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Article

Towards a Typology of the Use of Coloured Ink in Old Georgian Manuscripts

Jost Gippert | Frankfurt am Main

A common trait of most parchment manuscripts connected to Christian traditions is that in contrast to the black or dark brown ink that is dominant in them, some elements are written in a second colour, usually red. This is also true for the bulk of Old Georgian manuscripts, which are spread in various repositories in Georgia and abroad.¹ As the conditions and purposes of the use of ‘rubrics’ in Georgian manuscripts have not as yet been studied in detail, it seems sensible to establish a basic typology in order to facilitate future research.²

1. Decoration and Demarcation

A typical use of red ink in Old Georgian manuscripts is decorative, as in the braid-like bands of two colours we often meet

at the beginning or end of a given manuscript; such bands can be found, for example, in the Sinai mss. no. N 2 (Fig. 1) and 32-57-33 (Fig. 2), the latter representing the oldest dated Georgian manuscript known so far.³

The same type of coloured bands can also be found demarcating different elements of texts, such as in fol. 84r of the Sinai mss. no. 15 (Fig. 3), where it serves to separate the final verses of the Gospel of Matthew from the scribe’s colophon (in smaller letters). This contrasts with fol. 224v of the same manuscript (Fig. 4), where although a similar band is placed after the colophon (of the Gospel of Luke), the end of the main text is only indicated by a few neume-like scratches in red ink.



Fig. 1: Sin.geo. N 2, fol. 1r (detail)

¹ Within Georgia, most Old Georgian manuscripts are stored in the K. Kekelidze Institute of Manuscripts (now the National Centre of Manuscripts, <http://www.manuscript.ge/index.php?m=7&ln=eng>), Tbilisi, and the Kutaisi State Historical Museum (<http://www.histmuseum.ge/engmain.htm>). Outside of Georgia, larger collections are found in St. Catherine’s Monastery on Mt. Sinai (more than 200 items) and the Greek Patriarchate of Jerusalem (ca. 160 items). Minor collections are kept in European libraries and archives (Vienna, Graz, Paris, Leipzig, Göttingen, Rome, St. Petersburg, etc.). The Old Georgian period extends roughly from the 5th to the 12th century.

² The present study is mostly based on a survey of the Georgian manuscripts kept in St. Catherine’s Monastery that was undertaken during a sojourn

by M. Shanidze, S. Sarjveladze, D. Tvaltvadze, B. Outtier, and the present author on Mt. Sinai in May 2009, in connection with the international project ‘Critical Edition of the Old Georgian Versions of Matthew’s and Mark’s Gospels-Catalogue of the Manuscripts Containing the Old Georgian Translation of the Gospels’ (project kindly supported by INTAS, Brussels, under ref.no. 05-1000008-8026). The project members are extremely grateful to the monastery librarian, Father Justin, for the kind support he provided.

³ The Georgian manuscripts of Mt. Sinai are described in Garitte 1956; a catalogue of the so-called ‘New Finds’ (of 1975, numbers with a prefixed ‘N’) was provided by Aleksidze et al. 2005.—Ms. no. 32-57-33 is the so-called ‘Sinai polycephalion’ (*Sinuri Mravaltavi*) of 864 AD.

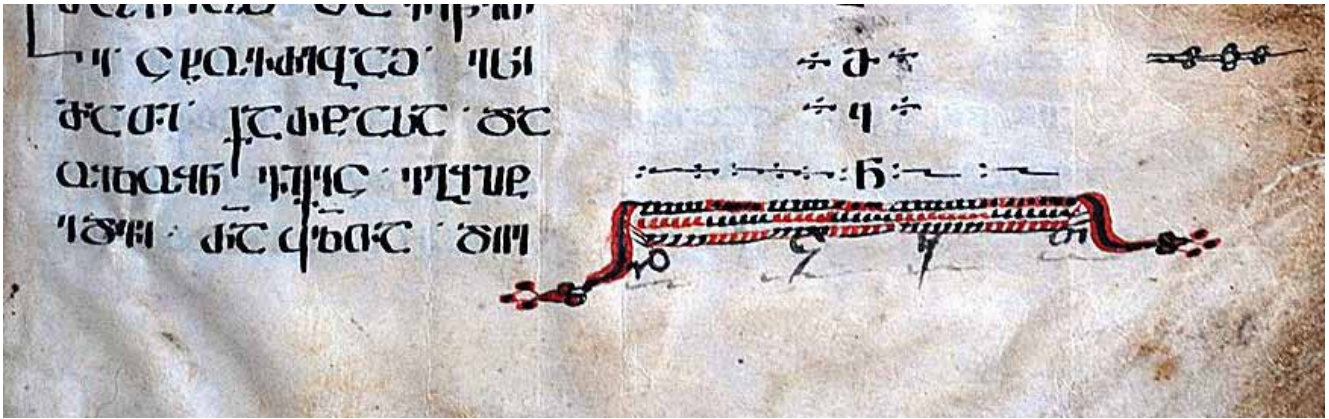


Fig. 2: Ms. Sin. geo. 32-57-33, fol. 273r (detail)

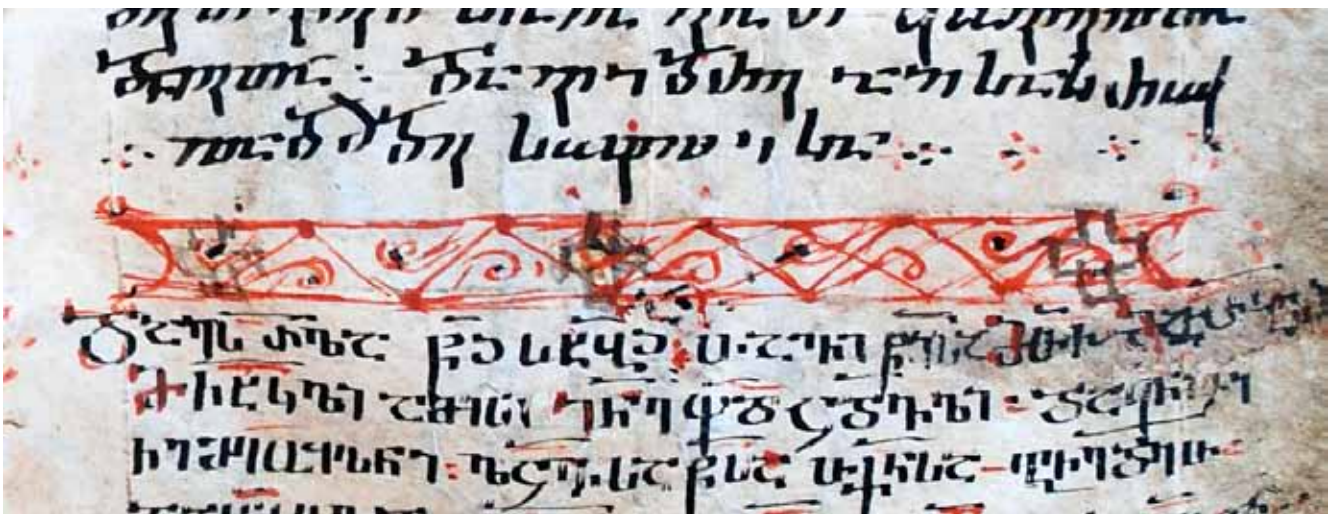


Fig. 3: Sin. geo. 15, fol. 84r (detail)



Fig. 4: Sin. geo. 15, fol. 224v (detail)



Fig. 5: Ms. Kut. 176, fol. 92r (detail)



Fig. 6: Sin. geo. 19, fol. 199v (detail)

By no means is this type of ornamental band restricted to the Mt. Sinai manuscripts. It is also found, for example, in ms. no. 176 of the Kutaisi State Historical Museum (Fig. 5),⁴ where such bands separate the different parts of the so-called Euthalian materials introducing the Pauline Epistles.

A special form of two-coloured ornament of this type consists in rows of crosses added at the end of Gospel texts and the like, as is found in the Sinai ms. no. 19 (Fig. 6).

2. Headings and Titles

A related demarcation purpose can be seen in the many cases of headings and titles being written in red ink, either completely or partly. This feature is widespread, both in Gospel codices such as the Sinai ms. no. 16 (Fig. 7, where we read *s(a)x(a)r(e)b(a)y m(a)t(ē)s t(a)vi* as the heading of the

‘Gospel of Matthew’ in the top margin) and in other manuscripts, as for example the Sinai ms. no. 6, where the heading introduces the legend of St. Christina with the date of the saint’s commemoration (*t(tues)a ivnissa k̄d: camebay ç(mi) disa kristīnaysi mamisa twsisa orbanosisg(an) dionisg(an) da ivliaysg(a)n*, ‘in the month of June, 24: Martyrdom of St. Christina by her father Urbanus, Dios, and Julian’, Fig. 8).

A similar type of marking is extensively used in liturgical codices, such as the Sinai lectionary ms. no. 37 (Fig. 9), where red ink indicates the date of a particular reading (in the given case, *didsa otxšabatsa*, ‘Big Wednesday’, i.e. the Wednesday before Easter, in the 5th line from the bottom), or the type of prayer or hymn to be sung in the service (e.g., *psalmuni ri’z*, i.e. ‘Psalm 116’, 2nd line from the bottom), etc.

⁴ My thanks are due to the staff of the Kutaisi State Historical Museum, who made ms. 176 and several other manuscripts of the collection available to

the members of the above-named INTAS project during a sojourn in Kutaisi in April 2007.

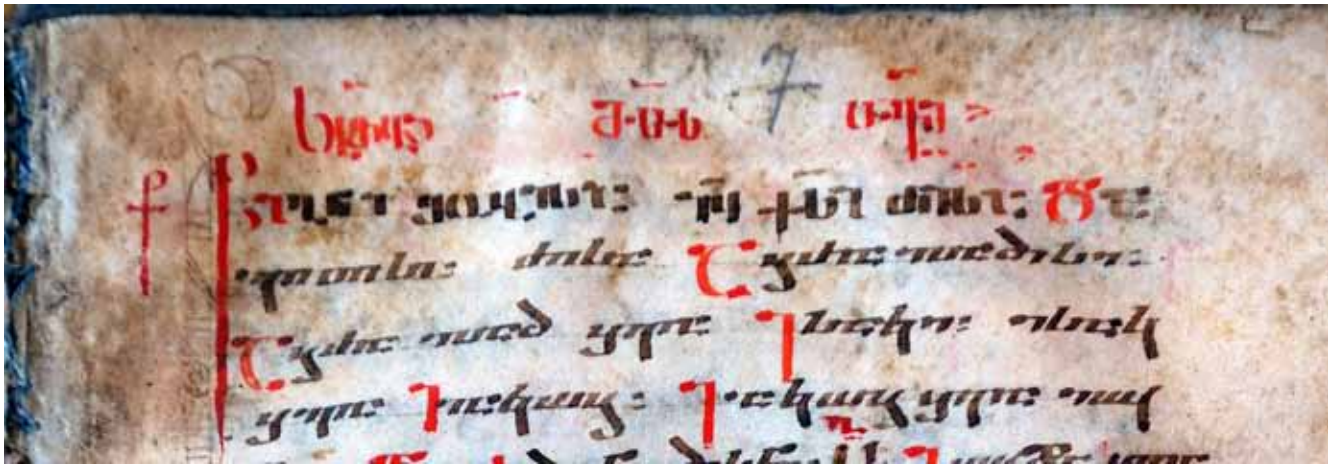


Fig. 7: Sin. geo. 16, fol. 7r (detail)

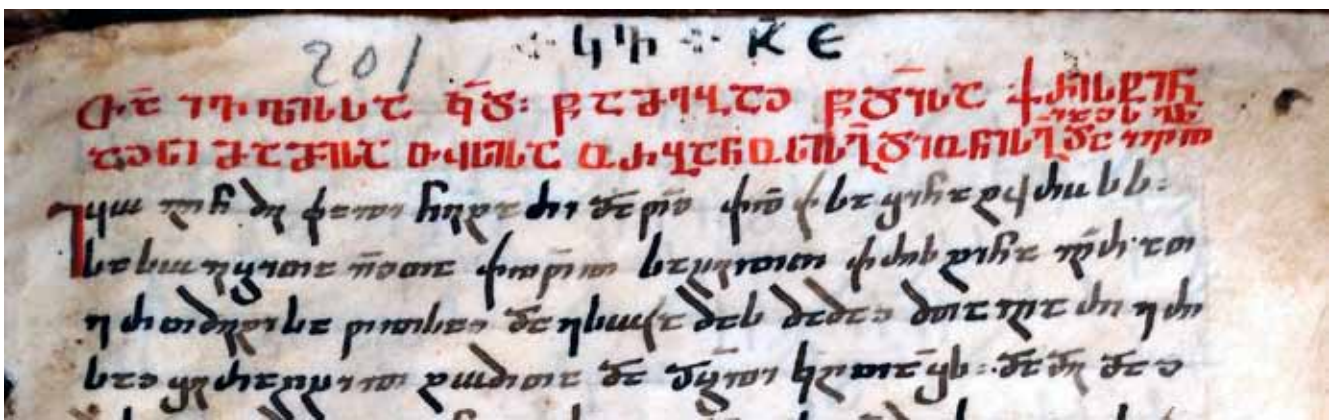


Fig. 8: Sin. geo. 6, fol. 201r (detail)



Fig. 9: Sin. geo. 37, fol. 105r (detail)



Fig. 10: Sin. geo. N 73, fol. 2v (detail)

Likewise, titles written in red ink are often found in hymnaries, where they indicate the type of hymn (*heirmos*) as well as its primary mode, as in line 1 of the Sinai ms. no. N 73 (*samš(a) b(a)t(o)nive: owg(a)l(o)bd(i)tsa: qmay b~*, ‘on Saturdays as well: the *ugalobdit* (*heirmos*), mode no. 2’;⁵ Fig. 10). In special cases, the elements in red ink represent the transcription into Georgian (majuscule) script of the Greek titles of hymns,⁶ as in the Sinai ms. no. N 5 (Fig. 11: *tonen morpi anže(low) ~ τὸν ἐν μορφῇ ἀγγέλου*), and *lowtroṭaṭow ~ λυτρωτὰ τοῦ (παντός)*).

3. Initials and Capitals

Serving a similar function to many of the examples above, single characters outdented into the left margin as initials are often written in red ink, either completely or outlined on a black background, as found in the beginning of the scribe’s colophon of the Sinai Gospel ms. no. 15 (on fol. 292r:⁷ *Ṣaxelita ġ(mrti)s(a)yta* ‘In the name of God’; Fig. 12). In the same way, red ink is also applied to initial letters within lines, usually indicating the beginning of a sentence or phrase, as in the text of the same colophon (*meoxebita ḥ(mid)isa ġ(mr) tismš(o)b(e)lisayta da ḥ(mida)ta maxar(e)belta : m(a)te mark(oz) l(ow)ka da i(ova)nesita : da...* ‘With the help of the holy Mother of God and the holy Evangelists, Matthew, Mark, Luke and John, and ...’), or in the colophon at the bottom of fol. 224v of the same manuscript (Fig. 4: *daesr(u)la ḥ(mida)y s(a)x(ar)e)b(a)y : tavi ḥ(mid)isa l(ow)ka m(a)x(a)*

reb(e)lis(a)y . mčx(re)k(a)li amisi i(oa)ne c(o)d(vil)i locvasa ḥ(mida)sa tk(ow)ensa gvedia, ‘Completed is the holy Gospel, the chapter of St. Luke the Evangelist. The writer of this, sinful Ioane, be remembered in your holy prayer.’).

In these examples, marking the initial letters of the names of the four Evangelists with coloured ink is similar to the use of capital letters in denoting proper names in modern Latin-based orthographies. An even more striking example of this is the list of the ancestors of Jesus Christ at the beginning of the Gospel of Matthew in the Sinai Gospel ms. no. 16 (fol. 7r, Fig. 7), where most of the names have red initials, with the additional enlargement of the initial letters (*Cigni šobisay i(eso)w k(risṭē)si zisa Davitisi: zisa Abrahamisi: Abraham šva Isaki: isaḥ šva Iiaḥob [sic!]: Iaḥob šva iuda...* ‘Book of the birth of Jesus Christ, the son of David son of Abraham. Abraham begat Isaac, Isaac begat Jacob, Jacob begat Juda...’).

4. Referencing and Marginalia

Another typical use of rubrics in Old Georgian manuscripts is related to referencing. A characteristic example can be seen in fol. 314v of the Sinai Gospel ms. no. 16 (Fig. 13), where initials in red ink (in one case, the dots over a black letter) are combined with references that comply with the system of Ammonian (or Eusebian) section numbers (in the given case: *sk̃d* = 224 = Jo. 21,12a–b, *ĩ* = 10th canon; *sk̃e* = 225 = Jo. 21,13, *ĩ* = 9th canon; *sk̃v* = 226 = Jo. 21,14–15a, *ĩ* = 9th canon). A similar use is found on the Georgian flyleaves of ms. no. 303 of the Yerevan Matenadaran (Fig. 14),⁸ here, only initials and canon numbers are written in red, while the section numbers have the same colour as the main text

⁵ The nine odes (*heirmoi*) that constituted the canon of the Georgian (Orthodox) church in the Middle Ages were named after their initial words (in the case in question, *ugalobdit* ‘praise (the Lord)’, Ex. 15,1); cf. Gippert et al. 2007, vi n. 17.

⁶ Cf. Meṭreveli 1971, 31 ff. with regard to this kind of transcript.

⁷ In the following transcripts and translations, the letters in red ink in the originals are marked by underlining.

⁸ Cf. Gippert, and Outtier 2010; my thanks are due to the staff of the Matenadaran, who made ms. 303 and several other manuscripts of its collection available to the members of the above-named INTAS project during a sojourn in Yerevan in September 2007.



