteristic structure. It is also still visible under infrared light (NIR, Near Infrared, 940 nm) (Fig. 13). For this reason, to confirm this finding, we measured this ink only on fols 3[r] and 62[r].

Two fundamentally different kinds of red ink were used for rubrication in Cod. germ. 1: inks containing cinnabar and inks containing red lead. Both kinds of 'ruberic' were also mentioned in the recipe collection, whereby in Recipes 16 and 26 there only the act of mixing the inks made of 'zinober' (cinnabar) or 'myni' (minium/red lead) were described and not their production.[29] Cinnabar is β-mercuric(II) sulfide (HgS) and in the Middle Ages was either mined as a mineral or artificially produced.[30] Minium or red lead, is lead (II,IV) oxide, which was mostly produced artificially[31]. Fig. 14a depicts for 18 measuring spots the amount of mercury (Hg), copper (Cu), iron (Fe), and manganese (Mn) in relation to lead (Pb). The red inks with a very high mercury content used on fols 2[r], 3[v], 58[v], 59[r], and 62[r] are thus clearly cinnabar inks, the others red lead inks. The sometimes high measured values for copper and iron can probably be attributed to impurities deriving from the copper green and iron gall inks used in the same place. They show that the measuring points should have been selected more carefully.

These two kinds of red inks can be distinguished with the naked eye in Cod. germ. 1. The cinnabar is characterized by its intense, bright red color, while red lead appears more brownish. Cinnabar inks were accordingly used on fols 2[r]–7[r], 8[v], 53[r]–54[r], 58[v]–59[r], and 61[r]–62[v]. All other rubrications were carried out with red lead. The data gathered do not permit a more distinction among individual ink batches; only the red lead ink used on fol. 100v stands out for its high mercury content. But we can distinguish two groups of red lead inks. There are red inks without mercury on fols 58[r],

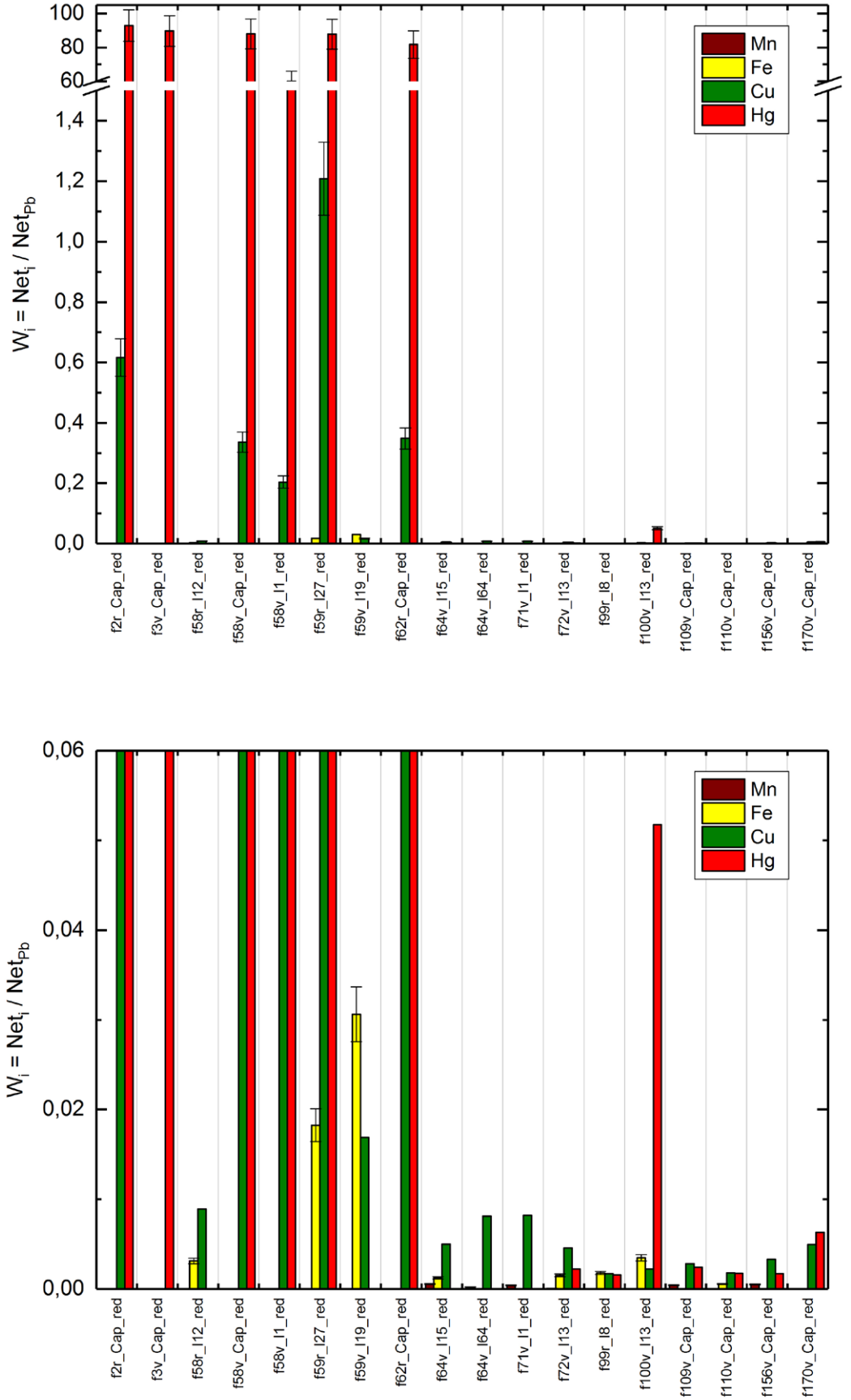
[27] Precise information on the way rubrication was carried out is found in the manuscript description by Marco Heiles, in *Manuscripta Medievalia* <http://www.manuscripta-mediaevalia.de/dokumente/html/obj31593540>.

[28] Cf. Heiles 2018b, 13–61.

[29] Cf. Heiles 2018b, 13–61.

[30] On this, cf. Bartl, Krekel, Lautenschlager, and Oltrogge, 2005, 542–544.

[31] Arnold, Ullrich, Dobianer, and Grunz 2009, 20–24.



