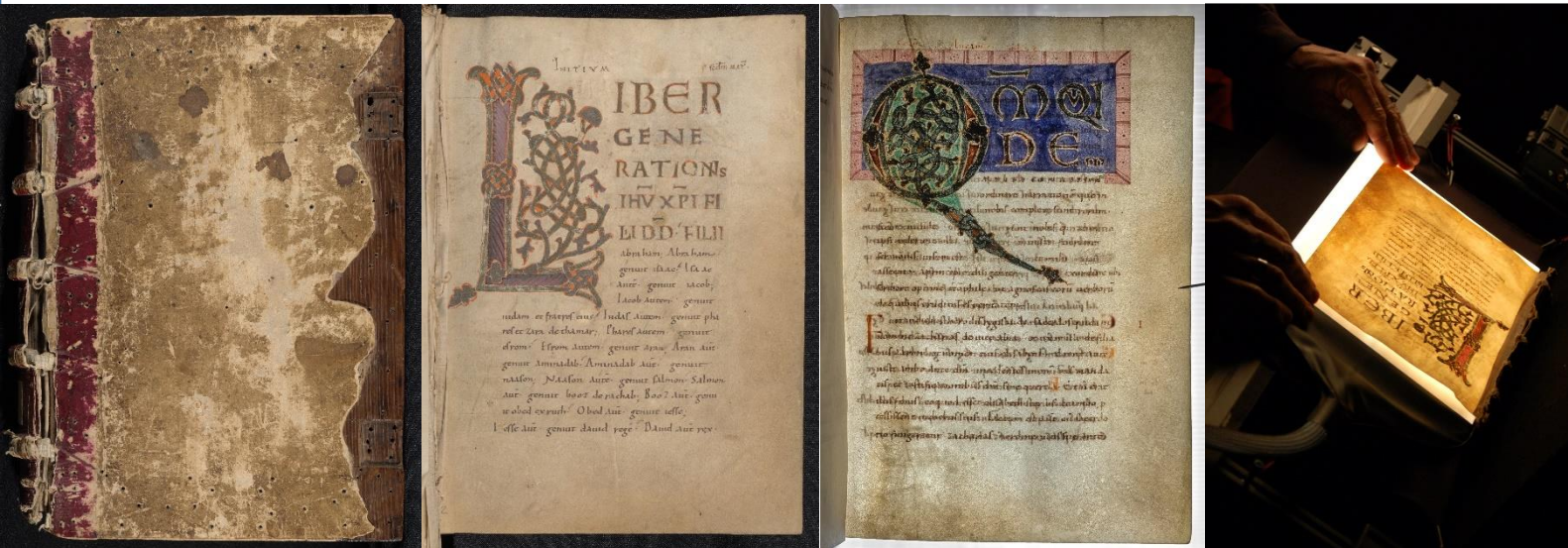


Digitisation of Manuscripts



Checklist

**Ilse Korthagen
Femke Prinsen
Lieve Watteeuw
Bruno Vandermeulen**

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Abstract

Medieval manuscripts represent a unique part of our cultural heritage. It comes as no surprise then that libraries are keen to make these manuscripts, including the masterpieces among them, digitally available. Often in this process, however, too little attention is devoted to the material properties of the objects and the risks to which they are exposed while the manuscripts are being digitised. The role of the conservator-restorer in this process is not always obvious, though they have command of a relevant body of knowledge.

In manuscripts, value can be attributed to both the content and the manuscript as a material object. The value of the content is largely transferable to the digital copy, but that of the material object is much less or not at all transferable. It is the responsibility of the conservator-restorer to ensure that the value of the physical object is recognised and neither diminished nor altered during the digitisation process. With the "Checklist for the digitisation of manuscripts" an aid is introduced that aims to reduce the risk of damage during handling in the process of digitisation and thus preserve the value of the object as much as possible.

Extended abstract

CHECKLIST FOR THE DIGITISATION OF MANUSCRIPTS Ilse Korthagen¹, Femke Prinsen², Lieve Watteuw³, Bruno Vandermeulen⁴

1 and 3 Book Heritage Lab – KU Leuven; Illuminare, Centre for the Study of Medieval Art
2 University of Amsterdam
4 Imaging Lab – KU Leuven Libraries

Corresponding author: ilsekorthagen@hotmail.com

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Medieval manuscripts are a unique part of our cultural heritage – many of them are priceless treasures. Unsurprisingly, many libraries want to digitise these objects to make them available online. Unfortunately, attention is not always specifically given to the physical aspects of these valuable objects during the digitisation process, nor has a consensus been reached concerning the proper role of the conservator-restorer. They are often not consulted, even though they obviously have a rare and very relevant combination of skills and expertise that should be deployed in this context.

Every manuscript is unique in its materiality and content and rigid guidelines may hinder the development of creative solutions to problems that emerge while digitising. Nevertheless, manuscripts are potentially at risk during the process. The main objective of this paper is to come up with a method to reduce those risks and to safeguard manuscripts' intrinsic material values. In this article, guidelines in the form of a *Checklist for the digitisation of manuscripts* are presented, as well as the rationale for its development.

Our methodology was as follows: first, a survey of the literature was conducted to determine the present state of manuscript digitisation in Belgium (Flanders) and the Netherlands (this was first done in 2016 and the information was updated in 2019). Second, a study was carried out of the values that can be attributed to medieval manuscripts. This was supplemented with information obtained first hand from staff members involved in the digitisation of manuscripts in Dutch and Belgian heritage libraries. Based on this data, a draft version of the *Checklist for the digitisation of manuscripts* was developed. This checklist was then tested and revised.

It became clear during our research that value can be attributed to both the materiality and the content of a manuscript. The value of the content can be transferred, at least in part, to the digital copy. Most values attributed to the material object cannot. The value of the book as an archaeological object with intrinsic historical traces cannot be duplicated; consulting a two-dimensional image on a screen can never be a substitute for the experience of reading an authentic medieval book.^{1,2} The value of the digital copy can, however, be greatly enhanced by the use of high-end imaging techniques and digital tools.³ The digital copy and the original thus complement each other and are both valuable in their own way.

With the *Checklist for the digitisation of manuscripts* an instrument has been developed from a conservator-restorer's perspective. It limits risks to the original manuscripts and enables the creation of a digital copy, while avoiding loss of value to the original object.

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- 1 Foot, Mirjam. 'Preserving books and their history.' *Bookbinder*, 1 (1987): 5–8; *Studies in the history of bookbinding* (1993): 433-434.
- 2 Meek, Elizabeth, 'Digitisation: the supremacy of the original.' LIANZA Conference, 14 September 2005, Christchurch, NZ (2005). http://www.lianza.org.nz/sites/default/files/lianza_conf_2005_meek.pdf. Consulted: 03-02-2019.
- 3 Gabriels, Nele and Bruno Vandermeulen. 'Over bits en bytes. De werkelijke toegevoegde waarde van digitalisering.' *Faro – Tijdschrift over cultureel erfgoed*, 9.1 (2016): 21 -26. https://issuu.com/faronet/docs/maart16_issuu. Consulted: 03-02-2019.

Preface

This publication was made possible by a research project funded by Metamorfoze, coordinated by Ilse Korthagen. She carried out this research to complete the requirements of the postgraduate track of the Conservation and Restoration of Cultural Heritage programme (book and paper) at the University of Amsterdam. As part of this project, she participated in a research internship at the KU Leuven from January until March 2016. As a follow-up, she worked on the conservation and digitisation of medieval manuscripts of the Maurits Sabbe Library as a junior staff member of the Book Heritage Lab from September 2018 until July 2019. The project team consisted of: Ilse Korthagen (Book Heritage Lab – KU Leuven), Prof. Dr. Lieve Watteeuw (supervisor at the KU Leuven, Head of Book Heritage Lab – KU Leuven), Femke Prinsen and Elizabet Nijhoff Asser (supervisors at the University of Amsterdam), Constant Lem (advisor at the National Library of the Netherlands, The Hague) and Bruno Vandermeulen (Head of the Imaging Lab – KU Leuven Libraries).

Introduction

The *Checklist for the digitisation of manuscripts* is a tool developed in the recent years to support safe digitisation of manuscripts in heritage collections. The instrument aims to give guidance to conservator-restorers, curators, librarians, collection-care and digitisation professionals.

Medieval manuscripts are a unique part of our documentary heritage. It is no surprise, then, that libraries are eager to digitise them so that they can be made available online to the largest possible group of readers and scholars. Some libraries have developed plans to digitise their entire manuscript collections (and some already have or are involved in carrying the plans out).¹ These are exceptions in Belgium (Flanders) and the Netherlands, however, because the collections are often large and in 2018/2019, the available funds and infrastructure were limited.

Medieval manuscripts in heritage collections are now treated with great care and respect. When they are exhibited or lent to other institutions, their treatment is governed by strict guidelines. Curators or librarians, sometimes in consultation with conservator-restorers, determine whether the manuscript, in its present condition, ought to be lent or exhibited. Before and after the exhibition or transportation, condition reports are generally produced. Data loggers monitor the climatic conditions in the spaces in which the priceless books are exhibited to the public, in sealed display cabinets on pillows or book supports especially crafted for the manuscripts.

If, however, these manuscripts are digitised, they generally go straight to the photographic studio, often without any involvement of the conservator-restorer. In such cases, hardly any consideration is given to the material properties and fragility of the objects and the possible risks that they are exposed to during their handling. All this, even though risks to the manuscript during the process of digitisation are clearly present. It has been established that there is an increased risk of damage and loss of fragments of the binding (*examples of damage: Figs. 1 to 4*).



Fig. 1. Clasp prior to digitisation.



Fig. 2. Detached clasp after digitisation.

¹ For a general overview of digitized manuscripts (Europe), see the CERL Portal. *Handschriften en vroege drukken*. <http://cerl.epc.uu.se/sportal/>. Consulted: 03-02-2019. As well as Sexy Codicology Team. *DMMapp: Digitized Medieval Manuscripts app*. <http://digitizedmedievalmanuscripts.org>. Consulted: 03-02-2019. A week long manuscript digitisation workshop 'From medieval to modern' organised in 2018 by the Queen Mary University of London in collaboration with Cambridge University Library, shows that manuscript digitisation is a 'hot topic'. QMUL. *From medieval to modern – Manuscript digitisation workshop takes place*. 2018. <https://www.qmul.ac.uk/media/news/2018/hss/from-medieval-to-modern-manuscript-digitisation-workshop-takes-place.html>. Consulted: 03-02-2019.



Figs. 3 and 4. Leather covering material on raised band, before and after digitisation.

Specific guidelines for the image quality of digital reproductions have been in existence since 2012.² Many institutions in the Netherlands and Belgium (Flanders) recognise the value of high-quality images and take great pains to work in accordance with the Metamorfoze guidelines. They choose, then, to strive to meet the accepted standards of (technical) image quality, which may require a greater investment of time during photographic sessions. In cases involving the digitisation of unique originals, however, there are no generally applicable guidelines. At the present time, every library defines its own workflow, methods and *ad-hoc* solutions, depending on the expertise of the staff who happen to be present and on the available infrastructure.

It is important that the responsible librarians or collection experts and project managers can guarantee that unique manuscripts receive appropriate attention during the digitisation process. It is essential in this regard that a conservator-restorer be closely involved in the digitisation process. The parties involved, particularly the digitiser, must be aware of the material properties of the manuscripts and their significance.³

Particular attention is required if risks for these objects during the digitisation process are to be avoided and damage or loss of value prevented. This may result in slowing the pace of digitisation or even that less digitising is carried out. Although the returns may diminish, the manuscripts will benefit, and the quality of the digital record may even occasionally show significant improvement.

Since every manuscript is unique in form as well as content, strict guidelines will hinder creative solutions and stifle thought. It remains true, though, that manuscripts are always exposed to risks during the digitisation process. The most important question for digitisation projects is then: how do we manage the risks that bound medieval manuscripts are exposed to during the digitisation process? To be able to provide a meaningful answer, it is necessary to consider the following questions:

1. What is the *status questionis* with respect to the digitisation of bound medieval manuscripts in the Netherlands and Belgium (Flanders)?
2. What makes a bound medieval manuscript valuable to us?
 - a. What makes the content of a manuscript valuable?
 - b. What make the material properties valuable?
 - c. Can the aspects that make a manuscript valuable be in part transferred to a digital copy?
3. What role does the conservator-restorer have in the digitisation process?
4. To what risks is the manuscript exposed during digitisation?
 - a. How can these risks be managed?

The objective is to develop an instrument, from the perspective of the conservator-restorer, that will enable to manage the risks manuscripts are exposed to during digitisation. That instrument is the *Checklist for the digitisation of manuscripts*.

² Van Dormolen 2012.

³ In this essay, the term "digitiser" designates the photographer, the digitising technician, the scanning operator or the imaging expert. In the Netherlands and Belgium (Flanders), there is no standard term for this professional activity in the trajectory of steps in the digitising process.

Status questionis

Until now, sporadic attention has been paid in literature to the preparation of rare books in heritage collections for digitisation; a specific focus on medieval manuscripts, however, is extremely rare.

Anna Bülow and Jess Ahmon (National Archives, London) offered a broad approach to the digitisation protocol with a handbook (2011) on the integration of the conservation of collections in a digitisation project.⁴ In 2013 Christina Duffy (British Library, London) wrote a blog 'Fail to prepare for digitisation, prepare to fail at digitising!' about preparing library materials (not specifically manuscripts) for digitisation.⁵ In the following year (2014), guidelines were published by the Rare Book and Manuscript section of the International Federation of Library Associations and Institutions (IFLA) regarding planning the digitisation of special collections and manuscripts.⁶ Subsequently, a protocol for handling modern books in the digitisation process (2015) was provided by the National Library of the Netherlands (KB), The Hague and in the *Metamorfoze* guidelines.⁷ Edith Kapeller and Julia Schön published an advice on the digitisation process following the practical experience of the monastic library of Klosterneuburg in 2017.⁸

The role of the conservator-restorer in this process has been discussed by, among others, Femke Coevert (Dutch independent conservator-restorer, 2011), Janien Kemp (Amsterdam City Archives, 2013), Constant Lem (National Library of the Netherlands, The Hague, 2014) and Flavio Marzo *et al.* (British Library, London, 2016).⁹

Roslyn Russel and Kylie Winkworth (2011) composed a manual on establishing the value of objects of cultural heritage that many heritage institutions have made use of, including the National Library of the Netherlands in The Hague.¹⁰ Ilse Korthagen (2012) focussed on the valuation of archival materials prior to digitisation.¹¹

Librarians and scholars, too, have contributed more concrete perspectives. Long before digitisation technology was widely used, various authors – such as Janos Szirmai (1988), Mirjam Foot (1993) and Nicholas Pickwoad (1997) – concentrated on the value of the book as an archaeological object and appealed for attention to all of its historical aspects.¹² In 2013, a collection of essays appeared under the editorship of Jonathan Wilcox on the materiality of medieval manuscripts.¹³ Book historian Nicholas Pickwoad (2011) argued furthermore that the mass-digitisation of books has had the effect of making the materiality of the modern book in codex form less and less relevant. He proposed that historical books – including medieval manuscripts – are increasingly regarded as museum objects.¹⁴ In their essays, Anthony Stockwell Garfield Edwards (2013) and Elizabeth Meek (2016) argue in favour of the greater value of the original as against the digital copy.¹⁵ Van Bergen (2015) discusses the historical development of the medieval illuminated manuscript in the age of digital reproduction in general.¹⁶ Johanna Green focused on the use of social media as a means of engagement with the materiality of medieval manuscripts (2018).¹⁷

⁴ Bülow and Ahmon 2011.

⁵ Duffy. *Fail to prepare for digitisation, prepare to fail at digitising!* 2013. <https://blogs.bl.uk/collectioncare/2013/11/fail-to-prepare-for-digitisation-prepare-to-fail-at-digitising.html>. Consulted: 03-02-2019.

⁶ IFLA, Rare Book and Manuscript section. 'Guidelines for planning the digitization of rare book and manuscript collection.' The Hague (2014). <http://www.ifla.org/files/assets/rare-books-and-manuscripts/rbms-guidelines/guidelines-for-planning-digitization.pdf>. Consulted: 03-02-2019.