Fig. 11: Sin. geo. N 5, fol. 4r (detail)



Fig. 12: Sin. geo. 15, fol. 292r (detail)

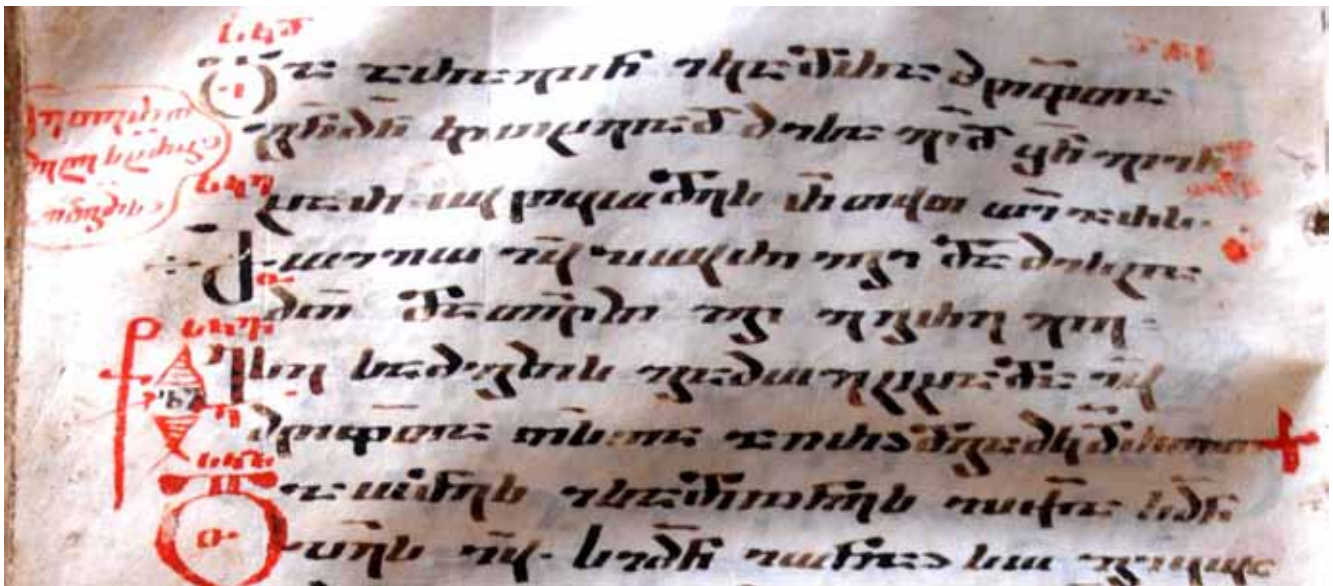


Fig. 13: Sin. geo. 16, fol. 314v (detail)



Fig. 14: Back flyleaf of ms. 303 of the Matenadaran (detail)

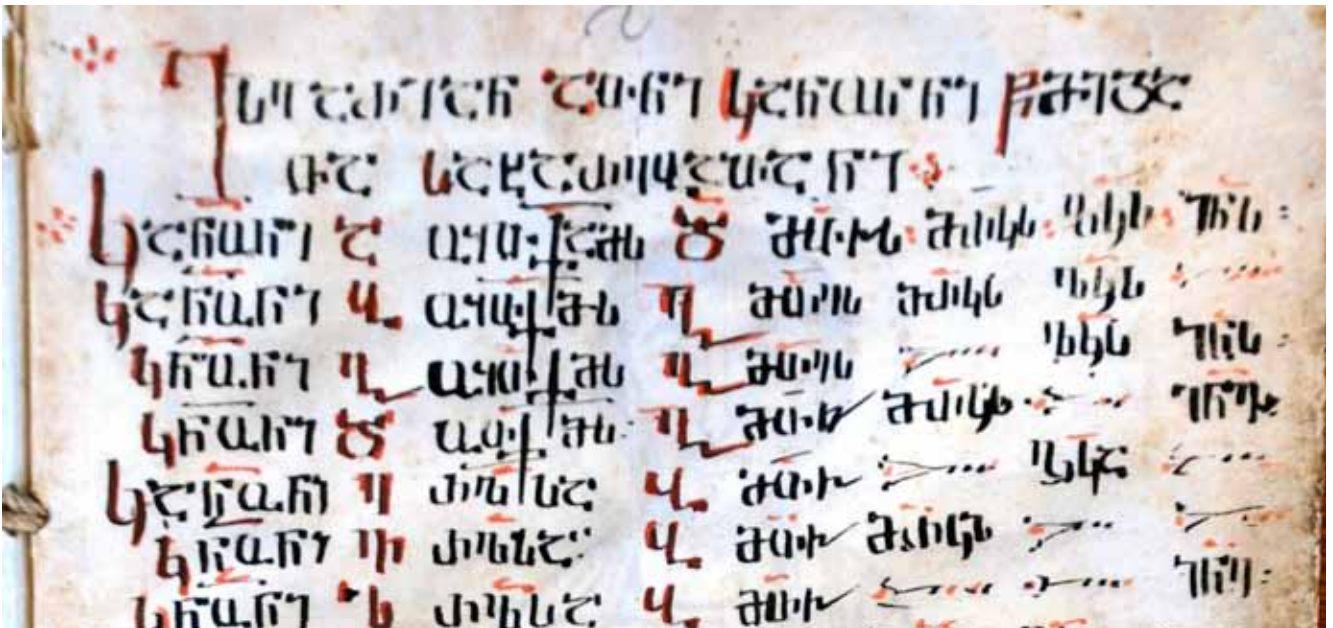


Fig. 15: Sin. geo. 30, fol. 2r (detail)

($sm\tilde{b} = 242 = \text{Lk. } 20,19$, $\tilde{a} = 1^{\text{st}} \text{ canon}$; $s\tilde{y} = 260 = \text{Lk. } 22,1$, $\tilde{a} = 1^{\text{st}} \text{ canon}$; $sy\tilde{a} = 261 = \text{Lk. } 22,2$, $\tilde{a} = 1^{\text{st}} \text{ canon}$).

In the margins of both these manuscripts, we find additional information written in red, either entirely or partially. In the Yerevan flyleaf, this is another element of referencing, viz. the number $\tilde{p}\tilde{z} = 87$ that is attached to the final verse (38) of Lk. 21, decorated with a dotted circle in red. On fol. 314v of Sin. geo. 16 (and elsewhere in the manuscript), one finds a complete gloss written in red that has been added in the margin, in this case with a liturgical background

(*metertmete s(a)x(a)r(e)b(a)y aǵdg(o)mis(a)y*, i.e. ‘eleventh Gospel (reading) of Resurrection (Day)’).

The rubrication of letters that represent numeric units is not restricted to marginal references of the type discussed above. It is also found in the tables listing the Eusebian canons in the front matter of the Sinai Gospel ms. no. 30 (Fig. 15), where all numerical data (as well as some letters) are in red (on a black background): *Ese arian atni kanonni emidata saxarebatani* ∴ *Kanoni a owtk(ow)ams d m(a)tēs ∴ m(a)rk(oz)is ∴ l(ow)k(ay)s ∴ i(ova)n(ē)s ∴ Kanoni b owtk(ow)ams g m(a)tes* [sic!] *m(a)rk(oz)is l(ow)k(ay)s*: ... ‘These are

the ten canons of the Holy Gospels: Canon 1 denotes (all) 4 (Evangelists), Matthew, Mark, Luke, John; canon 2 denotes 3 (Evangelists), Matthew, Mark, Luke ...'

A similar type of rubrication is seen in the Kutaisi ms. no. 176 (Fig. 5), where most of the numerical data comprised in the 'Euthalian' material, that is, the introduction to the Pauline Epistles attributed to a certain Euthalius Bishop of Sulca,⁹ are written in plain red ink; cf. Table 1, which illustrates this with two entries from the so-called 'Testimonia' chapter: a list of sources quoted or alluded to by Paul in his letters (fol. 95v).¹⁰

In comparison with other witnesses of Euthalius' work, which comprises a comprehensive account of the apostle's life in addition to the 'Testimonia' chapter, this must be regarded as a deviation from the author's intention, since Euthalius himself addressed the usage of red ink in several 'programmas' in the given context. According to these explanatory texts, Euthalius clearly intended to distinguish between two types of numerical data by using red and black ink, respectively; cf. the Greek text of the *programma* that is related to the 'Testimonia'¹¹ with its English translation in Table 2. It is true that this *programma* is not contained in the Kutaisi ms. no. 176,

Table 1

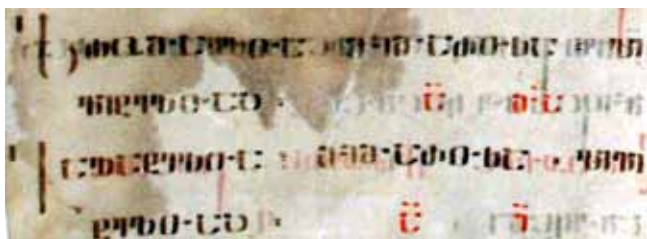


Fig. 1a: Ms. Kut. 176, fol. 95v (detail)

Hromaelta : *mimartsa* : *le-*
viṭeltay : *ã* *m̃a*
Galatelta : *mimartsa* : *levi-*
teltay : *ã* *ĩ*

ႠႡႣႤႥႦႧႨႩႪႫႬႭႮႯႰႱႲႳႴႵႶႷႸႹႺႻႼႽႾႿ
 ႠႡႣႤႥႦႧႨႩႪႫႬႭႮႯႰႱႲႳႴႵႶႷႸႹႺႻႼႽႾႿ
 ႠႡႣႤႥႦႧႨႩႪႫႬႭႮႯႰႱႲႳႴႵႶႷႸႹႺႻႼႽႾႿ
 ႠႡႣႤႥႦႧႨႩႪႫႬႭႮႯႰႱႲႳႴႵႶႷႸႹႺႻႼႽႾႿ

In the [letter] to the Romans:
 from [the book of] Leviticus: 1st 41st;
 in the [letter] to the Galatians:
 from [the book of] Leviticus: 1st 10th.

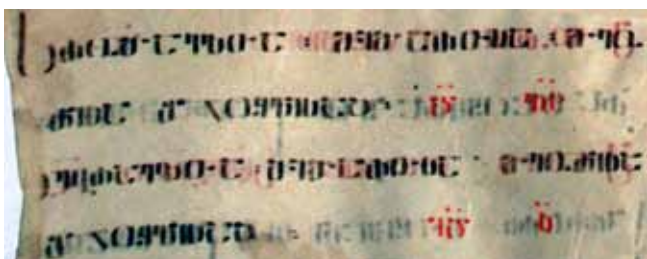


Fig. 1b: Ms. Kut. 176, fol. 95v (detail)

Hromaelta : *mimartsa* : *meo-*
risa šžowlisay : *d̃* *l̃ē*
Hebraelta : *mimartsa* : *meorisa*
šžowlisa : *ĩd* *k̃*

ႠႡႣႤႥႦႧႨႩႪႫႬႭႮႯႰႱႲႳႴႵႶႷႸႹႺႻႼႽႾႿ
 ႠႡႣႤႥႦႧႨႩႪႫႬႭႮႯႰႱႲႳႴႵႶႷႸႹႺႻႼႽႾႿ
 ႠႡႣႤႥႦႧႨႩႪႫႬႭႮႯႰႱႲႳႴႵႶႷႸႹႺႻႼႽႾႿ
 ႠႡႣႤႥႦႧႨႩႪႫႬႭႮႯႰႱႲႳႴႵႶႷႸႹႺႻႼႽႾႿ

In the [letter] to the Romans:
 from [the book of] Deuteronomy: 4th 38th;
 in the [letter] to the Hebrews:
 from [the book of] Deuteronomy: 14th 20th.

⁹ Cf. Willard 2009 for details on this work.

¹⁰ For a thorough account of the given passage and the structure of the Testimonia chapter in general cf. Gippert 2010, 1-2-5.

¹¹ Cf. the edition by Zacagnius 1698, 548–549. Zacagnius' edition was the basis for the text printed in Migne 1860, col. 725 bc.

Table 2

Foreword

I have read through all the epistles of Paul and excerpted from them all the words of quotations and listed them one after another in one place, in turn prefixing the name of the book where they derive from.

Then (follows) a single number, which is in red, initiating the arrangement, and (this number) indicates the running number of the quotation according to each epistle and re-starts again epistle by epistle.

However, (a number) which is in brown and which is (placed) below, is the total number of all (the quotations from) the (given) book, and (it) increases with the lectures up to the end and shows us the number of the quotations from each book.

And to each of these (quotations) I have added the respective number so that you might know how many times the Apostle took a quotation from the book which is mentioned at the same place and (whose name) is placed aside.

And you will find the number in red, arranged once again inside the lectures of the very words of the scriptures of the Apostle.

ΠΡΟΓΡΑΜΜΑ.

Τὰς πάσας ἐπιστολάς ἀναγνοὺς Παύλου τοῦ ἀποστόλου, ἀνειλόμην ἐκεῖθεν τῶν πασῶν μαρτυριῶν τὰ ῥητὰ, καὶ καθεξῆς ἀνεκεφαλαιωσάμην, ἀκολουθῶς προτάσσων τὴν προσηγορίαν τῶν ὄθεν εἰσὶ βιβλίων.

Ἔστιν οὖν ὁ διὰ τοῦ κινναβάρεως ἐκ μονάδος ἀρχό-μενος ἀριθμὸς τὴν τάξιν, καὶ τὴν ποσότητα δηλῶν τῶν καθ' ἑκάστην ἐπιστολὴν μαρτυριῶν, καὶ συναπολήγων πάλιν τῇ ἐπιστολῇ.

Ὁ δὲ διὰ τοῦ μέλανος καὶ ὑποκείμενος τούτῳ, καθολικός ἐστιν ἀριθμὸς πάσης τῆς βίβλου, καὶ συναυξόμενος τῇ ἀναγνώσει μέχρι τέλους, γνωρίζων ἡμῖν τὴν ποσότητα τῶν ἀφ' ἑκάστης βίβλου μαρτυριῶν.

Παρέθηκα γὰρ ἑκάστη τούτων τὸν ἴδιον ἀριθμὸν, ἵν' εἰδέναι ἔχῃς ποσάκις τὴν αὐτὴν εἴληφε μαρτυρίαν ἐκ τῆς μνημονευθείσης ἅμα, καὶ παρακειμένης βίβλου ὁ Ἀπόστολος.

Εὐρήσεις δὲ τὴν διὰ τοῦ κινναβάρεως ἀπαριθμησιν κανονιζομένην τῇ πάλιν ἔνδον παρακειμένη αὐτοῖς τοῖς ῥητοῖς τοῦ ἀποστολικοῦ τεύχους.

where it would fall into the large lacuna between the present fols. 93v and 94r. However, another *programma* of this type has been preserved in this codex, namely, at the bottom of fol. 92r (Fig. 16).¹² Under the title *Zemo ceril ars*: ('Above is written:') it reads: *R(ome)l-igi melnita ars ricxw raodeni ars tavebi mas x(olo) aowçq̄ebs: da r(ome)l-igi çitelita ars : aowçq̄ebs titoeowlisa çignisa çamebata gançesebasa erbamad ...* 'A number that is in black ink denotes only how many chapters there are (quoted). And (a number) that is in red ink denotes the sum of quotations of each book altogether...'¹³

There is no indication why the scribe of the Kutaisi manuscript did not adhere to the principle outlined by Euthalius; elsewhere in the Caucasian tradition it was applied, as seen in the Armenian underwriting of the Georgian palimpsest ms. no. N 55 of Mt. Sinai (Fig. 17). Here, as can clearly be seen even in the monochrome (UV) photograph of the fold

between fols. 28v and 29r,¹⁴ the numbers pertaining to the epistle names are much less distinct than the numbers concerning the book of Leviticus, which strongly suggests that in the erased original they were written in red ink.¹⁵

5. Neumes and other non-linguistic signs

A less common usage of rubrics in Old Georgian manuscripts is the denotation of melodic features with neume-like signs. A good example of this can be found in the Sinai hymnary ms. no. N 73 (Fig. 10).¹⁶ It remains unclear whether the awkward-looking scratches in red ink in the Gospel codex no. 15, fols. 84r and 224v (Figs. 3 and 4), which seem to serve as demarcations or perhaps simply as ornaments, have any relation to the neumes of the hymnaries.

¹² The present passage corresponds to Zacagnius 1698, 542 and col. 720 bc in Migne 1860; cf. p. 107 in the edition of the Georgian version of the Euthaliana by Danelia 1977.

¹³ There are several other passages that deal with the use of colours in Euthalius' materials: in the Greek text, p. 573 / 749C ('ecthesis' to the list of chapters of Romans); 591 / 753 C (the same, I Corinthians); 613 / 757C (II Corinthians); 625 / 759D (Galatians); 635 / 763A (Ephesians); 643 / 765B (Philippians); 650 / 768B (Colossians); 658 / 769D (I Thessalonians); 664 / 773A (II Thessalonians); 671 / 777A (Hebrews); 688 / 781B (I Timothy); 696 / 785A (II Timothy); 704 / 788B (Titus); 707 / 789A (Philemon; the last 13 attestations have no counterparts in the Georgian version).

¹⁴ Cf. the edition of the Armenian layer of the 'Albanian' palimpsests Sin. geo. N 13 and N 55 in Gippert 2010.

¹⁵ For an edition of the Armenian version of the Euthaliana cf. Vardanian 1930. —A preliminary version of the same edition was printed in the journal *Handēs Amsōreay* in subsequent fascicles of the years 1924–1927 under the title *Evt'ali Matenagrowt' iwnk'* (for matters concerning the Pauline Epistles: 1925, cols. 423–434; 515–530; 1926, cols. 1–16; 97–120; 193–208; 289–304; 417–436; 513–524; 1927, cols. 1–12; 97–108; 225–236; 353–366; 481–492; 545–558). —Parts of the Euthalian apparatus were also printed in the so-called Zohrab Bible (Zōhrapan 1805 / 1984).

¹⁶ Cf. Kiknaze 1982 for another Old Georgian manuscript exhibiting neumes.



Fig. 16: Ms. Kut. 176, fol. 92r (detail)

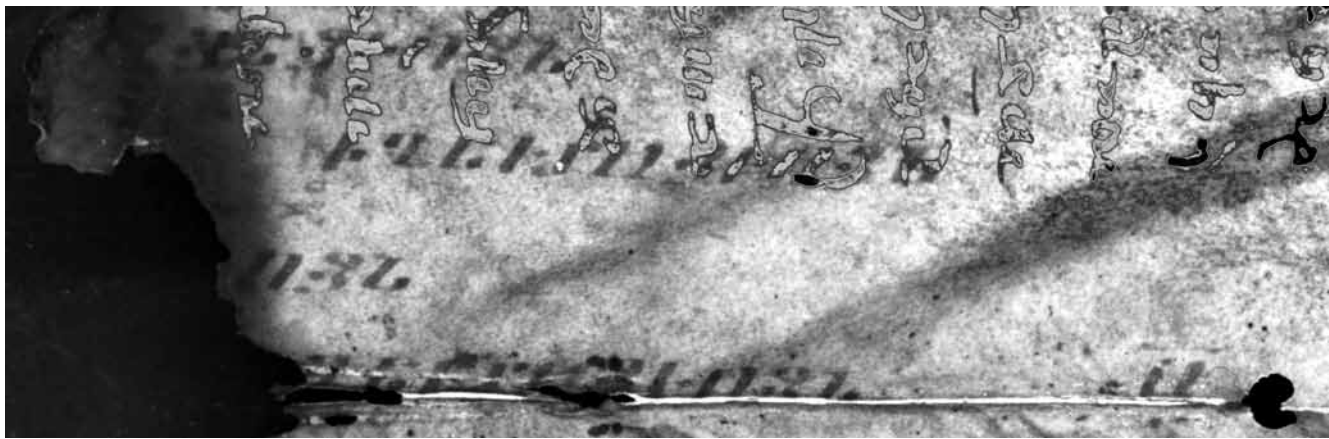


Fig. 17: Sin. geo. N 55, 28v-29r (detail)

<*i hrovni*> *ayec'woc'n*

i levtac'woc'n

<*i galatac'w*> *oc'n*

<*i*> *lewtac'woc'n*

x̃a

ã

ž̃

ã

<From the [letter to the]> Romans
 from [the book of] Leviticus
 <from the [letter to the]> Galatians
 <from> [the book of] Leviticus

the 41st (quotation):
 the 1st (quotation);
 the 10th (quotation):
 the 1st (quotation).