Figs 14a and b: XRF investigation of the red inks. Fingerprint values W_i of different elements normalised to lead.

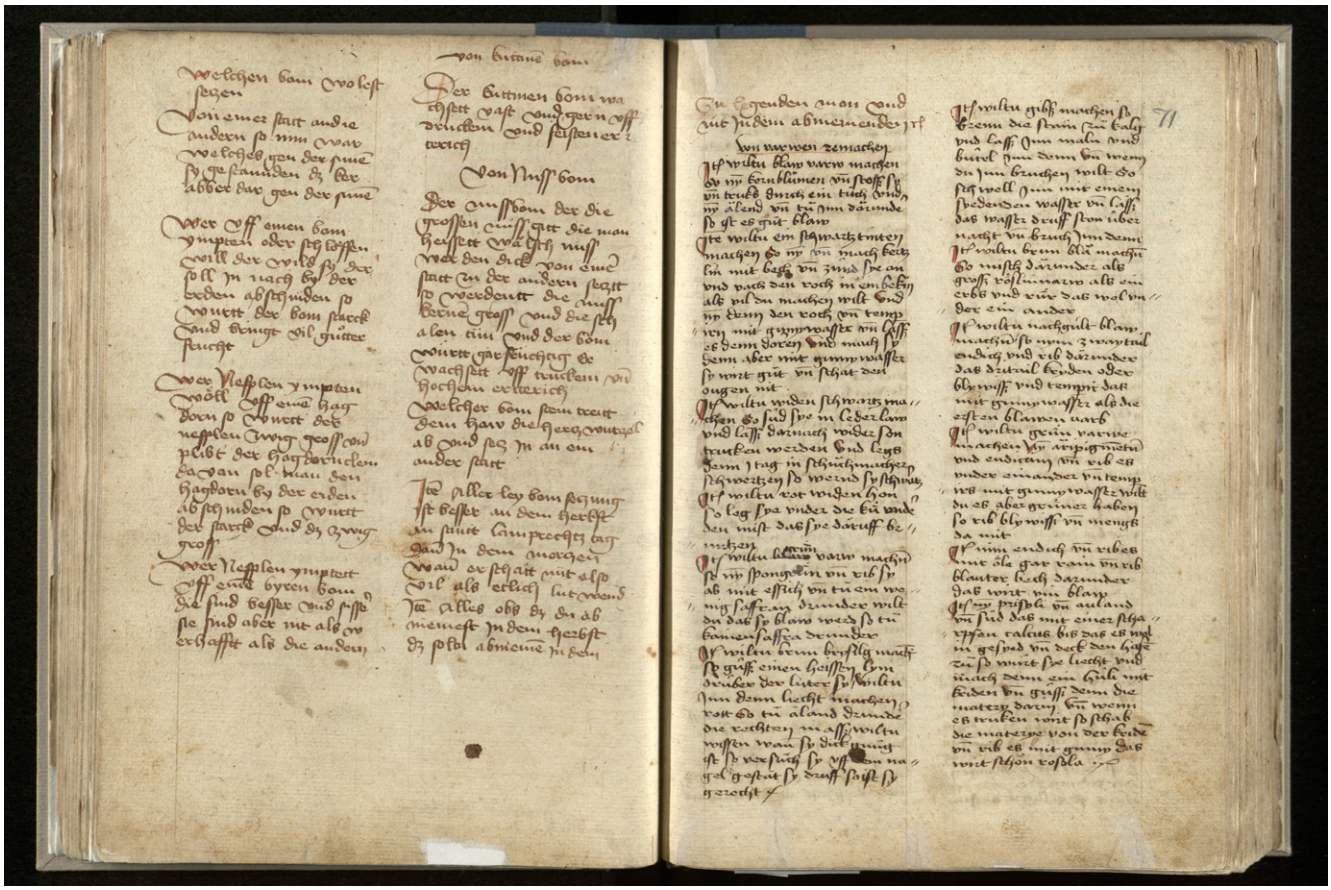


Fig. 15: Fols 70v–71r.

59v, 64v and 71v and red inks with very little mercury on fols 72v, 99r, 109v, 110v, 156v und 170v (Fig. 14b). Codicological evidence shows, that these entries were not made by only two rubricators, but it is remarkable, that there is a change of ink between fols 71v and 72v, where scribal hands are changing too (Hand III and Hand V).

Conspicuous is that copper green was used only where cinnabar was also used. There is no combination of red lead and copper green. Additionally, copper green and cinnabar are found together only in entries by Hand I. These entries are thus very probably the work of a single rubricator, either Hand I or someone who worked together with Hand I. But it is not clear why only certain sections of Hand I texts were rubricated by this rubricator.

The censorship on fol. 57ra

X-ray fluorescence analysis did not help us with the strikeout of the 'zagel' on fol. 64vb, but it did with the 'schwarcz tüfel' on fol. 57ra. The two measurements f57ra_corr1 and f57ra_corr2 that were made there show that the text here was censored with an iron gall ink (Fig. 6). That means that, with very probability, this was not done in very recent times. The ink shows a high tin and copper content, with the copper content higher than the tin in the second measurement, and there are traces of potassium. The censorship was thus definitely not done immediately during Hand I's writing, since the ink Hand I used differs markedly from that of the censorship. But we were unable to find anywhere in the entire manuscript other inks that have a similar composition. That does not mean that none of the other persons participating in the manuscript could have been the censor. But he or she did not do it with the same ink as used to write other texts. The gain in knowledge from the specific censored passages on fol. 57ra and fol. 64vb, taken by itself, does not have a favorable relationship with the effort of the examination. But on the production process of the manuscript itself and the attribution of marginal entries that could not be palaeographically attributed to specific writing hands, definitely valuable new knowledge was gained that can also encourage new studies. It seems to us that here, in the examination of marginalia, lays a particular potential of X-ray fluorescence analysis. Another untapped potential for revealing the work processes in a scriptorium seems to lie in examining the ruling of the writing space by means of microscopy and X-ray fluorescence analysis.

