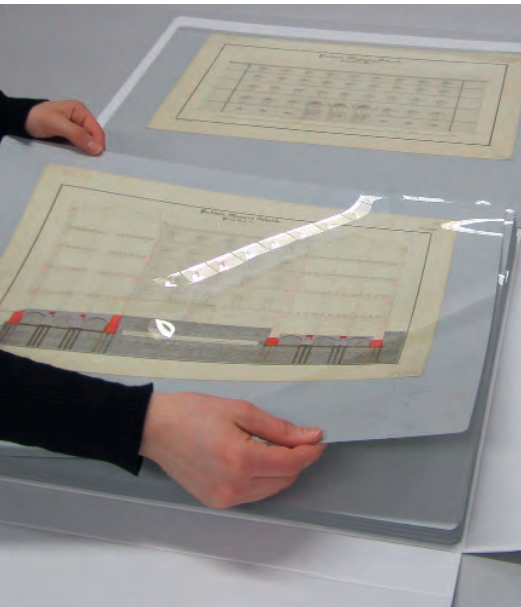


**IDA**  **XIII<sup>th</sup> Congress  
Berlin 2015**  
International Association of Book and Paper Conservators

Monday 12 October – Friday 16 October



**Staatsbibliothek  
zu Berlin**  
Preußischer Kulturbesitz





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Renate Mesmer

## Dear Congress Participants!



Renate Mesmer, Berlin, Museumsinsel (© Michaela Brand)

The VIth IADA congress was held in Berlin in 1987 and I am excited that after 28 years IADA is back in the now reunified capital of Germany. With about 170 museums, more than 100 archives and 369 libraries, we are in the German heart of history, art and conservation.

Berlin is an ideal choice for the XIIIth International IADA congress demonstrated by a fully booked conference with 480 participants from 30 countries including China, Estonia, Kuwait, Georgia, Greece, Guatemala, Japan, Macao, Malta and Turkey using every seat in the Otto-Braun-Saal at the Staatsbibliothek zu Berlin – Preußischer Kulturbesitz.

This year we had an overwhelming number of submissions which made it a difficult task for the Technical committee to select talks to be presented in Berlin. Therefore, you'll find that there are a greater number of talks and poster presentations on art on paper, books and manuscripts, cross-country projects and state-of-the-art conservation research than usual. IADA will do its best to help you navigate through the daily and weekly schedule to get the most out of your visit.

Many of our 'Berliner Kollegen' will welcome you on Monday morning with a 'Potpourri' of short lectures and share their knowledge on Friday by touring us through their institutions and labs. They even included a tour on Peacock Island and the State Security Service of the former GDR. Also, you can attend several hands-on workshops. An exclusive movie evening and presentation by Frau Prof. Savoy at the Zeughauskino is offered by the Deutsches Historisches Museum, providing a unique insight into Berlin's conservation studios before WW II.

I hope you will also find time to discover this wonderful city, which is perfectly described in the Lonely Planet: *'Berlin's combo of glamour and grit is bound to mesmerise anyone keen to explore its vibrant culture, cutting-edge architecture, fabulous food, intense parties and tangible history. [...] Berlin is a big multicultural metropolis but deep down it maintains the unpretentious charm of an international village. Locals follow the credo 'live and let live' and put greater emphasis on personal freedom and a creative lifestyle than on material wealth and status symbols. Cafes are jammed at all hours, drinking is a religious rite and clubs keep going until the wee hours or beyond. Sizewise, Berlin is pretty big but its key areas are wonderfully compact and easily navigated on foot, by bike or by using public transport.'*

IADA would like to thank our partnering institution the Staatsbibliothek zu Berlin – Preußischer Kulturbesitz for all its support and help.

Enjoy the conference, the city of Berlin, and please stop me to say hello!

A handwritten signature in black ink that reads "R. Mesmer".

