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New Light on the Gothic Palimpsest from Bologna*

INTRODUCTION

Nine fragmentary manuscripts, preserved in different European libraries, transmit texts in the script and language of the Goths.[1] They were most probably written or circulated in Italy during the period of the Ostrogothic kingdom (493–553), where they were used for liturgical purposes.[2] Seven of them are palimpsests, overwritten in Italian *scriptoria* with Latin texts between the second half of the 7th (in one case even earlier, see below) and the first quarter of the 8th centuries.[3]

The reason for the extensive reuse of Gothic manuscripts was not only economic. After the end of the war with the Byzantines (553) and the linguistic and religious assimilation of the remaining Goths to the Latin population, the Gothic texts were deprived of their public. In addition, they reflected, directly or indirectly, the Arian (Homoian) belief of the Goths, diffused also among the Langobards in the first period of their domination in Italy. Therefore, it cannot be excluded that the erasing of the Gothic texts is closely connected with the Langobards' conversion to Catholicism and, consequently, with the need to delete unorthodox books.[4]

Today, all these palimpsests are in a poor condition: one of the reasons is the use by previous generations of scholars of reagents to make it easier to decipher the underlying texts. Both Angelo Mai, who discovered the Gothic texts in the Ambrosian Library of Milan (from 1813),[5] and Carlo Ottavio Castiglioni, who assisted him in deciphering the texts and prepared them for publication (between 1819 and 1839[6]), used a mixture based on nutgall. This practice was also applied to the four leaves preserved in Turin (part of the ms. *Ambrosianus* A), discovered in 1866 by August Reifferscheid.[7] In subsequent years, Amedeo Peyron used a mixture of reagents (the so-called 'Gioberti's tincture'), primarily based on potassium ferrocyanide, to attempt to decipher the

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[1] The Gothic corpus, which includes long sections of the 4th-century Bible translation by Wulfila, has been edited several times. The latest edition of 2000 (Streitberg with Scardigli, *Gotische Bibel*) is a reprint of the edition by Streitberg (1919), with some additions. The Bologna fragment, discovered in 2009, is—of course—not included.

[2] Details in Falluomini, *Gothic Version*, *passim*.

[3] The seven Gothic palimpsests are: *Codex Ambrosianus* A (Milan, Biblioteca Ambrosiana, S 36 sup.; 102 leaves) + *Codex Taurinensis* (Turin, Biblioteca Universitaria Nazionale, F. IV. 1 Fasc. 10; 4 leaves); *Codex Ambrosianus* B (Milan, Biblioteca Ambrosiana, S 45 sup.; 78 leaves); *Codex Ambrosianus* C (Milan, Biblioteca Ambrosiana, I 61 sup., ff. 90, 91); *Codex Ambrosianus* D (Milan, Biblioteca Ambrosiana, G 82 sup., ff. 209/210, 451/452, 461/462); *Codex Ambrosianus* E (Milan, Biblioteca Ambrosiana, E 147 sup., ff. 77/78, 79/80, 111/112, 113/114, 309/310) + Vatican City, Biblioteca Apostolica Vaticana, Vat. lat. 5750, ff. 57/58, 59/60, 61/62); *Codex Carolinus* (Wolfenbüttel, Herzog August Bibliothek, Guelf. 64 Weiss., ff. 255, 256, 277, 280); *Codex Bononiensis* (Bologna, Archivio della Fabbriceria di San Petronio, Cart. 716/1, n° 1, *olim* 353; 2 leaves).

[4] Zironi, *Monastero longobardo*, 67–68.

[5] Lo Monaco, In codicibus, 681–682.

[6] Mai and Castiglioni, *Ulphilae partium* (this preliminary publication includes *specimina* from different Gothic palimpsests); Castiglioni, *Ulphilae Gothica*; Castiglioni, *Gothicae ... ad Romanos*; Castiglioni, *Gothicae ... ad Galatas*; Castiglioni, *Gothicae ... ad Thessalonicenses*.

[7] The discovery was reported by Pfeiffer, Germanistische Funde, 973–974.

fragment.[8] In 1936, Jan de Vries published a facsimile edition of the Ambrosian manuscripts which testifies to the poor state of their script. Like the Milan and Turin leaves, the Vatican fragments (part of the ms. *Ambrosianus* E) were also treated—under the direction of Angelo Mai—with tincture of nutgall, in order to decipher the underlying text. The photographic reproduction of 1906[9] shows the bad state of the Vatican palimpsest.

