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HEFT 89

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METHODS AND A CASE STUDY

ARBEITSKREIS FÜR TIBETISCHE UND BUDDHISTISCHE STUDIEN UNIVERSITÄT WIEN
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CONTENTS

LIST OF ILLUSTRATIONS

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This short, illustrated work is a product of the "Kingship and Religion in Tibet" research group based at Ludwig-Maximilians-Universität München from 2010 to 2015. The group's research, sponsored by the Alexander von Humboldt Foundation and the German Federal Ministry of Education and Research, concerns the study of Tibetan kingship in relation to ritual and narrative from the period of the Tibetan Empire (c. 608–866) up through approximately the thirteenth century. In charting the manner in which depictions of kings have shifted over time in Tibet, we have had to attend to properly dating our sources, be they iconographic, architectural, or textual. In attempting to date epigraphic and manuscript evidence such that one can place their testimonies in a proper temporal context, the research group has innovated results-driven methods in codicology, paleography, orthography, and lexicography. This has been a collective effort, and Brandon Dotson acknowledges the input and labor of the group's members who have contributed to the documentation and study of a large corpus of early Tibetan inscriptions and manuscripts. In particular, he wishes to honor the work of team members Lewis Doney, Nathan Hill, Gergely Orosz, Dorje Thondup, Iwao Ishikawa, and Emanuela Garatti.

While the present work evolved out of the activities of the "Kingship and Religion in Tibet" research group, it is a collaborative effort indebted to a larger community of scholars. In June 2012 the research group invited leading scholars in the field of early Tibetan manuscript studies to Munich to take part in a conference and workshop, "Merkmals and Mirages: Dating (Old) Tibetan Writing." There, Brandon Dotson presented a "beta-version" of the present work by way of an introduction to the research group's evolving methods in codicology, paleography, and orthography. The contributions at this conference, both in the form of the papers delivered and in the focused discussions in a workshop, accelerated the research group's progress and fed in to the present work. The authors are grateful to Lewis Doney for organizing the conference, and to the conference participants, Stefan Baums, Cathy Cantwell, Jacob Dalton, Amy Heller, Nathan Hill, Kazushi Iwao, Matthew

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Another fortuitous development was that Agnieszka Helman-Ważny, who presented a paper on codicology, expressed an enthusiasm for the group's methods and suggested that she augment them with her own expertise in the field of codicology and describing the physical features of manuscripts. This task was combined with her prior DFG-project undertaken at the University of Hamburg (PI: Prof. Michael Friedrich) intending to create a typology of Central Asian paper during the first millennium CE based on systematic, codicological, and microscopic studies of collections found in Dunhuang and Turfan. Her research was funded by the Deutsche Forschungs-Gemeinschaft (DFG) within the project "History and typology of paper in Central Asia during the first millennium AD: Analysis of Chinese paper manuscripts" (2010–2013), Abteilung für Sprache und Kultur Chinas, Universität Hamburg/ AAI, Germany (Grant number Fr702/9-1).

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INTRODUCTION

In recent years the methods for describing and studying Tibetan documents have grown increasingly sophisticated. Philologists have turned their hands to paleography in order to identify scribal hands, define styles of Tibetan writing, and attempt to fix in time some of the manuscripts that are currently undated. Those working on early inscriptions and manuscripts draw on each other's observations in order to identify and record an increasing number of features that may be relevant for dating Tibetan writing. With this has come a greater appreciation of the physicality of documents—be they manuscripts or inscriptions—as objects existing within a social context. Alongside advances in codicological, orthographical, and paleographical methods, and their application by scholars in their work on individual documents, there has also been a recent trend towards synthesis and overview. This latter trend is expansive in its orientation and ambitious in its goals in that it draws on all available methods in order to attempt to define how various observable features of Tibetan documents are distributed not only within a collection, such as that of Cave 17 in Dunhuang, but across time and place in collections from Mīrān, Mazār Tāgh, Turfan, Tabo, and so forth. It is no accident that this coincides with the rise of digital humanities and the accessibility of searchable transliterations and high-quality digital images. These, along with other new technologies, allow the philologist or digital humanist to achieve in a matter of minutes what would have taken hours, days, or weeks in the past.

The present contribution is a product of these recent developments in the study of Tibetan documents and Tibetan writing. Focusing on early Tibetan documents, and in particular upon paper manuscripts unearthed from Cave 17 in Dunhuang, the intention is to introduce a practical and systematic approach to describing early Tibetan documents and writing, and to perform a demonstration of these methods through a case study the *Old Tibetan Chronicle* and related documents. These methods are tailored to the investigation of early Tibetan writing, but the principles they outline, along with many of the specific techniques, are applicable to diverse Tibetan documents and writings.

More so than archeological, art-historical, linguistic, and genetic evidence, written documents are our most important and most detailed sources for the history of early Tibet. This includes the period of the Tibetan Empire (c. 608–866), when Tibet was one of the most important military and cultural forces in all of Eurasia.[1] Tibetans developed a written script in the first half of the seventh century, and kept records on stone, wood, and paper.[2] Most of these documents have been catalogued, and many have been studied.[3] Despite the quickening pace of research and the efforts of several excellent scholars, there remains a great deal of work to be done. Even our fundamental assumptions about the culture of the early empire, and about the dates of the Dunhuang manuscripts—our most important sources for the study of this period—remain open to debate. These manuscripts were deposited in Cave 17 in Dunhuang, a cave measuring roughly three cubic meters that was carved into the wall of Cave 16 between 834 and 836, and apparently sealed off in the first half of the eleventh century.[4] It was discovered again at the turn of the twentieth century, and its contents were carted away to museums and libraries in England, India, France, Russia, Japan, and China.[5] After a century of scholarship on the Dunhuang manuscripts, our assumptions about the Tibetan documents recovered from Cave 17 have undergone a sort of inversion: while it was once assumed that the vast majority of the manuscripts written in Tibetan dated from the period of Tibetan occupation of Dunhuang (786–848), it has become increasingly clear that a large proportion was written after the fall of

[1] For a political and military history of the Tibetan Empire, see Beckwith 1993. 608 is, arguably, the date of the first Tibetan diplomatic embassy to the Sui, and 866 marks the relative end of the "mopping up" of the last Tibetan imperial forces in the northeast.

[2] On the origin of the Tibetan script, see, most recently, van Schaik 2011. Cf. Schuh 2013.

[3] Among these catalogues, see Lalou 1939, 1950, 1961; Thomas 1935, 1951, 1955, 1963; la Vallée-Poussin 1962; Takeuchi 1998; Chayet 2005; Dalton and van Schaik 2006; Ma 2011; and Iwao, van Schaik, and Takeuchi 2012.

[4] The most balanced and perceptive summary of the nature and chronology of Cave 17 recognizes that it served multiple functions, including reliquary and storehouse; see van Schaik and Galambos 2012: 18–28. See also Imaeda 2008.

[5] These events have been described on numerous occasions; see, for example, Dalton and van Schaik 2006: xi–xix.

the Tibetan Empire in the early, or Zhangshi Guiyijun (848–c.915), or the late, or Caoshi Guiyijun (c.915–1036) periods.[6] The initial scholarly conflation of "Tibetan" with "imperial" also played into a tendency to lump "post-imperial" Tibetan Dunhuang documents into an undifferentiated mass. Additionally, there was a tendency among Tibetologists to focus myopically on the Tibetan documents to the exclusion of those in Chinese, Khotanese, Uighur, and so forth. Nowhere is this more apparent than in the way that Tibetologists have tended to catalogue those numerous texts written in Tibetan on one side and Chinese on the other: the Tibetan side—that is, the one on which Tibetologists focus—was often called "recto," despite the fact that the Chinese side was almost always written first. Re-cataloguing these documents and replacing most of these "rectos" with "versos" is a salutary lesson in the manner in which our assumptions shift, and is also a modest leitmotif for scientific progress.

With the clarity of hindsight, and with the knowledge that Tibetan continued to be used by Chinese, Uighurs, Khotanese, and Tibetans in Dunhuang and neighboring kingdoms as a *lingua franca* and as the language of Tibetan Buddhism, the overturning of our earlier assumptions seems obvious. The Tibetan Empire only persisted in Dunhuang for just over a decade after Cave 17 was carved. Most of the cave's "life" stretched over 150 years of the Zhangshi Guiyijun and Caoshi Guiyijun periods, from 848 to the walling up of Cave 17 some time in the first half of the 11th century. To find their way into Cave 17, Tibetan imperial manuscripts would therefore need to have a) been deposited between the completion of the cave in 836 and the victory of the Zhangshi Guiyijun in 848; b) been kept in a personal collection or archive before being deposited in the cave at any point up until its sealing;[7]

[6] See Uray 1981, Takeuchi 2004 and 2012a, Dalton and van Schaik 2006: xx–xxi. During this time Tibetan language enjoyed a high status as a prestige language, and was used in personal and official correspondence as well as in religious and other writings by Chinese, Uighurs, Khotanese, and Tibetans; see Takata 2000 and Takeuchi 2004.

[7] This seems to have been the case with a group of texts that belonged to, or pertained to Hongbian, the great monk to whom Cave 17 was dedicated as a reliquary shrine after his death in 862; see van Schaik and Galambos 2012: 18–19. Collections of documents from Sanjie Monastery and Baoen Monastery were also deposited in the cave; see Imaeda 2008.

or c) remained in circulation from, or even prior to, the beginning of Tibetan occupation in c.786 and the sealing of the cave in the first half of the eleventh century until finding their way into the cave at some point before its sealing. These factors tend to justify the "late-until-proven-early" approach to Tibetan Dunhuang manuscripts.

Absent dates, seals, or obvious datable features, this inversion of our assumptions does not necessarily help us to distinguish imperial from Zhangshi Guiyijun or Caoshi Guiyijun Tibetan manuscripts. Rather, and as one might assume, it has tended to problematize such distinctions, particularly between imperial-period documents and early, Zhangshi Guiyijun documents. We now appreciate, for example, that there was a large degree of continuity in Dunhuang between the successive Tang, Tibetan, and Guiyijun periods. This is reflected clearly in the many shared administrative and tax structures, but also in scribal practice.[8] We know, for example, that many if not most of the scribes who worked for the Dunhuang chancellery and who were responsible for copying the Tibetan *Śatasāhasrikāprajñāpāramitā-sūtra* and the *Aparimitāyur-nāma mahāyāna-sūtra,* in addition to the Chinese copies of the latter, and the Chinese *Mahāprajñāpāramitā-sūtra,* were ethnically Chinese. It is a fair assumption that these same scribes continued to be employed under the Guiyijun regime after the overthrow of Tibetan occupation, and that the change of regime did not necessarily usher in a new scribal culture. In this context Sam van Schaik makes the point that imperial styles of writing would "probably survive the fall of the Tibetan Empire by at least a generation."[9] This is also true in terms of the material basis for the manuscripts, where there were no significant changes to paper production techniques in Dunhuang between the early ninth and the late tenth centuries.[10]

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[8] On shared administrative structures and the use of similar land units, see Iwao 2009: 100–101.

[9] Van Schaik 2013: 120, n. 3. It also appears that some of the editorial practices introduced to Dunhuang Chinese editors by way of Tibet persisted after the collapse of Tibetan occupation. On the use of the term 兌 *dui,* "exchange," in the margins of panels of Chinese *Mahāprajñāpāramitā-sūtras* commissioned as part of a gift for the Tibetan emperor, and its possible connection with similar editorial notes in the margins of Tibetan *Śatasāhasrikāprajñāpāramitā-sūtra* produced by the same cohort of scribes, see Dotson 2013–2014: 56–61; cf. Schneider 1996: 141–46.

[10] See Helman-Ważny and van Schaik 2013: 738–39; also Drège 2002: 126–27.

Methodology

While these advances in our knowledge might appear to push our horizons back, making it seem ever more difficult to gain any purchase on this collection of manuscripts, they accompany and complement parallel, piecemeal advances that cause us to be optimistic about the prospects for dating Dunhuang documents. This philologically minded research brings to bear every instrument in our methodological toolkit in order to try to describe and date Tibetan documents and Tibetan writing. It is the result of the manner in which philologists have turned their hands to manuscript studies, paleography, and codicology, drawing on their own expertise in, for example, linguistics, orthography, textual criticism, and lexicography. As a result, we have at our disposal numerous methods for dating Tibetan documents and writings, and it has become an oft-repeated but no less profound truism that one must use all methods available in order to understand and date Tibetan writing. The use of official seals belonging to a particular period, or the appearance of the names of known individuals such as Hongbian, or more specific text-internal clues such as a year in the twelve-year cycle, are among the most straightforward clues for dating a document. Codicological observations are also crucial: texts written on the back of imperially sponsored *Prajñāpāramitā* panels and folia can only have been written after the commission of the *Prajñāpāramitā,* which ran from the 820s to the 840s.[11] Similarly, microscopic analysis of paper fibers enables one to roughly provenance documents, and in some cases this allows one to draw conclusions about date ranges. Dunhuang documents written on paper made from plant species that are found in central Tibet, but not in eastern Tibet and Dunhuang, for example, came to Dunhuang from central Tibet, and most likely date to the imperial period. In some cases, as in official letters issued from the Tibetan court, these can be more precisely dated and provenanced. One can also attempt to place documents in time

[11] See Iwao 2014. The nuances of re-using Chinese sutras shall be discussed in the case study below. On the dates of the sutra-copying project see Fujieda 1961: 79, and Dotson 2013–2014: 10–15.

through lexicography, textual criticism, and historical phonology.[12] All such tools, in addition to paleography and codicology, must be brought to bear on dating individual Tibetan documents.

In developing and improving the paleography, codicology, and orthography of Tibetan writing and Tibetan documents, we draw on a large body of existing scholarship. Every scholar who has studied inscriptions or manuscripts has tended to develop his or her own methods and terms, and offered unique insights. In terms of the movement that we describe towards a synthesis and towards a greater methodological self-awareness with regard to paleography and codicology, the watershed moment in Tibetan studies was the publication in 1999 of Cristina Scherrer-Schaub's "Towards a methodology for the study of Old Tibetan manuscripts: Dunhuang and Tabo." With characteristic erudition, Scherrer-Schaub drew on scholarship on the study writing systems in Asia and in Europe to outline methods for the study of Tibetan writing and documents. As a general introduction, it is unmatched, and we do not intend to duplicate here the over-arching perspective that it offers. Rather, picking up on some of Scherrer-Schaub's suggestions, and drawing also on more recent and more focused work by Sam van Schaik and Jacob Dalton, we are primarily concerned with explaining and demonstrating a practical method that achieves meaningful results.

Principles

Before introducing our methods, we must observe some fundamental distinctions. Most important among these are: the difference between the date(s) of the paper(s) and the date(s) of the writing(s); the distinction

[12] Concerning textual criticism as a method for roughly dating Dunhuang manuscripts, see Cathy Cantwell and Rob Mayer's observations that the errors in the Dunhuang *Thabs zhags* could only be possible after generations of textual transmission; Cantwell and Mayer 2011: 276. See also Uray 1972 and Dotson 2011a. Stein's "Tibetica Antiqua I," on the earlier "Chinese" and later "Indian" vocabularies for translation into Tibetan is the *locus classicus* for the importance of lexicography to dating Tibetan writing; see Stein 2010.

between the date(s) of writing of an individual manuscript and the date(s) of composition of the text(s) it contains; and the difference between those features of writing particular to a given scribe and those characteristic of a school.

Considering the first of these distinctions, there are a number of scenarios to keep in mind. The most obvious is one in which the hands of several scribes are found in a single document, whether as commentators or otherwise. A root text, for example, might be written long before a commentary is added. There may be a main commentary, and there may also be marginalia added by a third hand at a later time. In the process of transmission, some or all of this may be copied faithfully, or text and commentary might be blended and conflated. Such phenomena are intimately familiar to scholars of textual criticism. Even prior to such distortions, however, one can attempt to disentangle one scribal hand from another with the aim of fixing them in time.

Another obvious point concerning the difference between the date(s) of the paper(s) and the date(s) of the writing(s) is that blank paper may be kept for some time before it is written on. Related to this is a situation in which the verso is written on long after the recto. This may be the case, for example, for PT 2118[13] The Chinese recto includes part of the *Saddharmapuṇḍarīka sūtra*, the colophon of which tells us that it was written in the twelfth month of the fourth year of the reign of Empress Wu, that is, 689.[14] The verso is blank, save for four lines of Tibetan jottings on Tibetan mythological themes. If these were not written until the period of Tibetan occupation, then at least one hundred years elapsed between the writing of the verso and that of the recto. From the perspective of the later Tibetan writer, the scroll was just paper to be reused. In this case the Chinese recto contains a continuous text, but in other cases people have taken paper from various documents, either using discards or disfiguring these documents in the process, in order to collect paper for their own writings. This is true for the *Old Tibetan Chronicle* (PT

[13] Dunhuang manuscripts are cited according to their shelfmarks, where "PT" stands for "Pelliot tibétain" manuscripts kept in the Bibliothèque nationale de France, and "IOL Tib" stands for "India Office Library, Tibetan" manuscripts kept in the British Library.

[14] Lalou 1961: 204; Drège 2002: 120.

1286 + PT 1287) for example, whose compilers glued together panels from such diverse texts as the *Vimalakīrtinirdeśa-sūtra, Mahāprajñāpāramitā-sūtra, Saddharma-Puṇḍarīka-sūtra, Aṣṭasāhasrikā-Prajñāpāramitā-sūtra, Suvarṇaprabhāsottamarāja-sūtra,* and *Dharmaguptaka Vinaya* in order to assemble the seven-meter long scroll that would contain this Tibetan masterpiece. Needless to say, not all of these Chinese rectos date to the same year, and individual panels of paper would have been manufactured at different times, and perhaps even in different places.[15]

A less obvious distinction concerning date(s) of paper(s) relates to scientific methods for dating them. Namely, the raw materials that go into the rag paper that predominated in Dunhuang are fairly disparate, they can be stored for some time before being made into paper, and they can be contaminated by dyes and other substances. Radiocarbon dating is applicable to manuscripts composed of organic materials using milligram-size samples. However, as many scholars have pointed out, this technique alone cannot usually resolve issues of authenticity and precise dating. This will give the date that the cellulose molecules in the paper were formed rather than when the paper was made. If the paper is, as many Dunhuang-produced papers were, rag based on ramie or hemp, then there will first be a short interval (maybe 1–2 years) before the raw material has been harvested, transported and converted via several stages into cloth. It could then be in use or stored for decades or even centuries before being made into paper. In case of bark paper composed of paper mulberry or other bast fibers, it is easier to evaluate a time for raw material harvesting and storage. In addition, the papermaking process will sometimes have blended fibers from a wide variety of original sources. Further, other substances such as dyes or fillers may have been added when processing paper before writing, and can contaminate samples by stable C12 isotope ("dead carbon"). This makes the results of C14 dating disputable in the case of singular samples.[16] In addition, large-scale sampling from old

[15] For details of the three types of paper found in the scroll's panels, see on pages 174–82 the case study.

[16] On radiocarbon dating of manuscripts, see Pollard 2011 and Brock et al. 2010.

manuscripts is also questionable and not recommended. This is why only a combination of historical and scientific dating methods can provide reliable evidence, and C14 measurement may best serve as a control method.

The second point to keep in mind when trying to date a given document is when a text was composed on the one hand, and the date of the individual manuscript on the other. Or, put differently, we must not conflate the date(s) of the author(s) with the date(s) of the scribe(s). An obvious example would be a late, but faithful copy of an early text, as we almost certainly have in the case of the *Old Tibetan Annals*, most of whose individual entries would have been added at the end of each year beginning in the 650s, but whose present extant copies date to approximately the mid-ninth century.[17] This distinction can be particularly relevant when we look, for example, at grammar and orthography. A laconic administrative record like an annals or a legal text tends to be more conservative, and retains what appear to be archaic orthographies. A narrative text like the *Rāmāyaṇa*, on the other hand, is more inclined to update the language to reflect current grammatical and orthographic norms. In such cases one must look deeper, to the rough edges left by the editing process, in order to make any claims about the date of composition. An editor's work of updating language and grammar, incidentally, is one reason why it is very productive to study texts such as the *Rāmāyaṇa* and the *Prophecy of the Khotanese Arhat* (*Li yul gyi dgra bcom pas lung bstan pa*), where we have copies or recensions in Dunhuang manuscripts that are decades and even centuries apart.[18]

A third important distinction to keep in mind is that between scribes and schools. This is most relevant to paleography and to the study of ductus and to the definition of styles. Sam van Schaik has described several imperial-period writing styles based on salient paleographical features.[19] Together with Jacob Dalton and Tom Davis, van Schaik has also applied the techniques of

[17] The *Old Tibetan Annals*, an administrative record in which the annual entries were kept, was likely initiated in the 650s; see Uray 1975: 161–62 and Dotson 2009: 10–11.

[18] On the *Rāmāyaṇa,* see below; on the *Li yul gyi dgra bcom pas lung bstan pa,* see Zhu 2010 and Takeuchi 2012: 207, n. 8.

[19] van Schaik 2013.

forensic handwriting analysis in order to identify individual scribal hands.[20] In so doing, it is possible to define styles that are particular to certain genres, e.g. "official," and also to identify an individual scribal hand on numerous manuscripts in order to gain a picture of the repertoire or even the interests of a particular writer. This type of work is still in its early phases, however, so we must be cautious in maintaining the distinction between the features of a particular script, i.e., a style or a school, and the features of a particular scribal hand. Positive identification of a scribe's hand on diverse documents that are distributed across genres can help to demonstrate how a scribe adjusts his own writing according to the stylistic norms of different genres.

Methods

We approach our documents through three semi-permeable categories: codicology, orthography, and paleography. The overlaps are necessary, and are common to the study of writing and documents in other fields such as medieval European studies, where the word "codicology" is helpfully vague, and where there are many definitions of paleography. Here we include under the rubric of codicology both the classification of documents by shelfmark and format, and the physical description of paper, document, and page setting. The distinction between orthography and paleography is also fuzzy at the margins since individual orthographic or paleographic features can be helpful for identifying schools, scribes, or both.

With respect to codicology, orthography, and paleography, the imperative is to quantify descriptions as far as possible so as to move away from opinions based on subjective observations that cannot be clearly demonstrated. Even if the latter, like the opinions of art aficionados, are based on decades of expertise, and are therefore to be respected, they lose their value when the reasons for a given assertion cannot be described or taught, and where the "results" cannot be replicated. This is not to entirely demystify paleography and codicology,

[20] Dalton, Davis, and van Schaik 2007.

nor to deny the necessity of gaining the essential experience that allows one to recognize relevant styles, scripts, and scribal practices when one sees them. Rather, it is to acknowledge that much of the work of paleography, codicology, and particularly orthography can be quantified. This is a commonplace to those who work in digital paleography, and to anyone who develops software for handwriting analysis. Until such time as new technologies allow cameras and computers to do the work of the codicologist, however, one may still move towards quantification, and towards refining measurements that might some day be handed over to machines. Moreover, putting these methods into practice is not necessarily a "shortcut"; rather, it is to help one to "put in the hours" one needs to gain this experience, but to do so in a guided and purposive manner.

Before moving on to a presentation of the individual features classified under these four major headings, it will be helpful to orient these with some general remarks. The classification of documents is rather straightforward. Here one records shelfmarks, site numbers, conservators' notes, format, genre, and, if known, the date of writing. Moving on to a description of the document's physical features and its page setting, we begin to record quantified data. Besides the usual measurements of height and width, one measures the number of panels, the dimensions of each panel, the laid lines and chain lines. One can also measure thickness, and note the color of paper, color of ink, the presence of paints or dyes, and the type of paper. It is with regard to the latter that one can achieve greater precision through the application of material-scientific methods. Dunhuang manuscripts are composed of a variety of materials, few of which are from Tibet itself. Careful attention to paper, ink, wood, textile and other materials on a microscopic scale reveals the secrets of their production, and sometimes allows for dating and siting an artefact in place. Especially paper analyses can help to recognize a document's regional origin, or reveal links between groups of objects with the same distinguishing features. By identifying fiber composition using optical microscopy, and by studying paper and ink components using infrared spectroscopy, we may recover the history and geography of papermaking and other crafts related to book production. Variations in production methods, raw materials, and

treatment of the paper surface may allow us to determine the time and place of production. This option is only available to those trained in such methods, and in cases where an archive will allow a small sample to be gathered.

Other quantifiable codicological features include margins and leading. To quantify how cramped or expansive writing is horizontally, one can count the number of syllables per 20 cm horizontally, and make an average. To make the same measurement vertically one can measure the space between lines (leading), and measure the number of lines per 20 cm vertically, again making an average. Where format is standard, as in some officially commissioned sutras, one can be even more specific by measuring lines per folio or lines per column, along with measurements of column width, margin width, number of columns, and number of panels or number of folia. Here one also records non-quantifiable features such as the presence of drawings, seals, and ornamentation.

The second major heading, orthography, includes numerous quantifiable features, and a thorough description of a document's orthography generates numerical ratios that facilitate comparison with other documents. The category of orthography itself is problematic when one is describing early or non-standard Tibetan writing. The texts by which one learns the correct and incorrect manner of spelling and of writing grammatical particles in combination with words are the *Sum cu pa* and the *Rtags kyi 'jugs pa* attributed to Thonmi Sambhoṭa, a possibly legendary figure from the mid-seventh century. While a few sections of these texts may go back to the imperial period, most scholars agree that in the form in which they come down to us the majority of these two texts post-date its reputed author by centuries.[21] Rightly or wrongly, it is by this standard that we are able to assess non-standard Tibetan writing. However, this is not to assume, anachronistically, that early Tibetan writing is a deviation from this particular standard. Middle Old Tibetan texts (late-eighth to mid-ninth century) have different norms than Late Old Tibetan texts (late-ninth to early twelfth century) and Classical Tibetan texts, and the benefit of studying and quantifying orthography is that one is able to identify and date

[21] See Miller 1963.

these changing norms.[22] There are several features, born of observation, that one can quantify. With recourse to searchable transliterations one can quantify observations about syllable margins, *d/n* suffix variation, prevalence of *my* with *i* and *e* vowels, the use of the "extra" or "superabundant" *'a*, variation between aspirated and unaspirated voiceless consonants, variation between voiceless and voiced consonants, and the use of the *gi log*. To this one can also add the ratio of "stand-alone *'i* to "attached *'i*" (e.g. *de 'i* versus *de'i*), the frequency of the *da drag*, *anusvāra*, and subscribed suffixes.

In some cases an observation cannot be quantified. Noting the forms of plural particles, for example, and describing the presence or absence of the genitive particle preceding the plural particle *rnams*, we use "quasi-quantities," and, where necessary, prose. Thus "0" means the genitive never precedes *rnams*, "1" means this is uncommon, and "2" means it is common. In addition, where the value is "1" or "2," one notes if the genitive is used only with nominalized verbs, i.e., between the nominal particle and the plural *rnams*. This is an example of a measurement born of observation; it is relevant to early Tibetan writing, but may be of little use to later collections of documents. This and other such descriptions are meant to describe the grammatical systems that texts employ. In the same vein, we record the frequency of use of the sentence final particle, the presence of verbal auxiliaries, and the use of personal pronouns, which have been studied by Tsuguhito Takeuchi and Nathan Hill, respectively, and shown to be of relevance to the periodization of Tibetan language.[23]

Through these methods one establishes the norms of a given piece of writing without making many assumptions about what these norms "should" be. This is helpful when editing or translating a given text, since it provides clear guidelines for what sort of editorial interventions are justifiable and what sort of "corrections" are not. The latter are unfortunately far more commonplace than they ought to be, and seem to be born of a too widely

[22] On this periodization, which includes also Early Old Tibetan (mid-seventh to mid-eighth century), see Takeuchi 2012b. It remains a helpful working hypothesis that should be refined by future research.

[23] Takeuchi 2012b; Hill 2010.

held misapprehension that orthography is uniformly variable in early Tibetan writing. As a result, some scholars allow themselves remarkable leeway in "correcting" unknown words and troublesome passages by changing vowels, suffixes, and prefixes until they have a word or phrase that they recognize. The motive for this is obvious: Old Tibetan syntax can be unfamiliar, and many texts contain words that we don't know. The result of this approach, however, is a scattershot philology that produces insights mostly by accident, and one that flies in the face of fundamental principles such as that of *lectio difficilior*. This can be easily corrected through quantifying and describing the orthography of a given text, such that one can identify its norms and thereby have clear guidelines for which editorial interventions are justified and which are not.

In the third major heading, paleography, quantification is less straightforward. Here we often speak of the shapes of individual strokes, e.g., "straight," "wavy," "ticked," etc. We acknowledge the obvious scope for computer software to improve upon our methods, and welcome ongoing efforts to adapt digital paleographic technologies for Tibetan handwriting analysis. In the meantime, however, one can speak of the proportions of one part of the letter, e.g., the "leg of a *ga*," in relation to another part, e.g., its "belly."[24] One can measure the curl of an *dbu khyud* or a *gi gu* in degrees, e.g. "180º–200º," and one can describe a *ra btags* by measuring to where it points on an imaginary clock, e.g. "9:00." We can also speak of the position of vowels and superscripts in relation to root letters, and the presence or absence of ligatures with vowels. These should ideally accompany cut-outs of images, and the comparison of images of individual graphemes remains the most important method for identifying one scribal hand on multiple manuscripts. We have striven to establish quasi-quantifiable features in the form of typologies of index letters.[25] The typologies may require adjustment over time, or indeed become obsolete if and when computer programs are

[24] See, e.g., Uebach 2010.

[25] In developing index letter typologies we are consciously building on the work of van Schaik (e.g. van Schaik 2013), to which we are indebted.

able to recognize and categorize letter types. Nevertheless, our index letters offer a useful shorthand for comparison, since one can, rather than using a prose description that will vary from researcher to researcher, say that a given manuscript includes, for example, "*ka* type 2a."

Obviously, many of these measurements—particularly those concerning orthography—can only be taken by performing electronic searches in transliterated texts. This underlines the great importance of the work being undertaken by Old Tibetan Documents Online (OTDO) to provide reliable transliterations of a large corpus of early Tibetan documents.[26] Relying on transliterations, our sample is limited to those documents that have been reliably transliterated and which are therefore searchable. This is one of our method's inherent limitations, since at present it means excluding a large body of documents, some of which (e.g., thousands of folia of the *Śatasāhasrikā-prajñāpāramitā-sūtra*) may never be transliterated. It also means that our sample reflects the biases of OTDO, which is representative by and large of the biases of early Tibetan studies in general. This means there is a preponderance of letters, ritual texts, official texts, and divination texts, but little in the way of medical texts or canonical Buddhist scripture.

Apart from these measurements which can be made electronically by searching transliterated text, there are many features, such as the ductus of individual letters, that require that one examine the document very carefully, either with recourse to high-quality digital images such as are available on the International Dunhuang Project (IDP) website, that of the Bibliothèque nationale de France, and on the Artstor website, or that one consult the manuscript itself.[27] Most of the codicological measurements, such as the number of laid lines per 3 cm, necessitate consulting the document itself. Practically speaking, this gives us a two-tiered method: first we have the quantifiable and quasi-quantifiable features that one can measure largely from transliteration (most of which are included below in our "orthography"

[26] See http://otdo.aa.tufs.ac.jp/. The transliterations have been published in Imaeda, et al. 2007 and Iwao, Hill, and Takeuchi 2009.

[27] See http://www.gallica.bnf.fr, http://www.idp.bl.uk, and http://www.artstor.org.

section), and then we have more detailed observations pertaining to ductus and to the physical features of the document (found in our "codicology/physical description" and "paleography" sections). In the case study we shall demonstrate how one can identify possible relationships through a surface analysis, and then either confirm or deny a relationship through a deeper, second-level analysis.

What follows is a template for describing Tibetan manuscripts and other documents. Each field is explained in some detail, and some are accompanied by practical instructions for application. As will be seen in the table accompanying our case study, this template can be presented in various ways, and is amenable to several different methods for comparing and accessing data. One should note also that the explanation of these fields, along with the illustrative examples, are not intended as an exhaustive introduction to working with Tibetan manuscripts, nor a documentation of every feature that one finds in early Tibetan writings.

Some markers may be significant in one setting, depending on media (inscriptions in stone, scratchings in silver or gold, writing in ink on wood, etc.) or on genre. As a result, we have cast our net fairly wide, such that our template for describing documents and texts has around one hundred fields. In fact, this could be far larger and more exhaustive, and there may be some important features that we have overlooked, and which will need to be added. At the same time, one must balance the desire to be exhaustive with the necessity of a practical and manageable method.

METHODS

PART ONE: CODICOLOGY

1.1 Classifications

Shelfmark/Pressmark:

In general, this is the number under which a document is catalogued within an archive and is the designation by which the document is known, e.g. IOL Tib J 771, Pelliot tibétain 249.

Other catalogue number/site number:

A shelfmark is not always the same as a catalogue number or library call number. In the British Library, for example, upwards of seventy documents, each with a separate shelfmark, may be kept in a single box, and the latter has its own, single call number. Therefore one must know the call number/ catalogue number of the box, in addition to the shelfmark of the relevant document.

In the case of Stein documents, one includes here the "site number," e.g., the number Stein gave each document, which can be important for identifying relationships between documents that were found in the same "bundles" in Cave 17. Unfortunately, these numbers have been lost for the Chinese manuscripts, which are catalogued under "S. numbers." In the case of the Tibetan manuscripts, Takeuchi has demonstrated that certain of the site numbers correspond to the bundles in which the scrolls were stored in Cave 17. Some of these bundles, as one might expect from the perspective of the stratigraphy of a chamber filled to the brim with manuscripts, can be dated to the late Guiyijun period.[28] For Pelliot tibétain documents there is no such

[28] Takeuchi 2012a: 208–212.

parallel, but here one includes, where relevant, the earlier numbers assigned by Jacques Bacot.[29]

One should also note any conservator's notes, either in the form of an introductory card included in a volume or in the form of words or numbers in pen or pencil on the manuscripts themselves. In some cases, as when scrolls have been separated into leaves and bound into booklets, conservators have numbered the scrolls, making it possible to reconstruct the length and order of each scroll before it was dismembered in conservation.[30] Similarly one can uncover an archeology of conservation in the form of shelfmarks that have been crossed out and then renumbered. Such often happens when a later conservator or cataloguer reverses the decisions of a predecessor.

Format (e.g., fragment, small sheet, *pothī*, scroll, roll, concertina, booklet/codex, wood slip, stele, rock, metal):

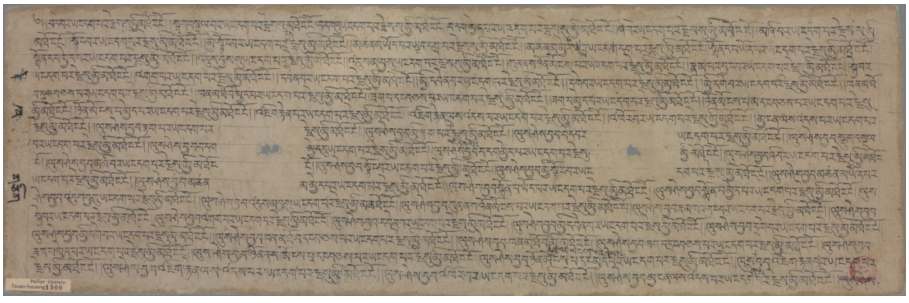
The term "format" is defined in the most general way as "the shape and size of a book or document." In a bibliographical context drawing on Latin codicology it is used to indicate the structure of a volume (codex) in terms of the number of times the original written or printed leaf has been folded to form its constituent pages. Since the structure of Tibetan books differs substantially from Latin codices (e.g., vis-à-vis quires) there is no reason to define the format of Tibetan books on the basis of the number of folds. It is why here we describe Tibetan book formats using terminology borrowed from classical book studies with necessary adjustment and respect for Tibetan book culture. This preliminary typology will hopefully allow for further development of terminology and standards specific to Tibetan book culture. We define "sheet," "panel," and "leaf" as follows: a sheet is a sheet of paper as might be found stacked in a chancellery. Sheets may be cut to a specific size, and they may be lined in ink or drypoint. When they are adhesed together to

[29] See Chayet's concordance of the "Bacot numbers" and the "Lalou numbers," along with Bacot's notes on various shelfmarks at the Bibliothèque nationale de France; Chayet 2005.

[30] See Dotson and Doney forthcoming.

make a roll or a scroll, they constitute panels of a roll or a scroll. A leaf, on the other hand, is generally unbound, as in the case of a *pothī*.

The Dunhuang collections indicate that the *pothī* was the most common format for Tibetan manuscripts by the 10th century, but other formats were in use as well. The *pothī* books in examined samples fell into two groups: a larger (20 × 73 cm; see fig. 1a) and a smaller size (7.5–10 × 26.5–46.5 cm; see fig. 1b). The larger size is only used for the *Śatasāhasrikā-prajñāpāramitā* manuscripts. The smaller size includes Buddhist sutras and tantras, as well as ritual texts. Within the large-format *pothī*, size distinguishes two subtypes of *Śatasāhasrikā-prajñāpāramitā* (*SP*): *SP1*, which Lalou believed came from central Tibet, measure 25 × 75 cm (fig. 1a), and *SP2*, which were produced in the scriptoria of Shazhou, measure 20 × 73 cm.[31]



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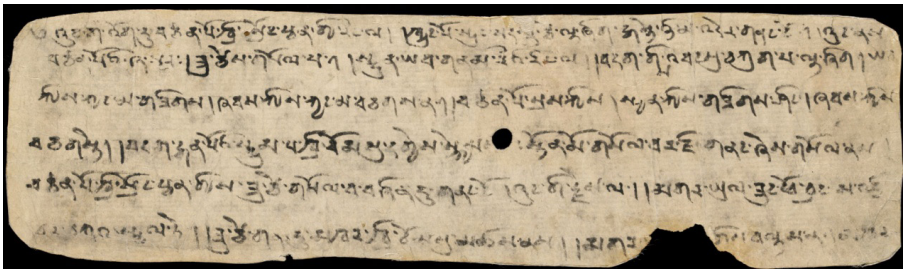


B

FIGS. 1A–B: Large and small format *pothī*: *SP1* folio from PT 1300, and "Chronicle Fragment" ITJ 1375; copyright Bibliothèque nationale de France and British Library.

[31] Lalou 1954: 258. For detailed descriptions of these documents, and a study of their production, see Dotson 2015.

The scroll or roll is one of the first book formats. Produced first on silk, then on paper, scrolls represent the largest part of Chinese Dunhuang manuscripts, and a significant proportion of the Tibetan manuscripts (fig. 2). The scroll format in Tibetan manuscripts was used for religious and literary texts, as well as official documents. Documents such as contracts and letters were written on single sheets and folded into thin rectangular packages.

Fig. 2: Scroll, ITJ 750; copyright British Library.

The roll is a variation of the scroll. It is the same, materially speaking, as a scroll, but the text is oriented horizontally in columns, instead of vertically (fig. 3). To read a roll, one unfurls it from left to right, instead of top to bottom, as one would do with a scroll. This is similar to how one would read a Chinese roll (i.e., horizontally, but right to left), and it has been suggested that the Tibetan roll is a hybrid format born of contact between Chinese and Tibetan traditions.[32]

[32] See Iwao 2013.

