

Reconstructing the Fragmented Library of Mondsee Abbey

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The Benedictine monastery of Mondsee was an important local centre for book production in Upper Austria already shortly after its foundation in 748. A central factor for the growth of the library were the monastic reform movements, which prompted the production of new liturgical books and consequently the discarding of older ones. When a bookbinding workshop was installed in the 15th century many of these manuscripts, regarded as useless, were cut up and re-used in bindings for new manuscripts, incunabula or archival materials. The aim of our two-year project funded by the Austrian Academy of Science (Go Digital 2.0) is to bring these historical objects in one virtual collection, where their digital facsimile and scholarly descriptions will be freely accessible online to a wide group of scholars from the fields of philology, codicology, history of the book and bookbinding.

After a short glance at the history of Mondsee and the fate of the fragments in particular, this article gives an overview of the different procedures established in the project for the detecting and processing of the detached and in-situ fragments. Particular focus lays on the technical challenges encountered by the digitalisation, such as the work with small in-situ fragments partially hidden within the bookbinding. Discussed are also ways to address some disadvantages of digital facsimiles, namely the loss of information about the materiality of physical objects.

Key words:

Fragments, Manuscripts, Mondsee, Digitisation, Medieval library.

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INTRODUCTION

The history of the Abbey St. Michael in Mondsee has been the object of extensive studies [Wolfram 1989; Kaltenecker 1994; Heilingsetzer 2001]. In connection with the current research, it is useful to list succinctly several events, which influenced the literary activity and the book production in the monastery. The first known product of Mondsee scribes is the so-called Montpellier Psalter (Montpellier, Bibliothèque interuniversitaire, H 409) written probably for a family member of the founder of the monastery – the Duke of Bavaria Odilo from the house of the Agilofinger [Bischoff 1980]. As Mondsee changed its possessor in 787 and became an imperial abbey, it acquired not only land properties but also established a busy scriptorium. The textual witnesses from that period, almost exclusively fragments, are datable based on their palaeographical features to the end of the eighth century. A more direct regional connection with Bavarian monasteries was established in 831 as King Louis the Pious placed the abbey under the control of the Bishop of Regensburg. The so-called Bathurich-Pontificale (Cod. Ser. n. 2762, [F-zml0](#)) written by a Mondsee scribe is an example for the collaboration and exchange also encompassing the scriptorial activities between the two institutions. The Hungarian raids in the tenth century had a detrimental effect on the book production in Mondsee. The monastery entered a new period of prosperity in the second half of the eleventh and the twelfth centuries with the introduction of the Hirsau reform, which prompted the copying of new liturgical books. Fires and devastation marked the next two centuries, from which the abbey recovered only in the fifteenth century thanks to the reform movement initiated by the Abbey of Melk and the close connections with the university in Vienna. Due to the new monastic reform, the old books containing the Hirsau liturgical texts were no longer of use. Many of them were recycled as bookbinding waste when Abbot Benedikt II Eck (1463-1499) decided to refurbish the library and rebind almost all Mondsee codices.

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FROM MANUSCRIPTS TO FRAGMENTS

Although parchment books could last for centuries, quite often manuscripts and charters lost their value while remaining physically intact. Among the binding waste used in Mondsee, there is a significant number of charters, letters or notes for the day-to-day life. While such documents were often only relevant for a limited time before their content became obsolete, the parchment from which they were made remained a precious and robust material. One finds such leaves used as pastedowns (Fragm. 820, F-qwea), sometimes preserving even typical codicological features (Cod. 3586, F-ylan). Another reason for medieval librarians to discard manuscripts is probably also the development of the writing system, which made earlier scripts illegible for the subsequent generations of readers. In such cases, the importance of the text played hardly any role, for even diligently written and decorated books of the Bible landed at the binding workshop as is evident by a group of early Carolingian fragments from the Old Testament (Cod. Ser. n. 3753, Cod. 15347, Fragn. 6 and Fragn. 10, F-hyhn) or the Letters of Saint Paul (Cod. Ser. n. 2065). Another group are texts that were in constant use such as schoolbooks. A fragment from Donatus *Ars minor* (Cod. 3586, F-r8r7) written in clear Northern Textualis came to serve as a pastedown in a fifteenth-century Mondsee binding not because the script was incomprehensible, but plausibly because the pages got worn off, the text became damaged and needed to be replaced by a new (printed) copy. The lion share of fragments in the case of Mondsee, however, consists of liturgical texts from the eleventh to the fourteenth century, which even if in good physical shape were no longer conformant with the newly introduced Melk reform.