As may be expected, the condition of the Gothic manuscripts has not improved since these endeavours, and in several places the writing is now illegible to the naked eye. The combination of scraping—to enable reuse of the parchment in the Middle Ages—and reagents have resulted in the loss of the *scriptio inferior*. The marginal glosses and annotations are in a similar bad condition. Fourteen Gothic annotations to a Latin liturgical manuscript,[10] which transmits mostly Arian texts, have been heavily scraped at an unspecified point in time, and only a few traces of the script remain. Curiously, the fifteen Arian sermons of ff. 40r–77v have not been erased. Presumably the Gothic script represented a more direct and evident connection with the heretical belief than the Latin texts.

More fortunate has been the fate of the *Codex Carolinus*, which suffered from minor damage in the Herzog August Bibliothek of Wolfenbüttel, where it was discovered in 1755. Franz Anton Knittel, who deciphered and published the text in 1762,[11] refrained from using chemical reagents.[12] The online digitalised images of these leaves show how the *scriptio inferior* is still clearly legible.[13]

The palimpsest from Bologna, a parchment bifolio (ca. 330 × 480 mm), was discovered in 2009 in the archive of the Fabbriceria of San Petronio in Bologna, where it is still preserved.[14] The Latin *textus superior*, which is part of the eighth book of Augustine's *De civitate Dei*, covers another—hitherto unknown—text, in Gothic script and language. Rosa Bianca Finazzi and Paola Tornaghi, who published the *editio princeps* in 2013, called this find *Gothica Bononiensia*.[15]

On the basis of cultural considerations and of palaeographical and codicological analysis, the Gothic fragment from Bologna may be dated to the first half of the 6th century. It was overwritten in a northern Italian centre (Verona?) with Augustine's text, between the end of the 6th and the first half of the 7th centuries.[16] Its subsequent history is unknown, until its reuse as the cover for a booklet of accounts in 1635 (according to the date on the booklet). The fragment is now in a poor condition: the *scriptio inferior*, although not treated with chemical reagents, is extremely faded and is often hidden by the overwritten Latin letters. In addition, the parchment is covered by some modern scripts and heavy smudges.

Considering the scanty attestations of the Gothic language, the importance of the Bologna fragment is enormous, not only for Germanic philologists and linguists, but also for church historians and medievalists. Unlike almost all the Gothic manuscripts, it does not transmit part of Wulfila's Biblical translation. According to the present state of research, it represents the only original, i.e. non-translated, text in Gothic (probably a sermon or liturgical prayer). For this reason, it seemed highly desirable to decipher it in full, as it could offer new insights into the language and culture of the Goths.

More generally, the investigation of the Gothic palimpsests with modern technologies appears now to be essential in order to provide a new edition of their texts. In the last ten years, some preliminary tests on these important witnesses of the early medieval written culture have shown how fruitful such a multispectral analysis

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8 Bellocchio and Dolcetti Corazza, Codex Taurinensis, 70.

9 Ehrle, *M. Cornelii Frontonis et aliorum reliquiae*, 57–62.

10 Verona, Biblioteca Capitolare, LI (49) + Venice, Collezione Giustiniani Recanati, CE 12.16 (end of the 5th/beginning of the 6th century). The Latin manuscript originally transmitted twenty-seven annotations, see Gryson, *Le recueil arien* (with photographical reproductions); Falluomini, Un codice miscellaneo.

11 Knittel, *Ulphilae versio Gothica.*

12 Lo Monaco, In codicibus, 667 and 671.

13 http://diglib.hab.de/wdb.php?dir=mss/64-weiss (accessed 01.07.2023).

14 The fragment was found by Armando Antonelli, who gave the first transcription and analysis of the *textus superior*. The *scriptio inferior* was discovered by Maddalena Modesti and Annafelicia Zuffrano in 2010: see the history of the discovery and the description of the palimpsest in Aimi *et al., Frammento bolognese*. Images of the fragment were sent to the Vatican Library, where Delio Vania Proverbio, the *Scriptor Orientalis*, recognised the *scriptio inferior* as Gothic (Finazzi and Tornaghi, *Gothica Bononiensia*, de la découverte, 30).

15 Subsequent editions, based on new images of the fragment, were published in 2014 (Falluomini, Zum gotischen Fragment) and in 2017 (Falluomini, Zum gotischen Fragment II). The reading of some letters is still doubtful.

16 Modesti, Tra Goti, 75.

could be.[17] As the following pages will show, new data have also emerged from the multispectral, spectrographic, and philological analysis of the Gothic fragment from Bologna, conducted by the team of the CIMA (Simon Brenner and Bernadette Frühmann, under the direction of Heinz Miklas) and by myself in February 2018.