⁷ National Library of the Netherlands. *Zorg voor bibliotheekmaterialen tijdens digitalisering*. <https://www.kb.nl/organisatie/onderzoek-expertise/conservering/zorg-voor-bibliotheekmaterialen-tijdens-digitalisering>. Consulted: 03-02-2019.

⁸ Kapeller and Schön 2017.

⁹ Coevert 2011; Kemp 2013; Lem 2014; Marzo 2016.

¹⁰ Russel and Winkworth 2001; National Library of the Netherlands. 'Collectiebehoudsplan 2010-2013. Fysiek en digitaal integraal.' The Hague (2011).

¹¹ Korthagen 2012.

¹² Szirmai 1988; Foot 1993; Pickwoad 1997.

¹³ Wilcox 2013; Borland 2013; Frost 2013; Wilcox 2013.

¹⁴ Pickwoad 2011.

¹⁵ Meek 2016; Edwards 2013.

¹⁶ Van Bergen 2015.

¹⁷ Green. *Hands-On Engagement with Medieval Manuscript Materiality*. 2018. <http://www.archivejournal.net/essays/digital-manuscripts-as-sites-of-touch-using-social-media-for-hands-on-engagement-with-medieval-manuscript-materiality/>. Consulted: 03-02-2019.

Furthermore, there is an ongoing trend to focus on very specific material characteristics in manuscript research, for example: dirt in books by Kathryn Rudy (2010) and extracting DNA from parchment by Matthew Collins (2017).¹⁸

Computerised imaging brings new information to the digitisation process. At universities, for example, the interest from Digital Humanities (in collaboration with computer science and information science) for medieval text-mining has been growing considerably for some decades now. These developments can be found in the research carried out by book historians and art technologists (Watteeuw and Van Bos 2014 and Watteeuw, Vandermeulen and Proesmans 2015).¹⁹ The essays by Nele Gabriëls and Bruno Vandermeulen (2016) and Watteeuw *et al.* (2016) also argue in favour of the added value of scientific imaging of manuscripts for scholarly use, imaging for text analyses, art technical research and condition assessment.²⁰ Moreover, imaging techniques such as spectral imaging are often being used to support conservation treatments, as Fenella France (2016) and Michael Toth illustrate (2018).²¹

How have attitudes concerning the preservation of the physical integrity of the manuscript evolved during the past fifteen years? When digitisation technology first emerged, little attention was paid to the possible damage that might occur while scanning or photographing books. To the producers of the relevant hardware, making the content of the heritage collections available online was worth taking some risks (Finley 2012).²² The requirements defined, however, by those responsible for the collections – the conservator-restorers, librarians and curators – led to the development of increasingly book-friendly solutions, such as the development of wedge-shaped scanners by the end of the first decade of the twenty-first century (Rieger 2008:11).²³ Furthermore, Flavio Marzo described the creation of a custom-made book cradle (2012), which, as a result, would minimize the risks for books during the digitisation process.²⁴ The tension between preservation and availability began to resolve slowly.

Methodology

This research represents a contribution to existing literature on the state of knowledge concerning digitisation and it aims to consolidate the knowledge scattered throughout various libraries. The review of the literature was initially devoted to mapping out the state of affairs in the domain of digitisation of manuscripts in the Netherlands and Belgium (Flanders).²⁵ Literature was also used to determine what values might be associated with manuscripts. Interviews and correspondence with specialists in the field have served to provide answers to questions that remained after the review of the literature.²⁶ To this end, ten libraries in the Netherlands and Belgium (all of which were in Flanders, except for the Royal Library of Belgium in Brussels) and the platform organisation Flanders Heritage Library were visited. The interviews were held with a curator, a photographer, a director, a senior librarian, conservator-restorers, collection experts, digitisation project managers and a conservation assistant. In this way information was assembled from a variety of perspectives.

¹⁸ Rudy 2010; Gibbons. *Goats, bookworms, a monk's kiss: biologists reveal the hidden history of ancient gospels*. 2017. <https://www.sciencemag.org/news/2017/07/goats-bookworms-monk-s-kiss-biologists-reveal-hidden-history-ancient-gospels>. Consulted: 03-02-2019.

¹⁹ Watteeuw and Van Bos 2014; Watteeuw, Vandermeulen and Proesmans 2015.

²⁰ Gabriëls and Vandermeulen 2016; Watteeuw, *et al.* 2016.

²¹ France 2016; Toth 2018.

²² Finley. *Google turns vacuum cleaner into book scanner*, 2012. <http://www.wired.com/2012/11/google-book-scanner/>. Consulted: 03-02-2019.

²³ Rieger 2008.

²⁴ The Book and Paper Gathering, Marzo. *The creation of a custom-made cradle to minimise risk during the digitisation process*. 2012. <https://thebookandpapergathering.org/2012/08/01/the-creation-of-a-custom-made-cradle-to-minimise-risk-during-the-digitisation-process-f-marzo/>. Consulted: 03-02-2019.

²⁵ Due to the limited research time for this project (three months), it was decided to focus on Flanders and the Netherlands, but digitising manuscripts is a global trend: Sexy Codicology Team. *DMMapp: Digitized Medieval Manuscripts app*. <http://digitizedmedievalmanuscripts.org>. Consulted: 03-02-2019.

²⁶ For information on those who were interviewed, see the "interviews" section of the bibliography.

This was followed by an analysis of the collected information and the development of the instrument *Checklist for the digitisation of manuscripts*. This checklist was subsequently tested in practice on both an object (digitising the eleventh-century Gospels, Rhineland area, Xanten²⁷) and a collection (filling in the checklist for twelve medieval illuminated manuscripts in the collection of the Maurits Sabbe Library, Faculty of Theology and Religious Studies, KU Leuven Libraries).²⁸

²⁷ Gospels, Rhineland, 11th century; *MS 1 B1*, Maurits Sabbe Library, KU Leuven Libraries.

²⁸ For the the descriptions of the manuscripts of the Maurits Sabbe Library - KU Leuven Libraries cited in this publication, see: Watteeuw, Reynolds and Dubois 2019 (Forthcoming).

1. Digitisation of manuscript in the Netherlands and Belgium (Flanders), (update 2019)

In part thanks to the Metamorfoze programme which has provided structural funding for digitisation projects for years and serves as a knowledge platform, the Netherlands is an international leader in the field of digitisation. Metamorfoze has funded conservation and digitisation projects for 121 institutions (archives, libraries and other cultural institutions) in the Netherlands between 1997 and 2018.²⁹ Metamorfoze also provides funding for research on the subject of paper conservation. Institutions can send a request for funding to Bureau Metamorfoze.³⁰ If funding is granted, the project will be executed by the institution and in collaboration with Metamorfoze and The National Library of the Netherlands in The Hague.³¹

In the Netherlands, significant projects for digitising medieval manuscripts are being carried out or have already been completed at the university libraries of Leiden, Nijmegen, Utrecht, Groningen and Amsterdam (UvA and VU), Athenaeum Library Deventer and at the National Library of the Netherlands in The Hague.

Leiden University Libraries has more than 1000 manuscripts in its digital collections, of which around 200 are Western Medieval manuscripts. These were digitised for educational purposes at the request of Erik Kwakkel.³² The Nijmegen University Library has 88 medieval manuscripts in its collection and some of these are digitised and available online.³³ This library also joined forces with the Staatsbibliothek zu Berlin in making the prayer book of Mary of Guelders available online.³⁴ Utrecht University Library has currently digitised the entirety of its vast collection of manuscripts (650+).³⁵ In the past, 56 manuscripts and *libri annotati* of the university of Groningen Library have been digitised and made available online. There are plans for the integral digitisation of their manuscript collection.³⁶ Amsterdam University Library has over 200 medieval manuscripts in its collection. The library began to digitise them in 2008 and has since digitised 47 of them (2008-2010). There are no plans to digitise any more in the near future, but the ones that were previously digitised will be made available online this year. This had not happened earlier due to problems with the catalogue.³⁷ All 17 manuscripts of the VU Amsterdam University Library were digitised during small projects starting in 2009.³⁸ At the Athenaeum Library Deventer, the digitisation of manuscripts began around 2010. More than 40 of the in total 124 Western medieval manuscripts have since been digitised. The digitisation of these books is a priority for this library and is ongoing.³⁹ The National Library of the Netherlands in The Hague has made several manuscripts available online. They are currently choosing a method for the integral digitisation of their manuscript collection.⁴⁰

²⁹ Metamorfoze. *Projecten*. <https://www.metamorfoze.nl/metamorfoze-projecten>. Consulted: 03-02-2019.

³⁰ Metamorfoze. *Mogelijkheden financiering*. <https://www.metamorfoze.nl/aanvragen/mogelijkheden>. Consulted: 03-02-2019.

³¹ Metamorfoze. *Archieven en bijzondere collecties*. <https://www.metamorfoze.nl/trajecten/archieven-en-bijzondere-collecties-0>. Consulted: 03-02-2019.

³² Correspondence Saskia van Bergen (Leiden University Libraries); Leiden University Libraries. *Medieval Manuscripts*. <https://www.library.universiteitleiden.nl/subject-guides/medieval-manuscripts>. Consulted: 03-02-2019; Erik Kwakkel. *medievalbooks*. <https://medievalbooks.nl/>. Consulted: 03-02-2019.

³³ Nijmegen University Library. *Manuscripts*. <http://bijzonderecollecties.ubn.ru.nl/cdm/landingpage/collection/p21010coll11>. Consulted: 03-02-2019

³⁴ Nijmegen University Library and Staatsbibliothek zu Berlin. *The prayer book of Mary of Guelders*. http://bijzonderecollecties.ubn.ru.nl/cdm/landingpage/collection/p21010coll3/lang/en_US. Consulted: 03-02-2019.

³⁵ Correspondence Coen van der Stappen (Utrecht University Library); Utrecht University Library. *Manuscripts*. <https://www.uu.nl/en/university-library/help-in-searching/searching-for/manuscripts>. Consulted: 03-02-2019.

³⁶ Correspondence Alisa van de Haar and Gerda Huisman (University of Groningen Library); University of Groningen Library. *Digital collections*. <http://facsimile.ub.rug.nl/cdm/search/collection/manuscripts>. Consulted: 03-02-2019.

³⁷ Correspondence Marike van Roon (Amsterdam University Library).

³⁸ Correspondence Willemien van Dijk (VU Amsterdam University Library); Vrije Universiteit Amsterdam. *Beeldbank*. <http://imagebase.ubvu.vu.nl/cdm/search/collection/mhs>. Consulted: 03-02-2019.

³⁹ Correspondence Suzan Folkerts (Athenaeum Library Deventer); Athenaeum Library Deventer. *Collecties van de Athenaeumbibliotheek Deventer*. athenaeumcollecties.nl. Consulted: 03-02-2019.

⁴⁰ Correspondence Paulien Rings (National Library of the Netherlands, The Hague); National Library of the Netherlands. *Medieval manuscripts*. <https://www.kb.nl/en/themes/medieval-manuscripts>. Consulted: 03-02-2019.

Belgium does not have an overall national programme for the preservation of documentary heritage or digitisation.⁴¹ Moreover, the field is fragmented due to the federal political structure.⁴² On the Flemish side, the Flanders Heritage Libraries (VEB) was established in 2008 as 'a structural cooperative association of seven representative libraries in the Flemish provincial capital cities'.⁴³ This comprises seven libraries: the University Libraries of KU Leuven, Ghent (UGent) and Antwerp (UA), the Bruges Public Library, the Limburg Provincial Library in Hasselt, the Library of the Conservatorium in Brussels and the Hendrik Conscience Heritage Library (previously Antwerp City Library). One of the objectives of the Flanders Heritage Library is the development of digital heritage collections.⁴⁴ The most important objects in the collections of the seven partner libraries (early printed works and medieval (illuminated) manuscripts) are being digitised by the institutions themselves and made available in their own online catalogue and on public platform *Flandrica.be*.⁴⁵

Starting in 2019, the Flemish government has been funding the *Medieval Manuscripts in Flemish Collections* (MMFC) project of the VEB. Within this project, all manuscripts in Flemish public and semi-public collections will be catalogued with the aim to digitise them in the coming years.⁴⁶

Of the seven partner libraries, the university libraries in Leuven and Ghent and the Bruges Public Library have relatively extensive experience in digitising manuscripts. A project to conserve and digitise the collection of illuminated manuscripts of the Maurits Sabbe Library, the Library of the Faculty of Theology and Religious Studies of the KU Leuven started in 2018. There are several thematic websites with access to digitized manuscripts by KU Leuven: the IDEM database (Integrated Database for Early Music)⁴⁷, with medieval musical manuscripts from the Alamire Foundation, KU Leuven and the 'Magister Dixit' projects of Lectio, KU Leuven which is devoted to the study of the intellectual history of pre-modern European thought.⁴⁸ In 2019 the MMMONK project (Medieval Monastic Manuscripts – Open – Network – Knowledge) began.⁴⁹ The manuscript department of the Royal Library in Brussels (KBR) has also made several manuscripts available online. From 2016 onwards, there has been a special focus in the KBR on the integral digitisation of illuminated manuscripts from the Library of the Dukes of Burgundy which will be launched in 2020.⁵⁰

Not only libraries are involved in digitising. Museums also hold remarkable collections of manuscripts. At the Plantin-Moretus Museum in Antwerp, mostly early printed books are digitised. Occasionally, however, they do digitise manuscripts as well. The Mayer Van den Bergh Museum, Antwerp has a project underway to make its precious collection of illuminated manuscripts digitally available by 2020 in collaboration with KU Leuven.

In 2013 in Wallonia, 49 medieval illuminated manuscripts from the University of Liege were digitised. The University of Louvain la Neuve (LLN) digitised their small collection of illuminated manuscripts (8) in 2018 and the University of Namur has a limited number of digitised manuscripts available online.⁵¹

⁴¹ Concerning the general background and history of Belgian libraries, see: Capiou 2012; Delsaerdt 2010.

⁴² Capiou 2012: 107.

⁴³ Delsaerdt 2010: 27; Flanders Heritage Library. *Organisation*. <http://vlaamse-erfgoedbibliotheeken.be/en/dossier/organisation/organisation>. Consulted: 03-02-2019.

⁴⁴ Flanders Heritage Library. *Werking*. <http://www.vlaamse-erfgoedbibliotheek.be/dossier/organisatie/werking>. Consulted: 03-02-2019.

⁴⁵ Flandrica. *About Flandrica.be*. <http://www.flandrica.be/en/over-flandrica-be/>. Consulted: 03-02-2019.

⁴⁶ MMFC. *Medieval Manuscripts in Flemish Collections*. 2018. <http://vlaamse-erfgoedbibliotheeken.be/activiteit/mmfc>. Consulted: 03-02-2019.

⁴⁷ IDEM. *Database for Music Sources*. <https://idemdatabase.org/>. Consulted: 03-02-2019.

⁴⁸ Lectio. *Leuven Centre for the Study of the Transmission of Texts and Ideas in Antiquity, the Middle Ages and the Renaissance*. <http://lectio.ghum.kuleuven.be/>. Consulted: 03-02-2019.

⁴⁹ Huis van de Bruggeling – Stad Brugge. *MMMOK: Middeleeuwse topstukken ontsluiten via toptechnologie*. 2019. <https://www.brugge.be/mmonk-middeleeuwse-topstukken-ontsluiten-via-toptechnologie>. Consulted: 03-02-2019.

⁵⁰ KBR. *An introduction to the DIGIT Department*. <https://www.kbr.be/en/digitisation/an-introduction-to-the-digit-department/>. Consulted: 03-02-2019. Online access to KBR manuscripts: KBR. *Belgica: the KBR's digital library*. https://belgica.kbr.be/belgica/default.aspx?_lg=en-GB Consulted: 03-02-2019.

⁵¹ Liège Université Library. *Du PEP'S à l'ULiège : 49 manuscrits médiévaux et renaissants numérisés*. <https://lib.uliege.be/fr/content/du-pep-s-l-uliege-49-manuscrits-medievaux-et-renaisants-numerises>. Consulted: 03-02-2019; Université de Namur. [https://neptun.unamur.be/s/neptun/search?q=&limit\[dcterms_type_ss\]\[0\]=Manuscrit](https://neptun.unamur.be/s/neptun/search?q=&limit[dcterms_type_ss][0]=Manuscrit). Consulted: 03-02-2019.