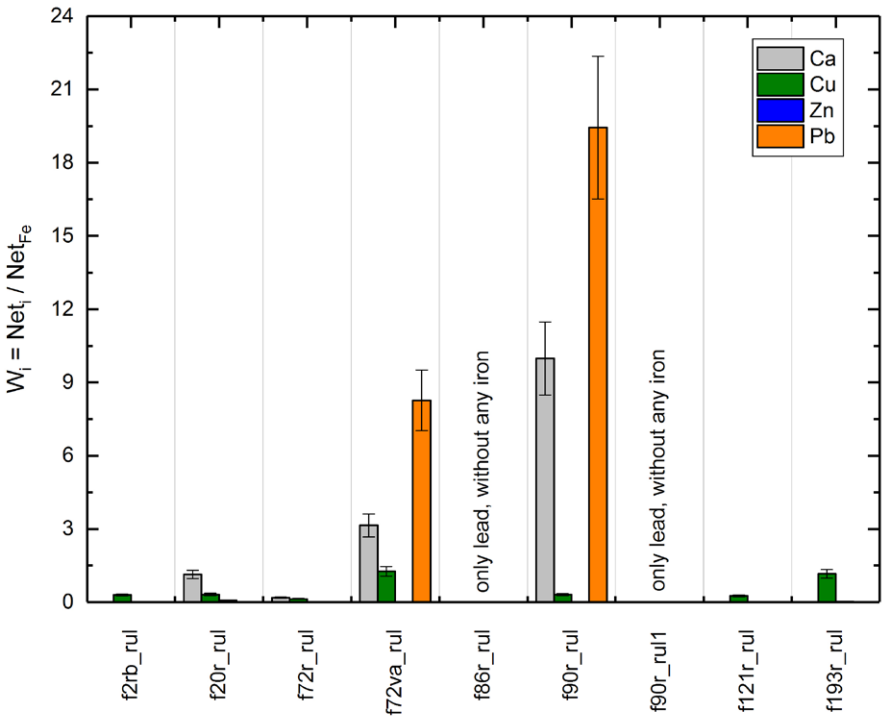


Fig. 16: XRF investigation of the rulings. Fingerprint values W_i of different elements normalised to iron.

The lines marking the writing space in the first codicological unit, which are also on the unwritten last pages of the unit, offer a consistent image visually and also under the ruler, but our data show that they certainly were not made in a unified work process. Among the sole four values measured in this codicological unit that showed iron gall inks, at least three different inks could be made out. Added to this are two lines actually drawn with a lead stylus. It thus appears that only a few pages were ruled at a time, for which ink or lead were used optionally. The change in ink from fol. 72^{r} to fol. 72^{v} also indicates that this working step was not undertaken for a whole quire, but was connected with a change of scribe and rubricator, which we can observe at precisely this point.

Outlook: ruling and writing space boundaries

The writing space of Cod. germ. 1 is consistently arranged in both codicological units. The first codicological unit was set up throughout with a two-column frame always ca. 14.5 cm wide. On fols 2^{r}–70^{v}, these were always inscribed by Hand I with ca. 35–37 lines that, taken together, are ca. 21 cm high. On fols 71^{r}–108^{v}, the primary Hands III, V, VIII, and IV used more space (Fig. 15). The text is now ca. 25 cm high and contains up to 45 lines, whereby this value differs for each hand. The primary text of the second codicological unit, the verse processing of the *Sieben weise Meister*, is written in one column. These pages all have an upper, a lower, and a left-hand frame line. The writing space measures *c*. 23 × 16 cm and holds 36–38 lines (see Fig. 8).

To examine the inks, we needed measuring points whose reverse side had not been written on, so we often chose letters on the edge of the writing space, which thus often lay very close to the ruling lines bounding the writing space. So, we used the favorable opportunity to gather data about these rulings without great effort. The measured values of these very arbitrarily chosen eight measuring points are presented in Fig. 16, where the amounts of lead (Pb), zinc (Zn), copper (Cu), and calcium (Ca) are set in relation to the amount of iron (Fe).

Here, a more precise examination with a much greater number of measuring points would certainly provide deeper insight into the collaboration of the many people who contributed to this manuscript. Since the lead lines, unlike the iron gall inks, are visible also under infrared light (Fig. 17) and can therefore be easily distinguished from them, here preliminary examinations are also possible without great technological effort.

Fig. 17: Microphotographs of the iron gall ink and lead lines on fol. 75^{r} (above) and fol. 193^{r} (below) with visible and near infrared light.

Tabelle 1: Differentiation of hands in Codex germanicus 1.

Hand	Folio	Type of script	Characteristics
Hand I	2^{r}–71ra	*Bastarda/Cursiva libraria*	single-compartment a f and ſ descending below the baseline b, h , k, and l with loops at the right of their ascenders d with and without loop w with and without loop in some cases r with vertical hairline (e.g. fol. 2^{rb}, l. 24 *rott*)
Hand II	64va	*Bastarda/Semihybrida libraria*	single-compartment a f and ſ descending below the baseline b and l with and without loops h and k with loops d without loop w without loop
Hand III	64^{vb}, 71ra–72^{rb}	*Bastarda/Cursiva libraria*	single-compartment a f and ſ descending below the baseline b, h , k, and l with loops d with and without loop w without loop
Hand IV	64^{vb}	*Bastarda/Cursiva libraria*	single-compartment a f and ſ descending below the baseline b, h , k, and l with loops d without loop w without loop
Hand V	72va–75ra	*Bastarda/Cursiva libraria*	single-compartment a f and ſ descending below the baseline b, h , k, and l with loops d with and without loop w without loop
Hand VI	75ra	*Bastarda/Cursiva libraria*	single-compartment a f and ſ descending below the baseline b, h , k, and l with loops d without loop w without loop