[C. Falluomini]

MULTISPECTRAL ANALYSIS

Multispectral Imaging (MSI) has proven a valuable tool for the recovery of faded or erased text in historic manuscripts.[18] By extending both the spectral range and the spectral resolution of human vision, which is restricted to about 400 to 700 nm and relies on only three distinct colour receptors for red, green, and blue, the contrast between visually similar surface points can be increased. In the case of the fragment of Bologna, the challenge was to increase the readability of the Gothic underwriting of the palimpsest, i.e. to emphasise the difference between the *scriptio inferior* and the background, as well as the difference between the *scriptio inferior* and the *scriptio superior* in areas where they are closely interlaced.

This fragment was imaged with CIMA's portable Multispectral Imaging system,[19] which is shown schematically in Figure 1a. In the imaging process followed, the manuscript is illuminated with multispectral LED panels capable of producing eleven narrow spectra in the ultra-violet (UV), visible and near-infra-red (NIR) ranges. The individual spectra are shown in Figure 1b. The light reflected from the manuscript is recorded with an achromatic middle format camera (Phase One IQ260 Achromatic), which provides a resolution of 60MP and a spectral response from UV to NIR radiation. An optical filter wheel in front of the camera lens enables the application of a UV-blocking or -permitting filter, thus enabling the acquisition of a UV-fluorescence and -reflectography image respectively. Additionally, a true colour image and raking-light images under white LED illumination as well as a colour-separated UV-fluorescence image are acquired using a full-format RGB camera (Nikon D4). To enable a full automation of the acquisition despite the use of two cameras, a linear unit moves the manuscript back and forth between them.

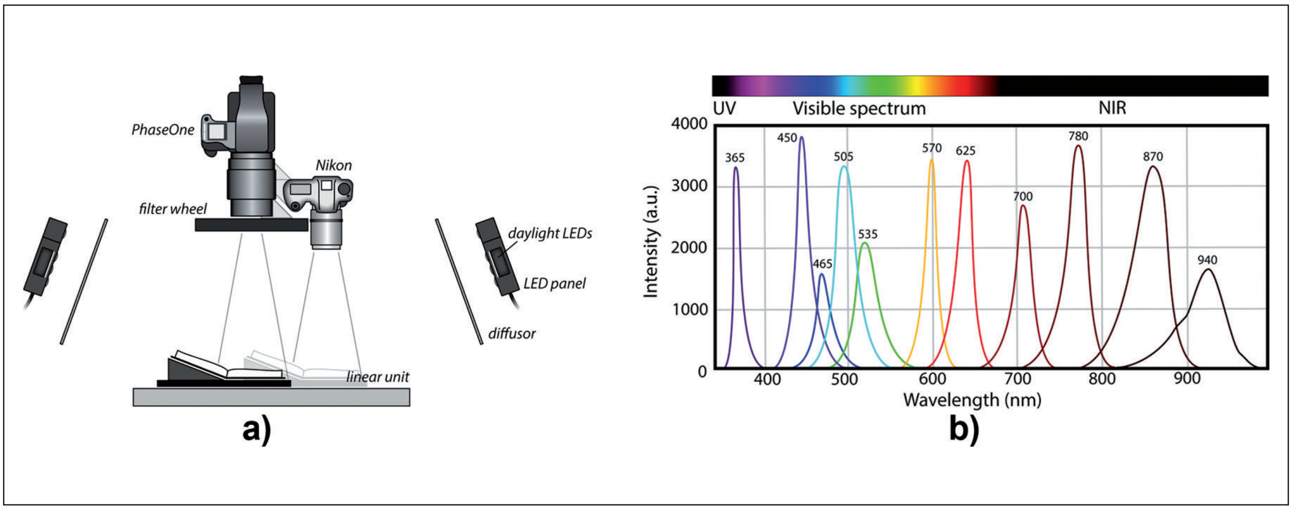

Fig. 1: a) schematic of MSI setup; b) spectra used
(© Simon Brenner, TU Wien)

[17] See Falluomini, Glosse gotiche.
[18] See Arsene *et al.*, High Performance Software, 73–96; Mindermann, *Hyperspectral Imaging*.
[19] Hollaus *et al.*, Investigation of Ancient Manuscripts, 93–96.

As the chemical analysis will show (see below), both the Latin *scriptio superior* and the Gothic *scriptio inferior* are written in iron gall ink. As these types of ink inhibit the fluorescent properties of the parchment where applied, their residues typically show the highest contrast in UV fluorescence images. Figure 2 shows an example where the visibility of the *scriptio inferior* is already improved in the UV fluorescence image. However, *scriptio inferior* and *scriptio superior* appear very similar in this image, making highly interlaced passages difficult to read. This problem can be addressed by using the information contained in all of the acquired images by means of statistical methods.