1.1 Policy and practice

In recent years, libraries in Belgium (Flanders) and the Netherlands – as in other Western European countries – have been keen to present themselves as actively involved in digitisation. As early as 2012, Bas Savenije, general director of the National Library of the Netherlands in The Hague at the time said: “What has not been digitised does not exist” and for those involved in research, that generally seems to be increasingly true.⁵² In general, the three most important reasons for digitising manuscripts are: preservation, digital availability and communication.⁵³ More funds are available for digitisation in the Netherlands than in Flanders, which enables a more systematic approach to project planning. In Flanders, a selection is often made of several outstanding works. However, the second phase of the MMFC project: *Medieval Manuscripts in Flemish Collections*, planned for the end of 2020, might focus more attention on the digitisation of manuscripts in Flemish collections and improve the situation there. In both countries, digitisation is often carried out ‘on demand’ or in other words, at the request of those involved in exhibitions or research projects. Now and then, digitisation requests are generated from within the institution, for example in connection with a publication or an exhibition.

1.2 Objectives in digitising

Preservation

Digitisation is a form of duplicating. Should something happen to the original, the digital copy will serve as a ‘back-up’ for whatever textual information and other qualities have been transferred to the digital copy.⁵⁴ In this way, at least those elements of the original will be preserved. It is therefore of the greatest importance for the digital copy to have, as far as possible, a 1:1 relationship to the original.

In some cases, a book has physically deteriorated so badly and is so fragile that it can no longer be referenced and can no longer be made available to users in the reading room. In most of these cases, a conservation treatment can at least stabilise or even improve the physical condition of the book prior to digitisation, but in some cases the decision is made to digitise it despite a relatively high risk of damage during the digitisation process. (Obviously this is not an option for illuminated manuscripts or other books from special collections). In these cases, digitisation enables at least some of the information and value in a book to be made digitally available to users. The book might be intensively handled once during the digitisation process and may suffer some damage in the process, but thereafter the book is withdrawn from use and only made available in very extraordinary cases. In that way, the original content and materiality are arguably better preserved over a longer period.

People should be aware, however, that digitisation can also have the opposite effect: since more people become familiar with a work because of digitisation, or even come to realise that it exists, they may be more likely to want to see it with their own eyes. This is especially true for those involved in research which is not primarily concerned with the content of the text but rather with aspects relevant to art history or to the history of the book – aspects that are not usually noted in catalogues but can clearly be observed in a digital copy.

In the end, the extent to which digitisation supports conservation depends on the policy of the relevant institution. Some institutions allow access to a manuscript for almost everyone who asks to see it and other institutions only allow access to those who have very good reasons to wish to see the original.

⁵² Oosterbaan 2012.

⁵³ Source: interviews.

⁵⁴ For instance, in a war such as in Yemen, as Schmidte describes: ‘Although the quality of some of the earlier [digital] material is wanting, in many cases the surrogates are all we have left. Many of the original personal collections have been confiscated, dispersed, or even destroyed, and it remains uncertain whether the individual physical codices are still extant.’ Schmidte 2018: 126-127.

An example of a manuscript that was lost in a war is the *Scivias* Rupertsberg manuscript of Hildegard von Bingen, which was lost in World War II. Only black-and-white photographs of the manuscript have survived. Source: Maddocks 2011.

Digital availability

Consulting a digital copy online has many advantages over consulting the original in a reading room. A digital copy of a manuscript is available to everyone, everywhere and always, provided someone has access to the internet or to a relevant database.⁵⁵ It is also easier to locate a specific manuscript online. Although manuscripts are mostly studied by specialised scholars who know how and where to find them, it can safely be assumed that a codex that has been documented, indexed and made digitally available online, will be consulted more often than a copy that has not. A book that has largely been forgotten may even be rescued from obscurity by digitisation and online publication. Manuscripts that were once taken from their original owners can be 'returned' digitally.⁵⁶ And some collections are very difficult to reach because they are very remote or because of war or an unsettled political climate which makes digital availability of these collections even more important.⁵⁷

Even if a manuscript is available on microfilm, in black and white photographs or in a facsimile edition, it is often digitised because of the advantages of digital availability. Because of this, some important manuscripts found themselves under a photographer's lens several times in the twentieth century. For example, the illuminated folios from some famous manuscripts of the Burgundian Library kept in the KBR were reproduced several times from 1906 onwards starting with glass negatives, then black and white analogue photography, colour Ektachromes and finally digital files. The consultation of manuscripts in the reading room has become significantly less frequent even though some scholars still prefer to carry out their research on location.⁵⁸ This is understandable since not all the information and values contained in an original are transferred onto the digital copy as will become clear in chapter 2. Scholars who are interested in the materiality of the manuscript will often still want to visit the relevant library. The time that must be spent researching the original manuscript will, however, be reduced because of the opportunity to study the manuscript digitally before the visit. This will benefit the conservation of the original.

Online visibility/publicity

'Online visibility' means, in this case, something different than online availability. It entails the promotion of the library and its collections by means of digital reproduction, usually of its masterpieces, for use in publications, exhibitions and for marketing purposes.⁵⁹

⁵⁵ The availability of the digital copy also varies from institution to institution: Rudy 2011.

For instance, the National Library of the Netherlands in The Hague writes on their manuscript website: 'Even the tiniest medieval manuscripts have great stories to tell. About the Virgin Mary, about knights and kings. The originals are priceless and are kept under lock and key, but online we can open our doors widely.' National Library of the Netherlands. *Medieval manuscripts*. <https://www.kb.nl/en/themes/medieval-manuscripts>. Consulted: 03-02-2019.

⁵⁶ Boserup 2005. And for example, the Zaydi Manuscripts from Yemen. This can be about more than just the availability for research as Schmidte describes: '[...] through the ZMT [The Zaydi Manuscript Tradition] scholars in Yemen will finally have unlimited access to their own intellectual, cultural, and religious heritage as reflected in the Zaydi manuscripts preserved in Europe, North American, and the Middle East, alongside scholars based in other parts of the world. As such, the ZMT will bring about a digital "repatriation" of the Yemeni/Zaydi manuscript treasures dispersed all over the globe. In the long run, protecting and preserving an important part of Yemen's cultural legacy, its rich manuscript tradition, will help enable future generations of Yemenis to have a firm sense of identity and belonging.' Schmidte 2018: 126-127.

⁵⁷ For example, the manuscripts of St. Catherine's Monastery in Egypt, which are being digitised in collaboration with the UCLA Library and Early Manuscripts Electronic Library: UCLA. *UCLA Library to host digital archive of ancient Arabic and Syriac manuscripts*. 2018. <http://newsroom.ucla.edu/stories/arcadia-funds-digitization-of-arabic-and-syriac-manuscripts-from-st-catherines-monastery>. Consulted: 03-02-2019. Another example: the manuscripts from Mali, which are now part of the UNESCO World Heritage and are being digitised in Hamburg, Germany. German Federal Foreign Office. *Preserving cultural objects: Saving manuscripts from Mali*. 2018. <https://www.auswaertiges-amt.de/en/aussenpolitik/themen/kulturdialog/09-kulturerhalt/mali-timbuktu-cultural-preservation/2158020>. Consulted: 03-02-2019.

⁵⁸ Hirtle 2002: 45.

⁵⁹ For example: the presentation of Anglo-Saxon masterpieces at the British Library: 'Don't forget that the British Library has made its outstanding collection of Anglo-Saxon manuscripts and charters available online in full, allowing people around the world to explore them in detail, and to support future research in the field.' - British Library. *Anglo-Saxon Kingdoms: a once-in-a-generation exhibition*. 2018. <https://blogs.bl.uk/digitisedmanuscripts/2018/10/anglo-saxon-kingdoms-a-once-in-a-generation-exhibition.html>. Consulted: 03-02-2019.

In this way, the library establishes itself on the international stage as an institution with outstanding collections and it can distinguish and promote itself to reach a broader public. A library can also distinguish itself from other institutions by digitising large numbers of books or special collections in their entirety. Digitisation is in a way a prestige activity that is undertaken to valorise or underline the importance of the institution and its collections. Because digitising is a relatively recent development, it shows that institutions are following the latest trends in their field.

Adding value

When a manuscript is digitised it opens doors to add value in a way that is unique to digital books. For instance, it is possible to use tools to annotate a text or to make a transcription or translation of it which can then be crowdsourced.⁶⁰ It is possible to link the manuscript to other manuscripts from the same scriptorium in other digital collections, allowing the reader to look at them simultaneously on a screen. It even enables the reader to match fragments of the same manuscripts which are physically in different institutions and scattered around the globe.⁶¹ Layers of context and meaning can be added to the online manuscript by presenting it with additional information. Usually this is done by adding texts comparable to what you would find in a physical exhibition of manuscripts, but it can also be taken to another level, for example by linking the digitised manuscript to online digital courses.⁶²

Target groups

Digital copies are above all interesting for scholars and students who are concerned with aspects of the content of the manuscript and for research areas like palaeography and art history. In addition, a lay public interested in, for example, admiring pictures of beautifully illuminated manuscripts or luxury bindings online, will be drawn to websites where these are made readily available. Many institutions exploit this potential by selecting their most lavishly decorated and illuminated manuscript masterpieces and making them very easy to find on their website.⁶³

Scholars whose interest is directed at the material aspects of manuscripts are only partially served by digital reproductions. They are limited, after all, to the qualities that can be captured in a digital image. The value of a reproduction for them is also dependent on the choices the institution has made concerning what should be captured. Have they chosen to reproduce only the bookblock or has the binding also been photographed? And if so, what details of the binding were photographed? The boards alone? Or the spine as well, and/or the edges so that details like clasps and headbands are visible? And what part of the bookblock has been digitised? Are endpapers and/or blank folios included? Is only the text area reproduced or are the full folios including the margins visible? Are loose fragments in the bookblock included in the reproductions? The more comprehensively the book – including its binding – is reproduced, the better scholars concerned with the material aspects of the book will be served.

⁶⁰ Crowdsourcing: 'the activity of giving tasks to a large group of people or to the general public, for example, by asking for help on the internet.' Source: Cambridge dictionary. For an overview of recent transcription and document annotation methods and tools, see: Hast, *et al.* 2018: 82 - 85.

⁶¹ *Fragmentarium*, for instance, 'enables libraries, collectors, researchers and students to publish images of medieval manuscript fragments, allowing them to catalogue, describe, transcribe, assemble and re-use them.' *Fragmentarium*. *Digital Research Laboratory for Medieval Manuscript Fragments*. <https://fragmentarium.ms/>. Consulted: 03-02-2019.

⁶² For example: 'The Book of Kells: Exploring an Irish Masterpiece' course: Trinity College Dublin. *Discover the iconic 'Book of Kells' through Trinity's free online course*. 2018. https://www.tcd.ie/news_events/articles/discover-the-iconic-book-of-kells-through-trinitys-free-online-course/. Consulted: 03-02-2019. With the course TCD aims at: 'Using the Book of Kells as a window the course will explore the landscape, history, theology, and politics of early medieval Ireland and explore how that past is understood in modern Ireland.' Source: Future Learn. *The Book of Kells: Exploring an Irish Medieval Masterpiece*. https://www.futurelearn.com/courses/book-of-kells?utm_campaign=trinity_college_dublin_book_of_kells_october_2018&utm_medium=organic_pr&utm_source=pr. Consulted: 03-02-2019.

⁶³ For example: British Library, *Catalogue of illuminated manuscripts*. *Virtual exhibitions*. <https://www.bl.uk/catalogues/illuminatedmanuscripts/tours.asp>. Consulted: 03-02-2019.

Why or why not to digitise?

Finally, the following question needs to be addressed: for what purpose does one digitise? This question seems upon first glance an easy one to answer: in order to have a digitised copy. But in fact, the answer is less clear because of the various trends and interests that need to be considered. Firstly, we must decide whether it is really such a bad thing not to digitise a manuscript or collection. To answer these questions, it is necessary to consider the underlying objective of digitising a specific manuscript or manuscript collection. If interest in a digital copy is significant because it is a manuscript that is often consulted, the decision to digitise is logical and defensible. If, however, a manuscript is being digitised just because there is a trend to digitise or because funds for digitisation are readily available – which often goes along with a digitisation trend – and the institution wants to take advantage of them, the answer is not so obvious. Books that are seldom consulted and are still in good condition can be accessed in the reading room. One ought to then ask whether it is such a bad thing not to digitise.

Further, the digitisation of a manuscript is often seen as the definitive reproduction of that manuscript, but it is important to be aware that the most recent digitisation of a manuscript is not likely to be the last one. Imaging techniques are constantly being improved. Devices to provide better support for books are coming onto the market, imaging resolution is getting better and better, and experiments are being carried out with supplementary techniques, such as digitisation with UV radiation or the application of 3-dimensional techniques. In some cases, it might then be advisable to postpone digitising, for example because in the present circumstances it is not possible to digitise a manuscript without causing some degree of damage or exacerbating existing damage.

1.3 Digitiser and conservator-restorer

A digitiser can be anyone from a well-trained photographer to a temporary employee without any experience at all. Scanning with a book scanner requires hardly any technical knowledge. For this reason, it is often carried out by people who already work in the library, such as a stock keeper. People differ greatly in their awareness of the material properties of books and knowledge of how to deal with them. A photographer who specializes in digitising objects of cultural heritage is more likely to have the proper tools available to support objects in a responsible manner (*Figs. 5, 6 and 7*) than one who is not.⁶⁴



Fig. 5. Photographer's tool box with lead snakes, sand bags and spatulas (KU Leuven).

⁶⁴ Source: interviews.



Figs. 6 and 7. Tools to hold down folios: an acrylic plate and an acrylic finger.⁶⁵

In half of the libraries we visited, there was no in-house conservator-restorer. When there was one, the extent of their involvement in the digitisation process varied greatly. In some cases, manuscripts to be digitised were inspected one at a time by the conservator-restorer; in other cases, the conservator-restorer was only called upon when complications arose. In some cases, checks were only carried out following digitisation. Usually the books were immediately returned to their storage locations.⁶⁶

Conservator-restorers are frequently burdened with an image problem: they are often considered demanding by the digitisation project manager, threatening to create a bottleneck in the workflow of the digitisation process. At times, the conservator-restorer can feel like a 'token' addition to a team where they have, in fact, nothing more than an indirect, advisory role concerning the treatment of the originals.

1.4 Digitisation method

Medieval manuscripts in the Dutch and Flemish libraries that were visited on behalf of this project are digitised in-house. This is largely a consequence of the economic value of the codices and the costs of transport and insurance if they were to leave the library.

The institutions work predominantly with two types of devices. The first is a book scanner; the *Zeutschel* brand is very popular (Figs. 8 and 9). Scanning with a book scanner is generally faster than photographing, especially if the codex can be opened to 180° and the reproductions can be made per opening. Books in a book scanner are supported by a book wedge: two boards that can be adjusted in height with respect to each other. This means that the book is well supported regardless of where the book has been opened. Between the two boards a space is left to cradle the spine of the book. The spine is supported by a piece of cloth fastened to both boards (Fig. 8). The use of the glass plate can be a disadvantage. If the pressure with which it comes down onto the manuscript has not been carefully adjusted, damage can occur due to excessive pressure being placed on the book's joints. Moreover, when the plate is raised, it can draw folios with it, which might damage the paper or parchment. The use of a glass plate should also be avoided with powdered inks, fragile pigments or raised gold leaf on a base layer of gesso.

⁶⁵ The "acrylic finger" is the end of the Perspex handle of a Series 18 Da Vinci brush (NOVA wash brush flat). Da Vinci – Artist brushes. *Nova synthetics*. <http://www.davinci-defet.com/englich/artist-brushes/products/water-colour-brushes/nova-synthetics.html>. Consulted: 03-02-2019.

⁶⁶ Source: interviews.



Fig. 8. Zeutschel OS 14000 A1.