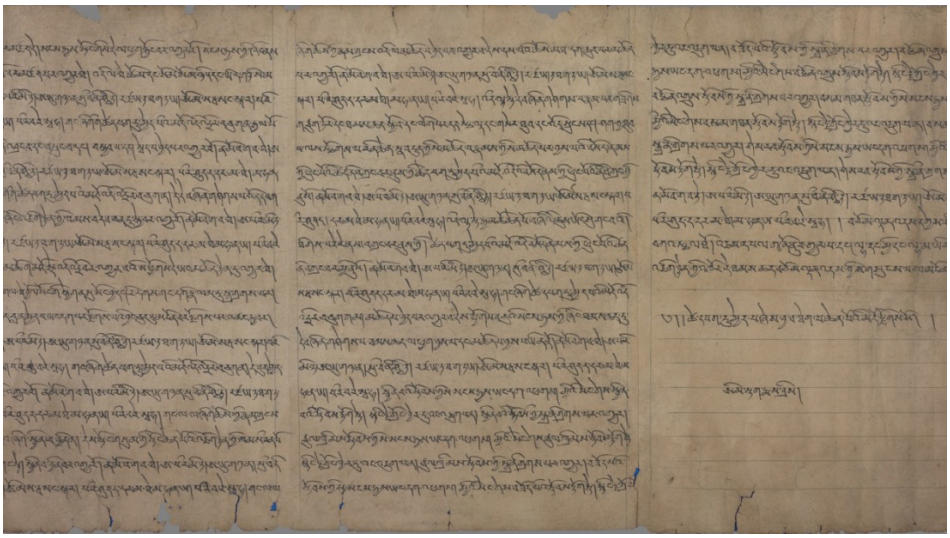


FIG. 3: Roll, PT 4008 (*Aparimitāyur-nāma mahāyāna-sūtra*); copyright Bibliothèque nationale de France.

The concertina format was also in common use for religious books, often compendia comprising a variety of texts. There are for example about eighty Tibetan manuscripts in this format in the British Library collection from Dunhuang and many of them are currently disjoined, but the original construction is evident in the narrow strips of paper that were previously used to join the individual panels of the concertina (fig. 4). Manuscripts in the concertina format tend to be made either of individual panels glued together with narrow strips, or of larger folded panels, or a combination of these two methods.[33] In China the concertina probably evolved from the roll format and was almost exclusively used by the Buddhists since the ninth century. This transformation, made possible by the new medium of paper, allowed an unfurled scroll to be folded in pleats, much like an accordion, creating individual pages and thus enabling the reader to flip through the text with ease. This format resembled *pothī*-format when closed and allowed for effortless navigation through text. The books with such pages had no need for

[33] Drège 1984.

a string to pass through them and much less damage was done to the paper, increasing the longevity of the books. An interesting feature of this binding is its apparent synthesis of traditional Chinese and Indian/Southeast Asian book formats.

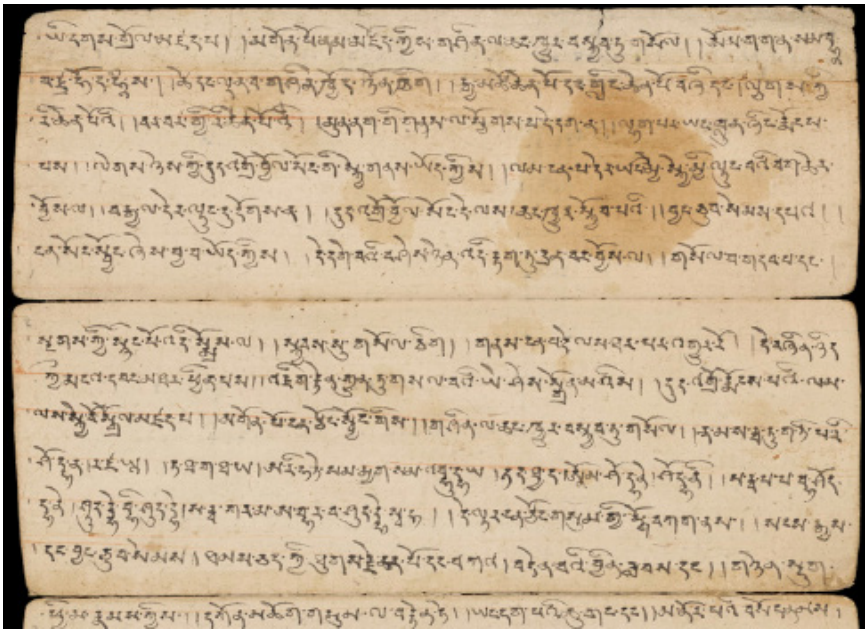


FIG. 4: Concertina, ITJ 151; copyright British Library.

The codex, generally stitched at the left side or at the top—hence the Tibetan name "head-stitched" or "head-gathered" (*mgo tshem pa* or *mgo lteb pa*)—also became popular in the 10th century for religious texts, often ritual or liturgical in nature (fig. 5).[34] This format is not well represented among Dunhuang Tibetan manuscripts. The thread booklets were made in two ways. In IOL Tib J 401, for example, *pothī* leaves (8 × 38 cm) are folded in half and stitched with leather thread. Paleographical analysis suggests that it

[34] On stitched books as a format for Tibetan books, see Stoddard 2010.

may date to the 9th rather than the 10th century, making it earlier than other thread booklets.[35] This format is not found in any other Tibetan manuscripts excepting the thread booklet IOL Tib J 510, which is constructed from a slightly smaller-format *pothī* leaf (5.8 × 28 cm) folded in half and stitched on the left side. In IOL Tib J 530, the booklet is constructed by sewing two sections with silk thread, each section comprising four bi-folios. This method is also seen in other Dunhuang manuscripts. All together there are more than ten Tibetan codices among the Dunhuang collection in the British Library.

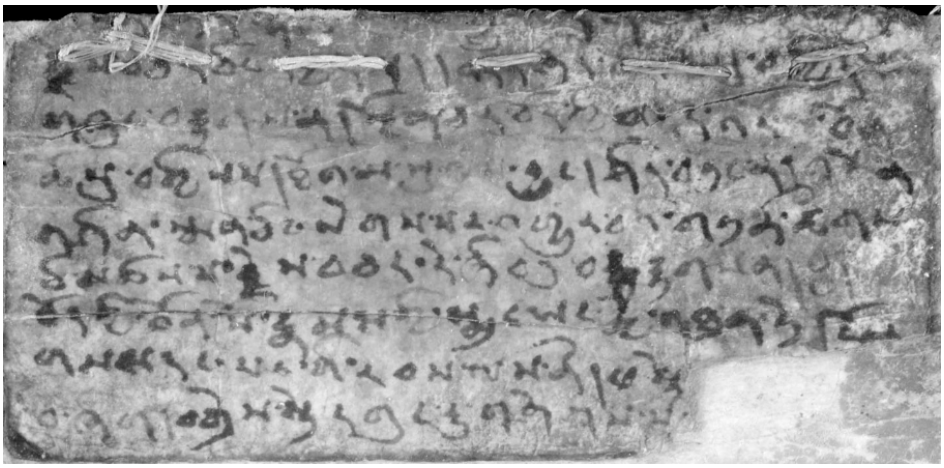
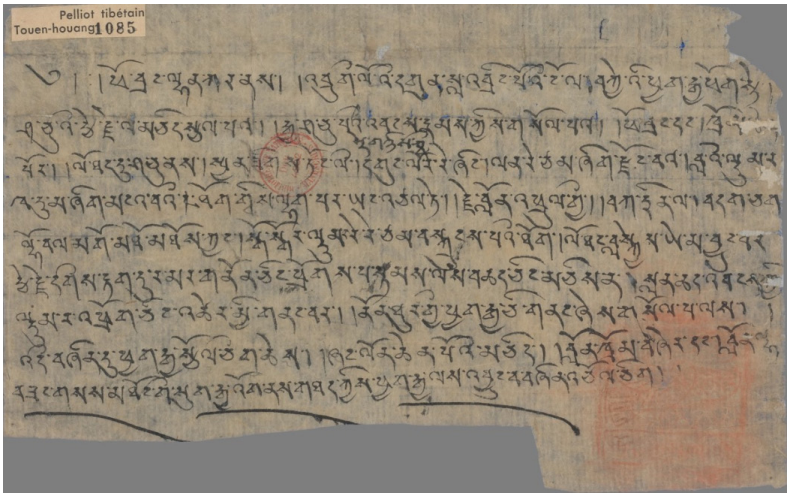


Fig. 5: Stitched book, Or.8212/S.12243; copyright British Library.

Finally, a fragment is defined as an incomplete document that is cut or torn, while a small sheet is a sheet of paper that has been deliberately cut to a small format, as in some administrative documents and letters (figs. 6a–b).

[35] See Helman-Ważny and van Schaik 2013: 720. Takeuchi (2012: 206) states that the book form or codex "probably started from the late-9th century or later."



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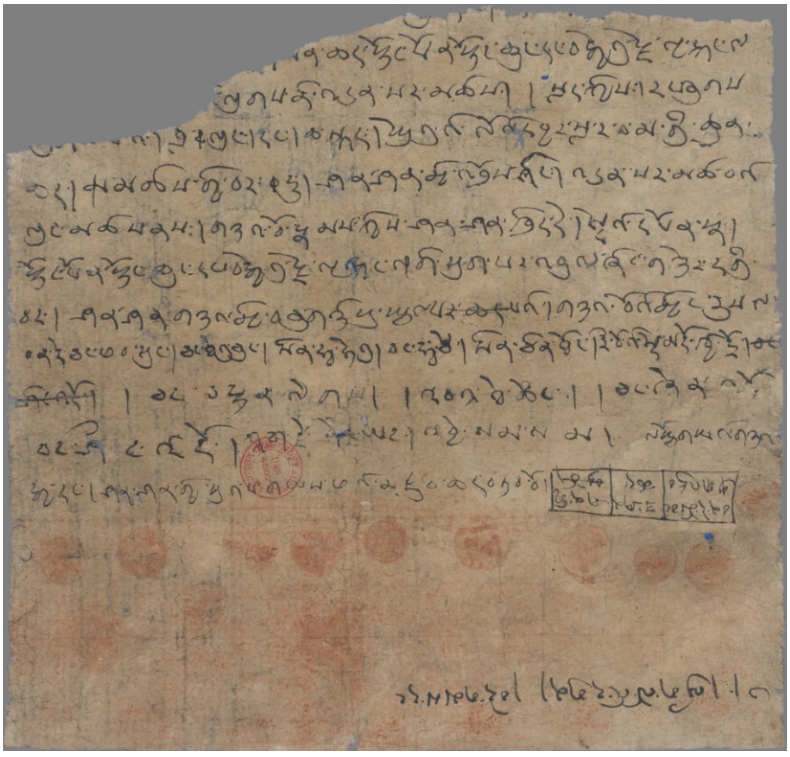

B

FIGS. 6A–B: Examples of a “small sheet,” PT 1085, and a “fragment,” PT 1087; copyright Bibliothèque nationale de France.

It should be noted that the format of a document is not always clear from published or online images. Concertinas, for example, are often photographed such that they look like they might be *pothī*-format. Many concertinas also have string holes in order to imitate the *pothī* format. Where images leave ambiguity, one clue to distinguishing *pothī* from concertina—that is, beyond consulting the document itself—is the orientation of writing. A concertina is like an accordion: if one were to unfold it, and if the pages did not crack and break along their creases, one would see a recto on which all of the text runs left to right, top to bottom. When at the end of the recto, one simply "flips up" the last page to begin the start of the verso. This is another way of saying that the document is flipped vertically, rather than horizontally, when going from recto to verso. Were one to flip it horizontally, all of the writing on the verso would appear upside-down. Therefore, a hypothetical concertina that begins at the start of the recto and ends at the end of the verso, and whose "pages" are indicated by the folds that usually give it a *pothī*-format shape, would have the following characteristic: if one looked at the back of the first "page" of the recto, one would find the last "page" of the verso. This is important to keep in mind, since detached concertina "pages," broken along their folds due to use and age, can be distinguished from detached *pothī*-format leaves by the fact that their content will not be continuous from recto to verso unless one happens to have come upon a detached concertina "page" at the end of the recto/start of the verso.[36]

Genre (OTDO tags: Buddhist, contract, divination, history, inscription, legal, letter, medical, narrative, non-Buddhist, ritual, administration):

These are the tags currently used by OTDO, but they may need to be expanded. One can also add here a title, if one is included, or give a title by

[36] For an extensive treatment of the formats used in Chinese Dunhuang manuscripts, see Colin Chinnery, "Bookbinding," International Dunhuang Project; http://idp.bl.uk/education/bookbinding/bookbinding.a4d; or for Tibetan bookbinding see Helman-Ważny 2014. In terms of digital paleography, one faces a similar problem with *pothī* leaves: published images rarely reveal when a scribe has accidentally written the verso upside-down; see Dotson 2013–2014: 42-43.

which the document has come to be known. This can minimize the opacity caused be referring to documents only by shelfmarks.

Date:

Here one should mention dates assigned by previous scholars, and one should also note any years given in the text, e.g., "horse year." In some cases, it may be a date range, such as "imperial," "early Guiyijun," "late Guiyijun," or simply "Guiyijun." In other cases, such as when a date in the twelve-year cycle falls within the reign of a given emperor, the date may admit more than one possibility, e.g., "824 or 836" or "779 ±12."

1.2 Physical description

Recto/Verso:

Here one distinguishes the recto from the verso, and notes what is written on each side, e.g., a Chinese Buddhist sutra on the recto and a Tibetan administrative document on the verso.

The front and back of a document are referred to as "recto" and "verso" respectively. Recto is abbreviated as "r" and sometimes denoted as "a," and verso is abbreviated as "v" or "b." The term "natural recto" can refer to the side of the paper that is smoother as a result of the manufacturing process and which is therefore most desirable for writing.[37] However, the processing techniques, especially application of starch or other mineral particles to the surface together with glue, then polishing, often make it impossible to judge which side of paper is the natural recto.

There has been a tendency, when dealing with those Dunhuang manuscripts with Tibetan on one side and Chinese on the other, for researchers to privilege as "recto" whichever side is of more interest to them. In many cases, however, the judgement is obvious. In the case of scrolls or fragments

[37] Drège 2002: 119.

with the Chinese *Mahāprajñāpāramitā* on one side and Tibetan text on the other, for example, the former is the recto, which had been intended for the Tibetan king, and the verso was written on later, after the panel in question was rejected and detached from its roll. The same is true in other cases where a larger document has been cut into pieces in order to make numerous smaller documents on the verso.[38] This is counterintuitive, since the recto is here secondary in the sense that it was disfigured in order to produce a document for the verso.

Dimensions (in cm):

When measuring a manuscript, the height is given first, then the width.[39] A *pothī* leaf, for example, is very wide and not very high, whereas a scroll is usually much higher (i.e., longer) than it is wide. A concertina's measurements should be given per "leaf" and, where possible one should include the document's full height when unfolded. Similarly, in the case of a roll, where the text is in columns, one should give the measurements of the columns by their margins and page setting, along with the full dimensions of the roll. Manuscripts were sometimes trimmed in their history, and it is therefore useful to give the dimensions of written space independently of format. It is also useful to document the size of the largest panel in a roll or scroll.

Number of panels, line numbers of changeovers:

A scroll or concertina is made up of many panels, which are attached with adhesive. The changeover is visible by one panel not being flush with the next, by it being partly detached, or by a dark red color that comes from excess adhesive. In the case of a *pothī* or codex, one should give here the number of leaves or pages. A concertina will also have several panels, since it is essentially a scroll that has been folded to resemble a *pothī*. These should be counted and numbered, and the location of the changeovers noted. The same is true of rolls.

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[38] Drège 2002: 119.

[39] Brown 1994: 49.

Scrolls often have Chinese on one side and Tibetan on the other, but some have a blank verso. In the case of PT 1089, for example, a sealed administrative document, the panel changeovers are marked with seals, presumably to prevent forgery (fig. 7).

Fig. 7: Example of a seal on a panel changeover from PT 1089 verso; copyright Bibliothèque nationale de France.

The same practice can be observed in some Guiyijun-era official letters, where we even find the "changeover seal" on the recto (fig. 8).

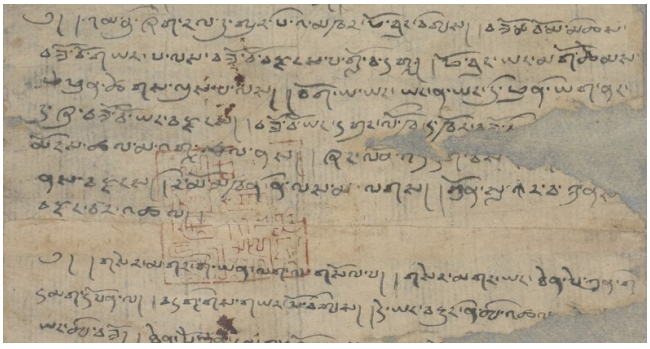


Fig. 8: Example of a seal on a panel changeover from PT 1082 recto; copyright Bibliothèque nationale de France.

In other cases, the panels are numbered on the verso, as in PT 849, where the bottom of the first panel says "the first" (*dang po gcig*), the bottom of the next says "second" (*gnyis pa*), and so on down to the seventh panel, marked "seventh" (*bdun pa*), as in fig. 9.

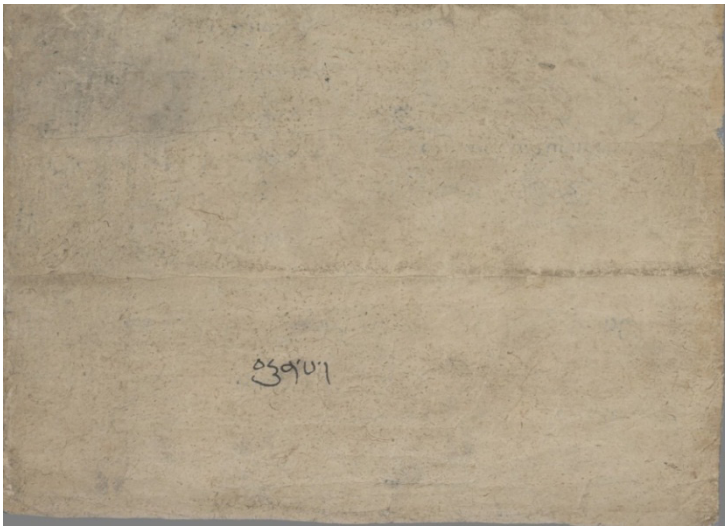


Fig. 9: Panel numbering on PT 849 verso; copyright Bibliothèque nationale de France.

The Tibetan term for panels of paper that were adhered in order to make a scroll or a longer document is *yug*. In commissioning copies of the *pothī*-format *Śatasāhasrikā-prajñāpāramitā-sūtra* (*SP2*) and *Aparimitāyur-nāma mahāyāna-sūtras*, officials issued scribes with paper, keeping records of how many sheets (Tibetan: *yug*) were distributed, and then of how many of these were returned as folia and panels of scribed sutras. Scribes could be punished for any discrepancy in the amount of paper returned from the amount issued, and lashes were given out according to the number of missing sheets.[40] Where a sutra was made of many panels, and the editors found one or more panels to be faulty, these would be detached and then replaced with newly written panels containing the corresponding text. This is apparent from several copies of the

[40] For details, see ITJ 1359, translated in Takeuchi 1994: 849–51, 857–58, n. 8.

roll-format *Śatasāhasrikā-prajñāpāramitā-sūtra* (*SP3*) that contain notes on the verso stating that this has taken place. In the *SP3* fragment below (fig. 10), there are notes on the verso stating that two "short panels" (*yug thung*) have been replaced. These measure 27.5 × 21.5 and 27.5 × 22 cm respectively. The roll itself is longer, with several panels, but the image is here cropped to show the detail; the panels to the left and right, only small segments of which are visible at the edge of the photo, are in fact full panels.

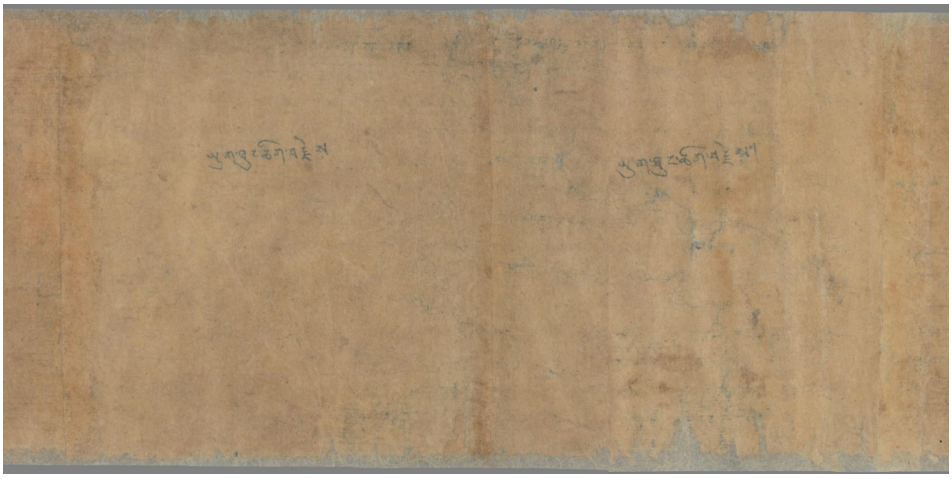


Fig. 10: Two replaced panels in an *SP3* panel of PT 1603 verso, with the words, "one short sheet replaced" (*yug thung chig brjes*); copyright Bibliothèque nationale de France.

Looking to the recto, it is clear that these two panels are in a separate hand from the preceding and following text. The scribe tasked with replacing these defective panels had to take care that the writing was properly spaced; in many cases one sees such replacement panels or replacement folia in which a scribe has had to drastically alter the spacing towards the end of the panel or leaf so that it will correspond to the original and not disrupt the coherence and foliation of the text into which they are inserted (fig. 11).[41]

[41] See Lalou 1954: 259, n. 1.

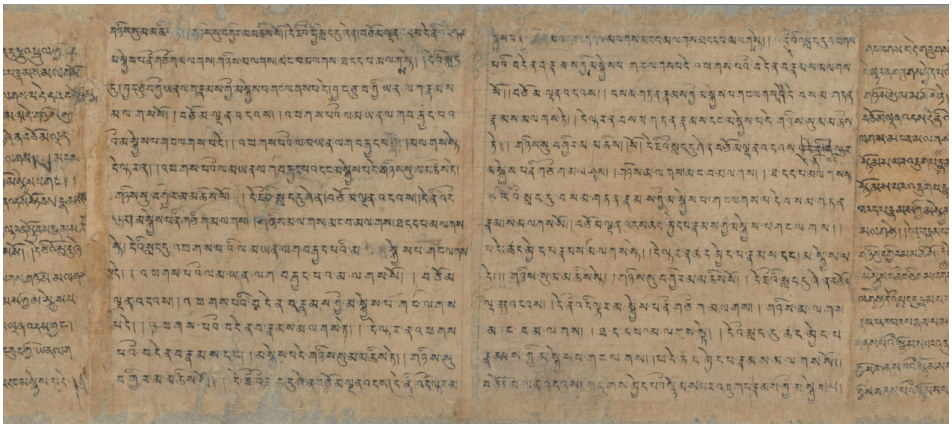


FIG. 11: Two replaced panels in PT 1603 recto; copyright Bibliothèque nationale de France.

These "short sheets" (*yug thung*) measure about 22 cm in width. A "long sheet" (*yug rings*), such as we find, e.g., in another *SP3* fragment, shelfmark PT 1618, measures 72 cm, and is also 27 cm high. A third Tibetan term for measuring sheets of paper is "two-thirds of a long sheet" (*yug rings kyi sum nyis*), which is also found on the verso of replaced panels of *SP3* fragments, shelfmarks PT 1856 and PT 1934, where the relevant panels measure 49.5 cm and 48 cm respectively and are also 27 cm high. The terminology corresponds neatly to the columns of these rolls: a short panel contains one column, a long panel contains three, and two-thirds of a long panel—sometimes also simply referred to as a panel—contains two columns. These columns range between 20 and 25 cm, and have 15 mm gutters.

The term *yug* also refers to one folio of 20 × 73 cm, *pothī*-format *SP2*. The surface area of one such folio is nearly equivalent to that of a panel of the *Aparimitāyur-nāma mahāyāna-sūtra* (i.e., 31 × 45 cm), which was copied by the same scribes as part of the same commission of sutras for the Tibetan emperor.

Observing the practice of scroll making, we can also see that there is a preference for joining the upper panels over the lower panels.[42] That is to say,

[42] Drège 2002: 119.

from the perspective of the recto, the upper panel goes over the lower panel, not vice-versa.

Average measurement of each panel/leaf:

Scholars such as Akira Fujieda have used this measurement to propose a typology of papers found among the Dunhuang manuscripts.[43] In the case of long scrolls, this measurement can give us a general, though inexact, idea of the dimensions of the screen that was used for paper making. In other cases, the format to which the paper was cut is often a marker of its genre.

Thickness (with caliper, in mm, if possible):

Thickness is not often measured, and it may or may not be useful for dating manuscripts. This is rather a parameter that helps to classify types of paper. Using a caliper, one should measure the paper in at least five different places and give a span value. For example, the papers made from paper mulberry fibers on the very fine bamboo sieve characterized by 28–32 laid lines per 3 cm usually have a very uniform thickness. This uniform thickness comes from very even fiber distribution within the paper-making mould that was lifted when shaping the paper. Much of the rag paper produced in Dunhuang is of variable thickness, and this measurement may therefore have limited value here.

One can note here if a document is made up of two or more layers / sheets of paper adhered together, as in the large, *pothī*-format *Prajñapāramitā* folia of *SP1* and *SP2*.

Texture (e.g., smooth, polished, sized, dyed):

This is qualitative, but it can be an important indicator of the "natural recto," that is, the side of the paper that is smoother as a result of the manufacturing process and which is therefore most desirable for writing. In the case of layered documents, such as some *Prajñāpāramitā* texts, the rough sides are pasted together, meaning that both the recto and the verso are

[43] Fujieda 2002.

"natural rectos." Where a document has been sized and excessively polished, it is not possible to identify the "natural recto" by touch.

Color of paper:

Jean-Pierre Drège applied methods borrowed from colorimetry to describe the color of paper, in order to go beyond subjective impressions.[44] However, even if we measure the color of paper nowadays it will not be sufficient for any typology until we distinguish the sources for particular colors, which is difficult and sometimes impossible. Color can result from raw paper (plant type, additional substances added during papermaking), but this primary color can drastically change due to aging processes, extensive light exposure, and microbiological attack.[45] This information is useful in the context of preservation when evaluating the degree of paper deterioration, but unfortunately does not have much use as a merkmal for dating. It is more significant if a color is the result of dyes introduced into the paper structure while preparing it for writing.[46] In such cases it can be a specific feature relevant to the methods of a particular workshop.

Type of paper (e.g., Rag, bark, woven, laid):

The primary feature of paper is the type of raw material used for its production. It is why fiber analysis, if applicable, can be helpful for identifying the regional origin and sometimes for dating when used alongside other methods. If it is possible to take a small sample from a manuscript for microscopic analysis, one can commission a detailed report on the composition of the fibers and other materials in the paper.

Rag paper (*mazhi* 麻 , literally *ma* 麻 means "hemp group," and *zhi* means paper) is the earliest kind of paper, which accounted for the biggest share of paper production from the Han Dynasty to the Tang Dynasty. This is recycled paper made of rag waste. Supposedly it was invented before Cai

[44] Drège 1981, 2002.

[45] Wazny, Rudniewski, Wazny, and Krajewski 1989.

[46] Gibbs and Seddon 1998.

Lun 蔡 , who is often credited with the invention of paper, and reputed to have made it in 105 CE from used ropes, broken fishing nets, rags, bottoms of shoes, etc. Rag paper represents a very significant proportion of Dunhuang manuscripts written in Tibetan and Chinese and was probably vastly produced in the Dunhuang area.[47] This type of paper is what Akira Fujieda referred to as "hemp paper."[48] In reality it is composed of fibers derived from recycled textiles made up mostly of ramie (*Boehmeria nivea*, in Chinese: *zhuma* 麻) with addition of hemp (Cannabis sativa, in Chinese: *dama* 大麻), jute (Chinese: *huangma* 黄麻), paper mulberry, silk, and later even flax (*Linum usitatissimum*, Chinese: *yama* 麻) (fig. 12).

Fig. 12: *Boehmeria* sp. fibers in rag paper colored reddish with Herzberg stain, from ITJ 587 vol. 68 f.79, under the microscope in polarized light (OM 600x). Copyright Agnieszka Helman-Ważny.

[47] Helman-Ważny and van Schaik 2013.

[48] See, e.g., Fujieda 2002.

Rag paper declined because of the shortage of raw materials and the high production cost. The documents about paper making after the Song Dynasty mention rag paper only occasionally. Bark paper (*pizhi* 皮) became popular since the Sui (581–618) and Tang (618–907) periods. It is usually of high quality, made of the woody plant-based fibers derived from the bark of paper mulberry, mulberry, *Daphne*, and *Edgeworthia* sp. (figs. 13 and 14).

FIG. 13: *Broussonetia* sp. fibers colored reddish with Herzberg stain, from ITJ 754 vol. 72 f. 77, under the microscope in polarized light (OM 60x). Copyright Agnieszka Helman-Ważny.

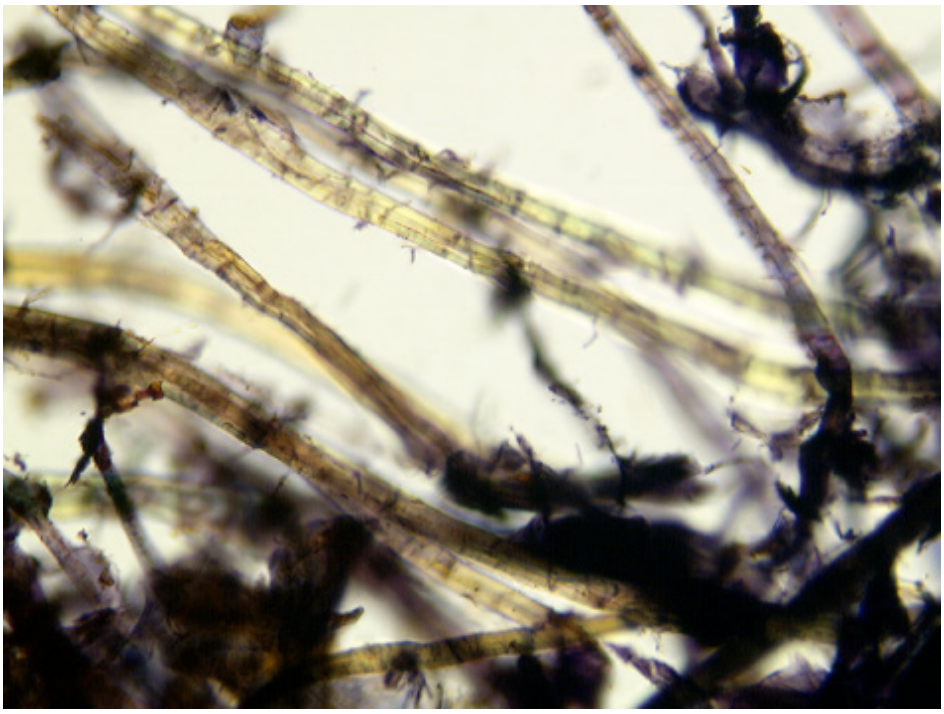


FIG. 14: *Daphne/Edgeworthia* or *Wikstroemia* sp. (Thymelaeaceae family) fibers colored olive-grey with Herzberg stain, from the British Library M 60 vol. 1 f. 60, under the microscope in polarized light (OM 600x). Copyright Agnieszka Helman-Ważny.

Independently of the techniques for forming sheets, any papermaking sieve makes an impression that is specific to the construction of the mould and sieve. This print is unaffected by aging processes and can serve as a feature for the identification and typology of paper in manuscripts. However, this information alone is not necessarily definitive.

According to Dard Hunter, a floating mould with a textile sieve was prevalent in the southern regions of China. It spread from Lei-yang, Hunan province—the place where paper was first invented by Cai Lun—to the Himalayas. In China, Korea, and Japan people developed and tended to use the dipping mould with a bamboo sieve, possibly very soon after the invention

of paper.[49] However, we do not have specific data about the development and geographic distribution of these technologies, nor do we know which type of mould came first. Both types could have been used at the same time by the same papermaking workshop for making paper along the Silk Road.

Woven moulds with textile sieves are usually classified as older and more primitive, and for this reason primary to the movable sort with a laid pattern. The floating mould is comprised of a wooden frame with a woven textile attached to it. This mould type is also called 'floating' because it is placed on a water surface such as a lake, pond, river, or puddle. At the end of the papermaking process, each sheet of paper is dried on individual moulds (fig. 15). Interestingly, woven paper does not appear in any of the oldest samples from Dunhuang manuscripts written in Chinese dated before 692 CE, which is the oldest example (dated by colophon) of woven paper. At the same time, all of the earliest samples show laid paper.

FIG. 15: Traditional Tibetan woven mould with a sheet of paper on it during sun-drying process. Traditional papermaking tradition is still followed in Nyemo, Central Tibet; copyright Agnieszka Helman-Ważny.

[49] Hunter 1978: 82–84.

FIG. 16: Traditional papermaking workshop in Xi'an area. Laid type of papermaking mould standing on the left side and traditional pressing of pile of papermaking sheets just taken out of bamboo sieve (on the right); copyright Agnieszka Helman-Ważny.

The other main type of paper mould which was used for production of laid paper is usually also known as a dipping mould, and as mentioned above, is thought to have developed subsequent to the floating mould. The dipping mould allows for faster paper production because it is possible to remove a wet sheet of paper directly from the sieve just after its shaping. This means that papermakers do not need to wait until the paper has dried before reusing the mould to begin the next sheet. The main difference between the two types of mould is in their construction. In the dipping mould used for making laid paper, a movable sieve made from bamboo, reed, or another kind of grass is placed on the wooden frame (fig. 16). Modifications to this technology have been reported, including a floating mould resembling a wooden box with a movable screen. In this case, we would continue to classify this type of paper as laid based on its sieve print. These results also clearly chart developments in the technology of laid/movable mould making—the earliest examined papers were patchy and with an irregular laid pattern, then more and more regular laid paper made on a bamboo sieve slowly appeared.

The print of a textile sieve differs clearly from that made of bamboo (laid regular), reed, or other grasses (laid irregular, laid patchy), and when sealed in the paper structure this allows us to distinguish handmade woven paper and handmade laid paper characterized by particular number of laid lines in 3 cm (figs. 17, 18 and 19). This type of mould/sieve is also sometimes characterized by chain lines. These are the vertical lines from the screen on which the paper was manufactured. They are uncommon in Dunhuang papers, but can be seen clearly in fig. 20, below, where they are the long, vertical lines at 6 cm intervals. The sequence of measurements of the interval between two (or more) chain lines should be given where chain lines are clearly visible. These intervals often vary within one sheet of paper, and in this case the sequences of span values should be given.[50]

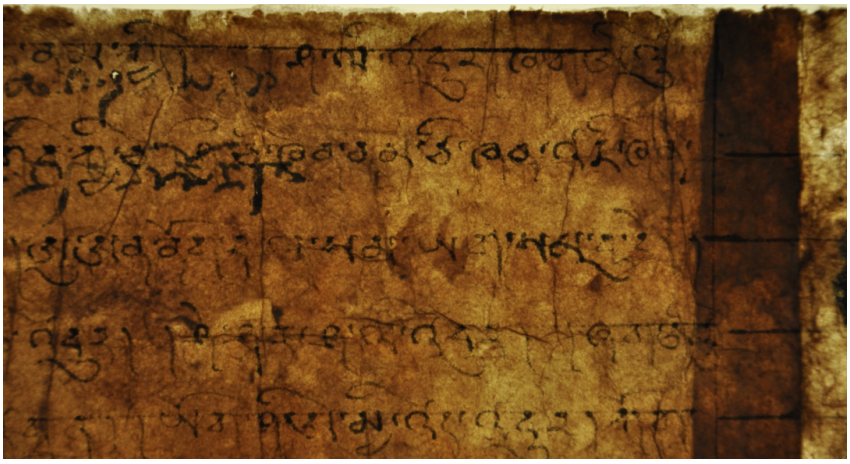


Fig. 17: Woven paper seen against light, from ITJ 1410. This paper was made with a "floating" type of papermaking mould made up of a frame with textile sieve; copyright British Library.

[50] For a more detailed study of papermaking in Tibet and Dunhuang, see Helman-Ważny and van Schaik 2013.

Laid lines per 3 cm:

These are the more numerous lines made from the sieve on which the paper was manufactured. They can sometimes be seen on the surface of the paper, without the use of a lightbox. In this case, the paper will have the "corrugated" appearance of cardboard (fig. 19).

FIG. 18: Laidlines visible with the use of a lightbox, ITJ 1363; copyright British Library.

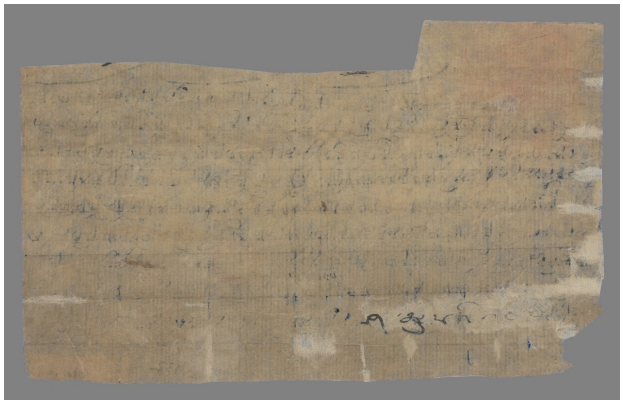


FIG. 19: PT 1085, verso, with clear laid lines on the surface. NB: these are the small, vertical lines. The horizontal lines are not chain lines, but folds, which are commonly found in letters; copyright Bibliothèque nationale de France.

Chain lines:

Where chain lines are present, one should measure, in cm, the span between them (fig. 20). Rather than averaging these where several chain lines are present, one gives the span values of each.

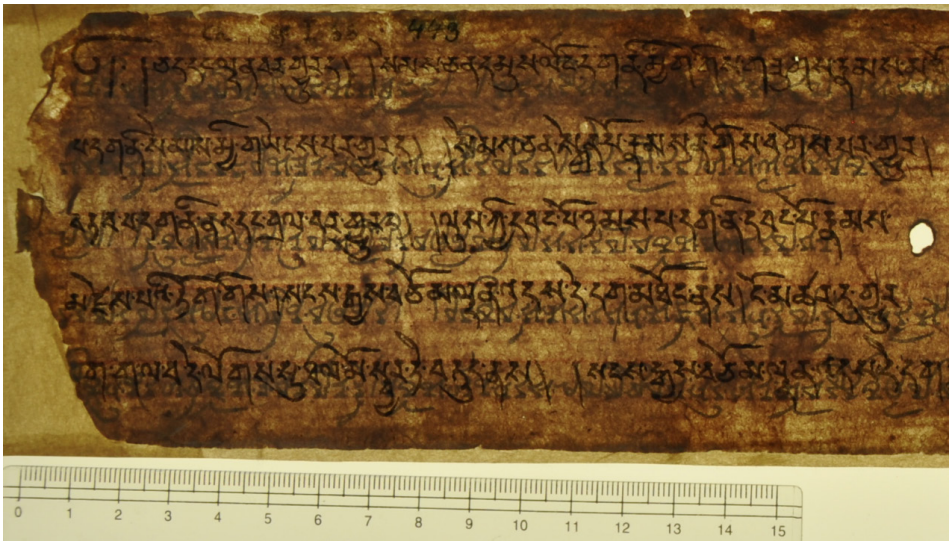


FIG. 20: Chain lines visible against light at 6 cm intervals, ITJ 444; copyright British Library.