A prerequisite for such statistical operations on pixel level is the accurate alignment of the individual layers, i.e. a given pixel position corresponds to the same point on the physical object in each of the MS layers. Aberrations from this perfect alignment are caused by chromatic aberration (different refraction angles for different wavelengths in the camera lens), changing of optical filters, mechanical impacts, or deformation of the manuscript itself due to changes in temperature and humidity. To be able to compensate for all of those error sources, a deformable region-based image registration using the MIND descriptor[20] was used. This approach was originally designed for the registration of multi-modal medical images, where similar problems are faced.

Principal and Independent Component Analysis (PCA and ICA) are well-known methods for the transformation of the information contained in a multispectral image stack to a set of components, which are statistically uncorrelated or independent respectively. This helps to isolate different sources of information, which in the case of a manuscript refers to the different layers of text and the substrate. The information contained in the MS images can thus be condensed to a few expressive component images.

The combination of different MS layers or statistical components in false colour images allows the simultaneous display of different aspects of an image, leading to an increased level of interpretability. See Figure 2c for an example, where the UV-fluorescence image, the broadband-illuminated image, and the independent component that is isolating the *scriptio inferior* are displayed in the R, G, and B channel of a colour image. Note that the *scriptio superior*, *scriptio inferior*, and background are shown in clearly distinguishable colours.

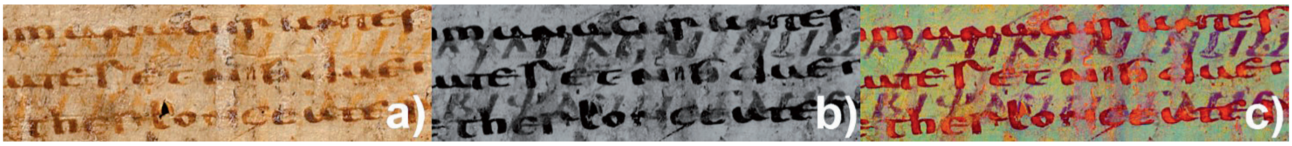

Fig. 2: Bologna, Cart. 716/1, n° 1, f. 2r, lines 20–21,
a) true colour image; b) UV-fluorescence image (achromatic); c) false colour image (© Simon Brenner, TU Wien)

However, in the most challenging parts of the fragment, including line 15 on folio 1v which will be addressed in this paper, PCA and ICA were not able to sufficiently increase the contrast of the *scriptio inferior*. We therefore applied the Linear Discriminant Analysis (LDA), which is a supervised machine learning method for classification. Supervised, in this context, means that the algorithm has to be provided with examples of pixels that are labelled with the class they belong to. Although Hollaus *et al*.[21] proposed a method for automatic labelling, it was not applicable here, due to the close spatial arrangement of the two layers of text. We therefore resorted to a manual labelling of examples for the *scriptio superior*, *scriptio inferior*, and background, by brushing. The classifier trained with the examples provided then predicts a class for each pixel of the MS image, accompanied by a prediction confidence. These per-pixel class confidences can in turn be interpreted as images and displayed in false colours.

[20] Heinrich *et al.*, MIND, 1423–1435.
[21] Hollaus *et al.*, Enhancement of Multispectral Images, 145–149.

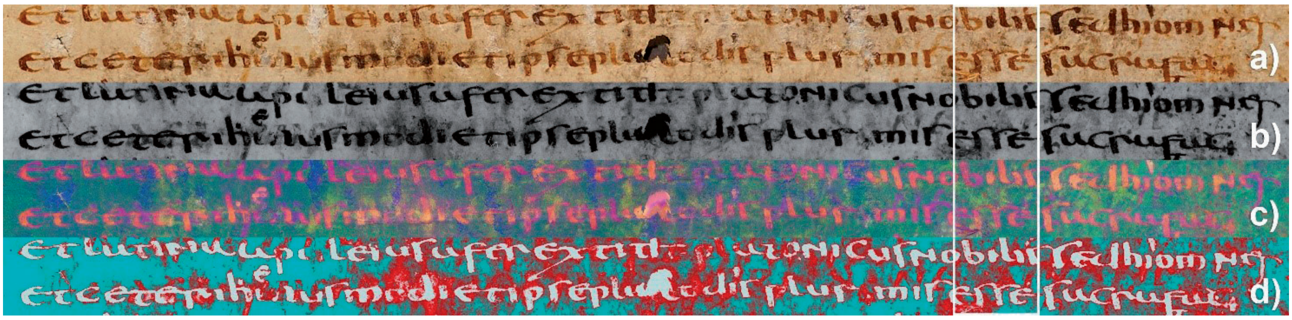

Fig. 3: Bologna, Cart. 716/1, n° 1, comparison between the natural colour image (a), the UV fluorescence image (b), a false colour image based on principal components (c), and a false colour image based on LDA confidences (d).
Note while the LDA result is still difficult to read due to some considerable background noise, it is the only result that clearly shows the letters of the *scriptio inferior* in a distinctive colour
(© Simon Brenner, TU Wien)