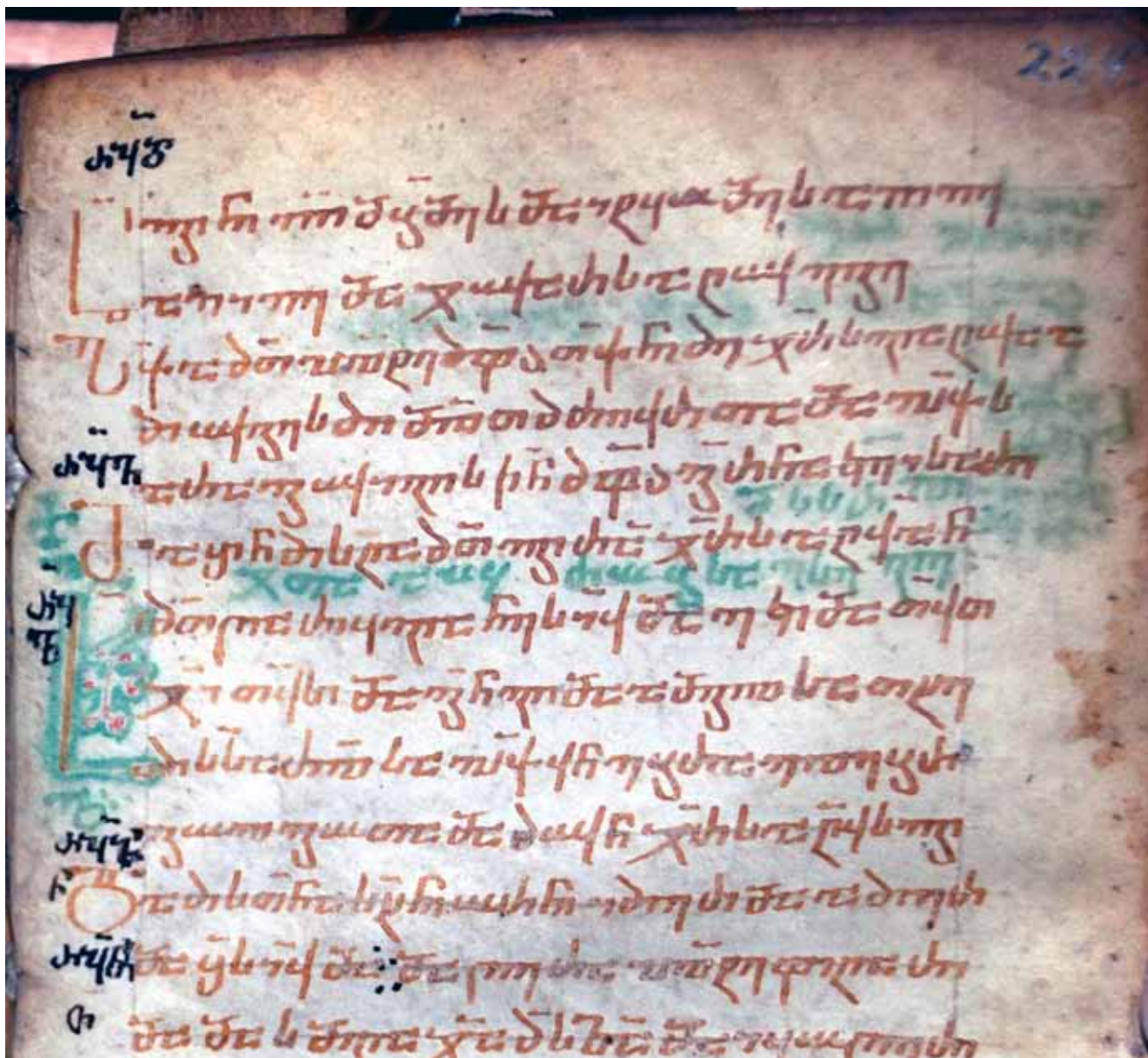


Fig. 18: Cod.Vind.georg. 1, fol. 224r (detail)

6. Multicoloured manuscripts

If we exclude illuminated codices, there are very few Old Georgian manuscripts that exhibit the use of more than two colours. One such case is the Gospel manuscript of the Austrian National Library (Cod. Vind. georg. 1),¹⁷ where we find green, red, and black elements accompanying the main text in brown ink. In the given example (fol. 224r, Fig. 18), the items in black are clearly numerical data, referring again here to the Ammonian sections ($r\check{z}\sim d = 194 = \text{Jo. } 19,15a$; $r\check{z}\sim v = 196 = \text{Jo. } 19,16$; $r\check{z}\sim z = 197 = \text{Jo. } 19,17-18a$; $r\check{z}\sim \bar{e} =$

$198 = \text{Jo. } 19,18b$; $r\check{z}\sim t = 199 = \text{Jo. } 19,19$),¹⁸ these references were probably added by a later hand. The elements in green are mostly liturgical prescriptions, as between lines 6 and 7, where we read $\check{z}(owar)ta\ apqrob(a)sa\ eseve$ ‘as well on the (day of the) Exaltation of the Cross’; the entry between the lines above reads $d(a)s(a)sr(u)li$, which simply means ‘end’. It is clear that these elements are indications of lectures to be read, thus preparing the Gospel manuscript for its use during holy services. In contrast to the references in black ink, it is likely that they were added *prima manu*, given that the same ink is also used for the large initial of Jo. 19,17 = 197

¹⁷ My thanks are due to the staff of the Austrian National Library, who made the Cod.Vind.georg. 1 and several other manuscripts of its collection available to the members of the above-named INTAS project during a sojourn in Vienna in June 2008.

¹⁸ The two single letters can hardly refer to the Eusebian canons ($\bar{e}\sim 8$ and $t\sim 9$), as the sections in question pertain to canon 1.

($X̄ = Xolo$ ‘but’).¹⁹ Lastly, red ink is applied here and there in initials, as seen in the latter initial, which again may be taken as being a purely ornamental feature.

It is clear that this list of features is only a first step in establishing a typology of the use of coloured ink in Old Georgian manuscripts, this to some degree due to the fact that until now very few codices have been easily accessible to Western scholars. To proceed, a methodical investigation of a larger number of specimens needs to be done, including sources

from different periods and genres. We cannot but hope that the major repositories of Georgian manuscripts will soon join the ever increasing number of libraries and archives that are ready to digitize their treasures and publish them online, thus sharing them with the interested public. And of course the Georgian data needs to be compared to that of other manuscript traditions, as this will enable a more general typology of the use of coloured ink.

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¹⁹ In beginning with *xolo* ‘but’ (instead of *da* ‘and’), the text of Cod. Vind. georg. 1 reveals itself as pertaining to the third redaction of the Georgian Gospels (the so-called Athonite vulgate).

Picture Credits:

Fig. 1a, 1b, 1–18: Jost Gippert.

Article

Computer-Based Stroke Extraction in Historical Manuscripts

Rainer Herzog, Bernd Neumann, and Arved Solth | Hamburg

Abstract

Recovering individual strokes in historical manuscripts can provide a valuable basis for various goals of manuscript analysis, e.g. retrieving similar allographs, comparing the handwriting of scribes, or recognising characters. Here we report on stroke analysis using the Constrained Delaunay Triangulation (CDT), previously proposed for shape decomposition in image analysis. Applied to handwritten graphemes, this method marks possible start, end points, and intersections of strokes based on local contour properties, thus providing stroke segments from which complete strokes can be formed by concatenation. Results are shown for Chinese, Amharic, and Tamil characters.

1. Introduction

Research into historical manuscripts often leads to questions in which the analysis of visual features can be helpful. Writing style, layout, and shape of characters may provide significant clues about the cultural origin of a manuscript, relationships to other manuscripts, or even the identity of scribes. For example, as pointed out by Richter,¹ visual features may constitute an important criterion for reassembling unearthed fragments of early Chinese manuscripts. He showed that angles between strokes of a Chinese character in different parts of a manuscript can differ systematically and hence indicate their origin from different scribes.

To derive a sound judgement from visual features, several complex and laborious tasks may have to be performed. Let us consider the task of scribe identification, in which an unidentified piece of writing must be assigned to one of two scribes A and B, whose writing is known from available samples. Firstly, one has to determine features suitable for distinguishing between the two scribes. Within limits, the human eye is quite apt at discerning regularities and differences between comparable shapes. But not all significant features are equally salient, and hence useful features such as the relationship between stroke lengths may be overlooked. Also, some features may be less suitable than others because of high variability within the samples of a single scribe. Secondly,

once features have been selected for comparison, a preferably large number of occurrences must be extracted from both the known samples and the unidentified piece of writing in order to ascertain the discriminating value of a particular feature through objective statistical criteria.

Note that in this example, as well as other tasks such as layout analysis, it is not important to recognise individual characters or graphemes of the respective writing system. Rather it suffices to identify and characterise reoccurring patterns, be they meaningful or not. The approach is similar to forensic handwriting analysis, where writing style and not contents is the issue. In fact, the relevance of forensic methods for the analysis of historical manuscripts has been emphasised by palaeographers.²

This report is about computer support for manuscript analysis. It is part of the research group ‘Manuscript Cultures of Asia and Africa’,³ in which a number of scholars in various humanities fields are investigating, among other things, the outward appearance of manuscripts in relation to their cultural function. These scholars are providing the palaeographical, archaeological, and cultural background knowledge that is indispensable for analysing historical manuscripts, while the research team of the authors of this paper is focusing on technical aspects.

Judging from the scenario of scribe identification described above, one can conclude that computer support would be beneficial for several subtasks:

- (i) Computing shape features
- (ii) Discovering distinguishing features
- (iii) Retrieving similar patterns from image databases
- (iv) Providing objective criteria for scribe identification

Basic methods and techniques for such subtasks are available from several subfields in Computer Science, in particular, Pattern Recognition, Computer Vision, and Artificial Intelli-

¹ Richter 2006.

² Dalton et al. 2007.

³ This work has been supported by DFG as part of the Research Group 963 ‘Manuscript Cultures in Asia and Africa’.

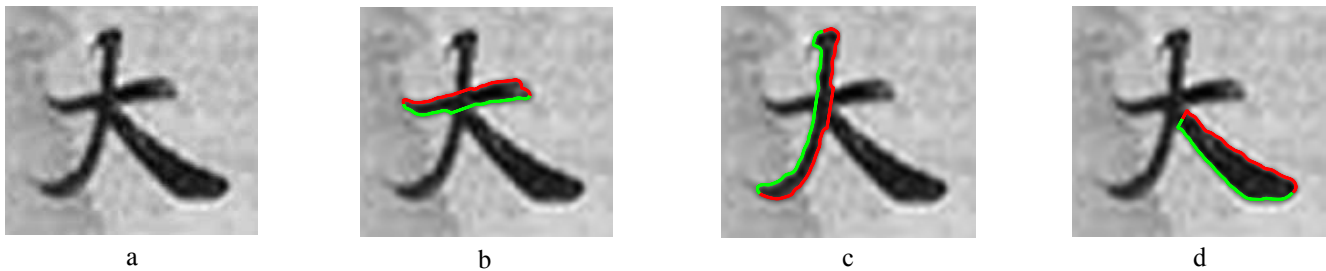


Fig. 1: Image of Chinese character (a) and superimposed extracted contours (b – d). The colours indicate tentative writing directions (green at right and red at left)

gence. Most of these fields have developed out of a long history of research into computer-based handwriting recognition. Optical Character Recognition (OCR) of handwriting, also called off-line character recognition, is today in widespread industrial use, however mainly for constrained applications such as business forms or postal address reading.⁴ On-line character recognition is based on the temporal sequence of stylus positions that are sensed with special writing equipment. On-line handwriting analysis contains additional temporal information, and thus is at an advantage compared to off-line analysis, but obviously it cannot be applied to historical manuscripts. Our approach of making stroke analysis a methodological part of off-line analysis can be seen as an attempt to reconstruct valuable on-line information.

Unfortunately, existing handwriting-analysis technology is not adequate for historical manuscripts—they pose new challenges. Firstly, analysing historical manuscripts typically requires techniques for reading handwriting that is less constrained with regard to expected layout and contents than, say, postal address reading. Furthermore, the writing material has often been corrupted by age, thus requiring more sophisticated methods for coping with incomplete and noisy data. Finally, the whole process may be aggravated by a lack of knowledge about historical writing conventions. These more difficult requirements are only partly offset by a less stringent need for segmenting text into characters, recognising characters and forming meaningful words, as has been pointed out above.

This report is about subtask (i), computing shape features, and in particular about the step of extracting strokes as an important basis for feature computation. Inspired by the pioneering work of Richter⁵ and in view of the significance of strokes in Chinese characters, we have primarily used Chinese historical manuscripts as examples, but we will also present results with handwriting in other writing systems.

Strokes are commonly defined as the trace of a writing instrument from the point where it first contacts the writing

surface to the point where it leaves the writing surface. Extracting strokes can therefore be viewed as a task of partially recovering temporal information. Other definitions constrain a stroke to being approximately straight or smoothly curved, according to a fluent motion. A more precise definition, based on a cognitive model of writing motion, is the Delta LogNormal model,⁶ but it does not necessarily apply to handwriting with historical tools. Our approach is therefore based on visible evidence for strokes, such as beginnings, endings, and direction discontinuities.

Fig. 1 illustrates the stroke extraction for a Chinese character performed with our tools.⁷ The image shown in Fig. 1a is taken as input, and the closed contours in the images of Figs. 1b–1d represent extracted strokes as output. Here, the writing direction has also been tentatively reconstructed based on conventions known for modern Chinese writing. The green part of a contour is to the left, the red part to the right, with regard to the direction of writing.

Our approach is based on a special kind of triangulation of the region occupied by the character called Constrained Delaunay Triangulation (CDT). CDT was first proposed for engineering applications⁸ and more recently also applied to printed Chinese characters.⁹ Parallel to our research, the analysis of handwritten characters using the CDT has also been investigated following an algorithmic procedure different from ours.¹⁰

The remainder of this contribution is structured as follows. In Section 2, we briefly describe the preprocessing used to extract the contour of a character or graph from the image. In Section 3, we present the Constrained Delaunay Triangulation in detail, and show how it provides valuable information for analysing written characters. To obtain stroke contours, the ribbon-like components have to be connected in a plausible

⁴ Cheriet et al. 2009.

⁵ Richter 2006.

⁶ Guerfali, and Plamondon 1995.

⁷ Solth et al. 2009.

⁸ Seidel 1988.

⁹ Zou, and Young 2001.

¹⁰ Nel et al. 2009.

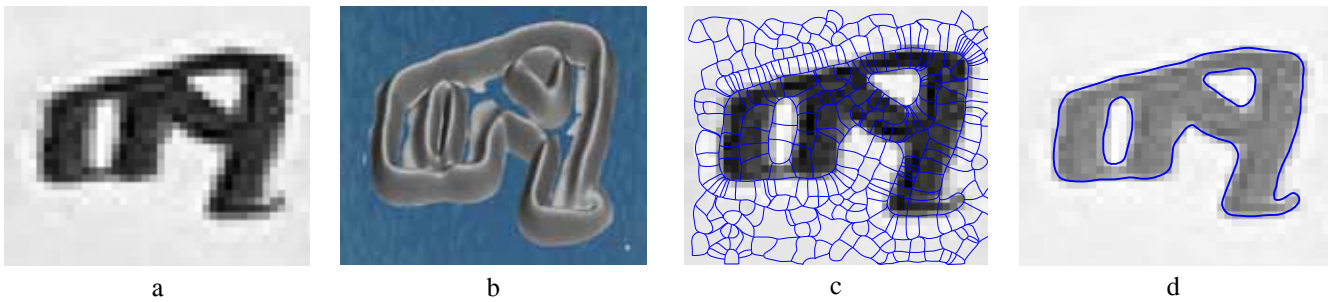


Fig. 2: (a) Coarse image of an Amharic character, (b) smoothly interpolated boundary image viewed as a hilly relief, (c) over-segmentation by watershed lines, (d) final segmentation after removing insignificant edges

way, reflecting the natural course of writing and conventions. This is described in Section 4. Experimental results for Chinese and Tamil writing are presented in Section 5. In Section 6, we discuss related work. We then conclude with a summary and a description of our next steps in manuscript analysis based on extracted strokes.

2. Contour extraction

In this section, we shortly describe the main preprocessing steps leading to the polygonal contour representation that is then used as input for stroke extraction. In contrast to commonly used binarisation procedures, we employ watershed binarisation with subpixel accuracy¹¹ to avoid artefacts from coarse pixel structures.

We assume here that the input image has been determined manually or by a preceding segmentation step. Ideally, the image will contain a character or grapheme extracted from the manuscript, but perfect segmentation is not a vital precondition for binarisation and stroke extraction. The idea of the subpixel (or ‘exact’) watershed transform is to determine boundary lines in a continuous version of the image, reconstructed from the discrete image by spline interpolation.

The first step is to transform the image into a boundary image using a boundary indicator function such as the gradient magnitude. Gradient magnitudes can only be determined for half the sampling rate compared to the sampling rate of the grey-value image.¹² To this end, the original image is smoothed with a discrete Gaussian derivative filter at the scale $\sigma=2$. The boundary image can then be viewed as a hilly relief with peaks and ridges at places of large grey-value changes in the original image.

In a second step, the boundary image is transformed into a continuous 3D surface using spline interpolation. Because of the differentiability requirements for the watershed computations, it is useful to choose 5th degree splines.

The next step is to extract watershed lines. These are the locations in the (continuous) relief of the boundary image relief, where a hypothetical water drop could run down to more than one regional minimum. Mathematically, watershed lines connect a local maximum with a saddle point, and the computational procedure is based on determining maxima and saddle points from the spline interpolation. Watershed lines have the nice property that they always form closed boundaries and do not cause artefacts at junctions.

For handwriting images, the result is usually an over-segmentation with many meaningless edges caused by noise or irrelevant grey-value variations. The final step is therefore a merging step, in which edges are removed that separate regions with similar grey-values, or that delineate isolated small regions. Here, thresholds have to be set with care. Polygonal contour representations of the remaining components are obtained by sampling the contour lines with a density appropriate for the subsequent triangulation (Section 3).

Fig. 2 illustrates this procedure for a noisy low-resolution image of a character in an Amharic manuscript. Note the realistic contours (d) obtained by the subpixel binarisation procedure in spite of the coarse original (a).

3. Constrained Delaunay Triangulation

In this section, we will describe Constrained Delaunay Triangulation (CDT), which we use to decompose the contour of a grapheme (or character) for stroke extraction. It is applied to the polygonal contour representation obtained from the segmentation procedure described above.

CDT is a variant of Delaunay Triangulation (DT), which is widely used in Computer Graphics and Engineering for surface modelling. Given a set of points, DT connects pairs of points in such a way that the circumference of each resulting triangle does not contain any other point. It is optimal in the sense that it maximises minimal angles, thus avoiding slim triangles and computationally difficult solutions.

¹¹ Meine, and Koethe 2005.

¹² Koethe 2003.

CDT is an adaptation of DT that is used to deal with points enclosed by a polygonal boundary.¹³ To avoid triangles outside the boundary, the circumference condition is modified as follows:

Three points form a triangle if the circumference of the triangle only contains points not visible from the three points. A point P is defined as visible from a point Q if the line segment PQ does not cross any polygon edge.

For our purposes, CDT is performed only with points representing the contour of the grapheme; Fig. 3 illustrates the result. Note that three types of triangles can be distinguished according to the number of chords they contain (a chord is an edge that does not coincide with a polygon edge): *junction* triangles (in green) with three chords, *sleeve* triangles (in blue) with two chords, and *terminal* triangles (in red) with one chord.

These triangle types provide useful information for decomposing a polygon into stroke-like components. One can observe the tendency that isolated smooth lines are filled by sleeve triangles, crossings, and sharp corners are marked by junction triangles, and line endings by terminal triangles. The figure also shows that the occurrence of junction triangles at line corners depends on the curvature. Exact conditions can be derived with help of Fig. 4.

Fig. 4a shows the contours of a stroke drawn with an idealised circular stylus with radius S. The cross section of the stylus is shown as a shaded circle on the left. The stroke begins with a straight section, followed by a curve with radius R and angle α , and continues with another straight section. The centre of the stroke is indicated by the heavy dotted line. The shaded triangle and all other triangles generated in the curve are sleeve triangles since the circumference of these triangles lies within the contour circle with radius R and hence does not contain additional contour points. Fig. 4b shows a curved line drawn with $R = S$. This is the maximal curvature achievable with an idealised circular stylus. Regardless of the angle α , this situation will give rise to junction triangles, because the circumference of a triangle as shown will contain additional contour points.

Fig. 4c illustrates the boundary case: A curved line with angle α and drawn with a stylus of radius S will generate a junction triangle, if the radius R of the outer contour satisfies the following inequality:

$$R < \frac{2S}{1 + \cos \alpha/2} \quad (1)$$

¹³ Seidel 1988.