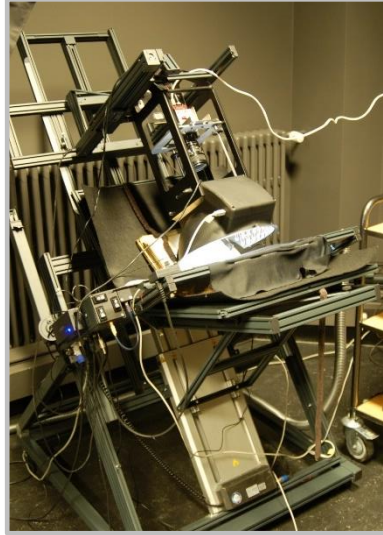
Fig. 9. OS 14000 A1 in use, Utrecht University Library.

The second type of device is a high-resolution digital camera. Manuscripts are generally supported with a book cradle during reproduction with a camera. A widely used model in the Netherlands and Belgium is the *Conservation Copy Stand* (CCS, also known as a *Grazer Kamertisch*, Fig. 10).⁶⁷ This cradle is also available in a portable variant, allowing photography on location. The *Traveller's Conservation Copy Stand* (also called the *Grazer Traveller*, Fig. 11).⁶⁸ This device can be easily transported in its customised protective case (Fig. 12). It can be adjusted to serve as an installation for photographing the binding and edges of the book using a piece of foam and a mirror (Figs. 13 and 14). The *Traveller's Conservation Copy Stand* was used in the crypt of the St. Catharina Church in Maaseik in December 2015 to digitise the *Codex Eyckensis*, the eighth-century Gospel and oldest surviving illuminated book in Belgium, the Netherlands and Luxembourg (Figs. 15 and 16).⁶⁹

⁶⁷ Mayer 1999.

⁶⁸ Vestigia – The manuscript research centre of Graz University. *Der Traveller TCCS 4232*. <https://vestigia.uni-graz.at/de/arbeitsbereiche-projekte/technologieentwicklung/der-traveller-tccs-4232/>. Consulted: 03-02-2019.

⁶⁹ In 2016, a multi-year project concerning the *Codex Eyckensis* started, a cooperative effort of the city of Maaseik and Illuminare Foundation, Centre for the Study of Medieval Art – KU Leuven; the Book Heritage Lab – KU Leuven and the Imaging Lab – KU Leuven Libraries. The digitisation took place as preparation for the research and the determination of the value of the *Codex Eyckensis*.
 KU Leuven, *Codex Eyckensis online i.s.m. Imaging Lab en Illuminare Leuven*.
https://www.arts.kuleuven.be/home/nieuws/codex_eyckensis. Consulted: 03-02-2019; *Codex Eyckensis*.
http://depot.lias.be/delivery/DeliveryManagerServlet?change_lng=en&dps_custom_att_1=staff&dps_pid=IE5258806&mirador=true. Consulted: 03-02-2019.



*Fig. 10. Conservation Copy Stand and RICH portable light dome (KU Leuven).
Fig. 11. Traveller's Conservation Copy Stand.*



Fig. 12. Traveller's Conservation Copy Stand stowed in its suitcase.



Figs. 13 and 14. Traveller's Conservation Copy Stand setup for photography of the binding.



Fig. 15. Digitisation of the Codex Eyckensis.

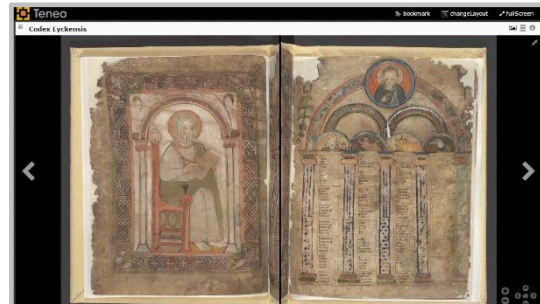


Fig. 16. Digital Codex Eyckensis.



Figs. 17 and 18. Positioning the manuscript and the book ready for reproduction (KU Leuven).

Everything on the CCS is adjustable, so books can be supported optimally (Fig. 17). The books do not have to lie open at 180° (Fig. 18). This means that pressure on the structure of the book is minimised. For this reason, digitisation in a device of this sort is particularly appropriate for more fragile manuscripts as well as for books that cannot safely be opened to a wide angle. However, the minimal angle of opening that books must be capable of is 110°.70 The setup is therefore not suitable for manuscripts that cannot be opened to that extent.

Overall, photographing with a high-resolution digital camera results in qualitatively superior images to those produced by scanning. This depends in part on the skill of the photographer and the quality of the device used. The disadvantage of photography with the CCS, on the other hand, is that the rectos must be reproduced first followed by all the versos.71 This is more time-consuming and results in images in the online viewer that are less true to life than the scanned images, which show two folios in each image. Photographed pages can, however, be seen next to one another in 'book view mode' (Fig. 16).

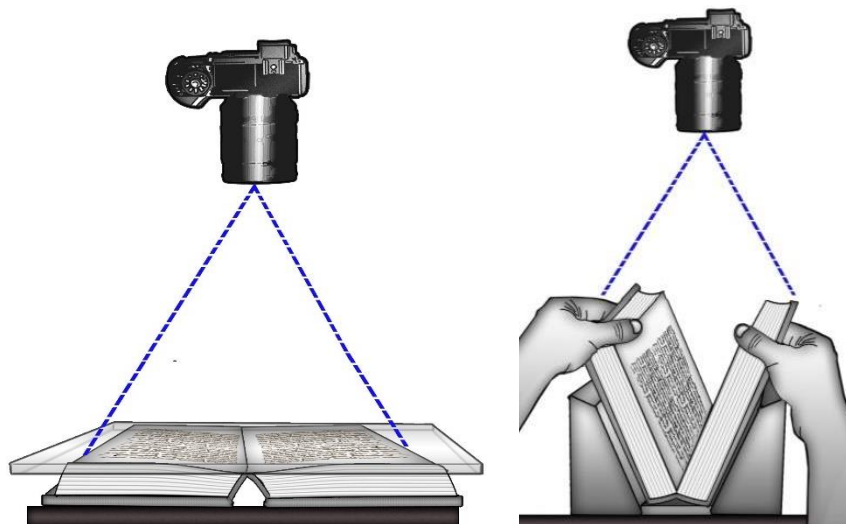
Some institutions choose to produce photographs using a photographic setup (without using the CCS). This can be done by the institution's in-house photographer or by an external photographer. The manuscript is opened as desired, supported by a custom-made stand or with a cushion. Such a photograph is generally made from above, with or without a glass plate, while two folios are being photographed simultaneously (Figs. 19 and 20).

⁷⁰ In addition, there are many other systems. In Germany, for example, the *Wolfenbütteler Buchspiegel* is widely used for digitising manuscripts and old printed books; it allows for openings as small as 45°. See: Stacker 2004.

⁷¹ There are, however, also systems that work with a book cradle and two cameras. There is, for example, an adapted version of the *Wolfenbütteler Buchspiegel*. Books that are digitised with the use of this variant must be able to be opened to an angle of at least 90°. Because of this wider angle of opening, it is possible to fix a camera simultaneously above the verso and recto sides. This means that two photos can be taken at once and the difference between what can be digitised with this device and a book scanner in terms of speed is insignificant. The same is true of the *Atiz*. In this regard, see: Atiz, *Book Drive Pro*. <http://pro.atiz.com/>. Consulted: 03-02-2019.

The advantage of this method is that it is suited to books with a small opening angle. Furthermore, a setup of this sort produces images that are realistic because they correspond to the actual reader's view of the folios of the book.⁷² Although this can be desirable, it can also be considered a disadvantage because the image might not satisfy all image requirements.

In addition to standard digitising, the Imaging Lab at the KU Leuven specialises in scientific imaging in the context of specific research projects by the archeology, art history or conservation units of the University of Leuven (*for more information in this regard, see section 2.3*).⁷³



Figs. 19 and 20. Simple photographic setup with and without glass plate.

⁷² For example, the Ets Haim Library in Amsterdam prefers this method and has had the photographer Ardon Bar Hama digitise the entire collection in this way. Source: interview Emile Schrijver (03-03-2016). In this regard, see the short film: Jewish Cultural Quarter. *700 year old Jewish manuscripts digitized and published online in Jewish library Ets Haim*. 2013. <https://www.youtube.com/watch?v=4b9y4sslg04>. Consulted: 03-02-2019. For the results, see: Ets Haim Library. *Manuscripts*. <http://etshaimmanuscripts.nl/manuscripts/>. Consulted: 03-02-2019.

⁷³ See also, among others: Imaging Lab – KU Leuven Libraries. 'Digitalisering en imaging.' <https://www.arts.kuleuven.be/digitalhumanities/documenten/DigitaalLaboKULeuven.pdf>. Consulted: 03-02-2019; KU Leuven. 'Portable Light Dome System – from registration to online publication within the hour.' Leuven, Brussel (2014). https://portablelightdome.files.wordpress.com/2014/12/portable-light-dome-system-from-registration-to-online-publication-within-the-hour_1-1.pdf. Consulted: 03-02-2019; LIBIS, KU Leuven. 'In the spotlight: services for researchers.' LIBISzine – het LIBIS magazine. 9 (2015). <http://libis.be/themes/default/images/libiszine/LIBISzine9.pdf>. Consulted: 03-02-2019; Watteeuw, *et al.* 2016; Illuminare – Centre for the study of Medieval art, KU Leuven. *RICH project – reflectance imaging for cultural heritage*. <http://www.illuminare.be/accordion-item/rich/>. Consulted: 03-02-2019; KU Leuven. *Portable Light Dome*. <https://portablelightdome.wordpress.com/>. Consulted: 03-02-2019; KU Leuven. *Rich: new research prototype installed. Mounting the Microdome on the Conservation Copy Stand*. 2014. <https://portablelightdome.wordpress.com/2014/04/30/rich-new-research-prototype-installed-mounting-the-microdome-on-the-conservation-copy-stand-2/>. Consulted: 03-02-2019.

2. Determining the value of manuscripts

We often assume that the value of a manuscript resides in its content. In most cases, access to a digital copy would suffice for a researcher. A manuscript, however, is more than its mere content and its material aspects are of essential historical importance.

2.1 Value of the content

The value of the textual information is heavily dependent on the knowledge and learning of the reader. When it comes to medieval manuscripts, such knowledge and learning are rare, according to K.M. Rudy: *'Studying medieval manuscripts "in the flesh" requires being properly credentialed. Reading manuscripts requires years of specialized training in palaeography, codicology, and foreign languages before one can even consider using them as material witnesses for making new historical, art historical, anthropological or cultural knowledge.'*⁷⁴ She adds later, however: *'Although manuscripts often pose significant barriers to study, they are worth the effort, because they constitute some of the liveliest witnesses to our cultural and artistic heritage that survive, and they remain one of our best conduits to the past.'*⁷⁵ In addition to the scholarly interest in the content, there are the aesthetic value and the art historical value of the illuminations to consider.

The value of the contents can largely be transferred onto a digital copy, although particularly illuminations have material characteristics – such as, for example, paint layers or the gloss of gold leaf – that cannot be transferred onto a two-dimensional surface or screen. On the other hand, many details are in fact easier to see on a digital copy and by means of scientific imaging, and the value of the digital copy can be greatly enhanced by the application of digital processes.⁷⁶

2.2 Value of the material characteristics

Other values can be attributed to the material properties and these are not always transferable to a digital copy or they are, but to a much lesser degree. Firstly, there is the value of the book as an archaeological object with all its historical traces.⁷⁷ These include traces of the codex's production and use. There is also the value of experiencing the book as a physical object, through the senses of sight, touch, smell and even hearing (parchment has a very distinctive sound) and the value of the general 'historical sensation' or age value.⁷⁸ Looking at photographs on an electronic monitor will never replace the experience of reading – and especially turning the pages of – an authentic medieval manuscript, although there are many attempts to simulate this experience digitally.⁷⁹

It is possible to identify other values encompassing the content and the materiality of the original manuscript. For instance, there is always the value of every manuscript's uniqueness. Manuscripts are, by definition, unique in both form and content. There is also the financial value: the economic value of an authentic, original codex will always far exceed the value of a digital reproduction. Among others, the cultural value, social value, spiritual value and symbolic value are also relevant.

2.3 Added value of digitisation and scientific imaging

Manuscript historians can acquire information on medieval codices, their miniatures and their bindings in collaborating with imaging specialists, as information is often invisible for the human eye or has become hidden through the ravages of time. Scientific value or scientific potential can be mined by means of specific digital imaging techniques or computerised images.

⁷⁴ Rudy 2011: 346.

⁷⁵ *Ibidem.*

⁷⁶ Gabriëls and Vandermeulen 2016.

⁷⁷ Foot 1993; Pickwoad 1997.

⁷⁸ Smith 2003: 177; Smith 2007; Wilcox 2013; Borland 2013; Frost 2013; Wilcox 2013.

⁷⁹ Green 2018.

Scientific imaging can be extremely helpful when researching the original manuscript and the study of the original and the acquired digital data can supplement each other very effectively.⁸⁰ These techniques request extra guidance by a conservator-restorer to safeguard the physical integrity of the manuscript. Research equipment must be positioned with great care, hanging just above the folios or binding, but never touching it. The presence of a conservator-restorer is essential in these research situations.

We can better visualize information concerning the materiality of the manuscript, such as imprints on the cover that are hard to make out, texts that are difficult to read or illegible, damage to the parchment and fragile pigments and gold leaf on miniatures. Visualisations are advantageous in that they are quickly available and non-destructive compared to some analytical laboratory methods. Some of these laboratory methods cannot even be adapted to researching manuscripts due to their uniqueness, dimensions and/or fragility.

This recently developed computerised imaging is a source of new insights for research in the fields of book history and art technology (for example: Watteeuw and Van Bos 2014, Watteeuw and Vandermeulen 2015 and Toth 2018).⁸¹ In addition to standard digitisation, the Book Heritage Lab, Illuminare, Research Centre for the Study of Medieval Art and the Imaging Lab of the KU Leuven have specialised in research by means of the scientific imaging of manuscripts and miniatures.⁸² This research platform was established in 2009 in response to the research on art technology and codicology being carried out by the art history faculty. An important subject of this research was the fourteenth-century Anjou Bible, a masterpiece of the collection of the KU Leuven (Maurits Sabbe Library).⁸³ For research of this kind, reproductions made with backlighting (*Fig. 21*), infra-red transmission (*Fig. 22*), RTI or photometric stereo and multi-spectral images are especially valuable (*Figs. 23 to 27*).⁸⁴



Fig. 21. Transmitted light (KU Leuven).



Fig. 22. Setup with infrared radiation used to capture watermarks.

⁸⁰ Easton, *et al.* 2010; France 2016.

⁸¹ Watteeuw and Van Bos 2014; Watteeuw, Vandermeulen and Proesmans 2015; Toth 2018.

⁸² KU Leuven. *Book Heritage Lab – KU Leuven*. <https://theo.kuleuven.be/apps/press/bookheritagelab/>. Consulted: 03-02-2019. RICH is a cooperative project involving four KU Leuven partners: Illuminare, Centre for the Study of Medieval Art – KU Leuven, ESAT-Visics, CS/Media and the University Library. The Plantin-Moretus Museum (Unesco World Heritage) is the external partner. The RICH project is funded by the Hercules Foundation.

⁸³ Watteeuw and Vandermeulen. *'Imaging the Bible of Anjou. Art Technical Research with the Microdome.'* Leuven (2016). https://www.academia.edu/27124300/Imaging_the_Bible_of_Anjou_Art_Technical_Research_with_the_Microdome. Consulted: 03-02-2019.

⁸⁴ See, among others: Imaging Lab – KU Leuven Libraries. *'Digitalisering en imaging.'* <https://www.arts.kuleuven.be/digitalhumanities/documenten/DigitaalLaboKULeuven.pdf>. Consulted: 03-02-2019; KU Leuven. *'Portable Light Dome System – from registration to online publication within the hour.'* Leuven, Brussels (2014). https://portablelightdome.files.wordpress.com/2014/12/portable-light-dome-system-from-registration-to-online-publication-within-the-hour_1-1.pdf. Consulted: 03-02-2019; LIBIS, KU Leuven. *'In the spotlight: services for researchers.'* LIBISzine – het LIBIS magazine. 9 (2015). http://www.libisplus.be/libisplus/themes/LIBIS_PLUS/images/libiszine/LIBISzine9.pdf. Consulted: 03-02-2019.