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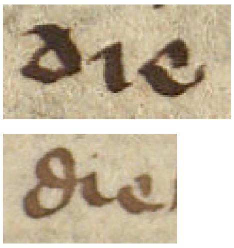		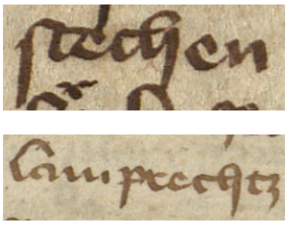	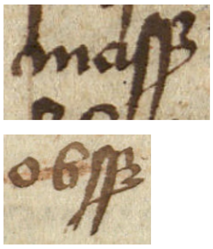
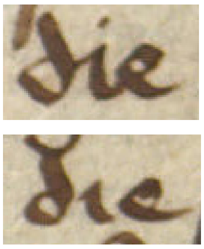	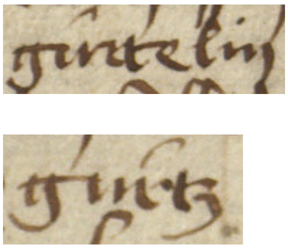	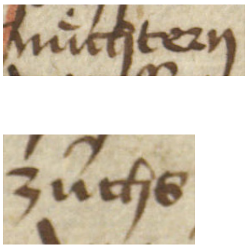	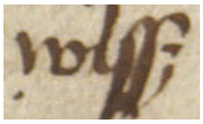
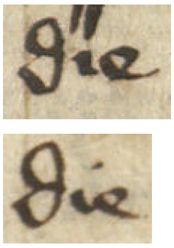	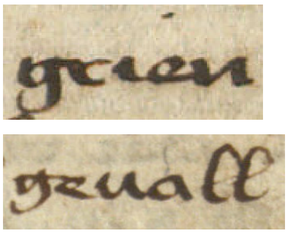	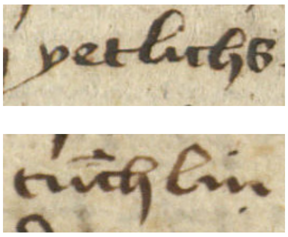	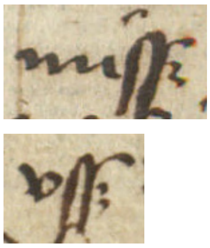
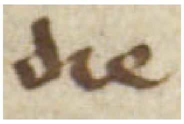	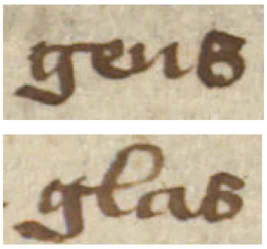	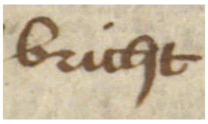	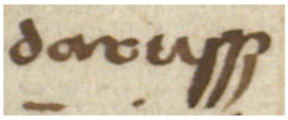
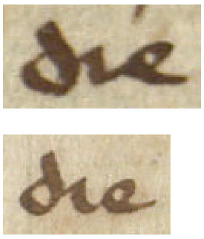	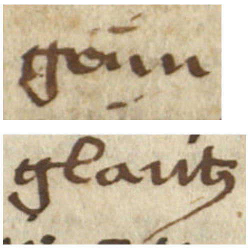	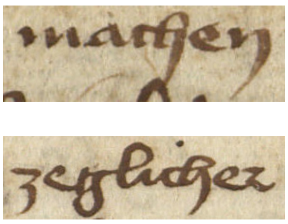	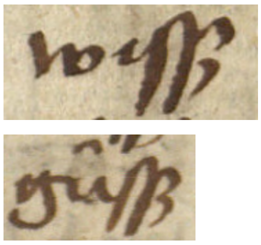
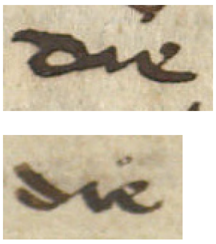	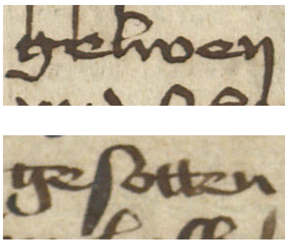	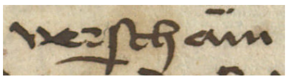	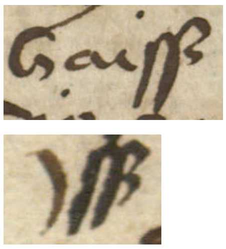

Hand	Folio	Type of script	Characteristics
Hand VIII	75^{v}–98^{vb}	*Bastarda/Cursiva libraria*	single-compartment a f and ſ descending below the baseline b, h , k, and l with loops d with and without loop w without loop
Hand IX	99ra–100^{vb}	*Bastarda/Semihybrida libraria*	single-compartment a f and ſ descending below the baseline b, h , k, and l with and without loops d with and without loop w without loop
Hand X	101^{r}, 212^{r}	*Kurrentschrift*	single-compartment a, f and ſ descending below the baseline b, h , k, and l with loops d with loop, w without loop
Hand XI	109$^{r/v}$, 120$^{r/v}$, 205$^{r/v}$	*Bastarda/Cursiva libraria*	single-compartment a f and ſ descending below the baseline b, h , k, and l with loops d without loop w without loop
Hand XII	110^{r}–119^{v}, 121^{r}–204^{v}, 206^{r}–211^{r}	*Bastarda/Cursiva libraria* and *Hybrida libraria*	single-compartment a f and ſ descending below the baseline b, h , k, and l with loops (until 201^{v}), without loops (201^{v}–211^{r}) d without loop w without loop
Hand XIII	211^{v}	*Bastarda/Cursiva libraria*	single-compartment a f and ſ decending below the baseline b, h , k, and l with loops d without loop w without loop