Renate Mesmer  
President of IADA

# Imprint

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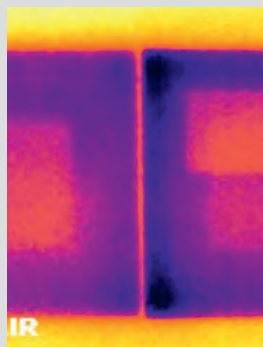
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# Program



## Morning session

08:00 – 09:45 Registration with coffee

10:00 – 10:30 Welcome

- > Barbara Schneider-Kempff, Director general, Staatsbibliothek zu Berlin
- > Renate Mesmer, President of IADA

10:30 – 12:30 'Potpourri' – Welcome

Short lectures by Berlin conservators on challenging exhibition mounts

- > Myriam Krutzsch
- > Ira Glasa
- > Barbara Korbel
- > Stephan Böhmer
- > Vendulka Cejchan
- > Gesine Siedler
- > Halina Fischer
- > Katharina Plate
- > Hanka Gerhold
- > Michaela Brand
- > Stephan Lohrengel
- > Barbara Korbel
- > Katarzyna Schirmacher

12:30 – 13:40 Lunch break

## Afternoon session

13:40 – 15:00 Full lectures

- > Iben Bak Christensen and Marie Vest (DK): 'Experience economy': Does it apply to the world of conservation? **p 8**
- > Irene Brückle and Ute Henniges (DE, AT): Bleaching treatment: Can we standardize? **p 9**
- > Véronique Rouchon et al. (FR): Gelatine and iron gall ink corrosion: Evidence of a 'stabilizing' effect **p 10**
- > Henk Porck (NL): Looking at letters: Unfolding hidden information **p 11**

15:00 – 15:40 Short lectures

- > Alexander Fohs (AT): Are books ready for the museum? Conservation meets museum education **p 12**
- > Guy de Witte (BE): Project development and management: New opportunities for preventive conservation consultants **p 13**
- > Laurence Caylux, Eve Menei, Isabelle Drieu la Rochelle (FR): Papers for prayers: The use and conservation of paper and cardboard in the production of devotional objects in Provence **p 14**
- > Maike Schmidt and Georg Josef Dietz (DE): Filling of losses in old master prints: A new method using digital reconstruction **p 15**
- > Fabienne Meyer et al. (DE, AT): Volatile organic compounds in collections of drawings and prints: Cause, effects and mitigation strategies **p 16**
- > Louise O'Connor (IE): Hugh Douglas Hamilton: A pastel portraitist in an European market **p 17**
- > Ambra D'Aleo (IT): Deacidification and reduction: Treating a copper corroded, 18<sup>th</sup> century engraving **p 18**

15:40 – 16:20 Coffee break

16:20 – 18:00 Full lectures

- > Gauthier Patin, Frank Ligterink et al. (FR, NL): Halos of hollowness: How air pockets in window mounts can cause discolourations – and how to best prevent them **p 19**
- > Mario Röhrle (DE): A life-cycle approach: From creation to archiving of born-digital documentation in paper conservation **p 20**
- > Barbara Busnardo et al. (IT): Coated paper – a multivariate system: A novel approach to the kinetics of its degradation **p 21**
- > Claudia Ma. Ordoñez Montoya (GT): Ignorance and neglect: Administrative management in preventive conservation of Guatemalan documentary patrimony **p 22π**

19:00 Student meets student

Informal meeting of conservation students

Café am Neuen See, Lichtensteinallee 2



Michaela Brand

## 'Potpourri' – Welcome

Short lectures by Berlin colleagues  
on challenging exhibition mounts



Exhibition work has certainly become an increasingly dominant aspect of paper conservators' jobs in Berlin (and elsewhere). Beyond the classical hands-on treatments in the conservation lab, we are facing the challenges that arise during both installation and dismantling periods which are intensive processes of the handling of artefacts and preparing their mounts for display.

Generally, object mounts for exhibitions should meet many different requirements simultaneously, which are mostly compiled by the curator, the designer, and the conservator. Beside the main purpose of holding and securing the artefact, the requirements for object mounts range from material and economical to esthetical and last

but not least practical criteria. The list is long: every mount should be stable, yet light, emission-free, and low-cost. Of course it must also be accurate, unobtrusive and aesthetically consistent with the overall exhibition design. Furthermore, the ability to reuse and store mounts efficiently can be desirable.