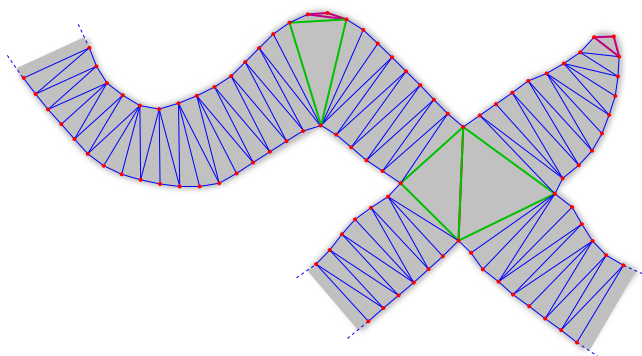


Fig. 3: Result of a CDT consisting of junction triangles (green), sleeve triangles (blue), and terminal triangles (red)

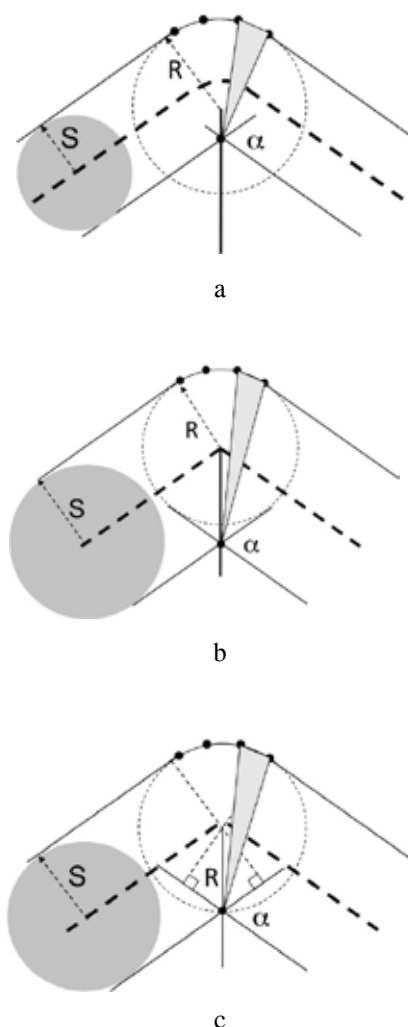


Fig. 4: Examples of curved lines with angle α and outer contour radius R, drawn with a circular stylus, radius S.

- (a) No junction triangles for this combination of S, R and α
- (b) The triangle shown violates the Delaunay condition. There will always be junction triangles for $R = S$
- (c) Boundary case with $R(1 + \cos \alpha/2) = 2S$

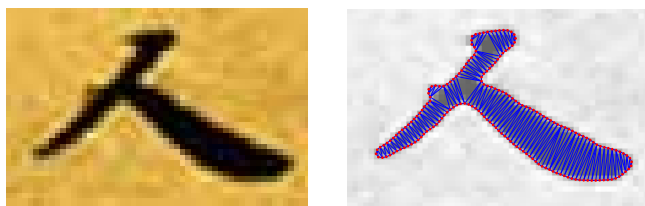
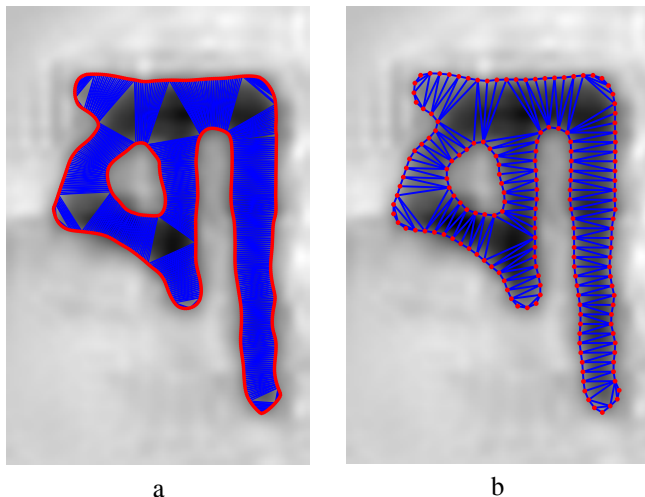
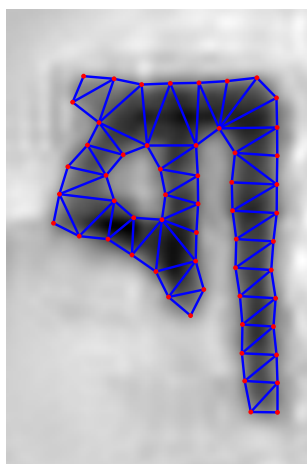


Fig. 5: Small distortions with a contour radius less than half the stroke width may cause junction triangles.



a

b



c

Fig. 6: Triangulations with different spacings of boundary points. Junction triangles at the upper left and right corners and at the lower stroke endings are generated in (a) and (b), but not in (c). The spacing of boundary points must be chosen carefully, dependant on the details that are to be captured

Hence junctions will only occur for sharp bends with an outer contour radius less than the stylus diameter. Note that in all junction cases, the inner contour shows a corner, i.e. a discontinuous direction change. Furthermore, all centerline corners will give rise to junctions. From the perspective of handwriting kinetics, centerline corners are locations where the writing velocity has come to a standstill, which conforms well with the conceptual notion of a stroke.

In summary, besides marking crossings or forks, junction triangles are useful indicators of line corners, at least under

favourable conditions, and may thus mark hidden stroke endings. However, there are possible reasons for exceptions. For one, consecutive strokes in fluent writing may have soft transitions,¹⁴ so a corner may become a curve not marked with a junction triangle. Second, small distortions may give rise to spurious junction triangles as shown in Fig. 5. These may, however, be easily recognised because of the small size of the distortion and no significant directional change along the stroke.

The distance between contour points also plays a part. With close contour points, CDT approximates a procedure for finding the *skeleton* of a shape. In its most popular definition,¹⁵ a skeleton consists of the centres of circles fitted to opposing tangential contour pieces—this is exactly the limiting case of sleeve triangles for densely spaced boundary points. Hence for obtaining a triangulation following the skeleton of a shape, dense boundary points are desirable.

However, one must also keep computational efficiency in mind if many graphemes are to be processed. For this reason, the chosen spacing of boundary points should be as wide as possible without sacrificing important contour details. Fig. 6 shows triangulations of a Tibetan character with different spacings of boundary points.

4. Determining strokes

In this section we will describe how strokes can be extracted from a triangulated grapheme. We have implemented a greedy algorithm,¹⁶ in which stroke segments are merged at junctions in a single pass without exploring alternatives. This may lead to errors because of premature local decisions in ambiguous situations. The basic idea is to merge stroke segments at junctions if they form a smooth stroke. Stroke segments are defined as areas between either junctions or endpoints and can be easily obtained through triangulation. We distinguish between three kinds of stroke segments: *isolated stroke segments* with no junction at either end, *terminal stroke segments* with one junction, and *connecting stroke segments* between two junctions. Each stroke segment has well-defined properties which can be derived from the triangulated grapheme:

- two lateral contours defined by the contour points between endpoints or junction triangles,
- a medial axis defined by the triangle centres,
- two endpoints defined by the endpoints of the medial axis.

¹⁴ Wienecke 2003.

¹⁵ Blum, and Nagel 1978.

¹⁶ An algorithm is called greedy if locally optimal decisions are taken irrevocably in the hope of achieving a global optimum.

Before merging stroke segments at junctions, some preprocessing of the junctions must be performed to eliminate spurious junctions with an edge length below a threshold, and to merge junctions at apparent stroke crossings. Short stroke segments between two junctions are taken to indicate a crossing and are marked as such. They may become part of more than one stroke. Fig. 7 shows the junctions before and after junction preprocessing.

Stroke segment merging proceeds as follows. First, all isolated stroke segments are immediately classified as strokes. Then all junctions are visited and adjoining stroke segments with sufficient directional continuity are merged. If one of the segments is marked as a crossing, it may also participate in a second merging at the same junction, forming the second stroke of the crossing.

After merging pairs with directional continuity, stroke segments are considered for which no merging partner could be found at a junction. Let the unmerged end of the stroke segment be called A and the other end B. A segment is processed according to the following rules:

1. If the segment is connected to a junction at B but not merged, then the segment is a stroke between A and B.
2. If the segment is already merged with another segment at B, then A is a stroke end.
3. If the segment has a free end at B and its length exceeds its width, then the segment is a stroke.
4. If the segment has a free end at B and its length does not exceed its width, then the segment is a distortion and is merged with one of the other segments at the junction.

The strokes resulting from merging the segments of the grapheme in Fig. 7 are shown in Fig. 8. The writing directions have been reconstructed based on modern conventions of Chinese handwriting and marked by green contours to the right and red contours to the left.

5. Experimental results

Our stroke extraction procedure has been evaluated with 339 characters of a section of the historical Chinese manuscript shown in Fig. 9. Ground truth, i.e. information about the correct results, has been provided by one of the authors. The digital images have a resolution of about 60 x 60 pixels per character. The recognition rate is plotted in Fig. 10 as a function of character complexity, measured by the number of strokes. The mean recognition rate for all characters is 72%, for characters with up to 8 strokes 86%. The zero-rate entries 19 and 22–26 are due to a complete lack of such characters in the dataset.

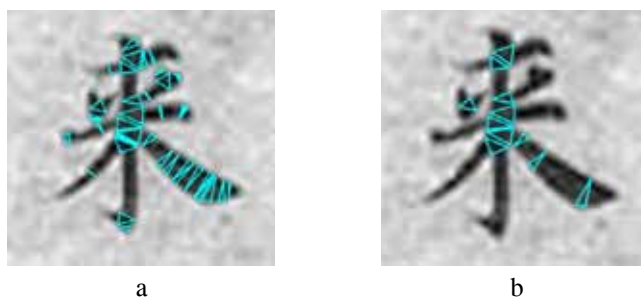


Fig. 7: Junctions (a) before and (b) after pre-processing.

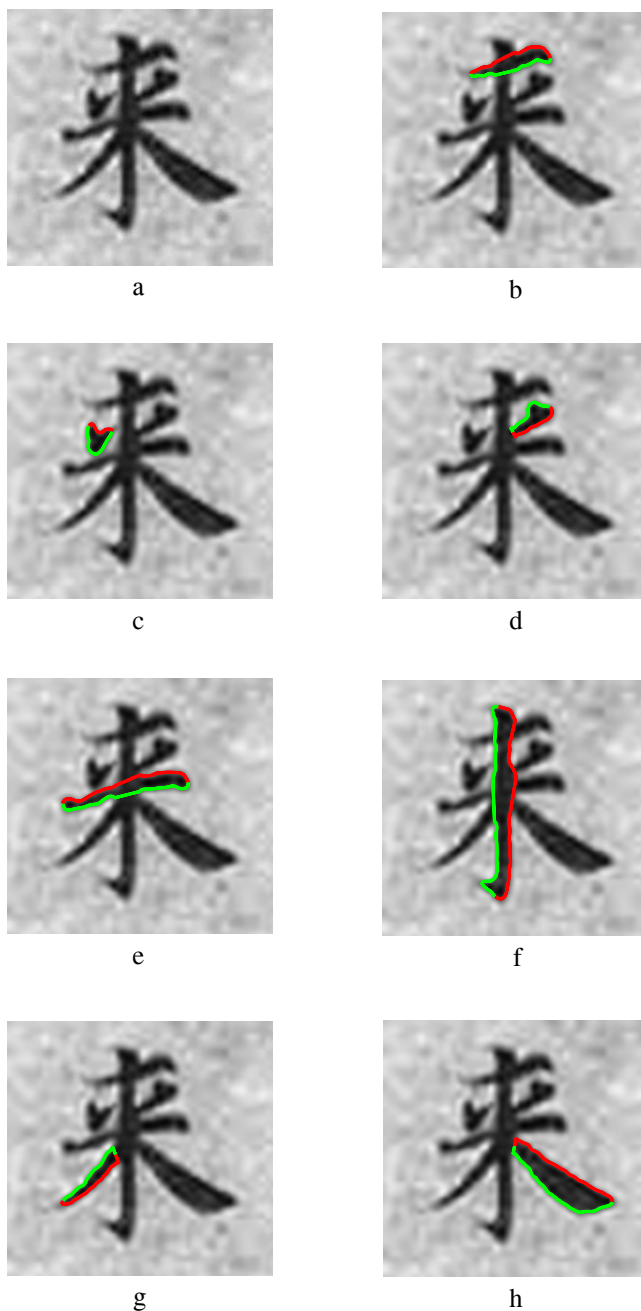


Fig. 8: Image of Chinese character (a) and superimposed extracted contours (b–h). The colours indicate tentative writing directions (green at right and red at left).

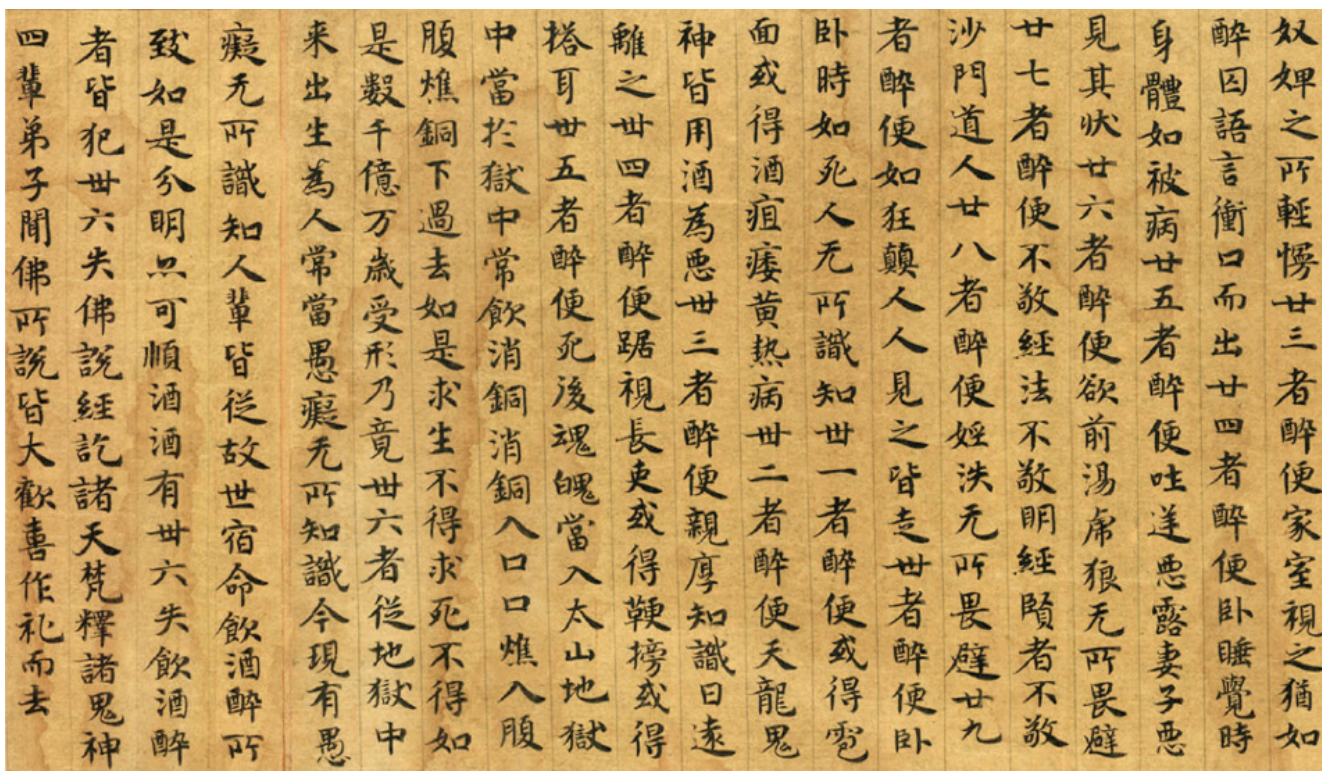


Fig. 9: Section of the *Fo shuo Tiwei jing* 佛說提謂經 (British Library Or.8210/S.2051) used for testing junction-based stroke extraction.

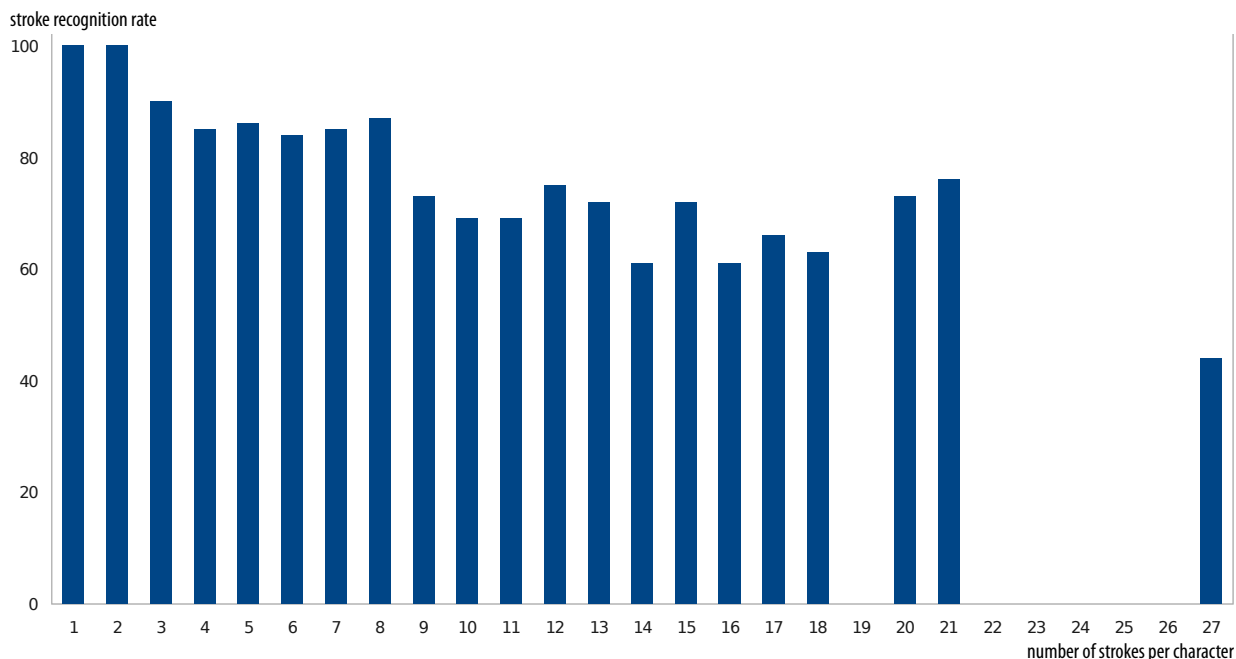


Fig. 10: Stroke recognition rates for characters with increasing complexity

Recognition failure had mainly two reasons. First, junction triangles were not generated when two distinct strokes formed a smooth corner, as shown in Fig. 11. Here, the rectangular shape shown in red has been drawn with three strokes (the upper horizontal and the right vertical section are drawn as a single stroke), but the strokes could not be separated.

Second, stroke segments connected due to imperfect handwriting and subsequent faulty segmentation could not be identified as separate strokes, as shown for an example in Fig. 12. Knowledge about the writing system must be applied to avoid such mistakes.



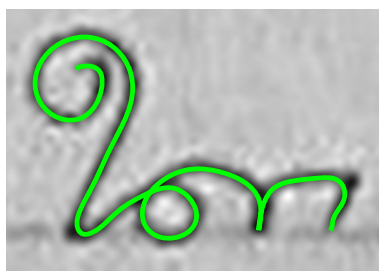
Fig. 11: Failure of recognising three strokes due to rounded corners. (a) Original character, (b) triangulated part of the character without junction triangles.

We also applied our approach to a number of Tamil paper manuscripts from the last centuries. In contrast to Chinese characters, syllables are largely written without lifting the pen from the paper. Comparable to Latin script, few parts are passed twice with the writing instrument. Fig. 13 shows some results.

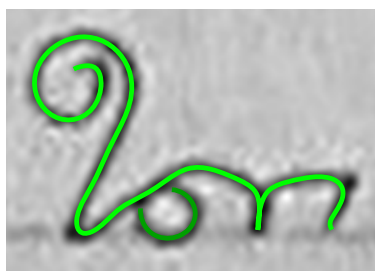
We have followed essentially the same procedure for reconstructing strokes as described above, however using a different merging strategy to better cope with ambiguities in written Tamil syllables. Instead of taking irrevocable ('greedy') decisions at junctions, we save alternatives until the end and then submit them to a final rating.