Yellow Dye:

The process of dying paper a yellowish color was commonly used when, as our written sources tell us, paper began to be used extensively for books in around the 2nd or 3rd century.[51] Many yellow-dyed papers are found among the manuscripts from Dunhuang, particularly that used for Chinese sutras, which were produced in inland China for the Chinese court (fig. 21). Among the roll-format Tibetan *Śatasāhasrikā-prajñāpāramitā-sūtra* (*SP3*), one also sees some panels that have been dyed yellow.

[51] Tsien 1985: 74.

FIG. 21: Paper showing yellow dye, Pelliot chinois 2413; copyright Bibliothèque nationale de France.

Besides litharge, red lead, or yellow sulfide of arsenic, which are pigments and not dyes, Chinese paper was soaked in plant extracts that repel insects. This procedure also resulted in a yellowish color of the paper. Gibbs and Seddon identified this yellow color as a natural *huangbo* dye derived from *Phellodendron amurense* tree.[52] This dye was made by soaking and repeatedly boiling the dried phellodendron bark in water, pounding it, and then straining it through cloth.

Ink color:

Most ink is black, but we also find red and occasionally yellow. Various recipes for ink preparation include soot or burnt resinous wood, other color pigments, or metal as the ink's main components with a possible mixture of gum, honey, borax, or, for a special occasion, other unusual and extravagant materials such as blood.

[52] Gibbs and Seddon 1998: 20.

In general black ink is often described as Chinese or Indian, which unfortunately in most cases does not indicate whether this ink was produced in China or India. Additionally, both types are based on carbon and they are almost undistinguishable both to the naked eye and to imaging technologies. Chinese ink is essentially a mixture of finely divided carbon and animal glue, often with a variety of additions for specific purposes. As John Winter said, the apparent simplicity is deceptive.[53] In fact we deal with innumerable products called 'Chinese ink' depending on both the type and quality of the ingredients and on the thoroughness of their mixing. When the carbon and glue solution, with or without secondary components, has been combined and thoroughly mixed, portions are moulded into sticks or cakes. This differs from the custom in India, where ink was stored as a liquid.

The use of black and red ink in Tibetan manuscripts is often purposive. Not unlike the use of rubrics for heading titles in medieval European manuscripts, we find in Tibetan manuscripts the use of red ink for heading titles or to mark off a topic.[54] In common with modern editors, the Tibetan and Chinese editors of sutras also often used red ink for their corrections. An additional use of red ink, seen below, is in writing the word "seal" in a copy of an official document where the original had included a seal (fig. 22a).

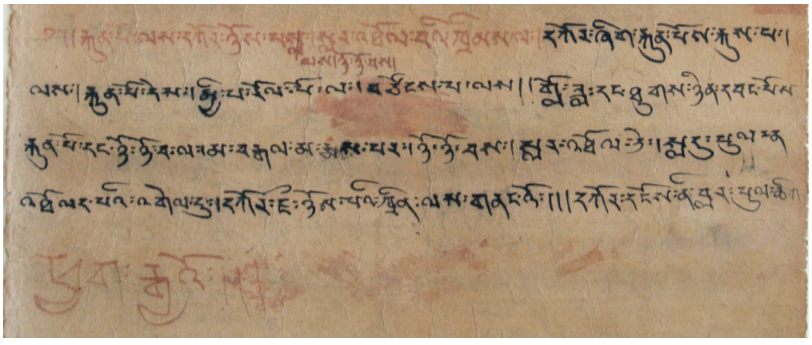


Fig. 22a: Use of rubrics in the law of theft, ITJ 753; copyright British Library.

[53] Winter 2008: 45–58.

[54] On rubrication in medieval European manuscripts, see Clemens and Graham 2007: 24–25.

In some cases, black and red inks are used together for ornamentation, as when an *dbu khyud* or a *shad* is written in both black and red to make it thicker and to create a shadowing effect (fig. 22b). On the back of an *SP3* panel we find a term for referring to this: "a *shad* that alternates red and black" (*dmar po dang nag po sphel ma 'I shad*; PT 1844v).[55]

Fig. 22b: Red and black *dbu khyud* and *shad*, ITJ 739; copyright British Library.

Additionally yellow ink is used. Often, yellow ink is used to draw guidelines, such that they appear fainter than the letters, as in PT 98. In rare cases, however, a text itself can be written in yellow ink, as in fig. 23.

Fig. 23: Example of yellow ink, PT 385; copyright Bibliothèque nationale de France.

Ink thickness/composition:

E.g., "thick," "fine," "faded," etc. In some cases, one can see the evidence of pen refilling, where the writing becomes thin and faded as a line goes on, and then is suddenly thick and black (fig. 24).

[55] Lalou 1961: 153.

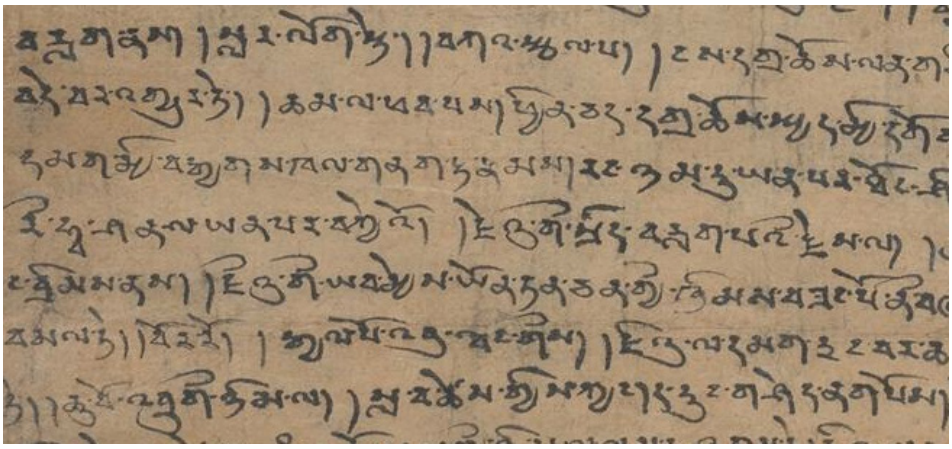


Fig. 24: Examples of re-inking, PT 986; copyright Bibliothèque nationale de France.

Writing instrument:

Scribes nearly always wrote with a split-nibbed pen, which creates a channel for the ink. When the nib becomes old and splits further apart, one can often see a faint parallel stroke alongside the intended stroke (fig. 25). Rectangular nibs are used for more calligraphic writing. Examples of writing tools found in Niya and Mazār Tāgh are visible in figs. 26a–c.

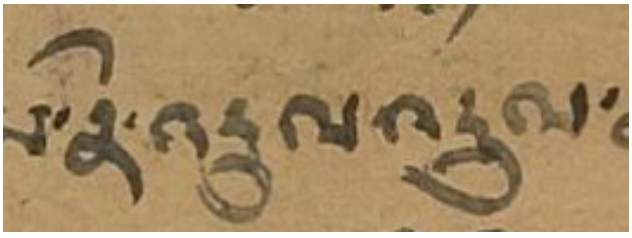


Fig. 25: Traces of split-nib visible, PT 1287; copyright Bibliothèque nationale de France.

FIGS. 26A–C: Two pens from Niya, British Museum 1907,1111.89 and 1907,1111.94; and one from Mazār Tāgh, ITN 1149; copyright British Museum and British Library.

1.3: PAGE SETTING

Lines per 20 cm:

Canonical Chinese Buddhist sutras from Dunhuang customarily have 17 lines per column. Each panel of a roll, measuring between 25–28 cm high and 41–52 cm long, contained anywhere from 25–30 lines. This contrasts with the various standards that were introduced at various times during the Tang and before, e.g. of 28 or of 31 lines per panel.[56] In Tibetan officially commissioned sutras we also find some variability across the various formats. "Type 1" *pothī*-format Tibetan *Śatasāhasrikā-prajñāpāramitā-sūtra* copies (*SP1*), which Lalou believed came from Central Tibet, contain 15 lines per 25 cm-high leaf, and "type 2" *pothī*-format leaves (*SP2*), measuring 20 cm high, have 12 lines per leaf.[57] Roll-type *Śatasāhasrikā-prajñāpāramitā-sūtras*

[56] See Eikei 2002.

[57] Lalou 1954: 257–58.

(*SP3*), whose panels are on average 27.5 cm high, have between 15 and 19 lines per column, with 17 and 18 being most common, while the roll-format *Aparimitāyur-nāma mahāyāna-sūtra* is higher at an average of 31 cm, and has between 15 and 20 lines per column, with 19 being most common. Given the variable formats and paper dimensions, not to mention differences in leading, one must have more precise a measurement than lines per panel in order to record vertical spacing such that one can compare one manuscript with another. To that end, we measure lines per 20 cm. Where possible, one should average at least four measurements.

Space between lines/ leading (from head of one line to head of the next line, in mm):

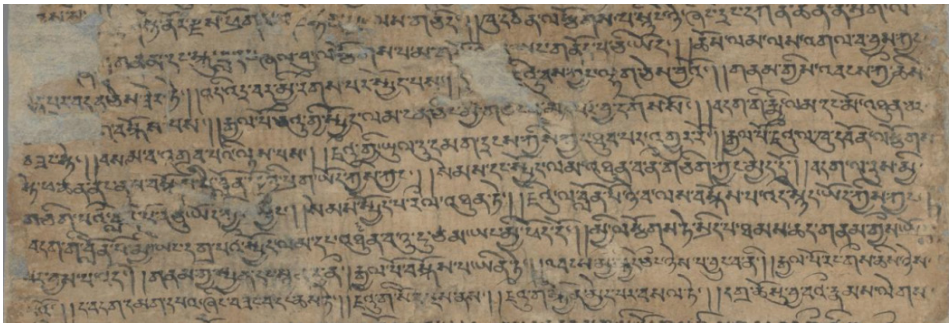
This is a similar measurement to lines per 20 cm, but instead shows the leading between individual lines. There will be variation in this measurement in unruled documents, and this should be noted. As with lines per 20 cm, it is best to average several measurements taken from different sections of the document, making note of sections that are either abnormally expansive or cramped. Across the officially commissioned sutras produced from the 820s to the 840s one finds a standard leading of 15 mm.

Syllables per 20 cm:

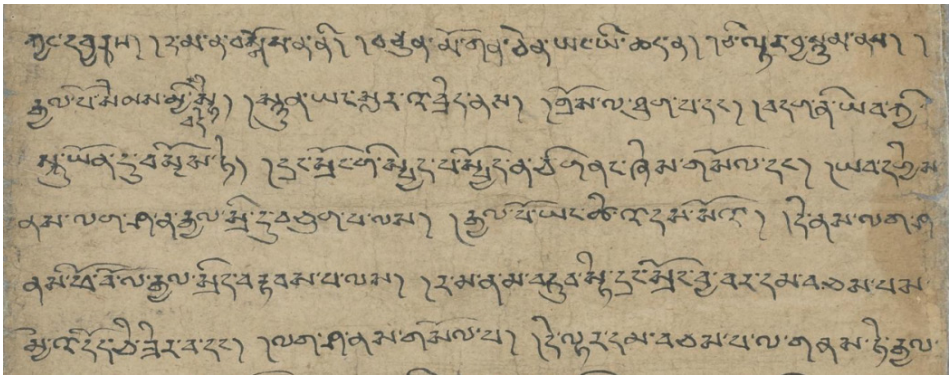
This quantifies descriptions that might otherwise refer to writing as "cramped" or "well-spaced," but on the horizontal rather than the vertical plane. As noted above, works from the Chinese *Tripiṭaka* were customarily written on rolls with 17 characters per column. Exceptions include the *Aparimitāyur-nāma mahāyāna-sūtra* copies commissioned for the Tibetan emperor, which have between 32 and 37 characters per column, and thus have a cramped, even miniscule appearance.[58] The precision concerning the number of characters per column in Chinese is less applicable to Tibetan writing, but one may still employ this measurement to quantify how consistently spaced the writing of a given manuscript is (figs. 27a–b). There will often be

[58] Iwao 2012: 102.

variation in this measurement, so it is best to measure several separate lines and average them, noting significant variations. The measurement of syllables per 20 cm is not applicable to smaller format documents, where one must adjust this accordingly, and measure, e.g., syllables per 10 cm.



A



B

Figs. 27a–b: Cramped and spacious writing on PT 986 and PT 981, respectively. The former has 10.5 lines/ 20 cm vertically, with 20 mm leading. Horizontally, it averages 13 syllables/ 20 cm. This sample of writing on PT 986 has averages of 19 lines/ 20 cm, 7.5 mm leading, and 18.5 syllables/ 20 cm. Copyright Bibliothèque nationale de France.

Margins (in mm):

As with many other measurements, this can vary, and should be made by taking several measurements and averaging them, noting any significant

variation, such as where margins might be larger on one leaf than on another. One also notes here if the margins are marked out in ink or in drypoint. Those that are will be far easier to measure. When measuring top margins, one measures from the edge of the paper to the head of the first line, whether ruled or unruled. Similarly for the bottom margins, one measures from the edge of the paper to the head of the last line. This "inflates" the measurement, but the alternative is to measure from the lowest pen strokes, which are variable and therefore lead to imprecise measurements. If one is describing a roll with columns, such as in *SP3*, one includes here measurements of the gutters. In officially commissioned sutras the gutters are a standard 15 mm.

Guidelines:

Paper with guidelines is essentially "ruled." This is often done with red or black ink, but it can also be done with an un-inked nib of a pen (or another tool), making only a depressed line in the paper. The latter process is called drypoint, or "nicking." Guidelines, like margins, and circles around *pothī* holes, are usually made before writing as part of the page setting (fig. 28).

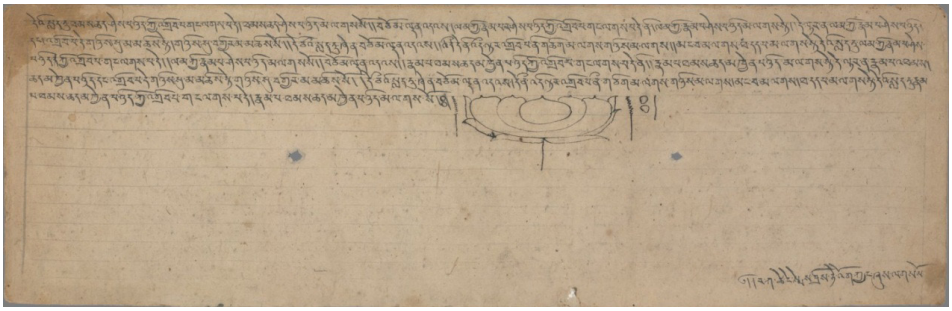


FIG. 28: Ruled margins and ruled lines in an *SP1* folio, PT 1304; copyright Bibliothèque nationale de France.

Seals, drawings:

These can be described and any legible text should be transcribed. Ideally, one should include an image (figs. 29, 30a–b). Where opinions, based

on art-historical grounds, have been expressed on the date, this should also be mentioned.

FIG. 29: Example of an official seal, ITJ 1126; copyright British Library.

A

B

FIGS. 30A–B: Drawing of a "dragon" at the end of PT 239;[59] lotus in the colophon to PT 1307; copyright Bibliothèque nationale de France.

[59] For remarks on this "dragon," see Heller 2013: 16.

Foliation:

In the codicology of Latin codices, a sheet of writing material, one half of a bifolium, is called a folio. Since most of Tibetan books are in *pothī,* scroll, concertina, or other than codex formats, it is probably better to use term "leaf" rather than "folio" in the context of Tibetan books. The numbering of leaves, as opposed to pages, is termed foliation and the numbering of pages is called pagination.[60] Tibetan systems for numbering leaves resemble foliation in Latin manuscripts. One prevalent method uses a letter of the Tibetan alphabet (e.g., from *ka* to ^*a*, that is, 1–30) to number the volume, and then uses written numerals (e.g., *so gsum* for thirty-three) for each leaf.[61] The latter is written on the recto, and the folio number is shared by recto and verso. This same combination of letter-numerals and written numerals is also used, however, to separate hundreds from tens and ones. That is, *ka* indicates 1–100, *kha* indicates 101–200, and so on. Thus if one sees *tha*, the tenth letter of the alphabet, followed by "ninety-four" (*go bzhi*), one is looking at folio 994. There are further methods of counting hundreds: in one variation *ka* is 1–100, and additional hundreds are indicated by subscribing a cross, e.g. *ka*+ for 101–200 and *ka*++ for 201–300. Another method, first deciphered by Ernst Steinkellner in the context of the "Tabo Kanjur," also uses *ka* for 1–100, but follows this with illicit subscripts *k+na, k+ma,* and *k+nga* for the next three hundreds.[62] These and other systems of foliation are part of a recent taxonomy proposed by Cristina Scherrer-Schaub.[63]

These methods of foliation apply to *pothī* and to concertina formats, and the latter was employed for *SPl*. Apart from the rare case, as noted above, of numbered panels, scrolls do not display foliation, and one must instead count the number of panels. The same is true of rolls, where one must additionally count and number the columns of text.

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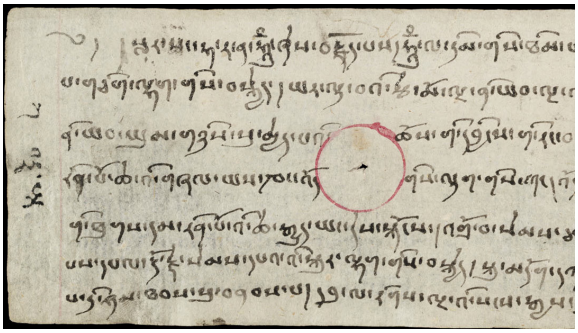
[60] Brown 1994: 57, 105, 125.

[61] For typologies of pagination/foliation in Tibetan manuscripts, see la Vallée-Poussin 1962: xv–xvi; Imaeda 2007: 110; and Scherrer-Schaub 1999: 20–22. On methods for transliteration, see Imaeda 2011.

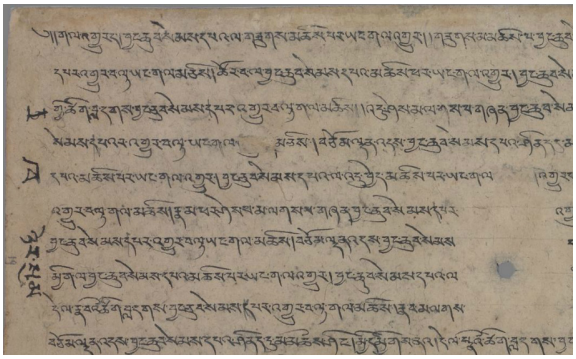
[62] Steinkellner 1994: 125–28.

[63] Scherrer-Schaub 1999: 22.

In addition to the methods outlined by Scherrer-Schaub for discerning typologies of Tibetan methods of foliation, we should mention that one may also profit from Takeuchi's observation that one particular practice, the use of Khotanese numerals, pertains to late-Guiyijun Tibetan documents (fig. 31a).[64] Additionally, Zhang Yanqing and He Jinjiang (and, independently, Brandon Dotson) have recently deciphered a system of foliation that is consistently struck through on those *SPI* folia where it appears (fig. 31b), and concluded that it represents an early, experimental foliation system pertinent to the early-to-mid-ninth century.[65]



A



B

FIGS. 31A–B: Foliation with Khotanese numbers written in Tibetan script (*'dra yA* = Khotanese *drraia*, "three"), ITJ 553; and foliation in an *SPI* folio, shelfmark PT 1300,

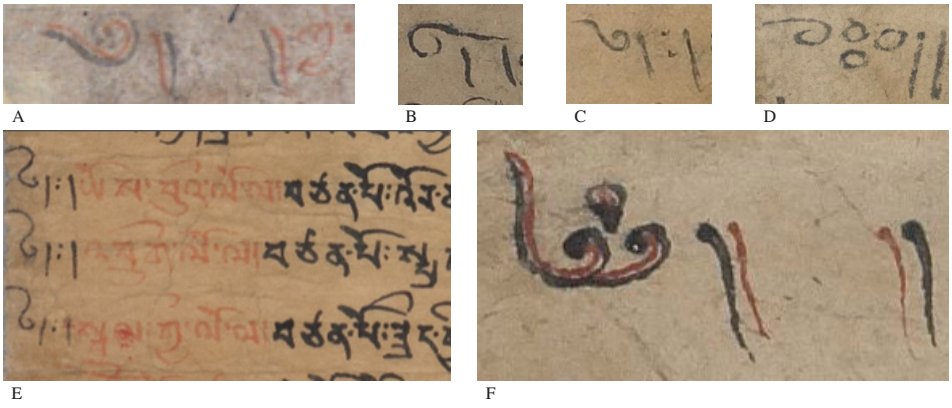
[64] Dalton, Davis, and van Schaik 2007: 13; Takeuchi 2012a: 206–207.

[65] For full details, see Zhang and He 2014 and Dotson 2015. Zhang and He's article did not appear until Dotson's article was in press.

where *kha* indicates hundreds and *nyer sum* indicates tens and ones, e.g. 123. To the left of this, another foliation, *tra*, which also corresponds to 123, has been struck through; copyright British Library and Bibliothèque nationale de France.

Ornamentation (e.g., type of *yig mgo*, or circles around *pothī* holes):

Types of *yig mgo* (Skt. *siddham asti*) or *dbu khyud* are not as varied in early Tibetan writing as they are later on.[66] There are rarely lines under the "curl," which is commonly followed by a few *shad*. Sometimes these are "shadowed" in red ink, sometimes there are also double *tsheg* or double circles. One should also note here the angle of "tail" in clock terms, e.g., if it points left to 9:30, up to 11:30, or if it is inverted, and points to 3:00 (figs. 32a–f).

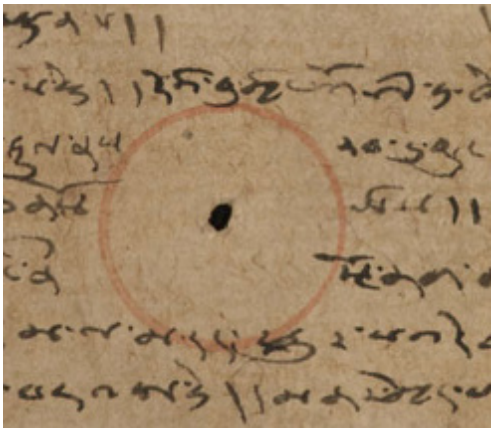


FIGS. 32A–F: Examples of *yig mgo / dbu khyud* from ITJ 739, PT 1096r, PT 1287, PT 44, PT 1288, and PT 116; copyright British Library and Bibliothèque nationale de France.

One common element of Tibetan manuscript layout is the circles around the string holes. These are the holes for a string that holds the *pothī* leaves together, a technology borrowed also from Indian palm-leaf books (Skt. *pustaka*). The circle surrounding it is part of the page setting, and is often

[66] For further reflections on the importance of the *yig mgo* or *dbu khyud*, see Scherrer-Schaub 1999.

drawn at the same time as one would draw guidelines and margins. It ensures that the scribe will not write too close to the string hole, and also creates a buffer zone around the string hole. In Tibetan Dunhuang *pothī* and concertina-format manuscripts, the *pothī* holes, when not left unadorned, are often graced with circles drawn in black or red ink, and sometimes with more elaborate designs (figs. 33a–b). The idiosyncratic string holes of *SP1* folia, which often lack drawn circles, distinguish them from the cleanly punched, usually circled string holes of *SP2*.[67] One also finds leaves where the paper is cut from the margin to the string hole. This, along with cutting or tearing the margin, was an editorial method for defacing a defective folio.[68] In other documents, such as concertina in which no hole has been pierced, string holes are drawn purely as ornamentation.



A

B

FIGS. 33A–B: Circles and designs around string holes in *pothī*, ITJ 318 and PT 1318; copyright British Library and Bibliothèque nationale de France.

In documenting string holes and circles, one should measure their distance from the margins, from each other, and give their diameters.

[67] Lalou 1954: 257–58.

[68] Lalou 1954: 258–59.

Script (e.g., *dbu can* or *dbu med*):

This is not as straightforward as it may seem, given that we see in Dunhuang is what is often called "running *dbu can*," and it was from the graphic principles of writing *dbu can* quickly, some argue, that *dbu med* developed.[69] Seeing this apparent process taking place before our eyes, and seeing a single scribal hand switch from *dbu can* to *dbu med*, the dividing line between the two can be blurred. One indicator is the letter *sa*, but rather than attend to this as a somewhat coarse litmus test of *dbu can* versus *dbu med*, our answer is to focus on the ductus of certain index letters (see below).

Number of scribal hands:

This is not always possible to identify, and involves a judgement that not everyone will be comfortable making. The writing of a single scribe will vary depending on the material support, the style (e.g., headed or headless), the perceived importance of the work, and any number of other factors. Where there is doubt, it is best to withhold an opinion on the number of scribal hands.

Where it is obvious that two scribal hands are at work, one should, where it is practical to do so, make separate measurements concerning the orthography, ductus, etc. of each.

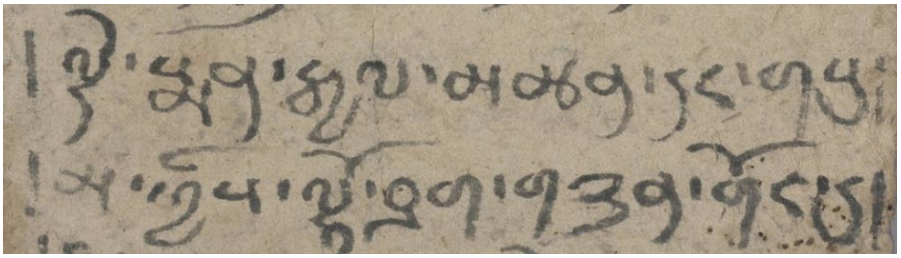
[69] See Gendun Chomphel 1983; van Schaik 2012.

PART TWO: ORTHOGRAPHY

2.1 Orthography

Line breaks (e.g., *gra* at end of line and suffixes *gs* starting the next; or a syllable or word repeated unnecessarily at the beginning of the next line):

In some texts, a word or syllable will span a line, such that rather than cramping the writing or subscribing the suffix, e.g., writing the *s* under the *g* in the word *grags*, a scribe will simply finish the syllable at the start of the next line, e.g. *grag&s* (fig. 34a). In other cases, e.g., ITJ 740 and ITJ 750, a scribe will unnecessarily and ungrammatically start a line with the same syllable that ended the previous line, employing it like a place-marker (fig. 34b). Here one can observe if any of these conventions are present, or otherwise state that the line breaks are normative. To be quantified as follows: 0 = no breaks; 1 = wrap around; 2 = repeated syllable.



A

B

Figs. 34a–b: Wraparound syllable (*gsu&m*) and repeated syllable (*jI*) in PT 44 and ITJ 740, respectively; copyright Bibliothèque nationale de France and British Library.

Syllable margins (e.g., *lastsogste* or *las stsogs te*; liaison with sentence final particle, e.g., *stsalto*; with terminative, e.g., *dusu* or *sladu*; with genitive, e.g., *bdagi*):

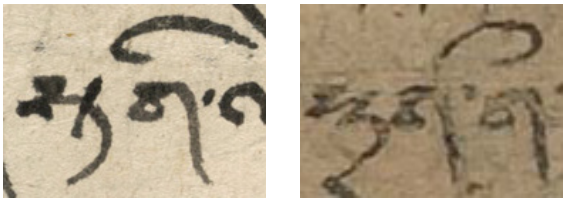
Traditionally, Tibetan syllables are separated by a *tsheg*. In early Tibetan writing, however, this is not as rigidly observed as it would be later (figs. 35a–b and 36a–b). This sort of blurring of syllable margins is characteristic of writing traditions cross-culturally when writing is introduced in a given society, and this is one of the reasons for testing it as a possibly distinctive feature of early Tibetan writing. In some cases of Tibetan "illegal" combinations like *lastsogste*, this can also be seen as a contraction to save time for the writer, but it is to be distinguished from the later tradition of Tibetan contractions (*bsdus yig* or *bskungs yig*), which more closely resemble English contractions like "o'er."

One should also be aware that the fluidity of syllable margins also means that sometimes one syllable's suffix, even when followed by a *tsheg*, can also serve as the following syllable's prefix, and vice-versa. This is a common feature in the formation of compounds, but is even more prevalent in early Tibetan writing. It is a good reminder that one must read Old Tibetan phonemically as well as morphemically.[70]

Syllable margins may be quantified as follows: 0 = fluid; 1 = rarely broken; 2 = rigid.

xxgi(s) to *xxg gi(s)* ratio (e.g., *stagi* versus *stag gi*):

This is one way of quantifying syllable margins, and should be used alongside the next quantification.



A B

FIGS. 35A–B: *stagi* and *stag gI* in ITJ 1383 and PT 1089, respectively; copyright British Library and Bibliothèque nationale de France.

[70] See Miller 1963: 494.

Practical note: when searching, one must ignore case and exclude *xxng gi* and *xxngi*. One should not exclude *gis/gIs*.

xxste to *xxs te* ratio (e.g., *lagste* or *byaste* versus *lags te* or *byas te*):

Together with the previous ratio, this should help to make a representative, if not an exhaustive, measurement of syllable margins. Such ratios are preferable to the quasi-quantitative use of numbers as abbreviations for other values.

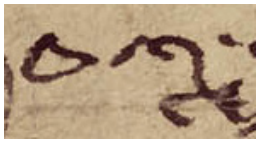
A B

FIGS. 36A–B: *bsduste* and *bsdus te* in ITJ 750 and Or.8210/187, respectively; copyright British Library.

Practical note: when searching, one must also include *xxs ste*.

Subscribed suffixes/letters per 10 lines:

The use of the subscribed suffix is often a matter of conserving space (figs. 37a–b). In some cases, such as in certain inscriptions, however, it seems to be a stylized choice. There it most often appears at the end of a line, but if we assume that the stone carver worked from a model text, then we must conclude that it was a conscious choice to subscribe a suffix rather than a matter of a stone carver running out of room as he reached the margin. Unless it is clearly a long vowel in a mantra, the subscribed *'a* is regarded as a subscribed suffix. While it is usually the suffix that is subscribed, occasionally, as in the word *bka'* where the *k* is under the prefix *b* (i.e., *b+ka'* instead of *bka+'*), the subscribed letter is not a suffix.



A B

FIGS. 37A–B: Subscribed suffixes, *bka+'* and *gi+s* in ITJ 793 and ITJ 1375, respectively; copyright British Library.

Da drag per 10 lines:

This is one of the most well known Tibetan archaisms, and is often found in words like *btstald* or *phyind*. It is still present by its absence in the rection of case particles that follow those verbs that once had or "should" have a *da drag*. In some cases, it may have served as a stylized, or even self-conscious archaism in later texts that do not otherwise feature a distribution of archaic features.

d/n suffix variation (e.g., *ched po*):

This is also a common feature of early Tibetan writing. Here one can note whether it is absent, uncommon, or common, quantifying this with 0, 1, or 2, respectively.

ched po to *chen po* ratio:

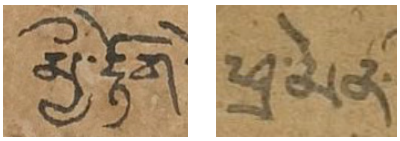
This is one way to further quantify *d/n* suffix variation.

Practical note: one should search for "*ed p*" and "*en p*" so as not to exclude variant forms like *cen po* or *ched pho*.

Ratio of *myi/mye* to *mi/me*:

This marker simply quantifies the prevalence of the *ma ya btags,* which is standard in Old Tibetan when the consonant *m* combines with *i* or *e* vowels (fig. 38a). It is more remarkable for its absence than its presence, and *mi* is especially rare. Certain words, typically of foreign origin, do not use the *my*. Among words where *mi* and *me* are not palatalized are *phra men* and *men*

tog (fig. 38b).[71] One should note these, but not include them in the ratio, e.g., "11: 1, excluding 4 *men tog*."



A B

FIG. 38A–B: *myi* and *men* in PT 1844 and PT 1071, respectively; copyright Bibliothèque nationale de France.

Anusvāra per 10 lines:

This quantifies the frequency of the *anusvāra* (Tib. *rjes su nga ro*) a small circle above the line that usually indicates a labial suffix, e.g., *gsuM* (fig. 39).

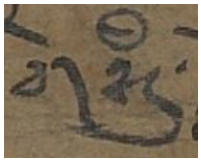


FIG. 39: *Anusvāra* (*gsuM*) in PT 1109; copyright Bibliothèque nationale de France.

pa'/ba'/na' to *pa/ba/na* ratio:

This is one way to quantify the use of the *'a* suffix (figs. 40a–b). It is not exhaustive, however, and one should note the salient occurrence of any forms (e.g., *brgya'*) not included here. One should also note if there are any significant variations within the individual members of this combined ratio itself, e.g., if there is a 1 : 2 ratio of *ba to ba'* but a 3 : 1 ratio of *pa* to *pa'*. The "grammatical" or pre-pausal use of this suffix is to be noted in another field below.

[71] On *men tog*, see Laufer 1914: 99, and Hill 2007: 480–81, n. 8; on *phra men*, see Dotson forthcoming b.

A B

FIGS. 40A–B: Final *a'* (in *ba'* and in *pa'*) in ITJ 740 and ITJ 844, respectively; copyright British Library.

xxa's, xxa'r, and *xxa'd* per 10 lines (e.g., as in *bka's*):

This measurement quantifies the use of the medial *'a/v/ḥ,* as in the word *bka's/ bkaḥs/ bkavs*. Here one searches for "*a's*," "*a'd*," and "*a'r*." This returns results such as *btsa's, dpya'd,* and *dga'r* (fig. 41). Were one to find two such instances in a ms. of 100 lines, the value would be "0.2." In making this measurement one excludes the addition of the concessive particle *'ang* to the end of a syllable.

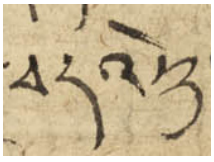


FIG. 41: Medial *'a* (in *bda'ste*) in ITJ 844; copyright British Library.

Alternation between aspirated and unaspirated voiceless consonants (e.g., *cen pho*)?

0 = absent; 1 = uncommon; 2 = common.

pha/pho to *pa/po* ratio:

This further quantifies alternation between voiceless aspirated and unaspirated consonants.

Alternation between voiced and voiceless consonants (e.g., *gun/kun, gyang/kyang*)?

Word initially, as in *gun*, this feature is less common than the alternation between aspirated and unaspirated voiceless consonants, but there are some texts in which it appears. One should attend especially to voicing within compounds such as *bka' grims, rje gol, dmu dag*, and Rma grom. 0 = absent; 1 = uncommon; 2 = common.

kyang to *gyang* ratio:

This further quantifies alternation between voiced and voiceless consonants.

Vowel assimilation (e.g., *lte bu* for *lta bu; cang* for *ci yang*; *mye ngan* for *mya ngan*; *e* or *e'i* for *a'i*):

In some cases, *lta bu* is written *lte bu*, presumably reflecting the phonetics based on vowel assimilation. Similarly, *pa'i* is sometimes written *pe'i* or even simply *pe*. This measurement can be useful for historical phonology, among other things.

Idiosyncratic or phonetic spellings (e.g., *zha 'bring/zham ring*; *lcags* for *phyag;* or *legs bu* for *glegs bu*):

Such spellings, whether they be genuine errors of hearing made via dictation, or sub-aural errors where one has "misheard one's internal voice," are very important for historical phonology and for determining the phonetic value, for example, of prefixes and suffixes.[72]

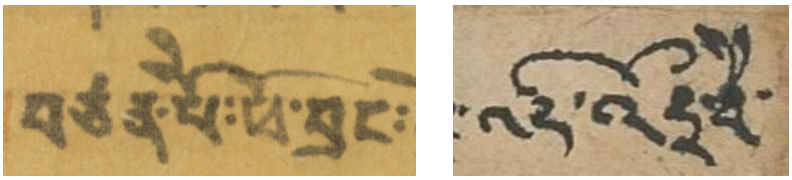
Contractions?

Called *bsdus yig* or *bskungs yig* in Tibetan, contractions are very rare in early Tibetan writing, and it is an open question as to when they developed. The use of the reverse *t* as a contraction for *gs* suffixes, for example, is so

[72] For more on such phonetic spellings, see van Schaik 2007: 194–201; and van Schaik and Galambos 2012: 144–45.

far unattested in early Tibetan writing, as are the many contractions that have become current in cursive writing. The most common contraction in Dunhuang manuscripts is the use of the *'greng bu* in place of the genitive *'i*. Thus one finds *po+e* for *po'i,* and *pe+e* for *pa'i* (figs. 42a–b).

Here one should also note the presence of any other contractions, with an eye towards eventually using these for the purposes of dating.



A B

FIGS. 42A–B: Use of *e* vowel over syllable as contraction for *'i.* Left: *btsan po+e pho brang* for *btsan po'i pho brang* in ITJ 750; copyright British Library. Right: *'di 'drI be+e* for *'di 'drI ba'i* in PT 1077; copyright Bibliothèque nationale de France.

Separated *'i* to attached *'i* ratio:

In some cases, *'i(s)* appears on its own where it could (and should, by Classical Tibetan standards) be joined to the previous syllable. Often this is not a matter of metrics. This ratio quantifies the frequency of use of the separated *'i*. The ergative cannot be easily searched, since it consists of a *s* suffix in one case and an *'is* in the other, so it is excluded here (figs. 43a–b).

A B

FIGS. 43A–B: Attached *'i* (in *lo'I*) and separated *'i* (in *pa 'I*); ITJ 740 and PT 1286; copyright British Library and Bibliothèque nationale de France.

This is one of the more interesting features on early Tibetan writing, since one can observe a movement away from what seems to have been a standard use of attached *'i*. The imperial inscriptions, for example, use only attached *'i*, as does the *Old Tibetan Annals* and the majority of legal documents. In some late Guiyijun texts, such as PT 44, the situation is reversed, and all *'i* are separated. Looking at official letters, narrative texts, and ritual texts of uncertain date, the data is mixed, however, and reflects a situation that is more complex than a simple progression from attached to separated *'i*. Considering the principles that may have been at work behind this complexity, and behind the orthographic changes going from imperial-period writing to early and late Guiyijun Tibetan writing, one possible motivating factor behind the separation of the *'i(s)* from the preceding syllable may have been a trend towards greater clarity for those who learned Tibetan as a second language. This process would have begun when the Tibetan Empire incorporated non-Tibetan peoples in its colonies, who learned to read and write Tibetan as a second language. Dunhuang's Chinese and multi-ethnic population might be a case in point.[73]

yi to *'i* ratio:
yis to *'is* ratio:

These two ratios measure the use of genitive and ergative particles following an un-suffixed syllable, or an *'a* suffix. In Classical Tibetan, *yi* and *yis* are found, particularly in metrical texts and in verse in order to add a syllable. In early Tibetan writing, *'i* and *'is* often perform the same function, while *yis* is very uncommon and *yi* is virtually absent.

Practical note: when searching here and anywhere else that includes the *i* vowel—apart from when making the *i : I* ratio—one must ignore case.

[73] A similar situation, the use of Latin by Irish monks for whom it was a foreign language, was an important factor in the development of clear forms of Latin punctuation and "a grammar of legibility" (Parkes 1993: 23; cf. Clemens and Graham 2007: 82–83). Such principles may also stand behind, for example, the rigidification of syllable margins, the reduced variation between aspirated and unaspirated voiceless consonants, and other features characteristic of early and late Guiyijun writing. These and similar hypotheses remain to be tested.

Ratio of *gi gu* to *gi log*:

The reverse *gi gu* (*gi log*) is, along with the *da drag* and the *ma ya btags*, one of the most salient features of early Tibetan writing. In some cases it is used for spatial considerations, but in just as many cases space has no relevance to the choice to use one or the other symbol for the i vowel. Fortunately, the *gi log* tends to be preserved in transliteration, usually by using the capital I, as practiced by the OTDO transliteration method, and it is therefore easily searchable.