One way to reuse them was to try to scrape or wash off the older text and write a new one, thus producing a palimpsest. From the material that came down to us, it seems this was a rare practice in Mondsee. There is only one whole manuscript, a liturgical book dated to 1478 written by the monk Jacobus Keser (Cod. 1992). In most cases, however, the parchment leaves ended up as bookbinding waste in the hands of the bookbinder, who reused them in the form of pastedowns, flyleaves, covers, spine lining, and so on. Naturally, little survived from the initial manuscript, which was cut to pieces for the most part without any attention to the text or the illumination. Still, fragments are often our only evidence for the existence of these dismembered books, which makes them of great importance to historians of texts, script and library holdings.

MONDSEE FRAGMENTS TODAY

To find the fragments used as bookbinding waste one needs to trace the host volumes, that is, the Mondsee books and archival material. For the 1000 anniversary of the abbey in 1748, the abbot Bernardus Lidl published the so-called *Chronicon Lunaelacense* [Lidl 1749], the second part of which contains a catalogue of all the manuscripts from the ninth to the sixteenth century. According to it, the library possessed at the time 1013 manuscripts. After the dissolution of the abbey in 1791 almost all of them, namely over 760, were incorporated into the court library in Vienna, today the “Austrian National Library” (ÖNB). The incunabula and rare books from Mondsee remained in Upper Austria and many are kept today in the “Library of Upper Austria” (OÖLB). In the OÖLB repository, the Mondsee books were mixed with those previously belonging to other monastic and church institutions. It is, however, still possible to establish a Mondsee provenance for about 290 incunabula thanks to their characteristics such as spine labels, red and black shelfmarks and owners’ inscriptions. At least part of the archive of the monastery with over 500 boxes, 289 archival manuscripts and 323 charters survived in the “Archive of Upper Austria” (OÖLA).

The fates of fragments in the ÖNB is similar to that in other large libraries in Europe [Unterkircher 1988; Fingernagel 2010; Kaska and Simader (in print)]. It was only in the early nineteenth century that librarians and scholars showed interest in binding waste and an appreciation of their historical value. One of the first fragments to attract the attention of scholars were the so-called Mondsee Fragments, representing a collection of Christian texts written in Old High German in the early ninth century [Krotz 2002]. In 1833 Stephan Endlicher, a scribe at the court library later joined by August H. Hoffmann von Fallersleben, examined all Mondsee manuscripts in search of these old German fragments. They detached the fragments from the bindings and managed thus to reconstruct 27 leaves from the original manuscript, preserved today under shelfmark Cod. 3093*.

The practice of detaching early medieval and illuminated fragments from bookbindings continued, and for the most part, librarians placed them in booklets now kept predominantly in the collection *Codices Series nova*. Fragments, which librarians could not order or reconstruct, or considered less important remained in the fragment collection, where they are kept under shelfmarks Fragn. + numerus currens. Interested strictly in the textual content or illumination, scholars in the nineteenth century usually omitted to mark down the host volumes of the detached

fragments, so that vital information about the provenance of both binding and fragment got irreversibly lost. The same happened by the restoration of a manuscript when the binding was often renewed and many fragments detached. Only since the 1930s, there is sufficient documentation recording the host volume and the position of the fragments within the binding. For the Mondsee project concretely, this means that there are further undocumented Mondsee fragments within the collection, the provenance of which remain untraceable.