[S. Brenner]

MATERIAL ANALYSIS

In addition to Multispectral Imaging, the CIMA team employed X-ray Fluorescence analysis (XRF) for the material investigations of this Gothic fragment.[22] This analytical method was used in a manner that is non-destructive and non-invasive, meaning that there were no changes made to the objects in any way before, during, or after the investigations. This analysis provides details regarding the chemical elements present in the area of interest. However, the great penetration depth of X-ray radiation must be considered (approx. 1 mm for parchment). While the simultaneous measurement of the support and rear of a folio cannot be avoided, further penetration into deeper layers of the manuscript or supporting cardboard can be avoided using a PMMA (polymethyl methacrylate) plate. Furthermore, in many cases the diameter of the X-ray beam is wider than the character-stroke. Therefore, it is essential to select the area of analysis carefully in order to avoid possible interference from or influence by surrounding materials. In order to understand the results from the points of interest (e.g. paint or ink layers), the spectra from the unpainted parchment must always be subtracted.

The investigations in this project were executed with a spectrometer Type ELIO (by XGLab, Milan, Italy), which is a device designed for application in the field of arts. The system head consists of a 4 Watt X-ray rhodium (Rh) tube and a silicon drift chamber detector (SDD) with an active area of 25 mm² enclosed by a thin beryllium window. The X-ray beam has a diameter of about 1 mm, ideal for investigating small lines, e.g. in the script. Two integrated laser pointers of the positioning system (690 nm) enable the selection of the area of analysis and adjustment of the point of focus (optimal working distance) between the instrument and the object. Their intersection coincides with the axes of the stimulating X-ray beam and the detector. These operations can be performed and recorded automatically by the integrated camera of the instrument (examples are shown in Fig. 5a–d). The settings for the measurements of this fragment were of 40 kV, 60 µA, and 60 seconds acquisition time. The results were processed using the Elio Software version 1.6.0.29. The XRF measuring head is mounted on a tripod and can thus be safely positioned over the object (Fig. 4).

[22] On chemical materials analysis carried out by CIMA researchers see Frühmann *et al.*, Multianalytical Approach; Frühmann *et al.*, Zur Bestimmung der Tinten. The resulting information facilitates the understanding of the manufacturing process of a manuscript, including support (parchment), inks, pigments, dyes, and binding media. The chemical investigations are expected to expand our knowledge of the materials used for the manuscripts, and—collected and compared in a database—to contribute to the dating and localising of the objects.

Fig. 4: a) portable XRF spectrometer Elio during the measurements of the fragment Cart. 716/1, n° 1 in Bologna; b) f. 2v: measurement points in the parchment (MP1), *scriptio superior* (MP2, 4 and 5), *scriptio inferior* (MP3), as well as the marginal notes (MP6 and 7) (© Bernadette Frühmann *et al.*, Academy of Fine Arts Vienna)

However, there are several limitations in the application of XRF for the identification of inks and pigments. The analyses were done in air; for this reason, the peaks of the argon K-lines are always present in the spectra. Furthermore, only elements with an atomic number higher than 16 (sulphur) can be detected by XRF in air. Consequently, only inorganic components can be characterised. It is also barely possible to characterise and identify mixtures of inorganic pigments.

The XRF analyses of the parchment yielded elements like sulphur (S), low intensities of chlorine (Cl), potassium (K) and iron (Fe), but high amounts of calcium (Ca). Calcium probably derives from the treatment of the parchment with lime ($Ca(OH)_2$) during the manufacturing process, or from whitening the folio with chalk ($CaCO_3$) before usage. Low values of potassium (K) are intrinsic to the chemical composition of the parchment, as well as sulphur (S). Iron (Fe) is present due to the parchment preparation (removal of the hair with an iron knife or polishing of the skin).[23]

[23] Thompson, *Materials and Techniques*, 24–30.

The XRF results of the investigations of the black/brown inks in the *scriptio superior* showed higher amounts of iron (Fe) compared to the parchment, in combination with sulphur (S) and potassium (K), as well as small amounts of copper (Cu) (Fig. 5). This can be related to iron gall ink[24] which would have contained copper. The marginal notes on f. 2v (MP6 and MP7) show small differences in the ratio of potassium (K) and iron (Fe) in comparison with the *textus superior* (Fig. 5e), which proves that different inks were used. However, the spectra of MP6 and MP7 are identical.