2.2 Punctuation

Single *shad*:

Some texts have single *shad* placed in the middle of clauses and even between words. Others use it "grammatically," that is, after case particles or at natural pauses. The frequency of the appearance of the single *shad* is quantified as follows: 0 = absent; 1 = uncommon; 2 = common; 3 = standard or default.

Single *shad* ending one "clause," and at start of next:

This is a standard "grammatical" use of the *shad* in many early Tibetan writings, and should be distinguished from a double *shad* (fig. 44). In some texts, it is used to the exclusion of the double *shad*, and even the end of the text features a significant space between two *shad* rather than a true double *shad*. In some cases, the spacing of words is such that one cannot reliably distinguish between this "*shad*-space-*shad*" and the double *shad*. The usual transliteration practices do little to help, since they often fail to distinguish these two different punctuation conventions. Quantified as follows: 0 = absent; 1 = uncommon; 2 = common; 3 = standard.

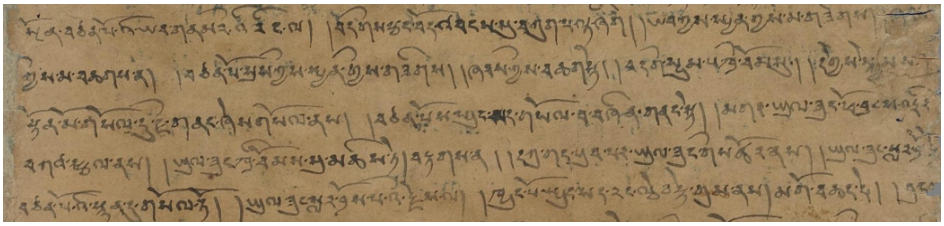


Fig. 44: Use of "*shad*—space—*shad*" or single *shad* ending one "clause" and starting the next, PT 1287; copyright Bibliothèque nationale de France.

Double *shad*:

As with the single *shad*, one can note here the frequency of the appearance of double *shad*. In some documents no double *shad* are found. Quantified as follows: 0 = absent; 1 = uncommon; 2 = common; 3 = standard.

Triple or quadruple *shad*:

In many early texts the triple and quadruple *shad* are unattested. The quadruple *shad* should be distinguished from two sets of double *shad* with space between them, or "double *shad*—space—double *shad*." Quantified as follows: 0 = absent; 1 = uncommon; 2 = common; 3 = standard.

"Grammatical" use of *shad*?

In some texts *shad* are used to separate clauses. In others they seem to have no rhyme or reason. The term "grammatical" may be a misnomer, but this has to do with the historical development of punctuation. In many instances, a *shad* will appear after a case particle or an indefinite article, so it plainly relates to pauses in reading. In fact, the signalling of a pause is relevant to the origins of punctuation cross-culturally.[74] To account for this, "grammatical" is used here in a very broad sense, such that the only "non-grammatical" uses of the *shad* are where it breaks up a word or it is otherwise obvious that it egregiously interrupts the flow of a sentence. This is quantified as follows: 0 = fully grammatical to Classical Tibetan standards; 1 = non-grammatical use only at the beginning or end of line; 2 = few non-grammatical uses; 3 = several non-grammatical uses.

[74] See, for example, Parkes 1993.

Tsheg before *shad*?

In later Tibetan writing, *tsheg* came to be inserted between the *ng* suffix and the *shad* so as to disambiguate it from a *g* suffix, and was often placed after an *a*' suffix to disambiguate and *a*' and *shad* from a *l* suffix. Such is not always the case in early Tibetan writing. Also, we sometimes find the *tsheg* consistently used before the *shad*, and this may be a marker of scribal or chancellery practice. For quantifying this, 0 = never; 1 = only before *nga*; 2 = rare; 3 = often; 4 = always.

Type of *tsheg* (standard, midline, double, or long):

The standard *tsheg* is a small dot at the top of the line marking syllable margins. The midline *tsheg*, often seen in inscriptions and in sutras, is aligned vertically to the middle of the line, and saves space. Sometimes it is found "inside" the strokes of the suffixes *ng* and *r*. The double *tsheg* is a rare form found in early inscriptions, in some legal, administrative, and ritual documents, and sutras (fig. 45). It may be a useful merkmal for dating early Tibetan writing. One Tibetan term for it is *tsheg drag*. Written quickly, it can take the appearance of a small *shad*, as the pen is not sufficiently lifted between the upper and lower points. Where a scribe shows a preference for this form, we can call it a "long *tsheg*." We also find very infrequent use of a "low-line *tsheg*," positioned at the bottom of the letter rather than adjacent to its head.

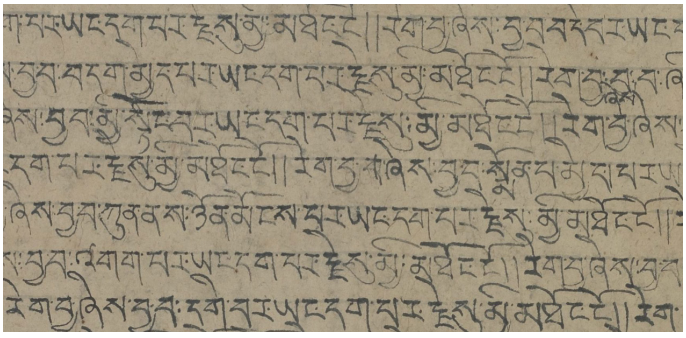


Fig. 45: Examples of single, midline, and double *tsheg* in PT 1300; copyright Bibliothèque nationale de France.

Ratio of single or midline *tsheg* to double *tsheg*:

This quantity can ideally be measured from a transliteration that distinguishes double from single or midline *tsheg*. Unfortunately, due to the amount of labor involved, and due to the fact that not all editions or transcriptions are concerned with such matters, this is hardly ever done. Barring a new comprehensive transcription, which may be impractical in a long text, one should take measurements from different lines and average them, noting, as with other such measurements, any significant variation between one part of the document and another, e.g., where one scribal hand uses the double *tsheg* more consistently than another scribal hand.

Circles (double or quadruple)

This symbol consists of two small circles one over the other (fig. 46). Often the sign appears twice, set off by *shad*. This punctuation can mark off key passages or instructions in a text. Sometimes there are even triple circles, one over another.[75]

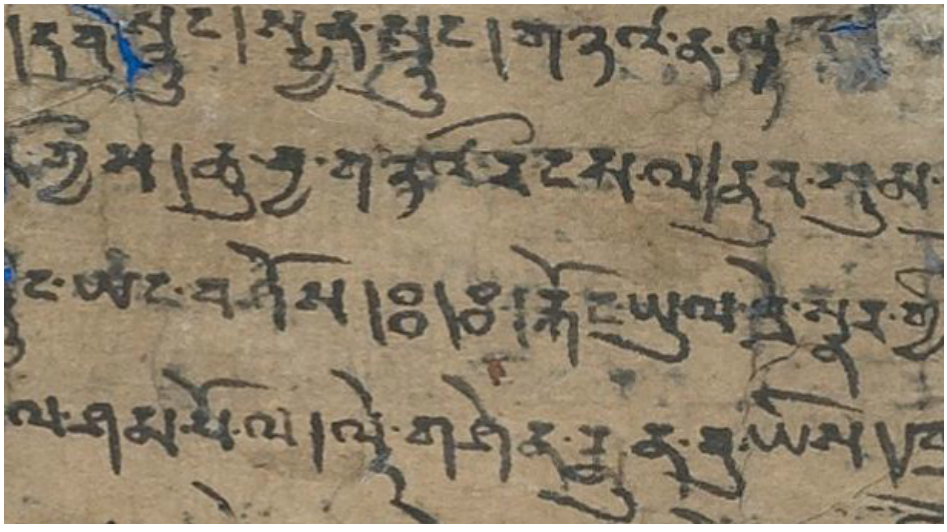


FIG. 46: Use of pairs of double circles in PT 1285; copyright Bibliothèque nationale de France.

[75] On such circles, see also Scherrer-Schaub 1999: 17–18.

Symbols for interlinear additions or *signes de renvoi* (e.g., "+"):

Most commonly, a small cross, similar to a lower-case "t" or a plus ("+") sign, it appears above the line, marking the spot where text should be inserted (fig. 47). Sometimes it takes on a cursive or "loopy" appearance. The text to be inserted generally appears below the line.

Such corrections are very important for orthography in cases where spelling has been corrected, since this tells us about the nature of orthographic standards.[76]

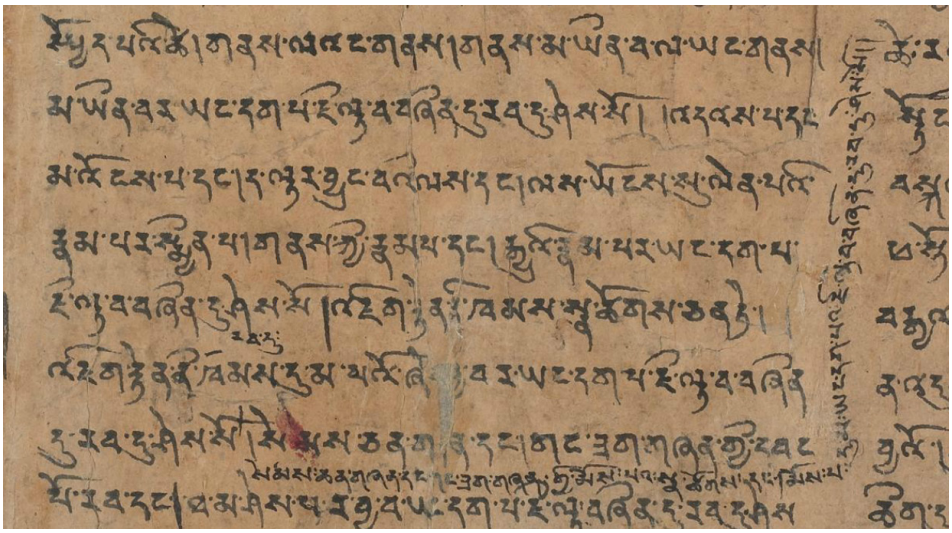
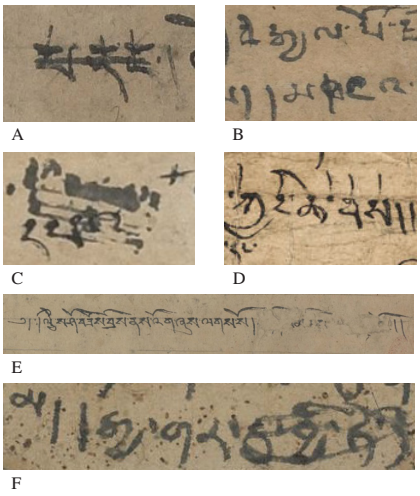


FIG. 47: Insertion below the line with "+" symbol, with inserted text curling up the gutter in an *SP3* panel, PT 1602; copyright Bibliothèque nationale de France.

Deletions (e.g., vertical or horizontal strikethrough, lines over deleted letters):

Besides vertical and horizontal strikethroughs, deletion is also achieved by scribbling, blotting, rubbing out, circling the words to be disregarded, or placing small marks over them (figs. 48a–f).

[76] There are many other editorial symbols besides those used for insertions. A few of these are noted in Scherrer-Schaub 1999: 23.



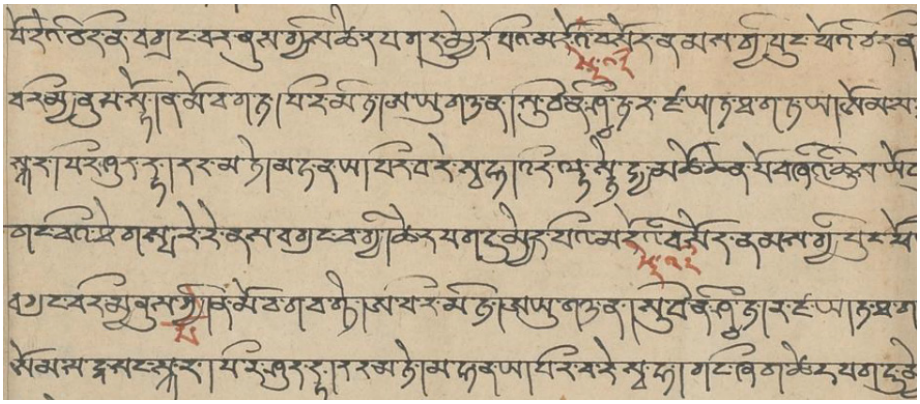
FIGS. 48A–F: Horizontal strikethrough, PT 1318; vertical strikethrough in PT 986; blotting/rubbing out and insertion in PT 116, marks above the letters, ITJ 737.2r; rubbing out, PT 1312; and circling in PT 44; copyright Bibliothèque nationale de France and British Library.

Deletions and insertions per 10 lines:

This quantifies how "clean" a manuscript is. If there are five deletions and three insertions on approximately every line, the numerical result is "80." When using this measurement for comparison, one must take account of the length of the lines of each manuscript that one compares, along with the density of the writing; one line of a very wide *pothī*, such as PT 1290, which has about 60 syllables, equals several lines of a small-format codex such as PT 44, which has around 5 syllables/line.

Deletions and insertions by another hand?

This is not always an easy judgment to make, given that the same scribe's writing may look significantly different in small, interlinear notes than it does in the body text. 0 = no; 1 = yes; 2 = uncertain (fig. 49).



FIGS. 49: Editorial insertion in red ink (correcting *mdo* to *mdo sde*), copy of the *Aparimitāyur-nāma mahāyāna-sūtra*, under the shelfmark PT 3740; copyright Bibliothèque nationale de France.

Explanatory glosses and commentary?

Here one makes the distinction between corrections (deletions and insertions) on the one hand, and explanatory glosses on the other. The latter are closer to commentary, and are intended elucidate the meaning of the text by providing additional information. For describing certain genres of texts, one should add fuller descriptions of various *signes critiques*. 0 = no; 1 = in scribe's hand; 2 = in another hand.

2.3 GRAMMAR

gi(s), gyi(s), kyi(s) all present and normative?

In Classical Tibetan, *kyi* follows *d*, *b*, and *s* suffixes, *gi* follows *g* and *ng* suffixes, and *gyi* follows *n, m, r,* and *l* suffixes. The situation in early Tibetan writing is less settled, but the patterns of use may tell us something about orthographic, scribal, and chancellery practice, and dating. In the majority of inscriptions and in several imperial-period texts we find, for example, *gyi* used in place of *kyi*.

Genitive used in formation of plural (e.g., *lha'i rnams*, …*mchis pa'i rnams*?)

0 = never; 1 = uncommon; 2 = common. One should also note if this is used only with nominalized verbs, i.e., between the nominal particle and the plural particle *rnams*.

Forms of plural or collective particles (e.g., *rnams*, *dag, cag, -o tshal, -o cog*):

Here one simply lists which of these are present, taking care to search both aspirated and unaspirated forms, e.g., *-o chog* and *-o cog*. Recording the use of these various particles may reveal diachronic developments in the grammatical system.[77]

Forms of terminative particle (norms are *tu* after *g, b,* and "lost" *da drag; du* after *ng, d, n, m, r,* and *l; r* suffixed after vowel or *'a,* or *ru* after vowel; and *su* after *s*):

One principal variation in the use of the terminative particle to look out for is the use of *du* in place of *tu*, e.g., *rab du* instead of *rab tu*. While the former is incorrect from the perspective of later Tibetan grammar, it seems to have been standard through the period of Middle Old Tibetan, where *tu* is virtually absent.[78]

Forms of semifinal particle (norms are *te* after *n, r, l,* and *s*; *ste* after *g, ng, b, m, 'a* or vowel; *de* after *d*):

One need not mention here whether or not the semifinal particle is separated by a *tsheg*, e.g., *la stsogs* versus *lastsogs*, since this is already covered in the "syllable margins" field.

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[77] With the same aim, Stein claimed that *–o c(h)og* did not appear in early Old Tibetan texts; Stein 2010, 173. In this instance Stein is uncharacteristically far of the mark, as *–o c(h) og* appears in the south face of the Sri/ Zhol Pillar, generally regarded as our earliest extant Tibetan document.

[78] For a discussion see Dotson forthcoming a.

Forms of concessive particle (norms are *kyang* after *g, d, b, s; yang* after *ng n, m, r*, and *l* unless *n, d,* or *l* have "lost" *da drag* in which case it is *kyang*; and *'ang* after *a*'):

Here one should particularly attend to whether or not *'ang* or *yang* are used after vowels and after the suffix *a*'. The use of the voiced form *gyang* is already recorded above in the *gyang* : *kyang* ratio.

Forms of coordination particle (norms are *cing* after *g, d, b*, and "lost" *da drag; zhing* after *ng n, m, 'a, r, l*, and final vowel; and *shing* after *s*):

In many texts this is normative. As a result of variation between aspirated and unaspirated voiceless consonants, we often find *ching*. In some cases we also find the voiced form, *jing*.

Forms of quotation particle (norms are *ces* after *g, d, b*, and "lost" *da drag; zhes* after *ng n, m, 'a, r, l*, *s,* and final vowel):

The norms for this particle are nearly the same as those for the coordination particle. As with the former, we often find the aspirated form *ches*. Unlike the coordination particle, however, the quotation particle does not—according to the traditional norms—use the voiceless form *shes* after *s*. Some confusion among scribes between the only slightly differing orthographies of these two particles may account for the fact that *xxs shes* appears to be more common across our corpus of Old Tibetan documents than is *xxs zhes*. Reciprocally, we find also *xxs zhing*, but this is less common than the normative *xxs shing*. The norms appear to be strictly followed with regard to the distribution of *ces*.

Pre-pausal *'a/v/ḥ* (e.g., as in *pa'/ pav/ paḥ*)?

0 = absent; 1 = uncommon; 2 = common. In some texts, the *'a* suffix appears to be simply a graphic feature, functionally identical with its absence (e.g., where *pa* and *pa*' are interchangeable). In other cases, however, the suffix appears to have a pre-pausal function. This extends beyond the expected pre-pausal function inherent in the use of *pa* and *ba* as nominalizers and *na* as an inessive or conditional particle. Whether the apparently indiscriminate use of this suffix is a degradation of an earlier "grammatical" or pre-pausal use is

uncertain, and the measurement of this feature is intended to assist in, but not to predetermine, such enquiries.

Sentence final particles (*-o*) per 10 lines:

This measurement gathers data that may help to test the hypothesis according to which the sentence final particle gave way over time to verbal auxiliaries.[79] Apart from being a possible diachronic development, its use may also pertain to genre.

Verbal auxiliaries

Here one should note the use of ergative or genitive particles as a verbal auxiliary of future, the auxiliary *pa yin*, *pa 'dra* as verbal auxiliary of doubt, and any other such auxiliaries that one comes across, excepting Tibetan periphrastic accommodations of Sanskrit grammar. One may include here the construction verb + *zhing/shing/cing* + *mchis*.[80]

Pronouns (*khyed* and *nged* as plural, or respectful?)

This has been put forward by Nathan Hill as a diachronic development of the pronominal system in Tibetan whereby *nged* and *khyed* were initially first-and-second-person plural pronouns, and later came to be used as respectful or honorific singular pronouns.[81] 0 = plural; 1 = *nged* as *pluralis majestatis*; 2 = respectful.

[79] Takeuchi 2012b.

[80] On the development of such auxiliaries in Old Tibetan, particularly *'dug*, see Hill 2013.

[81] Hill 2010.

PART THREE: PALEOGRAPHY

Style (e.g., epigraphic, square, official headed, official headless, epistolary, sutra):

Sam van Schaik has defined a few distinct styles of early Tibetan writing, and identified some manuscripts as belonging to these styles.[82] Here one can note if a manuscript has been so identified, or one can propose that it belongs to a given style. The styles are also a work in progress, and will likely be refined over time and with greater precision. In some cases a given style may not accurately fit a given text (and vice-versa), and it may be necessary to expand the list of early Tibetan styles.

3.1 Index Letters

There are as yet no accepted typologies of the various methods for writing certain letters or letter combinations. The most thorough method, as outlined by Jake Dalton, Tom Davis, and Sam van Schaik, and as demonstrated by Helga Uebach, and most recently by Dieter Schuh, is to make cut-out images of every letter or letter combination, e.g., *from ka, ku, kya, rka* to *ha, hu, hra, lha*, etc. including punctuation marks like *tsheg, shad,* and *yig mgo*.[83] In many cases, however, this is impractical and unnecessary, and paleographers often rely on a shorthand method, namely, the index letter. Likewise, we take note of variations in the ductus of certain letters, and identify a group of index letters, choosing those that appear to be most useful for comparison. This will

[82] van Schaik 2012 and 2013; see also http://idp.bl.uk/education/paleography/tibetan/script_types.html.

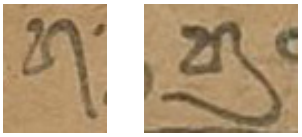
[83] Dalton, Davis, and van Schaik 2007; Uebach 2011; Schuh 2013. Note that Schuh makes use of a "beta-version" of this study, posted online by Brandon Dotson in early 2012, in order to document index letters in the Skardu Inscription and in other documents. For the method of using cut-out images for comparison, see also the website set up by Dalton and van Schaik for handwriting comparison: http://idp.bl.uk/handwritings/index.html. See also the DigiPal website for digital paleography of medieval European handwriting; http://www.digipal.eu/.

depend on the type of writing that one is describing, and the index letters that we've chosen reflect the styles of writing in the inscriptions and in Dunhuang manuscripts; were one describing another corpus of texts, e.g. official letters from the 15th to 18th centuries, one would likely employ different index letters that better reflect the most salient and potentially meaningful features of the corpus. In our case, we propose a typology that includes seven index letters: *ka, ga, nga, ca, pha, ra,* and *sa*. Of these, *ka, ga*, and *sa* are probably the most complex, and the most important. In proposing these typologies we aim to cover the most prevalent letter types rather than providing an exhaustive catalogue that includes every form of each letter. Nonetheless, we recognize that these types may be refined and adjusted over time.

In giving the typology of index letters, we tried to attend only to the "pure" letter that is not encumbered by superscripts, subscripts, the *zhabs kyu*, or any other ductus-altering graph. This is because the ductus will differ depending on the position of a letter within a word, and depending on the presence or absence of superscripts, subscripts, and the subscribed vowel. A given scribe may, for example, tend to write *ba* with a single stroke, the end of which ascends to the top right corner (fig. 50b). But if there is a *ya btags*, then the same scribe will often make the *ba* in two strokes, with the second stroke being the right descender and the *ya btags* (fig. 50g). Alternatively, he may start the *ba* in the lower right hand corner in order to write a *by* with a single stroke. Fig. 50a-g demonstrate the manner in which the addition of a descender changes the ductus of the root letter.

FIGS. 50A–G: Varying ductus of *ba* with and without subscripts; PT 1288, PT 1287, ITJ 1126 (figs. c and e), and PT 1094 (figs. d and f), copyright Bibliothèque nationale de France and British Library.

Similarly, a superscript or a *zhabs kyu* can change the ductus or shape of a root letter by combining with a descender (figs. 51a–b). The other vowels, which are written above the line, generally do not alter the ductus of the root letter.[84]



A B

FIGS. 51A–B: *zhabs kyu* shortens the descender; PT 1287; copyright Bibliothèque nationale de France.

In some cases, the stroke order and even the number of strokes is not clear, and may be open to dispute, since one can arrive at the same letter shape by different combinations of strokes. In describing the strokes, we use the term "descender" for a pen stroke that goes down, and "ascender" for a stroke that goes up. These terms are specific to the forms under consideration, and ignore what such strokes "should" do according to traditional Tibetan calligraphy manuals where, for example, the final stroke of a *ba* written in *dbu can* is customarily a descender. We do borrow from such manuals the terminology, however, for discussing most of the individual strokes of a Tibetan letter, which, according to the traditional nomenclature, can have a "head," "shoulders," "belly," "teeth," "neck," "legs," and much else. Our source for such terminology is the famous Amdo scholar Tshe tan zhabs drung, whose writing style is particularly popular in the Qinghai region of Amdo.[85]

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[84] This is untrue, of course, of later *dbu med* writings, where a *gi gu* might bleed into a suffix or a *tsheg*.

[85] His *dbu can* models, along with names of all of the strokes, are anthologized in Tshe brtan rdo rje 2002: 6–13. This is drawn from Tshe tan zhabs drung's *Bod yig dbu can dbu med kyi ma phyi*.

ka

As the first letter of the alphabet and one on which calligraphy instructors spend a huge amount of time, *ka* cannot be ignored. This is in a way unfortunate, since the ductus of the letter varies tremendously, making it a difficult letter to study. One of the most common shapes can be arrived at in at least four different combinations of strokes, and it is often difficult to determine which particular combination is being used. In some cases—and this is relevant to all of the index letters, and is also one indication of their limitations—a single scribe will not always use the same ductus for a given letter. So a manuscript written by a single hand may, for example, include type 3a, type 3b, and type 4a *ka*.

Type 1a: square, 3 or 4 strokes, short right descender (or "leg") / long middle "tooth" (*mche ba*) (fig. 52). The right angle is made either with one stroke, or, as in classical *dbu can* ductus, with two. One should note variation in the position and angle of the central descending stroke, which tends to vary between 6 and 7 o'clock. Type 1a, present in the imperial-era inscriptions and the *Old Tibetan Annals*, may be a feature indicative of our earliest extant writings.

FIG. 52: *ka* type 1a from the Bsam yas Inscription; after 'Jam dbyangs and Wang 2000: pl. 101.

Type 1b: same as type 1a, but with longer right descender / shorter middle "tooth" (figs. 53 a–b). Type 1 corresponds to "square style" as described by Sam van Schaik.

A B

FIGS. 53A–B: *ka* type 1b from PT 1288; copyright Bibliothèque nationale de France.

Type 2a: three strokes, with the long right descender as a single stroke (figs. 54a–c). The "tooth" and the "arm" both touch the head at the same point, and one of them—usually the "arm"—begins with a ticked-head, giving the letter a thick head and a similar appearance to type 3a.

FIGS. 54A–C: *ka* type 2a from PT 1077 (fig. 23c, with *ya btags* and *gi gu*, is included here only because it is exemplary in showing what seems to be the ductus of the other, unencumbered *ka*: ticked head + arm, then tooth, then leg). Copyright Bibliothèque nationale de France.

Type 2b: three descending strokes, no ticked head (fig. 55).

FIG. 55: *ka* type 2b from ITJ 321; copyright British Library.

Type 3a: collapses the second and third strokes of type 2a into a single stroke (fig. 56). First stroke: left part of head (ticked such that it extends to the left) and left-most "arm"; second stroke: middle "tooth," up to complete the right side of the head, then down to make the right descender.

FIG. 56: *ka* type 3a from PT 1300; copyright Bibliothèque nationale de France.

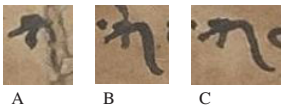
Type 3b: same as 3a, but the first stroke is not ticked to make a head (fig. 57).

FIG. 57: *ka* type 3b from ITJ 740 (ligature with a *na ro* vowel visible at top); copyright British Library.

Type 3c: two strokes: one is arm and tooth, the other is head and right descender (figs. 58a–c). This is essentially the same two-stroke ductus as type 3a, only the orientation of the first stroke has been rotated. The shape is often indistinguishable from 2a and 3a, and 4a. It can quite easily be modified into a single-stroke form, similar to a *nya* rotated 90 degrees.

FIGS. 58A–C: *ka* type 3c from PT 1287 (figs. a and b) and ITJ 740 (fig. c); copyright Bibliothèque nationale de France and British Library.

Type 4a: two strokes: stroke one: ticked head and middle "tooth"; stroke two: left "arm" (as ascender), head, and right descender (NB: this is not easy to distinguish from type 3a) (figs. 59a–c).



FIGS. 59A–C: *ka* type 4a from PT 1079; copyright Bibliothèque nationale de France.

Type 4b: same as 4a, but without ticked head (fig. 60).

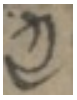


FIG. 60: *ka* type 4b from PT 1085; copyright Bibliothèque nationale de France.

ga

Like *ka*, the letter *ga* is also written in many different ways. A short "leg" or right descender is one point to attend to, as it may be an indicator of imperial-period writing. The length of the leg is already measured, however, in the typology for *ka*. The *ga* typology therefore attends to other features such as the shape of the enclosed area made by the "shoulder," "belly," and "middle leg"—there seems to be no indigenous term for it—and its position in relation to the head. This enclosed shape can be square or trapezoidal and joined with the head, or it can be triangular, dangling from the head by a "neck." As with *ka*, a single scribe will sometimes employ different types of *ga*, and do so inconsistently. That is, he will not reliably choose the same ductus based on the presence or absence of superscripts, subscripts, and so on.

Type 1a: square, 1 to 4 strokes, head extends left of the left "shoulder." The right angle is made either with one stroke, or, as in classical *dbu can* ductus, with two (fig. 61).

FIG. 61: *ga* type 1a from Lhasa Treaty Pillar; after Naito 1928.

Type 1b: same as type 1a, but left "shoulder" meets the left edge of head (fig. 62). This and type 1a correspond to "square style" as described by Sam van Schaik.

FIG. 62: *ga* type 1b from Bsam yas inscription; after 'Jam dbyangs and Wang 2000: pl. 101.

Type 2

This is the most common ductus for the *ga*. The letter is written in a single stroke, starting in the upper left and proceeding to the lower right, but the writer still maintains the ability to create several different shapes.

The letter can be rounded or angular, headed or headless. In many cases, one achieves the exact same shape that one does with a type-4 *ga*. Where one cannot discern the difference, one should record the letter as, e.g., "type 2a/4a."

Type 2a: ticked, closed head, one stroke (figs. 63a–c). Begins left side of head, left descender/ "shoulder," then "belly" (*sbo*), then back up to head, right side of head, then right descender. In some cases, the ascending stroke reaches the head to the left of the initial descender, creating an hourglass shape.

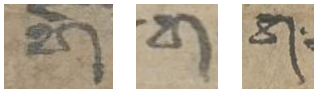


FIG. 63A–C: *ga* type 2a from PT 986 (figs. a and b) and PT 823 (fig. c). Note how fig 63b could quite easily be seen as type 4a; copyright Bibliothèque nationale de France.

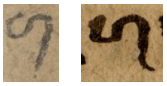
Type 2b: same as type 2a, but the ascending stroke does not meet the head, thus making an "open head" (fig. 64).

FIG. 64: *ga* type 2b from ITJ 742; copyright British Library.

Type 3a: same ductus as type 2a, but without a ticked head. The enclosed area of the *ga* can often be small and rounded (fig. 65).

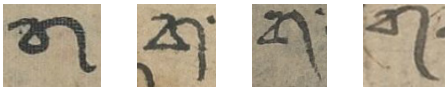
FIG. 65: *ga* type 3a from ITJ 742; copyright British Library.

Type 3b: same as type 3a, but with an open head (figs. 66a–b). The same scribe will often use types 2b and 3b interchangeably, as in ITJ 742.



FIGS. 66A–B: *ga* type 3b from PT 44 and ITJ 321; copyright Bibliothèque nationale de France and British Library.

Type 4a: looped, but with a ticked head; ticked head goes left to right, descending from head to middle descender ("shoulder"), then left and looping up and to the right and down for the descender ("leg"). Shape is usually triangular, and often the triangle is suspended from a "neck" made by the left-to right diagonal ascender (figs. 67a–d).



FIGS. 67A–D: *ga* type 4a from PT 1083, PT 67, PT 1085, and PT 1082. Note loop to the right of the "belly" in fig. 36c; copyright Bibliothèque nationale de France.

Type 4b: same as 4a, but without ticked head. Similar to *dbu med* ductus in some modern *dbu med* writing, i.e., a single "loop," starting at the head (fig. 68).

FIG. 68: *ga* type 4b from PT 1083; copyright Bibliothèque nationale de France.

nga

The "proper" ductus of the letter *nga* has been a matter of debate in Tibet for centuries. We do not wade into it here, but attend instead to the length of

the "shoulder" in relation to the rest of the letter and in comparison with the letter *da,* along with the angle of the final descender.

Type 1a: long "shoulder," that is, longer than the shoulder of the *da*. One to three strokes. The "belly" or final stroke/ end of stroke points to no lower than 3:30 (figs. 69a–c).

FIGS. 69A–C: *nga* type 1a from Bsam yas inscription, Lhasa Treaty Pillar, and ITJ 750; after 'Jam dbyangs and Wang 2000: pl. 101; after Naito 1928; copyright British Library.

Type 1b: same as 1a, but the descender points lower than 3:30 (fig. 70).

FIG. 70: *nga* type 1b from PT 1369; copyright Bibliothèque nationale de France.

Type 2a: short "shoulder" (same as or close to that of the *da*) (figs. 71a–b). Otherwise the same as 1a.

FIGS. 71A–B: *nga* type 2a from PT 16 and PT 1047; copyright Bibliothèque nationale de France.

Type 2b: short "shoulder" (same as or close to that of the *da*) (fig. 72). Otherwise the same as 1b.

FIG. 72: *nga* type 2b from PT 1290; copyright Bibliothèque nationale de France.

Type 3a: headless, but there is still a near-right angle from "shoulder" to "belly," and the end points no lower than 3:30 (fig. 73).

FIG. 73: *nga* type 3a from ITJ 740; copyright British Library.

Type 3b: same as 3a, but end points lower than 3:30 (fig. 74).

FIG. 74: *nga* type 3b from ITJ 425; copyright British Library.

Type 4: headless, curved descender, bowing left (modern *dbu med* ductus) (fig. 75).

FIG. 75: *nga* type 4 from ITJ 321; copyright British Library.

ca

For the letter *ca*, we attend principally to the location of the body of the letter in relation to the head. We find the absence of a "neck" between body and head in early inscriptions and in some Dunhuang documents, and this may be an indicator of our earliest extant writings.

Type 1: "open neck": there is space between the two downward strokes when they meet the head (figs. 76a–d).

FIGS. 76A–D: *ca* type 1 from Bsam yas inscription, PT 1304, and PT 1290; after Tucci 1973: pl. 43; after 'Jam dbyangs and Wang 2000: pl. 101; copyright Bibliothèque nationale de France.

Type 2: in between types 1 and 3; there is no "neck," but it is not open at the head, where the lines converge. This is sometimes executed in a single stroke with something like a ticked head at the start of the first stroke. This is evident when the head is not a neat, straight line (figs. 77a–b).

FIGS. 77A–B: *ca* type 2 from PT 1085; copyright Bibliothèque nationale de France.

Type 3: "closed neck": there is a line descending from the head before it branches into two (fig. 78).

FIG. 78: *ca* type 3 from PT 1101; copyright Bibliothèque nationale de France.

Type 4: one stroke, no head (fig. 79).

FIG. 79: *ca* type 4 from ITJ 425; copyright British Library.

pha

The *pha* typologies measure two features: the placement of the head in relation to the left descender (as with type-1 *ga*), and the orientation of the diagonal descender within the letter.

Type 1a: head is to the right (or on both sides) of the left descender, diagonal stroke reaches left descender at or above the lower left corner. One to four strokes (figs. 80a–b).

FIGS. 80A–B: *pha* type 1a from Zhol inscription, east face, and PT 1288; after Richardson 1985: pl. 2; copyright Bibliothèque nationale de France.

Type 1b: same as 1a, but diagonal stroke does not reach left descender, and instead touches the horizontal stroke, or "belly" (fig. 81).

FIG. 81: *pha* type 1b from ITJ 750; copyright British Library.

Type 2a: ticked head is to the left of the descender. One to three strokes, square; diagonal stroke reaches left descender at or above the "corner" (figs. 82a–b).

FIGS. 82A–B: *pha* type 2a from PT 1075 and Or. 8212/187; copyright Bibliothèque nationale de France and British Library.

Type 2b: same as 2a, but diagonal stroke does not reach left descender, and instead touches the horizontal stroke (fig. 83).

FIG. 83: *pha* type 2b from PT 1039; copyright Bibliothèque nationale de France.

Type 3a: headless, one or two strokes, diagonal stroke reaches left descender at or above the "corner" (fig. 84).

FIG. 84: *pha* type 3a from PT 126; copyright Bibliothèque nationale de France.

Type 3b: headless, but diagonal stroke does not reach left descender, and instead touches the horizontal stroke (fig. 85).

FIG. 85: *pha* type 3b from PT 230r; copyright Bibliothèque nationale de France.

Type 4: headless, rounded (fig. 86).

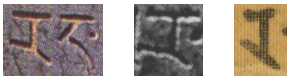
FIG. 86: *pha* type 4 from PT 1217; copyright Bibliothèque nationale de France.

ra

The main features of importance in the letter *ra* are the length and alignment of the "neck" between the "head" and the "belly," and the length of the belly's final descender. In the North Indian scripts that influenced the

Tibetan script, we either find no "belly" at all, or a very short one, giving it a snub-nosed appearance.[86] In imperial inscriptions and the *Old Tibetan Annals*, we also find a short "belly," along with a long "neck." In later orthography, this neck becomes shorter, and the final descender of the "belly" lengthens.

Type 1a: two or three strokes: first is head; second is neck; and third is descender/ "belly." If two strokes, then the head is stroke one. Alignment of neck between the head and final descender is right of center. Like the "shoulder" of the *nga*, the *ra*'s neck is often longer than the "shoulder" of the *da*. The "belly" has a short descender, giving the letter a "snub-nosed" appearance (figs. 87a–c).



FIGS. 87A–C: *ra* type 1a, Bsam yas Inscription (from the word *sbyard*, showing the comparison of the *ra*'s neck with the *da*'s shoulder), Skar cung Inscription, and ITJ 750; after 'Jam dbyangs and Wang 2000: pl. 101; after Richardson 1998: pl. 17; copyright British Library.

Type 1b: same as 1a, but second stroke is aligned middle or left, and the final descender is longer. This form is uncommon, since the central alignment and elongated descender are usually accompanied by a "neck" that is as short as the *da*'s "shoulder" (fig. 88).

FIG. 88: *ra* type 1b from the Spu hreng Inscription; after 'Jam dbyangs and Wang 2000: pl. 102.

Type 2a: one or two strokes (headed or ticked head), sometimes with loop; shorter "neck" and short final descender (fig. 89).

[86] For images, see van Schaik 2011: 85.

FIG. 89: *ra* type 2a from PT 1144; copyright Bibliothèque nationale de France.

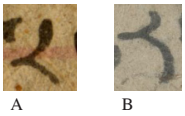
Type 2b: same as 2a, but with longer final descender. This includes what has become the more or less standard *dbu can* form of this letter in modern handwriting styles and typefaces (figs. 90a–c).

FIGS. 90A–C: *ra* type 2b from PT 1083 (figs. a and b) and PT 1079 (fig. c); copyright Bibliothèque nationale de France.

Type 3a: one stroke, no ticked head (fig. 91).

FIG. 91: *ra* type 3a from PT 1217; copyright Bibliothèque nationale de France.

Type 3b: same as type 3a, but orientation is rotated to the right to achieve the equivalent of modern *dbu med* ductus (figs. 92a–b).



FIGS. 92A–B: *ra* type 3b from ITJ 437 and PT 44; copyright Bibliothèque nationale de France and British Library.

sa

The letter *sa*, like *ka* and *ga*, is productive as an index letter for its difficulty and for its many variations.[87] One point that we attend to here, besides the great variation in ductus, is whether or not the *sa*'s first two descenders—that is, what would be descenders according to its normative *dbu can* ductus—both begin from, or give the appearance of beginning, from the head.

