Eighteenth international seminar on the care and conservation of manuscripts

Copenhagen 22nd – 24th of April 2020

The University of Copenhagen
Faculty of Humanities, Southern Campus

Care and Conservation of manuscripts 18
Copenhagen - 22-24 April 2020

Book of abstracts
Flateyjarbók (Codex Flateyensis) is the largest of all Icelandic medieval manuscripts, 225 leaves and richly illuminated. It contains a collection of texts relating to the Norwegian realm: Sagas of the kings of Norway, Orkneyinga saga, Færeyinga saga, Grænlendinga saga, Eiriks saga víðförla and other tales, as well as genealogies, annals and some poetry. In a preface on fol. 1v it says that its owner is Jón Hákonarson (who was a rich farmer, living in Víðidalstunga in Northern Iceland) and that the book was made by two scribes, both clerics, Jón Þórðarson and Magnús Þórhallsson. Magnús was also responsible for the illuminations. The manuscript was written in Northern Iceland, possibly at the monastery in Pingeyrar, in the years 1387–94, except for leaves 188–210 which were added later, probably in the fifteenth century.

Little is known about the early history of the manuscript, but by the late fifteenth century it seems to have passed into the hands of Þorleifur Björnsson hirðstjóri in the northwest of Iceland. It is certain that Þorleifur’s grandson, Jón Björnsson of Flatey, owned the book, and that he passed it on to his own grandson, Jón Finnsson, also of Flatey — hence the manuscript’s nickname. In 1647 Jón Finnsson gave the book to Bishop Brynjólfiður Sveinsson of Skálholt who nine years later sent the book as a gift to King Frederik III of Denmark. The manuscript remained in the Royal Library in Copenhagen until 1971 when it became one of the first two manuscripts to be restored to Iceland as a result of the bilateral agreement between Denmark and Iceland which put an end to the so-called ‘manuscript dispute’.

Flateyjarbók was rebound in the second half of the eighteenth century in two full-leather bindings, making its appearance similar to other books in the Royal collection. As no physical description of the manuscript exists before that time, it is a pertinent question whether the division of the book was made at the time of the rebinding or whether the manuscript was already in two volumes when it came to Copenhagen.

A facsimile edition of the manuscript was produced in 1930. In preparation for the edition the manuscript was disbound and photographed. It was then rebound, using the eighteenth century leather bindings. In the course of the rebinding, a thick layer of animal glue was applied to the spine of both volumes. Subsequently, the glue penetrated into the spine folds of the parchment bifolia and has even affected marginalia notes and decorated initials. The dried glue started to split, causing damage to adjacent parchment folia and resulting in a limited opening of the volumes. To make Flateyjarbók accessible for research and exhibition and to preserve it for future generations, conservation was unavoidable.

In this paper, conservators Vasarė Rastonis and Jiří Vnouček will describe the challenges the conservation of Flateyjarbók poses and the ways in which they were met, as well as discussing the question of how the manuscript should be rebound.
2. Silvia Hufnagel, Vasarė Rastonis and Robert Fuchs: Paper trails in Iceland: Taking hyperspectral images of watermarks in paper in Icelandic collections

In this presentation we are going to introduce the project “Paper Trails: A Material History of 16th and 17th Century Icelandic Books from Paper Production to Library Collection”, funded by the Icelandic Research Council and the Gerda-Henkel-Stiftung, as well as digital watermark databases, different methods of watermark imaging with a specific focus on hyperspectral imaging and conservational aspects of these methods. We aim to highlight our interdisciplinary approach by presenting aspects of engineering, paper conservation and book and paper history.

“Paper Trails” is a project that focuses on paper history and trade, object biography and library collections. It is housed at the Árni Magnússon Institute for Icelandic Studies in Reykjavík, and two important cooperation partners are the National and University Library of Iceland and the Cologne University of Applied Sciences. A key aspect is to determine the origin of paper used in Icelandic charters, manuscripts and books from the 16th and 17th centuries by analysing watermarks in these documents.

Methods to analyse watermarks include rubbing, tracing, beta radiography, electron radiography, soft-X-ray radiography, image subtraction methods, and infrared/thermographic/hyperspectral imaging.

Concerning watermark imaging with a hyperspectral camera, an infrared heat source is placed behind the paper with the watermark. The camera, placed in front of the paper, will then take scans of the heat permeating the paper with various wavelengths. Depending on the wavelength of thermal radiation, the ingredients of ink – if text is written or printed on the paper – and material aspects of the paper, only the structure of the paper will appear on the scans, and ink will become invisible. Thus, in such images watermarks are clearly visible.

For the project “Paper Trails”, we used a thermographic camera owned by the Fraunhofer-Institute for Factory Operation and Automation in Magdeburg, Germany. The camera is commonly employed for more commercial uses, such as detecting fungi in plants in agriculture and determining the structure of skin in the cosmetics industry. For our purposes, we used a 30cm lens in the camera and a small platform moved by a stepper motor to move the paper documents past the camera lens, allowing for a c. 8cm high and up to c. 40cm long scan.

Since the project has a very limited budget we had to resort to some low tech solutions in order to make the process work. For mounting the paper of both charters and manuscripts in a vertical position on a moving platform, we used a simple trouser hanger. The hanger was lined with fleece for extra padding and taped to the wooden crossbar of a bookbinder’s sewing station, which was fastened with large clamps to a metal frame that was screwed onto the moving platform. Infrared heat was generated from a special light bulb in a spotlight mounted to a tripod. To support the camera at the needed height we resorted to wooden boards and other equipment found in the conservation workshop.

Thermographic watermark imaging with such a setup creates several conservational concerns, however. The paper is exposed to a considerable amount of infrared heat which does not allow for long exposures. Bound objects lie flat on the moving platform, opened to 180°, which could cause a certain amount of stress on the binding and spine. Folds have to be unfolded and the mounting of the paper could cause strain to the charters and manuscripts. All these, and other concerns have to be weighed against the scientific value and output of the watermark imaging.
The watermark images that we were able to take – more than 600 within four days – are going to be added to a digital watermark database, the Wasserzeichen-Informationssystem hosted by six German libraries and the Austrian Academy of Sciences (ÖAW). It is part of an online portal of watermark databases, hosted by the Bernstein Project under the auspices of the ÖAW, and hosts watermarks from both medieval and post-medieval paper. By adding to, or docking onto an already existing database, we prevent technical difficulties often encountered when creating a database, and we make our images available to other scholars and the wider public immediately. We thus hope that scholars can benefit from the output of our project directly.

3. Élodie Levêque, Matthew David Teasdale, Morten Tange Olsen, Sarah Fiddyment, Maiken Hemme Bro-Jørgensen, Claire Chahine and Matthew Collins: Biocodicology as an aid to location the origin of materials: Investigation into the use of sealskins on manuscripts in the 12th and 13th centuries

As part of a research focusing on Clairvaux abbey’s Romanesque collection, a series of bindings covered in sealskin was discovered in several European medieval libraries. In France, examples can be found in Troyes and Montpellier (Clairvaux), Saint-Omer (Clairmarais) and Laon (Vauclair). In Belgium, the Royal Library of Belgium (Cambron) holds two examples; Bruges Public Library also owns a sizeable collection of hair-on chemise Romanesque bindings of the same type (from Dunes abbey); all of these are daughter abbeys of Clairvaux. Some sporadic examples can also be found in the UK. While the Clairvaux collection retains the largest number of hairy chemises, the use of such material seems to have been widely employed by the Cistercian order during the 12th and 13th C.

The initial collection of the library of Clairvaux Abbey, founded in 1115 by Saint Bernard, was formed from donations by the first monks and thereafter mostly from the production of the Abbey’s own scriptorium. By the end of the 12th century, Clairvaux possessed about 350 volumes, of which more than 170 romanescque bindings survived, probably made by lay monks. While a culture of austere sobriety developed at Clairvaux, the monks asserted a marked demand for quality materials in the making of books.

Although most of the collection would have been bound in the same way, only 18 Clairvaux bindings remain in their original state with their chemises almost intact. The chemises are described in modern catalogues as boar- or deer-skin. However, under magnified examination, the distribution of the hair follicle doesn’t match either animal. The remaining hair is damaged and the condition of the skin is unusually poor, compared to, for example, the primary leather cover; this prevents a straightforward visual identification of the animal.

To try to identify the animal origin of the chemises we applied non-invasive proteomic and genomic analyses to seven documents from the Clairvaux and Clairmarais collections. Proteomic analysis identified the skins as belonging to pinnipeds. The use of seal skins in Champagne, at a considerable distance from the sea, is curious. In addition, there is no archaeological evidence of seal populations on the French coast in the middle ages.

DNA sequences further resolved the species of origin for six documents, revealing five chemises as being produced from harbour seal (Phoca vitulina) skin and one from harp seal (Pagophilus groenlandica) skin. Comparing with DNA sequence data from contemporary populations, four of the harbour seal skins could be genetically assigned to Scandinavian and Scottish populations and the harp seal to Greenland. This suggests an important trade
in seal skins as a commodity, possibly at the Champagne fairs (although the monks may not have been aware which animal the skins were from).

The skins currently appear to be brown in colour, but it is highly unlikely that Cistercians would have covered their 350 books with brown skins: brown was associated with the Benedictine order; Cistercians were known for their affinity with white. The biocodicological study of the bindings helps us understand not only the extent of trading the Cistercians were involved in but also the original physical appearance of the manuscripts. This was only possible with the collaborative use of cutting-edge science techniques.

4. Abigail Quandt: Real or fake? Conservators, scientists and scholars join forces in debunking manuscript forgeries

While manuscript forgeries have been produced since medieval times a growing number of fake codices and single leaves began to circulate during the nineteenth and twentieth centuries, driven by a rise in interest on the part of private collectors to expand their holdings and a concurrent increase in prices for manuscripts sold on the art market. Earlier forgeries such as those produced by the Spanish Forger were relatively easy to detect, given their distinctly neo-Gothic appearance, yet modern practitioners of the art of fakery have become more sophisticated in their craft, replicating not only the artistic style and material composition of ancient and medieval manuscripts but also carefully reproducing signs of age and wear. These forgers have also played to the unconfessed desire among certain manuscript scholars to identify and publish rare examples of obscure or unknown texts, as well as to the personal greed of collectors to own unique and highly valuable items.

In this lecture I will present several examples of modern manuscript forgeries, such as the miniatures found in the Archimedes Palimpsest and a related Byzantine Gospel book and the Archaic Mark, a miniature illuminated parchment codex that was long thought to represent a very early text-type of the Gospel of Mark. Also included is a group of almost 100 purported fragments of the famous Dead Sea Scrolls, that were acquired from about 2002 onwards by a small group of evangelical Christian collectors and religious universities located primarily in the United States. In each of these cases the close collaboration between conservators, conservation scientists and manuscript scholars has resulted in the debunking of the forgeries. While scholars conducted literary and art historical research as well as a codicological analysis of the forgeries, conservators examined the artifacts using binocular and three-dimensional microscopes, recorded photomicrographs and studied multispectral and reflectance transformation images taken by imaging specialists, and conservation scientists undertook both invasive and non-invasive analysis using x-ray fluorescence (XRF), Fourier transform infrared spectroscopy (FTIR), polarized light microscopy (PLM) and X-ray diffraction (XRD). Despite their efforts each of the specialists did not have enough information on their own to refute the authenticity of these works, yet when viewed as a whole the evidence was overwhelming. In the case of the purported Dead Sea Scrolls only the sixteen fragments in an American museum have recently been confirmed as modern forgeries. In order to assist the other institutions and private collectors who own similar scroll fragments the results of this new research will be made freely available, but it will be up to these owners to make the necessary comparisons and undertake similar work, assuming that they have an interest in determining whether the highly prized ancient artifacts in their collections are real or fake.
1. Katarzyna Schirmacher, Julia Bispinck-Rossbacher and Christine Theuerkauf-Rietz: *Precious and brittle: Conservation and research on the late medieval prayer book of Mary of Guelders*

The prayer book of Mary of Guelders is a highly decorated late medieval parchment manuscript from the collection of the Staatsbibliothek zu Berlin-PK. Due to the severe damage of the paint layer and hundreds of fine cracks within the parchment folios, the manuscript has been inaccessible for decades.

Exactly 600 years after the manuscripts completion in 1415 a comprehensive interdisciplinary research project was initiated which was aiming not only for the conservation of the manuscript but also for a new assessment regarding the art technology, art history, philology of this outstanding, little-known example of Dutch book art.

During its eventful history the manuscript was split and rebound several times and today one smaller part is kept in the Austrian National Library in Vienna. By the means of thorough codicological examination the conservators revealed previously undiscovered information in both volumes, which is of great importance for the investigation of the genesis. Today it is possible to virtually reconstruct the original codex with its over 600 folios.

The scientific analysis, carried out by colleagues from the Rathgen Forschungslabor (SPK) as one of our partners in this project, aimed at two points: On one hand it focused on the art technology study involving various non-invasive methods to identify the pigment palette used in the manuscript. On the other hand the condition of the very fine parchment was examined in close cooperation with the conservators from the Staatsbibliothek. The meticulous documentation of all cracks formed the basis for a statistical evaluation. In addition different analytical methods have been carried out in order to assess the parchments condition. In the end all results indicated, that instead of chemical degradation the cracks in the parchment appeared most likely due to mechanical stress. This could have been caused during handling when in use as well as during several rebinding procedures including gold tooling of the edges.

During the close examination of the cracks the devastating state of the paint layer became even more obvious. Therefore the conservation treatment plan included as the first step the consolidation of the partly extremely brittle and fragile paint layers. After an expert meeting initiated by the library various test series on materials and equipment had been put into praxis. Now a workflow has been established which provides for the least possible handling and movement of the leaves. This includes in one working cycle the testing the condition of the paint layer, the consolidation by brush application and also the recording and documentation of the interventions. Due to the huge task of consolidating most of the 500 folios with the enormous amount of over 100 miniatures within this prayer book a team of two conservators share the work. One important part in establishing a workflow was the need of a continuously stable climate condition in the working space as well as in the safe the depot and during all transports. The consolidation is carried out in a walk-in climate chamber in which temperature and relative humidity is kept stable and continuously under control. This provides a perfect condition for the work with the fine parchment.

Regarding the damage in the parchment the conservation concept aimed at a very restrained method as the cracks appear nearly all in areas of illumination on both sides. It is not desirable to lay
any repair material on top of the illumination so therefore the conservation approach is literally purely conservative. The result is a non-adhesive binding of each single quire with a supportive “wrapper” which allows for future handling and presentation of the manuscript - a reasonable compromise between preserving the character of the book and safe handling of the still fragile illuminations.

1. Ariane Langreder: The challenges of a Romanesque re-binding: The Psalter of St. Paul’s Cathedral

Opinions can be divided regarding how to re-bind medieval manuscripts. Decisions need to be made on case-by-case basis considering the provenance, significance, use and ethical integrity of an item and with various permissions from external bodies, curators, librarians and conservators. This paper will explain the initial assessment, conservation proposal and challenges of the conservation process of the St. Paul’s Psalter, undertaken at Canterbury Cathedral’s Book and Paper Conservation Studio.

St. Paul’s Psalter, a late 12th/ early 13th century illuminated handwritten and illustrated calendar, is one of three manuscripts from St. Paul’s Cathedral that survived the Great Fire of London in 1666. The non-functional 18th century binding with a broken 19th/20th century re-back repair and damaged illuminations led St. Paul’s Cathedral to enquire about potential conservation options in 2015.

The Psalter is recorded on an ‘Outstanding Item’ list for St. Paul’s Cathedral. It needs special permissions regarding conservation work by the FAC (Fabric Advisory Committee) and the CFCE (Cathedrals Fabric Commission for England). This application process took more than a year as assessments and conservation suggestions had to be submitted and follow-up questions answered.

Treatment was outsourced to Canterbury Cathedral’s Book and Paper Conservation Studio. The project consisted of removing the broken binding/ re-back repair and replacing it with a historically appropriate Romanesque binding structure, taking into consideration sewing evidence found during the dismantling process.

During the disassembling process various sewing stations were identified. The Psalter showed evidence of circa four different structures. Specialist advice was sought for clarification on the sewing structures and gathering arrangements. This was followed by discussion about the evidence found. However, the first Romanesque style structure became clearly visible inside the gatherings.

The rebinding process was based on the evidence found but various difficulties were encountered throughout the process. It was hard to establish suitable thicknesses and sizes of the new materials to achieve a correct visual final product that reflects the ‘feel’ and function of a Romanesque binding.

As there was no evidence of previous materials and sewing left, challenging question were raised such as ‘How thick should the new oak boards be? How wide should the leather thongs be and how far should they lace into the boards to look visually correct for a binding that size? Which type of alum tawed leather will be most suitable? What tab shape is suitable?’ An essential point was to balance ethical thoughts with aesthetical judgement. It was important to visualize the final format and not to lose the focus on the purpose of the re-binding.

The aim was to create a historically accurate binding that reflects an original Romanesque structure, using correct materials and techniques that allows the potential reversibility without damaging any gatherings of the Psalter, reflecting its continued use as a religious object.
Guided by historic evidence to re-create a Romanesque binding, it became clear that such a binding construction favours a vellum text block. The non-adhesive sewing structure allows an easy, nearly-flat opening and supports the vellum gatherings. The original text block is fully preserved and the wooden boards give the necessary weight to hold the vellum in place. Easy reversibility of the individual gatherings is given without causing further damage to the individual folios.

During this project it was possible to apply the theory of Romanesque binding to an authentic manuscript, to reflect and understand the reality of a binding that ‘feels’ appropriate for its age and use as a working tool for religious purposes. This project provided also the opportunity to share this experience with colleagues and researchers of how the theory can be translated into practice.

2. Andrew Honey: Winchester’s binder: Beatrice Forder at work 1947-1948

In 1947 Beatrice Forder (1901-1976) began work to disband, repair and rebind the Winchester Bible. Made at and for Winchester Cathedral in the later twelfth-century, it is the largest of the surviving giant English twelfth-century lectern bibles and it has remained at the Cathedral for over 900 years. Within the Cathedral’s historic Morley Library, Forder worked on the Bible, repairing the parchment leaves and rebinding it as four large volumes by 1948. Recent work to conserve the Winchester Bible, begun by the late Dr Christopher Clarkson and completed by the author at the Bodleian Library, has led to a new appreciation of Forder’s pioneering work. This paper seeks to place both her treatment and Forder herself within the wider history of manuscript conservation.

Forder was working on the Winchester Bible in the years immediately after the Second World War. This is an interesting but unstudied period in the history of book conservation in Britain, falling between the death of Douglas Cockerell in 1945 and the future well-known work of Roger Powell. Powell in 1953 conserved and rebound the Book of Kells (Dublin, Trinity College, MS 58), and Cockerell had radically changed the approach to manuscript conservation in 1935 with his repair and rebinding of the Codex Sinaiticus (London, The British Library, Add MS 43725). Both published accounts of their work, Forder however did not leave a published account of her conservation work.