XRF investigations of the *scriptio inferior* reveal only iron (Fe) on the *recto* as well as *verso* side of the folio. An example is shown in Figure 5c. This may also be an indication of the application of iron gall ink. As the ink is for the most part almost deleted from the parchment, identification is rather difficult.

On the left side of f. 1v, a cross is detectable between the lines in the upper part of the text (Fig. 5d), which has a dark brown/black colour, different from the Latin text. The XRF results yielded only very small differences to the parchment, which indicates a carbon black ink in this case.

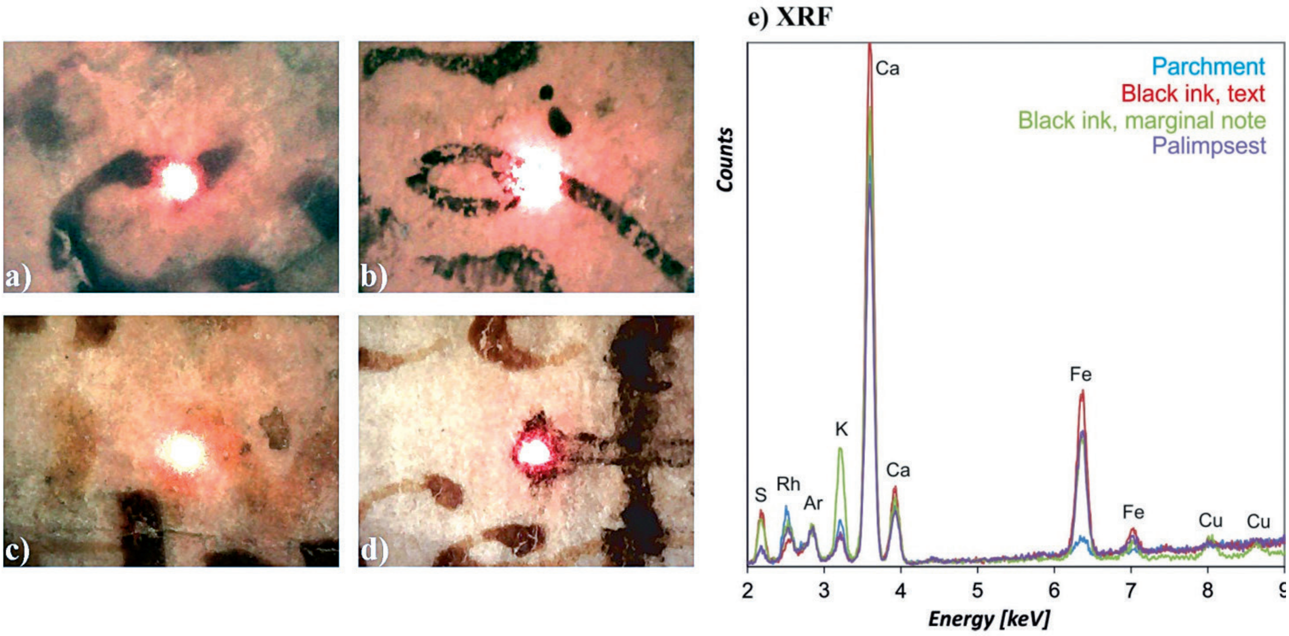

Fig. 5: images of the investigated areas and XRF spectra of the measurements in the fragment Cart. 716/1, n° 1. a) measurement point (MP) in the brown-black *scriptio superior*, red spectrum in e); b) MP in the marginal note, green spectrum in e); c) MP in the *scriptio inferior*, yellow spectrum in e); d) MP in the black ink of a cross symbol between the lines on the left side of f. 1v; the results are similar to the parchment—therefore a carbon black ink is likely; e) XRF spectra of the inks compared with the spectrum of the parchment (blue). The elements S (sulphur), K (potassium), Fe (iron), and Cu (copper) are characteristic for iron gall ink. The varying ratios of K/Fe correspond to the application of different inks
(© Bernadette Frühmann *et al.*, Academy of Fine Arts Vienna)

The XRF results for this fragment verified the identification of three different inks: an iron gall ink containing copper (Cu) in the Latin *scriptio superior*, an ink of similar composition but different ratio between potassium (K) and iron (Fe) in the more recent marginal notes, and a carbon-based ink for the symbol between the text lines. The ink of the *scriptio inferior* was most likely an iron gall ink as well, but due to the low levels present, it cannot be described in detail.

[B. Frühmann]

[24] Hahn, Analyses of Iron, 41–64.