Exhibition work requires a high degree of cautiousness, efficiency, and sound manual skills. Qualities such as experience, coolness and creativity will prove beneficial in unexpected situations – often being typical for exhibition installations with tight schedules. A wide range of intricacies such as deviant measurements of items, or of provided frames or show-cases, or the delayed delivery of loans can cause strains in the planned routine.

The conservator with his/her professional expertise and sound knowledge of the object should supervise the general set-up including climate, lighting, pollutants, transportation, duration, etc. He/she should be alert to identify risks, and should take the responsibility – in some cases perhaps versus curator and/or designer – to preserve all artefacts in their given condition during the exhibition, and to avoid any damage.

Usually, the concept for preparing both flat and three-dimensional paper works for display is well planned and scheduled in advance. But again, deviant dimensions of exhibits or their delayed delivery might call for spontaneous, inventive, and individual supports.

Looking for a representative element which reflects the daily practice of many Berlinian paper conservators in 2015 and earlier, a joining topic for a shared IADA presentation, we decided on:

Invariably careful, amazingly clever, impressively aesthetic, and enchantingly elegant mounting solutions!

Please share our 'Potpourri' on some scheduled and planned mounts, and on some ad-hoc, on-site and in-situ mounts in exhibitions!

### Case studies

*Myriam Krutzsch* from the 'Ägyptisches Museum und Papyrussammlung' (Egyptian Museum and Papyrus collection) will start the round introducing the old material papyrus being secured between two sheets of glass



Fig 1: Myriam Krutzsch – Papyrus (© SMB Ägyptisches Museum und Papyrussammlung)



Fig 2: Vendulka Cejchan and Gesine Siedler – Large formats (© Vendulka Cejchan)



Fig 3: Halina Fischer – Magnets for ephemera (© SMB Kunstbibliothek)

(Fig 1). Next we move on to polyester PET foil (Melinex/Mylar), which also has the characteristics of gloss and transparency of glass. *Ira Glasa* from the Staatsbibliothek (Berlin State Library) has developed 'Melinex Shirts' to allow hanging very fragile magazines in frames. *Barbara Korbel* from the Stiftung Deutsches Historisches Museum (German Historical Museum) was faced with the challenge of having to expose large format artists' accordion works in free space. Three more inventive solutions for oversize objects will be visualised by freelance colleagues. *Stephan Böhmer* will describe an example of the situation – mentioned above! – when he had to deal with the problem of unexpected dimensions, a gouache not being delivered in the announced state of five single segments but in an entire width of 456cm. *Vendulka Cejchan* will demonstrate the elaborate preparation of a large and heavily distorted old printed map of London. Her customer had asked for a frameless, permanent wall-mounted result. Accordingly, she used hooks that the paper and book conservator *Gesine Siedler* developed with an instrument mechanic specifically for wall presentations of extra heavy and bulky items (Fig 2).

Moving on from huge sizes and singular artefacts to small size objects in great numbers, *Halina Fischer* from the Kunstbibliothek (Library of Art History) will talk about their way of using magnets for mounting (Fig 3). In addition, she will introduce a method which they developed to solve a problem that a lot of colleagues face: How to store hundreds of magnets safe and effectively? *Katharina Plate* from the Stiftung Stadtmuseum (City Museum Berlin) will focus on her technique for attaching drawings in a mat (Fig 4).



Fig 4: Katharina Plate – Matted drawing  
(© Stiftung Stadtmuseum Berlin)

The Potpourri will then cover books and other three-dimensional exhibits. *Hanka Gerhold* from the Kupferstichkabinett (Museum of Prints, Drawings and fine Manuscripts) will show the accentuated and singular entry of a book, using a transparent support where not only the opened page, but also the book cover can be viewed (Fig 5). In contrast, *Michaela Brand* from the Stiftung Deutsches Historisches Museum (German Historical Museum) will explain the implementation of an exhibition designer's staging layout for plenty of books. Secondly, she will mention an unconventional in-situ upright remedy with an encapsulated wooden bar for a damaged, extra heavy book with no willingness to open at all. *Stephan Lohrengel* from the Jüdisches Museum (Jewish Museum Berlin) will talk about the construction he developed for the hanging presentation of large format rolled Judaica objects.