Working to complete the conservation and rebinding of the Winchester Bible following the death of Clarkson, which entailed close analysis of his working methods and aims, proved to be a kind of posthumous masterclass for me, leading to a greater understanding of his work. The careful work to undo Beatrice Forder’s binding and to study and evaluate her repairs has also given me a gradual understanding of her struggles and development whilst working on the Bible. Her rebinding work was exemplary and she incorporated many features that have stood the test of time, from her use of loose parchment quire guards which kept any adhesive from the spine, to her method of sewing a large and heavy text-block on raised supports, and her board shaping and attachment methods. She used an elaborate endleaf construction and endband method, both of which seem to have been thoughtfully designed to protect the manuscript. It is not clear where her ideas originated, but there is evidence of changes, improvements and development across the four volumes. Although she was clearly influenced by Cockerell’s work on Codex Sinaiticus she did not follow it slavishly, and most importantly she did not use his method of meeting guards which can be problematic. In many ways her approach was ahead of its time and is even more surprising as she appears to have been largely self-taught, and had not worked for any major library prior to her work at Winchester. Although her bindings were dismantled during the recent conservation project, her pioneering work at the beginning of modern book conservation deserves greater acknowledgement and appreciation. This paper will describe Forder’s methods, discovered and made visible during recent conservation work.
To conclude, my paper will compare Forder’s methods with those employed on two other iconic manuscripts treated during this period between Cockerell and Powell; the Gospels of St Augustine (Cambridge, Corpus Christi College, MS 286) rebound at the British Museum bindery between 1948-9, and Great and Little Domesday (Kew, The National Archives, E 31/1 and 2) rebound at the Public Record Office by T E Hassall in 1952. I hope to bring attention to the little known work of an early female pioneer of book conservation.

3. Nil Baydar: *Technical review: Spine structures and dublure characteristics of manuscripts prepared for the treasury of Sultan Mehmed II (1451-1481)*

The intellectuality of Sultan Mehmed II (1432 - 1481) and his interest in different cultures are frequently mentioned in many sources. This is reflected in the carefully decorated books on subjects such as astronomy, medicine, geography, mathematics, and philosophy. After Sultan Mehmed II ascended to the throne for the second time in 1451, he moved his manuscripts from Edirne to the Old Palace and then to the New Palace. Among the books which entered the palace library -apart from the ones written in the early periods- there are examples that were copied, bought and presented to the Sultan. There are books written for the Sultan’s private library, translated and dedicated to him, and sometimes prepared to his order. The catalogue of the books belonging to Mehmed II was made in 1502 by a man by the name Atüfî, palace librarian to Mehmed II’s son, Bayezid II (1447-1512). At the order of Bayezid II, the books were listed and the number of folios recorded in each one by Aîî al-Fanârî. Bayezid II’s seal was added on the first and last pages of the books. Some of the books which were once part of Sultan Mehmed II’s palace library but had been distributed to different libraries over the years.

We identified 152 manuscripts from different libraries and collections which were prepared for Sultan Mehmed’s mutaala or treasury. Approximately one-fifth of these manuscripts have survived without the text block and the covers having been seperated from each other and having undergone repairs that change the structure of the manuscript, these can be evaluated in four groups in terms of the styles and techniques of their bindings. The codicological examination of these books reveals that the spine structures and doublure characteristics are similar and prepared almost in the same way. However, the technical structure and material used vary in following centuries.

The manuscripts which were preserved in their original form but whose spine was damaged were examined closely. Primary endbands were sewn onto the thick leather adhered to the spine of the text block. The extensions of this leather were then adhered to the doublure to ensure that the covers and text blocks are joined. In some manuscripts, textiles were also adhered on the leather and a total of four layers of leather and one layer of textile were used on the spine. As a feature of this period, there is also no leather / paper extension on the joints through a köstek (joints) or doublure to the text block (to first/last pages).

In this study, the spine structures, doublure characteristics and joining the text block and covers of these 15th century manuscripts, which were prepared in 30 years under the reign of Sultan Mehmed II, will be evaluated.
Ekaterina Nossova, Ilona Teplouhova, Elena Shepilova, Julia Baskakova and Dmitriy Weber: Pigments of Western European wax seals: Norms and exceptions

The research is aimed to study pigments used for the manufacture of medieval wax seals. The making of wax seals is a complex process transforming over time. The information about constituents used for production of wax seals varies. It has been mentioned that the oldest wax seals were made of bees’ wax and gyps, but later the wax and pitch or resin mixture were used. Other sources reflect that the oldest seals were made of pure bees’ wax and only in later centuries wax were mixed together with colour pigments.

The work is based on the collections of the National Archives of Latvia (Riga collection) and the collection of academician Nikolai Petrovich Likhachev (1862-1936), which is currently kept in the Archives of the St. Petersburg Institute of History of the Russian Academy of Sciences (St. Petersburg collection). The examined objects come from Livonia, France, Germany, Italy and are dated from 12th to 17th centuries.

The following methods were used: transmitted light optical microscopy, X-ray Fluorescence analysis (laboratory (M1 Mistral Bruker) and portable (Olympus Vanta C), FTIR (Alpha II Bruker) spectroscopy – for St. Petersburg collection, and Wavelength Dispersive X-ray Fluorescence (WDXRF) (Rigaku Supermini 200) analysis, and X-ray Diffraction (XRD) (A D8 ADVANCE Bruker AXS GMBH) analysis – for Riga collection. Data obtained by various natural-scientific methods was supplemented by information extracted from written sources (accounts and technological manuals). As a result it was determined that the set of pigments used for the manufacture of seals was relatively narrow. Primarily it happened due to the poor range of colours: red, black, green, as well as natural wax, which was perceived as uncolored in some regions and yellow in others, i.e. had a colour differentiation. It should be noted that in the Western tradition there was no blue wax, which was rarely found in Russian practice. The most common pigments were a cinnabar for red seals and a copper pigments for green seals. Despite the stability of this practice, there were exceptions. For example, the research revealed a seal of German origin, which stood out among others because of its dark burgundy tone. The investigations have shown that it was colored with a pigment containing a large amount of iron, presumably hematite. Another exception to the common practice was the seal made from “cera di Spagna” or “Spanish wax”, which does not contain the usual elements (Hg, Pb, Cu). Apparently, this seal was manufactured without any colour pigment.

In addition to the seals, wax boxes (custodia) were studied. Most of them contain no mineral pigments. The exception is the seal of King Sigismund I of Poland. It is coloured with cinnabar, and the box contains lead.

In conclusion, the problem of transformation of the color of seals under the influence of time and external conditions were considered. Western European seals of green color, made with copper pigments, tend to darken. This complicates their study and description. Previously, gas chromatography was used to detect the pigment. However, this method is destructive, so it is not
recommended for historical heritage objects. The report proposes a method of detecting copper pigments using a portable X-ray fluorescence analyzer and ultraviolet radiation source.

This research will provide important data on wax seals’ composition and that in turn will help

2. Kouros Samanian and Nasim Koohkesh: Enhancing quality of traditional Persian Serish (Eremurus) plant glue for using as modern conservation glue for restoration of manuscripts and historical papers

In 2012, I attended the Care and Conservation of manuscripts conference and presented a paper entitled: Traditional or modern conservation material and techniques? A case study of conservation methods during the book binding of manuscripts at the Iranian parliament library.

In that paper, I introduced a traditional plant Persian glue and talked about its advantage and disadvantages as an adhesive for historical bookbinding of the books and manuscripts.

Upon my return, one of my students (Nasim Kohkesh) and I worked on disadvantages of that plant glue (Serish) to enhance its quality for its contemporary usage as a modified traditional plant glue.

Persian Serish (Eremurus) plant glue which has been used for restoring manuscripts and book binding, naturally is yellow-brown and it always leaves stain on paper after applying. This phenomenon is undesirable from aesthetic point of view and also conservation rules; hence eliminating color compounds from Serish adhesive was the aim of this research.

In this research, solvent extraction methods were used for separating coloring compounds from sticky polysaccharides and laboratory instruments were used to analysis it. Boiling ethanol was used in stabilizing unwanted enzymatic reactions. Serish powder and slices of Eremurus fresh roots were mixed with water for preparing adhesives. Then coloring compounds were excluded from polysaccharides by solvents. Phenolic structures of coloring compounds dissolve in these solvents, where polysaccharides stored in roots precipitate. These sediments were collected and dried by freeze drying method and then solutions were prepared from these dried products. These solutions were utilized to coat paper to prepare samples. First, samples aged by accelerated aging method and then brightness and color of samples, pH, FT-IR spectroscopy and their tensile strength, were measured. In addition, pastes behaviors were evaluated by pH meter, gravimeter and mold & fungi cultivating. Comparing different modes of extractions, best result belongs to extraction by ethanol from fresh roots with stabilized enzymatic reactions. This method not only eliminates the color from paste, but also exterminates mold and fungi and improves the durability of prepared adhesive.

In that paper, I introduced a traditional plant Persian glue and talked about its advantage and disadvantages as an adhesive for historical bookbinding of the books and manuscripts. Upon my return, one of my students (Nasim Kohkesh) and I worked on disadvantages of that plant glue (Serish) to enhance its quality for its contemporary usage as a modified traditional plant glue.

Persian Serish (Eremurus) plant glue which has been used for restoring manuscripts and book binding, naturally is yellow-brown and it always leaves stain on paper after applying. This phenomenon is undesirable from aesthetic point of view and also conservation rules; hence eliminating color compounds from Serish adhesive was the aim of this research.

In this research, solvent extraction methods were used for separating coloring compounds from sticky polysaccharides and laboratory instruments were used to analysis it. Boiling ethanol was used in stabilizing unwanted enzymatic reactions. Serish powder and slices of Eremurus fresh roots were mixed with water for preparing adhesives. Then coloring compounds were excluded from polysaccharides by solvents. Phenolic structures of coloring compounds dissolve in these solvents, where polysaccharides stored in roots precipitate. These sediments were collected and dried by
freeze drying method and then solutions were prepared from these dried products. These solutions were utilized to coat paper to prepare samples. First, samples aged by accelerated aging method and then brightness and color of samples, pH, FT-IR spectroscopy and their tensile strength, were measured. In addition, pastes behaviors were evaluated by pH meter, gravimeter and mold & fungi cultivating. Comparing different modes of extractions, best result belongs to extraction by ethanol from fresh roots with stabilized enzymatic reactions. This method not only eliminates the color from paste, but also exterminates mold and fungi and improves the durability of prepared adhesive.

3. Alessandro Scola: Conserving and preserving a 15-century Italian antiphonary: Non-traditional binding conservation techniques and an innovative all-in-one housing, display, and moving device

A 15th century Italian illuminated antiphonary, in its original wooden board binding with metal furniture, arrived to our lab in need of major structural repairs: both boards were almost completely detached and the leather cover spine was lifted and loose. The sewing structure was still functional and the parchment textblock, composed of roughly 300 individual folios, was in decent condition (though some leaves presented losses caused by iron gall ink corrosion). The feature of the binding that immediately struck our attention was the presence of copper alloy strips on the spine edge of the boards. Their removal seemed, at the initial observation, a necessary first step in a traditional rebacking treatment, until the following question came to mind: would it be possible to reback this huge antiphonary without touching them?

This volume is the only example of medieval antiphonary on parchment in its original binding in the Johns Hopkins Library system. It is heavily used, consulted by researchers and students, and displayed for book history classes or during fundraising events. Limiting or negating access is not an option since our rare materials are essentially research and teaching tools. An intervention that would fully re-establish the lost functionality and simultaneously be minimally invasive was thus the goal of the treatment design process. It was also determined to prioritize the consolidation of the binding structure and postpone any detailed assessments and possible treatment of the illuminations and text for a later date. Additionally, to make the post-treatment handling and transportation safer for both the volume and the operator, it was decided to create a unique housing device that could also be used as cradle and cart, a very unique challenge due to the size of the manuscript, approximately 60 x 45 x 20 cm, and its weight, ca. 20 kg.

To achieve our goals new techniques and approaches were developed. The size of the original lacing-through holes was reduced to match the size of the new sewing support extensions: a cord similar in diameter to the extensions was loosely wrapped in Japanese tissue and introduced into the wider original lacing-in holes; a poultice made of linen cord fragments and gelatin was used to fill the gaps around it; finally, once the poultice solidified, the cord was removed leaving the Japanese tissue behind and creating holes of the required size. This technique allowed the boards to be mechanically re-attached and correctly aligned with minimum vertical movement, facilitating all subsequent treatment steps.

To positively answer the question that re-directed our initial treatment plan, the deteriorated leather underneath the metal strips on the spine edge of the boards was removed to expose the wood. Then, a two-layer pig skin transverse lining that would precisely fit under the metal strips and between the original nails was adhered to the board edges. Any empty spaces between the lining and the metal strips were filled with a poultice made of linen cord fragments, starch and a drop of Jade 403 (to ideally make the filling more flexible, i.e. more shock absorbent, and to reduce the shrinkage after drying).
Finally, the spine was rebacked with multiple transverse vegetable-tanned leather pieces that covered all exposed areas between the metal strips on the spine edges of the boards. It was a two-step process: first, leather strips covered the raised bands; then, more strips covered the spine panels and formed the caps. This treatment was considerably facilitated by using a height-adjustable book press that allowed the antiphonary to be held securely in a vertical position at any tilting angle. Though this versatile aluminum press was conceived and designed independently from the antiphonary treatment, its construction was purposely scheduled to precede the reback phase of the treatment.

The challenge of providing post-treatment housing for this volume was also met with success. Aluminum T-slotted extrusions and plates (same building system used for the ergonomic press) provided the components to create a single device that, working as box, cradle, and cart, would achieve all our preservation goals: it provides a robust and safe housing and transportation solution; it minimizes the stress on the volume when in use; it minimizes the handling effort of the end user, e.g. the need for lifting the volume is completely eliminated. Regardless of whether the manuscript is closed in the box or displayed open on the cradle, its spine is only in contact with Volara® and its metal bosses and/or leather cover on the boards with UHMW (ultra-high-molecular-weight polyethylene), a slippery, soft, and stable plastic. The fragments derived from the conservation treatment are protected for safe housing and handling, depending on their size, in polyethylene zipper lock bags, in Mylar® or Mylar®-Vivak® encapsulations, and in Vivak®-Vivak® sandwiches, and stored within the main housing structure in two small dedicated compartments.

This paper will describe and assess the main steps of the binding conservation treatment, including the innovative techniques mentioned above, and the “all-in-one” preservation structure in which the antiphonary is currently stored. Several pictures and diagrams will be used to clarify and visualize important details. The goal is to show how alternative treatment options are feasible when dealing with similar binding structures, and how new tools can unveil new conservation and preservation approaches. Indeed, choir books are not new actors on the conservator’s bench, nor rare items of discussion at the Care and Conservation of Manuscripts Conference. The techniques and devices shown here could be replicated elsewhere to solve similar practical challenges, or work as inspirational ideas for further, diverse and much needed innovative treatment procedures and preservation strategies.

4. Athanasios Velios: St. Catherine’s condition survey: Considerations for Linked Data

Historical research on books of unknown provenance relies on a) observations of binding techniques and materials and b) how these compare with similar observations from books of established provenance. The understanding being that a technique frequently observed in a specific spatio-temporal extent would indicate that a book featuring that technique is likely to have been produced in that space and time. In recent years there have been discussions about increasing the sample of observations so that conclusions produced from these comparisons are more representative.

The idea of integrating datasets is central to achieving a larger sample. Typically researchers make observations about techniques and materials and they produce structured records of these observations (i.e. without using free-text descriptions but instead populating a database with significant fields) so that other researchers can access them. Retrieval of relevant records depends on the structure of the database used and the choice of significant fields. Efficiency drops when a researcher needs to perform hundreds of queries at different sources and then manually combine the results to a meaningful whole. The process of integration ensures that the different datasets are published following a common structure and are therefore harmonised when the researcher
attempts to query. Ideally, in a more coordinated environment such harmonisation could lead to performing a single query to retrieve records from the whole sample.

In this paper I consider the process of harmonisation for bookbinding records at a conceptual level. I begin from the two schemas used in the St. Catherine’s condition survey, I examine the types of observations made and how these have been recorded on each survey form. I look into the value of the CIDOC-CRM for integration. I compare the St. Catherine’s records with the classes and properties of the CRM and discuss both poor design decisions for the schemas as well as cases where the CRM seems inadequate.

I proceed with considerations about applying Linked Data technologies to these records, I test the capacity for integration between the two schemas and I discuss the complexities of reconciling records of books as well as reconciling records which refer to authority files.

I conclude with a discussion about global identifiers of records which are required for a global dataset of book descriptions. The paper features examples of records from the St. Catherine's database.

Session 3A (15.30-17.30) Lecture Hall 22.0.11

1. Patricia Engel and Andreas Gamerith: Care and conservation in Zwettl Cistercian Monastery

The focus of this interdisciplinary contribution is not only conservation in the narrow sense of the word, but care as well as the conservation measures, which is a well-documented and well-established tradition at Zwettl Cistercian Monastery, Austria. Unlike families of the nobility that kept valued assets within themselves, monasteries have had a great need for preserving their documents, among other things, as a legal justification of the ownership of their material property. However, Zwettl monastery has additional particular features.

The contribution tries to draw the reader’s attention to the fact that surrounding environmental factors greatly influence any conservation measure (past and recent) and might provide an insight into and an understanding of why conservation of written heritage is performed in so diverse forms throughout Europe, even if we all refer to the same conservation philosophy and ethics.

Furthermore, the contribution illustrates a method of surveying a complex set of conservation objects.

The monastery’s outstandingly careful documentation of its own consistent and careful work aimed at preserving its archival material and its books seen as expressions of its religious outlook and the economic facts of its life was a very fortunate starting point for a research project.

This documentation

- allowed a demonstration of the influence of intellectual/spiritual mindset on the conservation work
- allowed for a better understanding of the history of book conservation in Austria
- helped the surveyor to refine the survey methodology that can be applied to other similar collections
The archivist, librarian and head of the art collection, A. Gamerith, a trained art-historian and the conservator, P. Engel found numerous layers of evidence of care given to the collection over centuries, which weave a structure of “places”, both physical and transcendent.

The team started with a quite conventional survey of the rooms and the books, which confronted them with the need to understand the particular set of temperature and relative humidity in the library rooms built in the years 1731-1733, the construction of the windows and the position of the shelves, which changed over time. An outbreak of mould and its identification was considered a valuable indicator for an imbalance in the system and raised the question of how various parts of the rooms’ environment might have been meant and used originally. Plans and documents for changes were found; reports on problems, found at the monastery, allow better understanding of the entire place; side marks in identifiable hands, interviews with former librarians still living today and evidence of conservation measures on the books help reconstruct the picture of bookbinders and conservators, who were tasked with repairing and preserving the books over centuries. The systematic interdisciplinary survey of the archival material led to a profound understanding of who had implemented what actions and what ideas had been behind the measures undertaken.

2. Nurcin Kural Ozgorus and Basak Emir: Recovery and conservation of the library collection in Virgin Mary Church of the Syriac community in Mardin, Turkey

This paper aims to present the methods employed for the conservation and dissemination process of the project entitled ‘Manuscripted and Printed Heritage of Syriac Community’ realized by the Association for the Conservation of Cultural Heritage (Kültürel Mirası Koruma Derneği - KMKD) in Istanbul-Turkey with the grant of the Prince Claus Fund for Culture and Development.

The scope of the project covers more than five hundred items (both printed books and manuscripts) from the Library Collection of the Virgin Mary Church. It is owned by the Syriac Catholic Foundation, which oversees the places of worship of the Syriac Catholic community, a religious minority, whose members are located in the Southeastern region of Turkey. The Virgin Mary Church was established during the patriarch of Ignatius Antun Semheri, (1801-1864), one of the first Syriac Catholic bishops in Turabdin region which is located within the borders of the city of Mardin in Southeastern Turkey today. Having been influenced by the Catholic faith during his residency at the monastery of Deyrul Zaferan, where he also gained access to books on Catholic Church, Semheri converted to Catholicism from Orthodoxy. Following his establishment of the Virgin Mary Church, he brought together a comprehensive collection of books on Catholic faith, presumably to enhance the studies he had been conducting on his new sect. The collection now covers a wide range of materials varying from baptistery records and priest diaries to those of metropolitans and patriarchs, from daily life activities to visitor lists, as well as prayer books printed or handwritten in Arabic, Syriac and Latin.