The following criteria for merging stroke segments are applied:

1. Each written syllable should be composed of as few stroke segments 1–6, (c)–(e) highest-ranking reconstructions, (c) in terms of a single stroke with Segments 2 and 5 passed twice, (d) in terms of two strokes, in which Segment 3 is separate and Segment 5 is passed twice, and (e) in terms of two strokes in which Segment 2 is passed twice and Segment 6 is separate.
2. As the main direction of writing is from left to right, the starting position of each stroke should be at its left end.
3. Strokes should begin and end at terminal triangles.
4. At junction triangles, merged stroke segments should have directional continuity.
5. Each stroke segment must be passed at least once, but preferably not more than once.
6. Stroke segments that are passed more than once should be rather straight and short.
7. For the reconstruction of a written syllable with more than one stroke, the space between the end of one stroke and the start of the next should be small.



c



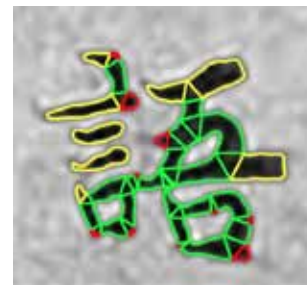
d



e



a



b

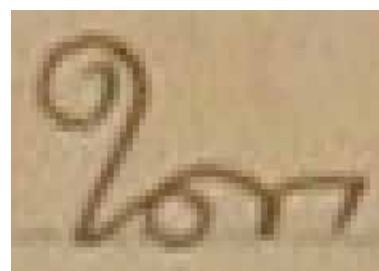
Fig. 12: Failure of recognising two separate strokes because of a segmentation fault.

(a) Segmentation, (b) stroke segments after triangulation, (c) faulty merged stroke.

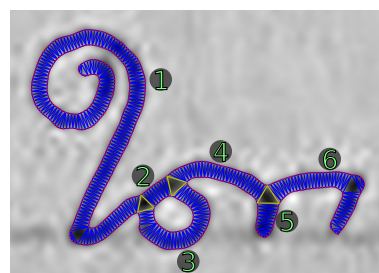


c

Fig. 13: Results of applying stroke recognition to a specimen of writing of the Tamil syllable lai. (a) Original, (b) triangulation resulting in six stroke segments 1–6, (c)–(e) highest-ranking reconstructions, (c) in terms of a single stroke with Segments 2 and 5 passed twice, (d) in terms of two strokes, in which Segment 3 is separate and Segment 5 is passed twice, and (e) in terms of two strokes in which Segment 2 is passed twice and Segment 6 is separate.



a



b

6. Related work

Computer-based analysis of historical manuscripts is a highly interdisciplinary field, with contributions from Pattern Recognition (a subfield of Computer Science), Digital Libraries, Palaeography, and Forensics as major sources.

In Pattern Recognition, historical handwriting analysis is an emerging field that has seen an increasing number of contributions at related conferences, in particular the ICDAR (International Conference on Document Analysis and Recognition), ICFHR (International Conference on Frontiers in Handwriting Recognition), and DAS (International Workshop on Document Analysis Systems), as well as in related journals such as IJDAR (International Journal on Document Analysis and Recognition), ICPRAI (International Journal of Pattern Recognition and Artificial Intelligence), and TPAMI (IEEE Transactions on Pattern Analysis and Machine Intelligence). Most contributions combine existing methods in specific ways to meet the challenges of historical documents. As a recent example,¹⁷ Bar-Yosef and co-workers present an approach to writer identification in historical Hebrew calligraphy documents, comprising an elaborate segmentation step, letter extraction based on medial-axis models, and writer identification using Linear Discriminant Analysis. A similar approach has been reported for Chinese calligraphic handwriting,¹⁸ with character models represented by point configurations. Our approach differs by choosing strokes as an intermediate representation; thus it is applicable to a variety of writing systems.

The idea of recovering temporal information and strokes from historical handwriting for improved off-line analysis was first proposed by Doermann and Rosenfeld.¹⁹ They analyse Latin handwriting regarding endpoint and intersection types, relative width and other features to come up with stroke hypotheses and a tentative temporal order. In the dissertation of Wienecke,²⁰ stroke analysis is refined by combining visual features with a biomechanical handwriting model. Invoking such a model would also be useful for our work, but it is difficult to obtain for historical writing tools. Elbaati and co-workers investigate stroke order recovery for off-line Arabic handwriting recognition.²¹ Here, strokes are extracted by skeletonisation and placed into a temporal order by maximising a quality criterion with a Genetic Algorithm. Within strokes, a velocity profile is generated based on a biomechanical writing model.

Stroke extraction for Chinese handwriting recognition has been developed by several researchers.²² All approaches are based on skeletonised characters and in this respect are indirectly related to our triangulation approach, which can also be used to identify skeletons. However, since our aim is handwriting characterisation and not recognition, we prefer stroke representations based on complete characters and not skeletons.

Our long-term goal of providing a toolkit for the analysis of historical manuscripts is shared by several other groups. Moalla and co-workers report about a first approach for analysing the writing style in medieval Latin texts ‘for the service of palaeography science’.²³ Aiolli and Cuila report on their ‘System for Paleographic Inspection (SPI)’, which has been developed over several years and provides a software suite for characterising and comparing letters in medieval Latin manuscripts.²⁴ Stokes gives a thoughtful analysis of the requirements for digital palaeographical support and a review of past attempts.²⁵ He points out that palaeographers hesitate to accept automatic methods for scribe identification, and prefer an interactive, stepwise approach. This differs from forensics, where black-box systems are preferred for scribe identification.²⁶

An interesting example for applying a black-box system, originally developed for forensics, to historical documents is reported by Ball and co-workers.²⁷ They have solved a dispute about two pages of a handwritten satirical newspaper dated 1846, which was suspected to have been authored by Herman Melville, the well-known author of *Moby Dick*. By analysing these pages and some letters known to be handwritten by Melville with the forensic examination system CEDAR-FOX, the authorship of Melville could be established with high certainty.

7. Conclusions and Outlook

We have presented our approach and initial results for stroke analysis of graphemes in historical manuscripts. Strokes are an important basis for characterising handwriting in the context of various tasks, as for example comparing documents with regard to their cultural origin or verifying the identity of scribes. Our approach aims at performing stroke analysis

¹⁷ Bar-Yosef et al. 2009.

¹⁸ Zhuang et al. 2004.

¹⁹ Doermann, and Rosenfeld 1993.

²⁰ Wienecke 2003.

²¹ Elbaati et al. 2009.

²² Wu 2000, Larmagnac, and Dinet 2000, Lin, and Tang 2002, Ban et al. 2003 and others.

²³ Moalla et al. 2006.

²⁴ Aiolli, and Cuila 2009.

²⁵ Stokes 2009.

²⁶ Franke, and Srihari 2008.

²⁷ Ball et al. 2010.

with as little knowledge of the characters and their meaning as possible, in order to provide a generally useful tool for manuscript research. However, as the experiments with Chinese characters have shown, results can be improved in further processing stages by exploiting prior knowledge about the conventions and peculiarities of a particular writing system.

The next step of our work will be the development of a similarity measure based on stroke properties. For Chinese characters, a relational structure consisting of the strokes

of a character and their relative positions will be used for comparison, allowing for partial matches. Preliminary work on Tamil handwriting indicates that comparisons could be based on stroke segments forming bends and loops.

Regarding the long-term goal of developing a toolbox for computer-supported manuscript analysis, the current work can only be considered a small step, with more time and resources still required.

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Article

Tai Manuscripts in the Dhamma Script Domain: Surveying, Preservation and Documentation, Part 3*

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1.4 Southwestern China (Sipsòng Panna)

Compared to the five million Tai Yuan (Northern Thai) and some twenty million Lao speakers, of which four fifths live in Thailand, the Tai Lü are a small ethnic group whose areas of settlement are located in four nation-states: China, Myanmar (Burma), Laos and Thailand. It is only in China that the Tai Lü possess a recognised ‘homeland’, which lies in the Autonomous Prefecture of Sipsòng Panna (*Xishuang Banna Daizu zizhi zhou*). There are nearly 400,000 Tai Lü currently living in Sipsòng Panna, making up slightly more than one third of the total population in the prefecture. The Chinese authorities, however, do not recognise the Tai Lü as a separate ‘nationality’ (*minzu*) but include them, along with the Tai Nüa of Dehong Prefecture, the Tai Ya and several smaller Tai groups in southern Yunnan, in the officially recognised Dai *minzu*. This categorisation is not without pitfalls, as the Tai Nüa and Tai Lü, for example, do not speak mutually intelligible dialects, nor do they share a common ethnic identity. Their scripts—and manuscript cultures—are different as well. Only the Tai Lü use the Dhamma script, whereas the writing system of the Tai Nüa (*lik to ngòk* or ‘sprout letters’) is much closer to the script of the Burmese Shan.

There are probably as many as 200,000 Tai Lü in the eastern sections of the Burmese Shan State, especially in the Chiang Tung (Kengtung) region, where they are intermingled with 150,000 Tai Khün to whom they are linguistically closely related. Slightly less than 200,000 Tai Lü live in Northern Laos. Müang Sing (Luang Namtha Province) and Phong Saly (of which the northern section was part of Sipsòng Panna until 1895) are the areas with the highest concentration of Tai Lü. There are no reliable estimates concerning the Tai Lü population in Northern Thailand. Conservative estimates number them at close to 100,000 persons. This figure includes only the Tai Lü communities that have consciously preserved the language and traditions of their ancestors. Other estimates, which also include assimilated Tai Lü, whose fore-

fathers were once forcibly resettled to places such as Lamphun, Chiang Mai and Nan during the 19th century, are as high as half a million.¹

Along with their customs and traditions, the Tai Lü also brought manuscripts to their new settlements, as already mentioned in the section on Northern Thai manuscripts. A considerable number of manuscripts classified as Lao, kept in the archives of the British Library (London) and the *École française d’Extrême-Orient* (Paris), are actually written in the Tai Lü language and script, as the author realised during research conducted at these institutions in 2002 and 2003. A large number of Tai Lü manuscripts are kept in monastic libraries and private collections throughout Northern Laos. Based on the inventories of the Preservation of Lao Manuscripts Programme, it appears that a complete survey and documentation of Tai Lü texts in Laos will become feasible in the near future. Among the 8,349 manuscripts that are currently (October 2010) accessible at the Digital Library of Lao Manuscripts, there are 604 manuscripts written in Tham Lü, i.e. the Tai Lü variant of the Dhamma script. The largest number of Tai Lü manuscripts from Northern Laos are found in the provinces of Luang Namtha (bordering Sipsòng Panna) and Sainyabuli (bordering the Thai province of Nan). Whereas almost all Tai Lü manuscripts from Sainyabuli (221 of 227 manuscripts) are written on palm leaves, mulberry paper is the dominant writing support in Luang Namtha (135 of 198 manuscripts). A systematic survey and solid study of Tai Lü manuscript in various areas of Northern Laos should be the focus of future research. The same applies to a survey and study of Tai Lü manuscripts in Northern Thailand and the influence of the Tai Lü language, orthography and script on Northern Thai manuscripts.²

¹ As for a useful introduction to the historical development of Tai scripts in the Burmese Shan State, cf. Sai Kam Mong 2004. The author subsumes all ethnic Tai groups in the region (Shan proper or Tai Yai, Tai Lü, Tai Khün, etc.) under the generic term ‘Shan’.

² Hundius 1990, 25, fn. 28 makes the interesting observation that certain inconsistencies in writing and ‘the failure to distinguish between the diphthong /ua/ and its phonetically related monophthong /əə/ are of significantly higher frequency in manuscripts from areas with large numbers of people from Khün and Lü descent (...) than in those from districts with predominantly Tai Yuan population.’

* This article draws upon several published and unpublished papers by Harald Hundius. I am grateful to him for giving his kind permission to use this material. However, any shortcomings in the analysis are my own responsibility.

No systematic survey of Tai manuscripts has been carried out so far in Myanmar.³

A thriving manuscript culture came to an end in the Tai Lü heartland of Sipsòng Panna when the Chinese communists seized power in Yunnan in 1950 and abolished the far-reaching political and cultural autonomy that Sipsòng Panna and other minority regions had enjoyed for centuries. In 1953, the new rulers in Beijing established a part of the Simao Prefecture as an Autonomous Prefecture of the Dai nationality in Sipsòng Panna. To facilitate the learning of the Tai Lü language and script, particularly among non-Tai ethnic groups, including a growing number of Chinese immigrants, the Chinese authorities set up a commission of local scholars and bureaucrats to design a completely new Tai Lü alphabet that was officially introduced in 1955. The simplified alphabet abolished the Pāli consonants; banned the use of ligatures as well as of subscript and superscript marks which are a typical feature of the Dhamma script; ‘simplified’ the shape of the remaining consonant and vowel graphemes; and lined up consonants, vowels and tone markers into single lines. Since then, the younger generation has been educated exclusively in the new script, which is also used for the typesetting of vernacular books and newspapers, such as the *Xishuang Banna baozhi* (Sipsòng Panna Newspaper), founded in 1957.⁴ The script reform constituted a radical break with the past; those acquainted only with the new alphabet were unable to read texts written in the traditional Tai Lü Dhamma script, which was probably one of the goals of the simplification. Since monastic education declined and practically came to a halt during the ‘Great Proletarian Cultural Revolution’ (1966–1976), very few Tai Lü in Sipsòng Panna are today still proficient in traditional literature.

During the decade-long persecution of local heritage, many Buddhist temples were destroyed and numerous valuable Tai Lü manuscripts were burned or lost. According to some informants, up to ninety per cent of Tai Lü manuscripts were destroyed during this period, which was a ‘dark age’ not only for the Tai Lü and other ethnic minorities in China, but also for the Han Chinese majority. It is worth mentioning that the destruction of Buddha images seems to have been carried out even more thoroughly. During his field studies in Sipsòng Panna in 2002 and 2005, the author was unable to find in reopened and renovated monasteries in the region even a single inscribed Buddha image older than twenty-five years.

Nevertheless, a number of old Tai Lü manuscripts have survived, in many cases due to courageous laypersons who managed to hide them from the eyes of the Red Guards and zealous party officials. Since the late 1970s, when China reopened her doors, a relatively scholarly atmosphere has gradually emerged, and the Tai Lü region, like other places in China, is now enjoying a cultural renaissance. Local authorities and researchers in Sipsòng Panna have begun to recollect and copy Tai Lü manuscripts, the largest collection of which is currently stored in the Cultural Bureau of the Political Council of the Prefecture of Sipsòng Panna in Jinghong. It should also be noted that after the opening of borders with Burma in the early 1990s, manuscripts from Tai Lü speaking ‘Shan’ areas in eastern Burma, notably from Chiang Tung, Moeng Yòng, and Moeng Luai, have entered the southern border districts of Sipsòng Panna.⁵ Moreover, during the last two decades, the Yunnan National Minorities Publishing House (*Yunnan minzu chubanshe*) has published a series of bilingual books containing Tai Nüa and Tai Lü literary and historical texts—written in Tai Nüa or, respectively, Old Tai Lü script—along with a Chinese translation.⁶

In 1998, the Japanese historian Kumiko Kato (University of Nagoya) and her Thai husband Isra Yanantan initiated the first survey of Tai Lü manuscripts in Sipsòng Panna in collaboration with Ai Kham, a local scholar in charge of the collection held at the Cultural Office, and Cao Maha Khanthawong (Dao Jinxiang), a retired official of aristocratic background and well-known expert on traditional Tai Lü literature. A questionnaire was prepared to document the characteristic features of the surveyed manuscripts (language, script, date, writing support, etc.). The survey took place in 1999 and 2000. Kato and Isra describe the technical procedure as follows:

Ai Kham selected the persons suitable to undertake the survey in the different localities. These persons took the questionnaires to survey the places where manuscripts were kept, putting down the [relevant] information in the questionnaires. Then the [data] were returned to Chiang Rung. The number of manuscripts documented in this way amounted to roughly 6,000 entries. After the completion of the survey the collected data were recorded in a register of interesting documents in monasteries as well as private collections.⁷

³ Apart from Anatole Peltier’s private collection of Tai Khün manuscripts from Chiang Tung (Kengtung), which also contains a number of texts of Tai Lü provenance.

⁴ Isra 2001, 461. See also Apiradee 2003, 7–10, so far the most in-depth study of Tai Lü script(s) and writing system(s).

⁵ Isra 2005, 191.

⁶ This series includes several versions of the Chronicle of Moeng Lü (Chinese: *Leshi*), discussed in detail in Liew, and Grabowsky 2004.

⁷ Kato, and Isra 2001, 150.

Table 1: Statistics of the survey of Tai Lü manuscripts in Sipsong Panna (Xishuang Banna) run by Kumiko Kato und Isra Yanatan (Balance: 2001)

place/ district	<i>mullberry paper</i> (volumes)	palm-leaf (bundles) (fascicles) ⁸	paper (other than <i>mullberry paper</i>)	no information available	total	
‘Cultural Office’	324	204	502	1	—	529
Chiang Rung/ Ceng Hung	2,531	216	608	36	1,046	3,829
Moeng La	98	51	344	1,247	72	1,468
Moeng Long	99	23	(?)	12	266	400
Moeng Hai	191	4	8	43	36	274
Moeng Ham	28	22	149	9	—	59
Total	3,271	520	>1,611	1,348	1,420	6,559

As Kato and Isra admit, the number of manuscripts surveyed and documented, as well as the reliability of the data collected in this way, depended very much on the interest of the person completing the survey. The incompleteness and unreliability of the data is indicated by the large number of manuscript descriptions lacking information on the writing support (one fifth of the total), provenance, or number of fascicles and folios. The catalogue that Kato and Isra published in 2001 indicates that their two-year project located a total of more than 6,500 manuscripts in monastic and private libraries.

Table 1 demonstrates that the bulk of extant manuscripts are written on mulberry paper and not on palm-leaf, as is also true of Tai Lü manuscripts found in Northern Laos (see section 1.3). The unusually large number of manuscripts in Moeng La written on modern paper, all kept in private libraries, may reflect the owners’ commitment to having had copies made of older manuscripts. While it is not uncommon to see manuscripts more than a century old in Laos and Northern Thailand, there are very few Tai Lü manuscripts in Sipsong Panna from the pre-Communist era, and the oldest dated document recorded in the above mentioned list is from *Cūlasakarāja* (CS, the so-called Little Era beginning in 638 AD) year 1249 (1887/88 AD).⁹

⁸ Terminology in the field of Dhamma manuscript studies is still in its infancy: An average palm-leaf fascicle (*phuk* ผุก, sometimes rendered as ‘bundle’—the smallest codicological unit) comprises 6 to 12 folios for traditional religious manuscripts. The fascicles are traditionally held between wooden covers. Larger codicological units consist of a number of fascicles held together by a cloth wrapping. Such ‘bundles’ (*mat* มัด, sometimes rendered as ‘volumes’) may contain single texts or only sections of a single work, or even unrelated texts that were perhaps sponsored by the same donor. See the explanations in the DLLM glossary (<http://laomanuscripts.net/en/pages/glossary.html>).

⁹ This is an astrological text entitled *Pakkatīn* (ปักกาทิน); a person named Phaya Phasaeng is mentioned as the author.

It is encouraging that between 2001 and 2003, the Yunnan Provincial Archives (Yunnan University) implemented a project to survey, catalogue and microfilm Tai Nüa manuscripts from the ‘Dehong Dai and Jingpo Autonomous Prefecture’. Of the 2,000 documents surveyed, almost 900 were selected for cataloguing and approximately 57,500 microfilm frames were recorded.¹⁰ In spring 2004 a follow-up project was started in Gengma County of Lincang Prefecture. In addition, a catalogue published in 2005 contains synopses of almost 200 manuscripts, mostly in Tai Nüa script, but 22 are written in the Tai-Lü Dhamma script.¹¹

2. Systems of Classification

The texts inscribed on palm-leaf or mulberry paper manuscripts were classified according to content and literary genre, with each project following its own guidelines. We can roughly distinguish between two different systems. The first system was applied by the Social Research Institute (Chiang Mai University) in the project undertaken during the 1980s in Northern Thailand. The second system was conceived by the Preservation of Northern Thai Manuscripts Project in Chiang Mai (1987–1991) and was also used in the subsequent Preservation of Lao Manuscripts Programme (1992–2002). The two systems are documented in Tables 2 and 3 and will then be compared with each other further below.

The contents of the twenty-one categories of manuscripts have been defined by the Preservation of Northern Thai Manuscripts Project as follows:

(01) *Vinaya*: The textual framework for the Buddhist monastic community, or *sangha*, containing rules of disci-

¹⁰ For details on this project, see Daniels 2005. The catalogue includes synopses in Chinese of the contents of each of the 881 manuscripts microfilmed. See Yin Shaoting et al. 2002.