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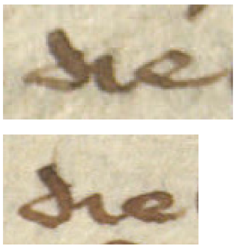
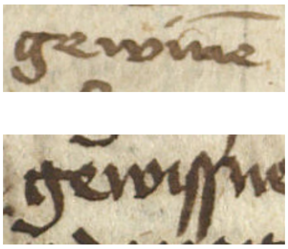
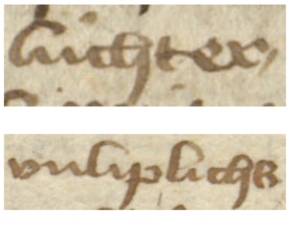
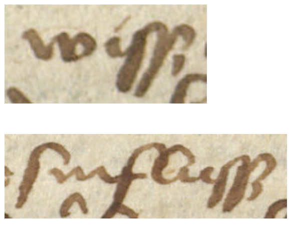
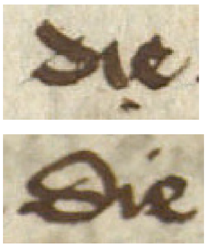
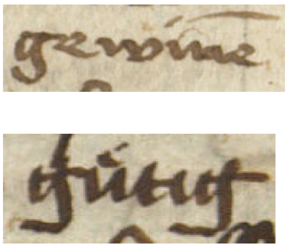
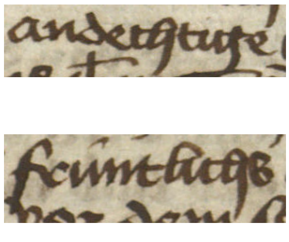
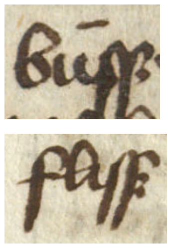
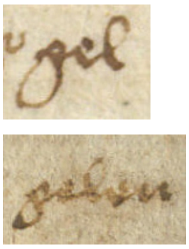
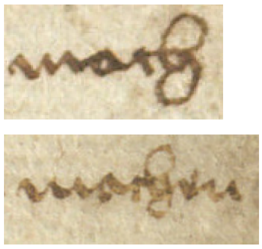
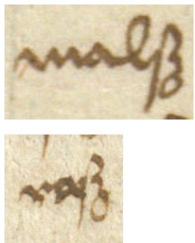
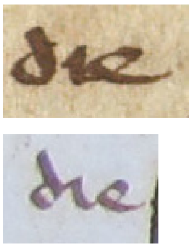
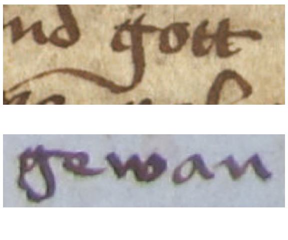
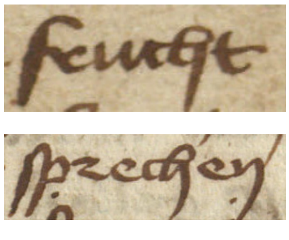
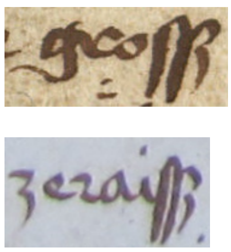
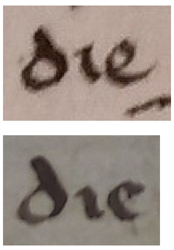
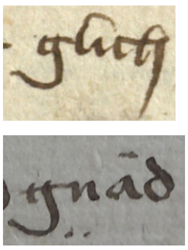
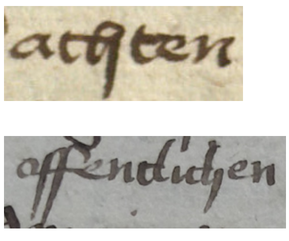
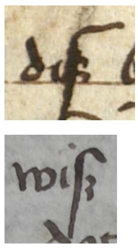
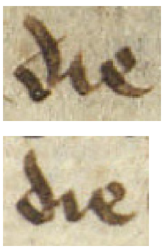
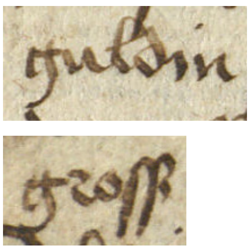
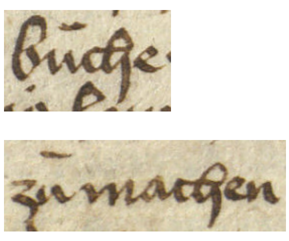
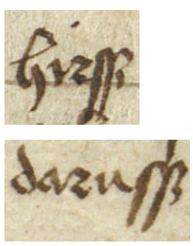
⟨die⟩	⟨g-⟩	⟨-ch-⟩	⟨-ß⟩
			
			
			
			
			
			

Table 2: Content of Codex germanicus 1.

Folio	Texts	Hand
fol. 1^{r}	Pen tests	
fols 5$^{r/v}$, 1ra	Bloodletting times and rules	Hand I
fols 1ra–3ra	Suitable bloodletting sites	Hand I
fols 3ra–3va	Unlucky Days (*Verworfene Tage*)	Hand I
fols 3va–4ra	The German *Macer* (Vulgate version), prose foreword (shortened and heavily redacted)	Hand I
fols 4ra–4va, 6ra–11^{vb}	Herbal book compilation, based partly on the German *Macer* (Vulgate version)	Hand I
fols 11^{vb}–47^{rb}	Medical recipes: treatment of various body parts (*A capite ad calcem*), women's medicine, wounds and poisonings, urine test, and veterinary medicine	Hand I
fols 47^{rb}–50ra	Recipes for preparing wine	Hand I
fols 50ra–50^{vb}	Vinegar recipes	Hand I
fols 51ra–51^{rb}	Plague recipes: *Der Sinn der höchsten Meister von Paris* ('The opinion of the greatest masters from Paris') and *Sendbrief-Aderlaßanhang* ('epistle – bloodletting annex')	Hand I
fols 51^{rb}–51va	Sleep recipes	Hand I
fols 51va–52^{rb}	Instructions on obtaining and using stones with supernatural qualities, illusion tricks, recipes against vermin	Hand I
fols 52va–54va	Technological, joke, and damage recipes	Hand I
fols 54va–55ra	Ps.-Albertus Magnus: *De virtutibus herbarum*, German (translated excerpts)	Hand I
fols 55ra–56^{rb}	Ps.-Albertus Magnus: *De virtutibus lapidum*, German (translated excerpts) and a recipe	Hand I
fols 56^{rb}–57^{rb}	Drug monograph, Ps.-Albertus Magnus: *De virtutibus animalium*, German (translated excerpts) and trick recipes	Hand I
fols 57va–62ra	Volmar: *Steinbuch* (H)	Hand I
fols 62^{rb}–62^{vb}, 63^{va-b}, 63^{ra-b}	Lunar prognostic: *Krankheitslunar* (HaD)	Hand I