During the infrastructure work conducted in 2012 as part of Mardin Municipality’s project regarding the renewal of sewage system and water supply network of the city, initiated in 2011, the excessive water caused an overflow damaging the walls of the Virgin Mary Church. Thus, most of the items in the Library Collection suffered damage as they were submerged in water. Following the incident, the custodian of the Church took the damaged items outside to dry promptly which prevented further harm. However, water and moisture had already caused severe harm to books and manuscripts.

The ‘Manuscripted and Printed Heritage of Syriac Community’ project implemented a plan composed of three phases for the conservation and dissemination of the items belonging to the Library Collection of the Virgin Mary Church. Initially the items underwent through a cleaning process carried out by a conservation team consisting of a professional book conservator, the
custodian of the Church and interns from the departments of Syriac Language and Literature, and Arabic Language and Literature of Mardin Artuklu University. The team removed dust, soil, and mould from the books and manuscripts to improve their maintenance. Later the bookshelves holding the said items have been covered with acid-free boards in order to set a barrier and prevent any harm that may arise from the books and manuscripts touching wooden shelves. The team also designed a catalog system to document the otherwise unregistered items, which included basic information such as their titles, language and measurements. In addition, they scanned three to four sample pages to be included in the catalog, which will provide with a digital database in further phases of the research.

During the condition survey, three books have been selected for remedial conservation. Within these three, the Arabic book dated to 19th century emerged as the most prominent. In addition to its damaged binding, the book’s boards of covers were detached due to harm caused by water and humidity. Further research on the book showed that the boards of the book belonged to a type called pasteboards where discarded paper leaves were pasted to form a new cover. The said leaves included both printed pages and manuscripts, some of which have been found to belong to 11th century and bear prayers handwritten in ancient Syriac. The team employed mechanical dry and semi dry methods to detach the leaves from each other. In addition, the inner leaves of the books have been cleaned and mended, the signatures have been brought together, they have been sewn in its original form. For the restoration of the book binding, acid-free boards have been used instead of original manuscripts which were kept apart and preserved for future researches.

The third phase of the project includes the dissemination of the findings of the conservation study, which will be made possible through a workshop aimed at local professionals working with such collections. Throughout the workshop the basic preventive conservation methods will be discussed within the context of the ‘Manuscripted and Printed Heritage of Syriac Community’ project. The studies will revolve around topics such as better storage environment, shelving, handling, mechanical cleaning, cataloguing, accessibility, and raise awareness among the caretakers of local collections. In addition, the books from the collection will be digitized along with their metadata to be rendered available on the web via an open-source software. The project ‘Manuscripted and Printed Heritage of Syriac Community’ has chosen DSpace software as an archival tool and employed the Dublin Core metadata scheme for the description of the items.

3. Claudia Benvestito, Alberto Campagnolo and Stefanos Kaklamais: Archaeological investigations into Codex Marcianus Gr. VII, 22: Reconstruction its manufacture and structure

The Codex Marcianus Gr. VII, 22 (1466) is an impressive Greek manuscript of Cretan provenance in the collections of the Marciana National Library in Venice, from Giacomo Nani’s collection (n. 244)i. The manuscript contains a Chronography ab initio mundi, interweaving biblical, eschatological and apocalyptic texts, illustrated with more than 400 drawings. According to some internal references, the manuscript was composed around 1592. The attributed author is Georgios Klontzas (Γεώργιος Κλόντζας – 1540 ca-1608), a renowned Cretan artist, who produced numerous paintings, triptychs, and illuminated manuscripts of fine quality, having as a major theme the history and eschatology of human life, and the forthcoming events of the Last Judgment.

Codex Gr. VII, 22 (1466) is a paper manuscript composed of 217 leaves conceived and produced by Klontzas in collaboration with two other scribes (possibly, his two sons). The artist pointed out the story to be inserted next to the drawing with few words, therefore hidden by ink strokes. In addition,
Two more hands appear in the final part of the codex: on leaves 205 and 206 there is a different text, and from leaf 208 the codex contains only a series of lead and brownish ink drawings.

The decorations throughout the whole codex are in iron-gall ink over lead drawings (sometimes leaving the underdrawing untouched). The ink is applied with more or less intensity of colour resulting in different stages of deterioration and perforation of the writing support due to ink corrosion. Some illustrations present a painted frame with pigments and liquid gold applied by brush. The style of these frames varies considerably, possibly as indication of different hands at work.

The Manuscript has undergone at least two major conservation treatments in 1951 and 1976 (without written documentation). The only information on the matter that can be found resides in the registers of the Abbey of Praglia, where there is mention of lining with silk screen (not present anymore) and conservation of the leather binding. Of the second conservation treatment, the library’s registers merely mention ‘disinfection procedures and conservation treatments’ made by the then-called Istituto Centrale per la Patologia del Libro (ICPL), Rome. Judging by the pictures in the ICPL’s photographic Archive, the book was taken apart and likely washed, considering the fading of the ink-corroded lines. These conservation treatments have, anyway, substantially altered the gathering structure, as evinced by the series of stains, imprints, and other material evidence that can be harnessed to reconstruct, corroborated by textual clues, a probable page order and quiring structure. In addition, the conservation of the binding completely removed any original structural evidence of a possible Greek-style binding.

In October 2018, a team from R.B. Toth Associates LLC and Equipoise Imaging LLC, in partnership with Phase One A/S, conducted a series of preliminary investigations by means of multispectral imaging to examine the manuscript. The digital imaging was carried out with a state-of-the-art technology system, using a portable narrowband system with multiple-wavelength. This allowed to gather insights into fainted and erased text, especially Kontzas’s notes, but also to glean information on the manufacturing history of the manuscript, looking into writing and illumination layering, and to match similar, but different inks through analysis of their spectral responses.

An hypothetical gathering structure has been reconstructed on the basis of the watermarks and laid lines of the paper. The operation is not always straightforward due to missing leaf portions and the presence of thick pigment layers in correspondence with the illuminations and the frames. At times, only the distance between the laid lines has permitted to re-join or refute hypothetical conjoins.

The proposed gathering structure will be modelled and annotated utilizing VisColl, a collation model and visualization developed by the Schoenberg Institute for Manuscript Studies (University of Pennsylvania). Whilst known to the Marciana Library that the book was not re-bound in the correct order, the manuscript would not be disbound only to fix such a mistake. At the same time, this digital reconstruction allows scholars to engage with the manuscript in a more correct sequence, and, at the same time, to propose variations based on further scholarly evidence.
in 9th-10th cc. in Georgia manuscripts of monastic or special purpose copied on parchment are written broadly generously, without sparing the leaf proving ones more that production of skin writing material in the country had attained an appropriate level.

The situation differs with respect to Georgian books created at foreign scriptoriums. These are books compiled in Palestine in 10th c. – the Iadgari, collection of annual hymns for holidays and a fragment of Psalms. In the latter book it is not only papyrus that is used as writing material but parchment as well. The collection is known as rush parchment iadgari (National Center of Manuscripts, H-1329).

In foreign scriptoriums men of letters often received donations from Georgian kings, nobles and Georgian church either in monetary form or in the shape of the material needed for the book – “celebratory books”: Vani Four Gospels, high quality white parchment, adorned with rich vaults, headpieces, miniatures; copied in Romana monastery, Constantinople, created for Queen Tamar, on her order (12th-13th cc. NMC, A-1335); Alaverdi Four Gospels, high quality parchment, adorned with ornamental capital letters and nine miniatures; created in Calipos Laura, Black Mountain (1054, NCM, A-484). The quality of the parchment was of special importance in the process of preparation of the scrolls (NCM, Ad-933, historical document, 13th c.). The parchment retained a leading position to the 14th c. and later too (17th-18th cc.).

There are more than 3 hundred Georgian manuscript fragments on parchment in the collections of the National Center of Manuscripts. The team of the Center (codicologists, restorator-conservators, chemists) had developed the project - Codicological Analysis of Fragmentary Manuscripts and Structural research of writing material. Purpose of the project is multidisciplinary study of the Georgian manuscript fragments on the parchment (9th-16th cc.): codicological research, determination of artistic value, diagnostic of the manuscript material structure and determination of the preservation terms, formation of the database and involvement of the existing material into international scientific circulation. New field of manuscript studies, fragmentology, which studies origin, composition, migration, material, illumination, direct relation with the manuscript and, generally, with the generating culture, is one of the important fields of modern codicology.

A total amount of fragments on the parchment is 333 units. Their chronological frame covers IX-XVI centuries. The Fund of fragments is permanently renewable. In the processes of studying the manuscript covers or working on the personal archive fund, the fragments were discovered, among them parchments as well. Interdisciplinary study of Georgian manuscript fragments - codicological research of the structure of the manuscript material is an innovation in the studies of manuscripts, textological-codicological study of the manuscripts and structural research of the material in complex, among them, of the fragmentary manuscripts by considering the demands of quite a new branch of codicology – fragmentology has not been done yet.

Session 3B (15.30-17.30) Seminar Room 15A.0.13


This paper will outline the conservation treatment and investigation of Corpus Christi 502, a copy of Durandus the Elder’s Rationale diuinorum officiorum. In the course of the paper I will outline the
desultory condition of the manuscript, the process of treating it, and how it will inform the
treatment of a series of other manuscripts from the same collection.

Guilelmus Durandus, Bishop of Mende (1285-1296) composed the Rationale between 1292 and
1296. It is at once a most popular medieval manuscript, and a most significant one. The Rationale is
a detailed treatise on all aspects of the liturgy; outlining the use and symbolism of everything from
ritual and ceremonial practice, to the sacraments, church utensils and architecture. It is one of the
most widely translated and disseminated works of Medieval Europe. As a document, it was an
invaluable source both in practical terms, and for the comprehension of church symbolism. By the
end of the fourteenth century, it was considered so important and was so widely used that Charles V
of France commissioned its French translation to aid theological and intellectual debate within his
court.

Manuscript 502 is part of the Elbing Collection within the holdings of the Parker Library, Corpus
Christi College, Cambridge. It is a modest Latin edition considered to be a fifteenth-century copy of
German or Bohemian origin, its condition had precluded study of the object and prevented a
thorough cataloguing.

A truncated record of the manuscript within the descriptive catalogue of the Library, written in
1911–12 by M.R. James, provides a general account of the date, layout and contents, but notes that
whilst ‘some parts of the text are recognisable, the book can hardly be used’. The provenance and
historical use of the manuscript had never been investigated, and the level of damage had made it
impossible to ascertain how much of the text had been copied and what had survived.

The conservation of MS 502 was begun in 2017 and completed in 2019. The manuscript was selected
as an exemplary for the treatment of six other manuscripts from the same grouping: MSS 501, 517,
523, 525, 526 and 527. In each case proper assessment of the manuscript had been hampered by
the condition of the bookblock, which was so fragile that any form of handling risked further
damage.

The manuscripts were all exceptionally degraded by mould, a state they were recorded to have been
in since 1911 at the very least. The archaic terminology employed by James in the catalogue
nonetheless presents the general disrepair, with MS 517 described as ‘In a grievous state from
damp’, whilst in MS 527 ‘... the leaves are much stuck together and very tender’. MS 502 was more
simply defined: ‘Binding fragmentary. Writing very much gone’.

Following an initial treatment process of sterilizing the manuscripts through irradiation in an effort
to ensure that the historical mould infestation was inactive, practical treatment was outlined with a
view to preparing repeatable procedures for all manuscripts. Methods of supporting the paper with
remoistenable tissues without taking down the binding were established.

The damage to the manuscript was severe but generally consistent, requiring a method of treatment
that utilised repeatable processes that could be applied in-situ. Treating the damage within the
binding, rather than taking it apart, also ensured that ethical considerations of minimal interference
with the historical features of the object were observed. The scale of damage required highly
efficient methods of treatment, which could progressively stabilise the book. An approached was
devised to support the paper and improve its pliant qualities to ensure repairs were successful. The
scale of the work also required cost effective, reversible methods.

In the course of repair it was found that the most complete parts of the bookblock contained the
catchmarks, and an original system for numbering the quires. These features, in concert with
watermark discoveries, have illuminated the method and order in which the manuscript was prepared, and have revealed valuable information about the date and area of its production.

Whilst it was initially unclear if the manuscript was a complete copy, or some assortment of texts bound together, treatment has allowed us to determine that this is indeed a complete copy of the Rationale and that although the binding remains fragmentary, the writing is far from gone.

The paper will provide the opportunity to share what has been learnt in the course of this challenging project. It will chart the development in appreciation of the manuscript, and show how the anxiety over treating what had seemed to be a ruined and irretrievably damaged item, was replaced with a genuine joy at discovering what remained, and the value of what could be recovered.


The Naumburger cathedral, united at the Vereinigte Domstifter zu Naumburg, Merseburg und Zeitz, owns eight large scale, greatly illuminated choir books made in the 16th century. The manuscripts measure roughly 81 x 63 cm, are between 8 and 15 cm thick and weigh between 30 and 40 kg. All of the eight books have a leather bound cover with metal fittings. The text block is made out of parchment. Through intense use till late in the 19th century and the nature of the used materials, it is not possible to use or exhibit the books to a broad audience. The main problem is a convex deformation of the wooden boards, which makes it impossible to close the books firmly. Due to the unclosed manuscripts and improper storage conditions, the text block is deformed.

At the Cologne Institute of Conservation Sciences (CICS), Technical University Cologne, the task for one Bachelor and one Master Thesis were about straightening the wooden boards. First attempts with moisture and pressure weren’t successful. The wood always returns to its original shape again. X-Ray analysis from one of the wooden boards showed the main reason for that. The construction of the wooden boards consists of four horizontal aligned boards glued together. At the left and right side two vertical aligned boards are added. Because of the different fibre directions in the wood, the heavy distortions are inevitable and it isn’t able to adapt to changing climate conditions without irregular deformation. The result is a strong distortion of the wooden boards on a long term range.

A new method to restore the functionality and to even the boards was needed. A selected number of treatments were evaluated on samples but all of them didn’t show the results that was desired or the risk of damaging the text block or the book cover was too great. As a final option it was decided to choose the Sverzatura technique, even though some of the original material had to be removed for that treatment. A suitable filling material for the slots were also evaluated. The Sverzature technique implies the slotting of the original boards for about 0.7 cm in a distance of ca. 6 cm. The gaps are filled with fish glue and linen threads. Immediately, the boards began to flatten and to align. The boards were kept for several weeks and months in the new position. The very first results are promising. For future storage the oversized manuscripts are fixed with tension belts.

3. Ágnes Ádám: Conservation of a 15th-century limp binding: How much intervention is necessary?

Codex 4909 from the Collection of Manuscripts and Rare Books of the Austrian National Library, an earlier Latin manuscript in a flexible parchment binding made with a special link-stitch sewing was a challenge because of its heavily damaged condition.

As result of a historic severe water damage, microorganisms had heavily degraded the limp binding and the paper pages including the sewing, making the manuscript unreadable.
The goal of the conservation was to make the pages of the codex usable again. The limp binding should be preserved as a historic book cover and keep the book from further deterioration.

The main issues were: Which ethical aspects need to be considered for the conservation and reconstruction of the codex? How to disinfect and stabilize the pages, if the sewing of the book is broken and unstable? Is it inevitable to take apart the binding because of the partially missing sewing? Which materials are suitable to fill losses and gaps in the parchment cover?

Before working on the manuscript, a model book was made to study the original binding technique. The first conservation step was stitching using the original method. The total re-stitching and addition of link-stitches were executed with a dyed cotton thread. After this stabilisation of the book, the sheets were disinfect locally and the losses filled with Japanese tissue. The cockled and severely creased parchment was flattened out. Losses in the parchment cover were filled in with a specially produced material: leaf-casted parchment and Japanese tissue. During the conservation process, a focus was to minimize the use of moisture, to use only natural materials and to keep the book from further deterioration.

The study of the original binding technique allowed adapting the conservation steps in order to preserve the book cover and the book block without taking them apart. Function and accessibility of the manuscript could be re-established.

4. Katherine Beaty and Kelli Piotrowski: From Florence to Rome: Conserving Italian stationery bindings at Harvard University

Over the past seven years, conservators at Harvard Library’s Weissman Preservation Center have undertaken two major conservation projects of Italian tacketed stationery bindings from the Harvard Business School’s Baker Library. The first project focused on the treatment of 150 volumes from the Medici Family Business Records (1376-1711), while the second encompassed 84 volumes from the Business Records of the Barberini and Colonna Families (1630-1818). The collections offer a glimpse into two spheres of stationery binding practice in Italy, that based in Florence and Rome.

Stationery bindings may appear uniform with their characteristic overbands and lacings applied to limp or semi-limp parchment bindings with fore-edge flaps; however, throughout the conservation project the conservators noticed unexpected binding variations. Given the scarcity of published material on tacketed stationery bindings, the conservators surveyed the collections and documented detailed information about the structural features, such as the sewing supports and endbands, overbands and lacing patterns, spine and endband tacketts, as well as fastenings. Many unique features could have been overlooked or obscured during conservation treatment had they not been closely examined during the survey process.

The treatment goal was to stabilize vulnerable binding elements, while preserving historical evidence of manufacture and use. The conservation of the Medici and Barberini collections culminated in a broad range of minimal to major treatment techniques for repairing stationery bindings. The types of damage observed were notably different between the two collections due to variations in the binding structures and materials used, which required different repair strategies.

For both projects, the broken overband lacings were a major area of concern as further damage or loss could easily occur through handling. Toned Asian tissue was attached to the broken end to extend the lacing material and anchor it onto the binding. Repairing broken spine tacketts, especially saltire tacketts, was often necessary to restore the structure and functionality of
the binding. Although select areas were occasionally left open or detached to allow access to the interior of the binding.

If necessary, distorted parchment covers were locally humidified in situ with a Gore-Tex package constructed from a Mylar L-sleeve, while work commenced on other parts of the binding. Repairs to the parchment cover were made with alum-tawed goldbeater’s skin, Asian tissue, or new parchment adhered with high molecular weight fish gelatin. One challenge was repairing and filling losses to the cover without disturbing original elements. Parchment fills could be incorporated around structural elements, such as tacket or lacing holes, to aid in the attachment and minimize the need for adhesive.

A common historic practice was the removal of unused gatherings from the back or middle of the book block. These large losses left the covers unsupported, and often left the endband core partially detached and the remaining sewing supports and threads vulnerable. Depending on the specific needs of the volume, the missing sections were filled with a spacer to better support the cover, but many times the binding was stable and usable in its slumped state.

Finally, many volumes had paper labels with heavily inscribed iron gall ink applied unevenly across the spine and overbands. Ink fragility and spine movement caused many labels to fracture. The brittle labels were supported with two layers of a solvent set tissue, one layer the color of the paper and the other toned to match the color of the ink.

Due to increased scholarly interest in these historic business records, these stationery bindings are being digitized to allow greater access to the content and reduce handling of the original objects. The success of these types of minimally invasive repair campaigns is greatly dependent on the culture of the repository and the availability of staff to assist patrons with careful handling. To promote long-term preservation, one must always consider housing, storage, and proper handling in addition to any conservation treatment.
Thursday 23 April
Session 4A (9-11) Lecture Hall 22.0.11

1. José María Pérez Fernández: *Colombina 5-3-25, or how Hernando Colón processed information for his catalogues*

Sammelband 5-3-25 at the Biblioteca Colombina in Seville features a series of texts and documents in both manuscript and print which illustrate the strategies and the rationale behind Hernando Colón’s fabulous library—including drafts for some of the summaries which would later become part of the clean copy of his Libro de los Epítomes, recently identified among the Spanish manuscripts in the Arnamagnæan Collection in Copenhagen. This paper provides an account of the most relevant among the texts bound in 5-3-25, with a particular emphasis on the manuscripts that exemplify the methods used by Hernando in the collection and recording of the information that went into his catalogues.