Type 1a: normative *dbu can* ductus, four strokes, or three if the final line is an ascender. Large head that extends to the right of the left descender/"shoulder," two descenders come down from the head. Head is a single stroke that extends to the right. Note: some, as in the two images below, have an "extra" stroke in the form of an extension of the left diagonal descender (figs. 93a–b).

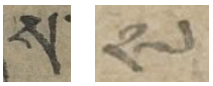
Fig. 93a–b: *sa* type 1a from the Lhasa Treaty Pillar and PT 1290; after Naito 1928 copyright Bibliothèque nationale de France.

Type 1b: same as 1a, but the second descender does not touch the head, thus creating a "neck" under the head (figs. 94a–b).

Fig. 94a–b: *sa* type 1b from PT 1288; copyright Bibliothèque nationale de France.

Type 2a: two strokes: first is ticked head, then left side of letter; second starts at or near the head, descends to the right, then ascends up, sometimes making a loop where the pen changes direction (figs. 95a–b). Often the top right is ticked away to the right in a pen lift as the stroke finishes.

[87] For detailed remarks on the index letter *sa*, illustrated with numerous images, and with reference to examples from *Brāhmī script,* see Schuh 2013: 153–69.



A B

FIGS. 95A–B: *sa* type 2a from PT 1085 and PT 1082; copyright Bibliothèque nationale de France.

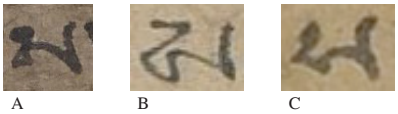
Type 2b: same as 2a, but without head (fig. 96).

FIG. 96: *sa* type 2b from PT 1082; copyright Bibliothèque nationale de France.

Type 2c: two strokes: first is ticked head and a stroke straight downward; second begins left of downstroke, passes through it and descends right, then comes straight up (fig. 97).

FIG. 97: *sa* type 2c from PT 16 (center is best example: others have vowels); copyright Bibliothèque nationale de France.

Type 3a: one stroke, with ticked head. Shape attempts to capture the three "points" of the *sa* (figs. 98a–c). There is great variation in this stroke: when compressed, it can resemble type 3b; when expansive, the shape is almost like the letter *ya*.



A B C

FIGS. 98A–C: *sa* type 3a from PT 1078bis, PT 981, and PT 1287; copyright Bibliothèque nationale de France.

Type 3b: same as 3a, but it only attempts to capture two points in that the end of first descender comes up a bit, essentially retracing the descender, before going to the right (figs. 99a–b). This essentially shades into the *dbu med* ductus.

FIGS. 99A–B: *sa* type 3b PT 1096 and PT 1077; copyright Bibliothèque nationale de France.

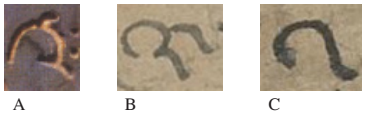
3.2 DUCTUS

Idiosyncratic ductus (e.g., *ta* descenders both from head; short left ascender on ^*a*):

Here one can make note of any idiosyncrasies in a scribe's writing, or make observations that are not included among the index letters above.

Hooked *'a:*

This refers to the "hook" or *dza btags* which is either present on the upper right side of the letter (figs. 100a-b) or is absent (fig. 100c). 0 = never; 1 = mixed; 2 = always.



FIGS. 100A-C: Hooked *'a* in Bsam yas Inscription and in PT 981; without a hook in PT 1087; after 'Jam dbyangs and Wang 2000: pl. 101; copyright Bibliothèque nationale de France.

Type of *shad* (e.g., straight, ticked-head, bowed, wavy, calligraphic):

A straight *shad* is a straight vertical line, as found in many inscriptions; a ticked-head *shad* is a *shad* that begins with a short stroke to the right (or up and to the right) before beginning its descent; a bowed *shad* bows out—usually to the right—between top and bottom; a wavy *shad*, seen as typical of late Old Tibetan writing, bows in (to near 6:30 or 7) towards the middle, and then out (to 5 or 5:30) towards the end. It often ticks away at the end. A calligraphic *shad* resembles the classical *dbu can shad*: it is thick at the top and thins out at the bottom (figs. 101a–g). It is not uncommon to find many types of *shad* in use in a single document and by a single scribe. When speaking of the "wavy *shad*," it is a matter of degrees, and it may be the case that only the extremely wavy *shad* is indicative of post-imperial writing styles.

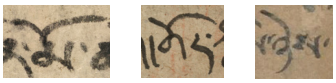
FIGS. 101A–G: Examples of *shad*: straight, calligraphic, ticked-head, ticked head combined with *tsheg*, bowed, ticked-away, and wavy; from Bsam yas Inscription, ITJ 750, PT 1078, ITJ 1375, PT 1287, PT 1082, and PT 981; after 'Jam dbyangs and Wang 2000: pl. 101; copyright Bibliothèque nationale de France and British Library.

Position of vowels in relation to the root letter (e.g., insertion left, center, right):

This pertains only to the three vowels inserted above the line. They can be aligned center with respect to the root letter, or they may be aligned left. Only very rarely are they inserted to the right of the center of the root letter.[88] There will often be variation such that a scribe inserts vowels sometimes left and sometimes center. In such a case where, for example, the majority are aligned left, one can record this as "left, center"; for the reverse, where

[88] Among others who have attended to the alignment of vowels, see Scherrer-Schaub and Bonani 2002: 190.

center-aligned vowels predominate, but left-inserted vowels are also present, one can write "center, left" (figs. 102a–c).



A B C

FIGS. 102A–C: Vowel insertion left, center, and right, respectively, in ITJ 1375, ITJ 897, and PT 986; copyright Bibliothèque nationale de France and British Library.

gi gu's and *gi log*'s curl in degrees; ligature:

This quantifies what would otherwise be referred to by prose descriptions like "curly," which are not as helpful. One should take note of divergence between the *gi gu* and the *gi log*. Often one will be consistently more curled than the other. In recording the ligature, one writes "yes" if the *gi gu* consistently touches the root letter or superscript, and "no" if it does not. Ligatures with this vowel are less common than with the other three vowel signs (figs. 103a–c).

A B C

FIGS. 103A–C: *gi gu* and *gi log* from ITJ 321 and ITJ 425: 180º, 220º and 250º (the first *gi gu*, with its angular shape, helpfully demonstrates how one might think of these angles in translating right angles of 90º into curved angles that one typically finds in these vowels); copyright British Library.

gi gu's and *gi log*'s angle in clock terms (measured by the tail):

Some *gi gu* are parallel to the line, with their tails perfectly horizontal. The tails of these point to 3:00. Others point to between 3:00 and 5:30. *Gi log* will point to between 9:00 and 6:30, generally. (Those in the figures above point to 5:00, 8:00 and 4:00, respectively.)

Ratio between "head" and "tail" of *na ro*; ligature:

Again, this quantifies what might be an otherwise idiosyncratic prose description. A *na ro* with a 1 : 1 ratio looks a bit like a stylized seagull, and 1 : 2 or 1 : 3 ratio is like a flattened check mark. Where the *na ro* has become simply a line in which one can discern no right side and no left, one writes "0." In recording the ligature, one writes "yes" if the center of the *na ro* consistently touches the root letter or superscript, and "no" if it does not. One other point to consider is symmetry: often the "head" is written at a different angle relative to the "tail" of the *na ro* (figs. 104a–d).

FIGS. 104A–D: *na ro* from ITJ 750, ITJ 740, ITJ 647, and ITJ 425; copyright British Library. They have ratios of 1 : 1; 1 : 2; 1 : 4; and 0, respectively. The first two have ligatures, and the second two do not.

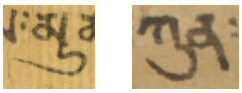
'greng bu's angle in clock terms; ligature:

Quite often the *'greng bu* curves such that it rises towards 11:00 and then points to 9:30. One can also note here whether or not the *'greng bu* is looped. In recording the ligature, one writes "yes" if the *'greng bu* consistently touches the root letter or superscript, and "no" if it does not (figs. 105a–c).

FIGS. 105A–C: *'greng bu* from ITJ 647, ITJ 425, and PT 1287; copyright Bibliothèque nationale de France and British Library. The first rises to 12:00, then turns to 9:30; the second points to 11:00, and the third is looped. The first barely has a ligature, and the third has none.

Size of *zhabs kyu*; ligature:

When remarking on size, one can note whether or not the tail breaks the left margin of the syllable (i.e., past the preceding *tsheg* or *shad*) or root letter, or whether it remains compact, confined to the area directly below its consonants. In early Tibetan writing the *zhabs kyu* is almost always joined with the grapheme above, sometimes by a visible descender (figs. 106a–b).



A B

FIGS. 106A–B: *zhabs kyu* with descender in ITJ 750 (the word is *mun*) and with simple ligature (no descender) in Or. 8212/187; copyright British Library.

Length of tails/feet, degree of inclination (e.g., 5 or 7 o'clock):

Here one quantifies the degree of inclination, and whether or not the descenders tick away. Length is less precise, though one can measure this in relation to the overall proportions of a given letter, as done by Uebach.[89] In such a case, one may note the length of the leg in relation to the enclosed area of the *sha* and the *ga* (e.g., 1 : 1 would describe a *ga* where the leg and the "belly" of the *ga* each extend to the same length, as in some type 1a or 1b *ga*).

Descenders (e.g., wavy, ticked away, calligraphic):

Wavy descenders, like the wavy *shad*, are often cited as a feature of Guiyijun, and in particular late Guiyijun Tibetan writing.[90] Their composition follows the same principles as the wavy *shad*, described above. Ticking away simply means that the pen is picked up in the direction of writing, usually to the right. This is evident from a small uptick at the end of a descender. Calligraphic writing relates to the use of the pen to make some parts of the

[89] Uebach 2010.

[90] Takeuchi 2012a: 205.

letter thick and others thin, with the end of a descender generally being thin. These measurements are often the same as those for the *shad*.

Position of root under superscripts (e.g., left, center, right):

Moreso than vowels, the position of the root under the superscript tends to follow general rules. Under a *ra mgo*, the root is often written slightly to the right. This is also the case under a *sa mgo*, which is often particularly noticeable in the *sp* combination (see fig. 107b). Under a *la mgo*, by contrast, the root is usually centered. Here one can note adherence or non-adherence to these patterns, e.g. "right: *rj, sp*; center: *lg, lng*" (figs. 107a–c).

FIGS. 107A–C: Roots inserted right and inserted center under superscripts, in Or. 8212/187, PT 986, and PT 1287; copyright Bibliothèque nationale de France and British Library.

va btags size, shape:

In middle Old Tibetan, the *va btags* is the first subscript in a group of four that proceeds *va btags, ya btags*, *ra btags*, and *la btags*.[91] By contrast, the Classical Tibetan subscripts change the alphabetical order by placing the *va btags* at the end. Additionally, it is then referred to as the "angular *wa*" (*wa zur*), erroneously linking the subscript *va* to the letter *wa*, rather than to the letter *va* or the letter *ba*.[92] In any case, the *va btags* refers to a labial semi-vowel. In early Tibetan writing the *va btags* is often larger than it is in

[91] This, and the use of the neologism *va btags*, is based on the foliation and numbering systems described in Dotson 2015.

[92] Uray argues that the *va btags* derived from Gupta *ba* (1955: 107–108), whereas van Schaik claims that it comes from the *Brāhmī va* (2011: 84, 89–91). The letter *wa*, originally the consonant *'a* with a subscribed *va*, continued to be written as a digraph even after it "became" the letter *wa*, and in Middle Old Tibetan it is a letter, used, for example, to transcribe Chinese names such as Wang; Dotson 2015: 155, n. 7.

Classical Tibetan (figs. 108a–d). One should note if the *va btags* is rounded or angular, and describe its size in proportion to the root letter. One should also note if it has a small horizontal "bar" at the top.[93]

FIGS. 108A–D: Large, triangular *va btags* in the Lhasa Treaty Pillar and in PT 1079; large rounded *va btags* in PT 1087; and small, triangular *va btags* in PT 1082; after Naito 1928; copyright Bibliothèque nationale de France.

ya btags size, angle, manner of combination with *zhabs kyu*:

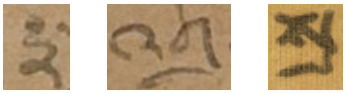
Some *ya btags* remain below the root letter. Others tick up to the right side of the root, the ascender pointing to 1 o' clock or even to 12:00 (fig. 109a). Some scribes write the *ya btags* adjacent to the root rather than under (fig. 109b). In many cases, the *ya btags* combines with a *zhabs kyu* such that *xyu* is a single stroke (fig. 109d); but in other cases the *zhabs kyu* joins from the middle of the *ya btag*'s "belly," sometimes via a descender (figs. 109c).

FIGS. 109A–D: *ya btags* below root and adjacent to root; *zhabs kyu* joining from "belly" of *ya btags* as a separate stroke and from end of *ya btags* as single stroke PT 1287, ITJ 1375, ITJ 740, and PT 1283; copyright Bibliothèque nationale de France and British Library. (The first remains under the root and rises halfway up the right side, pointing to 12; the second is adjacent and points to 11:30; the third remains under the root and points to 2:00; and the fourth remains under the root and points to 1:00.)

[93] On this feature, see Zeisler 2011: 203; see also fig. 151a, below.

ra btags size, angle, presence/absence of descender:

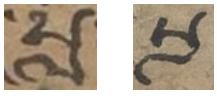
Like the *zhabs kyu*, the *ra btags* almost always has a descender (fig. 110c), but there are some cases where it does not (fig. 110b). The *ra btags* often points to 9:00, except in the case of a combination with *da*, where, sometimes looped, it tends to point to 5:00 (fig. 110a).



FIGS. 110A–C: *ra btags* in PT 1287 (figs. a and b) and ITJ 750 (fig. c); copyright Bibliothèque nationale de France and British Library. The first is looped, and points to 6:00; the second has no descender, and even misses the ligature; and the third has a descender. The latter two point to 8:30.

la btags size, position:

In many cases, the *la btags* is of a "standard" size and orientation—the same as when *la* is a root—and located directly below the root (fig. 111a). In some cases, however, the "loop" that customarily begins on the left instead starts down below, giving it a "vertical" rather than a "horizontal" appearance. If this is shortened, it can sometimes even look like a *ra btags*. This may be a stage in the development of the cursive *la btags*, which essentially rotates the letter 90º, such that the *la btags* is horizontal, rather than vertical to the line (fig. 111b).



FIGS. 111A–B: Normative *la btags* and 90º-rotated *la btags*, PT 1079 and PT 1087; copyright Bibliothèque nationale de France.

PART FOUR: MISCELLANEA

Additional notes:

This is a field for entering any observations that do not fit in existing fields. One might add here, for example, the appearance of certain terms that are only used in the Guiyijun period such as the Tibetan phoneticization of Chinese official terms that were only used during this period. Among such terms, Takeuchi has pointed out *sing thung* (Chinese *sengtong* 僧), *^am 'gra* (Chinese *yaya* 押衙), *leng kong* (Chinese *linggong* 令公), *zhang zhu* (Chinese *shangshu* 尙暑), and *the'i po* (Chinese *taibao* 太保).[94] We shall see the utility of such terms in the case study.

One can also point out any patterns that one notices with respect to single and double *tsheg*, *gi gu* and *gi log*, and aspirated and unaspirated consonants. Here, too, one can attend to whether or not the normative forms are used in compounds, e.g., with respect to the *dpon* becoming *pon* in compounds.

Proper names (and ranks, if given):

As mentioned in the introduction, the names of officials, scribes, and known figures are extremely important for dating texts. Most figures are unknown, but keeping a database of their names and ranks where they appear in dated and undated documents is a first step to triangulating them and placing them within a range of dates such that an individual's appearance in an undated text may then serve to assign it a date range. This is particularly relevant to the names of hundreds of scribes and editors found in colophons of sutras copied for the Tibetan king from the 820s to the 840s, and who were also involved in copying other sorts of documents including letters and petitions.

[94] Takeuchi 2012a: 205.

CASE STUDY

The *Old Tibetan Chronicle* and Related Documents

To complete a manuscript description based on the methods outlined above is a fairly straightforward process. The first level of analysis can be done with recourse to existing catalogues and electronically searchable transliterations, and can be completed in a matter of hours. The full analysis takes considerably longer, and, if one wishes to make a full codicological study, requires consulting the manuscript itself. Having described our methods, it now remains to demonstrate them. We do this in the form of a detailed description of the *Old Tibetan Chronicle*. Describing only one document, however, one cannot demonstrate how the data facilitates comparison and helps one to draw conclusions about relationships between documents. We therefore begin with a comparison of the *Old Tibetan Chronicle* (PT 1286 + PT 1287) with a selection of "related documents."

Introducing the *Old Tibetan Chronicle*

The *Old Tibetan Chronicle* comprises the shelfmarks Pelliot tibétain 1286 and 1287 in the Bibliothèque nationale de France. The former is a small scroll 92 cm long × 25.4 cm wide; the latter is a long scroll 620 cm × 26 cm. In fact, they are almost certainly two fragments of a single scroll, and are written in the same hand.[95] PT 1286, the "Royal Genealogy," contains the account of the first Tibetan king's descent from heaven, his conquest of the minor kingdoms, and a genealogy of the Tibetan royal line from its origin to the time of Emperor Khri 'U'i dum brtan, who came to the throne in 841 and

[95] Uray 1992: 124–25.

died the next year, leaving a succession crisis that ushered in the fall of the Tibetan Empire. PT 1287 is an episodic chronicle epic whose core narratives include songs rendered in six-syllable verse. It focuses on three main periods: the formative conquest by which the Yar lung Kingdom expanded to become the Tibetan Empire under Gnam ri Slon mtshan, father of Emperor Srong brtsan sgam po (d. 649); the conquest of Zhang zhung under Srong brtsan sgam po; and the conflict with the Mgar clan in the 690s under Emperor Khri 'Dus srong (d. 676–704). A final narrative with song is set in the reign of Emperor Khri Lde gtsug rtsan (704–c.755). These core narratives are linked together and chronologically organized through the inclusion of eulogies, that is, formulaic vignettes of the reign of each emperor. The longest of these narrates the reign of Emperor Khri Srong lde brtsan (742–c.800). In addition, PT 1287 opens with the tale of Dri gum btsan po, an aetiological myth of the Tibetan kingship. The second chapter is an anecdotal genealogy of Tibet's chief councillors, which, like the royal genealogy, goes up to about the year 841.

Generically, the *Old Tibetan Chronicle* has many identifiable influences. The eulogy form that organizes it chronologically is the same form that is carved on stele inscriptions erected near the tombs of emperors Khri Srong lde brtsan (died c. 802) and Khri Lde srong brtsan (died 815). The *Chronicle*'s similarly eulogistic vignettes of councillors employ some of the same formulae used to glorify Councillor Ngan lam Stag sgra klu khong (died c. 782) in the Sri Pillar (known commonly as the Zhol Pillar). Images of the descent of the first king in the royal genealogy are found in numerous inscriptions and in other Dunhuang manuscripts, and often share the same formulae and motifs. The six-syllable form used in songs and oaths in the *Chronicle* is found in a variety of Dunhuang manuscripts, and is often the form chosen to dramatize the speech of gods when they deliver omens in dice divination texts. The content of such omens also overlaps in some places with oracular utterances in the *Old Tibetan Chronicle*, particularly in the tale of Dri gum btsan po.[96] There we also find echoes of Indian epic, and motifs shared by the Old Tibetan

[96] For examples, see Dotson 2013a: 63–64 and Dotson 2013b: 208–209.

Rāmāyaṇa.[97] Here and throughout the *Chronicle* we also detect the influence of Tibetan ritual texts, not only in formulae and motifs, but even in story types, as in the casting of Sad mar kar, the sister of Srong brtsan sgam po, as an unhappy bride in a matrimonial narrative trope that is common to ritual narratives.[98] In addition to all of these influences, we also have an episode in the *Chronicle* that has been borrowed ultimately from the *Shiji*.[99]

The result of all of this is a remarkable literary achievement, and a window into a chronicle epic tradition whose long oral and textual transmission is belied in our extant textual artefacts. The *Chronicle*'s many influences also mean that its "related documents" are truly numerous. Here we compare it first of all to the two extant *pothī*-format "Chronicle Fragments," PT 1144 and ITJ 1375, the latter of which served as a direct source for two episodes in the *Chronicle* scroll. We also compare it with the following documents: a ritual text (PT 1136) that includes a matrimonial narrative trope similar to that found in the Sad mar kar episode in the *Old Tibetan Chronicle*; the Dbon Zhang inscription (also known as the Lhasa Treaty Pillar); two versions of the *Rāmāyaṇa* ("version A" = ITJ 737.3 + ITJ 737.1 and "version E" = PT 981); and a paraphrase of the *Shangshu* (PT 986). We present the data in a table for ease of comparison (Comparative Table on pages 144–61).

[97] See Dotson 2011b: 90–91.

[98] On this point see Macdonald 1971: 264, and Dotson 2013b: 208–19.

[99] Here two men dispute over who should lead an army. The setting has changed from warring-states China to early imperial Tibet, and the names of the principal actors have changed from Mao Sui and Pingyuan Jun to Seng go Myi chen and Khyung po Spung sad zu tse, but the dialogue remains essentially the same. On this episode, see Takeuchi 1985.

THE DOCUMENTS IN OUR CASE STUDY

Before pointing out the relationships apparent from the data, we shall briefly introduce the documents and give a short summary of each. It should be noted at the outset that the documents we have selected give us an opportunity to judge what is and is not a significant variation with regard to our quantifiable and quasi-quantifiable fields. PT 1286 and PT 1287, for example, are the same document, artificially broken into two parts by historical accident, and the same is also true of ITJ 737.3 and ITJ 737.1, and of PT 1144 and ITJ 1375. We record data individually, however, for their separate parts. The result is that we essentially have a controlled study. If we see, for example, that a quantifiable field in PT 1286, e.g., *gi gu* to *gi log* ratio, differs markedly from that of PT 1287, then we can a) re-evaluate our assumption that they are the same document, written in the same hand; b) having confirmed our assumption, check that there was no inputting error or transliteration error; and c) having confirmed that there are no such errors, we can determine what sort of variation is possible within a single text or by a single hand with regard to a given field. This last judgment should be made based on a large sample size; the two folia of the "Chronicle Fragments," for instance, are small enough that they may not constitute a representative sample from which to draw such conclusions. The significance of sample size also demonstrates the advantages of working with long documents. This has consequences in terms of the distribution of reliable data with regard to genre and with regard to dated or datable texts. Among our dated or datable imperial-period manuscripts, for example, we have short, administrative documents in the form of wooden slips and official letters, but we also have longer canonical sutras in the form of the *Aparimitāyur-nāma mahāyāna-sūtra* and *Śatasāhasrikā-prajñāpāramitā* manuscripts.[100] The latter, however, are customarily written in several hands.

Let us now turn to the individual texts in our sample before making a comparison.

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[100] For a study that attempts to establish an orthographic baseline for the Tibetan writings of the 820s to the 840s by measuring that of hundreds of *Aparimitāyur-nāma mahāyāna-sūtra* explicits, see Dotson forthcoming a.

FIG. 112: *Dbon Zhang Pillar* in Lhasa; copyright Agnieszka Helman-Ważny.

The Dbon zhang Pillar

This is the most famous and the most intensively studied of all of Tibet's imperial inscriptions. Standing in front of the Lhasa Jokhang, it was carved in 823 to commemorate a treaty between the Tibetan Empire and the Tang, concluded between 821 and 822. It is an official document, part of which is bilingual in Chinese, and which was overseen and ratified by Tang officials (fig. 112). There are several published rubbings, and published photographs in which the text is legible (fig. 113).[101]

[101] For the OTDO transliteration, which includes references to published images and studies, see OTDO and Iwao, Hill, and Takeuchi 2009: 32–42.

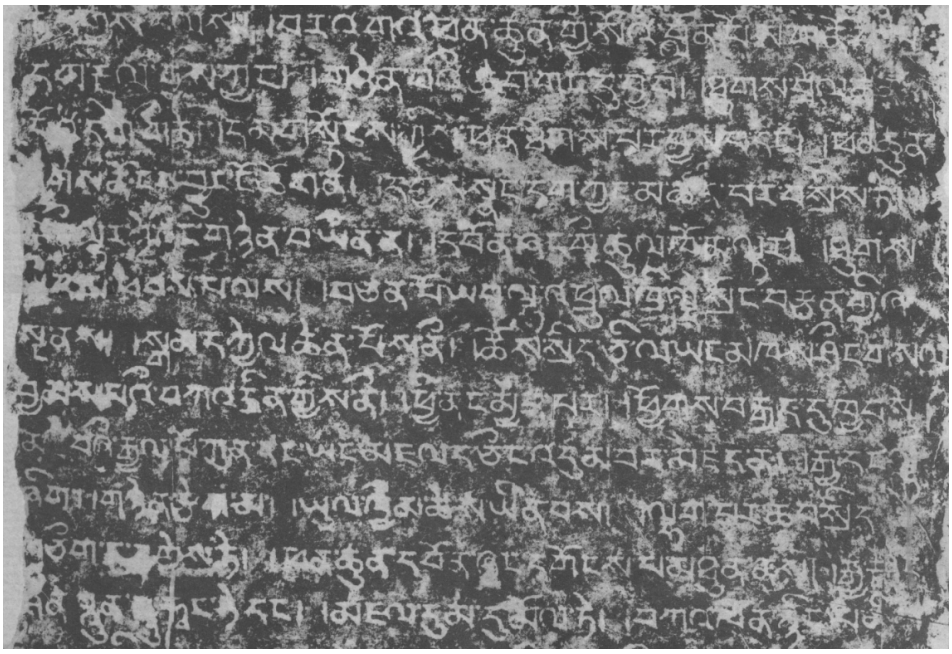

Fig. 113: Detail from a rubbing of the east face of the *Dbon Zhang Pillar* in Lhasa; after Naito 1928.

The preamble or *narratio*, which gives a necessarily partial and positive Tibetan perspective on Tang—Tibet relations, and the *dispositio*, which includes the terms of the treaty itself, are inscribed on the pillar's two wide faces, situated east and west, respectively. The narrow north and south faces bear the names and ranks of the Tibetan and Chinese officials who swore to the treaty. It is in the preamble that we find a formulaic description of the first Tibetan king and statements about the greatness of Tibetan kings similar to those found in the *Old Tibetan Chronicle*. It is in this sense that the document is related to the eulogies of the *Chronicle*, and the *Dbon zhang Pillar* also recommends itself for comparison by the fact that it contains more writing than any other extant imperial Tibetan inscription.

In terms of comparison, this inscription is the only dated document in our sample. As we shall see, the "Chronicle Fragment" ITJ 1375 most likely dates to the imperial period, and may even be earlier than the *Dbon zhang*

Pillar. Also, "version E" of the *Rāmāyaṇa* (PT 981) is late Guiyijun, but these are date ranges rather than dates. We shall not belabor any comparisons of the ductus of the *Dbon zhang Pillar* with that of our manuscripts, given the radical difference in media. Assuming a paper exemplar for the carver, however, it is not entirely improper to see behind the shape of a carved letter to make observations about the ductus of its paper-and-ink model. Less problematically, the inscription offers us a fairly good sample, in a dated, official document, from which to make observations and comparisons about orthography. One problem that this document introduces is the matter of regional variations in writing: it was written in central Tibet, and the other documents in our sample, with the exception of the "Chronicle Fragments," were most likely written in Dunhuang.

"Chronicle Fragments"

As Géza Uray claimed, and as Dotson confirmed through textual criticism, the "Chronicle Fragment" ITJ 1375 (fig. 114) was a direct source for the *Old Tibetan Chronicle* scroll.[102] This *pothī*-format leaf likely came from a larger document that may have constituted a separate version or telling of the *Old Tibetan Chronicle*, or a very similar tradition. We have only two surviving leaves, however, and the other, PT 1144, contains a narrative about King Stag bu snya gzigs that did not find its way into the episodes contained in the *Chronicle* scroll. Comparing the two leaves with respect to the writing's ductus, they are clearly the same hand. Aside from their mostly identical index letters, each, for example, writes the *ya btags* adjacent to the root rather than under, and each combines the double *tsheg's* lower dot with the following *shad* in the same manner.[103] Their quantifiable ratios are generally very similar, e.g., *gi gu : gi log* ratios of 34 : 9 and 38 : 7, and underscore what is already obvious from

[102] Uray 1972 and Dotson 2011a.

[103] For further details of the *Chronicle pothī*, including a first step towards the more comprehensive methods presented here, see Dotson 2011a: 232–33.

their identical ductus. On the other hand, the effect of a small sample size also asserts itself: ITJ 1375 has no *anusvāra*, while PT 1144 has two.

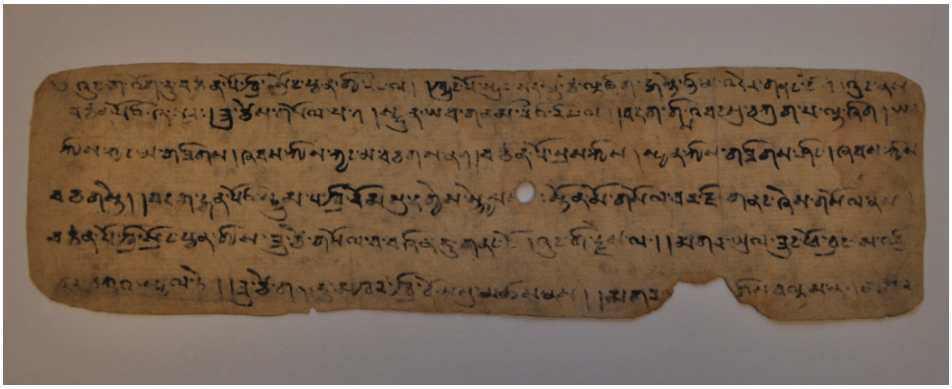

Fig. 114: "Chronicle Fragment" ITJ 1375; copyright British Library.

While textual criticism established that the "Chronicle Fragments" preceded the *Old Tibetan Chronicle* scroll, orthography and codicology complement and ratify this conclusion. The "Chronicle Fragment" ITJ 1375, for example, uses the archaic (and correct) spelling Khri Srong rtsan, as found, for example, in the *Old Tibetan Annals*, whereas the *Old Tibetan Chronicle* uses the ostensibly later spelling, Khri Srong brtsan.[104] This raised suspicions about the document's antiquity, and it was fascinating to discover in

[104] This point was noticed neither by Uray nor by Dotson in their respective analyses. The morphology of *brtsan/rtsan/btsan/tsan* is an extremely important matter with relevance to dating early Tibetan writing, and has been remarked on briefly by Hugh Richardson (personal communication cited in Heller 1997: 389, n. 2) and by van Schaik and Doney 2009: 183–84. Since the matter will be treated in a forthcoming work by Abel Zadoks, we will not go into it in detail here. Suffice it to say that the *Old Tibetan Chronicle* has fairly uneven data with respect to this orthographic shibboleth: it displays some old (pre c.800) orthographies such as Mgar Stong rtsan, some revised (9th to 10th century) orthographies such as Khri Srong brtsan, and some orthographies that are typical of an even later (e.g., 10th century) orthography, e.g. Gnam ri Slon btsan.

this connection that its thick, rough paper is made from *Daphne/Edgeworthia* sp. fibers, and shows no traces of paper mulberry (fig. 115).

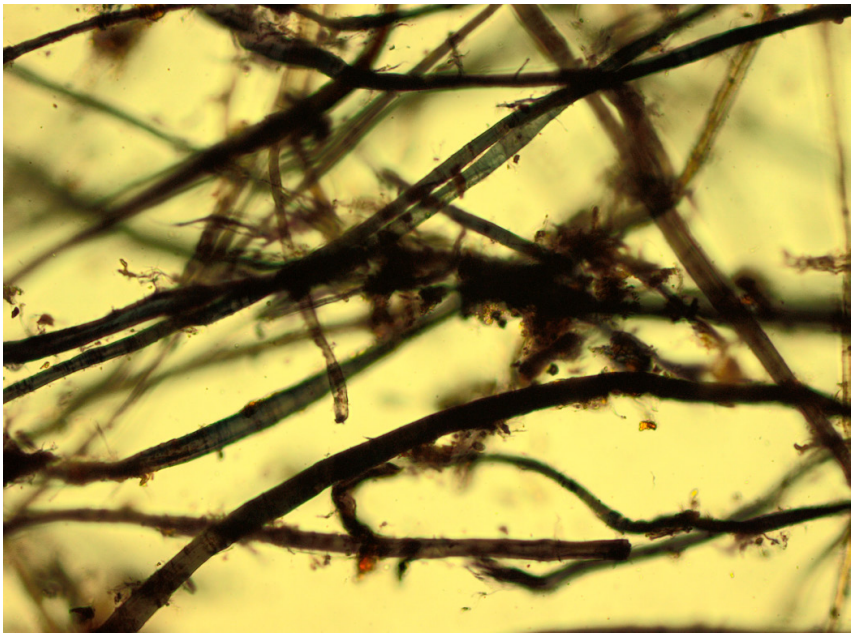

Fig. 115: *Daphne/Edgeworthia* sp. fibers colored with Herzberg stain, from ITJ 1375, under the microscope in polarized light (OM 200x). Copyright Agnieszka Helman-Ważny.

Daphne/Edgeworthia sp. plants are not found in or near Dunhuang, but are plentiful in lower parts up to about 3 500 m above sea level of central and southern Tibet. There, along with *Stellera,* which is found in areas 3 500 m above sea level, it is a standard material for papermaking.[105] The "Chronicle Fragments" are therefore among the handful of Dunhuang documents that were brought from Tibet, and most likely, given the materials, from central Tibet.[106] The *pothī*-format document to which the two "Chonicle Fragments" folia belong was almost certainly brought to Dunhuang during the period of

[105] See Helman-Ważny and van Schaik (2013: 707–708).

[106] See Helman-Ważny and van Schaik's remarks on other Dunhuang documents containing *Daphne/Edgeworthia* sp. fibers coming from central Tibet (2013: 735–39).

Tibetan occupation, and, given its orthography, quite possibly during the first few decades of occupation. This breakthrough—a good demonstration of the synergies of combining orthography and codicology—has implications for the date of the *Old Tibetan Chronicle*, which used the "Chronicle Fragments" as a direct source.

The Old Tibetan Chronicle

What was originally a single scroll is not divided here between libraries, but between shelfmarks in the Bibliothèque nationale de France. Our detailed descriptions confirm that PT 1286 (fig. 116) and PT 1287 are written in the same hand. Particularly indicative are the identical index letters and shared ductus, the identical *gi gu* to *gi log* ratios, identical separated to attached *'i* ratios, and shared orthography with respect to terminative, genitive, and ergative particles. Some discrepancies point to the unequal sample sizes: PT 1286 is composed of three partial panels and PT 1287 has 17 panels, several of them full size (approximately 45 cm long). Among the discrepancies, we have no *da drag* in PT 1286 but we find it in PT 1287, and the latter appears to have more fluid syllable margins than PT 1286, as reflected by their respective *xxgi* : *xxg gi* ratios (0 : 7 in PT 1286 and 30 : 19 in PT 1287). This informs us that these are unreliable indicators when we are dealing with small sample sizes.

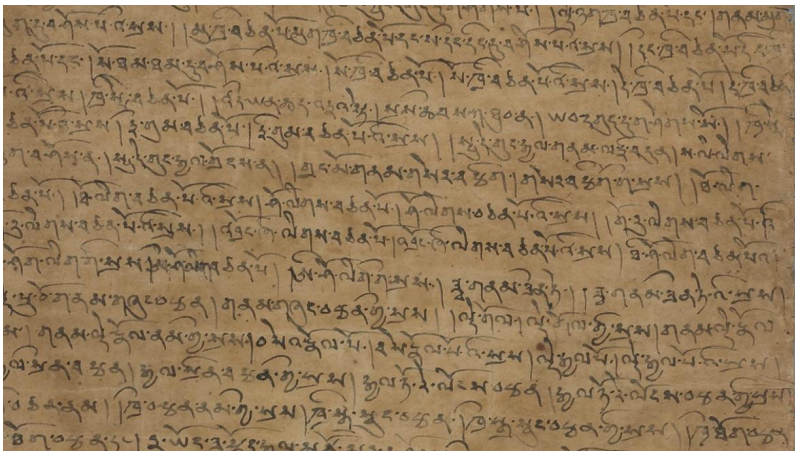

Fig. 116: PT 1286; copyright Bibliothèque nationale de France.

PT 1286 and PT 1287 have already been the subject of codicological studies with regard to the recto and verso, particularly in relation to a debate over a "misplaced panel." Ariane Macdonald, Géza Uray, Yoshiro Imaeda, and Hélène Vetch have all contributed to the debate. The dispute over the misplaced panel(s) was resolved, and the state of the art is represented by Uray's 1992 article, "On the Structure and Genesis of the *Old Tibetan Chronicle*." From our own study of the manuscripts we can add some further points. Our measurements confirm what was seen by Vetch with regard to the Chinese recto, and what was claimed by Uray: panel 11 was once joined with panel 14 (fig. 117). From the number of lines of text (12 and 23, respectively) and in the measurements in length (17 cm and 26.7 cm), it is clear that the two once formed a single panel: most panels are 35 lines long and measure between 41 and 48 cm in length. More to the point, the correspondence of the Chinese text on the verso already confirm that panels 11 and 14 were once part of a continuous text.[107] Uray took this into account when he pointed out that the "error" accounting for the main chronological problem of the chapters' ordering was not one of mis-attaching a single misplaced panel, but of someone cutting a panel into two pieces and then inserting two full panels

[107] Vetch 1979: 25.

between them. Given that the cut comes at the end of a paragraph, is straight, and does not disfigure a line, it was almost certainly a deliberate intervention.

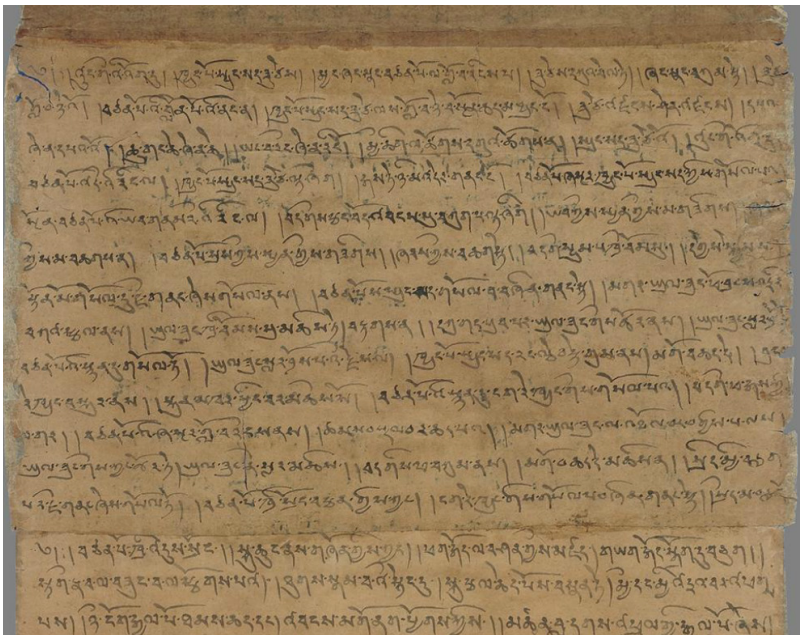

Fig. 117: Panel 11 of PT 1287, with the end of panel 10 visible above, and the beginning of panel 12 visible below; copyright Bibliothèque nationale de France.