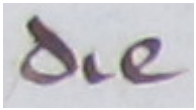
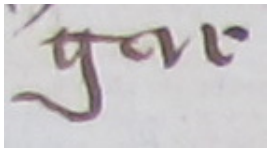
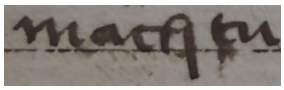
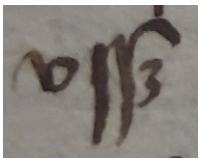
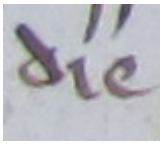
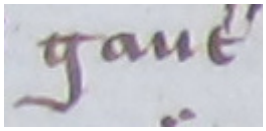
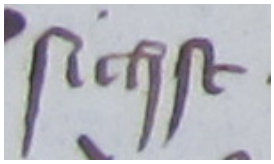
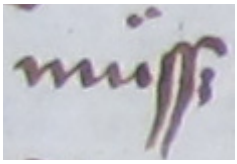
fol. 64ra	New Year's prognosis	Hand I
fols 64ra–64va	Medical and other recipes	Hand I
fol. 64va	Recipe against lice	Hand II
fol. 64^{vb}	3 medical recipes	Hand III
fol. 64^{vb}	Medical recipe	Hand IV
fols 65ra–69va	32 cooking recipes	Hand I
fols 69va–71ra	Recipes for caring for trees from Gotfried von Franken's *Pelzbuch*	Hand I
fols 71ra–75ra	41 paint and ink recipes	Hand III and Hand V
fol. 75ra	2 medical recipes	Hand VI
fol. 75^{r}	1 medical recipe and 5 recipes against hair loss (dirt pharmacy)	Hand VII
fols 75va–98^{vb}	*Lucidarius* / translation of *Elucidarius*	Hand VIII
fols 99ra–100^{vb}	Johannes von Indersdorf (?): Maxims and prayers	Hand IX
fol. 101^{ra-rb}	(Cooking) recipes	Hand X
fol. 101^{v}	*– empty –*	
fol. 102^{r}	Broken-off entry	
fols 102^{r}–108^{r}	*– empty –*	
fol. 108v	Name entry *angnes kellerin* and pen tests from the 16th century	
fols 109^{r}–117^{r}, 118^{v}–211^{r}	*Sieben weise Meister (The Seven Wise Masters)*, German, verse version	Hand XI and Hand XII
fols 117^{v}–118^{r}	*– empty –*	
fol. 211^{v}	6 medical recipes	Hand XIII
fol. 212$^{ra/rb}$	5 cooking recipes	Hand X
fols 212^{v}–214^{v}	*– empty –*	

Table 3: Measuring points of black ink

Folio	Type of the ink	ID No.
001^{r}	Addendum 01 Year	f1r_year
001^{r}	Addendum 02 *probatio pennae*	f1r_longEntry
002^{v}	Hand I 01	f2vb_5u
002^{v}	Hand I 02	f2vb_4u
015^{r}	Hand I 03	f15rb_12u
020^{r}	Addendum 03 margin (Johann)	f20r_Marg
023^{v}	Addendum 04 margin (double virgule)	f23vb_capitulum
023^{v}	Hand I 04	f23vb_l10
028^{v}	Addendum 05 margin (text)	f28va_margin
028^{v}	Addendum 06 correction	f28vb_corr
051^{r}	Hand I 05	f51rb_l4
051^{r}	Addendum 07 margin (finger)	f51ra_finger
051^{r}	Addendum 08 margin (cloud)	f51rb_cloud
051^{r}	Addendum 09 margin (da)	f51rb_da
052^{r}	Addendum 10 margin (bracket)	f52rb_bracket
052^{r}	Addendum 11 margin (da)	f52rb_da
057^{r}	Addendum 12 strike through	f57ra_corr1, f57ra_corr1
057^{r}	Hand I 06	f57rb_l30
058^{r}	Hand I 07	f58rb_l12
058^{v}	Hand I 08	f58va_l1
058^{v}	Addendum 13 margin (*capitulum* with red stroke)	f58va_Capitulum
062^{r}	Hand I 09	f62rb_l4
064^{v}	Hand I 10	f64va_l15
064^{v}	Hand II 01	f64va_l24T,Vis, IR
064^{v}	Hand III 01	f64vb_l1
064^{v}	Hand IV 01	f64vb_l24

066^{v}	Hand I 11	f66va_l15
071^{v}	Hand III 02	f71va_l1
072^{v}	Hand V 01	f72vb_l13
075^{r}	Hand VI 01	f75ra_l39
075^{r}	Addendum 18 margin (text)	f75ra_margin
075^{r}	Hand VII 01	f75rb_headline
075^{v}	Hand VIII 01	f75va_l1u, f75va_l1u_1
085^{r}	Quire number 01 "9"	f85r_number
085^{r}	Hand VIII 02	f8rrb_l1
090^{r}	Hand VIII 03	f90ra_l4
097^{r}	Quire number 02 "10"	f97r_number
099^{r}	Hand IX 01	f99rb_l8
100^{v}	Hand IX 02	f100va_l13
101^{r}	Hand X 01	f101ra_l1
102^{r}	Addendum 19 headline	f102ra_l1
108^{v}	Addendum 20 *agnes kellerin*	f108v_l1
108^{v}	Addendum 21 *probatio pennae*	f108v_Dein
109^{r}	Hand XI 01	f109r_l1
110^{v}	Hand XII 01	f110v_l29
121^{r}	Hand XII 02	f121r_l1
121^{r}	Quire number 03 "2"	f121r_number
170^{v}	Hand XII 03	f170v_l12
170^{v}	Hand XII 04	f170v_l16
193^{r}	Hand XII 05	f193r_l1_1
193^{r}	Quire number 04 "8"	f193r_number
211^{v}	Hand XIII 01	f211v_l1
212^{r}	Hand X 02	f212rb_l3

Table 4: Forms of letters on fol. 170^{v}.

Ink	⟨die⟩	⟨g-⟩	⟨-ch-⟩	⟨-ß⟩
Ink #1				
Ink #2				

REFERENCES

Arnold, Bärbel, Detlef Ullrich, Borris Dobianer, and Rico Grunz (2009), 'Historische Herstellung von Kupfer- und Bleipigmenten', in Brandenburgisches Landesamt für Denkmalpflege und Archäologisches Landesmuseum (ed.), *Umweltbedingte Pigmentveränderungen an mittelalterlichen Wandmalereien: Beiträge des 3. Konservierungswissenschaftlichen Kolloquiums in Berlin/Brandenburg am 13. und 14. November in Potsdam und Ziesar* (Worms: Werner), 20–24.