2. Guy Lazure: *Before Denmark: The Sevillian roots of Arnamagnaean collection of Spanish manuscripts*

The history of the Arnamagnæan Institute’s small but outstanding collection of medieval and early modern Spanish manuscripts, now perhaps most famous for Hernando Colón’s recently-discovered “Libro de los Epítomes”, is relatively clear and well-mapped once it left Spain with the Danish ambassador Cornelius Lerche in the mid 17th century. As we now know, the provenance of a number of these manuscripts can be traced back to the Count-Duke of Olivares’ impressive library in Madrid, but many of these originally came from the city of Seville, where Olivares resided between 1607 and 1615, and where his main advisor in the formation of his manuscript collection, Juan de Fonseca y Figueroa, was a cathedral canon. Based on the writings and correspondence of 16th- and 17th-century Spanish erudites, this paper will attempt to trace the “pre-history” of a number of the Copenhagen Spanish manuscripts, some of which remained in Seville for a number of years after the Count-Duke and Fonseca’s departure for the court.

3. Edward Wilson-Lee: *Dehydrate, duplicate, distil: Perserving the Universal Library*

This paper will introduce a series of papers on Hernando Colón and his Universal Library project, focusing on the extraordinary challenges presented by the material nature of his undertaking. Unlike the grand bibliographical ventures of the generations to come, Hernando's vision of a universal library was no abstract of the world's knowledge; rather, Hernando's library was a physical marvel as well as an intellectual one, gathering the flimsiest volumes from across the world of print and ever mindful of their fragile grasp on the information they held. This paper will introduce Hernando the conservator, and place the Arnamagnæan's own "Libro de los Epítomes" at the centre of Hernando's plan for an endless library.

N. Kivilcim Yavuz: *The missing piece of Hernando Colón’s library: Copenhagen, Den Arnamagnæanske Samling, AM 377 fol.*

In early 2019, one of the manuscripts in the Arnamagnæan Collection of the University of Copenhagen, AM 377 fol., was identified as one of the library catalogues of Hernando Colón (1488-1539), son of the famous navigator Christopher Columbus. This identification, which has been considered as one of the most exciting developments in early modern book history in recent
decades, has not surprisingly caught the attention of both the learned and the popular press (For a preliminary study of the manuscript, see Yavuz, “Hernando Colón’s Book of Books: AM 377 fol.”, https://manuscript.ku.dk/motm/hernando-colons-book-of-books/).

Estimated to contain over 15,000 printed books and manuscripts by the time of Colón’s death in 1539, the magnitude of the Biblioteca Colombina was certainly unparalleled at the time. The importance of the library is not just its size, however; the structures Colón developed to keep track of his books are argued to have laid the foundations of modern library cataloguing systems by providing a model for the conceptualization and development of cataloguing methods. In addition to keeping a register of accessions, Colón had conceived four types of inventories: a list of authors, a list of sciences (that is, subjects), a list of materials (that is, themes or keywords) and finally a list of epitomes, which contained detailed summaries of the contents of each book in his library. Known in literature as El libro de los epitomes [The Book of Epitomes] and considered to be lost until now, AM 377 fol., is a clean copy of one of these inventories and contains summaries in Latin of close to 2,000 books from Colón’s library.

The present author was involved in the identification of the manuscript as belonging to Hernando Colón and a preliminary study led to the identification of two of the previous owners of the manuscript, both of whom were not only important book collectors of their times but also prominent political figures in Europe: Gaspar de Guzmán (1587–1645), 1st Duke of Sanlúcar and 3rd Count of Olivares, was a member of the royal court of King Philip IV of Spain and served as prime minister between 1621 and 1643 and Cornelius Pedersen Lerche (1615–1681) was a member of the royal court of King Frederick III of Denmark and Norway and served as the Danish ambassador to Spain between 1650 and 1653 and then again between 1658 and 1662.

Examining the place of AM 377 fol. as part of the cross-referenced inventory system of Hernando Colón’s Library, this paper discusses the most recent findings about AM 377 fol., how it was prepared, what it contains, its fate after Colón’s death in 1539 and how it became incorporated into the Arnamagnæan Collection in Copenhagen.
1. Sarah Fiddyment and Matthew Teasdale: Biocodicology by numbers: How to? How many? How much?

Proteomics and genomics, two parts of the emerging field of biocodicology offer huge benefits for the care and conservation of manuscripts. By reading the biological record contained within parchments we can further our understanding of a manuscripts use, storage conditions and current state of preservation.

Proteomics, specifically eZooMS, allows for the collagen within parchment documents to be probed, these analyses can recover the species of the animal used to make the parchment and evidence of damage to the collagen molecules can provide information on parchment manufacture.

DNA analyses can further interrogate the animal who’s skin became parchment, allowing the sex of the animal to be deduced as well as a species ID and possibly an insight into its geographical origins. Moreover DNA technologies allow the interrogation of the bacterial and fungal species whose DNA remains on the surface of the document.

However, although these techniques are becoming more widely available, some common questions remain about their use, cost and efficacy in a conservation and a wider manuscript scholarship setting.

This paper aims to give an opinionated but practical overview of how proteomic and genomic technologies can be applied to manuscripts with a focus on numbers. How much these analyses cost, how many samples can be realistically processed in a certain time frame, what does the data looks like and how it can be integrated with the existing manuscript catalogues.

Two case studies will be presented to illustrate the pros and cons of each technique, when best to employ one or the other and what it can mean in terms of results, price and length of time.

With ever increasing pressure to maximise access and use in libraries and archives but still adhering to very limited budgets, it is important to be able to make informed decisions as to where the funds are best spent. We hope that with this practical guide we can help inform curators and conservators about what options are available, but more importantly when certain methods may not be the best use of resources to answer particular questions.

2. Laura Viñas Caron, Eva Birgitta Andersson Strand and Matthew Collins: Biomolecular and image analysis of parchment: a novel approach for understanding the origin of the Merino sheep in Medieval Spain

Libraries and archives preserve millions of books and manuscripts written on parchment, which is made from animal skins, and are thus an outstanding reservoir of biological information from these animals. This research, that has recently been funded by an ERC project Beasts to Craft (ercb2c.org), hopes to use a range of imaging and biomolecular methods such as genomics and proteomics to extract information which may help reveal clues about the domestication and improvement of animals; and the development of past economies such as wool textile production.

In this paper, we aim to investigate the origins of the Merino sheep, which is characterized by very fine wool and constitutes one of the most important breeds today. It originated in Spain during the Middle Ages and its development could have been facilitated by the introduction of new herds.
during the Islamic period, possibly from North Africa. However, its origins and population history remain poorly understood. Here, we present preliminary image data and discuss the potential of follicle pattern analysis for species identification and characterisation of type of wool in the context of our understanding of animal management in such texts as the Vidal Mayor.

3. Tuuli Kasso and Matthew Collins: ArcHives: Biomolecular record of bees in medieval sealing wax

Manuscripts of parchment, made from domesticated animal skins, carry the written history of our past, often dated, signed, and stamped with a wax seal. Manuscripts are an unprecedented reservoir of biological information localized and dated either directly (signed and dated historical documents) or estimated from palaeography (manuscripts) and sigillography (seals).

As a biological record, animal skins are evidence for the process of improvement from the middle ages to the 19th century and an attendant microbiome from scribing, handling and storage of the text. Honey bees A. mellifera were an unintended victim of the Reformation of the Church (mid 16th century). The burning of beeswax candles as symbolic representation of risen Christ was banned, and the decrease in demand was further enhanced by the abolishment of monasteries. The recent catastrophic decline in bee populations has caused concern for ecosystems worldwide and has highlighted bees’ vulnerability to environmental change.

Presented in this paper, the ArcHives project explores whether beeswax from the wax seals, like the parchment itself contains biomolecular data can be used to explore production and trade in the Middle Ages. Beeswax records (i) colony and (ii) the microbiome of the hives (iii) the pollen sampled (up to 802 km) around the hive, and (iv) the humans that kneaded the wax into seals. If we can recover human DNA trapped inside the wax seals we can explore the potential for an archaeology of the individual.

ArcHives is developing optimal methods for extraction of proteins and DNA from beeswax, based upon methods developed to extract DNA from paraffin wax embedded tissues and hive debris. The method will be applied to historical and archival beeswax, in addition to medieval wax seals. The information acquired via proteomics and genomics of beeswax (and associated parchment), are mirrored through historical trajectories and knowledge of the use of these materials in the Middle Ages.

4. Jiří Vnouček: The Late Antique parchment: Basic characteristics, methods of preparation and conservation problems

Parchment of the Late Antique manuscripts including earliest preserved codices from the fourth and fifth century have not been despite of its exceptional qualities properly studied and remains in certain way unknown territory of the studies of the writing material. Major attention was in the past paid to actual manuscripts containing mostly biblical texts written in Greek while its fine and thin parchment was described only by few words and often considered to be vellum (calf parchment) despite the fact that the Late Antique parchment is almost exclusively prepared from sheepskins.

Parchment of these manuscripts was prepared by very advanced method that confirms high level of development of various technologies in the Greek-Roman world but knowledge of preparation has started to disappear after the fall of the Roman Empire. Despite the fact that after the end the seventh century became method of preparation of sheep parchment modified and later completely replaced by different methods that has dramatically changed its appearance and characteristics, sheep parchment continued as writing material its journey through the history and was also widely
used for manuscripts in the medieval period. However at this time it was already the calf parchment that was considered to be best available writing material for the luxurious manuscripts while sheep parchment was often determined as rough material of poor quality.

My paper is going to be focused mostly on detail description of the characteristics of the Late Antique parchment and methods of its manufacture which development can be also demonstrated by changes in the way of reparation of various defects that appeared during the processing of the skins.

For the research of this unique writing material were used my own methods of visual analyses of parchment which are based on the observation of the traces coming from the method of its manufacture and observation of the anatomy of animals whose skins were used for its production. Visual analyses were in some cases also supported by biomolecular analyses that helped with precise identification of the animal species. As very valuable was also found experimental parchment making thanks to which (and often by accident) were in several cases revealed and reconstructed some of the technological mysteries.

Study of parchment of approximately twenty Late Antique codices (and their fragments) includes the Codex Vaticanus (B), the Freer Gospels or the Vienna Dioscurides and also several luxurious manuscripts written on purple parchment as the Vienna Genesis and the Codex Rossanensis. Beside of that will be discussed possible influence on development of coloring techniques of calf parchment produced during Carolingian renaissance and evaluated some problems coming from preservation and conservation of damaged folios of manuscripts.

Session 5A (11.30-13.00) Lecture Hall 22.0.11

1. Mary French: Honoring the past while preparing for the future: Conservation of a 15th century manuscript on the life on St. Augustine

In 2019, a German manuscript on the Life of St. Augustine dating from the late 15th century was brought to the Northeast Document Conservation Center (NEDCC) for conservation and imaging. Owned by the Boston Public Library, MS f Med. 77 is notable for being the most extensively illustrated Vitae Augustini still in existence. Containing 116 ink drawings with colored washes, many scenes are unique to this manuscript. Most pages feature at least one and sometimes two illustrated stories from St. Augustine’s life accompanied by short paragraphs of descriptive text written in gothic cursive in black ink with red rubrics.

The manuscript is bound in quarter-alum tawed pigskin over wooden boards and the skin is blind tooled with alternating diamond- and club-shaped tools. The binding is contemporary to the text and was bound circa 1494, approximately 10-20 years after the creation of the text block. The text block consists of gatherings of paper bifolia sewn through the fold onto three sets of double raised cords. Recesses and pin holes in the upper and lower boards indicate the former presence of a center clasp, although the clasp is now missing.

When formulating a conservation treatment plan for the manuscript, there were several condition issues to consider. There were significant losses in the alum tawed skin at the head and tail of the spine, as well as over the raised bands, and the skin and sewing supports were partially detached from the spine. Inside the text block, the sewing was broken along the kettle stitches and was loose at many of the sewing supports. Additionally, many spine folds were partially split and two leaves at
the back were fully detached. Most of the drawings featured large areas of a green colored wash; quite often, the paper underneath the green pigment was brittle and fractured, and some areas had losses. Based on this visual evidence, the presence of copper was suspected in the unidentified green pigment.

The many fractures in the green-pigmented areas of the illustrations posed a challenge for the conservator. Even when the pages were turned carefully by the reader, the breaks in the paper flexed significantly and were at immediate risk of further loss and damage. As the fractures occurred only within the drawings, traditional Japanese paper and wheat starch paste repairs would be immediately visually apparent. And, since most leaves contained drawings in the exact same position on both the recto and verso, it was not possible to subtly repair the drawings from behind. Because the pigment was suspected to be copper-based, this also limited the choice of repair material, adhesive, and application method since the addition of light, heat, moisture, acids, or bases could accelerate degradation further. After much thought, repairs to the fractures were carried out using individual kozo fibers adhered with a minuscule amount of wheat starch paste, a technique adapted from conservators at the British Library. Although nearly invisible, these repairs were strong and successfully stabilized the fractures while minimizing moisture exposure.

Because the early binding was largely intact, the conservator and curators all strongly felt that it was important to preserve as much of the original binding as possible and minimize any visible interventions. The decision was made to not disbind the manuscript so as to avoid inadvertently removing or altering any historic binding elements. This complicated the treatment, since it meant that any repairs to the split spine folds would need to be performed in situ. The loose and broken sewing, along with the partially detached spine piece and large losses in the spine’s covering material, allowed partial access to the spine and made it possible, albeit challenging, to repair the spine folds and reinforce the existing sewing while the book was still bound. These repairs restored functionality to the book by enabling the pages to be safely turned during reading without further contributing to damage in the paper. The binding was not rebacked so as to preserve the historic integrity of the original structure.

Without intervention, the binding’s historical features and structure would have remained unaltered, but the book would likely have sustained further damage with each subsequent use. A full conservation treatment, on the other hand, would have greatly reduced the risk of degradation or loss and allowed for safer handling, but would have come at the expense of the binding’s original structure. This treatment, a compromise between the two approaches, aimed to balance the conservation needs of the manuscript with preserving the historical integrity of the book. After conservation, the manuscript is now stable enough to be handled by the curator and careful readers, but remains largely unchanged in appearance. Although no approach is ever perfect, this treatment helped to preserve the book for the future while also keeping its artifactual history intact.

2. Lieve Watteeuw and Marina Van Bos: A manuscript for the head: The 13th-century illuminated parchment mitre of Jacques de Vitry

After the death of Bishop Jacques de Vitry in 1240 in Rome, his personal belongings were send to the monastery in Oignies (Belgium). One of the objects was an illuminated parchment miter produced in an workshop in Paris.

The miter is composed of two pieces of semi-stiff support of white alum tanned leather. On top of this, white taffetas silk in rectangular shape was mounted, decorated with gold and black paint (depicting two angels). The illuminated parchment strips (6 in total) were added on top of this,
stitched through the layer of silk and tawned leather. The front of the miter is illuminated and consists of a lower horizontal register (the circulas) with an arcade under which the twelve seated apostles are depicted. On the vertical element (titulus) on the front of the miter, three medallions were painted on a gilded background. On the lappets ten figures are represented, on the top of the left lappet Christ, on the right the Virgin Mary. The borders are simulating large precious stones, as would be on a real mitra preciosa. The illuminated mitre is an unique reply to precious metal and embroidered liturgical vestments.

The lecture will discuss the provenance, the iconography and stylistic features of the illuminations. The material composition of the illuminations and the ‘codicology’ of the miter will be put in focus, as the fragile miter was studied in a multidisciplinary way during the conservation treatment in 2017. A combination of analytical and imaging techniques were used to support the research and to develop the material characteristics, its conservation history, as the miter was adapted during the middle ages.

Macro X-ray Fluorescence scanning was used to investigate in a non-invasive way the painting materials on the parchment support. Although the implementation of this technique on the highly undulating and degraded parchment fragments was not so obvious, it gave remarkable results. Scanning of the illuminations resulted in detailed images which allowed not only to identify the used pigments and metal applications but which gave a condition evaluation at the same time.

Imaging was performed with multispectral imaging combined with photometric stereo, by the Portable Light Dome (PLD). This device allows in-depth visualizations through advanced filters, metric and visual monitoring, extraction of metric data, identification of materials and comparison of material characteristics on the topography of the artefact. Finally, highly detailed macro-photos with the Hirox 3D binocular document the technologies to create and consolidate the mitre.

The conservation was done in close collaboration between the manuscript and the textile conservator. The research project on the parchment mitre was a collaboration between KU Leuven - Book Heritage Lab, Illuminare, the Digitisation department of the University Libraries and the Laboratories and Textile Conservation Department of the Royal Institute for Cultural Heritage (2017-2018), a conservation and research project commisionned by the King Boudewijn Foundation for the Treasury of Oignies in Namur.


The ancestor table of Josse de Lalaing is an illuminated family tree on parchment from the Southern Low Countries, dated between 1475 and 1525 and kept in the national Royal Library of Belgium (KBR). The conservation of this document took place in a large conservation project preparing the opening in 2020 of a new museum about and around the Library of the Dukes of Burgundy. The goals of the conservation treatments were to stabilize the past degradations and to ensure optimal conservation in the future through minimal intervention. All the choices of treatments were made in accordance with those goals and global conservation principles like reversibility, visibility and use of neutral and stable materials.

The family three is traced with at least two sort of black-brown inks (one for the adornments and one for the outlines of the coat of arms and the names), painted with red, blue and green pigments, enhanced with silver and gold. The support is a large parchment of 580 / 900 mm. The document was mounted with paper strips on a carton board in a frame. The parchment presented strong deformations caused by variations of humidity and some of the paper strips were broken. Moreover,
The silver layer was strongly oxidized with a presence of small tears due to his fragility and stress from the deformations.

After dismounting, the mechanical stability of all the different zones of inks, pigments and metal were tested under microscope. It appeared that the colours were stable, except red, green and blue in the strongly wrinkled zones. The oxidized silver was still strong and the tears were stable. Most of the serious degradations of the pictorial layer and causes of actual instability were the strong deformations of the support. It was decided to stabilize the unstable zones and flatten the parchment to prevent new damages on the pictorial layers and ensure good preservation conditions in the future. A low concentrated isinglass glue was locally applied with a micro-drops tool on the zones with a strong lack of adhesion of the blue, red and green layers to prevent losses. Then, different options were tested on samples to choose a method to flatten the parchment. Because of the nature of the material and irreversibility of some parchment’s degradations (shrunk zones), the purpose was not to obtain a flat parchment but to resorb in a balanced way all the deformations with the aim of reducing and distributing the stress.

The document presented two types of deformations: first, large zones with a strong difference of eight (until 40 mm) and shrunk zones around but soft transition and then small zones with strong wrinkles. The presence of those two types of deformation complicated the flattening; some methods more adapted for one or the other type. For example, a local use of neodymium magnets could have been satisfying for the wrinkles but inefficient for the larger deformations and the use of a vacuum table could have been efficient for the large zones but dangerous for the strong wrinkles. The presence of illuminated layer was another constraint making the use of pressure and, more generally, techniques without possibility of visual control during the flattening dangerous. Our choice moved so towards a tension method, which allows a visual control during the flattening and can resorb large deformations and wrinkles on the same time. Those methods could provide very good results but could also cause damages if the tension is too strong, the drying too fast, the clamps used to fix the parchment too or not tight enough, the parchment too humidified ...

Therefore, a long series of tests with the different parameters of the flattening occurred. First, the relaxation of parchment (method, time, amount of humidity), then the tension system (type, protection of the clamps, force of clamping, placing of the parchment,...), then the control of the flattening, the time of stabilization, ... We finally set all those parameters and, after a soft stabilisation of the tears on the verso of the parchment, the flattening occurred. It was chosen to work gradually and repeat the treatment if necessary instead of taking the risk of a direct stronger treatment. After a first global flattening, local adjustments and a second global flattening, the flatness of the parchment was satisfactory. The parchment stayed 6 month at rest and was finally mounted on a new board with more and stronger paper strips, under a 3D matting.