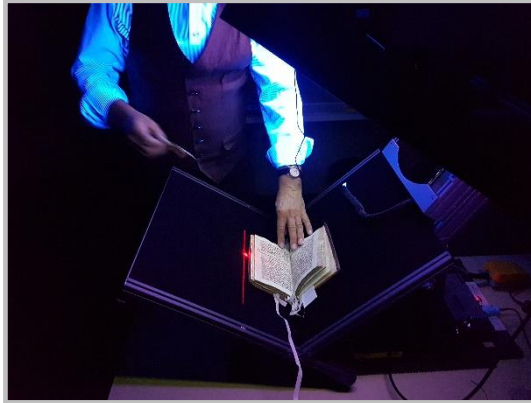


Fig. 23. Traveller's Conservation Copy Stand with UV lights.

Since 2013, art historians, conservator-restorers, photographers and engineers have been working together on the development of the 2D + imaging module for manuscripts in the RICH project.⁸⁵ In order to capture the topography of documentary heritage as well as the base and pictorial layers of manuscripts, a digital visualisation module was developed (RICH Project, Reflecting Imaging for Cultural Heritage). The technique employed is related to polynomial texture mapping, also known as Reflectance Transformation Imaging (RTI). This technique enables us to visualise the physical condition of objects in an interactive manner from varying angles of incidence.⁸⁶ The module consists of a hemisphere (ca. 30 cm in diameter) with 224 LEDs fixed to the inside. At the top is a camera (28 million pixels) facing downward, onto the object that is being monitored. By activating the individual LED's, 224 photographs are taken. The objects can be studied once the photographs have been processed. This can include techniques such as filtering and virtually added lighting. In 2016, a second microdome with a multispectral LED was developed. This process allows us to investigate underdrawings, pigments and overpaintings or retouches. Since 2019 the 3Pi Project of the Book Heritage Lab (Diagnosis of Papyrus, Parchment and Paper through Advanced Imaging) has been exploring the development of a smaller Nanodome.



Fig. 24. Microdome of the RICH project - KU Leuven.

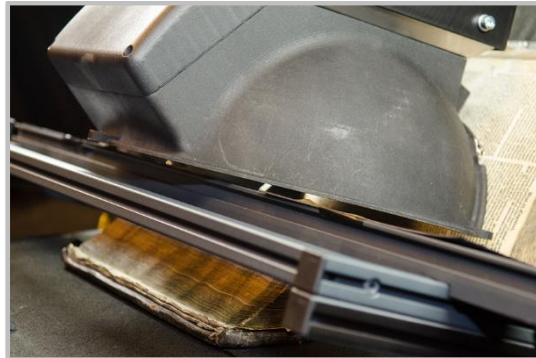


Fig. 25. Reproduction with microdome mounted on the CCS.

⁸⁵ Watteeuw 2016; Illuminare – Centre for the Study of Medieval Art, KU Leuven. *RICH project – reflectance imaging for cultural heritage*. http://www.illuminare.be/rich_project. Consulted: 03-02-2019; KU Leuven. *Portable Light Dome*. <https://portablelightdome.wordpress.com/>. Consulted: 03-02-2019; KU Leuven. *Rich: new research prototype installed. Mounting the Microdome on the Conservation Copy Stand*. <https://portablelightdome.wordpress.com/2014/04/30/rich-new-research-prototype-installed-mounting-the-microdome-on-the-conservation-copy-stand-2/>. Consulted: 03-02-2019; Watteeuw and Vandermeulen 2016; Van der Perre, *et al.* 2016.

⁸⁶ The underlying processes, developed for the visualisation of the material properties, are based on techniques like *photometric stereo* and BRDF analysis (*Bidirectional Reflectance Distribution Function*).

Issues of conservation were fundamental in the design and development of the microdome. A disc from the hemisphere can be removed so that recordings can be made deep into the fold of a gathering without causing damage (the dome hangs ca. 10 mm above the object). This made it possible for a conservation study to be carried out in 2015 which studied the characteristics of sewing threads and sewing techniques in hand-bound codices and early printed editions.⁸⁷ Usefully, the microdome can be mounted to the conservation copy stand. Most studies involving the microdome are carried out by integrated conservation and research projects which focus on a specific manuscript. In such projects, the KU Leuven's Book Heritage Lab and the Imaging Lab work closely together.⁸⁸ A conservator-restorer is always present to position the binding properly in the book cradle and to hold the parchment folios in position. The folios must remain flat for four minutes at a time while the images are being made.

Mobility was taken into consideration during the design of the digitisation device. The two small microdomes (30 cm in diameter) can be transported to collections where manuscripts are held so that the manuscripts are not put at risk during transportation. In recent years, studies of manuscripts have been carried out in Antwerp, Brussels, Amsterdam, Washington, Los Angeles and Naples.



Figs. 26 and 27. Microdome reproductions of a fourteenth-century miniature with white LED and with multi-spectral LED (under UV light).

⁸⁷ Duminico 2015; Chester Beatty Conservation, Duminico, Cecilia. *A tale of twisting threads*. 2015. <https://chesterbeattyconservation.wordpress.com/tag/care-and-conservation/>. Consulted: 03-02-2019.

⁸⁸ Watteuw. *Research Book Heritage Lab - KU Leuven, Introduction to the multispectral microdome, Book Heritage Lab – Expert Centre for Research and Conservation of Library Heritage*. Leuven, 2016. <https://theo.kuleuven.be/apps/press/bookheritagelab/>. Consulted: 03-02-2019.

3. Role of the conservator-restorer

As has already become clear, the role of conservator-restorers in the digitisation process is not always self-evident. Libraries' goals are, on the one hand, to preserve collections and, on the other, to make them (digitally) available. Digitisers are responsible for producing qualitatively satisfying digital reproductions – within the limitations imposed by available time and means. Conservator-restorers are generally those within an institution who are directly responsible for the physical condition of the original objects. Elizabeth Meek stresses that it is necessary for someone involved in the digitisation project to take this role upon themselves: *'We observe that sometimes, in the midst of the focus on image capture and storage, deadlines, and budget constraints, the original needs an advocate, sometimes even a little jumping up and down to remind people of why and how it needs to be cared for, and why it [the original] is, indeed, supreme.'*⁸⁹ The objective of conservator-restorers is, then, to limit the risk of damage during the digitising process as much as possible. Digitisers and conservator-restorers work closely together during this process.

Within the staff of a library, conservator-restorers often have the most extensive knowledge of the physical characteristics of the materials of which a manuscript is composed and the processes of degradation to which they are susceptible. In addition, they possess very specific knowledge concerning different types of book structures and how they function. Experienced conservator-restorers are able to estimate the various values of the material properties of a codex (see the previous section for more on this point).

This knowledge set enables conservator-restorers to understand the risks of (aggravating) damage in various situations in a way that no one else can as well as to establish preventive measures that should be taken to prevent these risks (see the following section). Because of this, it is important for them to be aware of which devices are being used for digitisation within their institution and also to know who is doing the digitising (and what sort of training they have), to make clear the kinds of situations to which the manuscripts will be exposed.⁹⁰ On this basis, they will be able to determine whether a book can be safely digitised with the available devices and advice upon which devices are most appropriate to use for each manuscript.⁹¹

The role of the conservator-restorer in digitising projects should consist of the following aspects:

1. Determining whether a manuscript is suitable for digitising within or outside of the existing infrastructure. A conservator-restorer should be able to advise for or against digitisation based on the physical condition of a manuscript;
2. Determining the condition of the manuscript and what conservation and/or restoration measures are necessary before a manuscript can be digitised in a particular way;
3. Employing the measures determined by points 1 and 2;
4. Contributing to contextual information (for example, on websites and in publications);⁹²
5. Reducing the risks to the objects during the digitisation process by:
 - a. Giving advice concerning the transportation and temporary storage of the codices;
 - b. Providing training and advice to digitisers concerning handling of special and/or fragile codices;
 - c. Providing advice concerning the purchasing of digitisation devices and support equipment appropriate for certain manuscripts, in close consultation with the digitiser;

⁸⁹ Meek 2005: 1.

⁹⁰ In the case of manuscripts, this will most often involve devices that the institution has already or can readily bring in, because it is not desirable for the manuscripts to leave the relevant institution.

⁹¹ If it concerns a larger digitisation process, considerations of workflow will sometimes dictate that a certain device is selected. In Wolfenbüttel, the Wolfenbüttler Buchspiegel was used for the larger projects, even for books that in principle could have been digitised on another device.

⁹² A good example of this are the blog posts on the website of the *Early Irish Manuscripts Project* of Trinity College Library, Dublin. Among others: Trinity College Dublin. *Preparing the Book of Dimma for imaging*. 2016. <http://www.tcd.ie/Library/early-irish-mss/preparing-the-book-of-dimma-for-imaging-2/>. Consulted: 03-02-2019; IIC, Marzo, Hoffman and Borghese. *The British Library/Qatar Foundation Partnership behind the scenes – an interview with NiC*. 2013. <https://www.iiconservation.org/node/4390>. Consulted: 03-02-2019.

- d. Assisting in digitisation (handling the manuscript while the digitiser does the imaging).
- 6. Arranging appropriate final storage if necessary, particularly if books will be (more or less) completely withdrawn from consultation after digitisation, as digitisation is in some cases considered to be a means of preservation;
- 7. Designing and maintaining a database if desirable.⁹³

To make a carefully considered judgment concerning whether or not and how a manuscript should be digitised, knowledge from several disciplines should be gathered together. In addition to the previously mentioned knowledge of the conservator-restorer, this might include knowledge about the collection, the value(s) of a manuscript (from several perspectives, but especially history, palaeography, philology and book history) as well as knowledge of the various reproduction techniques. These are not considerations that would all be within the scope of a single individual. Ideally there will be interdisciplinary consultation prior to digitisation and, if necessary, also during digitisation. The down side of this is that consultation at such a detailed level is labour intensive, time-consuming and, because of this, quite costly. These disadvantages can be alleviated in part by increasing the background knowledge of the involved parties, such as the person bearing ultimate responsibility for the digitisation project or the conservator-restorer.

Two parties who should in any case be in frequent consultation are the conservator-restorer and the digitiser. Due to the cost of insurance, manuscripts are usually digitised within their institution. It is an advantage to keep the relevant lines of communication short. Here, the conservator-restorer and the digitiser share responsibility: the digitiser must handle the manuscript with respect and care so that its condition does not deteriorate, thereby diminishing its value. A conservation treatment carried out by the conservator-restorer prior to digitising may enhance the quality of the final digital images. If the digitiser has considerable experience in digitising objects that are unique cultural heritage and has a sensitivity to the materiality of manuscripts, then the conservator-restorer can feel confident in their work. The digitiser's goal is, however, usually focussed on producing the best possible reproductions. The limitations determined by the physical properties of the object will have to be respected and safeguarded by both the digitiser and the conservator-restorer.

If the manuscripts are not digitised in-house, but by an external digitisation company, the role of the conservator-restorer is important both before and after the objects are transferred. They can also assist on location during digitisation, if necessary. Their duties should at least include: writing a condition report, filling in the checklist and packing the manuscript. Also, they must evaluate the facility reports and cost estimates of the external digitisation companies. Immediately after return the condition of the manuscript should be re-evaluated.

The *checklist for the digitisation of manuscripts* is an aid for communication between the conservator-restorer and the digitiser. The risks to a manuscript can be limited by identifying per object which points require the digitiser's attention and by offering advice on these points. But what exactly are these risks? This will be discussed in greater depth in the following section.

⁹³ NB: All the above points are ideally taken into consideration in planning for a digitisation project (including establishing a budget).

4. Risks to manuscripts

During the digitisation process, there are various situations in which manuscripts are exposed to risks. The first such situation occurs when moving manuscripts to the location where they will be digitised. The location where digitisation will take place is of great influence on the degree of risk to which the books are exposed. Will the book be digitised in-house or will it leave the institution? If it will be digitised at its own institution, will it be digitised in its own building or will it have to be brought to another building, and are there obstacles or hindrances on the way, such as thresholds, awkward corners or movement from one storey to another? The books could bump against something during transport; they could fall from the transport cart or they could shift position within the transport case. Manuscripts can also be exposed to risks in temporary storage areas before and after digitisation as conditions in such areas are not always ideal.

The second such situation is the actual digitisation procedure itself. During digitisation, the manuscript is handled rather intensively. The pages are turned once or twice – depending on the digitisation method – all the way from front to back (and back again) and the book also must remain open for a relatively long time at a relatively wide angle (in the case of the methods most often used in the Netherlands and Flanders, at a 110° or 180° angle). Depending on the way manuscripts are constructed and their condition at the time of digitisation, this can have a substantial influence on the risk of (additional) damage. The consequences of damage suffered because of intensive handling during digitisation can be:

- Diminution of value/change in value;
- Reduction of physical integrity;
- Loss of material;
- Loss of information;
- Impaired stability and handling;⁹⁴
- Reduced accessibility.

The possibility of damage occurring during the digitisation process cannot be eliminated altogether, but various measures can be taken to reduce them to a minimum. Firstly, it is important to be mindful of the transportation of the manuscripts. It might be useful to consider; moving small quantities at a time and avoiding moving unstable piles, using solid, protective packaging and choosing or creating routes with the fewest possible obstacles. The rule generally holds that the shorter the route from the permanent storage location to the digitisation device, the smaller the risk of damage. In addition, it is important that the manuscripts be carefully stored before and after digitisation, for example in a box and in a closed, climate-controlled environment or – in the case of (economically) very valuable manuscripts – in a safe.

A digitisation workflow adapted to the condition and physical characteristics of a collection of manuscripts will also reduce the risks to the books. A choice must be made between treating the manuscript before or after digitisation (*more on this topic: section 5.6*). With respect to the digitisation itself, it is important that the people involved are aware of the physical characteristics that make manuscripts vulnerable during the intensive handling that is required. It is at least as important for them to know how to reduce risks to a minimum. One of the most important factors in this regard is that they know how to handle the manuscripts properly during the digitisation process. Factors playing a role in this respect are: how far can a book be opened without putting too much pressure on the joints? Do certain parts of the book need extra support? To what extent can certain book structures or (aged) materials be burdened and in what circumstances does one need to be extra careful? In general, the risks are higher when the digitisation staff have little experience or have not received training in handling fragile manuscripts. Instruction for these members of staff by conservator-restorers and experienced digitisers reduces such risks.

⁹⁴ On the other hand, digitisation can in some cases result in a book becoming easier to use. This is true, for example, for stiffly bound manuscripts: since the pages are turned page by page during digitisation – something that rarely occurs in ordinary use – they may become supple through the attention.

Finally, the smaller the budget, the fewer the available resources for dealing with risks and thus the more substantial the risks. This has to do with various factors. Firstly: if the budget allows it, the most appropriate reproduction devices and aids can be acquired. Ideally, a choice can be made between several different devices, so that an optimal balance can be found between reducing risks to the manuscript and working with an efficient digitisation method. Secondly, a large budget usually offers the possibility of ensuring that the appropriate people – trained digitisers and conservator-restorers – are involved in the process and have enough time to do their job well, consider the risks and have the resources to minimise them. On a small budget, deciding not to digitise, to digitise fewer manuscripts or to digitise less quickly would be the most obvious option for limiting the risks to the manuscripts.

5. Checklist for the digitisation of manuscripts

If and how a manuscript can be digitised depends primarily on how the book was made as well as the binding structure and the materials that were used. In addition to these factors, it is important to determine the condition of the book. The general condition is important as well as the condition of individual parts of the book. Even books that are seemingly in good condition can be more fragile than they appear to be at first glance and could be damaged by the stresses involved in digitisation. Aged material, for example, has often lost its flexibility, something that can only be determined by opening the book and not merely by looking at it. Alternatively, in some cases, a book might be badly damaged, but digitisation might not involve unreasonable risks. For example, because what might get damaged when digitising has already been damaged in the past. It is important that the digitiser is aware of the possible risks that a specific manuscript faces before beginning the digitisation process and of the physical characteristics they should be looking out for. The *Checklist for the digitisation of manuscripts* introduced and explained in this section serves as an aid for this. Based on conversations with the staff of libraries in the Netherlands and Flanders, a review of the literature and experience in digitising manuscripts, the draft version of the checklist has been developed with specific points of interest regarding the digitisation of manuscripts.