There is a further point of even greater relevance to the date of writing: four of the seventeen panels comprising PT 1287 have on their Chinese recto the *Mahāprajñāpāramitā-sūtra* (fig. 118).[108] This sutra, along with the *Aparimitāyur-nāma mahāyāna-sūtra* and the *Śatasāhasrikā-prajñāpāramitā-sūtra,* was part of an official sutra-copying project designated as a gift for Emperor Khri Gtsug lde brtsan from the 820s to the 840s. The panels of the Chinese *Mahāprajñāpāramitā-sūtra* on which the *Chronicle* was written are discards, so the question then arises as to how much time elapsed between their being rejected by an editor at some point from the 820s to the 840s, and their being repurposed for the *Chronicle* scroll.

[108] Vetch 1979; Schneider 1996: 142, n. 3; Iwao 2014.

Fig. 118: Panel 14 PT 1287, recto. The compilers reused a panel of discarded *Mahāprajñāpāramitā-sūtra*, which the editors marked for discard with the term *dui* 兑, "exchange," written in the top margin and over the main text. Copyright Bibliothèque nationale de France.

The question can be more or less settled with reference to an administrative text concerning the process of accounting for paper expenditure for this sutra-copying project, and with recourse to editorial notes in the margins of discarded *SP2* folia. In the first place, the administrative document ITJ 1359 informs us of the methods for keeping track of how much paper was given out to scribes, and for preventing the misuse or theft of this paper. Namely, the amount handed out was recorded in a record (*dkar chag*), and when scribes handed in their completed folia and panels, this was recorded in a receipt (*dar ma phul ba'i bul yig*; ITJ 1359, ll. 3–4). Subtracting the second number from the first, administrators calculated the shortfall, that is, missing sheets. The punishment for each missing sheet was ten lashes (*lcag*). The remainder of

the document tallies the missing sheets for the scribes of Dunhuang's three districts in two consecutive years, a method that agrees with accounting and taxation practices more generally in Tibetan-ruled Dunhuang (Iwao 2011: 67). What is important with respect to the accounting process is that scribes' miswritten folia or discards (*ro*), along with damaged panels (*gron*), and paper writing boards (*glegs tshas*), were not counted against them.[109] This was only true, however, if they handed these in to the paper official (*rub ma pa*) so that they could be counted. If a given scribe was issued with 200 sheets in two consecutive years, for example, and the receipt of sutra panels or folia offered records 360, then the scribe must hand in 40 discards or damaged sheets to avoid whipping.

This dynamic, in which it is the scribes, and not the accountants, who must physically retain the discards and be sure that they are counted, gave rise to a black-market trade of sutras and discards between scribes.[110] It also accounts for the insecurity of the scribes that is evident in some of their jottings. After an editor marked a folio as a discard, it had to be rewritten and replaced by another team of scribes and editors.[111] In that the original scribe needed that discarded folio back, he or she was essentially at odds with the replacement team. This is apparent from a jotting by the scribe, Kvag Ti ti, in the margin of the discarded *SP2* folio Db. t. 0799: "this is Kvag Ti ti's discard. Whoever removes it, don't give it [to anyone else]" (*kvag ti ti 'i ro lags so sus phyung ba ma 'tshal lo*).[112] Even more clearly, a note in Db. t. 0874 states, "this discard is to be replaced. Don't anyone take it!" (*ro 'dI ni brje lagso//sus kyang ma bzung shig*).[113] A similar note at Db. t. 0405 reads, "This is Dze'u Phug yen's discard, so don't anyone touch it—whether you're an official, a servant, or what-have-you!" (*dze'u phug yen gyi ro lags pas su yang ma reg cig*

[109] ITJ 1359a; see Takeuchi 1994: 849–51, 857–58, n. 8.

[110] See Dotson and Doney forthcoming.

[111] On the details of this editorial process, see Dotson 2013–2014: 44–53.

[112] Ma 2011: 268.

[113] Ma 2011: 281.

re nas dpon po dang g.yog pa lastso[]).[114] In the series of editorial notes and jottings on Db. t. 0780, we read "discard replaced; one sheet" (*ro brjes pa yug gchig*).[115] The term *yug*, for "sheet" of paper or for a "panel" of a scroll or a roll, is that employed in ITJ 1359 in the paper official's accounting process. As noted above, it refers to sheets of paper in the form of both *SP2* folia and the panels of the *Aparimitāyur-nama-mahāyāna-sūtra* and perhaps those of the Chinese *Mahāprajñāpāramitā-sūtra* (*MP*).

From this accounting process we can infer that discards would not be allowed to circulate after they were handed in to the paper official. The reasons for this inference are clear. If our hypothetical scribe, for example, handed in 39 discards to the paper official, he would still be missing one, meaning that he faced a punishment of ten lashes; if what he handed in through the paper official's front door came right out the back, he would be able to resubmit one of these 39 discards as the 40th, and avoid punishment. In this and in other scenarios, e.g., using the discards from one round of accounting to avoid whipping in a subsequent round, it is clearly the case that the discards would have been kept safely out of circulation until the end of the sutra-copying process, or at least until the end of its accounting.

Assuming a similar process obtained for discarded panels of Chinese *MP*, then the vast majority of these would have been in the possession of the paper official, and kept in a sort of "dark archive," out of circulation. The regime of punishment for missing panels or folia was a strong disincentive both for stealing paper and for failing to hand in one's discards. The assumption, therefore, is that panels of *MP*, and other discards from the sutra-copying project, would not have been reused until the end of the project. Unfortunately, we do not know when the project was completed, and it may have simply come to an end with the death in 841 of the emperor for whom the sutras were intended. Against this eminently logical assumption that paper would only be available for reuse after the end of the sutra-copying project stand the hundreds of missing sheets recorded in ITJ 1359. This is clear evidence

[114] Ma 2011: 204.

[115] Ma 2011: 264.

that quite a lot of paper—hundreds of sheets—did go unaccounted-for. In addition, we must admit the possibility that the paper official allowed reuse of *MP* panels under certain circumstances, e.g., when they were assembled into a larger scroll, as in the case of the hunting laws (PT 1071) or the *Old Tibetan Chronicle*, or in order to patch the damaged panels of brittle *SP3* rolls. In sum, reused *MP* panels were most likely reused from 841 onwards, but some were probably reused as early as the beginning of the sutra-copying project in 826.

In discussing the reuse of Chinese sutras we have already mentioned the example of PT 2118, where the Chinese recto dates to 689 and the Tibetan verso to probably at least a century later. Examining other Tibetan documents written on the versos of Chinese *MP*, most appear to be late Guiyijun texts.[116] Examples include a Buddhist text on conquering the three poisons (ITJ 720), and a tantric invocation to the seven wrathful goddesses (ITJ 727).[117] There is also a coin divination text, ITJ 742, that appears to date to the tenth century, and a manual for interpreting omens by means of astrological divination (S.6878) that may also date to the late Guiyijun.[118] For historical reasons, one would assume that this type of paper reuse was an anomaly. In the first place, it requires that a discarded sutra panel be stored for decades and even centuries before being reused. On the face of it, immediate reuse seems more plausible. Secondly, Dunhuang was a center for paper production, and there seem to have been very few periods in its history when such paper reuse would have been practiced out of necessity. Nevertheless, there are other examples of Guiyijun documents written on the verso of imperial-period documents, and the economy of paper reuse remains to be clarified with further research.[119]

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[116] Van Schaik and Galambos 2012: 31–32.

[117] See Dalton and van Schaik 2006: 299, 302.

[118] See, respectively, Nishida 2011: 316 and Iwao, van Schaik, and Takeuchi 2012: 82–88.

[119] PT 1120 is one such example of Guiyijun reuse of imperial Tibetan documents. The recto contains an official Tibetan document, likely dating to 842, and the verso contains a Guiyijun-era draft letter. One might consider the question of whether there was a spike in paper reuse in the years leading up to and following the collapse of Tibetan occupation, and at other periods of transition in Dunhuang.

Apart from these examples of late Guiyijun versos, there is also a group of texts that appear to have reused paper towards the end of Tibetan occupation. This has been noted by Sam van Schaik and Imre Galambos, who include in this group the *Old Tibetan Annals*, several legal texts, and the *Old Tibetan Chronicle*.[120] The *Old Tibetan Annals* and the *Annals of the 'a zha Principality* are written on the versos of assembled panels of Chinese texts, but none of these are officially commissioned *MP*. Two of the five panels used for the hunting laws (PT 1071), however, are from these *MP*. If we take 826 as the likely beginning of the sutra-copying project, then this is also the earliest date at which *MP* panels could have been reused to assemble the scroll on which the hunting laws appear. Like the *Old Tibetan Annals*, the hunting laws make use of archaic punctuation in the form of the double *tsheg*. This is rarely observed in Tibetan writings postdating the period of Tibetan occupation. In the case of the *Chronicle*'s four panels of *MP*, these also mean that it could not predate c.826. Text-internal evidence in its genealogies of kings and councillors places its *terminus post quem* at 841, anyway. Its paleography is less indicative, but as we shall see below, its preference for the separated *'i* form of the genitive particle generally aligns it with late Guiyijun writings. Also relevant to the date of paper reuse in this context is the fact that the *Old Tibetan Chronicle*'s only identified direct source, the "Chronicle Fragment" ITJ 1375, was brought from Tibet, almost certainly during the period of Tibetan occupation in Dunhuang. For the *Chronicle* to be a late Guiyijun document, as some have claimed, not only its raw materials, but also one of its textual sources, would have had to persist intact—either in circulation or in storage—for around a century before the *Chronicle* scroll was compiled and written.[121] This is not impossible or unprecedented, but it is unlikely.

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[120] Van Schaik and Galambos 2012: 31–32. This was also the conclusion of Géza Uray, who dates the *Old Tibetan Chronicle* to "around the middle of the 9th century" (1989: 5).

[121] On the opinion that the *Old Tibetan Chronicle* is "as late as the eleventh century," see Walter 2009: xxvi, n. 5. Walter follows Beckwith in assuming that the *Chronicle*'s use of the term *rgyal po* instead of *btsan po* marks it off as being at a far remove from Tibetan imperial culture, a point that rests on several contentious assumptions and reconstructions about what constituted early Tibetan imperial culture. The present study, by contrast, presents the available data and shows it to be clearly mixed. This is to say nothing of the dates of the contents of

Just as a single text under separate shelfmarks gives us a "control" by which to assess the range of acceptable variation in our measurements and the significance of sample size, so our separated panel acts as a control for our codicological measurements of the paper. We can note in this connection that chain lines were observed on the latter half of the panel (panel 14) whereas none were recorded on the former half (panel 11). One possible explanation for this has to do with the condition of the sieve on which this sheet of paper was made. In the first place, as noted below, it may be the case that textile was used as a secondary support for a grass sieve and that the water did not drain well. This would account for the fact that the chain lines are not always visible. Another reason could be wear. The sieve was likely made of bamboo strips held together by strings made of horsehair, chain-stitched over and under the bamboo strips. As explained above, the impressions made on the paper by the bamboo strips are laid lines, and those made by the horsehair strings are chain lines. With time and usage of the sieve those hair stitches become softer, and the marks less and less visible. (One reason why chain lines are so clearly visible in European medieval papers is the fact that instead of bamboo and hair stitches, in Europe wire was used to twist around the laid wires to tie them together. 'Chain wires' were much harder than 'chain horsehair stitching' and it is why chain lines in European papers are always clearly visible compared to the disappearing chain-line pattern in the early papers of Central Asia.) Thus the sieve mat that made the sheet now divided into panels 11 and 14 may have had fairly intact, or sufficiently raised, horsehair chain stitches on one end—that which formed panel 14—but partly broken, deteriorated, or flattened chain stitches on the part of the seive mat that formed panel 11.

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the various traditions amalgamated in the *Old Tibetan Chronicle*, or of the history of their transmissions prior to and after the production of the *Chronicle* scroll.

Rāmāyaṇa

We described two *Rāmāyaṇa* manuscripts, kept under three separate shelfmarks.[122] ITJ 737.3 is the beginning of the scroll that continues with ITJ 737.1, and represents a situation comparable to PT 1286 and PT 1287. This text is chosen because of the echoes of Indian epic found in the *Old Tibetan Chronicle*, and because the script closely resembles that of the *Chronicle*. The second *Rāmāyaṇa* manuscript described here is PT 981. We have also given a description of part of the verso (fig. 119). The verso consists of thirty lines, and lines 2–18 are written in the same elegant and expert hand as found on the recto. In the description, we have confined ourselves only to these 17 lines in order to confirm that they are by the same hand that scribed the recto.

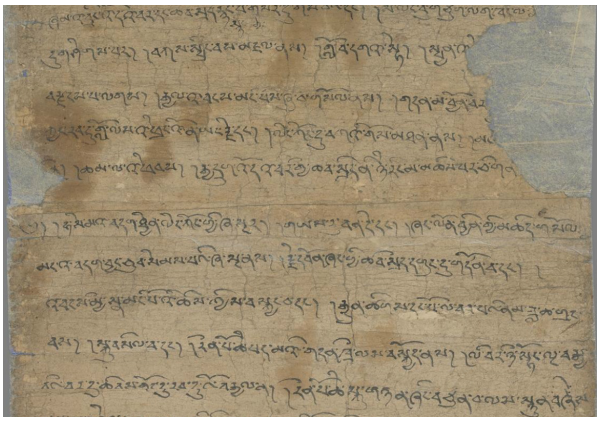

FIG. 119: PT 981v, letter draft written in same hand as *Rāmāyaṇa* version E on the recto; copyright Bibliothèque nationale de France.

[122] J.W. De Jong made a study of the Old Tibetan *Rāmāyaṇa* manuscripts in a series of articles and made a translation in a short monograph, De Jong 1989. Following earlier studies by Lanman and by Balbir, he assigned letters to the different versions of the *Rāmāyaṇa*. In "rescension 1" he includes versions A (ITJ 737.1), C (ITJ 737.2v), D (ITJ 737.3), and F (PT 983), and in "rescension 2" are B (ITJ 737.2r) and E (PT 981). Given that versions A and D were originally the same manuscript, of which D formed the first part—a fact of which De Jong was aware—we simplify matters by referring to ITJ 737.3 + ITJ 737.1 as "version A."

Nearly every measurement (ratios, ductus, etc.) is the same in ITJ 737.1 and ITJ 737.3. The few divergences can be attributed to the small sample size of ITJ 737.3. Even from the very small sample on the verso of PT 981, one can see from the index letters, descenders, and vowels that it is written in the same hand as the *Rāmāyaṇa* on the recto (fig. 120). The quantifiable features also line up nicely: they share a similar *pa'/ba'/na'* to *pa/ba/na* ratio, similar separated to attached *'i* ratio, and *gi gu* to *gi log* ratio. The fluid use of *gi* and *gyi* in PT 981r clarifies the slightly skewed impression, based on a sample of three, that PT 981v always uses *gyi* for *gi*.

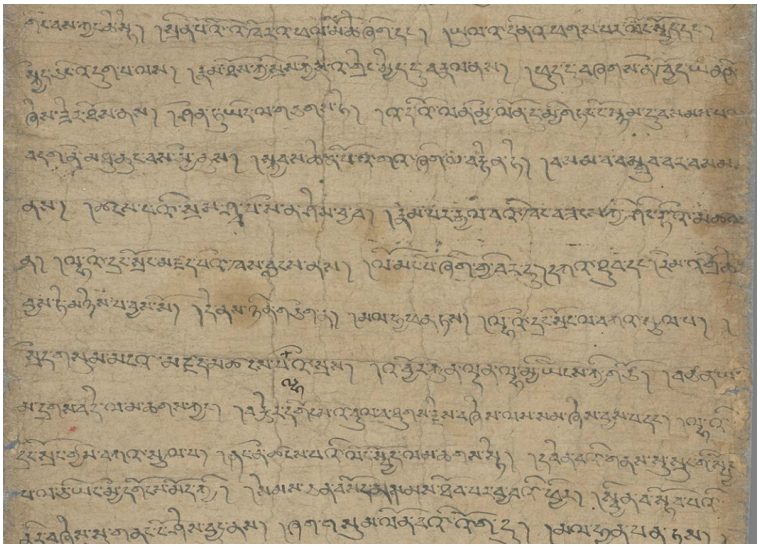

Fig. 120: PT 981r, *Rāmāyaṇa* version E; copyright Bibliothèque nationale de France.

The identification of the recto's hand with one of the hands on the verso is important for dating, since the draft letter on PT 981 verso corresponds to type 3 in Takeuchi's typology of Old Tibetan letters, and employs greeting pattern 2 (which includes reference to the season), a form that Takeuchi argues is exclusively found in late Guiyijun letters.[123] The letter also addresses a ruler as *leng kong* (Ch. *linggong* 令公), a title used by the ruling family of

[123] Takeuchi 1990. A very similar hand is found on another draft Guiyijun letter, PT 1120v.

Guiyijun from 928–995.[124] This further narrows the date of the *Rāmāyaṇa* on the recto. The handwriting also features the wavy descenders characteristic of late Guiyijun writing. In the absence of a text-critical study of the various Dunhuang *Rāmāyaṇa* manuscripts, however, we do not know their precise relationships and if, for example, some represent copies or redactions of others. Therefore the fact that Version E (PT 981) dates to the late Guiyijun era does not necessarily tell us anything about the date of "Version A" or of any other Dunhuang *Rāmāyaṇa* manuscript (figs. 121 and 122).

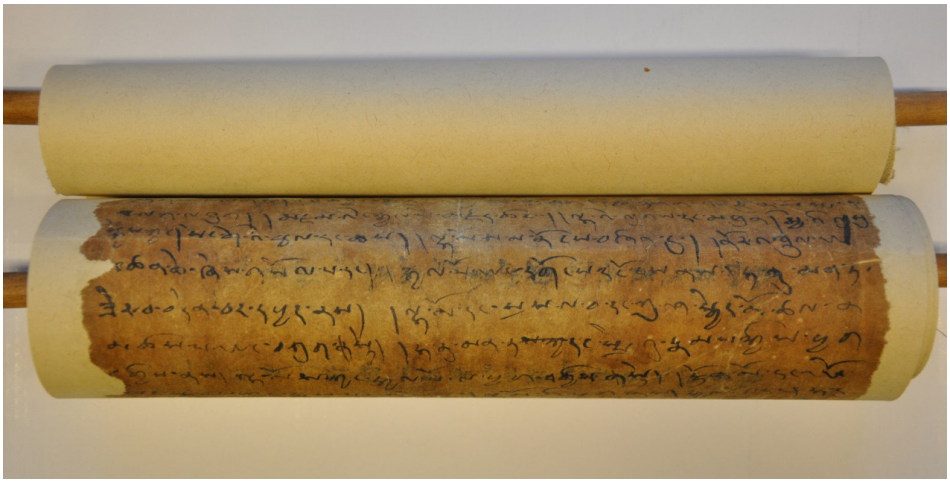

Fig. 121: *Rāmāyaṇa* manuscript, ITJ 737.1, which is a continuation of ITJ 737.3; copyright British Library.

[124] For the chronology of the rulers of Guiyijun, and the periods during which certain titles applied, see Rong 1996: 129–32. On the use of such titles to date Guiyijun-era Tibetan manuscripts, see Takeuchi 2012a: 205. The same, method, incidentally, applies to the dating of "version C" of the *Rāmāyaṇa* that is, ITJ 737.2v. Before this telling begins, the scroll starts with numerous draft letters, one of which includes the Guiyijun official title ^*am 'ga*' (Chinese: *yayа*); ITJ 737.2v11. The telling of the *Rāmāyaṇa* begins after this, halfway down the scroll, so it was almost certainly written subsequently.

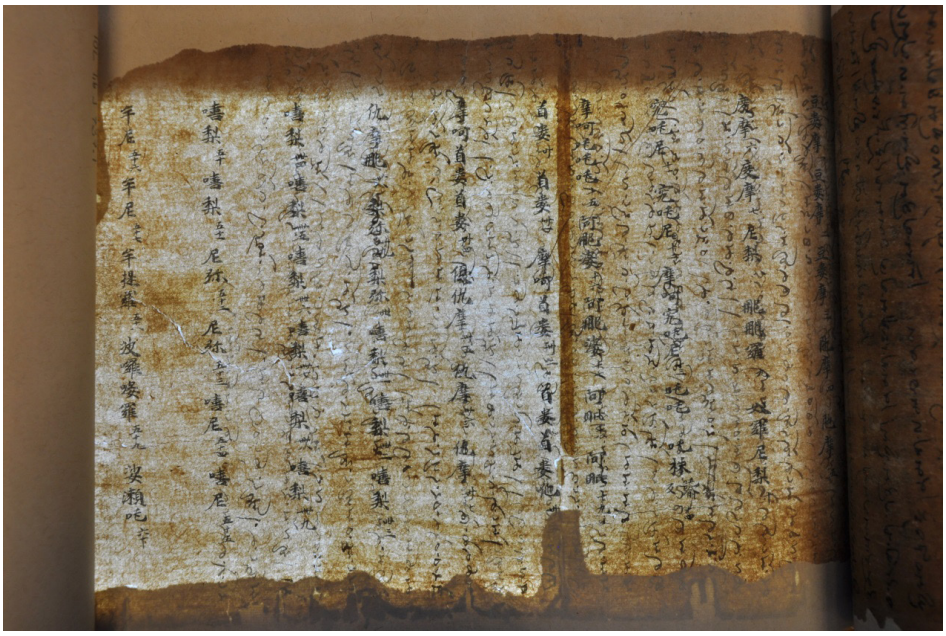

Fig. 122: Laid irregular and patchy type of paper observed on light box in manuscript ITJ 737.1; copyright British Library.

PT 1136

This is an incomplete scroll that contains two ritual antecedent tales (*rabs*). The first is the "Tale of Blood Brotherhood," and the second is the "Tale of Lho rgyal Byang mo btsun," a ritual narrative concerning the death and funeral of Lho rgyal Byang mo btsun (fig. 123). The scroll is written in a hand that shares some similarities with that of the *Chronicle* scroll, and has also been chosen because the second tale contains a matrimonial narrative trope very similar to that found in the *Chronicle*'s episode of Princess Sad mar kar's marriage to the ruler of Zhang zhung.[125]

[125] For a detailed analysis, see Dotson 2013b.

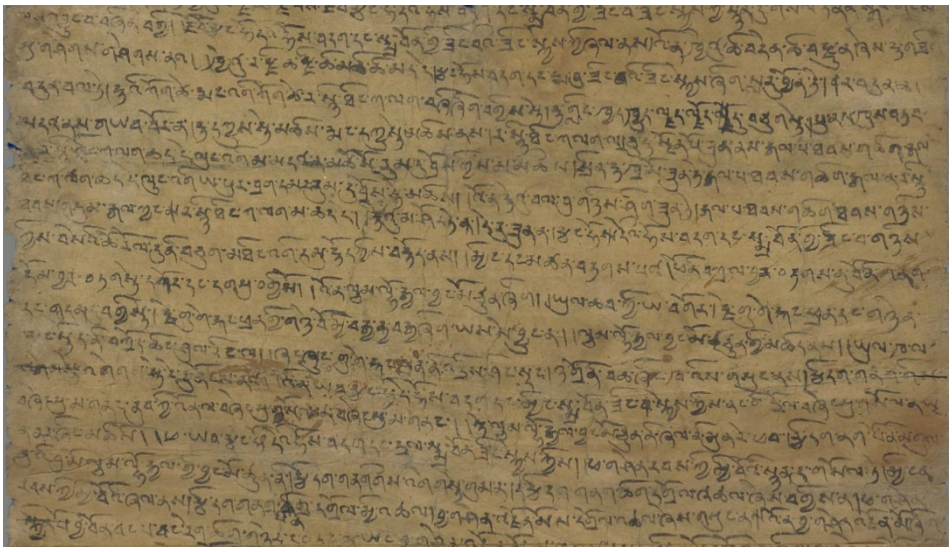

FIG. 123: PT 1136, containing the ritual narratives the "Tale of Blood Brotherhood," and the "Tale of Lho rgyal Byang mo btsun"; copyright Bibliothèque nationale de France.

Shangshu Paraphrase

This text is included here as a nod to the *Old Tibetan Chronicle*'s Chinese influences. As noted above, the *Chronicle* adapts an episode from the *Shiji*. The *Shangshu* (fig. 124) deals with themes that are fairly similar to those of the *Old Tibetan Chronicle*, and similarly contrasts the conduct of good kings with that of evil kings.[126] The script also, after the first twenty-five lines of cramped *dbu can*, bears some resemblance to that of the *Old Tibetan Chronicle*.

[126] For a study of this document, see Coblin 1991a and 1991b.

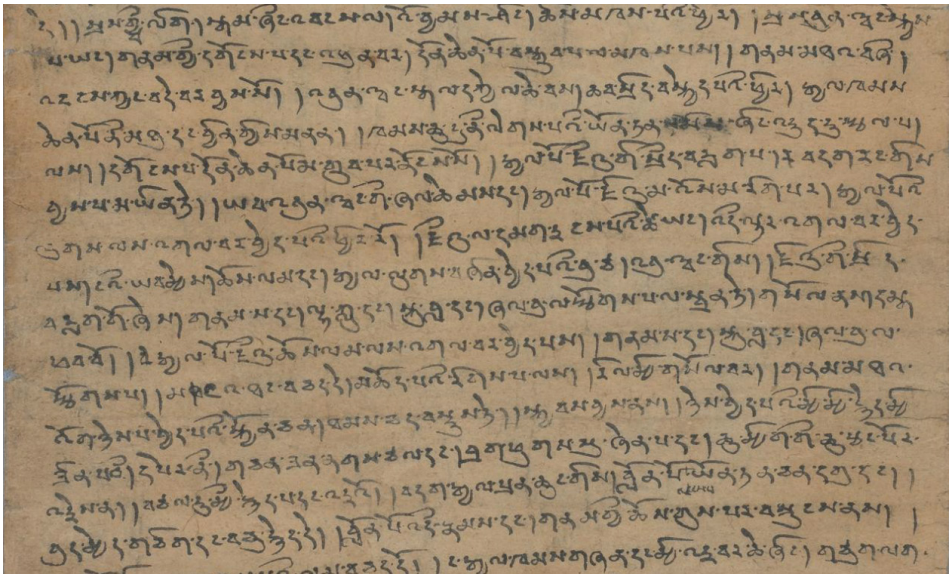

FIG. 124: *Shangshu* Paraphrase, shelfmark PT 986; copyright Bibliothèque nationale de France.

Besides these chosen here, there are other documents that are "related" to the *Old Tibetan Chronicle*. For the sake of completeness, we might have examined dice divination manuscripts such as ITJ 740.1, or royal eulogies such as that found in the 'Phyong rgyas Bridge Head Inscription and in the inscription at the tomb of Khri Lde Srong brtsan. We have chosen not to for a variety of reasons. For one, dice divination texts are too numerous, and none is written in a hand similar to that of the *Old Tibetan Chronicle*. The two inscriptions mentioned are too damaged to make a comprehensive study, and one must rely upon transcriptions given in Ka thog Rig 'dzin Tshe dbang nor bu's history, which are not very useful for our purposes, given that they do not necessarily retain the original orthography. Nevertheless, we are already left with a good sample, book-ended by two imperial documents in the "Chronicle Fragments" and the *Dbon zhang Pillar* and one late Guiyijun document in PT 981, with undated manuscripts in the middle that share similarities in form and/or content. We can now turn to these similarities and differences.

COMPARATIVE TABLE

COMPARATIVE TABLE

SHELF MARK / FEATURE	Treaty Inscription (Dbon zhang Pillar)	ITJ 1375 (Chronicle Fragments)	PT 1144 (Chronicle Fragments)	PT 1286 ("Royal Genealogy" in the Old Tibetan Chronicle)	PT 1287 ("Chronicle" in the Old Tibetan Chronicle)
Other catalogue number / Site number	extant, in front of Lhasa Jokhang	Ch.xvii.2	641 (ML) (T.641)	no. 249	no. 250
Type / format	rectangular stone stele	pothī	pothī	scroll	scroll
Genre (Bud, contract, div, hist, legal, letter, med, narr, non-Bud, Ritual)	historical	narrative, history	narrative, history	narrative, history	narrative, history
Date	823	imperial period, possibly pre-9th century	imperial period, possibly pre-9th century	after 841. Opinions: mid-9th century (Stein, Richardson); as late as the 11th century (Walter)	after 841. Opinions: mid-9th century (Stein, Richardson); as late as the 11th century (Walter)
Recto/Verso (e.g., title of Chinese text on recto)	treaty on wide sides, signatories on narrow sides	Tibetan both sides	Tibetan both sides	Chinese sutras on recto	Chinese sutras on recto
Height × Width (cm)	470 × 95 × 50	7.5 × 26.7	7.5 × 27	92 × 25.4	620 × 26
No. of sheets/ panels in a scroll or concertina; No. of folia; line numbers of change-overs	bilingual inscriptions on three sides, Tibetan only east face	1	1	3: after ll. 29, 41 (ends at l. 69)	17; one w/o writing, then after ll. 33, 63, 100, 135, 170, 206, 242, 284, 314, 327, 363, 397, 421, 460, 501 (ends at l. 536)
Average measurement of each panel or folio	n/a	7.5 × 26.7	7.5 × 27	Pannel I: 45.5 × 25.5	43 × 26, excluding cut panels.
Thickness (mm)/ Number of sheets if glued together	n/a	not measured	not measured	not measured	variable, but usually 0.12–0.15
Texture	varies	irregular	irregular	smooth	smooth
Color of Paper/media	grey	light	light	varies from light to dark	varies

ITJ 737/1 (Rāma A, part 2)	ITJ 737/3 (Rāma A, part 1)	PT 981v, ll. 2-18 (Draft letter)	PT 981r (Rāma E)	PT 1136 (Ritual antecedent tales)	PT 986 (Shangshu Paraphrase)
Ch.80.IX.3; scroll box 141; de Jong's "version A"	Fragment 63; call number 056:011; de Jong's "version D"	245(2), 444, 245.E	de Jong's "version E" 245(2), 444, 245.E	420	244
scroll	scroll (from same scroll as ITJ 737/1)	scroll	scroll	scroll (Chinese Buddhist text on verso)	scroll
narrative	narrative	letter draft, type 3.2	narrative	non-Buddhist, ritual	narrative, history
roughly same as Chronicle scroll	roughly same as Chronicle scroll	late Guiyijun	late Guiyijun	undated	undated
Chinese sutras on recto	Chinese sutras on recto	Rāma E on recto	draft letter on verso	recto: Chinese Saddharmapundarika	verso blank
497 × 25.5 (width varies between 25 and 27.5)	56 × 26	550 × 30	550 × 30	58 × 25.3	200 × 31
11 panels; after ll. 15, 64, 113, 164, 212, 262, 301, 349, 390, 428	2; change after l. 16	14	14; after ll. 18, 41, 64, 86, 107, 125, 146, 167, 189, 202, 221, 241, 263,	3 (changes after ll. 2, 53)	5; changes after ll. 39, 75, 112, and at/through l. 149 (scroll ends l. 158)
46 × 25.5	n/a	n/a	41 × 30	51 × 25.3 (sample of 1)	43 × 30
not measured	not measured	not measured	not measured	not measured	not measured
smooth, some tears	smooth, some tears	smooth	smooth	smooth, some tears	smooth, some tears
varies	varies	light	light	varies	light

SHELF MARK / FEATURE	Treaty Inscription (Dbon zhang Pillar)	ITJ 1375 (Chronicle Fragments)	PT 1144 (Chronicle Fragments)	PT 1286 ("Royal Genealogy" in the Old Tibetan Chronicle)	PT 1287 ("Chronicle" in the Old Tibetan Chronicle)
Type of paper	n/a	Daphne/Edgeworthia sp.	Daphne/Edgeworthia sp.	laid paper	laid paper, from paper mulberry and unidentified grass; 3 types of paper – see description for details
Laid lines (per 3 cm)	n/a	visible on surface	not observed	not observed	type 1: 12-13; type 2: 27; type 3: 18-21
Chain lines (span of the intervals in cm)	n/a	not observed	not observed	not observed	type 1: 6-6.5; type 2: 5.5, 3.2, 2.8, 5.5; type 3: 3.5
Dyes	n/a	none	none	none	none
Ink color(s)	n/a	black	black, some faded and rubbed	black, some very faded	black
Ink thickness	n/a	thick, clear	thick, but some is faded	varies	varies
Writing tool	chisel	pen	pen	pen	pen
Lines per sheet/panel or folio	W: 77; E: 71; N: 40; S: 49	6	5, 6	n/a (middle panel is not a full panel	31.5 is the average, with 18 the fewest and 42 the most
Lines per 20 cm	not measured	6 lines/ 7.5cm	5.5 lines/ 7.5cm	19	18.5
Space between lines (leading) (in mm)	not measured	8-12mm	13mm	10mm, evenly spaced	evenly spaced, mostly 12mm; down to 8mm in a few places
Syllables per 20 cm	E: 18/line (others have adjacent columns of Chinese)	18	23	18	19
Margins (mm)	space left at each side	5mm left	5mm left	5mm left	8mm left (only 5mm in panels 1 and 2, but up to 14 thereafter; 4mm right
Guidelines (inked or drypoint)	none, but lines are straight	ruled	ruled, but lines are not straight	none	none. Lines tend to dip in the middle, and rise to the right in the first two panels, then are straighter thereafter, occasionally rising slightly to the right

ITJ 737/1 (Rāma A, part 2)	ITJ 737/3 (Rāma A, part 1)	PT 981v, ll. 2-18 (Draft letter)	PT 981r (Rāma E)	PT 1136 (Ritual antecedent tales)	PT 986 (Shangshu Paraphrase)
laid paper	laid paper	laid paper	laid paper	laid paper	laid paper
not observed	not observed	14, visible on surface in damaged areas	14, visible on surface in damaged areas	not visible on surface	visible on surface
not observed	not observed	not observed	not observed	not observed	not observed
none	none	none	none	none	
black	black	black	black	black	black
varies, but generally thin	varies	thin, consistent	thin, consistent	varies, but generally thin	thick
pen	pen	pen	pen	pen	pen
average: 49; outliers: 51, 41, 38	n/a	n/a	20	51	37
19	19	10.5	10.5	23	19 in first part; 16.5 in second part
8-10mm	8-10mm	20mm	20mm	8mm; varying between 6 and 10	7.5mm for first 24 lines, then 12mm
17.5	18	14	13	26; fewest 19, most 28	18.5 in first part; 14 in second part
6mm left; 0 right	6mm left; 0 right	L: 10mm; R: 5mm	L: 10mm; R: 5mm	none	6mm left; 6mm right; 45mm bottom
none, but lines are straight	none, but lines are straight	none, but lines are straight	none, but lines are straight	none, but lines are fairly straight	none; lines tend to rise in the middle then fall to the right

SHELF MARK / FEATURE	Treaty Inscription (Dbon zhang Pillar)	ITJ 1375 (Chronicle Fragments)	PT 1144 (Chronicle Fragments)	PT 1286 ("Royal Genealogy" in the Old Tibetan Chronicle)	PT 1287 ("Chronicle" in the Old Tibetan Chronicle)
Seals, drawings	vegetal designs on capital; orb fineal; tortoise base	none	none	in the blank space in middle of the first panel after l. 5, there is a pale rectangle, too small to be an official seal	after chr. i. there are some sketches of yig mgo and what looks like the roman numeral I
Foliation	n/a	none	none	none	none
Ornamentation (type of yig mgo, including angle of its tail; circles around string holes, etc.)	$// tail to 12:00	$ / and $ points to 11:00	$/./ tail points to 11:00	$/:/ and $/./with midline tsheg; points to 10:00, curls to 9:00	$/:/ and 1 $/./ points to 10:00, curls to 9:00
Script (e.g., dbu can, running dbu can, dbu med)	epigraphic dbu can	dbu can	dbu can	dbu can, with some dbu med features	dbu can, with some dbu med features
No. of scribal hands		1	1	1	1
Line breaks (0 = no breaks; 1 = wrap around; 2 = repeated syllable)	0	0	0	0	0
Syllable margins (0 fluid; 1 rarely broken; 2 rigid)	2	1	1	1	0
xxgi to xxg gi ratio	0 : 1 (0 : 8)	0 : 1 (0 : 1)	1 : 2	0 : 1 (0 : 7)	3 : 2 (30 : 19)
xxste to xxs te ratio	0 : 1 (0 : 8)	3 : 1	n/a	1 : 0; or 1 : 1 if we count bdams ste	42 : 37; but 42 : 64 when we include s ste
Subscribed suffixes or letters/10 lines	0	1	2	.5	.4
da drag/10 lines	.3	0	0	.15	.13
d/n suffix variation (0 no; 1 uncommon; 2 common)?:	0	0	0	2	2
ched po : chen po ratio	0 : 1 (0 : 45)	n/a	0 : 1 (0 : 3)	1 : 0 (1 : 0)	10 : 1 (20 : 2)

ITJ 737/1 (Rāma A, part 2)	ITJ 737/3 (Rāma A, part 1)	PT 981v, ll. 2-18 (Draft letter)	PT 981r (Rāma E)	PT 1136 (Ritual antecedent tales)	PT 986 (Shangshu Paraphrase)
none	none	none	none	none	none
none	none	none	none	none	n/a
none observed	not observed	$/ / to 10:00	$// //, in double outline, to 10:00; $// pointed to 9:30	$/:/ tail to 10:30 (l. 60); $ /./ line 7 (tail is off the page); $/:/ line 30 (tail off page)	$/./ tail points to 9:00; $//tail points to 9:00, ticks up to 12:00 (looks like a smile, and in one case makes a full circle)
dbu can, with some dbu med features	dbu can, with some dbu med features	dbu can	dbu can	dbu can	dbu can
1	1	3 (here we look at 1)	1	1	2, maybe 1; script changes in middle of l. 24
0	0	0	0	0	0
0	1	2	2	0	1
1 : 1 (24 : 24)	1 : 0 (1 : 0)	n/a	0 : 1 (0 : 8)	0 : 1 (0 : 7)	1 : 4 (5 : 20)
49 : 22; and 49 : 27 if we count s ste	7 : 0 (7 : 2 when one allows s ste)	n/a	0 : 1 (0 : 28; 0 : 32 with s ste)	14 : 0 (14 : 5 when one allows s ste)	1 : 26 (and the one is deleted)
1	.5	.5	.5	.5	1.2
.3	.4	0	0	1	.06
2	2	0	2	0	1
6 : 1	1 : 1 (1 : 1)	n/a	2 : 1 (6 : 3)	0 : 1 (0 : 1)	1 : 9

SHELF MARK / FEATURE	Treaty Inscription (Dbon zhang Pillar)	ITJ 1375 (Chronicle Fragments)	PT 1144 (Chronicle Fragments)	PT 1286 ("Royal Genealogy" in the Old Tibetan Chronicle)	PT 1287 ("Chronicle" in the Old Tibetan Chronicle)
myi/mye : mi/ me ratio	1 : 0 (35 : 0)	1 : 0 (1 : 0)	5 : 1	1 : 0 (7 : 0)	1 : 0 (231 : 0); excluding place names
Anusvāra/10 lines	0	0	1.8	0	.2
pa'/ba'/na'/ : pa/ba/ na ratio	0 : 1 (0 : 86)	0 : 1 (0 : 16)	0 : 1 (0 : 9)	1 : 10 (1/0/4 : 16/4/33)	1 : 18 (34 : 623)
xxa's, xxa'd, and xxa'r/10 lines	0	0	0	.14, but 0 if Dba's is excluded	1.06, but .43 if Dba's is exluded
Alternation between aspirated and unaspirated voiceless consonants (0 absent; 1 uncommon; 2 common):	0	0	0	1	1
pha/pho : pa/po ratio	0 : 1 (0 : 201)	0 : 1 (0 : 15)	0 : 1 (0 : 19)	0 : 1 (0 : 107)	0 : 1 (0 : 499)
Alternation between voiced and voiceless consonants (0 absent; 1 uncommon; 2 common):	0	0	0	0	0
gyang : kyang ratio	0 : 1 (0 : 9)	0 : 1 (0 : 3)	n/a	n/a	0 : 1 (0 : 53)
Vowel assimilation	not observed	not observed	not observed	not observed	lte bu for lta bu
Idiosyncratic or phonetic spellings	many, from Chinese names	not observed	not observed	not observed	zha 'bring (l. 219)
Contractions?	no	no	no	no	no
Separated 'i : attached 'i ratio	0 : 1 (0 : 94); OTDO has two separated 'i, but these are almost certainly transcription errors	0 : 1 (0 : 6)	0 : 1 (0 : 9)	1 : 0 (65 : 0 or 64 : 1)	23 : 1 (247 : 11)
yi : i ratio	n/a	n/a	n/a	0 : 1 (0 : 65)	0 : 1 (0 : 247)
yis : is ratio	n/a	n/a	n/a	n/a	0 : 1 (0 : 19)
gi gu : gi log ratio	229 : 287	5 : 1 (38 : 7)	4 : 1 (34 : 9)	165 : 133	1 : 1 (1387 : 1154)