Session 5B (11.30-13) Seminar Room 27.0.9


In April 2019, I started a new project at the Estense University Library in Modena - Italy. The Biblioteca Estense was created at the behest of the Este family—Lords of Ferrara—as early as the late fourteenth century, the two remaining closely intertwined until the dissolution of the duchy and unification of Italy.

The project named Extense aims to digitalize three important collections of the Modena’s library:
1- The collection of music manuscripts and printed books composed by 4,000 records of volumes and single quires from XIV century to XIX;

2- The large size maps made by paper or parchmnets from the XV century to the XX century;

3- Muratori’s collection composed by letters and single folios documents from XVII to XVIII century.

A team of conservators, software engineer, digitizers, librarians and metadata expert is working on a Digital Humanities project under the supervision of Jeffrey Schnapp. The project will produce a platform with digitalized materials and metadata with IIIF and high standards. The conservator is working to stabilize the materials before digitalization and helping during digitization process, searching of new techniques to protect the integrity of the objects.

2. Aida Nunes: Storing an oversized Museau de Lisboa textile banner collection

In 1947 Lisbon held the "Cortejo Histórico de Lisboa", a parade belonging to the “VII Centenary of the Reconquest of Lisbon to the Moors” celebrations. For the accomplishment of this parade, hundreds of scenic objects and accessories were created and three thousand extras and actors participated. Museu de Lisboa has in its collection a significant set of these objects, with highlight to the seventeen-banner collection. These banners that since 1947 were kept in different warehouses, were transferred in 2008 to the Museu de Lisboa Central Storage Unit textile room. The large dimensions of these objects were the main preventive conservation issue the Museum had to solve, regarding the way of storing the collection. In 2018 the Museum designed a project for the vertical storage of these banners. Due to its enormous size (being the biggest 315 cm height and 212 cm width) it was impossible for the museum to store these objects in flat format. The alternative was designed and executed using Tycore® boards as backing panel, hinged with acid-free buffered paper sheets and then glued together into one large piece with the same size as each banner. The banners with textile strip extensions were mounted onto the panels and stored vertically on metallic grids used for the storage of the Museum painting art collection. Treatments such as dust cleaning, tear consolidation and stain removal were carried out to stabilize the banners prior to the mounting on the boards. This paper describes some of the steps of this eight-month project, involving six people.

3. Silvia Pugliese, Sara Gottoli, Michael B. Toth and William Christen-Barry: The 3 ½ foot Marciana celestial globe of Coronelli, 1689: Scientific investigation and conservation

The Marciana Library, Venice, holds the first set of 3 ½ foot celestial and terrestrial printed globes made by Vincenzo Coronelli (1650-1718) and bequeathed to the Venetian Republic in 1689.

For its manufacturing history, the celestial globe made of laid paper gores mounted on plaster, can be considered as a prototype, and it presents unique features, such as numerous manuscript insertions. This globe has been on permanent exhibition since the beginning of its life, resulting in serious light damage, ingrained dirt, mechanical damage, and insect infestation. In the 1950s, since it was badly damaged, it underwent a substantial conservation process with integrations over the exposed gesso areas, removal of the original varnish, overpainting in substantial areas, and total reconstruction of the missing paper in the South Pole area.

On the occasion of the author’s death anniversary in 2018, a new conservation campaign was launched, with the help of the Italian ArtBonus crowdfunding platform.
For a comprehensive understanding of the materials and structure, it was decided to perform a series of scientific and diagnostic analysis on pigments and varnishes, and to carry on an X-Ray digital tomography to uncover its inside construction details.

In addition, a team from R.B. Toth Associates LLC and Equipoise Imaging LLC, in partnership Phase One A/S, conducted multispectral imaging in support of conservators and researchers. This digital imaging with a state-of–technology imaging system, using a portable narrowband system with multiple-wavelength, provided insights into faint and hard-to-read features, as well as spectral responses for ink analysis. This was the first application of such a system on a curved and three-dimensional surface. Multispectral images revealed difficult-to-see manuscript lines corresponding to the globe's elliptic grid, prior repairs, and numerous manuscript notes now invisible to the naked eye. It also allowed comparisons of inks, varnishes and colorants from prior work on the globe.

The conservation treatment developed over many stages, and involved all of the globe’s components (wooden pedestal, brass mount, the printed paper gores pasted over the gesso sphere, and over 1000 brass nails used as stars). At first, an anoxic treatment for disinfestation was performed, followed by dry cleaning. With the help of a scientist, a wide variety of cleaning gels and emulsions were then tested: the globe presented dirty areas due to a number of different agents, and we took care not to affect any of the fugitive manuscript notes and insertions. This required care not to leave behind any solvent, limiting to the minimum the water intake on the substrate.

Considering the obvious importance of the aesthetics of the object, particular care was taken in the subsequent conservation steps: loss and abraded area infill, retouching, and final varnishing. Solkafloc®, a cellulose powder, which has been recently introduced to paper conservation, was selected as the ideal product for infills due to its blending properties, appearance, ease and versatility of application. The retouching phase had to take into consideration the great variety of ink and pigments present, the uneven coloration of the substrate, and the interaction with the varnishing that would be applied as the final coating. Different varnishes were tried, and the choice fell on isinglass because of its translucent and compact nature, and its proven durability and long-term stability when applied onto paper.

Due to the curved shape of the object and its future relocation as part of the library’s permanent exhibition, all conservation treatments were fully discussed and weighted, keeping in mind that the light would be reflected in different angles by each portion of the globe, and that this effect would be exacerbated by the shiny varnish coating. For this reason, the case and the lighting system are going to be carefully designed.

Session 5C (11.30-13) Seminar Room 15A.0.13

1. Ekaterina Pasnak: Types of bookbinding from 16th until early 18th centuries from the Manuscripts and Rare Books Collections at the Special Collections of the University Library in Bergen: Results of a condition survey

INTRODUCTION

The Special collections of the University Library in Bergen trace their history back to the establishment of Bergen Museum in 1825 and the activities of Wilhelmi Koren Christie (1778-1849) who travelled around Norway in the first half of the 19th century gathering artefacts that had visual,
cultural, natural-historical and philological significance. Among these artefacts were many manuscripts and books. The collection of these rare books was named Librar, from the Latin term libri rari. The codicological survey of the Manuscript and Librar collections are the focus of the proposed contribution.

METHODS

The survey of these collections was undertaken in 2016-2017. It consisted of an overview of the types of bookbinding of manuscripts and rare books, including principal elements, like type of paper in a book block, sewing structure, boards, covering, decoration, and furniture. For the survey, a special condition rating system was devised that included condition of the text block, the binding, the furniture and other special features. To rate the overall condition of the object, various elements of the book were mathematically weighted based on their specific importance in the object, thus creating a more objective approach towards condition rating. Biological contamination was checked with UV light. A condition card with handling recommendations was inserted inside each surveyed object. All this information was entered into an Excel sheet with the intention of developing a database that will include extensive bookbinding information and be available through the portal marcus.uib.no.

In the collection, there is only one fully bound medieval manuscript (ubb-ms-0028), a commentary on the Bible by Hieronymus written in the Cistercian monastery Cambron in Belgium around the year 1200. The rest of the manuscripts from the Middle Ages are Charts and fragments that are kept unbound.

On the contrary, much more codicological data is preserved from the post-reformation period, thanks both to the cold climate of Norway, with small differences in temperature between summer and winter, the lack of sunshine etc.; and to a small degree of urbanization and industrialization until 1940-ies.

Finally, it should be noted that many book owners in Norway could not afford rebinding of their books, and there was a limited number of book binding shops in Western Norway. Since, moreover, there was no book conservator in Bergen Museum, and Library bookbinders managed to rebind only a limited number of books and manuscripts, we were lucky to have these precious artefacts preserved to date.

For these reasons, attention will be given in the proposed contribution to bookbinding examples from the 16th-18th centuries.

THE 16TH CENTURY

Books from the 16th century mostly demonstrate traditions stemming from Denmark and Northern Germany and associated with the Hanseatic League, which was present in Bergen from the 14th century. Both sources were influenced by German printing and bookbinding customs. German books from the 16th – early 17th centuries are characterized by Gothic inboard binding with tight spine, sewn on double raised cords. They have either wooden boards from oak or beech or paste boards made from adhered sheets of paper (Librar f10) that are covered either with calfskin or with alum tanned skin with fine blind tooling illustrating the book content (e.g. ubb-ms-0558, Librar q14). Often original clasps and bosses or their traces also are preserved (e.g. ubb-ms-0063, Librar q53). One other characteristic of German type bindings is that end bands are mostly adhered and not sewn
into the text block. Paper is usually thin and not well-sized, resulting in the spreading of the ink into the paper and the causing of discoloration. Some books exhibit the use of medieval parchment fragments as part of spine lining (e.g. Librar q73 and Librar q24); these await analysis and research.

THE 17TH CENTURY

In the 17th century, there appeared the influence of Dutch printing and bookbinding. There are many books in lace-case bindings in boards (e.g. Librar q40); a few limp vellum bindings with parchment covers (Ms.78); and inboard bindings with modest blind tooling on calfskin (Librar q57). There are some fine, fully preserved examples of limp vellum binding with virtually unchanged decorated edge (Ms 62) and other lace case bindings in boards with still preserved green silk laces and find blind tooling on parchment (Librar Groot Plakaat, vol II-VII). There are also a few 17th century books printed and possibly bound in Switzerland and Italy (Librar, q56, q88).

THE 18TH CENTURY

In the 18th century, the French book binding style starts to predominate with its single raised bands, calfskin covers and gilding on the spine only. Examples of this style are mainly to be found in a different collection of rare books from the Special Collection of the University Library of Bergen, the so-called “Fastingssamlingen”, which will not be included in the proposed contribution to the conference.

CASE STUDY

Alternatively, from this period special attention will be given to an Icelandic manuscript (Ms1491 marcus.uib.no/search/?q=ubb-ms-1491) dated in the early 18th century, a unique object containing seven sagas. It has wooden boards, one of which has been partially broken and lost, and a leather cover with simple blind-tooled decoration that is semi-detached, revealing the sewing structure of hemp twine. The text is written with iron gall ink, with minimal use of red ink for vignettes. The book’s pages are heavily discolored from the sooty environment of Icelandic interiors, as well as from water stains. It is hoped that conservation treatment will be done with consideration toward Icelandic bookbinding tradition, making feasible access to the details of the contents for closer philological and linguistic analysis.

CONCLUSION

Once a conservation atelier is built at the University Library, priorities will be established for conservation and research, making our material more accessible to interested students and scholars. Gradually, both the objects and the results of this work will become available via marcus.uib.no portal.


The Conservation treatment on MS 40655, an 11th century Greek parchment manuscript at The British Library a required a certain approach. This talk discusses the unique treatment approach and describes the considerations and discussion which occurred between curator and conservator at the British Library. An institution where ‘museum objects’ still perform their original function – a huge challenge for Conservation.

Conservation of this binding was a special opportunity and a partnership with the curators started in the planning stages. It was especially important to establish the future needs of this binding because
as well as needing to function it can be defined as a museum artefact. There was a key aim was to preserve all evidence of original technique and structure in this binding. In particular looking at treatment options to ensure that repair was added as a reconstructive element to the structure without changing or removing any evidence of the original binding.

In particular, the techniques used to perform the tricky task of reconstruction of the broken and missing parts of the link stitch sewing. And the reconstruction of the areas of missing leather fragments by moulding the spine allowing the remaining original fragments to be secured but evidence of their manufacture left unaltered.

Within the binding there is evidence of past repair, different re-used front and back boards, previous lacing paths on the boards, evidence of re-sewing, several board attachment methods, new ‘Alla Greca’ style end bands (all part of history and important evidence of craft techniques). All done at different stages, showing a patchwork of types of repair and technique. A palimpsest was discovered during conservation on the inner board.

3. Valentina Yañez Langner: Inter-agency collaborations for the preservation of choir books at the National Museum of Viceroyalty, Mexico

The choir books in Mexico are protected by different educational, cultural and religious institutions. One of the main research that has been developed for the preservation of choir books in Mexico began since 2005 from the project called “Chorus Books at MUSICAT. Rescue, preservation, cataloguing and dissemination of the collection of 129 choir books of the Metropolitan Cathedral of Mexico City”. From this, more lines of research were generated. However, information related to analyses and diagnoses for damaged illuminations was scarce. Through inter-agency collaboration from INAH’s networks of museums, laboratories and National Coordinations, it was possible to carry out instrumental analyses for the identification of materials of damaged capital letters of three choir books from the collection.
1. Amy Baldwin: Risen from the ashes: Balancing the historic and archival in the conservation of Charlotte Canning’s Indian Journals

The India Office Archives of the British Library comprise records of the administration of the East India Company and the pre-1947 government of India, as well as collections of private and personal papers relating to the British experience in colonial India. The diaries of Lady Charlotte Canning (wife of the then British Governor-General of India) from 1858-59 are from one such collection, and provide a direct and personal insight into the immediate aftermath of the 1857 Indian Rebellion from a distinctly female perspective. In December 1859 the five manuscript diaries were fire-damaged when Lady Canning’s tent was set alight during a tour of northern India, and the resulting brittleness and fragmentation of folios has meant that the diaries require stabilisation before they can be handled by readers and researchers. Four remain as volumes, in the form of mass-produced, leather-bound notebooks. The fifth manuscript has lost all binding features and survives only as fragments.

Charlotte Canning continues to be the subject of extensive research and biographical interest, and accordingly the conservation of her diaries is a curatorial priority. Considerable detail is known about the context of the fire in which the manuscripts were damaged, and the resulting evidence of burning thus provides a direct physical connection to the author and, accordingly, to the wider historical and political context in which she lived. It was therefore decided to preserve as much of the visual evidence of the fire damage as possible while stabilising the manuscripts to a level where they can be handled by more easily by curators and made available to readers. This paper will focus firstly on the establishment of what constitutes a suitable level of stabilisation for these manuscripts which, through their significance as damaged objects, blur the boundaries which often exist for conservators between archival source material and historic artefacts. A key factor informing conservation decisions was the fact that alternative sources of almost all the information contained in the diaries is available elsewhere in the India Office Archives, Lady Canning having repeated much of it in letters which have survived in good condition. It could therefore be assumed that readers whose primary interest was in the information contained in the text could be directed to these rather than to the manuscript diaries as their first port of call. This allowed repairs, especially structural ones, to be more minimal than would have been advisable had they been intended for a greater level of handling by readers.

The conservation treatments selected have preserved both the manuscripts and their evidential features to the degree that they can be handled, with care. However, while it is likely that this handling will be minimal, it is impossible to control it completely short of limiting public access to the manuscripts, which would both fail to meet the aim of conservation and be a potentially questionable use of approximately 400 treatment hours. The ongoing fragile, though stable, state of the volumes means that tailor-made housing strategies and handling guidance are required to minimise the risk posed to them by handling.

Remedial treatment has focused upon consolidating burned paper areas by the application of kozo 4 tissue with cold gelatin and upon localised reconstruction of spine folds and sewing to enable each volume to function as a single text block. Burned and abraded covering leather has been consolidated but little has been done in the way of infilling or reconstructing missing board material.
No attempt was made to return the fifth, fragmentary, diary to a bound format, but after consolidation all of these fragments were encapsulated in Melinex.

The second focus of this paper will be the use of housing strategies as a means by which the conservator can communicate with the reader, not only through verbal instructions but by implicitly and explicitly communicating the object’s vulnerability through the protection offered to it by its housing. Any handling instructions have to be readily comprehensible to curators, reading room staff and readers. The encapsulated fragments of the fifth manuscript are surrounded by frames of 2mm mountboard to prevent any flexing of the Melinex and possible cracking of the paper, which remains brittle. In addition to standard acid-free phase boxes, the four volumes each have a secondary rigid wrap-around case made from mount board. This protects the burnt edges of the folios from abrasion by the sides of boxes should the volume shift during transit. The correct usage of these secondary cases will be communicated via numbering and/or diagrams. Written instructions will also be included with the items to direct readers in the use of book supports, since one of the volumes is only sewn through the lower half of the spine folds. In designing both the housing and the instructions a careful balance had to be achieved between protection and functionality - if it is too complex for readers to use then the risk of damage to the items is increased.

While the treatment of the Canning diaries has fulfilled the aims of both conservator and curator, the continued risks posed by its dual status as repository of text and historical artefact mean that digitisation would be a desirable final outcome for the project.

2. Amélie Couvrat Desvergnes: Book culture in Northwestern India: An insight into the production of handwritten and graphic documents in the 19th century

The Northwestern region of India comprises the today-states of Jammu-Kashmir, Punjab, situated in the plains, in addition to Himachal Pradesh and Uttarakhand, the so-called Pahari region, located in the lower foothills of Himalaya. The region was a crossroad of various social, cultural and religious influences in the context of incessant wars; as the result of an intricate pattern of diverse religions - Hinduism, Islam, Jainism and Sikhism - alongside their corresponding languages, scripts and the manuscript formats. Therefore, the tremendous production of handwritten and artistic artifacts reflects the diversity of cultures and influences. Moreover, from the eighteenth century onwards and throughout the nineteenth century, the area saw the gradual expansion of the British colonization and more generally of the European incursions which has a significant impact not only on the production of manuscripts and artistic pieces but also on the materials implemented.

Scrolls, bundles of leaves, single sheets to bound volumes have formed a rich and complex corpus of forms, structures and materials. Paper, tree leaf, leather and textile, among others, were put together to produce a large range of graphic idioms, physical incarnations of the manual gesture of the calligrapher, the painter, the scribe or the pandit. Among others, are encountered bound volumes derived from the Persianate and Islamicate traditions, religious et devotional Hindu manuscripts of oblong format covered with textile or piles of loose sheets wrapped in cloth, historical records and handwritten documents in the form of scroll or long paper sheets folded and tied together with cords as well as loose painted folios inspired by Mughal miniature painting. Such diverse production epitomizes the complexity of the social and historical context of the region but also highlights, in the nineteenth century, the duality between the resilience of traditional and indigenous forms and materials and the mutations towards new modes of expression. In this paper, the topic will be addressed through the angle of materiality. Handwritten idioms, will be examined as ethnographic means to understand the material culture and the artistic developments during this specific period of cultural and social changes.
Alongside physical three-dimensional items, the graphic representations of artists at work, princes, priests and scribes using documents, volumes and writing implements represent a great source of information which provide a better understanding of the usage of books, their handling, their storage and their preservation. These will help to reconnect the physical objects with their social and prolific artistic milieu. In addition, the lecture will be the occasion to highlight the collections from libraries and museums in the Netherlands, collections which are generally under-studied by the scholars.

3. Ina Fröhlich: An illuminated Egyptian manuscript from the 17th century: Codicology, ink and copper corrosion, conservation

The manuscript Ms. or. fol. 2564 in the Staatsbibliothek Preußischer Kulturbesitz zu Berlin is a richly illustrated manuscript produced in Egypt in the 17th century. The text which recounts an episode of the Arabian Nights is accompanied by miniatures on nearly every second page.

In a master thesis at the Cologne Institute for Conservation Sciences (CICS) the manuscript has been examined under codicological and conservational aspects with a special focus on the causes and treatment of its damages.

The text is written on paper imported from Europe. The cover was probably replaced in France and decorated in an oriental style. The choice of materials used in the book as well as in the repairs show close contacts between Egypt and Europe over three centuries.

The manuscript has been heavily used which led to extensive repair work in the 18th and 19th centuries. The damages include a loosened sewing structure, which was replaced by heavily gluing the back in the 18th century. This led to tensions in the paper which resulted in tears and creases in the paper and even in the illustrations. The opening of the binding is reduced.