Bartl, Anna, Christoph Krekel, Manfred Lautenschlager, and Doris Oltrogge (2005), *Der 'Liber illuministarum' aus Kloster Tegernsee: Edition, Übersetzung und Kommentar der kunsttechnologischen Rezepte* (Publication of the Institut für Kunsttechnik und Konservierung im Germanischen Nationalmuseum, 8) (Stuttgart: Steiner).

Bibliothecae Vffenbachianae Universalis (1730), Tomus III, [...] (Frankfurt am Main). <http://nbn-resolving.de/urn:nbn:de:gbv:3:3-18817> (last accessed 15 May 2018).

Brévart, Francis B. (2008), 'Between Medicine, Magic and Religion: Wonder Drugs in German Medico-Pharmaceutical Treatises of the Thirteenth to the Sixteenth Centuries', *Speculum,* 83: 1–57.

Catalogus Manuscriptorum Codicum Bibliothecae Uffenbachianae (1747) (Frankfurt am Main). <https://hdl.handle.net/2027/hvd.32044080348816> (last accessed 15 May 2018).

Derolez, Albert (2006), *The Paleography of Gothic Manuscript Books: From the Twelfth to the Early Sixteenth Century* (Cambridge Studies in Palaeography and Codicology, 9) (Cambridge: Cambridge University Press).

Di Venosa, Elena (2005), *Die deutschen Steinbücher des Mittelalters: Magische und medizinische Einblicke in die Welt der Steine* (Göppinger Arbeiten zur Germanistik, 714) (Göppingen: Kümmerle).

Fechter, Werner (1935), *Das Publikum der mittelhochdeutschen Dichtung* (Deutsche Forschungen, 28) (Frankfurt am Main: Diesterweg).

Fuchs, Robert (1999), 'Der Tintenfraß historischer Tinten und Tuschen – ein komplexes nie enden wollendes Problem', in Gerhard Banik and Hartmut Weber (ed.), *Tintenfraßschäden und ihre Behandlung* (Werkhefte der staatlichen Archivverwaltung Baden-Württemberg. Serie A: Landesarchivdirektion, Serie A, 10) (Stuttgart: Kohlhammer), 37–76.

Gerdes, Udo (1992), 'Sieben weise Meister', in Wolfgang Stammler et al. (eds), *Die deutsche Literatur des Mittelalters: Verfasserlexikon*, 2nd edition, vol. 8, 1174–1189.

—— (2004), 'Sieben weise Meister', in Wolfgang Stammler et al. (eds), *Die deutsche Literatur des Mittelalters: Verfasserlexikon*, 2nd edition, vol. 11, 1430.

Gottschall, Dagmar (1992), *Das 'Elucidarium' des Honorius Augustodunensis: Untersuchungen zu seiner Überlieferungs- und Rezeptionsgeschichte im deutschsprachigen Raum mit Ausgabe der niederdeutschen Übersetzung* (Texte und Textgeschichte, 33) (Tübingen: Niemeyer).

—— and Georg Steer (eds) (1994), *Der deutsche 'Lucidarius'*, vol. 1: *Kritischer Text nach den Handschriften* (Texte und Textgeschichte, 35) (Tübingen: Niemeyer).

Hahn, Oliver (2010), 'Analyses of Iron Gall and Carbon Inks by Means of X-ray Fluorescence Analysis: A Non-destructive Approach in the Field of Archaeometry and Conservation Science', *Restaurator: International Journal for the Preservation of Library and Archival Material,* 31.1: 41–64.

Handschriftencensus: Eine Bestandsaufnahme der handschriftlichen Überlieferung deutschsprachiger Texte des Mittelalters, <http://handschriftencensus.de/4859> (last accessed 15 April 2018).

Heiles, Marco (2014), 'Seelenheil und Prüderie: Zensur in einer deutschen Sammelhandschrift des 15. Jahrhunderts', *Manuskript des Monats* 12/2014. <http://www.manuscript-cultures.uni-hamburg.de/mom/2014_12_mom.html>; 'Salvation of the soul and prudery: Censoring a 15th-century German-language manuscript', Manuscript of the Month 12/2014. <http://www.manuscript-cultures.uni-hamburg.de/mom/2014_12_mom_e.html> (last accessed 15 May 2018).

—— (2018a), 'Das Wunderbare in der deutschsprachigen Rezeptliteratur des 15. Jahrhunderts', in Stefanie Kreuzer and Uwe Durst (eds), *Das Wunderbare: Dimensionen eines Phänomens in Kunst und Kultur* (Traum – Wissen – Erzählen, 3) (Paderborn: Fink), 233–250.

—— (2018b), 'Die Farb- und Tintenrezepte des Cod. germ. 1 der Staats- und Universitätsbibliothek Hamburg und ihre Vorlagen', *Mittelalter: Interdisziplinäre Forschung und Rezeptionsgeschichte,* 1: 13–61. <https://mittelalter.hypotheses.org/11576> (last accessed 15 May 2018).

—— (forthcoming), 'Gesicherte Geheimnisse? Über Buchschlösser und das, was sie verbergen', in *Proceedings des 17. Symposium des Mediävistenverbandes 'Geheimnis und Verborgenes im Mittelalter'.*

Henrici, Emil (1911), Handschriftliche Archivbeschreibung für die Königlich-Preußische Akademie der Wissenschaften zu Berlin, 19 and 21 Oct. 1911 (Berlin), in Berlin-Brandenburgische Akademie der Wissenschaften (ed.), *Deutsche Texte des Mittelalters: Handschriftenarchiv*, <http://www.bbaw.de/forschung/dtm/HSA/startseite-hsa.html> (last accessed 15 May 2018).

Hickel, Erika (1963), *Chemikalien im Arzneischatz deutscher Apothekendes16.JahrhundertsunterbesondererBerücksichtigung der Metalle* (Brunswick: Pharmaziegeschichtliches Seminar der Technischen Hochschule; Dissertation, Technical University Brunswick).

Kanngießer, Birgit (2004), 'A Fingerprint Model for Inhomogeneous Ink Paper Layer Systems Measured with Micro X-ray Fluorescence Analysis', *X-Ray Spectrometry,* 33: 229–233.