Significantly fewer binding waste was removed from the incunabula at the OÖLB. Among the circa 15 detached fragments there are pieces from an early Carolingian homiliary, calendar sheets, letters and pieces of liturgical music. Similarly, in the OÖLA among the so-called Buchdeckelfunde one finds listed around 20 pre-sixteenth-century fragments detached from Mondsee archival manuscripts. Unclear until now was the number of in-situ fragments in both collections, as studies on medieval bookbinding practice show that binders used old manuscripts as waste for both incunabula and as wrappers for archival material [Pickwoad 2000].

Mondsee fragments have already been the object of scholarly research: Kurt Holter [1950] and Bernhard Bischoff [1980] discussed many of the earliest witnesses from palaeographical point of view; Carl Pfaff [1967] studied the Mondsee scriptorium in the High Middle Ages, while Robert Klugseder [2012] collected and analysed all music texts produced in the monastery. The majority of the fragments, however, remain unknown to the general researcher community. The main reason for that is that such historical objects are notoriously difficult and time-consuming to describe, lacking virtually all of the aids of identification that manuscript researchers otherwise use, such as title page or rubrication stating the title and author or incipit [Unterkircher 1988]. The digital turn in the humanities has significantly facilitated the identification of texts using internet search engines and full-text specialised databases such as the Library of Latin Texts, Patrologia Latina Database, Repertorium biblicum, Acta Sanctorum Database and Cantus Index, to name just a few. The possibility to publish description and digital images online is another reason for the rise of fragmentology [Duba and Flüeler 2018].

PROJECT

The primary goal of the project funded by the Austrian Academy of Science (Go Digital 2.0) was to digitise the Mondsee fragments and to make them available as open access documents via the Fragmentarium web application¹. Each document is supplied with a detailed scholarly description of its content, codicological features, and known provenance. Users of Fragmentarium can easily search and filter the metadata or apply specialised facets to refine their queries. In that way, specialised scholars and the general audience can get to know these historical objects, some of which due to their fragile state are often not to be consulted in situ.

A close examination of the material by the project team was necessary in order to reconstruct fragmented manuscripts and to bring together fragments and their host volumes. A further aim was to explore the phenomena of discarding and recycling manuscripts for bookbinding in Mondsee.

The two-year project was hosted in the ÖNB with advisor Andreas Fingernagel and project manager Katharina Kaska. The team included two researchers (Ivana Dobcheva and Larissa Rasinger) and one photographer (Veronika Wöber). The initial step was to inspect all host volumes coming from the Mondsee library in order to see if there are in situ fragments in their bindings. This turned out to be the case in 358 of the 760 manuscripts in the ÖNB and in 118 of the 293 incunabula in the OÖLB. The number of singular fragments is, however, significantly higher, since very often fragments from several original manuscripts were used as binding waste in one binding. Hence, one should count with about 1050 singular fragments – here including the detached ones now stored in the collections *Codices series nova* and *Fragmenta*. While some are too small, illegible or hidden within the bindings to be properly investigated, the researchers managed to provide a full or partial description of around 700 fragments.

DIGITALISATION

The project also had the particular aim to develop guidelines for digitising fragments. The researchers and photographer worked in close collaboration, assuring best possible practice when it comes to objects that are difficult to access or document visually. All larger formats or fragments, which had to be digitised in a higher resolution (600 PPI), were scanned with the in-house scanner in the ÖNB, the Zeutschel OS 1400. The advantage of this A1-format linescanner is the low light pollution on the object - while the scanning process is done, only a small

¹ <http://fragmentarium.ms>

beam of light moves over the page. Images were saved in TIF-format. For colour, density and scale reference it is important to include a colour chart with every object – in this case the standardised Kodak Colour Control Patch. The photographer digitised each page and section of the binding on its own, whereby she paid attention to choose the right angle, so the page does not get contorted. In this way, it is easier to put several pictures from the same element together and visualise it digitally.