The main focus of this paper, however, will be on copper- and ink-corrosion which can be observed on several pages.

The majority of the literature on copper corrosion covers the reaction and treatment of copper acetate. In this special case the green pigment has been identified as a copper chloride (paratacamite). The writing ink is a mixture of iron gall ink and carbon black ink. The ink corrosion seems to be triggered where copper corrosion is active.

Since the corrosion of copper chloride has not yet been researched in the context of paper conservation, there was no treatment developed for this kind of damage.

Therefore test series were carried out to evaluate possible treatments of the pigment and the ink and their stability after artificial ageing cycles. A procedure needs to be developed, which treats both damages concurrently. The goal was to remove the harmful mobilized metal ions or at least immobilize them. Ideally, this goal should be achieved by using and adapting a method which has been tested already. Current treatments of copper corrosion which could alter the color of pigments or the paper were excluded from the beginning. In the end the test series focused on spreading a layer of proteins as gelatine or isinglass onto the surface of the corroded parts of the samples, as proteins were said to immobilize the free metal ions. The metal ions were rinsed out by a mixture of water-ethanol on a suction table before the application of the protein. As both the pigments and the inks are water-sensitive and the carbon black ink could be detached and dislocated, it was necessary to develop a treatment to remove aggressive substances by keeping the water amount as low as possible.
Difficulties arose in the measuring of the success of the treatment. It was vital to see if the metal ions were not just moved deeper into the paper or were leaking laterally in the adjacent areas but rinsed out of the paper or at least immobilized.

It was possible to examine these factors through the use of indicator papers for iron and copper ions (bathopenanthrolin and bathocuproin) as well as REM-EDX-measurements on the samples. The results of the tests were the basis of the conservation treatment of the manuscript and were successfully applied to it.

4. Marleena Vihakara and Anna Aaltonen: Conservation of Coptic parchment fragments and a bifolio from the Ilves Collection

A private collection of Coptic manuscripts called The Ilves Collection consists of over 200 individual items and is housed in Helsinki, Finland. The variety of material in the collection varies from fragments made of papyrus and parchment to complete and voluminous, although admittedly quite late, paper codices. The research project of the Ilves collection has been funded by the The Academy of Finland during 2016–2020 aiming at making the manuscripts collection accessible to the public, following the principle that “a manuscript available to one scholar is available to all”. The Ilves Collection is the only known collection of Coptic manuscripts in Finland.

The main focus of the presentation is on the conservation of 12 parchment fragments and one bifolio that belong to the Ilves Collection. The fragments and bifolio are written in iron-gall ink and they mainly come from a miniature codex containing the biblical Book of Esther. The text of the Book of Esther was composed in Hebrew and later translated into Greek. The Coptic version is a translation of the Greek version thus contains sections missing from the Hebrew original. The dialect of the codex is Sahidic, the most widespread Coptic dialect of the first-millennium Egypt. The codex was probably produced around 600 CE and is similar to a codex in Dublin that is securely dated to this time period. The exact place of production in Egypt has not yet been recognised.

The fragments and bifolio suffered from strong deformation, were dry hence had lost their strength and flexibility, had tears, folds and losses as well as accumulation of inbed surface dirt that prevented fragments from being handled and researched. Iron-gall ink used for the writing, humidity/water damage and fire damage had caused loss of text, embrittlement and missing areas to the parchments. The fragile overall condition of the parchment created challenges and restrictions to the traditional parchment conservation methods and their accommodation resulted in innovative treatment solutions.

The aim of the conservation project was to stabilize the condition of the Coptic fragments and the bifolio as well as facilitate their safe handling during research and display in the future exhibition. There were several main problematic issues to address and the solutions were comprised by careful investigation, planning and testing of the materials and treatment methods and by consultation of conservators internationally. The humidification method used for straightening and strengthening the strongly curved and brittle parchment objects enabled the simultaneous surface dirt removal. The suitable adhesive for the repairs made with goldbeater’s skin were tested on both parchment and paper. The areas experiencing the iron-gall ink corrosion were treated with gelatin in aerosol form. Furthermore, the conserved fragments and the bifolio required framing and housing technique that would maintain a stable humidification and allow their research on both recto and verso without compromising their safety, conservation and preservation. This challenge was resolved using an inlay technique and Art-Sorb material. The project took place during a 7-month-period, starting in 2017, and was successfully completed in 2018.
1. Penelope Banou and Angeliki Stassinou: *Letters Patent for the establishment of Roman Catholic Church confraternities in 17th-century Greece: Typology, materials and aspects of preservation*

The paper will discuss a special type of illuminated documents, the letters patents (litterae patentes), that used to issue the establishment of roman catholic confraterinities in particular islands of Greece in the 17th century and belong to the collections of the General State Archives of Greece. After the sack of Constantinople in 1204, catholic confraternities scarcely appeared in the Greek region, but the majority of them developed by the end of the 16th century and the 17th century. The catholic confraternities were established by the adherents and they had religious, worship and charity purposes, as well as mutual assistance among the members.

The letters patents in question provided a published written permission for the establishment of a catholic confraternity issued by the great magister of a specific catholic order. Generally, the term letters patent describes a variety of types of documents, that cover a huge diversity of subjects, including grants of official positions, lands, commissions, privileges and pardons. Letters patents are regarded as “open letters”, a category of documents that intended to be read by a wide audience or nonetheless widely distributed intentionally. The opposite of letters patents are letters close (litterae clausae) that are sealed so the recipient can read their contents exclusively.

The letters patents are rectangular shaped documents on parchment substrate, written in Latin minuscule. Only the title and the names of the pope and the head of the order issuing the document, the place and the date are scribed in capital letters. In certain cases, the capital letters are gilded. The scribe layout and the main content of the document are specific for every catholic order.

The borders of the documents are wide and the head border is usually adorned with illuminations associated with the symbolisms of the confraternities. In some cases the side borders are elaborated with floral decoration. The documents bear a plica on the lower part of the substrate. In the middle of the plica there is a cord passing through two round holes to hold the pending bulla. The documents were folded several times in a smaller form. Endorsements have been recorded in the verso of some documents.

The letters patents present intense planar distortions and creases due to the original folding of the parchment substrate. Cracking, flaking, and loss of the painting layers of the illumination and the text were principally attributed to the folding of the document. Likewise, tears and losses were recorded on the substrate along the creases. In many cases the pendant metal seal is missing and the area of the plica between the holes, where the cord passes through, is torn and distorted.

In order to prevent further damage of the ink and painting layers, flattening of the support could be regarded necessary. Although flattening of a document which was originally folded can raise ethical issues, the fact that letters patents are open documents folded to serve purposes of archiving and storage might change the aspects of the argument.

Storage of each letters patent in special tailor made cases is also discussed.
2. Angelica Anchisi: Conservation of a 19th-century register of children from the Charter School in Kevin Street, Dublin

The subject of this paper is the conservation treatment of a register of children from a Charter School in Kevin Street, Dublin. The item is part of a collection of registers and documents given to Trinity College Dublin by the Incorporated Society for Promoting Protestant Schools in Ireland in 1971, and held in the Manuscripts department of the Library.

The volume contained the name of all the children who were transferred to and from the Kevin Street School in the years from 1793 to 1823. The entry for each child registered name, age, religion, the place where they came from and their destination with a space left for special annotations, such as apprenticeships, return to the family because “admitted without knowledge or consent” of their parents, attempt of elopement and subsequent transfer to the penitentiary for young criminals, illness or death.

Due to severe mould damage resulting in the fragile condition of the volume it had been unavailable for consultation for some time. The other registers and documents donated by the Incorporated Society to Trinity are subject of much research and publication, however this is somewhat compromised by the lack of access to data from the three decades recorded in the damaged volume.

The register is a full reverse calf stationery binding over pasteboards with two broad leather bands (Russia banded) attached to front and back boards, and across the spine secured with parchment tackets. It was originally sewn on four wide parchment straps laced into the covers. The text block is pen ruled machine-made paper, with watermarks.

Prior to acquisition by the library, the book had been exposed to a high level of humidity and dust over an extended period. It remained unnoticed until recent years when it was removed to the conservation department and placed in the fume cupboard because of the extensive mould spores throughout the book block and the cover.

The first and last sections were heavily damaged by mould as were the top half of the pages in the rest of the book block. The back folds of the sections and the sewing structure had been also severely affected by the mould resulting in the complete loss of the spine. The leather cover was degraded and stained with losses in some areas. The pasteboards were mostly delaminated and heavily damaged by mould resulting in an overall weakness and loss of structure.

The treatment involved much discussion followed by extensive intervention that required finding solutions to several unforeseen issues such as the complete disintegration of the boards; deciding to rebuild what remained of the pulp boards rather than constructing new replacements, was one such decision. It was also necessary to find a way to consolidate and repair all the 226 pages without creating an excessive bulk at the top of the book block and to guard all the sections and to sew them back while keeping the original size of the spine.

Key to the treatment plan was whether to keep the original structure as a stationery binding with new tackets connecting the sections to the spine or to find a new way to join the binding and the book block without putting excessive tension on the still fragile back folds.

It has been an extremely complex but satisfactory conservation treatment that has involved numerous interventions from paper consolidation to reconstruction of boards. At the end of the two
months required to complete the project the volume was finally available to be consulted by researchers and historians for the first time in more than thirty years.

3. **Paul Hepworth: An Islamic treasure binding and its conservation**

Two bindings in the collection of the Istanbul University Rare Books Library involve the extensive use of gold wire in their decoration as well as some distinctive but unidentified materials. Awareness of the existence of this type of binding has been previously restricted to only a few scholars, and the methods of manufacture for these bindings have never been studied or described before. This paper will introduce this type of binding as a rare but important part of the Islamic repertoire: they demonstrate the exploration of materials and production techniques not usually associated with bindings in the Islamic tradition. They could only have been made in the context of the Ottoman imperial workshops, probably in the 16th century, where artists usually working in different media—binders, embroiderers, jewelers—could collaborate on such an unusual project.

The conservation of such complex objects poses great challenges. Given the nature of the materials and techniques used, what kinds of treatment could be safely undertaken on them? Their rarity as well as their great material and historical value also adds another dimension to their treatment. The practical decisions that attend any treatment protocol must be further balanced within the context of their presence in a non-western collection where the aims and limitations of conservation may not be well understood. Before beginning a treatment, who should participate in the decision-making process and how informed should those decisions actually be? This paper will explore some of the ethical factors which impinge on making treatment decisions in these situations.

4. **Cécile Brossard: Original decorated remnants under a 16th-century Syriac re-binding**

Conservators-restorators rarely work on Syriac bindings. I had the opportunity to do so in 2018 with the manuscript “Syriaque 402” which is stored in the Manuscript Department of the National Library of France, in Paris.

Acquired in 1991, “Syriaque 402” is from the 13th century and is a gospel on paper in the Syriac language, a Semitic language from the Middle-East, derived from Aramaic. The Eastern binding is typical of the Syriac bindings, with wooden boards, from the 16th or 17th century. Moreover, a hand-written note on the endleaf indicates that an intervention occurred in the 16th century, that corresponds with the present binding. A further restoration with a sheepskin re-back, from approximately the 19th century (?), was present when the book arrived in the workshop.

The conservation-restoration project generated by the very poor condition of the binding (detached board, a spine with many losses) and of the book-block (numerous torn and detached pages, broken sewing) led to a meeting with the curator and two specialists on Syriac manuscripts. The result was the decision to dismantle the binding.

The spine disassembly was performed in several steps and right away there was a pleasant surprise: the discovery of a blind-tooled spine under the sheepskin re-back, corresponding to the 16th century binding. Then, the unexpected discovery of another piece of leather, of a piece of a brown textile and at last, of the historical lining, which once removed, enabled us to see the quire backs, restored with small pieces of dark grey or yellow textiles. A green silk thread passed through all these parts, which was sewn at the same time of the sheepskin re-back.

After the dry cleaning of the very dirty leaves, they were treated taking into account the presence of iron gall ink, then the quires were reassembled. The book-block was re-sewn un-supported, identical to the former one, from the back wooden board.
A new textile lining was done respectfully of the original lining, in three layers.

The endbands were very damaged and were replaced by new ones according to the Syriac model, with the same colors found under the turn-ins.

The historical leather being very thick, it was necessary to put two layers of new leather to restore the spine, which also supported the reintegrated 16th century spine, which had become stiff and fragile with age.

When the paper pastedowns were temporarily taken off, it was possible to see a mark from a textile on the inside back wooden board. This proves the presence of textile pastedowns in the past, no longer present, unless the brown textile piece found under the spine is the last witness...

The housing of the removed binding fragments gave the opportunity to examine more closely the other piece of leather which was found during the dismantling of the different layers of the spine and it was a shock to discover a decoration, difficult to see, but revealed with raking light. This decoration presents dots and lines. We hope that this remnant belongs to the 13th binding.

The book and the binding fragments are now protected in a conservation box. The restoration required more than 400 hours of work and was thoroughly documented.

To conclude, I can say that the dismantling of the binding, a difficult decision at the beginning, in the end had unexpected results. It allowed the discovery of the 16th century blind-tooled spine and even more astonishing, the recovery of a blind-tooled former spine, perhaps belonging to the original 13th century binding.

Session 7 (16-18) Lecture Hall 22.0.11


PART 1

The Vinland Map was introduced to the world in 1965, as a newly discovered mid-15th century map of the world, purportedly showing both Greenland and a part of the northern coast of the North American continent known as ‘Vinland’. Some viewed this as an exciting revelation that proved the Vikings were the first to reach America, at least 50 years before Columbus. Others remained skeptical; doubt over the map’s authenticity fueled decades of cartographical, historical and scientific research.

This presentation will trace the known history of the Vinland Map and its relationship with its seldom mentioned companions, a 15th century copy of the 4th volume of Beauvais’ Speculum Historiale, and a rare copy of a 13th century travelogue, the Hystoria Tartarorum. The structure, materials, and radiocarbon dates of both volumes and the map will be discussed, as well as a study of the dubious physical interventions made to them over the centuries. Multi-spectral examination of the inks, and recent analytical testing of the parchment using peptide mass fingerprinting and DNA analysis provides interesting new information, but also raises more questions about the mysterious Vinland Map.
PART 2

For over 50 years, the Vinland Map has been the subject of intense interest and investigation by historians, cartographers, paleologists and scientists. Almost immediately after its debut questions arose that cast doubt on the Vinland Map's genuineness. For several decades scientific analysis has been one of the tools employed to attempt to address the authenticity question through examination of the parchment and ink used to create the map. While science cannot be used to prove a work of art or an artifact is genuine it is possible to establish that an object is likely a forgery if the materials from which it is made are inconsistent with the time period and geography of its purported origin.

This presentation will follow up on the history of the Vinland Map, Speculum Historiale, and the Hystoria Tartarorum by briefly providing an overview of the analytical results obtained by previous researchers. This will be followed by a description of new discoveries made possible through the application of scanning macro X-ray fluorescence (MA-XRF) spectroscopy, Raman spectroscopy, and other analytical tools. In order to learn more about ink components used in the time period and area of origin associated with the map, spectroscopic analysis of dozens of 15th century manuscript fragments was also carried out.

2. Laurianne Robinet, Lucie Arberet, Stéphane Lecouteux, Anne Michelin, Véronique Rouchon, Sylvie Heu-Thao and Oulfa Belhadj: Mont Saint-Michel manuscripts: Focus on the scriptorium practices in the 11th century

Since the revolution, the city of Avranches watches over a real treasure: over 200 medieval manuscripts coming from the famous Mont Saint-Michel abbey. These manuscripts copied on parchment are dated between the 8th and 18th century, and half of them was produced by the Mont Saint-Michel scriptorium between the end of the 10th and the middle of the 13th century. This exceptional collection constitute a testimony of the writing and illuminating practices over a large period of time, for that reason a research project was started to characterize the different constitutive materials, namely the parchment, the coloring materials and the inks, in order to retrace the copyists practices.

This research conducted by the city of Avranches and the research center for preservation (CRC) focused in 2019 on manuscripts from the Romanesque period (end of 10th – 12th century), and in particular those dated before 1100, which represents a corpus of 46 items. This corpus benefits from the previous codicology studies that allowed to define group periods and attribute some manuscripts to known copyists [1]. From the physico-chemical analysis of the constitutive materials, we aim to confirm and complement these attribution, but also to provide precise chronological markers for the manuscripts produced in this scriptorium. In addition, the research aims to gains a better understanding of the pigments degradation, affecting mostly the reds and greens, to help with their conservation. In fine, the results gained from this study will be added to the virtual library (https://www.unicaen.fr/bvmsm/) and will be integrated into the Avranches scriptorial where the manuscripts are exhibited.

The scientific analyses were carried out in the patrimonial library of Avranches where the manuscripts are conserved, using mostly portable and non-invasive analytical techniques. Five experimental sessions have taken place in 2019. Prior to the analysis, visual observations were done at the macro and micro scale using different light sources. The coloring materials were identified from the combination of X-ray fluorescence spectroscopy (XRF) and fiber optic reflectance spectroscopy (FORS) over the visible and near infrared range. In order to confirm some attribution or
when the identification was not possible from the non-invasive approach, micro samples of pigments were taken to undertaken micro Raman spectrometry analysis in the laboratory. The results gained on the pigments will be compared to the work carried out by Claude Coupy on Fecamp manuscripts in 1990’s that revealed an evolution in the use of red and blue pigments [2, 3]. The organic binder was punctually identified using infrared spectroscopy in reflectance mode. For the inks, XRF was used to identify and quantify the elemental composition. The animal species of the parchment was determined from proteomic analysis using the peptide mass finger printing method applied to a micro sample of parchment.

In the coming months, 6 manuscripts from the corpus requiring more attention because of the fine and extensive illuminations, will come to Paris to be analysed using two additional imaging techniques: hyperspectral imaging and X-ray fluorescence scanner. These techniques will provide information on the nature and the repartition of the different coloring materials and their alteration.

The preliminary results gained from these ongoing analyses already revealed an evolution in the choice of the materials over time, or depending on the location in the manuscript. The completion of the analyses over the full corpus will help validate these first observations and allow to identify materials and practices that could be related to the scriptorium of the Mont Saint Michel. This knowledge will be useful largely to the scientific community, and serve as a reference to undertake comparative studies with contemporary manuscripts produced in other workshops in Normandy.

References

3. Julia Poirier: The Samaritan wooden endband structure: A case study of BFN Samaritan 1

This paper will describe in detail the Samaritan wooden endband plate structure, thought to be typical of 12th to 14th century parchment Samaritan Pentateuch manuscripts. Using manuscript Samaritain 1 from the Bibliotheque Nationale de France as a case study, the evolution of this unique binding structure, from as early as the 12th century to the late 19th century, will be traced.

Only a handful of medieval examples of this sewing style have survived to date and one of the best preserved and earliest of these is the manuscript BNF Samaritain 1. This 11th -12th century Pentateuch manuscript preserves two wooden endband plates and the unique Samaritan sewing structure. Although it is difficult to date with certainty, the observed evidence gathered in the manuscript and its binding gives some clues as to its production date and the technique used for its sewing structure.

In the 17th century, when manuscript BNF Samaritain 1 entered the bibliophile Nicolas-Claude Fabri de Peiresc’s collection in France, its wooden endband sewing structure was protected by the addition of a red leather binding. However, the upper board of this 17th century cover is now detached, revealing a clear view of the original spine structure.