5.1 Usefulness and realisation of the checklist

At times during the interviews, doubts were raised about the usefulness of a checklist for the digitisation of manuscripts. It was said that only modern paper collections with acidic or brittle paper, such as newspapers, are challenging to digitise. Medieval manuscripts were said to be in better condition because they were made of superior materials. Although the materials used to produce medieval manuscripts are generally much more stable than those used to produce books since ca. 1840, medieval manuscripts can of course still be severely damaged.⁹⁵ They can even be in a very poor state. Some medieval manuscripts are bound less durably or with materials of lesser quality (for example poor quality parchment with many holes and repairs in it). Moreover, one must keep in mind that many medieval manuscripts were rebound centuries after they were produced, sometimes even on multiple occasions. It is therefore possible to find an illuminated medieval manuscript bound in a 19th century binding, for which inferior, acidic materials were used (thin cords as sewing supports or a flimsy sheepskin covering material, for instance, *Figs. 37 and 40*). The condition of a book and the materials used are not the only relevant concerns; there are other physical characteristics too that must be considered before the digitisation process commences. All these points have been included in the *checklist for the digitisation of manuscripts*.

A checklist looks simple, but it is not so easy to design one that is user-friendly and will be interpreted unambiguously. The advantage of using a checklist is that attention will be given to the points included in it. A disadvantage could be that people might stop thinking on their own and fail to register possible challenges that are not listed. And there will undeniably be other challenges and exceptions because every manuscript is unique both in form and content. It is necessary, then, to encourage people to continue to think critically and to produce the most complete checklist possible. The first version of the checklist was tested on twelve manuscripts from the collection of the Maurits Sabbe Library, KU Leuven Libraries. These codices will be digitised in the Imaging Lab of KU Leuven Libraries in 2018-2020.⁹⁶ The checklist was subsequently modified and filled in for one case: Gospels, Rhineland, 11th century (see *appendix I*).⁹⁷

⁹⁵ Because books from the period 1840-1960 are often more fragile, Metamorfoze funds conservation projects for these books: Metamorfoze. *Mogelijkheden voor archieven en collecties*. <https://www.metamorfoze.nl/aanvragen/mogelijkheden>. Consulted: 03-02-2019.

⁹⁶ This concerns the following twelve codices: *GBIB PM0021/V*, *GBIB PM0029/V*, *GBIB PM0037/V*, *GBIB PM0036/V*, *GBIB PM0012/V*, *GBIB PM0016/V*, *GBIB PM0691*, *GBIB PM0018/V*, *GBIB PM0034/V*, *GBIB PM0064/V*, *GBIB PM0022/V* and *GBIB PM0022/V*. Digitisation of the collection of illuminated manuscripts from the Maurits Sabbe Library will start in 2019. The conservation project of these codices has the support of the Fund Baillet-Latour of the King Baudouin Foundation, Belgium.

⁹⁷ Gospels, Rhineland, 11th c., *MS I BI*, Maurits Sabbe Library, KU Leuven Libraries. In adapting the checklist, attention was devoted particularly to making it as easy as possible to use, making the lay-out as clear as possible (for example, the digitiser can see at a glance whether anything requires his special attention), limiting the time needed to fill it in and making it as comprehensive as possible.

5.2 Using the checklist

In general, after the printed checklist has been filled in, it is meant to accompany the manuscript when it goes to the digitiser. They then review the checklist before digitising, so they know what will require special attention. The checklist has been developed in such a way that the digitiser can see at a glance if they need to be particularly careful: If everything to the left is checked, then there are no special problems. If there are checks in the middle or to the right, then there are matters with which they need to be especially careful.

The checklist as it is presented in this essay should be treated explicitly as a provisional version (*appendix II*). Every institution will have to adapt it to its own conditions. This version of the checklist could also be adapted to a specific sub-collection, if a set of manuscripts shares physical characteristics. In addition, an institution could decide to add values (such as financial value, value of the content and value of the physical properties) to their own checklist.

The checklist as presented here consists of six parts which are discussed individually below in the order in which they appear on the checklist. The first two parts consist of some general details of the manuscript and the details that are necessary for meta-dating. This information is very specific and will vary between different institutions. For this reason, no more attention will be devoted to it here.

5.3 Binding

In the third part of the checklist, the binding is evaluated in terms of physical characteristics that might be of consequence to the method and manner of digitisation. It is important for the digitiser to familiarise themselves with the thesaurus of bookbinding terms: *The Language of Bindings Thesaurus (LoB)*, so that they can understand the terms used in the checklist.⁹⁸ The most important terms are, however, also included in the illustration below (*Fig. 28*).

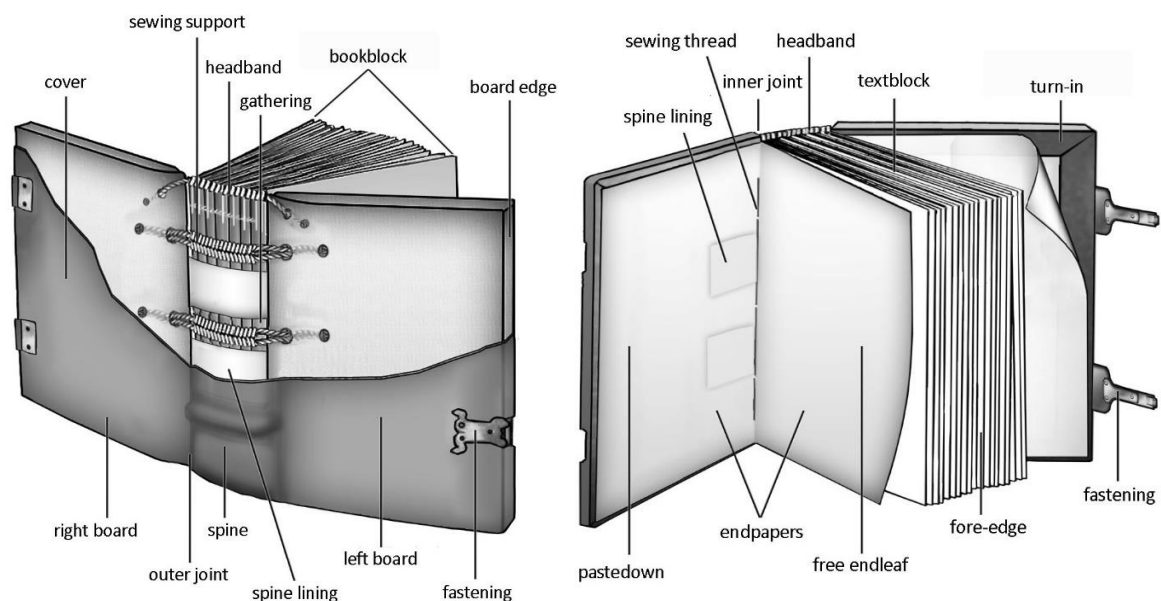


Fig. 28. Most important terms.

⁹⁸ Ligatus. *Language of Bindings*. <https://www.ligatus.org.uk/lob/>. Consulted: 03-02-2019. The Language of Bindings Thesaurus (LoB) is a thesaurus of bookbinding terms for book structures dating from the ninth to the nineteenth century.

One must first determine very generally whether the binding is easy to handle, should be handled with care or is difficult to handle (*Fig. 29*). Next, the dimensions are recorded, which, along with the issue of safe handling mentioned above, can have consequences for the digitisation setup used: very large, very thick (*Fig. 30*) or very small books often have to be digitised in a different way from books of more common dimensions.



Fig. 29. Difficult to handle.



Fig. 30. Very thick codex.

Next, the covering material(s) is/are written down and it is determined whether the binding has a hollow back or tight back. Tight back bindings are exposed to different risks from bindings with a hollow back. Bindings with a tight back are at relatively high risk of damage to the spine, because the book's spine is drawn into a convex shape during digitisation (*Fig. 31*). Leather or parchment and any gilded decorations on the spine can crack or break (which is why these decorations are also recorded), and pieces of covering material have a tendency to flake off (*Figs. 32 and 33*).

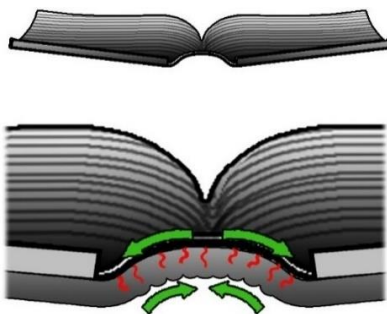


Fig. 31. Stress when opening a tight back book.



Fig. 32. Gilded spine.

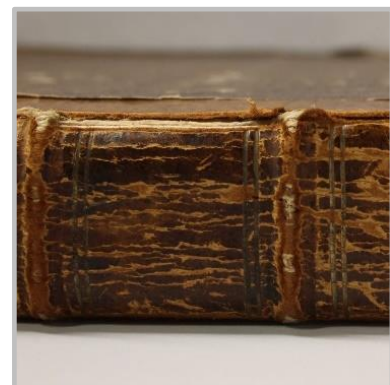


Fig. 33. Typical damage on the spine.

Bindings with hollow backs, by contrast, are at relatively high risk of damage to the joints and the sewing supports because these parts are under the most stress when the books are opened (*Fig. 34*). In addition, these books have an increased risk of the spine cracking if it is not supported well enough during digitisation (*Fig. 35*). The larger the opening angle, the higher the risk of such damage.

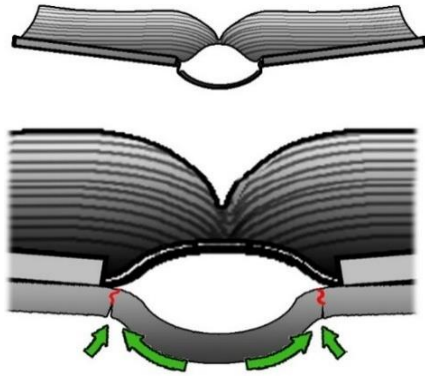


Fig. 34. Stress when opening a hollow back book.

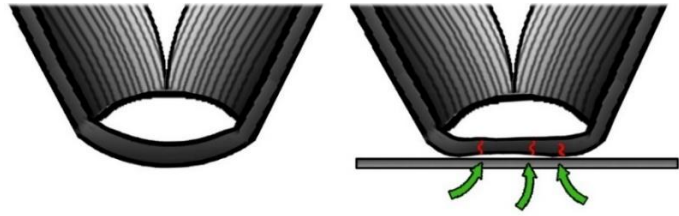


Fig. 35. Cracks can form if the spine is unsupported.

The current condition of the spine and caps are then classed as good, moderate or poor. Already damaged or fragile covering material can easily be damaged further and, as explained, this is especially true for the parts that move: the spine and the joints. Aged leather and, in particular, aged parchment that has become inflexible or brittle can easily break or crumble further with handling (Fig. 36). Powdery leather can cause problems if it sticks to hands or to a glass plate - if one is used - because the powder can spread throughout the bookblock and show on the digital images (Fig. 37).



Fig. 36. Damaged parchment.



Fig. 37. Powdery leather.

In addition, the following points are evaluated: whether the sewing supports are rigid or broken; the condition of the outer and inner joints; whether the boards are detached or whether even the entire binding has detached from the bookblock.

Because of the pressure exerted on a binding during digitisation, parts of the structure can be (further) damaged. The combination of the sewing supports (Fig. 38), the outer joints (covering material, Fig. 39), the extensions of the spine linings, and the inner joints (the endpapers, Fig. 40) are responsible for the board attachment. If any of these structural parts are damaged, the pressure on the others is increased. In this way, damage can quickly escalate and if all of the parts mentioned previously break, the boards or even the entire binding can become detached from the bookblock (Fig. 41). Handling the manuscript becomes even more difficult as a result and the risk of additional damage increases even further: the most vital functions of the boards or the binding – making the manuscript easier to handle and protecting the bookblock – can no longer be optimally fulfilled.

Furthermore, one must be aware of fragile boards (*Fig. 42*). The risk of the boards breaking is present in particular with smaller books with thin, wooden boards. Besides this risk, wooden boards are also vulnerable to woodworm. A board may appear to be strong while it is in fact extremely brittle because it has been largely eaten away.

The endbands can also play a (small) role in the attachment of the boards or binding to the bookblock as they often have tie-downs which pass through the spine-folds of certain gatherings (tacked endbands) and have cores that can be laced through the boards. In addition to the fact that these cores – just like sewing supports – can break if subjected to too much pressure while digitising, the sewing can wear and unravel (*Fig. 43*). Care is then required because there is a risk of the sewing unravelling even further with handling. The endbands might even become detached, creating the risk of losing them altogether.



Fig. 38. Broken sewing supports.



Fig. 39. Broken outer joint.



Fig. 40. Broken inner and outer joint.



Fig. 41. Detached board.



Fig. 42. Broken board.



Fig. 43. Damaged endband.

Additional attention is required for books with fastenings. Clasps can damage the bookblock during digitisation if they fall against it (*Fig. 44*). Leather straps are often vulnerable. In order to digitise the folios well, the straps will have to be bent far back and fastened in that position, so that they remain outside the digital image. Therefore, the stress on the straps is many times greater during digitisation than when the book is consulted in the reading room (*Fig. 45*). There is the risk of weak straps that may be already torn or no longer flexible, tearing or breaking off altogether during digitisation. Silver clasps or other metal parts may only be touched while wearing gloves to prevent (additional) oxidation by contact with, among other things, acids from the skin.⁹⁹



Fig. 44. Clasp.



Fig. 45. Left: clasps during digitisation; right: clasps during consultation in reading room.

In the "binding" section on the checklist, the final aspect to be indicated is whether there are any loose fragments of the binding with the manuscript (in the box or between the endpapers/folios). If so, there is the risk of damaging them or of the fragments being misplaced and lost.

Next, there is space for additional comments and, finally, in the section 'pay attention! – binding', the most important issues for the digitiser to be aware of before they begin digitisation can be indicated.

5.4 Bookblock

In the fourth part of the checklist, the physical characteristics and condition of the bookblock are described. This exercise is potentially time-consuming, particularly if every folio is independently considered (something that may not always be realistic for every book and every workflow). It is in any case important to give a general evaluation of how easily the bookblock can be handled. This depends on the material that comprises the bookblock, the condition and type of sewing structure that was used (*Fig. 46*) and the condition of the individual folios. Are there any loose folios (*Fig. 47*)? Are any folios adhered to one another? Is there mould damage (*Fig. 48*)? Is the parchment distorted (*Fig. 49*)? Are there any creases (*Fig. 50*), tears (*Figs. 51 and 52*) or unstable lacunas (*Figs. 69 and 70*)? Or are there any detaching previous repairs (*Fig. 53*)?

⁹⁹ For parts of the book that are not metallic, the rule is, however, that they should not be handled with gloves because doing so would in fact increase rather than decrease the risk of damage. See: Baker and Silverman 2005.



Fig. 46. Damaged sewing.

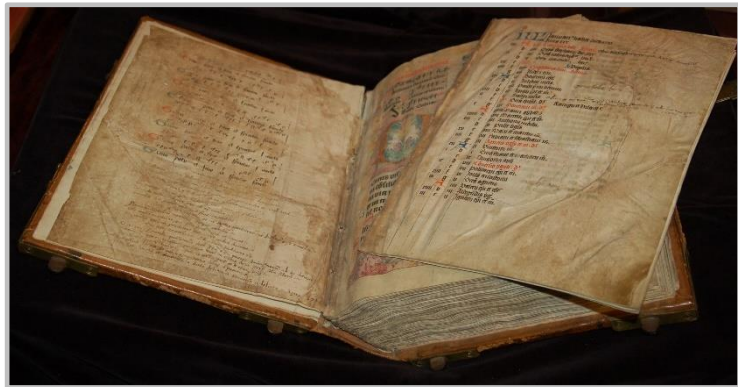


Fig. 47. Loose folios.