¹¹ Yin Shaoting, and Daniels 2005.

Table 2: Classification System I (Social Research Institute, Chiang Mai University)

No.	Name Thai	Name English
01	พระพุทธศาสนา	Buddhism
01A	พุทธตำนาน	Buddha's Legendary History
01B	มหาชาติชาดก	Great <i>Jātaka</i> Story
01C	ทศชาติชาดก	Ten <i>Jātaka</i> Stories
01D	ชาดกทั่วไป	General <i>Jātaka</i> Stories
01E	พระสูตร	<i>Suttanta</i> Doctrine
01F	พระอภิธรรม	<i>Abhidhamma</i> Doctrine
01G	พระวินัย	Disciplinary Rules
01H	ธรรมทั่วไป	Religious Teachings
01I	อานิสงส์ต่างๆ	Blessings
01J	ทรรศนะเกี่ยวกับจักรวาล	Cosmology
01K	ประวัติศาสตร์พุทธศาสนา	History of Buddhism
01L	ตำนานปูชนียวัตถุ	History of Sacred Objects
01M	พระสาวกที่มีชื่อเสียง	Famous Disciples
01N	พยากรณ์เหตุการณ์อนาคต	Prophecy
01O	บทสวดมนต์และพิธีกรรม	Prayers and Rituals
01P	พิธีกรรมสงฆ์	Sangha Ceremonies
01Q	เทพนิยาย	Buddhist Myths
02	นิทานพื้นบ้าน	Folktales
03	กฎหมายโบราณ	Customary Law
04	จริยศาสตร์	Ethics
05	ประวัติศาสตร์	History
06	โหราศาสตร์	Astrology
07	โคลงกลอน	Poetry
08	ยาสมุนไพร	Traditional Medicine
09	ลัทธิพิธีกรรม	Rites and Rituals
10	ไสยศาสตร์	(White) Magic
11	ปกิณฑกะ	Miscellany

pline for monks and novices. The *vinaya* is divided into five sections, i.e., *mahāvibhaṅga*; *bhikkhuvibhaṅga*; *mahāvagga*; *cullavagga*; and *parivāra*.

(02) *Sutta* (or *suttantapīṭaka*): The canonical scriptures that are regarded as records of the oral teachings of Gautama Buddha. They are divided into the following five sections or *nikāya*: *dīghanikāya* (long *suttas*); *majjhimanikāya* (medium-sized *suttas*); *saṃyuttanikāya* (related to certain

persons or places); *aṅguttaranikāya*; *khuddakanikāya* (small or less significant *suttas*).

(3) *Abhidhamma*: A category of Buddhist scriptures that attempts to use Buddhist teachings to create a systematic, abstract description of all worldly phenomena. The *abhidhamma*, representing a generalisation and reorganisation of the doctrines presented piecemeal in the narrative *sutta* tradition, consists of the follow-

Table 3: Classification System II (Preservation of Manuscripts Programmes in Northern Thailand and Laos)

No.	Name Thai	Name Lao	Name English
01	พระวินัย	ພະວິໄນ	<i>Vinaya</i>
02	พระสูตร	ພະສູດ	<i>Sutta</i>
03	พระอภิธรรม	ພະອະພິທຳ	<i>Abhidhamma</i>
04	คัมภีร์ภาษาบาลี	ຄຳພິພາສາບາລີ	Monolingual Pāli
05	บทสวดมนต์	ບົດສວດມົນ	Chants
06	อาถรรพ์	ອາถິງ	<i>Anisong</i> (Blessings)
07	ชาดก	ຊາດົກ	<i>Jātaka</i>
08	โอวาทคำสอน	ໂອວາດຄຳສອນ	Didactics
09	ประเพณีพิธีกรรม	ປະເພນີພິທີກຳ	Customs and Rituals
10	ธรรมทั่วไป	ທຳທົ່ວໄປ	General Buddhism
11	นิยายธรรม	ນິยายທຳ	Buddhist Tales
12	นิยายนิทานพื้นบ้าน	ນິยายນິທານພື້ນບ້ານ	Folktales
13	ตำนานพุทธศาสนา	ຕຳນານພຸດທະສາດສະໜາ	Buddhist Chronicles
14	ตำนานเมือง / ราชวงศ์	ຕຳນານເມືອງ / ລາຊະວົງ	Secular Chronicles
15	กฎหมาย	ກົດໝາຍ	Law
16	ตำราอักษรศาสตร์	ຕຳລາອັກສອນສາດ	Philology
17	กวีนิพนธ์ร้อยกรอง	ກະວີນິພົນຮ້ອຍກອງ	Secular Literary Works
18	ตำราโหราศาสตร์	ຕຳລາໂຫລາສາດ	Astrology
19	ตำรายา	ຕຳລາຢາ ແລະ ໄສຍະສາດ	Medicine (and Magic)
20	รวมหลายหมวด	ຮວມຫລາຍໝວດ	Miscellaneous
21	อื่นๆ	ອື່ນໆ	Other

ing seven sections: *saṃgiṇī*; *vibhaṅga*; *dhātukathā*; *puggalapaññatti*; *kathāvattu*; *yamaka*; and *paṭṭhāna*.

(4) *Monolingual Pāli*: Buddhist scripts written exclusively in Pāli, not mixed with any other language.

(5) *Chants* (or *suat mon*): This includes *parittas* and other texts recited during a wide variety of ceremonies, mostly but not exclusively religious.

(6) *Ānisaṃsa* (Thai: *anisong*): Texts describing the rewards of meritorious deeds, such as the observance of the Buddhist precepts and the making of personal sacrifices (*paricāga*).

(7) *Jātaka*: Legends about the previous lives of the Buddha. These include both canonical works, such as the stories of the ‘Ten Lives’ and the ‘Fifty Lives’, as well as extra-canonical works.

(8) *Didactics*: Admonitions and instructions (*ovāda*) of the Buddha, for example in the form of wise sayings of

the Buddha (*bhāsita*) and teachings of the elders, such as ‘Grandfather teaches his grandchild’ (*Pu sòn lan*).

(9) *Customs and Rituals*: Texts pertaining to various rituals, such as the consecration of Buddha images (*buddhābhiseka*), formulaic expressions for official acts (*kammavācā*), and sacrificial ceremonies (*phithi bucha*).

(10) *General Buddhism*: Texts dedicated to the Buddhist religion. Teachings of the Buddha constitute important components of these texts. Examples are *Dhamma-mahāvīpāka* and *Dhamma-saṃveja*.

(11) *Buddhist Tales*: Texts of Buddhist provenance in which certain persons are the heroes, for example Phra Malai and Nang Wisakha (*Visākhā*).

(12) *Folktales*: Texts recorded by ordinary people, mostly based on oral traditions.

(13) *Buddhist Chronicles/ Legends*: Texts about the history of Buddhism, including legends about the Buddha or

Buddha images. Examples for such texts are the ‘Legend of the Buddha’ (*Phuttha-tamnan*) and the ‘Legend of the Five Buddhas’ (*Tamnan phra cao ha phra-ong*).

(14) *Secular Chronicles*: Historical texts about the founding of a polity (*müang*) or the history of dynasties (*rājavamsa*). Examples are the Chiang Mai Chronicle (*Tamnan phün müang Chiang mai*), the Chiang Tung Chronicle (*Tamnan Chiang tung*) and the Chronicle of the Dynasties of Lan Na (*Phün ratchawong lan na*).

(15) *Law*: Customary law texts such as ‘The Laws of King Mangrai’ (*mangraisat*), *Dharmaśāstra* (*thammasat*), and ‘The Customs of King Kü Na’ (*Carit kü na*).

(16) *Philology*: Textbooks on the learning of languages such as Tai Yuan (Kam Müang) and Pāli.

(17) *Secular Literary Works (Poetry)*: Poetic texts of mainly non-religious character, mostly composed in poetic structures called *khao* (used only in Lan Na) and *khlong* (used throughout Thailand).

(18) *Astrology*: Astrological treatises, including divination of auspicious days and events. Most of these treatises are written on mulberry paper (otherwise palm-leaf is the overwhelmingly used writing support), and are sometimes richly illustrated.

(19) *Medicine*: Medical treatises about curing various diseases by using local herbs. The Preservation of Lao Manuscripts Programme also includes White Magic (*sainyasad*).

(20) *Miscellany*: Manuscripts containing several texts that belong to different categories. One example is a manuscript from Nan which, though comprising a single fascicle (*phuk*), starts with a historical text and continues with a medical treatise. Thus it has been given the (artificial) name ‘History of Nan and various medical treatises’.

(21) *Other*: Texts that do not fit into any of the categories described above. This last category comprises, for example, seriously damaged manuscripts and modern texts printed in Siamese characters.

Comparing the two different classification systems outlined above, we can discern that the system applied by the Preservation of Manuscripts Programmes in Northern Thailand and Laos appears to have better coherency, clarity and structure. The system used by the Social Research Institute, Chiang Mai University, reflects traditional scholarship, with its basic distinction between Buddhist literature and non-Buddhist literature, the latter divided into seventeen sub-categories. The primary merits of the Classification System II is that it not only avoids unnecessary overlapping and redundancy, but also puts the categories in a well-devised order pertaining to religious versus secular contents. Furthermore, it makes sense not to distinguish between sub-categories of *Jātaka*

stories and to recognise the proximity of the categories ‘Buddhist Chronicles’ and ‘Secular Chronicles’ (called ‘History’ in Classification System I). The concordance in Table 4 may help identify texts that have been classified differently in the two systems.

A common feature of Tai literary traditions is the fact that a single work may have more than one title, and variant titles may sometimes be found *within* the same manuscript. For example, the extra-canonical *Jātaka* story bearing the Pāli title *Dvesīsahamsajātaka*, may also be named *Hong sòng hua* or a combination of these: *Dvesisa hong sòng hua*. An exceptional case is the *Vessantarajātaka*, which can be found under more than ten different titles within Laos, as for example *Vetsantala sataka*, *Vetsandòn sadok*, *Mahasat*, and *Lam pha wet*.

Conversely, general titles such as *Du sankat pi* or *Busa thevada* or *Labiap kotmai* may contain different texts. There are also a number of cases where a text with a seemingly known title is actually quite different, such as the title *Nipphana sut*, which might be presumed to contain the canonical *Mahāparinibbānasutta*, whereas in fact it is a completely different, apocryphal and vernacular text.

Apart from recording the title (if it is not indicated on the front page or in a colophon, a title is provided by the cataloguers) and determining the literary genre as well as the script and language in which the texts are written, all of the projects in Northern Thailand, Northeast Thailand and Laos also record the number of bundles and fascicles of a manuscript, the total number of folios, as well as its location, providing the names of monasteries, villages, districts, and—in the case of private libraries—owners. In the case of a manuscript being dated, its date is also supplied, as a rule according to the CS year; the month or day is only rarely mentioned. The manuscript preservation projects in Northern Thailand and Laos also provide additional information about the writing support (palm-leaf, mulberry paper, etc.) and the physical condition of the manuscripts.

Each manuscript receives a code number referring to province, district, monastery, category, the number of bundles, as well as the number of fascicles contained in each bundle. The code numbers given by the Social Research Institute (Chiang Mai University, SRI), which focuses on the microfilming of manuscripts, record only the year of acquisition, the microfilm reel, the literary genre, and the place within the microfilm reel. Thus a single manuscript is catalogued under two completely different code numbers. One example is a manuscript kept at Wat Phrathat Chang Kham Wōrawihan (วัดพระธาตุช้างค้ำวรวิหาร), Müang district, in Nan province. It contains a secular chronicle entitled *Phün wongsa cao nai sawoei ratchasombat nai müang pua lae müang nan* (พื้นวงศ์เจ้าชายเสวยราชสมบัติ

Table 4: Concordance of classifications in Systems I and II

category	number of category (System I)	number of category (System II)
<i>Vinaya</i>	01	01G
<i>Sutta</i>	02	01E
<i>Abhidhamma</i>	03	01F
Monolingual Pāli	04	—
Chants	05	01O
<i>Anisong</i> (Blessings)	06	01I
<i>Jātaka</i>	07	01A / 01B / 01 C / 01D
Didactics	08	04 / 07
Customs and Rituals	09	09
General Buddhism	10	01H
Buddhist Tales	11	01Q
Folktales	12	02
Buddhist Chronicles	13	01J / 01K / 01L / 01M
Secular Chronicles	14	05
Law	15	03
Philology	16	07
Secular Literary Works	17	07
Astrology	18	06 / 01N
Medicine (and Magic)	19	08 (/ 10)
Miscellaneous	20	11
Other	21	—

The two different code numbers of this particular manuscript, acquired for microfilming by the SRI in 1982, are as follows:

A.) Social Research Institute, Chiang Mai University: 82.107.05.044–044

year		microfilm reel			category		place within microfilm reel					
8	2	1	0	7	0	5	0	4	4	0	4	4

B.) Preservation of Northern Thai Manuscripts Project: นน.01.14.002.00

province		monastery		category		number of bundle			text/ fascicle ¹²	
น	น	0	1	1	4	0	0	1	0	0

ในเมืองบ้านและเมืองน่าน), Chronicle about the rulers in Müang Pua and Müang Nan. The palm-leaf manuscript consists of one fascicle with 130 folios; it is wrapped as one bundle.

3. Digitisation of Tai Manuscripts

In 2004, a pilot project to digitise a sample of Northeast Thai palm-leaf manuscripts was started by Mahasarakham University. A new digitisation project for Northeast Thai manuscripts has been undertaken by The Center for the Research on Plurality in the Mekong Region at Khon Kaen University since 2004. In collaboration with other institutes in Northeast Thailand and supported by the Northern Illinois University (NIU), 50 palm-leaf manuscripts from Northeast Thailand — with three exceptions all written in the regional Lao variant of the Dhamma script—have been digitised and recently put online (<http://sea.lib.niu.edu/kk-palmleaf.html>). A much more ambitious project is being carried out by the Lao National Library to facilitate research and dissemination of Lao literature and culture (and research in Southeast Asian and Buddhist Studies) through the digitisation of approximately 12,000 microfilmed manuscripts and the production of inventories in Lao and English. In September 2009, the Digital Library of Lao Manuscripts was officially launched (<http://laomanuscripts.net/>).

The National Library of Laos undertook research in 2006, 2007, and 2009 towards producing an *Annotated Catalogue of Tai Nua Manuscripts in Northern Laos*, funded by The Toyota Foundation, Japan. The project focused on Tai Nua manuscripts in the *lik* script, which are kept in the homes of lay people in Müang Sing in Northern Laos. These mulberry paper manuscripts are closely related to those of the Tai Nua culture of the Dehong and Jinggu regions of Yunnan Province in Southwest China. They have received almost no scholarly attention, owing to the scarcity of expertise in reading Tai Nua script in Laos. This project is also an important step in the research on Lao literary traditions outside of mainstream Dhamma script literature.

Another centre of manuscript studies in Southeast Asia is based at the centre of the École française d'Extrême-Orient (EFEO) in Bangkok, which is housed within the Sirindhorn Anthropology Center (SAC), a research institute under the Thai Ministry of Culture.¹³ An important project in the field of Buddhist literature is the inventory, digitisation, and study of the corpus of manuscripts related to the tradition of North-

ern Thai *tamnan* or traditional religious chronicles. This work is also being carried on in cooperation with the Siam Society. Since 2005, François Lagirarde, the head of this project, has been in charge of organizing field trips to the provinces of ancient Lan Na, taking high-quality digital photos and coordinating the reading, translating and database processing. Two young graduate researchers from Silpakorn University and a photographer have assisted Dr Lagirarde. The primary aim of this project is very simple: easy access to primary sources. So far hundreds of bundles of palm-leaf manuscripts have been photographed and computerized, the image collection having now reached an approximate total of more than 40,000. The photos were taken of the holdings of one library in Bangkok (The Siam Society) and thirty-five different monastic libraries from all over Northern Thailand. A database of this digital collection is expected to be operational in 2011 on the EFEO, SAC, and Siam Society Internet sites.¹⁴ A comprehensive survey and documentation of Tai manuscripts in Sipsong Panna and adjacent Tai populated areas, such as Simao and Moeng Laem, including the digitisation of the most important manuscripts, is an urgent task. It should follow the guidelines laid down by the successful manuscript preservation projects supported by the German Foreign Ministry in Northern Thailand and Laos.

The above-mentioned inventories and enhanced access to manuscript resources via digital libraries will significantly widen potential research perspectives. This might range from descriptive works, such as annotated catalogues, philological studies focusing on the editing of reliable texts, comparative studies on literary works known throughout the 'Dhamma Script Cultural Domain', Theravada Buddhism, to historical linguistics. Studies on local histories, traditional law, astrology, traditional medicinal healing, and many other related subjects of cultural significance would also be stimulated by using extant manuscripts as primary source material. Finally, studies that analyze the material aspects of Tai manuscripts, their cultural significance and importance in the organisation of traditional knowledge should be strongly encouraged.

¹² This column refers to the sequence of texts/fascicles in a bundle containing several texts. If a bundle contains a single text/fascicle, the code '00' is given.

¹³ The following paragraphs are based on information kindly provided to the author by Dr François Lagirarde (personal communication, 2 February 2010).

¹⁴ This database stresses the need for identifying and distinguishing the texts and using proper titles. As a research program, the EFEO *tamnan* project aims firstly at providing an overall idea of the *tamnan* genre itself. The project will also make use of biblio-metric and biblio-economic data to propose a more accurate understanding of the genre. In its second phase, the EFEO *tamnan* project will propose a more philological and historical approach to deal with the corpus of texts henceforth available. Editing and translating of specific texts are planned, but the project will emphasize the need for comparative readings of different versions of the same text and different texts bearing the same title in order to explain the function of the traditional Buddhist chronicles from Lan Na, which represent a tradition probably born in the early fourteenth century and which became extinct only in the 20th century.

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Research Note

A Case for Multiple Text Manuscripts being ‘Corpus-Organizers’*

This short paper intends to propose a possible understanding of multiple text manuscripts as being ‘corpus-organizers’, and elaborate on the function they may have come to play in a particular manuscript culture. The concept being proposed here—which I dare say is common to many ‘manuscript cultures’, and especially ‘codex cultures’, where ‘multiple text manuscripts’ are widely attested—came to my attention a number of years ago, when in 2002 I happened to be editing the *Acts of Phileas*,¹ a short hagiographical text narrating the trial and martyrdom of the Egyptian bishop of Thmuis (d. 305).

The Ethiopic Acts, probably based on a Greek *Vorlage*, is an interesting piece that, in several places, marvellously integrates a fragmentary Greek text attested by the earlier (P. Chester Beatty XV, dating to 310–350) of the two precious, ancient papyrus witnesses of the *Acts of Phileas* (the latter being P. Bodmer XX, dated 320–350).² The Ethiopic version is attested by several manuscripts known under the traditional labels (used for identification and inventory reasons since the end of the 13th century), which overlap in part, of *Gädlä säma‘tat* (i.e. ‘[Spiritual] Contendings of the Martyrs’) and *Gädlä qəddusan* (i.e. ‘[Spiritual] Contendings of the Saints’). These are manuscripts with hagiographic contents that include several hundred *Acts* of mostly non-Ethiopian martyrs and saints. However, the individual manuscripts of this corpus, even the largest ones, never contain more than a few dozen items. They are usually distributed according to the commemoration days of the saints, but neither the occurrence nor the sequence of the items are clearly fixed, and arrangements according to monthly or yearly liturgical readings often coexist with other organisational criteria that are, as yet, unclear. Over the course of time—following an apogee of this particular type of manuscript in the 14th and 15th

centuries—these criteria and needs shifted, resulting in a radical change and the emergence of different types of texts and manuscripts with quite different types of organization. The codicological and palaeographic evolution of manuscripts during this period, together with the resultant implications occurring in this process, needs to be carefully considered and investigated. These changes are reflected in the ‘material dimension’ of manuscripts (i.e. ‘volume’ as a ‘measure’), varying requirements and needs, the orientation of specific realms of knowledge, as well as transmission processes.