Through the detailed description of this manuscript and the many components of its binding, this paper hopes to record in detail this rare sewing structure as it pertains to the early Samaritan binding tradition.
Research on a rare manuscript structure such as this informs our understanding of a little known binding tradition. Through close looking and documentation of BNF Samaritain 1, the construction, evolution over time, and relationship of this manuscript with other binding traditions will be better understood. This will in turn help conservators, curators and librarians to preserve and identify the unique binding characteristics of the Samaritan Pentateuch.
Friday 24 April

Session 8A (9.30-11.30) Lecture Hall 22.0.11

1. Christa Hofmann, Sophie Rabitsch, Maurizio Aceto, Antonia Malissa, Katharina Uhlir and Martina Griesser: *The miniatures of the manuscript The Vienna Genesis: A study of pigments and painters*

The Vienna Genesis (Austrian National Library, Cod. theol. gr. 31) is a Greek manuscript written with silver ink on purple parchment. The codex is dated to the first half of the sixth century and was presumably created in the Near East. 24 folios with 48 miniatures are preserved at the Austrian National Library. During a three-year research project supported by the Austrian Science Fund FWF, an international team of researchers investigated the parchment, the purple dye, the inks and the pigments. Based on these findings the manuscript was conserved and newly housed.

The Vienna Genesis is famous for the 48 miniatures, which illustrate the text of the book of Genesis. The paintings are considered the richest cycle of book illuminations from Late Antiquity. Various aspects of these miniatures have been the research focus of numerous scholars over centuries. One question that has been ardently debated for over 100 years is how many painters worked on the illustrations. It is obvious that not only one artist designed and painted the miniatures. So far, the painters have been differentiated by their style and their iconography. The colours used by the artists have not been investigated, therefore the aim of this project was to identify pigments and dyes as well as to differentiate palettes of individual painters. A combination of methods was employed to gain better understanding of the art technology. Based on the latest theory on painters and visual observation of the miniatures, seven painters were identified. Representative measurement points in the main colours were selected for each artist. The measurement points were analysed by micro-X-ray-fluorescence spectroscopy (μ-XRF) and by UV-visible diffuse reflectance spectrophotometry with optic fibres (FORS). Spectrofluorimetry and optical microscopy were used to obtain additional information. Loose paint particles that could no longer be assigned to definite locations were used as micro-samples for further studies with Raman spectroscopy, surface enhanced Raman spectroscopy (SERS) and scanning electron microscopy- energy dispersive X-ray spectroscopy (SEM-EDX). The analytical results were compared with microscopic examination of the measuring points using magnifications of 6.3x to 32x. Observations of the miniatures under normal light and ultraviolet light (UV) as well as on infrared reflectography (IRR) images completed the interpretation of the painting techniques. In discussion with all partners, a suggestion for the colours used by seven different painters was formulated. Not all pigments and dyes could be clearly identified. Despite open questions it is possible to distinguish differences between painters namely in the use of blue, green and black colours. Relationships with other illuminated purple manuscripts from the 6th century like Codex Rossanensis (Museo Diocesano, Rossano) and Codex Sinopensis (French National Library, Cod. Suppl. gr. 1286) can be established.

2. Dan Paterson and Alan Haley: *The conservation and digitization of 41 volumes of the Yongle Dadian, a Ming Dynasty era encyclopedia at the Library of Congress*

The Library of Congress holds 41 volumes of the Yongle Dadian, a manuscript encyclopedia first commissioned in 1403 by the Yongle emperor, the third ruler of the Ming Dynasty. When completed in 1408 the Yongle Dadian comprised 11,095 manuscript volumes, recording an enormous scope of
Chinese life and culture and making it the world’s largest compendium of accumulated knowledge prior to the twenty-first century. Around 1565 a second copy of the encyclopedia was completed, also in manuscript form, meant to ensure the preservation of the work. The completion of both sets of the Yongle Dadian is widely considered one of the great scholarly achievements of the Ming Dynasty. None of the original volumes from 1408 is believed to survive. Worldwide there are about 400 known fascicles from the 16th century edition that are extant. The 41 volumes at the Library of Congress is the largest holding outside of those at the National Libraries of China and Taiwan.

In 2016 the staff of the Asian Division at the Library of Congress proposed digitization of the Yongle Dadian volumes. The Yongle Dadian digitization project is envisioned as a means to share the collection with international institutions and scholars of Chinese history. There is particular interest in scanning the collection because many of the other institutions that hold copies of the Yongle Dadian have either already scanned theirs, are in the planning stages of doing so, or have created hardcopy facsimiles.

Special collections digitization at the Library of Congress requires collaboration among many areas of expertise. The Yongle Dadian project was placed within the existing scanning workflow with acknowledgement of the unique needs of the collection. These needs precipitated an expanded review process that involved photography and detailed reports for each of the 41 volumes and required over two years to complete.

During the review process, multiple condition issues that were common to virtually each fascicle were discovered. Many of these issues are likely attributed to the events during and immediately after the Boxer Rebellion, an occurrence that significantly impacted the history of the Yongle Dadian. The collection was stored in the Hanlin Library which was burned during hostilities between the Boxers and Westerners. Many of the surviving volumes were subjected to water damage as a result of the skirmish and an ensuing fire.

Following the condition review, treatment of individual volumes by a team of conservators began. One of the interesting features of the Yongle Dadian is that each volume at the Library of Congress (and the remaining volumes worldwide with the exception of those that have been rebound) has a uniform binding structure. All are covered in yellow/gold silk with layers of paper bonded together to form rigid cover boards. The cover to textblock attachment was established by endpaper construction and the exterior covering silk. The leaves of the textblocks are held together by four paper twists, rather than sewn with thread. This type of binding, used in the early Ming era, is usually referred to in English as the “wrapped back” style. Despite differences in terms of material and leaf attachment, this binding structure has some similarities to case style bindings, a book structure commonly found in Western libraries. This similarity between structures, and our familiarity with the case style binding, helped to inform some treatment strategies and protocols throughout the entirety of the project.

After treatment, each fascicle has been or will be digitized in the Library of Congress scan center. At present about 50% of the collection has been scanned. The Yongle Dadian’s importance, and the specific physical characteristics of these unique items, impacted the steps chosen in planning the scanning workflow, including the choice of scanning equipment available in our digital scan center, creating special care and handling recommendations for camera operators, and addressing security concerns.

This paper will discuss all three phases of the project: condition review, single item treatment, and digitization. Each portion has been central to the success of the Yongle Dadian project to date. In
addition there will be discussion of how the conservation team worked together with the other library units involved in the project. Finally, there will be analysis of how the size, complicated history, and cultural significance of the collection impacted each phase and decision making throughout the process.

3. J.D. Sargan, Alexandra Gillespie and Jessica Lockhart: *Manuscript ghosts: Uncovering early manuscript structures via MicroCT*

The Book and the Silk Roads is an international project based at the University of Toronto and supported by the Mellon Foundation. It seeks to produce a new world history of communication technologies, one powerful enough to replace popular Western narratives about the emergence of the codex, commercial printing, and mass media as triumphs of “Western Civilisation.” Using non-destructive scientific methods to mine details from surviving codices—especially the binding structures used to turn books from parts into wholes—and combining these discoveries with historical research, we trace the codex’s development through a mix of local experiment and innovation and the transnational exchange of ideas, material, and craft practices. A global approach to premodern book history will transform the story of human communication technology by revealing the networks of relationships—as well as the more complex technological and material entanglements—that knit together our premodern world.

The project works with scholars from across the world to use non-destructive scientific techniques to study the structure and materials of old books—from DNA extraction and genomic analysis to Fibre Optic Reflectance Spectrometry. We are conducting focused case studies on key examples of premodern codicological structures from the Kushan Empire, the Roman Empire, Coptic Egypt, Anglo-Saxon England, Tang Dynasty China, Abbasid caliphate Iran, fifteenth-century Ethiopia, and Ottoman Constantinople. This paper focuses on one technique used by our team: x-ray microtomography (microCT). Early experiments within the medievalist community show that CT has huge potential for the study of often fragile early codices. MicroCT can be used to show gatherings, collation, sewing, and other concealed aspects of early bindings.

In this paper I will present the new results of our team’s microCT collaboration with Western University. In these scans, past binding structures—what we are calling “ghost bindings”—are clearly discernible: in empty sewing holes and faint impressions left on gatherings. Given how many pre-modern books have been rebound, microCT’s capacity to uncover lost evidence of books’ structures is vital: we need it to flesh out the story we want to tell about how the codex developed—separately but convergently in some regions, and through the transmission of objects, materials, and crafts in others. Ghost bindings can help us understand the multi-directional circulation and development of communication technologies around the network that is the Silk Roads.

The results of these scans, and the directions they point for our future research, will be hugely significant to the work of manuscript conservation. By revealing previously unknown structures we will be able to add to a growing corpus of historic binding techniques that may influence the approaches taken to preserving or restoring similar structures. In revealing historic binding structures these images also reveal individual histories of rebinding and conservation, records of which are often sparse. Indeed, as the CT scanning becomes a more prominent technique for manuscript analysis, we might ask: how do we identify and date such repairs in these images? What implications does this have for future conservation efforts? Are there techniques that might be used to improve or clarify the identification of modern repairs under CT conditions? And will there be a point at which it is appropriate to include CT scanning as part of the workflow in the conservation lab?
1. **Per Cullhed: B68: Riddles and revelations**

The Swedish 15th c. law manuscript UUB Ms. B68 has been the subject of intensified research by art historians, linguists, medievalists, and others. In conjunction to a symposium on the manuscript it was decided to further investigate its material components too see what could be added to its history. A thorough investigation of the binding was carried out in 2018 at Uppsala university library and BioArch at York university. This paper will describe current research, results from the determination of animal species for the parchment and a dating for the binding (which was added to the manuscript at a later stage), based on the identification of watermarks in the endpapers of the new binding. A full description of the collation will be presented as well as new digital methods for tracing watermarks in paper. The manuscript is fully published in the digital repository Alvin and this publication will be discussed as a way to publish a manuscript, its binding, its provenance, and its watermarks in a comprehensive way.

2. **Guðvarður Már Gunnlaugsson: On lost manuscripts from the Arnamagnæan Collection**

It is evident that some manuscripts have disappeared from the Arnamagnæan Collection between the time Jón Ólafsson from Grunnavík registered the collection in 1730 and Kristian Kålund published his catalogue in the years 1888–1900. According to an unpublished list at the Árni Magnússon Institute in Reykjavík from around 1970 which is an extract from Kålund’s catalogue, 23 manuscripts are completely lost, while material from 59 additional manuscripts is missing. However, the list is not complete, since leaves have gone missing from other manuscripts as well — for example from the famous Möðruvallabók (AM 132 fol.). Later research has also shown that a few manuscripts of the Saga of Grettir the Strong have disappeared from the collection. This paper will give an overview of the manuscripts that have gone missing since the time Jón Ólafsson compiled his catalogue. Further, two particular aspects of the list will be discussed: The period of time when most of the manuscripts/leaves seem to have gone missing and the possible reasons behind their disappearance.

3. **Beeke Stegmann: The modular method goes North: Evidence from prayer-books produced outside the Netherlands**

From ca. 1390 on, prayer books in the Netherlands were often produced according to the Modular Method, as part of which scribes worked on different segments of the manuscripts separately to improve efficiency.1) Key characteristics of this method include new texts starting on new quires, which frequently resulted in blank space at the end of quires, and full-page illuminations on singletons. Such modules were combined to form the desired prayer books, leaving ample room for customization. Further, the modular make-up of these manuscripts facilitated adjustments and updates by later users as more quires could easily be added, desired illuminations could be inserted, and additional texts could be written on previously blank leaves.2) While the Modular Method has hitherto only been described for manuscript production in the Low Countries, there is evidence that the approach was also employed elsewhere. The 15th-century Low German prayer book Copenhagen, The Arnamagnæan Institute, AM 73 8vo, for example, was created from four major parts, of which the largest one shows the codicological characteristics of having been produced according to the Modular Method. Moreover, after the quires of at least two of the major parts had been combined, full-page illuminations on singletons were bound into the manuscript in relevant places.3) The back sides of these singletons were originally blank, but were in
most cases filled with later writing – at times overlapping onto other previously blank parts. As a possible place of origin for AM 73 8vo, the diocese of Schleswig in northern Germany has been suggested. In any event, the Low German texts together with some 15th-century additions in Danish indicate a production place outside the Netherlands.

Codicological analysis of the major prayer books on parchment that are known to originate from Iceland yields no indications of production according to the Modular Method. Consequently, while the more efficient approach to producing medieval prayer books had spread north by the fifteenth century, there is no indication that it reached Iceland. Further research will have to show exactly how far the Modular Method spread in (northern) Europe and if it reached, for instance, Norway or Sweden.

2) Rudy, Piety in pieces, 6-15.
4) Stegmann, “Frömmigkeit und Kodikologie”, 84.
5) The following manuscripts have been analysed: Copenhagen, The Arnamagnæan Institute, AM 428 a 12mo (16th c.), AM 429 12mo (c. 1500) and AM 433 c 12mo (c. 1500).

4. Chantal Kobel: Revisiting the codicology of the Book of Ballycummin (RIA MS 23 N 10), a medieval Irish manuscript

The Book of Ballycummin (RIA MS 23 N 10) is an important sixteenth-century Irish manuscript miscellany that preserves some of Ireland’s earliest vernacular writings. The book, as it is now bound, consists of 28 vellum leaves followed by 118 paper pages, with many of the texts split and misplaced throughout the manuscript. Previous scholarly opinion held that the Book of Ballycummin was a replica of a manuscript in which the leaves were already out of order. In this paper, however, it will be shown that this manuscript was in fact unbound and rebound incorrectly in the 1850’s. The original arrangement and structure of the manuscript will then be discussed. The paper will conclude by highlighting what impact such codicological findings has for the Book of Ballycummin, and for our understanding of Irish manuscript culture in general.

Session 9A (12.30-14) Lecture Hall 22.0.11

1. Marco Fagiolo: Conservation of a Mamluk manuscript: Approaches and decision-making for the preservation of its original structure.

I recently made a challenging conservative intervention of a Mamluk manuscript dated at the end of the 14th century belonging to an important Italian private collection of Islamic and Asian art. A past restoration treatment dating back to the late 19th and early 20th centuries had altered the book structure and covered some original parts that were thought to have been lost. These parts resurfaced during the necessary dismantling of the work (the sewing was now compromised being all the detached files, the papers were felted and one plate was completely detached from the volume) and their discovery aroused debates and reflections on how to continue the work. Always maintaining a conservative point of view, codicologically correct it was chosen to eliminate the 19th century restoration and restore those original elements still present but hidden such as the back and
the flap of extension decorated of the doublure (covered with a layer of paper now browned). The bookbinding is coeval with the manuscript and almost complete, only the flap is lost and the headbands, of which, however, remain few traces of the thread of the primary sewing. It was not easy to pull out the original hidden structure trying to keep all the original elements and be as invasive as possible also because the bibliography about these peculiar manuscripts of a short historical period and circumscribed region is quite poor especially about the conservation treatment and the study of the original structures and bookbindings which are very rare outside public libraries and museums.

2. Ana Tourais, Conceição Casanova, Catarina Barreira, Catarina Gonçalves and Catarina Pinheiro: *Alcobaça Bookbinding as a hidden treasure: The case study of an Expositio in Evangelium Matthei*

The collection of manuscripts of Alcobaça Abbey, currently kept in the National Library of Portugal, is one of the largest medieval collections in Europe, conserving several original bindings between the end of the 12th and the beginning of the 16th century. This Cistercian Abbey (i.e. Mosteiro de Santa Maria de Alcobaça), was founded in 1153, affiliate of the Clairvaux Abbey and had a prolific scriptorium between the twelfth and the sixteenth centuries (Casanova, 2019). Recently, different authors found on archival records from two Cistercian abbeys (12th century sources from Vaucelles and 15th century sources from Alcobaça) references denouncing that the monk copyist could also bond the codices he copies (Tock, 2018; Lopes & Barreira, 2020). Following that idea, it was decided to look for material evidences of this fact in the Alcobaça collection. In this communication we developed a holistic approach study of an Expositio in Evangelium Matthei (Alc. 341), a manuscript that belongs to a set of twelve codices attributed to the copyist Iohannes Peccator, from the 13th century that signed some of his copied books in the colophon. In addition, this manuscript is considered to bear the closest original binding due to i) the presence of typical structures of earlier periods, and ii) the reduced evidence of later interventions (Nascimento & Diogo, 1984). In this sense, it becomes a representative model for the identification and establishment of key characteristics that will allow, at later stages, the development of a systematic comparison with the remaining manuscripts of the group as a way of unravelling hidden techniques of singular producers and/or the scriptorium tendencies. The research methodology for the full identification and dating of Alc. 341, as well as its record method will be explained and discussed as a basis for further application in the remaining manuscripts. The first in-depth examination results will be presented, covering topics related to the analysis of formal features of textual and illumination contents, and binding systems. The results of advanced techniques, such as optical microscopy (OM), attenuated total reflection infrared spectroscopy (ATR-FTIR) fibre-optic reflectance spectroscopy in the ultraviolet and visible range (UV-Vis FORS); handle-energy dispersive X-ray fluorescence (micro-EDXRF), and scanning electron microscopy (SEM) for the material characterization of the manuscript will also be addressed.

3. Lisa Camilleri: *Fantastic features and where to find them*

Despite the increased interest and study of archival bindings, I have found that archival collections remain a vastly under documented topic. In my doctorate research into Maltese Notarial bindings, I have found several oddities and features that I could find no published research to refer to or established term to use to identify them.

Of particular note is a feature which I have called a ‘title-tab’. This is a tab of parchment that was sewn on or slotted into the tail edge of the front cover of many Maltese notarial volumes, that usually contain the name of the Notary and the dates of that volume. In the eight years since I 1st
noted them in my bachelor, and the two years since I have been actively looking I have only found two other examples or references of such tabs. One was a series of photos taken at the House of Lords in London. The other, most recently, at the state archives of Syracuse where I found a single example in leather. Two years of digging through English and Italian glossaries have failed to bring forward a term already in use to describe such features. It is my hope that through venues such as this, I can not only introduce what seems to be a rare and precious archival feature, but also find sources and references to features such as this that are perhaps described in other languages.

Session 9B (12.30-14) Lecture Hall 23.0.50

1. **Ilse Korthagen, Femke Prinsen and Lieve Watteeuw: Checklist for the digitisation of manuscripts**

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.