Fig. 48. Mould damage.



Fig. 49. Distorted parchment (raking light).



Fig. 50. Crease

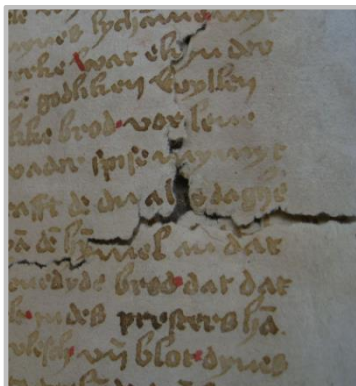


Fig. 51. Dried-out paper with tears.

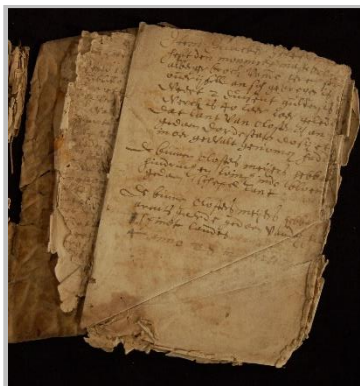


Fig. 52. Torn edges.

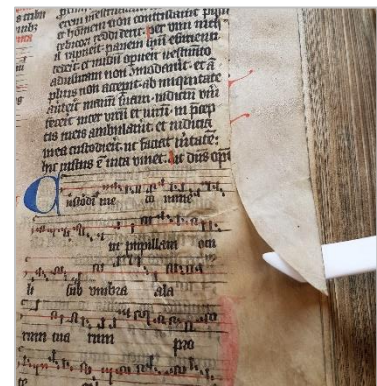


Fig. 53. Detaching previous repair.

Just like powdery leather, soiling can stick to hands or glass plates, spread throughout the bookblock and thus negatively influence the quality of the digital images. The same applies to mould residue (Fig. 54), and in such cases there is also a health risk if they are inhaled. Further, fungal spores can be germinative, posing a significant risk of the mould spreading.

Textual information can be concealed underneath fold-outs, stubs or fragments that are attached to folios in some way (Fig. 55). When these are discovered, a decision has to be made about how to deal with them when digitising. Should fold-outs only be reproduced when fully folded out or also in their folded-in position (or even in each phase of being folded-out)? Stubs can be very narrow and thus be overlooked; a note to the digitiser alerting them to stubs that cover up or carry information would therefore be useful.

It will also be necessary to decide how to deal with wax seals (Fig. 56), pins and loose fragments (Fig. 57) when digitising: should they be digitised where they were found in the book or removed from the book and reproduced separately, or both (Figs. 58 and 59)?

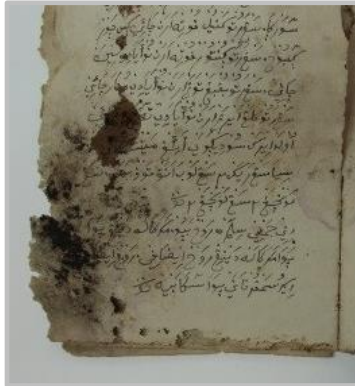


Fig. 54. Mould residue.



Fig. 55. A sewn-on fragment covering text.

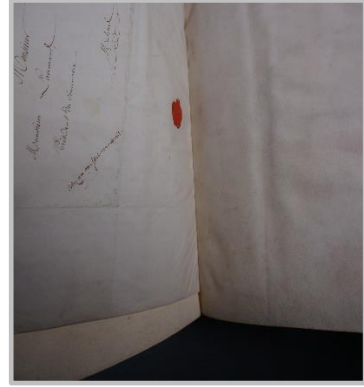


Fig. 56. Wax seal.



Fig. 57. Loose fragments and folios.



Fig. 58 and 59. Digitise in the book and/or separately?



The use of certain media can mean that, in addition to requiring extra care when handling, a glass plate cannot be used in digitisation because the risk of damage or loss of material would be too great. Flaking inks or powdery pigments (Fig. 60), vulnerable paint layers (Fig. 61), gold-leaf on a base layer of gesso (Fig. 62) or advanced ink or copper corrosion are especially vulnerable (Figs. 63, 64 and 65).¹⁰⁰

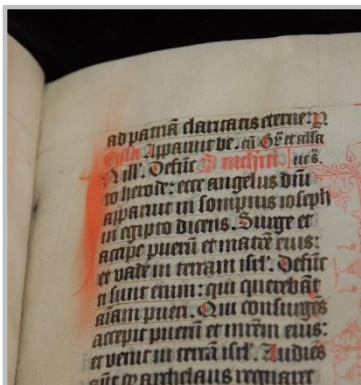


Fig. 60. Powdery pigments.



Fig. 61. Vulnerable/flaking paint layers.



Fig. 62. Initial with goldleaf.

¹⁰⁰ In some cases, vulnerable media will mean that the book is rejected for digitisation or that digitisation can only take place under the supervision of the conservator-restorer, in other cases, however, digitisation can take place on the condition that glass plates are not used.



Fig. 63. Ink corrosion.



Figs. 64 and 65. Copper corrosion on paper (left) and parchment (right).

The text may also be written deep into the gutter, where it cannot easily be accessed. This can mean that one must accept that a portion of the text will not be captured in the digital reproduction or that a book will be rejected for digitisation, particularly if the codex can only be opened at a small angle (less than 90°).

The items on the checklist can be supplemented with other considerations that have come to the attention of the conservator-restorer, such as, for example, a little sewn-in curtain covering an initial (Fig. 66). Finally, a summary is made for the digitiser under the section 'pay attention! – bookblock'.



Fig. 66. Sewn-in curtain covering an initial.

5.5 Conservation

In the fifth section of the checklist, preparations necessary before a manuscript can be safely digitised, if any, are described: folding out dog-ears, for example, or foliating in pencil. Next it is determined whether the manuscript requires conservation or restoration treatment by a conservator-restorer. With regard to the bookblock and the book's structure, consideration can be given, for example, to the following: consolidation of media, repairing unstable tears or tears across the text or illuminations, flattening creases across the text or illuminations, stabilising ink or copper corrosion, attaching loose folios, stabilising the sewing, resewing (portions of) the bookblock, reinforcing the inner joints, re-attaching boards or stabilising endbands.

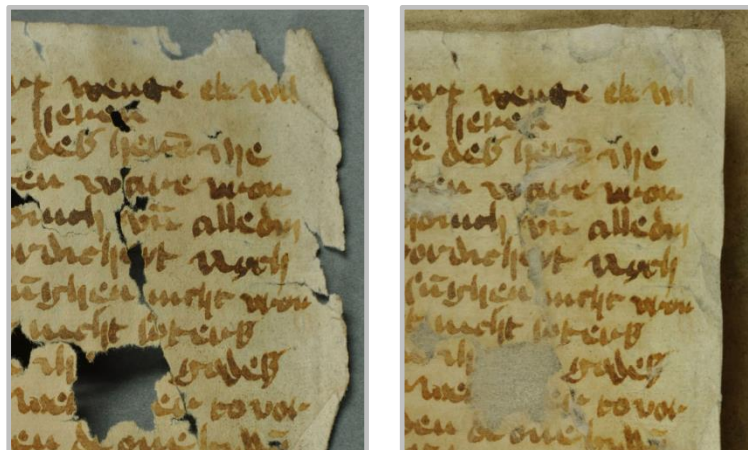
With respect to the binding: repairing outer joints, caps or spine, or consolidating powdery leather may be considered. Consideration may also be given to removing the manuscript from its current binding prior to digitisation, but only in very exceptional circumstances – when, for instance, the present binding is not contemporary with the manuscript and is also actually causing damage to it.

In some cases, treatment will have to precede digitisation, for instance when the manuscript would otherwise be too difficult to handle (the risk of additional damage or loss of material would be too high) (Figs. 67 and 68) or because it would make textual information or illuminations more visible on the digital copy (Figs. 69 and 70).

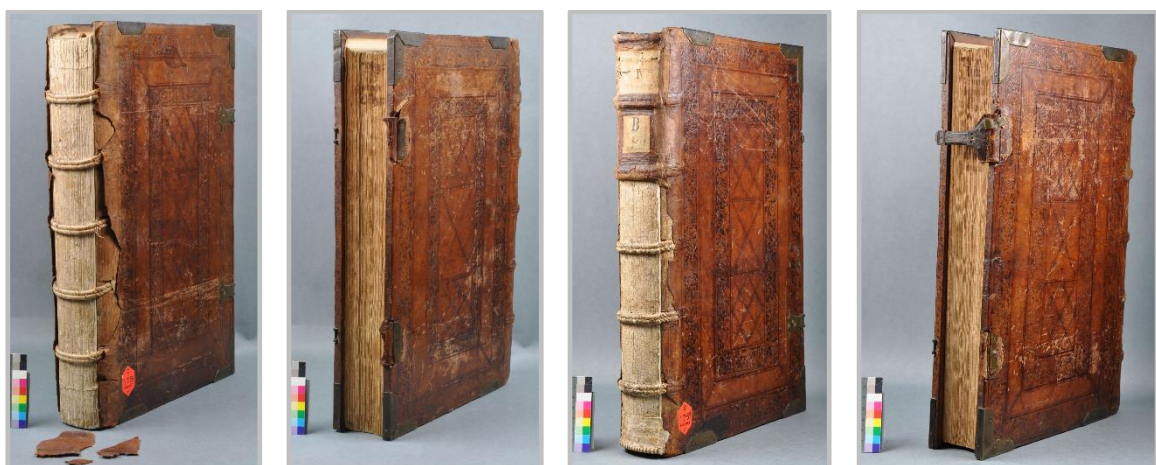
In other cases, the advice will be to carry out treatment after digitisation because the codex will be easier to digitise in its present condition (Figs. 71 - 74). It can be necessary for the conservator-restorer to assist and handle the manuscript during the digitisation process. Finally, the most practical option can be to digitise during the restoration treatment, considering that an unbound or spineless manuscript is often more easily opened than one that has been re-backed or rebound.



Figs. 67 and 68. Damaged, thin leather covering material. The risk of further damage during digitisation is significant; therefore, it is better to stabilise the damage prior to digitisation.



Figs. 69 and 70. Treatment prior to digitisation prevents additional loss of material and information.



Figs. 71 - 74. Binding with detached spine and clasp. The book can be opened most effectively without covering material on the spine and digitisation is less complicated without the clasp (Figs. 57 and 58), therefore, this book is best digitised in its current condition and restored only after digitisation is finished (Figs. 59 and 60).

5.6 Digitisation

Firstly, it is important to accept that some manuscripts simply cannot be digitised, at least not with present-day equipment or the technology available within an institution. It is therefore often unrealistic to attempt to render an entire collection digitally available due to the nature of the original manuscripts. Before beginning to digitise, the digitiser must know whether they are dealing with a manuscript that is read from left-to-right or right-to-left, because this determines on which side the digitiser will start.

Whether a glass plate can be used in a responsible way must be determined based on the previous observations with respect to, among other things, the condition of the manuscript's joints and the media used. A very important question is: how wide can the book safely be opened? It is very tempting to force a book open a little further in order to enable a good reproduction. If it has been recorded on the checklist that a book cannot be opened wider than 90°, such advice from the conservator-restorer must be strictly adhered to (*Figs. 75 and 76*).



Fig. 75. Tight back – opens less than 90° after a re-back.

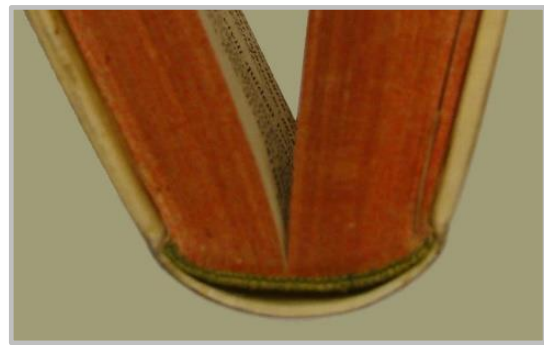


Fig. 76. Hollow back – opens less than 90°.

The condition of the binding next determines whether use of the *Conservation Copy Stand* is necessary to optimally support the manuscript during digitisation.

Finally, the checklist should indicate whether the assistance of a conservator-restorer is required and what aids are likely to be needed during digitisation. In this regard, consideration might be given to the use of custom-made pieces of foam to support the spine, gloves for handling codices with silver fastenings or lead snakes to weigh down a book that will not lie flat on its own.

If desired, the information on the checklists of a selection of manuscripts can be entered into a database. The information in the database might be useful for planning a digitisation project: separate lists can be generated that, for example, indicate manuscripts that can be digitised at once or manuscripts that first require treatment, or that can only be digitised in a responsible way with the assistance of a conservator-restorer.

Conclusions

Too often, during the digitisation of medieval manuscripts, too little consideration is given to the physical properties and the materiality of the books and the potential risks to which they are exposed during their handling. When we are concerned with the large-scale digitisation of books whose textual information is much more valuable than their physical properties and materiality, then from a pragmatic point of view this might be considered a responsible practice. However, if we are working with expensive and unique manuscripts, then the attention given to the original is not something to be dealt with heedlessly. It is important to rely on the expertise of the conservator-restorer and to incorporate their advice that in some cases less, slower or even no digitisation at all should be carried out due to the condition of a manuscript at the start of a project. The appropriate care and attention in dealing with the materiality of the manuscript and its historical book binding during digitisation are of fundamental importance. By involving the conservator-restorer closely in the digitisation process, the value of the project with respect to the long-term conservation of the unique heritage of manuscripts can be significantly enhanced. The *Checklist for the digitisation of manuscripts* introduces an instrument that is intended to aid with the preparation of a manuscript for the digitisation process, to register and reduce risks of damage and guide the digitiser in his work. In this way, the cluster of values inherent in a bound medieval manuscript can be optimally preserved.

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About the authors

Ilse Korthagen is a junior conservator-restorer at the Book Heritage Lab – KU Leuven (2018 - 2019) and at RNA - Restauratie Nijhoff Asser in Amsterdam. In October 2016, she completed the postgraduate track of the Conservation and Restoration of Cultural Heritage programme (book and paper) at the University of Amsterdam. Previously, she worked at Hoogduin Papierrestauratoren in Delft and did internships at the Rijksmuseum Amsterdam; the National Archives and the National Library of The Netherlands, The Hague; Leiden University Libraries; Trinity College Library, Dublin; KU Leuven Libraries; the National Library of Scotland, Edinburgh and Staatsbibliothek zu Berlin. In addition to the digitisation of books, she takes a special interest in the history of book conservation and restoration.

Femke Prinsen is a book conservator-restorer at the National Archives of the Netherlands and a lecturer in book conservation at the Department of Conservation and Restoration of Cultural Heritage at the University of Amsterdam. She also works as an independent book and paper conservator for libraries, archives and museums, such as Leiden University Libraries and the National Museum of Antiquities, Leiden. From 2010 to 2013 she was employed as a conservator of manuscripts and early printings at the Herzog August Library in Wolfenbüttel, in the context of a large-scale research and digitisation project of medieval monastic libraries. Femke Prinsen holds an MA in History from the University of Groningen and she completed the four-year programme in Book and Paper Conservation at the Cultural Heritage Agency in Amsterdam.

Professor dr. Lieve Watteuw is an art historian and conservator-restorer of manuscripts and graphic materials at the KU Leuven where she lectures 'Technology and Laboratory Research', 'Medieval Manuscript Illumination' and 'Book Archaeology'. She is a senior staff member at Illuminare, Research Centre for Medieval Art and head of the Book Heritage Lab - KU Leuven (Faculty of Theology and Religious Studies). She is coordinator of the RICH Project (Reflecting Imaging for Cultural Heritage) and the 3Pi project (Diagnosis of Papyrus, Parchment and Paper through advanced Imaging, 2018-2022). The Book Heritage Lab is an expert centre for researching manuscripts through imaging, visualisation and analytical methods. Her research focusses on the scientific imaging of manuscripts and miniatures, art technology and the history of conservation-restoration. She is involved as an expert in various national and international research projects in the area of medieval manuscripts.