The fact remains, however, that the Ethiopian manuscript culture perceives these manuscripts in a very material and concrete way, according to a concept which is neither that of ‘work’³ nor that of ‘miscellaneous manuscript’. It is notable that Ethiopian literates never hesitated to consistently use the label *Gädlä säma‘tat* to identify manuscripts, thus classifying them and attributing them a precise status on the basis of their textual contents. The term ‘miscellaneous manuscript’, even if classified as ‘homogeneous’ (i.e. not containing unrelated materials), is too generic to use for these *Gädlä säma‘tat* manuscripts.⁴ What is missing is the relational function that links a specific manuscript to others, thus collectively representing and attesting to a corpus of written knowledge and to tools used in a concrete praxis (in the case of *Gädlä säma‘tat*, liturgical readings). Even if perfectly satisfying the atomistic perspective that describes a manuscript as a unicum—a perspective that, not surprisingly, has seen the re-emergence of an actual ‘historical discourse’ that follows the notion of ‘codicological unit’—the term ‘miscellaneous manuscript’ does not fully meet the requirements of a comprehensive manuscriptological approach.

As an alternative, considering a multiple text manuscript to be a ‘corpus-organizer’ seems a better means for defining the exact, concrete intersection between the corpus and

* The context and occasion for this short paper has been a research proposal on Ethiopic manuscripts that lies within the wider framework of a research project on Manuscript Cultures presently being proposed at the University of Hamburg under the directorship of Prof Dr Michael Friedrich. I would like to express my thanks both to him and to Prof Dr Harunaga Isaacson for their stimulating reflections and reactions, as well as for their constructive criticism, remarks and suggestions.

¹ Cf. Bausi 2002.

² Two small parchment fragments of a previously unknown Coptic version — confirming the dating of the martyrdom to 4 February 305, as in the Ethiopic version—have recently (2010) been identified by Schenke in the Kölner Papyrussammlung (Inv. 20838e).

³ This term has been used for *Gädlä säma‘tat* and the like in handbooks on Ethiopian literary history and in manuscripts catalogues. Disregarding other considerations, it may suffice to say here, however, that the term ‘work’ only refers to fixed contents and a precise sequence.

⁴ These terminological problems have been brilliantly examined by several authors: cf. Gumbert 2004, 2010; Maniaci 2004; Andrist 2006; and Crisci and Pecere 2004. They have come up with various proposals, dealing with descriptive problems, however, primarily from a strictly codicological perspective. Further reflections, I believe, could reveal a substantial link underlying these descriptive problems as well as a better understanding of ‘knowledge organization’.

the actual realization of these manuscripts as material objects. Here, the corpus represents a range of a ‘homogeneous continuum’, including possibilities implied by traits that are ‘mentally’ and ‘culturally defined’ (including praxis such as liturgical needs, but also aesthetic and artistic appreciation, literary affinity, etc.).⁵ These traits give a set of manuscripts a precise status (i.e. which makes it a corpus from the internal perspective of a given manuscript culture),⁶ while the actual realization of the manuscripts include its format as well as its actual editorial and textual interventions. The structural and mutual interrelationship between the various manuscripts, and between each of them and the ‘corpus’, is fundamentally one of ‘matter’ to ‘knowledge’ as a function of its organization. In its form and contents, a ‘corpus-organizer’ realizes the contents contained in the ‘projectual intention’ of the copyist, or of those who are behind him.⁷ The ‘homogeneous continuum’—determined by culture and praxis—is intercepted by sets of ‘corpus-organizers’, in that they provide the necessary ‘slots’ for hosting ‘modules’ of written knowledge. Knowledge, in turn, has the function of filling up the ‘slots’ of the ‘corpus-organizers’. This is determined by balanced compromises between habits and innovations, needs and material constraints. Assumed to be units that are serially interchangeable or substitutable, the ‘modules’ provide very concrete evidence for—and prevent circularity in the definition of—the relationship between a corpus and a ‘corpus-organizer’. This systemic and synchronic view—abstract and theoretical as it is—must be contrasted against the diachronic

⁵ The limits of this are unclear, although it is well defined by the entire ensemble of ‘corpus-organizers’. In this sense, the manuscripts materially attest the boundaries of the corpus in which they obtain, but also define them. This, I believe, is a concept complementary to that of the manuscript as a ‘corpus creator’, which has been proposed by Prof Dr Harunaga Isaacson. In my opinion, this should be applied to corpora that prelude a tendentially canonical transmission.

⁶ The term is also used to denote artificial ‘research tools’ used to investigate a particular literary genre, or a variously searchable and utilizable set of texts.

⁷ For the relationship between ‘corpus’ and organization, cf. some hints in this direction that can be found in Gumbert 2004, 37 (‘this sample shows a scribe wrestling with his material and only gradually coming to see how he wants to organize it’); and Petrucci 2004, 3: ‘perché a me sembra che il nocciolo del problema... consista proprio nel rapporto, mutevole e a volte drammatico, fra corpus di testi diversi e corpo materiale del libro contenitore, che il codice miscelaneo comunque propone ed impone...’; *ibid.*, 4: ‘i codicologi, rivolgono la loro attenzione soprattutto a quello che ho definito il ‘corpo’, cioè la struttura materiale dell’oggetto contenitore; gli altri, i filologi, altrettanto naturalmente al ‘corpus’, cioè alla successione dei testi disposti nel medesimo contenitore’; *ibid.*, 6: ‘Nel caso di veri e propri *corpora* organizzati secondo un preciso piano di ordine e di successione dei singoli componenti testuali si è però di fronte ad una involontaria pianificazione dei rapporti infratestuali, che può trasformarsi in tradizione perpetuata nel tempo e prefigurante un ordine di lettura corrispondente a quello stesso dei testi’; *ibid.*: ‘compito ‘degli ordinatori’ testuali’.

developments, as well as the historical and contextual conditions of any given manuscript culture.

For the specific case in point, the Ethiopic *Acts of Phileas*—probably based on a Greek *Vorlage* dating to the Aksumite period, but transmitted within a corpus that also includes other items translated later which were based on other models—is evidence for the on-going role of these manuscripts as ‘corpus-organizers’ and mediators in the transmission of written knowledge within the Ethiopian manuscript culture from late antiquity to the medieval period. In the case of this corpus, clues to understanding the actual function of each manuscript as a ‘corpus-organizer’ can be found in internal, external and material elements, marginalia to the liturgical readings, colophons and subscriptions, as well as the relative sequence of the texts.

Far from being conceived as an autonomous and well-defined witness of texts (as it would appear from a purely philological perspective), each of these ‘corpus-organizers’ acquires its full significance only in mutual relationship to the others. Each manuscript organizes an implicit, but nevertheless also quite material and concrete, evolving knowledge. From this perspective, not only including components is meaningful, but also excluding them.

The concept of the manuscript as a ‘corpus-organizer’ outlined here seems to open up further reflections on the material organization of written knowledge in manuscript cultures. It links material (codicological) and textual (philological) reflections and problems that lie beyond the simple understanding of the manuscript as a ‘text carrier’. Indeed, it seems that other labels and terms—to start with, that of ‘anthology’ (whether authorial or not)—might benefit from fresh theoretical rethinking.

Alessandro Bausi | Hamburg

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Research Note

A Buddhist Colophon from the 4th Century: Its Reading and Meaning

The colophon under discussion is found at the end of a paper roll Buddhist manuscript that is now in the possession of the Anhui Museum in Hefei, China. A facsimile of the manuscript was published for the first time in 1959, but unfortunately the photograph was of poor quality.¹ In the years that followed, this circumstance led to readings that were less than satisfying. Even the much praised corpus of colophons in Chinese manuscripts had to accept this important text with lacunae.²

Meanwhile the situation has changed greatly for the better. In recent years, the Chinese authorities in charge of cultural affairs have launched a prestigious project of compiling a National Catalogue of Rara (*Guojia zhengui guji minglu* 國家珍貴古籍名錄; the phrase ‘valuable traditional books’ is used in the broadest sense of the word, and includes manuscripts independently of the physical distinction of their media, inscriptional rubbings as well as wood-block printed books).

This manuscript has been chosen to be part of the second catalogue, published in 2009, and bears the No. 02452.³

The colophon is written apparently by the same hand that copied the main text. Hence it belongs to the earliest scribal colophons that have survived. The Buddhist monk Baoxian, who has written the colophon, shows a perfect command of the clerical style prevalent in Northern China that is typical of manuscripts from the 4th to 5th centuries AD.

In the course of the Rara Catalogue’s compilation, two scholars of the National Library of China in Beijing took the opportunity to undertake a new reading of the colophon.⁴ Thanks to today’s better conditions, they were able to achieve a coherent reading that is a substantial improvement on the previous ones. Only minor shortcomings have remained. In addition, a particularity in the manuscript deserves attention: There seems to be at least four characters at the bottom of the second line in colophon. Judging from the photograph,



Fig. 1: Baoxian’s manuscript of a Buddhānāma text (dated 399 AD)

¹ Shi 1959, 33.

² Ikeda 1990, 78 with bibliographical information. Cf. also Wang 1997, 75.

³ *Guji minglu* II 2010, Vol. 2, 82–83.

⁴ Lin, and Liu 2009.

they are smaller than the foregoing characters and have been erased with a yellow pigment. But a reading of them is difficult. The colophon reads as follows:

神璽三年太歲在亥正月廿日，道人寶賢於高昌寫此千佛名。願使眾生禮敬奉侍，所生之處，歷奉千佛。

On the 20th day of the 1st month of the 3rd year of the Shenxi era (i.e. 13th March, 399 AD), while Jupiter was occupying the hai station, the Buddhist monk Baoxian copied these Thousand Buddhas' Names in Gaochang. May thereby all living beings be caused to venerate and observe [them] and wherever reborn, encounter the Thousand Buddhas!

The title of this fragmentary manuscript should first be discussed. The Rara Catalogue provides a bibliographic description, saying that the manuscript roll consists of two fragments of the same height (24.5 cm). The longer fragment measures 121.8 cm with 72 written lines, whilst the shorter one is 55 cm with 32 lines. There is no mention concerning the relation between the two pieces. In addition, nothing is said about the beginning and final parts of the roll, and hence the key information about the original title is missing.⁵ The Catalogue lists the manuscript with the title *Xianjie jiubai Foming pin dijiu* 賢劫九百佛名品第九 'Section of Names of the Nine Hundred Buddhas to Appear in the Good Aeon, chapter 9'. On the facsimile we are shown only the end of the roll, but here no title is encountered. This is contrary to the usual practice in traditional Chinese books of writing titles at both ends of a chapter or similar closed units.

We are told that the present title given in the Catalogue is taken from 'the beginning part of the roll'.⁶ On the official home page of the Anhui Museum, we see an image carrying this short section title. Unfortunately the image is cut off from the context so it is not possible to determine its position.

It is, however, disquieting that this heading contradicts Baoxian's own statement concerning the title. In the colophon, he called his manuscript 'Names of the Thousand Buddhas'. Relying on his authority, one can imagine the title 'Names of the Nine Hundred Buddhas' being a mark that separates a section of 100 names, probably from the 801st to the 900th. In fact this type of division can be found in another Buddhanāma sutra (T. 447b), which uses the phrases *jiubai Fo jing* 九百佛竟 'The End of Nine Hundred Buddhas' and *yiqian Fo jing* 一千佛竟 'The End of One Thousand Buddhas'. Even in the section title of the Nine Hundred Names,



Fig. 2: Detail of the Baoxian manuscript

the key word *xianjie* refers to the Thousand Buddhas, since in Buddhist lore, a *xianjie* (*bhadra-kalpa*) has one thousand worthies. In view of these internal and external factors, the proper title of the Baoxian manuscript should be 'Names of the Thousand Buddhas'.⁷ However, a definitive solution of this problem can be only possible after a complete publication of the whole manuscript.

Disregarding a few scribal variants and misspellings, Baoxian's list of the Buddhas' names is very close to that found in the closing part of section 20 of the 6th chapter of the *Xianjie jing* 賢劫經千佛名號品, in the translation by Zhu Fahu 竺法護 (Dharmarakṣa, 230?–316 AD) (T. 425, 14, 49c24–50a20). T. 425 enumerates 70 Buddhas and 1052 Bodhisattvas. The two texts are largely identical in structure. Textual variants are largely of a graphic nature; some variants point to the superiority of the Baoxian manuscript, as for example the expression T. *Qiyinqiang* 其音強 'a Bodhisattva whose voice is strong' vs. ms. *-xiang-* ~香~, 'a Bodhisattva whose fragrance is intense'. The preceding name is *Zhihuihua* 智慧華, 'the Bodhisattva Blossom of Wisdom', which fits better to the manuscript variant of the olfactory sense. *Shenyouli* 甚有力 in the manuscript reveals the corresponding name *Qiyouli* 其~ in T. to be a graphic corruption. Four names of the T. version are missing in the manuscript. With regard to linguistic features, the manuscript appears archaic, with names consisting of either two or three characters. In contrast, T. seems to be a later rearrangement in clear-cut trisyllabic verses.

⁵ As for the description norm, the editors of the Catalogue treat manuscripts as books. In so doing, not all necessary data can be included.

⁶ Lin, and Liu 2009 use the same title, saying 'This [title] has been decided on grounds of the title appearing at the outer part (*juanduan* 卷端)'.

⁷ *Bei Liang Shenxi sannian Baoxian xie Qianfo minghao* 北涼神璽三年寶賢寫千佛名號.

Worship of the Thousand Buddhas was widespread in Central Asia.⁸ ‘Hearing, preserving, and having faith’ in the Buddhas’ names was much encouraged. Copying them was believed to be one way of worshiping the Buddha, and indeed, the earliest witnesses of the worship of the Thousand Buddhas are in the form of words and images. Lists of the Buddha’s names are not only a frequent component in Buddhist scriptures, there are even texts exclusively devoted to enumerating the names of Buddhas and Bodhisattvas, together with, in the rule, an introductory and a summarizing sermon (e.g. T. 440, T. 441).⁹ The Baoxian manuscript appears to represent a third type: it is a pure list of Buddhas’ names. As mentioned above, our manuscript is striking in its lacking an end title. Comparing it with T. 425, we find that T.’s concluding paragraph is not included in manuscript.

Another difference consists in the point that in the manuscript the words *Fo ming*, ‘name of the Buddha (is)’ appear ahead of every Buddha and Bodhisattva, whereas in T. the sections of Buddhas and Bodhisattvas are introduced in each case by an overall heading of the style ‘They are as follows’. If the manuscript indeed contained one thousand Buddhas’ names, Baoxian must have repeated this word one thousand times. In other words, the Baoxian manuscript seems to be a special sort of list of Buddhas’ names. One might ask why Baoxian chose such a labour-intensive way. Was it intended to be an excerpt from a lengthy *Buddhanāma* for liturgical purposes?

The colophon is one of the oldest Chinese Buddhist witnesses to bear the complete date and place of its production,

and thus is an ‘ideal’ Buddhist colophon. In that time, Gaochang (present-day Turfan) was ruled by the Northern Liang (397–439 AD), whose capital was in Guzang (present-day Wuwei). However, owing to the lack of accurate information about its chain of owners, scholars are of different opinions as to its provenance. On the one side, it is believed that the manuscript was found in Turfan (cf. Wang 1997). On the other side, Dunhuang is favoured (Rara Catalogue; Lin, and Liu 2009). Relying on hearsay about its alleged Dunhuang provenance, the paper historian Pan Jixing has placed the Baoxian roll into the Dunhuang group, instead of the Xinjiang group, and considers it a representative sample of paper used in Dunhuang.¹⁰ But the fact is, since it came to the Museum via several hands probably at a rather later date, any claim for the provenance of this manuscript can only be *cum grano salis*. It is generally known this uncertainty also applies to many minor Dunhuang collections of unclear origins, in contrast to those gained through archaeological work and transmitted via secured ways. In this sense, the manuscript of Baoxian is more fortunate as he unambiguously wrote down the place where he produced this manuscript: Gaochang. Indeed it is one of the earliest testimonies of the local Buddhist communities in Chinese Central Asia. Whether the manuscript was later taken to another place or not is not relevant with regard to the fundamental fact of its origin.

Ding Wang | Hamburg

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⁸ Bechert et al. 2010, 257.

⁹ Kuo 1994, 119–147; Schopen 2005, 198–200.

¹⁰ Pan 1979, 174, 176.

Inside MCAA

MCAA People 2010

Visiting Fellows

Again in 2010, generous financial support from the German Research Foundation (DFG) enabled us to invite two outstanding specialists to take part in our research team. They both covered topics on manuscript cultures that are outside those being worked on in our group's projects.

Professor Dr Avihai Shivtiel, a specialist in Semitic languages, literatures, and cultures, stayed with us from May through June. He has published over 150 books, articles, and reviews, as well as entries in three encyclopaedias: the Encyclopaedia of Islam, of Language and Linguistics, and of Arabic Language and Linguistics. Until his retirement in 2007, Professor Shivtiel taught Semitic languages, literatures, and cultures, and served as Head of the Department of Semitic Studies and later of Arabic Studies at the University of Leeds. For many years he also worked concurrently as a Senior Research Fellow at the Taylor-Shechter Genizah Research Unit at the University of Cambridge, which is undertaking a comprehensive programme of conserving, cataloguing, and studying the manuscripts in the Genizah Collection. Professor Shivtiel made a great contribution to the activities of our research group, not only by introducing Arabic and Judaeo-Arabic manuscripts into our discussion, but also by introducing former and current research being done on the topic in the UK, mainly at the University of Cambridge. Professor Shivtiel shared his knowledge with the interested public by giving a public lecture on the Cairo Genizah Collections, and conducted a workshop for our research group on Arabic and Judaeo-Arabic (and to a lesser extent, Hebrew) codicology and palaeography. Professor Shivtiel utilised his stay in Hamburg for collecting materials on various manuscript-related articles he is currently writing.

Professor Dr Hamza M. Njozi from the Muslim University of Morogoro in Tanzania, where he currently serves as Vice Chancellor, stayed with us for the month of June. Be-

fore his appointment as an Vice Chancellor in 2007, Professor Njozi taught literature for twenty-three years at the University of Dar-es-Salaam, with temporary stays abroad on the invitation of various renowned institutions, including the University of London (SOAS) and the Center for African Studies at the University of Florida. Professor Njozi's broad range of interests and considerable authority in the fields of literature, folklore, and politics are documented in numerous books and articles, of which many have been translated into more than one language. Professor Njozi is one of the few experts worldwide on Swahili literature and Swahili manuscripts in Arabic script. While in Hamburg, Professor Njozi continued his research on the relationship between manuscripts and textual transmission, and in spite of his very short stay, made a considerable number of new discoveries, that will, among other things, shed new light on the transmission of the 'Poem of Mercifulness' (Utenzi wa Shufaka), a classical Swahili epic. Professor Njozi gave a talk on Swahili manuscripts in Arabic script to an interested public.

During their stays, both visiting fellows were able to conduct their research in the idyllic atmosphere of our premises at Rothenbaumchaussee 34, and participated actively in the research activities of our group. It was very special to have two such inspiring personalities at our institute, and we were grateful for the daily chances we had for informal exchange about our work in the field of manuscript studies. Both experts are held in great esteem and were much sought after by colleagues as well as students, stimulating the research being done in the field of manuscript studies on many levels. We wish to express our warmest thanks to our visiting fellows for their contributions to our project, and we all hope that there will soon be another occasion to continue our discussions.

Hanna Sofia Hayduk | Hamburg

Inside MCAA

MCAA International Conference *On Colophons* 3–5 December 2009

Conference Report

In most of the world's manuscript cultures, colophons are commonly encountered. Although they are an indispensable aid in the study of manuscripts, as for example as a means of dating or obtaining information about manuscript transmission, to date only a few efforts have been made to examine them on a systematic and comparative basis. To fill this gap, the research group 'Manuscript Cultures in Asia and Africa' convened a conference on colophons at the University of Hamburg, which was held 3–5 December 2010.

Taking into consideration the enormous differences between the various manuscript cultures, the main objective of the conference was not to arrive at a general characterisation, but to present and discuss the individual traditions. A number of guidelines, however, were provided to the participants in advance, as for example, the genesis of the genre, typological and systematic standards, particularities of native terminology, and specifics of usage.