Krekel, Christoph (1999), 'Chemische Struktur historischer Eisengallustinten', in Gerhard Banik and Hartmut Weber (ed.), *Tintenfraßschäden und ihre Behandlung* (Werkhefte der staatlichen Archivverwaltung Baden-Württemberg. Serie A: Landesarchivdirektion, Serie A, 10) (Stuttgart: Kohlhammer), 25–36.

Lambel, Hans (ed.) (1877), *Das Steinbuch: Ein altdeutsches Gedicht von Volmar* (Heilbronn: Henninger). <http://www.archive.org/details/dassteinbuchein00heingoog> (last accessed 15 May 2018).

Lappenberg, Johann Martin (1834), 'Inhalt einer Handschrift in der Hamburger Stadtbibliothek', *Anzeiger für Kunde des deutschen Mittelalters,* 3: 99–100.

Paschke, Paul (1891), *Über das anonyme mittelhochdeutsche Gedicht von den sieben weisen Meistern* (Breslau: Breslauer Genossenschafts-Buchdruckerei; Dissertation, Royal University Breslau – Universitas litterarum Vratislaviensis). <http://www.archive.org/details/berdasanonymemh00pascgoog> (last accessed 15 May 2018).

Petersen, Christian (ca. 1830), *Handschriftliches Verzeichnis der Codices germanici der Stadtbibliothek Hamburg* (manuscript, available in the Manuscripts Reading Room of the State and University Library Hamburg).

Schneider, Karin (2014), *Paläographie und Handschriftenkunde für Germanisten*, 3rd revised edition (Berlin: de Gruyter).

Schorbach, Karl (1894), *Studien über das deutsche Volksbuch Lucidarius und seine Bearbeitungen in fremden Sprachen* (Quellen und Forschungen zur Sprach- und Culturgeschichte der germanischen Völker, 74) (Strasbourg: Trübner). <http://www.archive.org/stream/quellenundforsc03unkngoog#page/n163/mode/2up> (last accessed 15 May 2018).

Ulmschneider, Helgard (2011), *Der deutsche 'Lucidarius'*, vol. 4, *Die mittelalterliche Überlieferungsgeschichte* (Texte und Textgeschichte, 38) (Berlin/New York: de Gruyter).

Weißer, Christoph (1982), *Studien zum mittelalterlichen Krankheitslunar: Ein Beitrag zur Geschichte laienastrologischer Fachprosa* (Würzburger medizinhistorische Forschungen, 21) (Pattensen/Hanover: Wellm) .

—— (1987), 'Neujahrsprognosen', in *Die deutsche Literatur des Mittelalters: Verfasserlexikon*, 2nd edition, vol. 6, 915–918.

—— (2004), 'Neujahrsprognosen', in *Die deutsche Literatur des Mittelalters: Verfasserlexikon*, 2nd edition, vol. 11, 1049.

Artesliteratur.de, 'Kategorie: Eisengallustinte', <https://www.artesliteratur.de/w/index.php?title=Kategorie:Eisengallustinte&oldid=1450> (last accessed 15 May 2018).

Wikimedia Commons, 'Hamburg, Staats- und Universitätsbibliothek, Cod. germ. 1', <https://commons.wikimedia.org/wiki/Category:Hamburg,_Staats-_und_Universit%C3%A4tsbibliothek,_Cod._germ._1> (last accessed 15 May 2018).

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Studies in Manuscript Cultures (SMC)

Ed. by Michael Friedrich, Harunaga Isaacson, and Jörg B. Quenzer

Writing is one of the most important cultural techniques, and writing has been handwriting throughout the greater part of human history, in some places even until very recently. Manuscripts are usually studied primarily for their contents, that is, for the texts, images and notation they carry, but they are also unique artefacts, the study of which can reveal how they were produced and used. The social and cultural history of manuscripts allows for 'grounding' the history of human knowledge and knowledge practices in material evidence in ways largely unexplored by traditional scholarship.

With very few exceptions, the history of the handwritten book is usually taken to be the prehistory of the (printed Western) book, thus not only denying manuscripts their distinct status as carrier medium, but also neglecting the rich heritage of Asian and African manuscript cultures from which, according to conservative estimates, more than ten million specimens survive until today.

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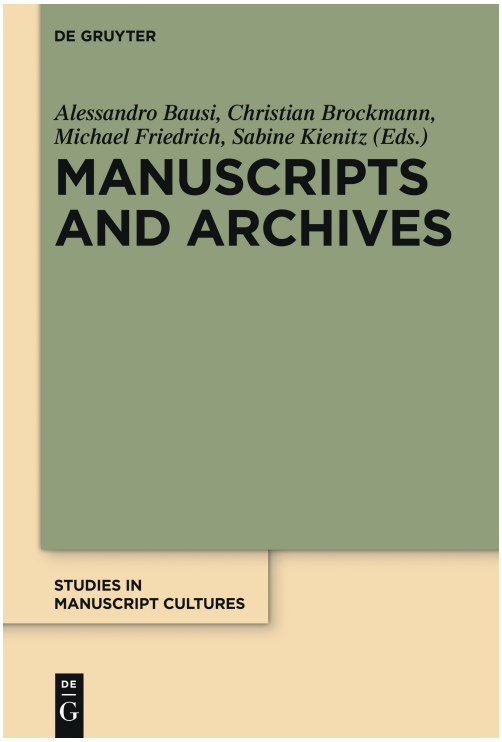

11 - *Manuscripts and Archives: Comparative Views on Record-Keeping* edited by Alessandro Bausi, Christian Brockmann, Michael Friedrich, and Sabine Kienitz

Archives are considered to be collections of administrative, legal, commercial and other records or the actual place where they are located. They have become ubiquitous in the modern world, but emerged not much later than the invention of writing. Following Foucault, who first used the word archive in a metaphorical sense as 'the general system of the formation and transformation of statements' in his 'Archaeology of Knowledge' (1969), postmodern theorists have tried to exploit the potential of this concept and initiated the 'archival turn'. In recent years, however, archives have attracted the attention of anthropologists and historians of different denominations regarding them as historical objects and 'grounding' them again in real institutions. The papers in this volume explore the complex topic of the archive in a historical, systematic and comparative context and view it in the broader context of manuscript cultures by addressing questions like how, by whom and for which purpose were archival records produced, and if they differ from literary manuscripts regarding materials, formats, and producers (scribes).

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