ITJ 737/1 (Rāma A, part 2)	ITJ 737/3 (Rāma A, part 1)	PT 981v, ll. 2-18 (Draft letter)	PT 981r (Rāma E)	PT 1136 (Ritual antecedent tales)	PT 986 (Shangshu Paraphrase)
30 : 1 (209 : 7; all 7 are me, excluding me(n) tog and proper names: bud med and dme)	14 : 1 (28 : 2; one men tog, one personal name)	1 : 0 (3 : 0)	51 : 1 (103 : 2; excluding men tog and personal names; 2 remaining: me long, lham me)	1 : 0 (40 : 0)	1 : 0; excluding Chinese place names
.41	0	0	.4; snyaM at l. 166	.5	.38
1 : 18 (24 : 410)	1 : 41 (2 : 83)	1 : 12	18/5/9 : 155/98/0	1 : 6 (9 : 56)	0 : 1 (0 : 256)
.52	.4	0	.04; one bka's at l. 254	0	0
1; usually unaspirated for aspirated	2; especially c/ ch	0	0	2	0
1 : 400	1 : 65	0 : 1 (0 : 23)	0 : 1	0 : 1 (0 : 37)	0 : 1 (0 : 246)
0	0	0	1	0	0
0 : 1 (0 : 52)	0 : 1 (0 : 6)	0 : 1 (0 : 1)	1 : 22	0 : 1 (0 : 1)	0 : 1 (0 : 23)
yes; lte bu, mye ngan	one cang	not observed	mye ngan and mya ngan present; cang	not observed	not observed
inconsistent rendering of Indian names	inconsistent rendering of Indian names	not observed	in Indian names	rtsi dag for rtsid thag	inconsistent rendering of Chinese names
no	no	no	no	no	no
18 : 1 (250 : 14)	20 : 1 (41 : 2)	1 : 2 (5 : 9)	2 : 3 (62 : 96)	1 : 10 (3 : 29)	0 : 1 (0 : 88)
0 : 1 (0 : 250)	0 : 1 (0 : 41)	0 : 1 (0 : 5)	0 : 1 (0 : 62)	0 : 1 (0 : 3)	n/a
0 : 1 (0 : 2)	0 : 1 (0 : 1)	n/a	0 : 1 (0 : 2)	0 : 1 (0 : 3)	n/a
2 : 1 (1147 : 560)	141 : 87	3 : 1 (50 : 15)	3 : 1 (615 : 216)	20 : 1 (373 : 18)	406 : 266

SHELF MARK / FEATURE	Treaty Inscription (Dbon zhang Pillar)	ITJ 1375 (Chronicle Fragments)	PT 1144 (Chronicle Fragments)	PT 1286 ("Royal Genealogy" in the Old Tibetan Chronicle)	PT 1287 ("Chronicle" in the Old Tibetan Chronicle)
Single shad?	0	2	2	2	2
Single shad ending one „clause" and starting the next?	3	3	3	2	2
Double shad?	0; perhaps one at end, but even there it appears to be shad space shad	0	0	0	0
Triple or quadruple shad?	0	0	0	0	0
Grammatical use of shad	0	0	0	0	0
Tsheg before shad (0 never; 1 after nga; 2 rare; 3 often; 4 always)	2	3, and often combined with tsheg in a single stroke	3, and often combined with tsheg in a single stroke	3	3
Type of tsheg (single, midline, double, dbu med)	standard single	single, double	single, double	single, midline	single, midline, very rare double, maybe quasi-double caused by split nib
Single or midline tsheg : double tsheg ratio	1 : 0 (all single)	45 : 1 (260 : 8 approx)	87 : 1 (260 : 3)	1 : 0 or 500 : 1	1 : 0 or 500 : 1
Circles (double or quadruple):	no	no	no	no	no
Symbols for interlinear annotations	n/a	n/a	n/a	+	+
Deletions	no	none	vertical strikethrough	vertical strikethrough	vertical strikethrough
Deletions and insertions/10 lines	0	0	1	.1	.3
Deletions and insertions by another hand (0 = no; 1 = yes; 2 = unclear)?	0	0	0	0	0

ITJ 737/1 (Rāma A, part 2)	ITJ 737/3 (Rāma A, part 1)	PT 981v, ll. 2-18 (Draft letter)	PT 981r (Rāma E)	PT 1136 (Ritual antecedent tales)	PT 986 (Shangshu Paraphrase)
2	1	2	2	2	2
3	3	3	3	2	3
0	0	0	0	0	0
0	0	0	0	0	0
2	2	0	0	0	0
3	3	0	0	1	2 (4 to l. 24; 2 after)
single, midline	single, midline	single	single	single	single
1 : 0	1 : 0	1 : 0	1 : 0	1 : 0	1 : 0
none	none	none	none	none	quadruple
+	+	no symbol	+	no symbol	+
horizontal, vertical	vertical strikethrough	n/a	vertical strikethough or simply written over = discrete; some scribbles	horizontal, vertical	vertical; horizontal; blotting
2	2	1	.3	1	.25
0	0	0	0	0	0

SHELF MARK / FEATURE	Treaty Inscription (Dbon zhang Pillar)	ITJ 1375 (Chronicle Fragments)	PT 1144 (Chronicle Fragments)	PT 1286 ("Royal Genealogy" in the Old Tibetan Chronicle)	PT 1287 ("Chronicle" in the Old Tibetan Chronicle)
Explanatory glosses and commentary (0 = no; 1 = in scribe's hand; 2 = in another hand)?	0	0	0	0	0
gi(s), gyi(s), kyi(s) present and normative?	yes, but for bod gyi at W1	yes, but for one n kyi	yes, but for one r kyi	yes, but for 1 n kyi and 1 l kyi	mostly; some kyi after n and r; 3 gyi after b
Genitive used in formation of plural? (0 = never; 1 = uncommon; 2 = common. Only with nominalized verbs?)	2	0	0	2	1; found twice for seven rnams; both nominalized verbs
Forms of plural or collective particles	rnams, dag, -o chog,	none	none	rnams	rnams, -o chog
Forms of terminative particle	du for tu, consistently	du for tu (in 2/2 instances)	du for tu (in only instance)	du for tu	du for tu
Forms of semifinal particle	normative	normative	normative	normative; one s ste	mostly, but several s ste; 4 : 3 preference for s te over s ste
Forms of concessive particle	normative	normative	only 'ang present; no opportunities for others	normative	normative
Forms of coordination particle	normative	normative	normative (sample of 1)	normative, but for 1 d shing	normative; 2 : 1 preference of ching : cing
Forms of quotation particle	zhes present; sample of 1	normative; sample of 1	normative; sample of 2	normative; sample of 2	14 : 8 ches to ces ratio, used normatively; s shes for s zhes
Prepausal a' suffix (0 = absent; 1 = uncommon; 2 = common)	0	0	0	1	1
Sentence final particles/ 10 lines	.43	7.5	7.3	.9	5.6
Verbal auxiliaries	none	none	none	V pa yin no at l. 40	V pa 'dra; l. 99; V zhing mchis x6; V pa yin no at ll. 212, 260

ITJ 737/1 (Rāma A, part 2)	ITJ 737/3 (Rāma A, part 1)	PT 981v, ll. 2-18 (Draft letter)	PT 981r (Rāma E)	PT 1136 (Ritual antecedent tales)	PT 986 (Shangshu Paraphrase)
0	0	0	0	0	0
some n kyi; consistently spre'u gyi	yes	gyi for gi (sample of 3)	present, but use is fluid, particularly gi and gyi	yes	kyi uncommon; gyi for kyi common
0	0; sample of 1	n/a	1	0	2, but not always, and use is inconsistent regarding nominalized verbs
rnams, dag, chag, -o chog	rnams, dag	none	rnams, dag, cag, ,o chog,	rnams	rnams, dag, cag, -o ,tshal
du for tu, consistently	du for tu	du for tu	du for tu; tu appears only twice, in shin tu, ll. 28 and 170	du for tu	du for tu
normative; but 3 : 1 preference for s te over s ste	2 s ste	normative	normative	ste for te	normative; with few errors
normative	normative	normative	normative	1 b yang and 1 l kyang; small sample size	normative; with few errors
ching for cing	normative; 1 l cing	normative	normative	normative	normative, with few errors
42 : 3 ches to ces ratio, used normatively; s shes for s zhes	ches for ces; s shes for s zhes; otherwise normative	absent	mostly normative; some fluidity, and some s shes	normative; sample of 5	Uses s shes, some overuse of ces
2; esp. preceding speech	1	1	2	2	0
2.2	1.75	0	3.05	1.17	2.3
pa'dra x5; V zhing mchis	none	none	pa ,dra	V zhing mchis	one pa'dra, but not as doubt

SHELF MARK / FEATURE	Treaty Inscription (Dbon zhang Pillar)	ITJ 1375 (Chronicle Fragments)	PT 1144 (Chronicle Fragments)	PT 1286 ("Royal Genealogy" in the Old Tibetan Chronicle)	PT 1287 ("Chronicle" in the Old Tibetan Chronicle)
khyed and nged as plural, or as respectful/honorofic? (0 = plural; 1 = nged as pluralis majestatis; 2 = respectful)	n/a	n/a	n/a	n/a	0
SvS style?	epigraphic	similar to "official (headed)"	similar to "official (headed)"	similar to both "official" styles	generally similar to both the headed and headless versions of the "official" style.
Index letters: ka	1b	4a	3c, 4b; neither are "pure" letters	3b, but with a variation in stroke 1: short stroke down and to left, then ticks back up to right for ligature; sometimes all in 1 stroke	3b, but with a variation in stroke 1: short stroke down and to left, then ticks back up to right for ligature; sometimes all in 1 stroke
Index letters: ga	1a	4a/2a, some 4b	4a/2a few 4b	2a/4a, few accidental 4b, rare 3a	2a/4a, few accidental 4b, rare 3a
Index letters: nga	1a	2a, 3a	2a, 3a	2a, 3a	2a, 3a
Index letters: ca	1, 2	2	2, 3	3	3, 2
Index letters: pha	1	3b	2b, 3b	2b	2b
Index letters: ra	1a	2a	2a	2b, 3a	2b, 3a
Index letters: sa	1a	2a, 3a	2a, 3a	3a, 2a	3a, 2a
Idiosyncratic ductus?	hook on tsha rises in center of head; sa has extra left descender	ya btags is adjacent rather than under	ya btags is adjacent rather than under	same as PT 1287	one-stroke ka, sometimes with loops, one-stroke sa
Hooked 'a? (0 never; 1 mixed; 2 always)	2	0	0	1	1
Type of shad	straight, short	straight; some combine with preceding tsheg to make highly ticked head	straight; some combine with preceding tsheg to make highly ticked head	bowed, ticked head, and straight (to 5:30)	bowed, ticked head, calligraphic, some slightly wavy, some straight (to 5:30)
Position of vowels in relation to the root letter	center	left	left	left and center; mainly left	left, center

ITJ 737/1 (Rāma A, part 2)	ITJ 737/3 (Rāma A, part 1)	PT 981v, ll. 2-18 (Draft letter)	PT 981r (Rāma E)	PT 1136 (Ritual antecedent tales)	PT 986 (Shangshu Paraphrase)
0; but one khyed as respectful and one pluralis majestatis nged; ll. 28, 29	0 or 1 on l. 51	n/a	0; and 2 (khyed, l. 74)	n/a	0
similar to both "official" styles	similar to both "official" styles	similar to "Buddhist (headless)"	similar to "Buddhist (headless)"	similar to both "official" styles	begins similar to "official (headed)"
3b, 1 or 2 strokes, as in PT 1286 + 1287	3b, 1 or 2 strokes, as in PT 1286 + 1287	2a	2a	3b	2a
2a/4a, 4b; some 3b	2a/4a, 4b; some 3b	3b, 4a	2b, 3b, 4a	3b, 4a, 4b	2a/4a
2a, 3a	2a, 3a	2a	2a	2a, few 1a	2a
3, 2	3, 4	4	4	3	3, 2
2b, 3b, 4	2b, 3b, 4	2b	2b	3b, 2b	2b
2b, 3a	2b, 3a	2b	2b	2a, 2b	2a, 2b
3a, 2a	3a, 2a	3a, 2a	2a, 3a	2a, often with no ticked head	3a, 2a
sa has an open, obtuse angle for lower left corner, making it like a ya; see also PT 1287, sri dgum gyis in l.5	same as ITJ 737/1	open, one-stroke sa	open, one-stroke sa	not observed	not observed
1	1	2	2	1	2 in first script; 0 in second
ticked-head, bowed, straight, ticked-away, calligraphic	Straight; ticked head; ticked away; calligraphic	wavy	wavy	straight, calligraphic, ticked	ticked head, bowed, ticked away, wavy, calligraphic
left	left	center	center	left	left, center

SHELF MARK / FEATURE	Treaty Inscription (Dbon zhang Pillar)	ITJ 1375 (Chronicle Fragments)	PT 1144 (Chronicle Fragments)	PT 1286 ("Royal Genealogy" in the Old Tibetan Chronicle)	PT 1287 ("Chronicle" in the Old Tibetan Chronicle)
gi gu's, gi log's curl in degrees; ligature?	220°; no ligature	160-180°; 220-240°; few ligatures	160-180°; 220-240°; few ligatures	150-220°; 140-180°; few ligatures	160-220°; 120-200°; ligatures rare
gi gu's angle in clock terms; gi log's angle in clock terms (measured by the tail):	4:00; 8:00	3-3:30; 8-8:30	3-3:30; 8-8:30	3:30-4; 7:30-8:30	3-3:30; 7:30-8:30
Ratio between head and tail of na ro; ligature?	1 : 1; ligature	1 : 1 to 1 : 2, with ligature	1 : 1 to 1 : 2, with ligature	1 : 3; ligatures rare	1 : 2 to 1 : 3; some with ligatures
greng bu's angle in clock terms, ligature?	rising 11:00, turns to 9:30; ligature	9:30-10:00; some looped; ligature	9:30-10:00; some looped; ligature	11:30, looped; sometimes 11:00, turning to 10:00; often with ligature	10-10:30, often looped; others rising 11:30 turning to 10:00; with ligature
zhabs kyu size, ligature:	yes; remains under root	yes, extends far to left, often beyond prefix	yes; extends to left, often past prefix	yes, extends beyond border of root	yes, some small, round, under root, others extend beyond border of root
Length of tails/feet, degree of inclination	short; 6	fairly long (2:1 to ga and sha; longer for na); 5:30	fairly long (2:1 to ga and sha; longer for na); 5:30	sha, ta, na to 7:00, ga ticked to 5:30	medium, ga ticked away to 5:30
Descenders	straight	some calligraphic; few ticked away right	some calligraphic; few ticked away right	ticked away ga	ticked away, straight
Position of root under superscripts	center: rm, sl, rj, rn, rng, lt, sg, sny, rd, zl; slightly right: sk, lh, sts	center: rl; right: sn, rj, st, sng, sg, sny, sts, rts, sp, sd	center: rg; right: sng, st, lh, sd	center: st, rl; right: rj, st, lt, sng, rt, lh, rg, sp, ld, rts, sny	center: sb, st, rd; right: rj, rng, sny, rts, rm, sts, rg, lh, sg, sk, sp
Size, shape of va btags	small, triangular	n/a	n/a	small, triangular	small, triangular
ya btags size, angle; ligature with zhabs kyu	remains under root, points up to 2:00. Zhabs kyu centered, with ligature	adjacent; points to 12:00; zhabs kyu begins from end	adjacent; points to 12:00; zhabs kyu begins from end	most remain under the root, point 12:30-1:30, some come up just beside; zhabs kyu continuous from end of stroke	most remain under the root, point 12:30-1:30, some come up just beside; zhabs kyu continuous from end of stroke

ITJ 737/1 (Rāma A, part 2)	ITJ 737/3 (Rāma A, part 1)	PT 981v, ll. 2-18 (Draft letter)	PT 981r (Rāma E)	PT 1136 (Ritual antecedent tales)	PT 986 (Shangshu Paraphrase)
160-200°; 100-180°; few ligatures	160-180°; 120-180°; some ligatures	200-230°; 200-220°; no ligature	200-230°; 200-220°; no ligature	160°; 180°; ligatures accidental	100-160°; 180°; many with ligature
3-3:30; 7:30-8:30	3-3:30; 8-8:30	3:30-4; 8-8:30	3:30-4; 8-8:30	3-3:30; 8:30, ticked down to 6:00	3-3:30; 8:30
1 : 3, some 1 : 2; few ligatures	1 : 2 to 1 : 3; some with ligatures	1 : 2; varies between 1 : 1 and 1 : 3; no ligature	1 : 2; varies between 1 : 1 and 1 : 3; no ligature	1 : 2; most with ligature	1 : 1.5; ligature
rises to 11:00, turns to 9:30; some rising 10:00, turned to 9:30; most with ligature	rises to 11:00, turns to 9:30; some rising 12:00, turned to 11:00; some straight to 10:00; ligature	11:30, curled/ticked to 3:00; some rising 12:00 turned to 9:00; ligature	11:30, curled/ticked to 3:00; ligature	9:30-10:00, ligature	10:30-11:00, often looped; ligature
yes, small and round, remains under root, with descender	ligature; small, stays mainly under root	yes, extends beyond border of root	yes, extends beyond border of root	yes; some extend beyond border of root	yes, extends beyond border of root
g normative; straight, or ticked to 5:30	g to 5:30; n between 5:30 and 6:30	medium (1 : 2 for sh and g); g ticked 2:30-3:00	medium (1 : 2 for sh and g); g ticked 2:30-3:00	2.5 : 1; ticked away 5:30	medium, to 5:30-6:00
straight or ticked away; na to 6; ta to 7	g ticked away right	wavy	wavy	straight, ticked away	ticked away and/or calligraphic
center: sm, st, sn, rm, rt; right: sp, rg, lj, sny, lt, ld, rj, lng, rts, sb, sk, sm, lh, sg	center: rt, st; right: lh, sny, rts	center: rj, sn, rg; right: sng, sk, sny, rny, sp, rdz, st	center: rg, rny, rl, rk; right: sn, st, sg, rt, sts, lt, sp, sk, sd, sng	center: sn, rng, rt, rm, sny, rk, lc, rg, rts; right: sm, sk, sts, sny, sg, rt, st, lh, sng, rdz	center: rg, sn; right: sg, rg, sny, lt, st, sts, sk, sp, sb, lh, ld, rny, sm, sng
large, triangular no headline	n/a	n/a	large, triangular, no headline	small, rounded (l. 36)	triangular, large
points up between 12:00-2:00; sometimes under, sometimes adjacent, esp. gy and ky; zhabs kyu joins from end	remains under root, small, points up 1:00-2:30; zhabs kyu continues from end	Under root, points up to 12:00 to 2:00	Remains under root, points up to 2:00. Zhabs kyu centered, with ligature	mostly under, pointing 1:00-2:00; zhabs kyu starts from middle	ll. 1-25: large, remains under, curves up to 2:00; remainder: comes up adjacent, points to 12:00; zhabs kyu joins at end

SHELF MARK / FEATURE	Treaty Inscription (Dbon zhang Pillar)	ITJ 1375 (Chronicle Fragments)	PT 1144 (Chronicle Fragments)	PT 1286 ("Royal Genealogy" in the Old Tibetan Chronicle)	PT 1287 ("Chronicle" in the Old Tibetan Chronicle)
ra btags size, angle. Descender?	extends to edge of root; with descender; 9:00; straight with no curve	long, 8:30-9:00, with descender	long, 8:30-9:00, with descender	small, usually without descender, between 7:00-8:30, ticked away right; dra to 5:00	small, usually without descender, between 7:00-8:30, ticked away right; dra to 5:00
la btags size, position	normative	normative	normative	rotated up to 90°; some normative	mostly normative; some rotated slightly; a few abbreviated to resemble a ra btags
Notes	none	orthography of syllable btsan/rtsan/ tsan/brtsan is rougly pre-800 in "correct" spelling of spelling Khri Srong rtsan	none	none	orthography of syllable btsan/rtsan/ tsan/brtsan is mostly post-800 "brtsan" form; but btsan in the name Slon btsan accords with later (post-10th century), simplified spelling
Names	too many to list	spung sad zu tse, Myang Zhang snang, Khri Srong rtsan, rjo bo Bor yon tse, Mgar Yul zung	gung blon Shud bu Nga myi; Klu dur (king of Lho brag); rgyal po Khri Stag bu Snya gzigs; 'Ol god (bdag po of Yar ,brog); 'Ol god za (btsun mo)	too many to list	too many to list

ITJ 737/1 (Rāma A, part 2)	ITJ 737/3 (Rāma A, part 1)	PT 981v, ll. 2-18 (Draft letter)	PT 981r (Rāma E)	PT 1136 (Ritual antecedent tales)	PT 986 (Shangshu Paraphrase)
extends to or beyond edge of root, points 8:30-9:00; no descender; often ticked right (as in PT 1287); dra to 5:00-6:00	some without descender, short, 8:00-8:30. some ticked away right; dr to 5:00	extends to edge of root, 9:00; with descender	extends to edge of root, 9:00; with descender	8:30-9:00, with descender	some with descender, 8:30-9:00; some without, 8:00
some normative, some rotated up to 90º	normative	normative	normative	rotated 45º	normative
too many to list	too many to list	Ha se mnga' bdag thyen leng kong (addressee); G.yon ru tsang kun Bkra shis; g.yas ru ban de; Zhang lon byin (sender)	too many to list	too many to list	too many to list

Comparison

These descriptions establish the norms for each text. Even in this restrictive sample of texts chosen for their similarity in form and genre, the wide divergence among quantifiable and quasi-quantifiable features is instructive. As noted in the introduction, establishing such norms allows one to exercise good judgement when editing and translating a text. Observing the divergence also reminds one of the wisdom of refraining from gross generalizations about the features of early Tibetan writing. Very few features are shared by all of the documents in our sample. Exceptions are the standard use of "*shad*—space—*shad*" punctuation, rather than double *shad*, the use of the terminative *du* where *tu* is expected, and largely consistent use of *my* with *i* and *e* vowels. This is not to say that such punctuation is standard across the entire body of early Tibetan writing. Though small, the sample already explodes some incorrect assumptions by demonstrating that the *da drag*, the final *'a* or "superabundant *'a*," as well as alternation between aspirated and unaspirated voiceless consonants, and variation between *d* and *n* suffixes, are absent in some documents. Similarly, some of our sample texts display rigid syllable margins, while others are more fluid.

In general, one knows the larger trends in the evolution of Tibetan writing: ligatures disappear such that vowels come to float above or below the line; *gi log*, *da drag*, final and medial *'a*, midline and double *tsheg*, and *myi/mye* disappear, ornamentation becomes more embellished, syllable margins more rigid, and grammatical systems more complex with regard to evidentials, egophorics, and periphrastics. In light of the small number of documents under review, however, one cannot draw from our texts any generalizations about the development of Tibetan writing from the imperial period to the early Guiyijun to late Guiyijun. The features of the *Dbon zhang Pillar* and the "Chronicle Fragments" should not be extrapolated as being characteristic or typical of imperial Tibetan writing any more than those of PT 981 should be taken to typify late Guiyijun writing.

From our comparison of these texts, we cannot fix the *Old Tibetan Chronicle* in time, but we can see its relationships with the other texts in our

sample. One interesting point to begin with is a comparison of the *Chronicle* with the *pothī*-format "Chronicle Fragments," its only known direct source. The latter was brought to Dunhuang from central Tibet, and is almost certainly an imperial-period document. The ductus differs considerably, with the "Chronicle Fragments" displaying a less fluid, squarer style. The latter also has a greater ratio of *gi gu* to *gi log*, and includes some double *tsheg* where none are found in the *Chronicle*. The ratio of *gi gu* to *gi log* may be indicative only of scribes, and not of schools, and, as we shall see, it may also be the sort of paleographic feature that can vary over the course of a scribe's career. The double *tsheg* is also far more common in imperial-period documents than in early and late Guiyijun documents, particularly with regard to the legal genre. There are exceptions to this as well, and these preliminary findings await confirmation after a larger sample of early Tibetan documents has been adequately described. The "Chronicle Fragments" use exclusively the attached *'i*, where the *Old Tibetan Chronicle* favors a separated *'i*. As noted above, the use of attached or separated *'i* is a very significant feature of early Tibetan writing that may aid in dating. The imperial inscriptions feature only attached *'i*, and imperial administrative documents also tend to privilege the attached *'i,* with a few exceptions. By the time of late Guiyijun documents, however, the situation has largely reversed itself, and datable late Guiyijun writings tend to use the separated *'i*.[127] Within this general trend from attached to separated *'i* from Middle Old Tibetan to Late Old Tibetan there are naturally some outliers, and the orthography did not change overnight. The late Guiyijun *Rāmāyaṇa* in our sample, for instance, has a ratio of 62 separated to 96 attached *'i*. In the orthographic baseline established from the explicits of hundreds of *Aparimitāyur-nāma mahāyāna-sūtra* copies, the ratio of separated to attached *'i* was 26 : 146.[128] This should constitute a general standard for writings of the 820s to the 840s. Generally speaking, therefore, the *Chronicle*'s 30 : 1 ratio aligns it with late Guiyijun writings.[129]

[127] Examples include PT 44 and PT 1097.

[128] Dotson forthcoming a.

[129] Considering the hunting laws, which, as noted above, also reused *MP* panels we find an inverse ratio of approximately 1 : 50 separated to attached *'i* in PT 1071. Similar ratios are

The ritual text PT 1136 has a few similar index letters and vowels to those in the *Old Tibetan Chronicle*, but it also has some telling differences. First, while there is some overlap in the index letters, they do not match, and PT 1136 lacks the idiosyncratic types of *ka* and *sa* found in the *Chronicle*. The absence of a descender on many *ra btags* in the *Chronicle*, as well as its divergent manner of combining *ya btags* and *zhabs kyu* also suggest that PT 1136 was written by a different hand. They also have a vastly divergent *gi gu* to *gi log* ratio of 20 : 1 in PT 1136 to 5 : 4 for the *Chronicle*. More importantly, they have inverse separated to attached *'i* ratios (1 : 10 for PT 1136; 30 : 1 for the *Chronicle*). Additionally, the *Old Tibetan Chronicle* employs the *da drag* and displays variation between *d* and *n* suffixes, where PT 1136 does not.

The *Shangshu* paraphrase (PT 986) also displays similar ductus to that of the *Chronicle*, but contains some differences that rule it out as a work by the *Chronicle* scribe. The latter has a longer sign for the *na ro* vowel, that is, where the "tail" of the vowel is two or three times the length of its head. The *Shangshu*'s *gi gu* and *gi log* are less curled than those of the *Chronicle*, and its scribe (that is, the hand found from l. 25 onward in PT 986), never ticks the *'a*, whereas the *'a* is often ticked in *Chronicle*. The *Shangshu* also lacks the *Old Tibetan Chronicle*'s particular form of the *ka* index letter, a one-stroke variation on type 3b, and the *Shangshu* uses stacked circles, a form of punctuation not found in the *Chronicle*. In terms of quantifiable features, the two works share a similar *gi gu* to *gi log* ratio, and an identical *pa/po* to *pha/pho* ratio (with no aspirates). The *pa/ba/na* to *pa'/ba'/na'* ratio is also similar, though the *Chronicle* uses some *'a* suffixes here whereas the *Shangshu* has none at all in a respectable sample of 256. More definitively, they have inverse *chen po* to *ched po* ratios (the *Shangshu* preferring *chen po*, the *Chronicle* preferring *ched po*), and inverse separated to attached *'i* ratios, with not a single separated *'i* in the *Shangshu*. The *Shangshu*'s syllable margins are also significantly less fluid than those of the *Chronicle*.

The most interesting result of this exercise is the discovery that the *Old Tibetan Chronicle* and "Version A" of the *Rāmāyaṇa* (ITJ 737.3 + ITJ 737.1)

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found for the *Old Tibetan Annals* and the *Annals of the 'a zha Principality*.

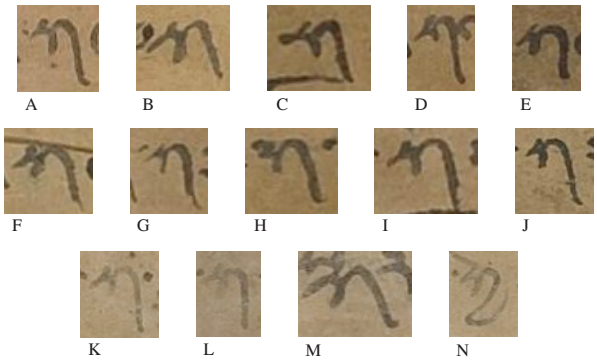
are written in the same hand. In describing our methods, we introduced two levels of analysis, where orthography can be measured with a searchable transliteration, while paleography is more painstaking work that requires high-quality images and, ideally an archive visit where one can also make a codicological description. For making an identification, it is this second level, paleographical analysis, which is decisive. Consequently, we shall begin with the ductus in order to demonstrate that the two documents were written by the same hand, and then we shall discuss the convergence and divergence of quantifiable features.

The two texts share the same types of index letters—with *Rāma A* displaying slightly more letter forms than the *Chronicle*. More importantly, both write their overlapping index letters in the same idiosyncratic way in the case of the single-stroke *ka* and the single-stroke, somewhat open *sa*. The vowels and ligatures with subscripts are very similar, if not identical, and the two share the particular form of *ra btags*, which ticks down and away in the direction of writing. Neither uses wavy descenders or wavy *shad* typical of late Guiyijun writing. To begin with *ka*, we should keep in mind that a single scribe will not write a given letter in the same way every time. It will depend on the letter's position in the word, and the presence or absence of superscripts, subscripts, and vowels. Even absent such considerations, one will find variations in how a single scribe writes a given letter. We can observe three different ways of writing *ka* from PT 1287, for example, as in the figures 125a–c.

FIGS. 125A-C: Examples of *ka* from PT 1287; copyright Bibliothèque nationale de France.

One of the ways in which our scribe writes his *ka* is idiosyncratic enough to erase any doubt that the same scribe wrote both PT 1286 + 1287 and ITJ 737.3 + 737.1. Our scribe begins his *ka* from the top middle. He makes a short

stroke down and to left, then ticks back up to right, descends to make the middle "tooth," sometimes making a loop when he ascends back up to the head before making the final descender to the right. This can all be done in a single stroke, or with two. The ductus is evident from PT 1286 and PT 1287, as seen in figs. 126a–n.

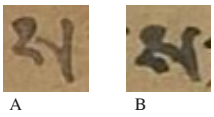


FIGS. 126A-N: Examples of distinctive *ka* from PT 1286 and PT 1287 (the final four images are from PT 1286); copyright Bibliothèque nationale de France.

The loops present in figs. 126a–c, 126l, and 126m clearly demonstrate the ductus as described above. Ductus is rarely so evident in cleanly executed examples of letters. As noted above, it is preferable to use instances where there is no vowel, superscript, or other such element when comparing index letters of this sort. A few such images above, however, such as 126c and 126m, clearly demonstrate the particular ductus that concerns us here, and are therefore included. Here is the same *ka* in *Rāma A*. See figures 127a–f.

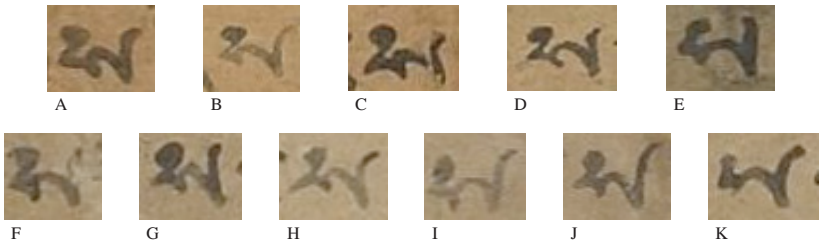
FIGS. 127A-F: *ka* from ITJ 737.1 and ITJ 737.3 (only the last is from the latter); copyright British Library.

The two documents' shared *sa* is similarly idiosyncratic. As with *ka*, our scribe also writes this letter in many different ways. One of these is a two-stroke form, where the second stroke begins at or near the head, as seen on figures 128a–b.



FIGS. 128A–B: Examples of *sa* from PT 1287; copyright Bibliothèque nationale de France.

The form on which we focus is the result of our scribe's tendency to start the second stroke from nearer the end of the first stroke (figs. 129a–k). This makes for an open, less angular *sa* that in some cases looks as if it has been completed in a single stroke.



FIGS. 129A-K: Examples of distinctive *sa* from PT 1286 (figs. g to k) and PT 1287 (figs. a to f); copyright Bibliothèque nationale de France.

At its most open, this letter can resemble *ya*, or even *pa*, and one might view it as an intermediary between the *dbu can* and *dbu med* forms of *sa*. The same distinctive form is found in *Rāma A* (see figs. 130a–e).

FIGS. 130A-E: *sa* from ITJ 737.1 (figs. a to c) and ITJ 737.3 (figs. d and e) latter); copyright British Library.

Beyond the index letters, the vowels and ligatures with subscripts are very similar, if not identical, and the two even share the particular form of *ra btags*, which ticks down and away in the direction of writing (figs. 131a–b).


A B

FIGS. 131A–B: *ra btags* ticked in the direction of writing, ITJ 737.1 and PT 1287; copyright Bibliothèque nationale de France and British Library.

Their orthography and use of grammar is also identical or very similar with respect to almost every recorded marker. Notable here is the similar use of *ste* for *te, ching* for *cing*, a very similar separated to attached *'i* ratio and *chen po* to *ched po* ratio, nearly identical *pa/ba/na* to *pa'/ba'/na'* ratio, similarly fluid syllable margins, and the use of *lte bu* for *lta bu*. Exceptions to this picture of convergence are the *Chronicle*'s use of the genitive particle preceding the pluralizer *rnams*, which is not used with *rnams* in *Rāma A*, and the presence of the occasional non-grammatical *shad* in *Rāma A*. One quantifiable marker, the ratio of *gi gu* to *gi log*, also differs: in a large sample, the *Chronicle* shows a 5 : 4 ratio, against a 2 : 1 ratio in *Rāma A*. This is grounds for asserting that the two representations of the i vowel may be given to variation over the course of a scribe's career, and may not be a feature of scribal schools.

One other notable discrepancy, the use of *dbu khyud* in the *Chronicle* and the absence of this sign in *Rāma A*, cannot be as easily explained. It may be due to the punctuation of an original that was being copied, or due to the differing organization of the narratives, where the *Chronicle* is episodic and the *Rāmāyaṇa* forms a single unified narrative. It should be noted in this connection that *Rāma A* is more of a rough copy than the *Old Tibetan Chronicle*. It has eight times as many deletions and insertions: 2 per 10 lines compared to .25 per 10 lines, where the lines are of comparable length (26 cm) and with comparable spacing (17.5 syllables/ 20 cm and 19 syllables/ 20 cm).

These discrepancies, however, are rendered moot by the shared idiosyncratic ductus and by the overwhelming convergence of most of the features. Unfortunately, the conclusion that the same hand appears in the *Chronicle* scroll and *Rāma A* does not immediately bring us any closer to dating

either text. It does mean, however, that any light shed on the one also shines on the other. And, besides raising interesting points concerning variations in a scribe's hand over the course of his career, this discovery also offers us a bit of insight on the *Chronicle* and its "authorship." There are motifs from Indian epic in the *Chronicle*, and in one place, we even find a phrase spoken by a character in the *Chronicle* that is very nearly the same phrase spoken by a demon in the *Rāmāyaṇa*. The safest way to approach this phenomenon is and has been to view both texts as drawing on a shared pool of tradition.[130] Given that the same hand wrote these two passages, however, we might also venture to speak of intertextuality. Even more intriguing than that, we catch a glimpse of a creative intelligence that leads us to wonder if our scribe was not also making his own contributions to a narrative already adorned with popular motifs.

[130] For an application of Lauri Honko's concept of a "pool of tradition" to the *Old Tibetan Chronicle*, see Dotson 2013b.

CONCLUSIONS

The methods that we have outlined quantify, where possible, the salient features of early Tibetan writing. By focusing on codicology, paleography, orthography, grammatical systems, phonology, and lexicographic or historical clues (e.g. terms and names), we unite in a single template the most important features for identifying scribes and schools, and for dating Tibetan writing. Quantification and quasi-quantification, along with more precise methods for describing ductus, and the introduction of a fairly precise typology of index letters, allow us to move beyond idiosyncratic and vague descriptions that are not always ideal for purposes of comparing one document with another. These methods are biased towards use with Dunhuang manuscripts, since this is the crucible in which they have been forged. They should, however, have some applicability to later texts and to other types of Tibetan documents, though they may require some modification in order to be fit for purpose. Similarly, the proposed methods for describing Tibetan writing and Tibetan documents will continue to be refined with wider use and application. In their balance between comprehensiveness and ease of application, however, they constitute a teachable method, and one that should improve the practice of early Tibetan philology. Attention to the document and the paper also tells us about the provenance of a document, and sometimes about the conditions under which it was written.

Any prescriptive methods are likely to fail if they do not demonstrate their utility. With this in mind, we made a case study of the *Old Tibetan Chronicle* and related documents, and our methods enabled us to identify the scribe of the *Rāmāyaṇa*, version A, with the scribe of the *Old Tibetan Chronicle*. We were also able to date the *Rāmāyaṇa,* version E (and version C), to the late Guiyijun period, and to provenance the paper of the *pothī*-format "Chronicle Fragments" from central Tibet, and to effectively date it to the Tibetan imperial period. One of these "Chronicle Fragments" was a direct source for the *Old Tibetan Chronicle*, whose scroll reused panels of Chinese sutras including *MP* panels that were copied sometime between the 820s and 840s. This raises questions both about the reuse of paper and the circulation and conservation of

manuscripts and of discarded folia and panels. In discussing the orthographic features of these manuscripts, we observed a general trend by which the *'i* form of the genitive particle, customarily attached to the preceding syllable in imperial period inscriptions and official documents, came to be detached from the preceding syllable by an intervening *tsheg* by the time of the late Guiyijun. Eventually, this trend would reverse itself, and attached *'i* would once again become normative while the form *yi* took the place of the separated *'i*. In our sample, the preference of the *Old Tibetan Chronicle* and version A of the *Rāmāyaṇa* for the separated *'i* argues in favor of a late Guiyijun date. The ductus, it should be noted, does not display the telltale wave-form descenders typical of late Guiyijun writing. This mixed picture is surely complicated by many outliers, however, and testifies to the importance of measuring several features for comparison against a corpus of dated early Tibetan writings. Far more documents must be adequately described before one can take a given feature, such as strong preference for separated *'i*, as a definitive indicator for dating a given manuscript.