PHILOLOGICAL ANALYSIS

The multispectral analysis of the Bologna fragment has permitted verification of some previous conjectures and readings of the Gothic text. Among the passages that have been reanalysed, there is line 15 on f. 1v. Finazzi and Tornaghi[25] deciphered the last word of this line as *liwane*, genitive plural of the—hitherto unattested—Gothic word for 'lion'. This word fits the context perfectly, since it is a passage from Daniel 6:22–27 (Daniel in the lions' den). The space between 𐌴 ‹e› of the previous word 'b[a]*l*jondane'[26] 'roaring' and the supposed 𐌻 ‹l› of *liwane* is, however, too wide (framed in Fig. 3) and, in my second edition of this fragment,[27] I proposed reading '*l*aiwane', thinking that what has been read as 𐌻 ‹l› is instead an 𐌰 ‹a› (the two letters are very similar) and that the letter 𐌻 ‹l› occupies the space between 𐌴 ‹e› and 𐌰 ‹a›. Traces of the letter 𐌻 ‹l› emerge now thanks to the false colour image, which shows that the conjecture "*l*aiwane" is indeed the form attested in the manuscript (see Fig. 3c and 3d).

The origin of the term for 'lion' is not clear. It is obviously a borrowing, which could theoretically derive from Lat. *leo*, *leonis* (a loanword in its turn[28]), Gr. λέων, λέοντος, or another unknown language. This animal was not indigenous in the territories where the Goths came from (Northern Europe) and settled (Dacia and Moesia Inferior), but it was probably known through the *venationes*, i.e. the entertainments typical of the Roman Empire that involved the hunting and killing of wild animals.[29] *Leones* '(the) lions' was also the name of Caracalla's bodyguards, recruited among Scythians (probably Goths) on the Danube border.[30] In such contexts, the Goths might have learned and spread the Latin term.

The term *laiwane* is a genitive plural of a weak masculine or neuter substantive (with the stem suffix -*an*-), as the ending suggests and the connected participle form 'b[a]*l*jondane' confirms. Before reconstructing the nominative form, it is necessary to examine the word from a graphic-phonetic point of view and in relationship with other loanwords. Goth. ‹ai› [e] usually renders Lat. *e* or Gr. ε in loanwords; Goth. ‹w› is instead problematic in this context. In diphthongs, ‹w› represents Lat. ‹u› (as in Goth. *kawtjo* < Lat. *cautio* 'caution') and Gr. ‹υ› [u] (as in Goth. *aiwlaugia* < Gr. εὐλογία 'blessing', 'benefaction'; Goth. *paraskaiwe* < Gr. παρασκευή 'day of preparation'). Its presence in *laiwane* is therefore difficult to explain in relation to Lat. *leo*, *leonis* or Gr. λέων, λέοντος.

The phonetic and morphological adaptation to the Gothic language suggests that the term is an old borrowing, perhaps from Latin, a language with which the Goths came into very early contact.[31] In fact, borrowings from Greek, which may be ascribed to Wulfila's time, usually retain a form close to the original, as in the case of Goth. *laigaion* 'legion' (< Gr. λεγεών vs. Lat. *legio*). On the basis of such considerations, the nominative form may be reconstructed as **laiwa* (masculine) or **laiwo* (neuter). **Laiwo* would be phonetically closer to the supposed donor form *leo*.[32] In the other Germanic languages, the form for 'lion' is masculine, but a hypothetical neuter in Gothic might be justified as independent borrowing. Different gender is attested, for instance, in Goth. *skaurpjo* 'scorpion', weak feminine, in comparison with Old High German *scorpio*, weak masculine, both from Lat. *scorpio*,[33] masculine. On the other hand, the masculine form **laiwa* is preferable because the neuter gender for an animate being—and particularly for the lion—seems to be anomalous.

Goth. **laiwa* (or, less likely, **laiwo*), as already noted, exhibits the problematic -*w*-. This Gothic word might stem from Vulgar Latin (?) **leuo*, with irregular insertion of the labiovelar glide after the front vowel.[34]

25 Finazzi and Tornaghi, *Gothica Bononiensia*, de la découverte, 42.

26 Quotation marks indicate the forms given in the critical edition (Falluomini, Zum gotischen Fragment II, 287); within the quotations, the letters which are underlined are only partially visible; italics are used for conjectures; the letter between '[ ]' is lost due to material reasons.

27 Falluomini, Zum gotischen Fragment II, 287–288.

28 Ernout and Meillet, *Dictionnaire etymologique*, 626.

29 On the distribution of lions in Antiquity, see Blažek, Hic erant leones, 66–68.

30 See Strobel, Strategy and Army Structure, 279, with additional literature.

31 See Corazza, Parole latine, *passim*.

32 Loanwords are integrated in different manners: Gothic may maintain the phonetic form of the original word and change the gender (as in the case of *skaurpjo* 'scorpion', see below) or maintain the gender and change the phonetic form (see *aikklesjo* 'church', feminine < Lat. *ecclesia* or Gr. ἐκκλησία, feminine).