Thanks to the cooperation with the “Institute of Austrian Historical Research” (IÖG), the team had at their disposal a second mobile scanning machine – the Traveller’s Conservation Copy Stand – TCCS 4232. It is equipped with a portable camera stand with a Canon Camera and two lines of LED lights on each side. Depending on the dimension of the object and the resulting distance between the page and the lens of the camera, it has about 400 to 500 PPI resolution. To avoid stray light, the digitalisation was conducted in a dark room. For the Mondsee project, it was advantageous to have such a compact scanner, which could be positioned in the immediate vicinity of the manuscript storage, thus minimising the time (and personnel) needed to move the objects a relatively long way across the library to the digitisation centre.

Challenges by the digitalisation of fragments

Pastedowns and flyleaves are probably the least problematic fragments to digitise. A binding technique, not exceptional to Mondsee, was to hook the endleaves around and sewn with the outermost gathering – in this way strengthening the connection between the book block and the boards. Even if the hooks are blank (pertaining, for instance, to the margin of the original leaf), they were nevertheless digitised so that no information is lost about the codicological features of the original manuscript (such as original size of the leaf or existing pricking in the margin) or particular binding practice in Mondsee. One way to facilitate the online users is to include all codicological details in the description and explain the way the fragment is or was inserted in the binding. In the Fragmentarium app users can look at the digital facsimile and at the same time read the description in a toggle sidebar, as by Cod. 1118 (F-6l^{he}).

Significantly smaller and trickier to digitise is the type of binding waste called by Nicholas Pickwoad [2000] comb guard. He refers to it as a feature present exclusively in south German bindings. If the pastedowns are intact, such fragments are visible only as small slips cut at the height of the supports hooked around the outermost gathering. This technique seems to be well known in Mondsee, where one encounters it especially in bindings from the late fifteenth and sixteenth century. Although the visible parts are too small for adequately determining the content, it is often possible to define which group of fragments they belong to by comparing the script, the height of a single line, the illumination and musical notation. In this way, the team could successfully identify the fragment in Cod. 4073 (F-kiwq) as another piece from a thirteenth-century breviary which came down to us today only as binding waste.

Sewing guards (also referred to as centre strips) are one of the most challenging fragments to describe. These narrow strips of parchment, sometimes only a centimetre wide, were used to strengthen the fold in paper quires. Over 190 Mondsee manuscripts include such strips, which were often cut from not one but several manuscripts. In the past, the usual practice was to detach such fragments by making tiny cuts on the level of the sewing stations to release the guard from the sewing thread (see for instance *Fragm. 4a*, F-rea⁰). Nowadays librarians, restorer and scholars do not relent to separate the two historical objects (host volume and fragment), which share at least partly a common history. Fortunately, there are methods to digitise a large percentage of the guards with the help of a glass prism, specially devised by Manfred Mayer, an engineer and conservator at the University Library Graz in Austria.

The photographer positions the prism at the opening of the sewing support so that the camera takes one picture of the inner part. For photographing the outer side of the fragment, the prism needs to be repositioned between the quire fold and recto of the sewing support and its verso respectively.



Fig. 1. Prism at the opening of a sewing guard (© CC-BY-NC)

Rigid or fragile bindings that cannot be opened up to 90 degrees pose a particular challenge for the photographer, who has to proceed with extra care. Most important in these cases is to avoid any damage to the medieval bindings, even at the cost of some information being lost. If the prism does not get to the bottom of the fold, a part of the image in the middle of each sewing guard remains unphotographed, as shown below: the letter “e” is visible in the in situ observation, but is unfortunately cut off in the scanned image (Fig 2a and b).



Fig. 2. Sewing support in Cod. 3820 a) by in-situ observation; b) image through the prism with missing middle section; c) reconstructed page (© CC-BY-NC)

The processing (including taking the images, renaming, rotating and mirroring them, joining the two outer images to form one) is extremely time-consuming. Despite all of this, when one matches all the scans of the small parchment strips together like a puzzle, one gets a fascinating glimpse on how the original page would have looked like (Fig. 2c).