Beyond offering further information relevant to dating these documents, our case study demonstrates how our methods can be used to determine their relationships to each other and to describe documents in such a way that they can easily be compared. In the process, we prioritized ductus vis-à-vis index letters, vowels, and ligatures, and explored the utility of our quantifiable and quasi-quantifiable features. Choosing texts generically related to the *Old Tibetan Chronicle*, arguably our most important undated Tibetan Dunhuang manuscript, we chose among our sample several manuscripts that were artificially separated into two shelfmarks. This effectively served as a control, in the sense that by treating the same manuscript as if it were two separate manuscripts, we could both test the reliability of our descriptions and identify significant versus insignificant variation in our quantifiable and quasi-quantifiable fields (error, essentially). In the process we also demonstrated the importance of sample size: a small sample of text may be unrepresentative of the orthographic practices that inform its scribe(s). Also, by identifying the scribe of the *Chronicle* as the same hand on version A of the *Rāmāyaṇa*, we

saw that some features, such as the ratio of *gi gu* to *gi log*, are given to vary over the course of a single scribe's career.

Besides their use for scribe or author attribution, these methods also constitute a powerful tool for the larger and more important project of identifying scribal schools, defining or refining early Tibetan writing styles, and moving towards a more secure periodization of early Tibetan writing. With respect to the Dunhuang collections, the methods should allow us to identify the clusters of features that characterize imperial Tibetan Dunhuang documents (786–848), early Guiyijun (848–914) documents, and late Guiyijun (914–1036) documents. Besides constituting a method by which to approach Tibetan documents and writing in a purposive and effective way, and a means of introducing key codicological, palegraphical, orthographical, grammatical, and lexicographical features of early Tibetan writing, work such as this will soon allow us to assign date ranges. Looking beyond Dunhuang itself, we may also be able to distinguish features relevant to central Tibetan writing as opposed to Dunhuang writing, and draw conclusions about the impact of Chinese scribes on Tibetan orthography. Taking an even broader view, we can apply these methods (with appropriate modifications) to documents from Dga' thang 'bum pa, Tabo, Kharakhoto, Mīrān, Mazār Tāgh, Turfan, and Etsin Gol in order to gain a better understanding of each of these collections, and also to gain a wider perspective on the early development of Tibetan writing.

APPENDIX:
DETAILED DESCRIPTION OF PT 1287

1. Codicology

1.1 Classifications

Shelfmark/Pressmark: Pelliot tibétain 1287
Other catalogue number/site number: 250
Format: scroll
Genre: history, narrative
Date: after 841. Opinions: mid-9th century (Uray 1989: 5); as late as the 11th century (Walter 2009: xxvi, n. 5).

1.2. Physical Descriptions/Codicology

Recto/Verso: Tibetan is on the verso. Recto: fragments of the *Vimalakīrtinirdeśa-sūtra, Mahāprajñāpāramitā-sūtra*, *Saddharma-Puṇḍarīka-sūtra*, *Aṣṭasāhasrikā--Prajñāpāramitā-sūtra*, *Suvarṇaprabhāsottamarāja-sūtra*, and *Dharmaguptaka Vinaya.*

Dimensions: 620 × 26 cm,

No. of panels or folia, line numbers of change-overs: 17 panels. Change-overs after ll. 0, 33, 63, 100, 135, 170, 206, 242, 284, 314, 327, 363, 397, 421, 460, 501 (ends at l. 536). Panels 1–3: *Vimalakīrtinirdeśa-sūtra;* panels 4–6: *Saddharma-Puṇḍarīka-sūtra*; panels 7–8: *Aṣṭasāhasrikā-Prajñāpāramitā-*

sūtra; panels 9–10: *Dharmaguptaka Vinaya* (these are the greasy, transparent panels)*;* panel 11: *Mahāprajñāpāramitā-sūtra* (this panel is cut); panels 12–13: *Vimalakīrtinirdeśa-sūtra;* panel 14: *Mahāprajñāpāramitā-sūtra* (with 2nd half of panel 10); panel 15: *Mahāprajñāpāramitā-sūtra* (upside down in relation to other panels); panel 16: *Suvarṇaprabhāsottamarāja-sūtra*; panel 17: *Mahāprajñāpāramitā-sūtra* (upside down in relation to other panels)

Average measurement of each panel/folio: 43 × 26 cm, excluding cut panels.

Thickness (with caliper, if possible): variable, but usually 0.12–0.15 mm.

Texture (e.g., smooth, polished, sized): smooth; panels 7–8 and 9–10 are heavily sized.

Color of paper: varies. panels 7–8 are dark, and panels 9–10 are also dark, and less absorbent (the Chinese on the verso is visible through the paper). Other panels are light.

Type of paper (e.g., Rag, bark, woven, laid): the scroll is composed of 17 panels executed on 3 types of paper:

Type 1

Panels 1–6 and 11–17 are executed on the same type of paper made of paper mulberry fibers with the addition of unidentified grass. Patchy laid structure characterized by 12–13 laid lines/ 3 cm with irregular and wavy laid lines pattern. This suggests that a reed or grass type of screen/sieve attached to papermaking mould was used for making this paper. Wherever chain lines are visible their intervals are 6 or 6.5 cm. The reason why chain lines are not always visible can be that in this case textile was used as a secondary support for grass sieve and water did not drain well (fig. 132).

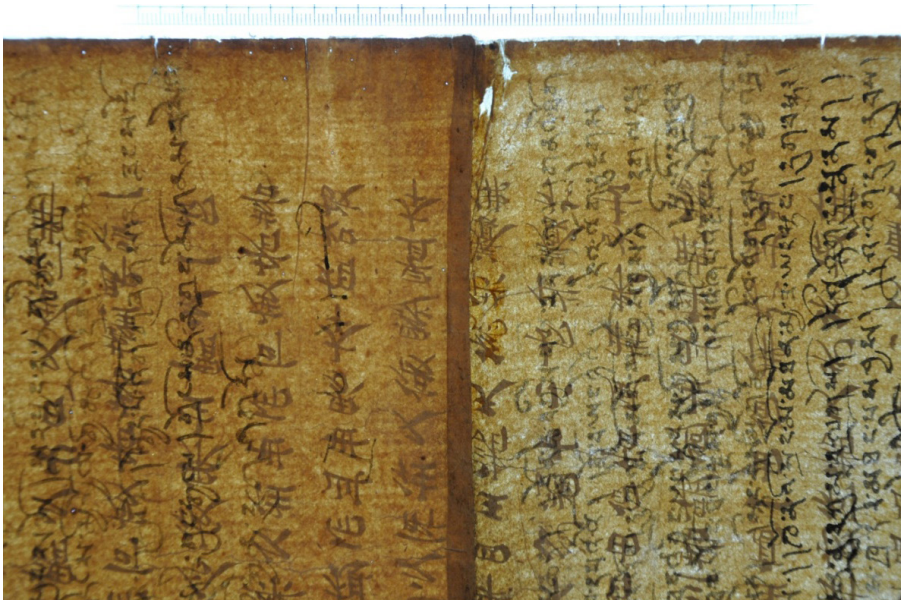


FIG. 132: Panel change-over with lightbox, paper type one, PT 1287; copyright Bibliothèque nationale de France.

Type 2

Panels 7–8 are executed on a different type of paper. It is also laid paper, but the laid structure is even fainter, and the paper almost resembles woven type in large areas. This paper is characterized by 27 laid lines/ 3 cm, and chain line pattern is 5.5, 3.2, 2.8, 5.5 cm. The thickness range is 0.114 up to 0.186 mm (fig. 133).

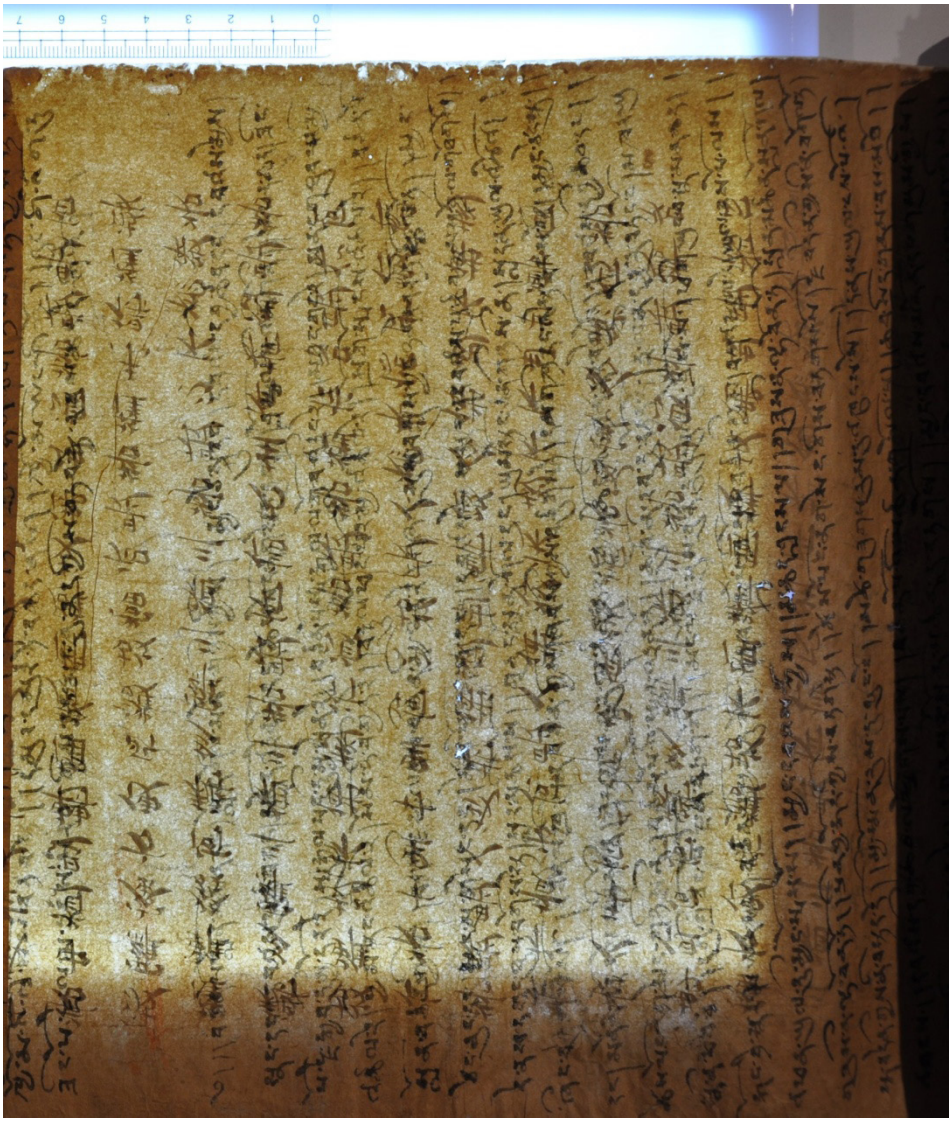


FIG. 133: Paper type two, PT 1287; copyright Bibliothèque nationale de France.

Type 3

Panels 9–10 are executed on the third type of paper composed of pure paper mulberry fibers. Here the laid structure is clear and characterized by 18–21 laid lines/ 3 cm. Chain lines intervals are 3.5 cm. The paper is paper is more deteriorated and of slightly worse quality than the others. The thickness range is 0.123 up to 0.223 mm. The ink of the reverse side is visible to the naked eye, indicating that paper is more absorbent (blotted), or less sized than other two (fig. 134).

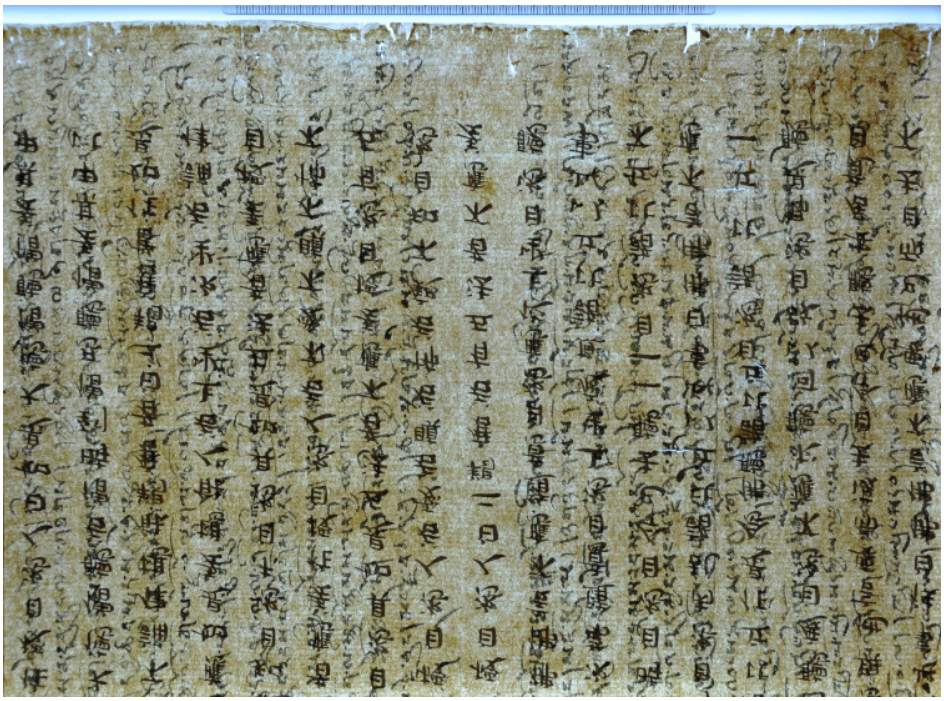


Fig. 134: Paper type three, PT 1287; copyright Bibliothèque nationale de France.

Detailed measurements of individual panels (relevant due to the composite nature of the document):

Panel 1:

Dimensions: 5.2–5.6 × 25.8 cm

Thickness: 0.123, 0.124, 0.128, 0.114 mm

(Note: there is no Tibetan text on the recto of panel 1, however there is Chinese text on the verso side of this panel.)

Panel 2:

Dimensions: 32.8–32.9 × 25.7 cm

Thickness: 0.120, 0.129, 0.096, 0.132 mm

Single layered paper. Laid paper with half-glossy surface; wavy and irregular laid lines pattern suggest that reed or grass papermaking mould was used; 11–12 laid lines/ 3 cm; chain lines are not visible.

Panel 3:

Dimensions: 35.3 × 25.6 cm

Thickness: 0.129, 0.121, 0.095, 0.121, 0.122, 0.143, 0.120 mm

One-layered paper; quite even fiber distribution. Reddish adhesive on the panel change-overs. Laid structure even more wavy and irregular: 12-13 laid lines/ 3 cm. Laid lines perpendicular to Tibetan text. Uneven fiber distribution: pulp thickened along laid lines. Same type of paper as in panel 1.

Panel 4:

Dimensions: 42 × 24.8–25 cm

Thickness: 0.118, 0.167, 0.135, 0.146, 0.085, 0.097, 0.116 mm

Irregular, wavy laid lines, with structure disappearing from time to time in what is called "patchy laid" structure. Same type of paper as in panels 1–3. More irregularities in laid lines pattern that point to use of a grass mould for papermaking. Chain lines not visible. Pulp thickenings along laid lines and perpendicular to Tibetan text.

Panel 5:

Dimensions: 41.8 × 25 cm

Thickness: 0.185, 0.178, 0.157, 0.166, 0.162 mm

Laid paper: 12 laid lines/ 3 cm; irregular and patchy structure of laid lines print. Same paper as in previous panels.

Panel 6:
Dimensions: 41.4 × 24.9 cm
Thickness: 0.125, 0.116, 0.131, 0.137, 0.134 mm
Laid paper characterized by 12 laid lines/ 3 cm with irregular and patchy structure of laid lines print. Same paper as in previous panels.

Panel 7:
Dimensions: 44.4 × 26 cm
Thickness: 0.133, 0.138, 0.114, 0.124, 0.147 mm
Different type of paper starts here, looks like woven, but in some places laid structure is visible. This however is characterized by 27 laid lines/ 3 cm. Very patchy laid structure. Chain lines hardly visible; not possible to measure intervals.

Panel 8:
Dimensions: 25.9 × 43.1 cm
Thickness: 0.140, 0.156, 0.186, 0.139, 0.154, 0.114, 0.124 mm
Same paper as panel 7, but slightly yellower. Hardly visible laid structure characterized by 27–30 laid lines/ 3 cm when visible; wavy irregular laid lines print. Chain lines intervals pattern: 7.5–3.2–2.8–4.1–1.6–5.8–5.7 cm. Paper highly sized, not absorbent (first/previous type is softer and more absorbent).

Panel 9:
Dimensions: 47.8 × 25.4 cm
Thickness (including conservator's muslin): 0.149, 0.223, 0.123, 0.180 mm
Much thinner, quite clear laid structure, text visible on both sides, more yellowish/brownish, and brittle, supported by muslin. 20–21 laid lines/ 3 cm.

Chain lines hardly visible, but in some places possible to observe: 3.7–3.4–3.5–3.8 cm.

There was a tear in the paper near the top of this panel, repaired with a rectangular patch from a Chinese scroll, pasted on the recto (fig. 135). This is obvious on the Chinese recto, where the rectangle is of a very different color, with characters that do not align or fit in with the text. This covers roughly the second half of the first three lines (or 2.5 lines) of PT 1297.

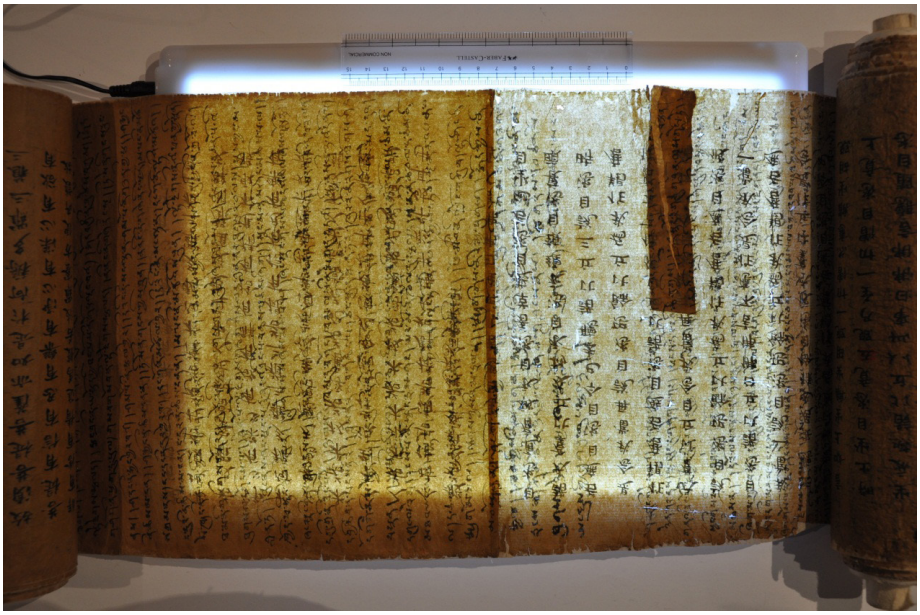


FIG. 135: Repairs to panel 9, PT 1287; copyright Bibliothèque nationale de France.

Panel 10:

Dimensions: 38 × 25.9 cm

Thickness of paper together with muslin: 0.125, 0.176, 0.198 mm

Slightly irregular wavy structure; 18–19 laid lines/ 3 cm; chain lines hardly visible, intervals 3 cm.

Panel 11:
Dimensions: 25.6 × 17 cm
Thickness: 0.113, 0.144, 0.100 mm
The same type of paper as in panels 1–6; without muslin layer, laid lines perpendicular to the text. Laid structure, wavy, irregular: 12–13 laid lines/ 3 cm. Half glossy surface, possibly polished.

Panel 12:
Dimensions: 45.4 × 25.8 cm
Thickness: 0.107, 0.100, 0.154, 0.120, 0.107 mm
Irregular, wavy laid structure; 12 laid lines/ 3 cm; chain lines hardly visible, intervals 6.2–6.1–6.2 cm.

Panel 13:
Dimensions: 41.6 × 25.7 cm
Thickness: 0.103, 0.128, 0.129, 0.132 mm
Glossy/ polished surface. Laid lines vertical to text; wavy/ irregular laid structure; 12 laid lines/ 3 cm.

Panel 14:
Dimensions: 27.6 × 26.7 cm
Thickness: 0.114, 0.102, 0.108, 0.151mm
Wavy/irregular laid structure characterized by 13 laid lines/ 3 cm; chain line intervals: 6.6–6.5 cm.

Panel 15:
Dimensions: 44.5 × 27.5 cm
Thickness: 0.227, 0.141, 0.133, 0.119, 0.145 mm

Same type of paper as in previous panel; very irregular laid structure characterized by 13 laid lines/ 3 cm. A glue stain is highly visible where it joins with panel 12, in the middle of a line of text. The scroll is hardened by it, and orangeish red.

On the right margins from ll. 422–27 we see a dark, greasy-looking stain, and there is another on the left side of ll. 424–25. These stains are repeated symmetrically as we go further down the scroll, onto panels 16 and 17, getting larger and larger until the end of the scroll. The Chinese versos are from separate texts, so this indicates that the damage, perhaps from liquid, occurred after the scroll had been assembled. It is consistent with damage that would occur were liquid to soak in from the outside of the scroll, with the size and shape of the stain getting smaller and smaller as it bled through each successive layer of rolled-up scroll. The larger stain on the right margin is found again at ll. 436–42, 449–55, 459–68, 470–81, 483–96, 496–510, 511–25, 528–end; and the smaller blotch on the left side of the scroll is found at ll. 435–37, 451–53, 465–78, 479–94, 495–508, 509–24, 526–end.

Panel 16:
Dimensions: 45.5 × 28 cm
Thickness: 0.097, 0.169, 0.205, 0.107, 0.100 mm
Same type of paper as in previous panel, however laid structure slightly more visible; 13 laid lines/ 3 cm; chain line intervals: 5.7–5.8–6–6.5 cm. Long fibers visible in the paper structure, uneven fiber distribution resulted in variable thickness.

Panel 17:
Dimensions: 42.3 × 26.7 cm
Thickness: 0.189, 0.211, 0.210 mm
The same type of paper but slightly thicker–this is probably effect of previous conservation treatment. Last two panels are more deteriorated with darker areas/ spots, which may be a reaction to light. Dark and brittle, with some breakages. No evident glue at end.
Laid lines per 3 cm: panels 1–6 and 11–17: 12–13/ 3 cm; panels 7–8: 27/ 3 cm; panels 9–10: 18–21/ 3 cm.
Chain lines (span of the intervals in cm): type 1: 6-6.5 cm; type 2: 5.5, 3.2, 2.8, 5.5 cm; type 3: 3.5 cm.

Yellow dye: none.
Ink color: black.
Ink thickness/composition: varies. Pen refills are evident in places.
Writing instrument: split-nib pen.

1.3. Page setting

Lines per panel/sheet/leaf: 31.5 is the average, with 18 the fewest and 42 the most.
Lines per 20 cm: 18.5.
Leading/ space between lines (from head of one line to head of the next line): evenly spaced, mostly 12 mm; down to 8 mm in a few places. Lines tend to dip in the middle, and rise to the right in the first two panels, then are straighter thereafter, occasionally rising slightly to the right.
Syllables per 20 cm: 19.
Margins: 8 mm left (only 5 mm in panels 1 and 2, but up to 14 thereafter); 4 mm right.
Guidelines? Inked or Drypoint? None.
Seals, drawings: after the end of the first chapter (PT 1287, l. 62) there are some sketches of *yig mgo* and what looks like the Roman numeral I (fig. 136).

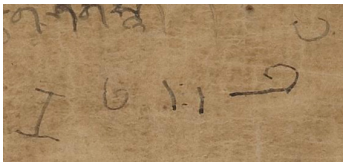


Fig. 136: Ornamentation at end of the first chapter, PT 1287; copyright Bibliothèque nationale de France.

Pagination/foliation: none.
Ornamentation (e.g., type of *yig mgo*, or circles around *pothī* holes): mostly $/:/ and 1 $/./ points to 10, curls to 9. An interesting *yig mgo* here has a sort of "half *shad*" between two *shad* after the curl (figs. 137a–l).

FIGS. 137A–L: *yig mgo / dbu khyud*, PT 1287; copyright Bibliothèque nationale de France.

Script (e.g., *dbu can* or *dbu med*): *dbu can*, but shifts almost to *dbu med* near ll. 425–432.

No. of scribal hands: one.

2. ORTHOGRAPHY

2.1 ORTHOGRAPHY

Line breaks (: 0 = no breaks; 1 = wrap around; 2 = repeated syllable): 0.

Syllable margins (0 = fluid; 1 = rarely broken; 2 = rigid): 0. Combined to not-combined with sentence final particle *so* it is about 1 : 2; but it never combines with *go ngo, do, no, bo, mo* (we even see *guM mo* and *bkuM mo*), *'o, ro, lo*; a few *'bangsu.*

xxgi(s) to *xxg gi(s)* ratio (e.g., *stagi* versus *stag gi*) = 3 : 2 (30 : 19).

xxste to *xxs te* ratio (e.g., *lagste* or *byaste* versus *lags te* or *byas te*) = 42 : 37; but 42 : 64 when we include *s ste*.

Subscribed suffixes or letters/ 10 lines: 0.4.

Da drag/ 10 lines: 0.3.

d/n suffix variation (e.g., *ched po;* 0 absent; 1 uncommon; 2 common)?: 2.
ched po : chen po ratio = 20 : 2.
Ratio of *myi/mye* : *mi/me* = 1 : 0 (231 : 0); excluding place names.
Anusvāra/ 10 lines: 0.2.
pa'/ba'/na' : pa/ba/na ratio = 1 : 18 (34 : 623).
xxa's, xxa'r, and *xxa'd/* 10 lines *'a/v* (e.g., as in *bka's/ dga'r, and dpya'd*): 1.06, but 0.43 if Dba's (a recurring clan name) is exluded.
Alternation between aspirated and unaspirated voiceless consonants (e.g., *cen pho;* 0 absent; 1 uncommon; 2 common)? 1.
pha/pho : pa/po ratio = 0 : 1 (0 : 499).
Alternation between voiced and voiceless consonants (e.g., *gun/kun, gyang/ kyang*; 0 = absent; 1 = uncommon; 2 = common). 0.
kyang : gyang ratio = 0 : 1 (0 : 53).
Vowel assimilation (e.g., *lte bu; e* or *e'i* for *a'i*)? 8 *lte bu/ lte 'u* to 0 *lta bu.*
Idiosyncratic or phonetic spellings (e.g., *zha 'bring* / *zham ring*; or *lcags* for *phyag*): *zha 'bring* (l. 219).
Contractions? 0.
Separated *'i* : attached *'i* ratio = 23 : 1 (247 : 11).
yi : 'i ratio = 0 : 1 (0 : 247).
yis : 'is ratio = 0 : 1 (0 : 19).
Ratio of *gi gu* to *gi log* = 1 : 1 (1387 : 1154).

2.2 Punctuation

Single *shad* (0 = absent; 1 = uncommon; 2 = common; 3 = standard): 2.
Single *shad* ending one "clause," and at start of next (0 = absent; 1 = uncommon; 2 = common; 3 = standard): 2.
Double *shad* (0 = absent; 1 = uncommon; 2 = common; 3 = standard): 0.
Triple or quadruple *shad* (0 = absent; 1 = uncommon; 2 = common; 3 = standard): 0.

Grammatical use of *shad* (0 = fully grammatical to Classical Tibetan standards; 1 = non-grammatical use only at the beginning or end of line; 2 = few non-grammatical uses; 3 = several non-grammatical uses)? 0.

Tsheg before *shad* (0: never; 1: only before *nga*; 2: rare; 3 often; 4: always): 3.

Type of *tsheg* (standard, midline, double, or long): standard, few midline, no double apart from some pen slips or from pen's split nib.

Ratio of single or midline *tsheg* to double *tsheg* = 1 : 0 or 500 : 1.

Circles (double or quadruple): none.

Symbols for interlinear annotations or *signes de renvoi* (e.g., "+"): +.

Deletions: (e.g., vertical or horizontal strikethrough, lines over deleted letters): vertical strikethrough.

Deletions and insertions/ 10 lines: 0.3.

Deletions and insertions by another hand (0 = no; 1 = yes; 2 = unclear)? 0

Explanatory glosses and commentary (0 = no; 1 = in scribe's hand; 2 = in another hand)? 0

2.3 Grammar

gi(s), gyi(s), kyi(s) all present and normative? Mostly. Some *kyi* after *n* and *r*; 3 *gyi* after *b*.

Genitive used in formation of plural (e.g., *lha'i rnams*, *…mchis pa'i rnams;* 0 = never; 1 = uncommon; 2 = common.)? Only with nominalized verbs? 1; found twice for seven *rnams*; both nominalized verbs.

Forms of plural or collective particles (e.g., *rnams*, *dag, o tshal, o cog*): *rnams, -o chog.*

Forms of terminative particle (norms are *tu* after *g, b,* and "lost" *da drag; du* after *ng, d, n, m, r,* and *l; r* suffixed after vowel or *'a* or *ru* after vowel*; su* after *s*): *du* for *tu*.

Forms of semifinal particle (norms are *te* after *n, r, l, and s; ste* after *g, ng, b, m, 'a* or vowel; *de* after *d*): mostly normative, but several *s ste*; 4 : 3 preference for *s te* over *s ste*.

Forms of concessive particle (norms are *kyang* after *g, d, b, s; yang* after *ng n, m, r,* and *l* unless *n, d*, or *l* have "lost" *da drag*; and +*'ang* after *'*): normative.

Forms of coordination particle (norms are *cing* after *g, d, b,* and "lost" *da drag; zhing* after *ng n, m, 'a, r, l,* and final vowel; and *shing* after *s*): normative; 2 : 1 preference of *ching* : *cing*.

Forms of quotation particle (norms are *ces* after *g, d, b,* and "lost" *da drag; zhes* after *ng n, m, 'a, r, l,* s, and final vowel): 14 : 8 *ches* to *ces* ratio, used normatively; *s shes* for *s zhes.*

Pre-pausal *'a/v/ḥ* (e.g., as in *pa'/ pav/ paḥ*) (0 = absent; 1 = uncommon; 2 = common.)? 1.

Frequency of sentence final particle (*-o*)/ 10 lines: 5.6.

Verbal auxiliaries (e.g., V *pa 'dra*; V *zhing mchis*): *V pa 'dra* at l. 99; *V zhing mchis* x6; *V pa yin no* at ll. 212, 260.

Pronouns (*khyed* and *nged* as plural, or respectful? 0 = plural; 1 = *nged* as *pluralis majestatis*; 2 = respectful): 0.

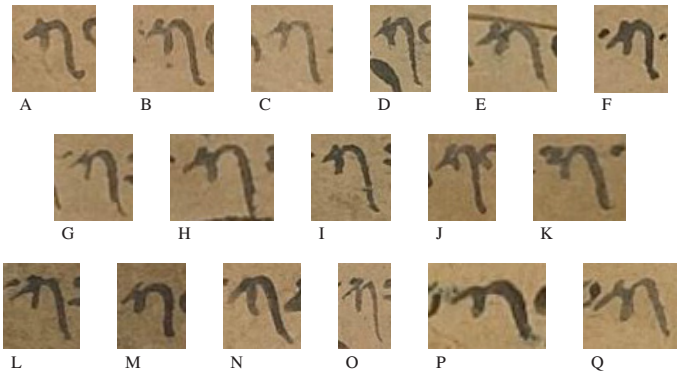
3. Paleography

Style (e.g., epigraphic, square, official headed, official headless, epistolary, sutra): not a perfect fit with any style, but is generally similar to both the headed and headless versions of the "official" style.

3.1 Index Letters

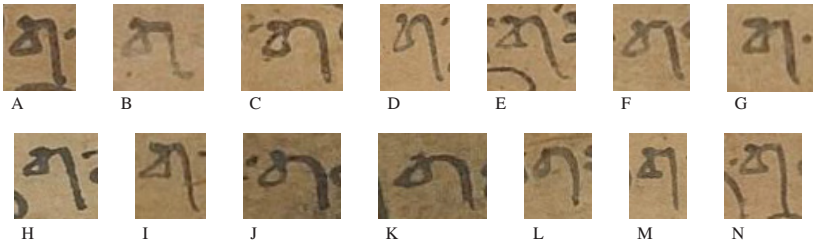
Index letters (give "type" according to template, or describe it if it does not correspond to those given; provide at least 3 photos of each):

ka: 3b, but with a variation in stroke 1: short stroke down and to left, then ticks back up to right for ligature with middle "tooth" (figs. 138a–q).



FIGS. 138A–Q: *ka*, PT 1287; copyright Bibliothèque nationale de France.

ga: 2a, 4a, rare 2b, 4b (figs. 139a–n).



FIGS. 139A–N: *ga*, PT 1287; copyright Bibliothèque nationale de France.

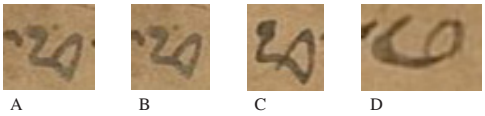
nga: 2a, 3a (figs. 140a–d).

FIGS. 140A–D: *nga*, PT 1287; copyright Bibliothèque nationale de France.

ca: 3, 2 (figs. 141a–d).

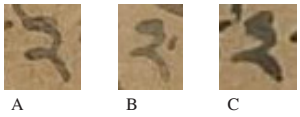
FIGS. 141A–D: *ca*, PT 1287; copyright Bibliothèque nationale de France.

pha: 2b (figs. 142a–d).



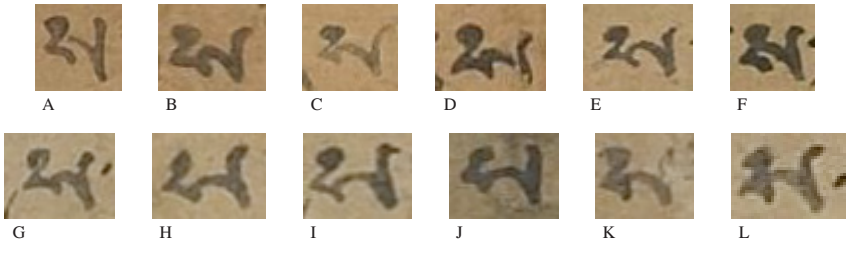
FIGS. 142A–D: *pha*, PT 1287; copyright Bibliothèque nationale de France.

ra: 2b, 3a (figs. 143a–c).



FIGS. 143A–C: *ra*, PT 1287; copyright Bibliothèque nationale de France.

sa: 3a, 2a (figs. 144a–l).



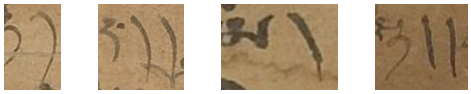
FIGS. 144A–L: *sa*, PT 1287; copyright Bibliothèque nationale de France.

3.2 Ductus

Idiosyncratic ductus: some headless *rl*; 1-stroke *ka*; *ra btags* often w/o ligature.

Hooked *'a* (0 for never; 1 for mixed; 2 for always)? 1.

Type of *shad* (e.g., straight *shad*, *kyog shad*, bowed *shad*, wavy *shad*): bowed, ticked head, calligraphic, some slightly wavy, some straight (to 5:30) (figs. 145a–d).

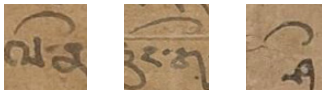


Figs. 145a–d: *shad*, PT 1287; copyright Bibliothèque nationale de France.

Position of vowels in relation to the root letter (e.g., insertion left, center, right): left, center; mostly left, especially *gi gu* and *na ro*.

gi gu's and *gi log*'s curl in degrees; ligature with root?: 160º–220º; 120º–200º; ligatures rare (figs. 146a–c and 147a–c).

Figs. 146a–c: *gi gu*, PT 1287; copyright Bibliothèque nationale de France.



Figs. 147a–c: *gi log*, PT 1287; copyright Bibliothèque nationale de France.

gi gu's and *gi log*'s angle in clock terms (measured by the tail): 3:00–3:30; 7:30–8:30.

Ratio between head and tail of *na ro*: 1 : 2 to 1 : 3; some with ligatures (figs. 148a–c).

FIGS. 148A–C: *na ro*, PT 1287; copyright Bibliothèque nationale de France.

'greng bu's angle in clock terms: 10:00–10:30, often looped; others rising 11:30 turning to 10:00; with ligature (figs. 149a–c).

FIGS. 149A–C: *'greng bu*, PT 1287; copyright Bibliothèque nationale de France.

Ligature with *zhabs kyu*? Size? Ligature present; some *zhabs kyu* small, round, under root, others extend beyond border of root (figs. 150a–c).

FIGS. 150A–C: *zhabs kyu*, PT 1287; copyright Bibliothèque nationale de France.

Length of tails/feet, degree of inclination (e.g., 5 or 7 o'clock): medium, *ga* ticked away to 5:30.

Descenders (e.g., wavy, ticked away, calligraphic): ticked away, straight.

Position of root under superscripts (e.g., left, center, right): center: *sb, st, rd*; right: *rj, rng, sny, rts, rm, sts, rg, lh, sg, sk, sp*.

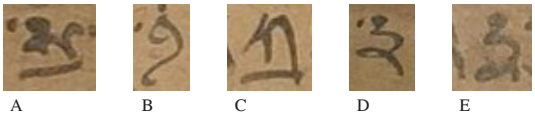
va btags size: varies; some small, some large; triangular (l. 58) (figs. 151a–c).

FIGS. 151A–C: *va btags*, PT 1287; copyright Bibliothèque nationale de France.

ya btags size, angle, manner of combination with *zhabs kyu*: most remain under the root, point 12:30–1:30, some come up just beside; *zhabs kyu* continuous from end of stroke (figs. 152a–d).

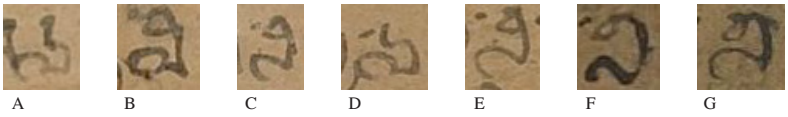
FIGS. 152A–D: *ya btags*, PT 1287; copyright Bibliothèque nationale de France.

ra btags size, angle, presence/absence of descender: small, usually without descender, between 7:00-8:30, ticked away right, sometimes looped; *dra* to 5:00 (figs. 153a–e).



FIGS. 153A–E: *ra btags*, PT 1287; copyright Bibliothèque nationale de France.

la btags size, position: mostly normative; some rotated slightly; a few abbreviated to resemble a *ra btags* (figs. 154a–g).



FIGS. 154A–G: *la btags*, PT 1287; copyright Bibliothèque nationale de France.

4. MISCELLANEA

Additional notes (e.g., lexicographical notes that might help in dating): Generally uses the *brtsan* form where *rtsan* would be expected in an early

(roughly pre-800) orthography, e.g. in the name Khri Srong brtsan. Uses later (i.e., from 10th century) form *btsan* for Slon btsan, the early orthography of which would be *Slon tsan, and the roughly post-800 form of which would be *Slon brtsan. Note also here the oddity of the variant form of this name, Slon mtshan, which may stand behind the otherwise anomalous orthography.

Proper names (and ranks, if given): Too many to list, but the name of 'U 'I dum brtan in PT 1286, a disjoined document that originally belonged to this scroll, means that the scroll cannot have been written before 841. Within PT 1287 itself, the last named minister, Dba' Rgyal to re Stag snang, dates to approximately the same time.

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INDEX

A

B

C

D

F

G

H

I

L

M

O

P

Q

R

S

T

U

V

W

Y

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