33 Corazza, Parole latine, 77.

34 It is not normal to have the glide -*w*- after a front vowel in Latin, but some examples are present in Latin texts from Britain (Adams,

However, a similar evolution is not attested in the Latin spoken in the regions of Dacia and Moesia Inferior.[35] There is a second, more likely hypothesis to explain the form **laiwa*: the insertion of the labiovelar glide in hiatus might be the result of an adaption of the borrowed form into the Gothic language.[36] Other Germanic languages show a similar insertion: Old High German *leuuo* (9th century) and Old Dutch *lewo* (10th century). In these cases, -*w*- has been explained as secondary addition, independent from the Latin form.[37] An analogous adaptation may also have occurred in Gothic.

Before the discovery of the Bologna fragment, some scholars[38] had suggested—on the basis of the Proto-Slavic form **lьvъ* 'lion'—the reconstruction of the Gothic form **liwa*,[39] from which the Proto-Slavic term would be derived. Goth. -**i*- was advocated on the basis of the Proto-Slavic vocal -**ь*-, which may not stem from a short -*e*- (Goth. ‹ai›) but only from a short -*i*- (Goth. ‹i›).[40] Thus, if the Proto-Slavic term really derives from a Gothic form, this is presumably different from that attested in the *Gothica Bononiensia*.[41]

To conclude, the application of sophisticated methodologies to the Gothic palimpsest from Bologna has allowed parts of the text that were previously illegible to be recovered. The philological investigation has brought a new word to light (**laiwa* or, less likely, **laiwo* 'lion'), which had never been attested before the discovery of this fragment. It is a borrowing, probably from Lat. *leo* 'lion'. Its phonetic and morphological adaptation suggests a long acquaintance of the Goths with the lion or—most probably—with its designation.

[C. Falluomini]

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Social Variation, 113–118) and earlier from Pompei (Väänänen, *Introduzione al latino*, 96).

35 Mihăescu, *Langue latine.* I wish to thank James Noel Adams ([†] Oxford University) and Giovanbattista Galdi (Ghent University) for their very kind and detailed reply to my questions about this phenomenon in Vulgar Latin forms of Dacia and Moesia Inferior.

36 Motivated by the front vowel [e] (‹ai›)? This hypothesis could also explain the Gothic form **alew* 'oil' (*alewa*- in compounds), which exhibits the problematic insertion of -*w*- after [e:] ‹e› (Pagliarulo, Etymology). A labiovelar glide in hiatus is also present with the suffix -*(w)isk* (as in *haiþiwisks* 'wild'), according to Krahe and Meid, *Germanische Sprachwissenschaft*, 196. On the other hand, Goth. *saijands* exhibits the insertion of -*j*- between ‹ai› and ‹a›. Or is the insertion of -*w*- motivated by a possible back vowel [o:] (‹o›)? In this case, the form **laiwo* vs. **laiwa* would be preferable. The Gothic examples of vowel insertion in hiatus are too few to draw a phonetic rule.

37 See Bremer, Ahd. *Leo*, 384–387 (see also EWA, 1218–1222); EWN, 196–197. Thanks are due to Vittoria Dolcetti Corazza (Turin University), Heiner Eichner (Vienna University), Sergio Neri (Basel University) and Roland Schuhmann (Sächsische Akademie der Wissenschaften zu Leipzig) for discussing the origin of this word with me. All possible errors are, of course, my responsibility alone.

38 Stender-Petersen, *Slavisch-germanische Lehnwortkunde*, 361–362; Blažek, Hic erant leones, 88; Pronk-Tiethoff, *Germanic Loanwords*, 136.

39 The element -**liwa*-, attested in the Gothic onomastic material, has nothing to do with the word for 'lion'. It derives from Germ. **leuƀa*- 'dear' (Francovich Onesti, *Nomi degli Ostrogoti*, 120).

40 Stender-Petersen, *Slavisch-germanische Lehnwortkunde*, 362. By contrast, Mallory and Adams (*Encyclopedia of Indo-European Culture*, 356) assume that the Germanic word originally stems from Slavic. There are, however, insufficient elements to support this hypothesis. On other etymologies of the Slavic word, see also Černych, *Istoriko-etimologičeskij slovar'*, I, 471.

41 It seems likely that **liwa* may be a late Gothic form, given the development of Goth. [e] ‹ai› in [i] ‹i›. This development is also found in some forms attested in Gothic manuscripts (as in 2 Cor 2:13, *Ambrosianus* A: *Makaidonja* against *Ambrosianus* B: *Makidonja* for Gr. Μακεδονία).

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