Due to time limitation, it was impossible to digitise all sewing guards within the duration of the project. The priority lied on fragments written in Carolingian minuscule, while for the rest a compromised solution was reached – to take at least one image per group of strips, belonging to one original manuscript. In this way, scholars interested in the fragments can have at least one visual example and perhaps order further images or consult the fragments in-situ. The fully digitised sets were used as case studies for fragmentation practices. It was, for instance, interesting to probe if bookbinders prepared the binding waste in advance or cut the discarded manuscript leaves ‘ad hoc’. The above-cited example of Cod. 3820 (F-f72y) demonstrates that the binder used two leaves from a breviary as pastedowns hooked around and sewn with the outermost gatherings and another two cut in vertical strips for the sewing stations.

Further challenges for the digitisation are limp binding. Making a cover from old parchment leaves was a cheap alternative to leather binding. Cod. 4070 (E-cfrj), for instance, is a laced-in limp parchment binding, for which the binder folded the discarded leaf vertically in the middle to get a more stable cover before wrapping it around the book block. The slips of the sewing supports, on which the gatherings are sewn, exit through the covering leaf at the spine edge and re-enter underneath the covering, where they are left loose. One part of the fragment (that is, one side of the text) is visible by in-situ examination only through a narrow slip in the covering, which makes photographing it a delicate matter (Fig. 3).



Fig. 3. A glimpse at the inner side of the limp binding of Cod. 4070 (© CC-BY-NC)

Since the parchment warps through the years of storage and often becomes brittle, it is necessary to make several scans in order to reproduce individual parts without distortion. The pictures are again assembled to build a virtual reconstruction of the original page. For Cod. 4070, a manuscript with a comparatively small size (145 x 115 mm) it was necessary to make about twenty pictures in order to assemble one side of the parchment (see Fig. 4). Since the inside of the folded parchment is in its entirety inaccessible in the current state of the binding, a full virtual reconstruction of the page could not be achieved.