By chance, the first two lectures approached the question of colophons from entirely opposite directions, establishing thereby a perfect framework within which the other presentations could be placed. In his keynote address, Professor Dr Richard Salomon (University of Washington), a specialist on Gandharan scrolls, offered a description of some rare specimens of this early, recently rediscovered Indian manuscript type. Despite the fact that within this corpus, colophons have very rarely been preserved, the three examples he brought forward embodied the three main aspects of this genre: a) the primary function as a means of identification and/or transmission (e.g. recording the name of the scribe or author); b) a discernible tendency towards standardisation (e.g. their size, number of lines, order of categories, etc.); and c) the colophon's role as paratextual means for contextualizing a given manuscript (e.g. providing a donor dedication or recording merit).

In contrast, Dr Lucien Reynhout (Bibliothèque Royale de Belgique, Bruxelles), the renowned author of *Formules latines de colophons*, based his in-depth study on colophons in Medieval Latin manuscript culture on a vast foundation of analysed manuscripts. He has established a detailed typology that covers almost every type of colophon to be found in the Occident. His final differentiation between a 'common cul-

tural ground' and an 'anthropological ground' might serve as promising basis for comparative studies.

The contribution on colophons within the Jewish manuscript tradition, presented by Professor Dr Gianfranco Miletto (Universität Halle), stressed again the close relation between the religious status of manuscripts and the meta-commentary provided by the colophon. The discourse within the colophon of the Jewish manuscript tradition, however, reflects less the socio-religious aims of the scribe or initiator, as for example in comparison to Buddhist examples, than the religious status of the written word.

A preliminary decision was made to group most of the remaining presentations according to regional criteria rather than methodological or phenomenological aspects. This decision proved to work well, as on one hand, genealogical relationships gained clarity, while on the other, vague differences between related cultures came into view more distinctly.

The two presentations dealing with colophons in East Asia both dealt with manuscripts related to the Buddhist tradition and were related to shifts in medium. Mark Schneider, MA (Universität Hamburg) spoke on the topic of late medieval Japanese Buddhist manuscripts, thereby tracing the shift in media from manuscript to woodblock print. Dr Wang Ding (Universität Hamburg), in his introduction to colophons in the Chinese Buddhist tradition, included early colophons and related paratexts on materials other than paper.

Professor Dr Dorji Wangchuk (Universität Hamburg) gave an extensive overview of the colophon tradition in Tibet, including woodblock prints. As distinguishing functions he pointed out the denoting of authorship, meta-strategies to mark intentional changes during the copying process, and specific ways colophons have been used in printed versions. As well, a further characteristic is seen in the various ways paratextual information was handled during the process of adopting Indian texts. Dr Yukiyo Kasai (Berlin-Brandenburgische Akademie der Wissenschaften) presented Buddhist colophons from the Uighur tradition which developed under the influence of the Chinese Buddhist tradition (Dunhuang). Not surprisingly, in this context, the presented material regularly mentions the donor.

The next lecture dealt with the origins of the Buddhist colophon tradition. Professor Dr Oskar von Hinüber (Universität Freiburg) gave an extensive overview of all aspects of colophons as they were used in India, the birthplace of Buddhism. Apparently, emphasis on the donor is strongly connected to the Buddhist tradition and its concept of merit. Professor Dr Volker Grabowsky (Universität Hamburg) discussed colophons in modern Thai Lü manuscripts, dealing with a rather recent revival of a manuscript culture as part of a renewed self-awareness and quest for cultural identity.

With the last three lectures, the conference returned to monotheistic traditions. Dr Rosemarie Quiring-Zoche (Universität Jena) dealt with colophons in Arabic manuscripts. In addition to their close relation to certificates of transmission ('*Hörerzertifikate*'), here the content seems restricted to remarks concerning the production of the text. Another aspect worth mentioning is the strong tendency in Arabic manuscripts to use certain graphic arrangements such as a triangle or trapezium, something also seen in other regions. Professor Dr Nikolay Dobronravin (St. Petersburg State University) continued the theme of manuscripts from the Islamic tradition, discussing transcultural phenomena reaching from Africa to the New World: Arabic and

Ajami colophons in West Africa and in 19th century Brazil. Last but not least, Dr Anaïs Wion (Centre d'études des mondes africains, Paris) looked at colophons in Ethiopian manuscripts, discussing several questions and problems of transmission, especially as part of historiographic texts.

A very lively discussion, stimulated in part by some general remarks by Dr Eva Wilden (Universität Hamburg/EFEO), concluded the conference. To mention just a few of the topics that were discussed: Strong emphasis was placed on the difference between textual and codicological approaches to the phenomenon of colophons. Various misunderstandings could be traced back to inconsistency of terminology in this regard. Close relations to other paratexts were observed in several manuscript cultures, especially with regard to titles. Nevertheless, the predominant position of colophons in most cultures still remains the bottom of the text, insofar as most of information they contain presumes that the text's composition or copying is finished. Another interesting feature was the concept of a 'Buddhist colophon' tradition covering East, South and Central Asia.

The conference proceedings will be published in *Studies in Manuscript Cultures* at de Gruyter.

Jörg B. Quenzer | Hamburg

Inside MCAA

MCAA International Conference *One-Volume Libraries* 7–9 October 2010

Conference Programme

■ Thursday 7 October 2010 | Asien-Afrika-Institut

- | | |
|-----------------|---|
| 2.00 pm–2.15 pm | Opening and Welcome |
| 2.15 pm–3.15 pm | Composite Manuscripts and Multiple Text Manuscripts in Japan
Prof Dr Niels Gülberg, Waseda University Tôkyô |
| 3.15 pm–4.15 pm | Multiple Text Manuscripts from Early Imperial China (2nd Century BC)
Prof Dr Michael Friedrich, Universität Hamburg |
| 4.45 pm–5.45 pm | Manuscripts as Products of Accumulation: The Case of a 10th Century Chinese Manuscript from Dunhuang
Dr Imre Galambos, British Library (IDP), London |
| 5.45 pm–6.45 pm | One-Volume Libraries in the Malay Tradition
Prof Dr Ulrich Kratz, University of London (SOAS) |

■ Friday 8 October 2010 | Asien-Afrika-Institut

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|-------------------|--|
| 9.00 am–10.00 am | Mravaltavi. Old Georgian Collective Manuscripts
Prof Dr Jost Gippert, Universität Frankfurt |
| 10.00 am–11.00 am | A Buddhist Multiple Text Manuscript from Gilgit (Northern Pakistan)
Dr Gudrun Melzer, Universität Leipzig |
| 11.30 am–12.30 pm | Collecting the Secret: Multiple Text Manuscripts of Buddhist Tantric Literature in Sanskrit
Prof Dr Harunaga Isaacson, Universität Hamburg |
| 2.00 pm–3.00 pm | Tibetan Zen Miscellanies: The Roles of Pedagogy, Patronage and Liturgy in the Creation of Multiple Text Manuscripts
Dr Sam van Schaik, British Library (IDP), London |
| 3.00 pm–4.00 pm | Composite Manuscripts and Multiple Text Manuscripts in the Cairo Genizah
Prof Dr Avihai Shvitiel, University of Leeds |
| 4.30 pm–5.30 pm | Arabic Collective Manuscripts and the Teaching Tradition of the Mediaeval Madrasa
Prof Dr Gerhard Endreß, Ruhr-Universität Bochum |
| 5.30 pm–6.30 pm | From Portable Libraries to Scrapbooks: Ottoman Miscellaneous Manuscripts in the Early Modern Age
Prof Dr Jan Schmidt, Universiteit Leiden |

■ Saturday 9 October 2010 | Asien-Afrika-Institut

- 9.00 am–10.00 am** **A few Observations on Text Collections, Handbooks and Miscellanies in the Ethiopian Islamic Tradition**
Prof Dr Alessandro Gori, Università degli Studi di Firenze
- 10.30 am–11.30 am** **Miscellaneous Manuscripts and Church Identities: The Ethiopian Evidence**
Prof Dr Alessandro Bausi, Universität Hamburg
- 11.30 am–12.30 pm** **Miscellaneous Manuscripts and Church Identities: Alexandria and Antioch in the Codex Veronensis LX**
Prof Dr Alberto Camplani, Università di Roma (La Sapienza)
- 2.00 pm–3.00 pm** **From Single Text to Multiple Text Manuscripts: Transmission Changes in Coptic Literary Tradition. Some Case-Studies from the White Monastery Library**
Dr Paola Buzi, Universität Hamburg
- 3.00 pm–4.00 pm** **The Mediaeval Codex as a Multifaceted Container: the Greek and Latin Tradition**
Prof Dr Marilena Maniaci, Università degli Studi di Cassino
- 4.30 pm–5.00 pm** **Conclusion**

Discussants

Dr Dmitry Bondarev, University of London (SOAS)

Prof Dr François Déroche, Ecole Pratique des Hautes Etudes, Paris

Prof Dr J. Peter Gumbert, Universiteit Leiden

Prof Dr Philip J. Jaggard, University of London (SOAS)

■ Sunday 10 October 2010 | MCAA (Rothenbaumchaussee 34)

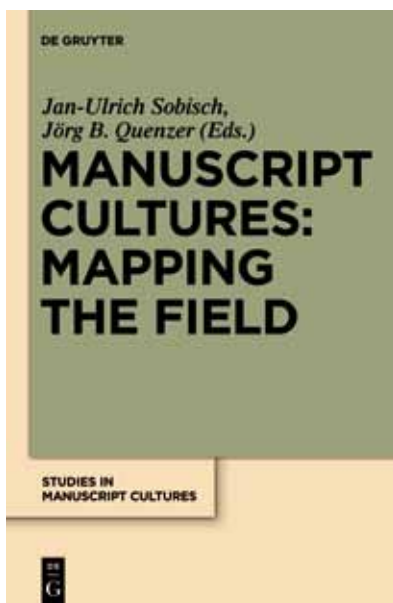
- 10.00 am–12.00 noon** **Presentation of the Concept of the 'Encyclopedia of Manuscript Cultures in Asia and Africa'**

Inside MCAA

MCAA *Studies in Manuscript Cultures*

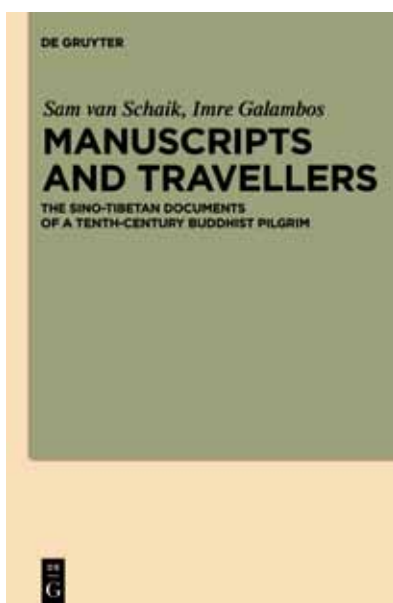
We are proud to announce publication of the first two volumes of the new series *Studies in Manuscript Cultures* (SMC) which is edited by three members of MCAA and published by de Gruyter in Berlin. They are scheduled to appear in September 2011 and represent the idea behind the series: to publish monographs and collective volumes contributing to the emerging field of manuscript studies (or manuscriptology) including disciplines such as philology, paleography, codicology, art history, and material analysis. SMC encourages comparative study and contributes to a historical and systematic survey of manuscript cultures, providing a new foundation for current discussions in Cultural Studies. For further information, please see:

<http://www.degruyter.de/>



Jörg B. Quenzer, and Jan Sobisch (eds.), *Manuscript Cultures: Mapping the Field*

What do Mesoamerica, Greece, Byzantium, Island, Chad, Ethiopia, India, Tibet, China and Japan have in common? Like many other cultures of the world, they share a particular form of cultural heritage: ancient handwritten documents. In 2007, scholars from some 20 countries around the world gathered at the University of Copenhagen for a workshop on manuscripts to compare notes. This event led to the publication of this volume, which brings together 16 articles on philological, cultural, and material aspects of manuscripts in search for a common ground across disciplines and cultures.



Sam van Schaik, and Imre Galambos, *Manuscripts and Travellers: The Sino-Tibetan Documents of a Tenth-Century Buddhist Pilgrim*

This study is based on a manuscript which was carried by a Chinese monk through the monasteries of the Hexi corridor, as part of his pilgrimage from Wutaishan to India. The manuscript has been created as a composite object from three separate documents, with Chinese and Tibetan texts on them. Included is a series of Tibetan letters of introduction addressed to the heads of monasteries along the route, functioning as a passport when passing through the region. The manuscript dates to the late 960s, coinciding with the large pilgrimage movement during the reign of Emperor Taizu of the Northern Song recorded in transmitted sources. Therefore, it is very likely that this is a unique contemporary testimony of the movement, of which our pilgrim was also part. Complementing extant historical sources, the manuscript provides evidence for the high degree of ethnic, cultural and linguistic diversity in Western China during this period.

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MCAA Calendar 2010

■ 9 January

Presentation of the research group at the Third General Meeting of the 'European Consortium for Asian Field Study'; (ECAAF) MCAA, Universität Hamburg

■ January

Dr Anaïs Wion

Participation in the seminar 'L'apport des disciplines érudites à l'étude de l'écrit' organised by B. Fraenkel (EHESS) and the research group 'Pratiques d'écriture: corpus, analyses, enquêtes', EHESS. Title of the paper: 'Stratégies d'écriture des chartes: privilèges royaux, exceptions princières et roublardises cléricales (Éthiopie, XVe–XIXe s.)'

■ 29 January

Prof Dr Tilman Seidensticker

Die 'Katalogisierung der Orientalischen Handschriften in Deutschland' zwischen Minimal- und Maximalprogramm. Lecture given at the workshop 'Islamische Handschriften in Deutschland', Orientalisches Institut/ Universitätsbibliothek Leipzig

■ 29 January

Prof Dr Bernd Neumann

Manuskriptbeschreibung mit Bildanalysemethoden. Lecture given at the workshop 'Islamische Handschriften in Deutschland', Universitätsbibliothek Leipzig

■ 24 March

Dr Florian Sobieroj

The way of mystical states and stations in classical Sufism: the 'Uyun al-ajwiba of al-Qushayrī'. Lecture given at the University of Human Unity, Auroville, India

■ 12 April

Camillo A. Formigatti, MA

Manoscritti parlanti. Oralità e auralità, scritture e manoscritti nell'India tradizionale. Lecture given at the Università degli Studi di Milano, Dipartimento di Scienze dell'Antichità

■ 22 April

Prof Dr Michael Friedrich,

Prof Dr Jörg B. Quenzer

Das Manuskript als Leitmedium der Buchkulturen Ostasiens. Lecture given at the Conference 'Handschriften- und Textforschung heute', Universität Hamburg

■ 6 May

Prof Dr Ahivai Shivtiel, University of Leeds

What is the Cairo Genizah? Lecture given at MCAA, Universität Hamburg

■ 20 May

Prof Dr Tilman Seidensticker

Islamische Kleinhandschriften. Lecture given at the 'Bayerisches Orient-Kolloquium', Bamberg

■ 28 May

Prof Dr Tilman Seidensticker

Der Tübingen Umar aus kodikologischer Sicht. Lecture given at 'The Arabian Nights Workshop', Universität Erlangen

■ 28 May

Nafiseh Sadat Sajjadi, MA

From manuscript to print: variance in text and media of copies of Shahnama from 19th century Iran. Lecture given at the 'Conference on Codicology and History of the Manuscript in Arabic Script', Madrid

■ 17 June

Prof Dr Hamza M. Njozi, Muslim University of Morogoro, Tanzania

Swahili-Arabic Manuscripts: Some Preliminary Observations. Lecture given at MCAA, Universität Hamburg

■ 8 July

Prof Dr Alessandro Bausi, Universität Hamburg, and Prof Dr Alberto Camplani, Università di Roma, La Sapienza

The Recovery of Late-Antique Church Archives: Methodological Considerations about new Ethiopic Documents and their Coptic and Latin Parallels. Lecture given at MCAA, Universität Hamburg

■ 15–23 July

Prof Dr Harunaga Isaacson

Organized the 'Third International Workshop on Early Tantra'. Paper: *Further notes on the Trisamayāraṭīkā and the Kalyāṇakāmadhenu*, Asien-Afrika-Institut, Universität Hamburg

■ 23–24 July

Prof Dr Bernd Neumann

Developments in Computer-supported Palaeographic Analysis. Keynote-Lecture given at the workshop 'Digital Support for Manuscript Analysis', Universität Hamburg

■ 3 August

Dr Eva Wilden

Text Constitution and Manuscripts: the Cases of Kuṇṭokai, Naminai and Akanāṇūru. Lecture given at the Classical Tamil Summer Seminar, Pondicherry, India

■ 19 August

Dr Orna Almogi

The Circulation of Manuscript and Xylograph Editions of the Tibetan Canon: A Preliminary Survey. Lecture given at the 12th Seminar of the International Association for Buddhist Studies, Vancouver

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MCAA Calendar 2010

■ 8 September

Dr Ding Wang

Some questions concerning Chinese Buddhist colophons. Lecture given at the Institute of Research in Chinese history, Peking University, Beijing

■ 15 September

Prof Dr Tilman Seidensticker

Eine kleine Einführung in die klassische arabische Literatur. Lecture given on the occasion of the opening of the exhibition 'Die Wunder der Schöpfung' at the Bayerische Staatsbibliothek, München

■ 23 September

Dr Florian Sobieroj

Mystische Zustände und Standplätze in einem wiederentdeckten Text al-Quschairis. Lecture given at the 31. Deutscher Orientalistentag, Marburg

■ 26 September

Prof Dr Harunaga Isaacson

On the Importance of Sanskrit and of Sanskrit Manuscripts for the Study of Buddhism. Invited lecture given at the Department of Philosophy, Tsinghua University, Beijing

■ 27 September

Dr Orna Almogi

Towards a History of the Transmission of the rNying ma rgyud 'bum Manuscript Collections. Lecture given at the China Tibetology Research Center, Beijing

■ 2 October

Dr Orna Almogi

Travelogues as Sources for the Study of the Culture of the Book in the Tibetan Cultural Sphere: The Example of Kah thog si tu Chos kyi rgya mtsho's gNas yig. Lecture given at Renmin University, Beijing

■ 7–10 October

One-Volume Libraries: Composite Manuscripts and Multiple Text Manuscripts. International Conference organized by Prof Dr Michael Friedrich and Dr Hanna Sofia Hayduk, Universität Hamburg. Abstracts are available online at <http://www.manuscript-cultures.uni-hamburg.de/Abstracts-One-Volume-Libraries.pdf>

■ 19 October

Prof Dr Harunaga Isaacson

Sanskrit Manuscript Culture. Invited lecture given at the China Tibetology Research Center, Beijing

■ 23–26 October

Dr Ding Wang

Co-organized the 'Turfan Forum - Old Languages of the Silk Roads'. Paper: *Barbarian features in Chinese manuscripts and inscriptions*, Turfan, China

■ 11 November

Dr Susan Whitfield, British Library (IDP), London

The History and Formats of Silk Road Manuscripts: Interchanges of Cultures. Lecture given at MCAA, Universität Hamburg

■ 2 December

Angelika Wöbken,

Bundeskriminalamt, Wiesbaden

Methodische Grundlagen der forensischen Schriftuntersuchung und die Arbeitsweise des Handschriftenerkennungsdienstes. Lecture given at MCAA, Universität Hamburg

■ 16 December

Dr Dmitry Bondarev, SOAS London,

Dr Doris Löhr, Universität Hamburg,

Dr Abba I. Tijani, University of Maiduguri

Bridging linguistics, palaeography, and codicology: Old Kanembu in the Borno Qur'anic manuscripts. Lecture given at MCAA, Universität Hamburg

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Japanese Studies	Variance and Change of Media in Late Medieval Japan: The Tradition of the 'Direct Instructions' (<i>jikidan</i>)
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Ethiopian Studies	Variance in the Ethiopian Short Chronicles Corpus (18 th –20 th c)
Informatics	Computer-Based Analysis of Asian and African Manuscripts



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