Bruno Vandermeulen earned his MA in Fine Arts, Photography, at the LUCA School of Arts, Brussels, and is head of UBD Digitisation of the University Library, KU Leuven. The Imaging Lab is specifically equipped for digitising documentary heritage with a special focus on quality, in both reproduction and handling of the original object. In addition to large digitisation projects on location, at both national and international levels (incunabula collection, KU Leuven; Magister Dixit; European Photography), he works closely with researchers in art and engineering sciences on art-technological imaging (RICH project; Fingerprint; Art Garden). His expertise is increasingly drawn upon for digitising external collections in the context of research projects, such as the Codex Eyckensis, the collection of manuscripts at Museum Mayer van den Bergh, etc.

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Wagenaar, Miriam and Paulien Rings (National Library of the Netherlands, The Hague)

All interviews were held between Januari and March 2016.

Correspondence

Bergen, Saskia van (Leiden University Libraries)

Dijk, Willemien van (VU Amsterdam University Library)

Folkerts, Suzan (Athenaeum Library Deventer)

Haar, Alisa van de and Gerda Huisman (University of Groningen Library)

Rings, Paulien (National Library of the Netherlands, The Hague)

Roon, Marike van (Amsterdam University Library)

Stappen, Coen van der (Utrecht University Library)

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Gospels, Rhineland, 11th c., *MS 1 B1*, Maurits Sabbe Library, KU Leuven Libraries.
Photography: Imaging Lab – KU Leuven Libraries, 2016
- Fig. XI* *Opening.*
Gospels, Rhineland, 11th c., *MS 1 B1*, Maurits Sabbe Library, KU Leuven Libraries.
Photography: Imaging Lab – KU Leuven Libraries, 2016

Appendix I: Checklist case-study - Gospels, Rhineland, 11th century

MANUSCRIPT DIGITISATION		Name	Ilse Korthagen	Date	31-03-2019
MANUSCRIPT Shelfmark <u>MS 1 B1</u> Custodian <u>Maurits Sabbe Library (GBIB)</u> Short title <u>Gospels</u> Author, date <u>unknown second half 11th c.</u> Enclosure <u>PYXIS box (acid free)</u>		METADATA Foliation <u>present / supplemented (new)</u> Number of folios <u>199</u> Total amount of images <u>407</u> Additional comments <u>include blank folios, spine & edges</u>			
BINDING Handling <input type="radio"/> easy <input checked="" type="radio"/> with care <input type="radio"/> difficult Dimensions (HWD in mm) <u>292</u> x <u>220</u> x <u>86</u> Covering material(s) <u>alum tawed sheepskin</u> Spine <input type="radio"/> hollow back <input checked="" type="radio"/> tight back <input type="radio"/> good <input checked="" type="radio"/> moderate <input type="radio"/> poor Cap (head) <input checked="" type="radio"/> good <input type="radio"/> moderate <input type="radio"/> poor Cap (tail) <input checked="" type="radio"/> good <input type="radio"/> moderate <input type="radio"/> poor Gilding on spine <input checked="" type="radio"/> no <input type="radio"/> yes Powdery leather <input checked="" type="radio"/> no <input type="radio"/> yes Rigid sewing supports <input checked="" type="radio"/> no <input type="radio"/> yes Broken sewing supports <u>4</u> out of <u>5</u> Left outer joint <input type="radio"/> good <input type="radio"/> moderate <input checked="" type="radio"/> poor Right outer joint <input type="radio"/> good <input checked="" type="radio"/> moderate <input type="radio"/> poor Left inner joint <input type="radio"/> good <input type="radio"/> moderate <input checked="" type="radio"/> poor Right inner joint <input type="radio"/> good <input checked="" type="radio"/> moderate <input type="radio"/> poor Detached boards <u>no</u> Detached binding <input checked="" type="radio"/> no <input type="radio"/> yes Vulnerable boards <input checked="" type="radio"/> no <input type="radio"/> yes Headband <input checked="" type="radio"/> good <input type="radio"/> moderate <input type="radio"/> poor Tailband <input checked="" type="radio"/> good <input type="radio"/> moderate <input type="radio"/> poor Clasps <input checked="" type="radio"/> no <input type="radio"/> yes Vulnerable fastenings <input checked="" type="radio"/> no <input type="radio"/> yes Silver components <input checked="" type="radio"/> no <input type="radio"/> yes Loose fragments <input checked="" type="radio"/> no <input type="radio"/> yes Additional comments <u>vulnerable paper label on spine</u>		BOOKBLOCK Handling <input type="radio"/> easy <input checked="" type="radio"/> with care <input type="radio"/> difficult Bookblock material(s) <u>parchment (relatively thick)</u> Sewing <input checked="" type="radio"/> good <input type="radio"/> moderate <input type="radio"/> poor Stitching <input checked="" type="radio"/> no <input type="radio"/> yes Loose gatherings/folios <input type="radio"/> none <input checked="" type="radio"/> some <input type="radio"/> many Adhered folios <input checked="" type="radio"/> no <input type="radio"/> yes Mould damage <input checked="" type="radio"/> none <input type="radio"/> some <input type="radio"/> many Distorted parchment <input checked="" type="radio"/> none <input type="radio"/> some <input type="radio"/> many Dog ears, creases <input type="radio"/> none <input checked="" type="radio"/> some <input type="radio"/> many Tears <input type="radio"/> none <input checked="" type="radio"/> some <input type="radio"/> many Detaching previous repairs <input checked="" type="radio"/> none <input type="radio"/> some <input type="radio"/> many Unstable lacunas <input checked="" type="radio"/> none <input type="radio"/> some <input type="radio"/> many Soiled folios <input type="radio"/> none <input checked="" type="radio"/> some <input type="radio"/> many Mould residue <input checked="" type="radio"/> no <input type="radio"/> yes Fold-outs <input checked="" type="radio"/> no <input type="radio"/> yes Stubs <input type="radio"/> none <input checked="" type="radio"/> some <input type="radio"/> many Seals/pins/etc. <u>no</u> Other loose components <u>some fragments</u> Flaking inks/pigments <input checked="" type="radio"/> no <input type="radio"/> yes Vulnerable paint layers <input type="radio"/> none <input checked="" type="radio"/> some <input type="radio"/> many Gilding <input checked="" type="radio"/> no <input type="radio"/> yes Ink/copper corrosion <input checked="" type="radio"/> none <input type="radio"/> some <input type="radio"/> many Text in gutter <input type="radio"/> no <input checked="" type="radio"/> yes <u>0</u> mm Additional comments <u>some vulnerable initials</u> <u>some missing folios</u>			
PAY ATTENTION! - BINDING <u>left board almost detached, 1 very weak sewing support</u> <u>handle with care!</u>		PAY ATTENTION! - BOOKBLOCK <u>loose folios: left endpapers, ff. 1 - 10, 52, 53, 54.</u> <u>partly loose: ff. 50, 51, 52, 54, 96, 97, 98, 145 & 146</u>			
CONSERVATION Preparation <input checked="" type="radio"/> no <input type="radio"/> yes Treatment <input type="radio"/> no <input checked="" type="radio"/> yes <input type="radio"/> before <input type="radio"/> during <input checked="" type="radio"/> after Duration estimate <input type="radio"/> less than one day <input checked="" type="radio"/> more New enclosure needed <input checked="" type="radio"/> no <input type="radio"/> yes		DIGITISATION <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES Orientation <input checked="" type="radio"/> left-to-right <input type="radio"/> right-to-left Glass plate <input checked="" type="radio"/> no <input type="radio"/> yes Max. opening angle <input type="radio"/> 180° <input checked="" type="radio"/> 120° <input type="radio"/> 90° <input type="radio"/> < 90° Conservation Copy Stand <input type="radio"/> no <input checked="" type="radio"/> yes Conservator's assistance <input type="radio"/> no <input checked="" type="radio"/> yes Recommended aids <u>lead snakes, spine support</u>			



Fig. I and II. Left board.



Fig. III. Spine and left outer joint.



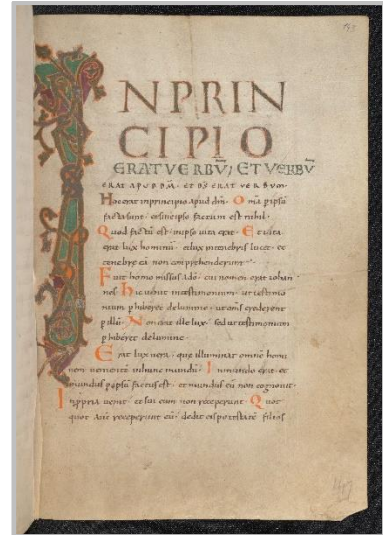
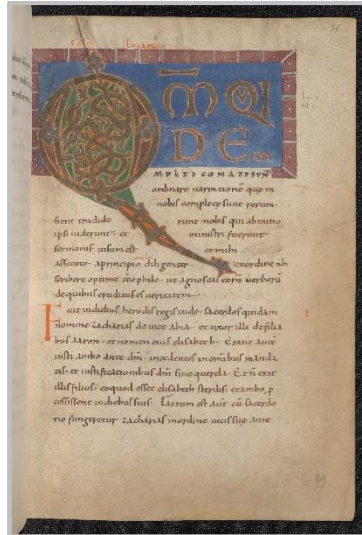
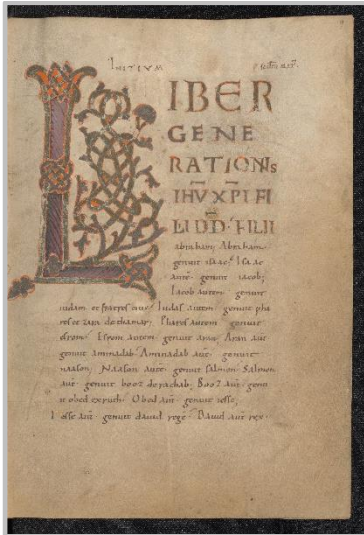
Fig. IV. Spine and right outer joint.



Fig. V. Left inner joint and loose folios.



Fig. VI. Loose folios: ff. 50 - 54.



Figs. VII, VIII and IX. Fragile initials: ff. 11r, 99r and 147r.



Fig. X. Fragment.



Fig. XI. Opening.

Appendix II: Checklist for the digitisation of manuscripts

MANUSCRIPT DIGITISATION	Name	Date
<p style="text-align: center;">MANUSCRIPT</p> <p>Shelfmark</p> <p>Custodian</p> <p>Short title</p> <p>Author, date</p> <p>Enclosure</p>	<p style="text-align: center;">METADATA</p> <p>Foliation present / supplemented / new</p> <p>Number of folios</p> <p>Total amount of images</p> <p>Additional comments</p>	
<p style="text-align: center;">BINDING</p> <p>Handling <input type="radio"/> easy <input type="radio"/> with care <input type="radio"/> difficult</p> <p>Dimensions (HWD in mm) x x</p> <p>Covering material(s)</p> <p>Spine <input type="radio"/> hollow back <input type="radio"/> tight back</p> <p style="padding-left: 20px;"><input type="radio"/> good <input type="radio"/> moderate <input type="radio"/> poor</p> <p>Cap (head) <input type="radio"/> good <input type="radio"/> moderate <input type="radio"/> poor</p> <p>Cap (tail) <input type="radio"/> good <input type="radio"/> moderate <input type="radio"/> poor</p> <p>Gilding on spine <input type="radio"/> no <input type="radio"/> yes</p> <p>Powdery leather <input type="radio"/> no <input type="radio"/> yes</p> <p>Rigid sewing supports <input type="radio"/> no <input type="radio"/> yes</p> <p>Broken sewing supports out of</p> <p>Left outer joint <input type="radio"/> good <input type="radio"/> moderate <input type="radio"/> poor</p> <p>Right outer joint <input type="radio"/> good <input type="radio"/> moderate <input type="radio"/> poor</p> <p>Left inner joint <input type="radio"/> good <input type="radio"/> moderate <input type="radio"/> poor</p> <p>Right inner joint <input type="radio"/> good <input type="radio"/> moderate <input type="radio"/> poor</p> <p>Detached boards</p> <p>Detached binding <input type="radio"/> no <input type="radio"/> yes</p> <p>Vulnerable boards <input type="radio"/> no <input type="radio"/> yes</p> <p>Headband <input type="radio"/> good <input type="radio"/> moderate <input type="radio"/> poor</p> <p>Tailband <input type="radio"/> good <input type="radio"/> moderate <input type="radio"/> poor</p> <p>Clasps <input type="radio"/> no <input type="radio"/> yes</p> <p>Vulnerable fastenings <input type="radio"/> no <input type="radio"/> yes</p> <p>Silver components <input type="radio"/> no <input type="radio"/> yes</p> <p>Loose fragments <input type="radio"/> no <input type="radio"/> yes</p> <p>Additional comments</p> <p>.....</p>	<p style="text-align: center;">BOOKBLOCK</p> <p>Handling <input type="radio"/> easy <input type="radio"/> with care <input type="radio"/> difficult</p> <p>Bookblock material(s)</p> <p>Sewing <input type="radio"/> good <input type="radio"/> moderate <input type="radio"/> poor</p> <p>Stitching <input type="radio"/> no <input type="radio"/> yes</p> <p>Loose gatherings/folios <input type="radio"/> none <input type="radio"/> some <input type="radio"/> many</p> <p>Adhered folios <input type="radio"/> no <input type="radio"/> yes</p> <p>Mould damage <input type="radio"/> none <input type="radio"/> some <input type="radio"/> many</p> <p>Distorted parchment <input type="radio"/> none <input type="radio"/> some <input type="radio"/> many</p> <p>Dog ears, creases <input type="radio"/> none <input type="radio"/> some <input type="radio"/> many</p> <p>Tears <input type="radio"/> none <input type="radio"/> some <input type="radio"/> many</p> <p>Detaching previous repairs <input type="radio"/> none <input type="radio"/> some <input type="radio"/> many</p> <p>Unstable lacunas <input type="radio"/> none <input type="radio"/> some <input type="radio"/> many</p> <p>Soiled folios <input type="radio"/> none <input type="radio"/> some <input type="radio"/> many</p> <p>Mould residue <input type="radio"/> no <input type="radio"/> yes</p> <p>Fold-outs <input type="radio"/> no <input type="radio"/> yes</p> <p>Stubs <input type="radio"/> none <input type="radio"/> some <input type="radio"/> many</p> <p>Seals/pins/etc.</p> <p>Other loose components</p> <p>Flaking inks/pigments <input type="radio"/> no <input type="radio"/> yes</p> <p>Vulnerable paint layers <input type="radio"/> none <input type="radio"/> some <input type="radio"/> many</p> <p>Gilding <input type="radio"/> no <input type="radio"/> yes</p> <p>Ink/copper corrosion <input type="radio"/> none <input type="radio"/> some <input type="radio"/> many</p> <p>Text in gutter <input type="radio"/> no <input type="radio"/> yes mm</p> <p>Additional comments</p> <p>.....</p>	
<p>PAY ATTENTION! - BINDING</p> <p>.....</p> <p>.....</p>	<p>PAY ATTENTION! - BOOKBLOCK</p> <p>.....</p> <p>.....</p>	
<p style="text-align: center;">CONSERVATION</p> <p>Preparation <input type="radio"/> no <input type="radio"/> yes</p> <p>Treatment <input type="radio"/> no <input type="radio"/> yes</p> <p style="padding-left: 20px;"><input type="radio"/> before <input type="radio"/> during <input type="radio"/> after</p> <p>Duration estimate <input type="radio"/> less than one day <input type="radio"/> more</p> <p>New enclosure needed <input type="radio"/> no <input type="radio"/> yes</p>	<p style="text-align: center;">DIGITISATION <input type="checkbox"/> NO <input type="checkbox"/> YES</p> <p>Orientation <input type="radio"/> left-to-right <input type="radio"/> right-to-left</p> <p>Glass plate <input type="radio"/> no <input type="radio"/> yes</p> <p>Max. opening angle <input type="radio"/> 180° <input type="radio"/> 120° <input type="radio"/> 90° <input type="radio"/> < 90°</p> <p>Conservation Copy Stand <input type="radio"/> no <input type="radio"/> yes</p> <p>Conservator's assistance <input type="radio"/> no <input type="radio"/> yes</p> <p>Recommended aids</p>	