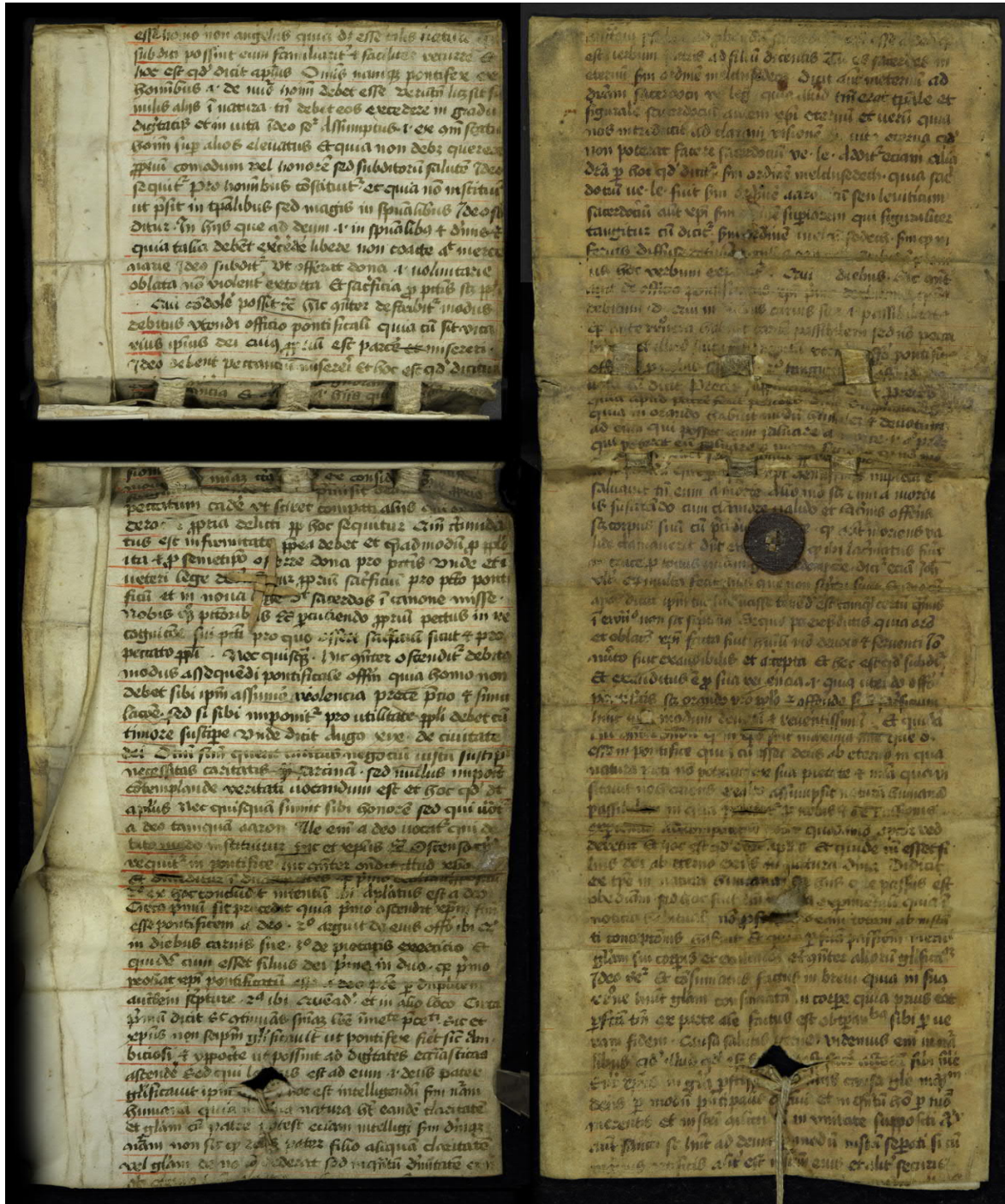


Fig. 4. Virtual reconstruction of one side of the original leaf used for the limp binding of Cod. 4070 (© CC-BY-NC)

Another issue the team dealt with concerned the digital reconstruction of fragments in the digital platform. Our aim was to facilitate scholars who needed to know the gaps between fragment sections in order to extrapolate missing text. For that purpose, it was sometimes necessary to combine separated fragments into one reconstructed page. In Cod. 3585 (F-xa56) the binders used four vertical strips from one leaf and placed it as transverse spine linings. In order to enable users online to have an experience as real as possible of examining the object and get a precise idea of how much text is hidden, the photographer connected the images of the left and right board, where the fragments are pasted, placing the image of the fore edge in the middle. Another virtual reconstruction shows two of the fragments reconstructed to one long strip with two sections hidden by the book block. In the Fragmentarium app, the fragment is presented with the help of multiple IIIf sequences for displaying the real physical state of the fragments, and another for the virtual reconstruction.

In cases where the binding waste had one written and one blank side (as is usually the case with charters) the binders preferred having the blank side visible in the binding. Both pastedowns in Cod. 3740 (F-4qif) are glued in this way, with the written side of the charters pasted to the boards. The text is hardly visible by the naked eye through the paper, however, under ultraviolet light the ink becomes much more evident. The images made were then horizontally flipped to get a mirrored projection (Fig. 5).