2. **Fenella France and Andrew Forsberg: Accessible linked scholarly and scientific data-visualisation for manuscripts**

The need for online platforms to share cultural heritage information is an important component for manuscript studies, especially with cultural heritage conservation, scholarly and scientific data. Heritage research requires collaboration between disciplines and international colleagues, and being able to effectively share in a timely manner is important for these collaborative initiatives. Monitoring of manuscript treatments and materials as well as tracking change over time, is important for many research projects and the need for linked open data (LOD) is critical to enable accurate sharing of manuscript research. A Data Visualization Project Initiative (DVP) has created a cloud-based integration of scholarly, curatorial and scientific data on a visual rendering of the heritage object. This initiative uses a commonly shared international infrastructure, the International Image Interoperability Framework (IIIF), expanding the framework and open access through the Mirador viewer to include different forms of preservation data. One of the challenges with including the scientific data is linking to authoritative sources for instrumentation, methods, and scientific definitions, terminology and vocabulary, and ensuring this can be done within the IIIF Framework. A number of plug-in applications using complementary software have expanded existing IIIF capabilities for linking and annotating data layers. Exploring the linking of shared conservation and
scientific terminologies and ontologies to avoid reinventing the wheel has led to an extensive exploration of available LOD sources, working through the challenges of integrating original source terminology. The data visualization integrates conservation needs based upon extensive discussions with conservation, preservation and scientific colleagues to develop and customize a “dashboard” approach that allows users to work with the data they want to see in the interface in relation to the manuscript. Further, the platform assures engagement with datasets that are reusable and active, rather than static data created for one purpose. Discussions with colleagues at other cultural heritage and research institutions – libraries, archives, museums and art galleries, – have revealed similar challenges with integrating LOD. Data and informatics and library colleagues at the National Institute for Standards and Technology (NIST) and other institutions have indicated significant crossover between research data within chemistry, archaeology, materials science, physics and other fields. Studies and project based review have led to the development of a “go-team” group for each manuscript project that includes conservators, curators and scientific staff who together create the template of what analyses are needed to answer conservation and curatorial questions, and then create a standardized efficient session using portable instrumentation that can move to the object if needed, rather than lengthy in lab analyses. This has reduced in-lab analytical time from upwards of 3 days to 3-4 hours being all that is needed to effectively capture required data. Portable analytical instrumentation includes spectral imaging and microscopy (including ultra-violet and infrared capabilities), x-ray fluorescence (XRF), fiber optic reflectance spectrometry (FORS), Fourier transform infrared spectrometry (FTIR), Raman spectroscopy, and in-situ or time-weighted gas chromatography-mass spectrometry (GC-MS) for volatiles and “manuscript sniffing”. An additional component of this multi-instrument approach has been the expansion of a reference collection of conservation and scientific samples and materials that have been fully characterized by the portable instruments, and can then be used as surrogates for treatment testing and characterization, as well as predictive testing. A number of benefits have evolved from this more structured but efficient collaborative approach. The advantages have including greatly enhanced reporting timeliness on results for conservation colleagues and management, significant accessibility from being able to take instruments to fragile collection items in secure areas, reducing time demands on curatorial staff, and the much lower cost on portable instrumentation compared to laboratory grade instruments that still provide high quality data.

3. Gayane Eliazyan: Medieval Armenian miniature: Research and conservation of the paint-layer on the example of the Matenadran manuscripts

The art of book illumination with miniatures was one of the most important fine arts in the Middle Ages. The study of miniatures does not only enrich the history of painting, but is also the starting point for taking measures on their conservation and investigating the aging of the dyestuff.

Adopting whatever valuable from the neighboring countries: Assyria, Babylon, Egypt, Greece and Byzantium, and based on its own high culture Armenia achieved much success in the field of the pigments chemistry. It is most magnificently exemplified by artistically elaborated miniatures in the Armenian manuscripts that have survived up to date owing to the high quality pigments.

The detailed exploration of the medieval Armenian recipes for manufacturing pigments and dyestuff enabled us to reveal the products of various compositions.

The advent of the new more perfect analysis methods enabling to determine the composition of the materials applied provided an opportunity not only to determine the composition of the pigments, but also to reproduce the technology of their production and their chemical composition by the recipes available in the ancient manuscripts.
Research on pigments and inks used in medieval Armenian manuscripts is currently one of the preventive directions of the Conservation and Restoration Department of the Ancient Manuscripts Institute n. a. Mashtots (Matenadaran, Yerevan, Armenia), since their structure has not been studied enough up to this date.

Research on medieval paints and inks is important both from an artistic point of view and for the competent organization of the strategy of conservative works.

The paper makes an effort to present the condition of the paint layer of some valuable medieval manuscripts of the Matenadaran, as well as to present the method of conservation the paint layer in those manuscripts.

Session 9C (12.30-14) Seminar Room 27.0.9

1. Zinaida Vakhovskaya and Tolganay Egorova: Examination of the manuscript “Alexandria and the Legend of the Mamai Battle”

A comprehensive study of the manuscript “Alexandria and the Legend of Mamai Battle” f. 178.1 № 3155 Russian State Library was carried out before restoration. A review of historical and archival materials was required to understand the life of the manuscript before intervention, which must be taken into account in the description of conservation state and the processes occurring during its storage. The analyses of the composition of materials (paper, inks, pigments of miniatures) were necessary for understanding the nature of materials, manufacturing technology, processes of the document’s aging and for selection of the conservation techniques.

2. Fezeh Rahimi: Conservation measurements on papers works of the National Museum of the Holy Quran, Tehran

Works in National Museum of the Holy Quran can be a valuable source in studies of history and culture of Quran scribing because such works have been scribed by famous scribes from Timurid to Qajar era and many of these works are inlaid and illuminated. These studies can help to introduce a considerable part of the history of illumination and scribing of religious texts.

Since few studied have been done on these works, several research projects reviewed these on studying their decoration motifs and such projects are being introduced in this article.

Introduction of National Museum of the Holy Quran

National Museum of the Holy Quran opened in 2005 aiming preservation of Quran works and continuing Qur'anic activities. This museum has some sections such as treasury of manuscripts, treasury of prints, microfilm and treasury of art works that possess considerable number of historical objects such as Quran manuscripts, printed Qurans, prayer books and artistic paintings mostly with religious theme. One of the prominent works of Quran museum is Quran manuscript related to Timurid era which has golden and colorful decoration motifs.

Research Background
Investigation on paper documents and manuscript in Iran, like other parts of the world, have always been carried out but due to their diversity, many of such works have not even been studied. Therefore literatures, old texts and reports in this field have been reviewed.

Methodology

Available sources dealing with properties of decorative motifs of Qurans in Iran and the performing techniques were studied. Afterwards in experimental part, 5 Quran manuscripts were documented, then sample were taken for FTIR, SEM-EDAX analysis, microscopic observations were carried out and finally the color identification tests were analyzed.

Conservation Measurements

Studies in recent 10 years in Quran Museum are in the fields of identification of objects and conservation-restoration evaluations. In the first project titled “Conservation-Restoration Evaluations of Objects in Quran Museum”, the state of different parts of the museum, facilities, challenges and shortcomings have been discussed in two phases. Afterwards proper solutions are given according to these issues. In the second phase the state of the objects in the museum will be studied. This includes pathology, prioritizing conservation measurements, providing and completion of conservation identity cards and organizing paper works in the museum.

In the next two projects technical studies of Qurans in other periods will be done. Such projects title “technical study of Afshar era Qurans in National Museum of the Holy Quran” and “technical evaluation of decorative motifs of Qajar Qurans (5 Qurans of National Quran Museum)”. In these projects, in addition to analyzing motifs in the works, colors used in these decorative motifs are studied. The reports of such projects was published in form of articles afterwards.

Regarding damages in some cases, some projects were carried out on degradation process and the reasons such as the project of Muhammad Mohsen Esfahani. In this project pathology of colors used in one Quran manuscript of Afshar era, is studied.

It should be noted that there is few studies focused on identification of objects since the opening time of the museum. Only a handful number exist in this field such as:

- Gold in decorative motifs of Qajar Qurans (identification of golden color in 5 Quran manuscript of National Quran Museum)

- Technical study of golden color in Qurans of Afshar and Zand era (regarding Quran manuscript of National Quran Museum)

- Recognition and technical analysis of decorative motifs in Qajar Qurans (regarding Quran manuscript of National Quran Museum)

- Evaluation of blue color in Qurans of Afshar and Zand era (regarding Quran manuscript of National Quran Museum)

Conclusion

According to this fact that there are only few number of Quran manuscripts in different periods of time in Iran, such studies can help to a part of Iranian culture in the field of scribing, tools and materials be recognized. This matters in anthropological, historical and cultural studies. Therefore research on Afshar, Zand and Qajar Qurans and their colors and decorative motifs were done. Results showed that Arabesque and Khataei motifs and Golden and Lapis lazuli blue have the most
application in decorative motifs of Afshar, Zand and Qajar Qurans. Studying Muraqqa of National Quran museum can be the subject of further research.

Session 10 (14.30-16.30) Lecture Hall 23.0.50


The Hill Museum & Manuscript Library (HMML) holds the world’s largest archive of manuscript images in both microfilm and digital format. Many of the photographed collections are endangered due to warfare, religious and political instability, climate change, and natural disasters. The HMML archive, begun in 1965, now contains images of more than a quarter million complete manuscripts, in dozens of languages, ranging in size from large codices of hundreds of folios to brief documents consisting of just a few leaves. HMML has partnered with libraries in more than 25 countries, beginning with work in east Africa [Ethiopia] and Europe [Austria/Germany], and moving into the Middle East, west Africa, and south Asia. HMML currently supports 15 digital preservation studios in 11 locations - including sites in Mali, Egypt, Iraq, Nepal, Jerusalem, Croatia, and Montenegro. These global field sites support the digitization of manuscripts by local teams, funding local economies, a 21st-century model that is essential to this work. Digital preservation allows this cultural heritage to be preserved, cataloged, and shared on vHMML.org, HMML’s digital library. This documentation makes a digital surrogate available to scholars and the public for study and safekeeping, and records the manuscripts’ condition at an instance in time, deterring theft, and providing information that can inform future conservation efforts.

This paper presents an overview of HMML’s work over the last 50 years and discusses the changes in photographic preservation techniques [microfilm to digital, storage systems and formats] and changes in preservation motives as threats to manuscript culture have changed. The presentation highlights current global hot spots, discussing some of the challenges of working in various conflict zones in Africa and the Middle East and presents information on preservation ‘kits’ – the pared down photographic mobile units that are sent to global digitization sites. The paper draws parallels between the physical and digital preservation of manuscripts, discusses similarities of approach, suggesting ways in which both types of preservation overlap and how teams might collaborate to achieve shared goals especially in the field, where access to resources are compromised. The presentation makes an appeal for a wider, more interdisciplinary dialogue about the preservation of global manuscript heritage – one that encompasses library professionals, digital preservationists, cultural heritage and conservation experts.

2. Sam Foley, Cecilia Duminuco and Shaun Thompson: A collaborative digitization project in progress: The Polonsky Foundation Greek Manuscripts Project

The Polonsky Foundation Greek Manuscripts Project is a two-year collaborative conservation project between Cambridge University Libraries and college libraries in Cambridge and a collection of similar size, formerly of the Bibliotheca Palatina of Heidelberg, the majority of which now resides at the Bibliotheca Apostolica Vaticana. The project began in November 2018 with the aim of conserving and digitising more than 800 medieval Greek manuscripts. The aim of this paper is to share the main aspects of the project, consider some of the challenges faced by an interdisciplinary, multi-stakeholder project, and share some of the solutions devised by the conservation team. We will focus on the Cambridge side of the project and, more precisely, how we have approached the
challenge of facilitating the digitisation of 444 manuscripts spread between 14 Cambridge institutions. By April 2020, the project will be at its half-way point, where we will also be reflecting on our progress, considering both our successes and some unexpected challenges encountered on the way.

At the start of the project, our first task was to familiarise ourselves with the materials. This meant examining the collection, gathering data, including cataloguing and codicological information, and assessing the condition of the manuscripts. It quickly became clear that managing the quantity and variety of data we needed to collect required a tailored solution. Collection items ranged in date from the 5th to the 18th centuries, and included manuscripts on paper and parchment, a papyrus fragment, and even a wooden board. Formats included fragments, single leaves, unbound gatherings, as well as bound manuscripts in structures from the medieval period through to the 20th century. Developing a tool that could record the description and condition of such a wide range of material whilst remaining usable was a major early challenge.

The conservation team’s answer to this was a bespoke database built using Microsoft Access. With some training and a little help from friends and colleagues, we designed a database that would become an essential tool within the project. How this database has informed the project will be a running theme throughout this paper, which will also consider both its advantages and disadvantages.

Our database was first put to use in surveying the 444 Medieval Greek manuscripts held within the 14 partner institutions in Cambridge. During this process, the database was populated with codicological data, condition assessments, and treatment proposals. As the survey continued, the database was revised and adjusted, and has so far proved very useful in enabling a structured workflow to be put in place ensuring targets for conservation and digitisation have been met.

Another early challenge faced by conservation was how to share information across the project team, which consisted of two book conservators, three cataloguers, and a photographer. A multitude of operations needing to extract and share data were identified early on, including the facility to track an item’s progress through the project, to extract specific datasets, as well to deliver handling guidance to the project photographer. Real time collaborative working was always the ideal; however, working practices within distinct parts of the project resulted in a greater variety of information sources than we could integrate with our database. This led to the predecessor of the conservation database, an Excel spreadsheet, becoming the master document for the project. This created some challenges, one example being the version control of those documents.

The data collected from the survey has been instrumental in identifying at risk items, designing treatment proposals and planning a workflow. From studying the data collected during the survey it was decided our first step would be to prepare the sixty-eight flat and unbound materials from CUL for digitisation. This meant that these materials could serve as a pilot for expanding the database to include treatment records and testing the treatment workflow. On the completion of the pilot we could start the treatment and rehousing of bound materials with confidence, knowing that our systems and workflow had been thoroughly tested.

At the beginning of the project, there was a need to develop specialist skills in the conservation of Eastern Mediterranean material. To address this issue, Shaun Thompson attended a week-long course Identifying and Recording Bookbinding Structures of the Eastern Mediterranean at the National Library of Greece. This laid a foundation for the development of the conservation team’s knowledge and skills, an element of the project that has continued throughout and has been
consistently encouraged by the management and funding bodies supporting the project. Production of traditional medieval Eastern Mediterranean book models and research into similar structures has allowed us to develop a better understanding of Eastern Mediterranean bookbinding. This understanding has enabled us to better identify important structural features on bindings, assess conservation needs and propose appropriate treatments.

Development of specialist conservation skills has also been a critical part of the outreach aspect of the project, as transforming physically unstable, ‘untouchable’ objects into accessible, readable books, is an immediate and tangible outcome for a non-academic audience. To this end, we have focused on the conservation of three unstable bound manuscripts from CUL, whose treatments are estimated to require over 200 hours of remedial conservation per volume. The selection of these manuscripts was decided between the cataloguers and the conservators, bringing together both their knowledge, and resulting in some very interesting discussions.

By April 2020, the first year of the project will have presented the conservation team with a wealth of challenges and opportunities in data collection and sharing, understanding and conserving Eastern Mediterranean manuscripts and working in close collaboration with cataloguers, curators and photographers. We will close our paper by reflecting on some of the successes and unexpected issues we have encountered along the way, as well as looking forward to the final phases of the project. Of our many future challenges, the most pressing will be to address the conservation of material held by the Cambridge colleges, which will greatly multiply the range of stakeholders involved, information to be shared and decisions to be made.

3. Toby Burrows: Tracing the histories of medieval manuscripts: A new digital environment for provenance research

The provenance of medieval manuscripts is a vital element in their library catalogue descriptions, as well as an important subject of curatorial interest and academic research. It is also valuable information for booksellers and auction houses that specialize in the sale of manuscripts. But the approach taken to recording provenance in traditional printed manuscript catalogues and online catalogue records alike is not well-suited to provenance research on a larger, more analytical scale. Recent years have seen the development of specialist databases, such as Bibale and the Schoenberg Database of Manuscripts, which are beginning to address this kind of requirement.

Since 2017, the “Mapping Manuscript.Migrations” project (MMM) has been working to aggregate data about manuscript provenance on a large scale, drawing on these two databases and on the Bodleian Library’s new catalogue of medieval manuscripts in Oxford libraries. With funding from the Digging into Data Challenge of the Trans-Atlantic Platform, the project brings together the University of Oxford, the University of Pennsylvania, the Institut de recherche et d’histoire des textes, and Aalto University, in a team which combines expertise in manuscript studies, research library management, digital humanities, and computer science.

The resulting MMM database covers more than 215,000 manuscripts and 902,000 provenance events, and is now the largest single source of provenance information for manuscript research. It is technologically innovative: built in a Linked Data environment, with the data expressed in RDF (Resource Description Framework) and structured in accordance with a data model which uses a combination of library- and museum-related ontologies (CIDOC-CRM and FRBROO). The source data are transformed into RDF and mapped to this data model, and made available in a Linked Data triple store. While the people, places, works, and manuscripts common to the different data sources have
been matched and reconciled, information about the source of each piece of data has been retained.

The result is a digital service which can be browsed using various combinations of data types and filters. The data can be easily visualized against a map, to show the places where manuscripts were produced and their movements over the centuries. Sophisticated research questions can also be asked using the SPARQL query language, and the data can be exported for reuse with other software. The presentation will demonstrate the different features of the MMM service from the user’s point of view, and will also show the processes by which the source datasets are absorbed and aggregated into this larger service. Above all, it will illustrate how curatorial descriptions of the history and provenance of manuscripts can be transformed into a sophisticated digital environment for research, exploration, and analysis.

4. Alberto Campagnolo and Rachel Di Cresce: Recording bookbinding structures and their visualizations as communication tools

As recently as the 1970s, bookbinding studies were essentially synonymous with bookbinding decoration studies, with little consideration given to binding structures. However, since the last decade of the 20th century, scholars have established new approaches to the study of book-bindings that have resulted in novel descriptive and investigative practices focussed on the material and structural elements of bindings, and their mechanics(1). Correspondingly, archaeological investigations into book-bindings have an increasing need for shared standards and methodologies in description and terminology.

Based on the work of the new wave of bookbinding historians, this paper explores common challenges and potential solutions to studying and modeling bookbindings for researchers and conservators.

The book in codex format is the result of a series of operations and structures that work in concert for the functioning of this complex object. Just like a car’s blueprint, for example, implies the difference between a heap of parts and a well-structured and functioning vehicle, bookbinding description requires more than mere listing of materials and components because of their mereological & ontological complexity — . A good description, therefore, needs to be able to convey information on the material components of bookbinding structures (with their whole/part relationships) and their spatial configurations. In addition, if this information is provided through formal and structured means, such as eXtensible Markup Language (XML) or JavaScript Object Notation (JSON) or Resource Description Framework (RDF) files, for example, then it is possible to harness this information and transform it automatically into diagrammatic drawings that exemplify visually the structures being described, allowing for a more immediate communication. These visualizations are particularly useful for conservators as they can be annotated and printed with ease. In addition, because of the immediacy and the synchronicity of information presented through visual means, these visualizations provide an information accuracy system that allows to quickly check and correct data collected in the database, especially for the less computer savvy users(2).

Inspired by this work and the minimal research dedicated to book structure the University of Toronto has embarked on the Mellon-funded project, The Book and the Silk Roads. Its aim is to reimagine the history of the premodern book as an object whose concealed structure contains vital information about its manufacture and thus about the development of book technology. As part of our development goals, our team will develop a binding visualization application which will allow scholars to create simple representations of the structures of codices. The tool, VisCodex, will be
developed with Campagnolo’s consultation and make use of and extend existing shared vocabularies
(Language of Bindings), and schemas (ex. Ligatus) in the book history community. The resulting
application will enable scholars to create useful visualizations of bindings that communicate their
findings clearly. In keeping with our technological philosophy, this application will prioritize data
curation and transferability, thereby ensuring that all data can be exported with appropriate,
standardized metadata to ensure enduring usability. The application will also allow users to upload
images to present next to visualizations as well as add metadata and classifications to binding
features. This paper will report on the overall development, challenges, use cases and technical
considerations of VisCodex.

(1) János Alexander Szirmai, The Archaeology of Medieval Bookbinding (Aldershot; Burlington (VT):
Ashgate, 1999); Mirjam M. Foot, ‘Bookbinding Research: Pitfalls, Possibilities and Needs’, in Eloquent
Witnesses: Bookbindings and Their History, a Volume of Essays Dedicated to the Memory of Dr.
Phiroze Randeria, ed. Phiroze Randeria and Mirjam M. Foot (London; New Castle (DE):

(2) Alberto Campagnolo, ‘Transforming Structured Descriptions to Visual Representations. An
Automated Visualization of Historical Bookbinding Structures’ (PhD Thesis, University of the Arts
Corrige. Visual Identification of Meaningless Data in Database Records of Bookbinding Structures.’, in
Care and Conservation of Manuscripts 15: Proceedings of the Fifteenth International Seminar Held at
the University of Copenhagen, 2nd-4th April 2014 (Copenhagen: Museum Tusculanum Press;
University of Copenhagen and the Royal Library of Denmark, 2016), 79–88.