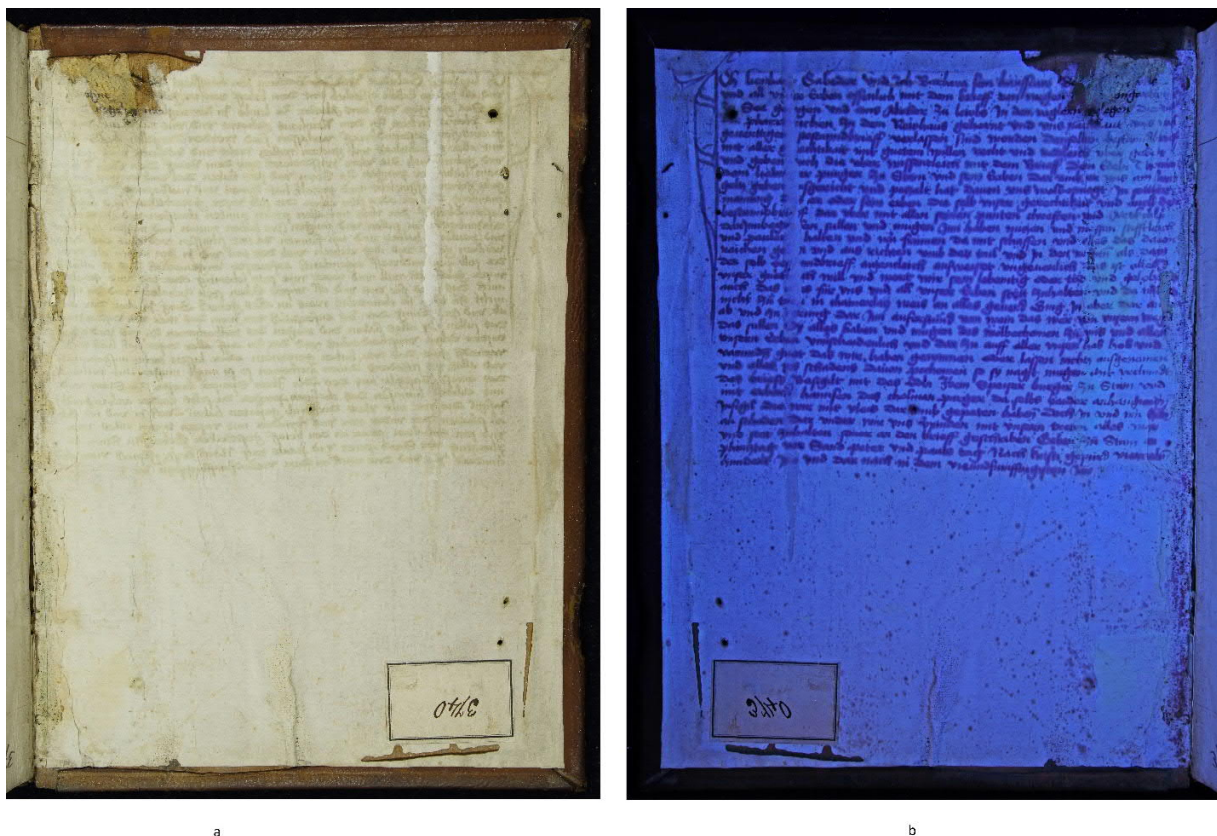


Fig. 5. Charter used as pastedown in Cod. 3740 a) image with normal light and b) image under UV light, horizontally flipped (© CC-BY-NC)

A fundamental principle guiding the project was that the material would be of interest to a wide range of scholars. The study of bookbinding, in particular, is closely related to that of fragmentology. On the one hand, binding historians examine detached and in situ fragments in restored bindings for glue residue, stains, rust and other pieces of evidence from the binding techniques used in the original binding [Sheppard 2000]. On the other hand, the study of a binding can provide many historical clues about the binder workshop, the provenance and possession of the host volume and the in-situ fragment. Thus, to accommodate the need of binding historians and facilitate the examination of the objects online, it was imperative to provide the digitalisation of the whole binding - left and right cover,

pastedowns, spine, head, tail, and fore edge. Additionally, the textual descriptions offer further information about elements of the bookbinding that could not be digitised sufficiently (endbands) or are hardly recognisable on a two-dimensional image (stamps). When it comes to detached fragments, the Fragmentarium app offers the possibility to publish photos of the host volume and the offset from the fragment as additional images, as for instance by *Fragm.* 813 (*F-ts3a*). Thanks to such virtual reconnection, scholars can easily enrich the history of both historical objects.

CONCLUSIONS

The importance of the fragments lays not only in their nature as evidence of a prior manuscript. They are also an essential source for the transmission of text, musicology, diplomatics, and art history. In the case of the Mondsee, the study of the fragments can help trace the growth of the medieval library and examine the development of scribal and literary activities as well as the binding workshops practice. Furthermore, the practices developed in the framework of the project as discussed above could serve as an example of how to digitise, describe and publish large fragment holding in other libraries as well.

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