*Barbara Korbel* from the Stiftung Deutsches Historisches Museum (German Historical Museum) will highlight movable toy figures accommodated to museum board, or attached to a rod. She will also share her different ideas on displaying fans. Her last focus is on a stage model being housed in a museum board construction, or between Plexiglas rods, or in a frame (Fig 6).

A conservator from the IADA conference's host, the Staatsbibliothek, (Berlin State Library) will complete the Berlinian Potpourri. *Katarzyna Schirmacher* will introduce the eye candy of a unique example of Berlin's printing history, an astrolabe with delicate thinly cut out paper layers. She named the Plexiglas solution 'Wedding Cake'.

Enjoy it!



Fig 5: Hanka Gerhold – Single book presentation  
(© SMB Kupferstichkabinett)

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Fig 6: Barbara Korbel – Displaying fans  
(© Stiftung Deutsches Historisches Museum)



I. Bak Christensen\*<sup>1</sup>, M. Vest<sup>1</sup>

## 'Experience Economy'

Does it apply to the world of conservation?



Can we as conservators use the learnings of 'Experience Economy'? What are the benefits?

As conservators we have knowledge of crafts in order to perform conservation treatments as authentically and true to the original techniques as possible. We learned about pigments, parchment, paper, bookbinding, decorative techniques, etc. In our professional world we tend to look for preventive measures in order to preserve collections on the long term. Does this mean that our knowledge of the physical object and the crafts behind it becomes irrelevant?

This is not the experience of the Preservation Department of The Royal Library in Denmark. The department has throughout the last 12 years been a part of Copenhagen's Culture Night – a yearly event where 250 institutions, museums etc. open the doors for the public.

We have learned, in alignment with the evidence of experience economy, that the public attending this event wants to discover, touch, and understand the physical

object and the techniques behind it, just as much as to know the written texts inside.

This has given us a unique opportunity to present our skills as conservators and bookbinders (Figs 1 and 2). Knowing the materials and the crafts behind the objects adds another dimension to the way the Royal Library presents its collections at such events, and also in how we interpret our collections and their value.

Is the interest of the physical object a result of the world of digital media? – Maybe!

It appears that a computer screen does not have the appeal of a bound book, the scent of fresh leather, the esthetics of marbled paper, or the ability to satisfy our desire to find the secrets of the physical object.

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Fig 1: Culture Night 2011 (© The Royal Library, 2011)



Fig 2: Culture Night 2014 (© The Royal Library, 2014)



# Bleaching treatment

Can we standardize?



Bleaching requires many decisions (selection of a chemical, concentration, application method, duration) to keep the object within a corridor of desired progress. Each decision aims at minimizing a risk and maximizing a benefit associated with a material or procedure.

Options take into account the factors given at the respective treatment stage, including vital new information about the object materials and their treatment responsiveness. The sequence washing-bleaching-washing can assume a repeat function with variations concerning the area treated (small to large), the treatment duration (short to long), and bleach concentration (low to high) (Fig 1). Each option carries a risk-benefit ratio in relation to the object.

A decision-support system can make conservation choices more efficient that require access to current scientific and evidential knowledge. Options can be value-classified according to whether they are

- required
- recommended
- of neutral value
- discouraged
- or prohibited.

For instance, aqueous deacidification is *required* to diminish the risk of cellulose degradation; bleaching in stages is *recommended* to avoid overbleaching (Fig 2); bleach application by misting or brushing is possibly *an equal value choice*; exposing non-discoloured paper areas to bleaching is *discouraged*; bleaching ligneous paper with chlorine-based bleaches is *prohibited* because chlorine remains in the paper.

Making the ramifications of interconnected choices within the treatment network explicit does not turn treatment into a rote exercise. It serves to highlight the fact that the expert practitioner must handle a complex set of choices while taking into account those aspects of the object and its treatment that cannot be fully known in advance.

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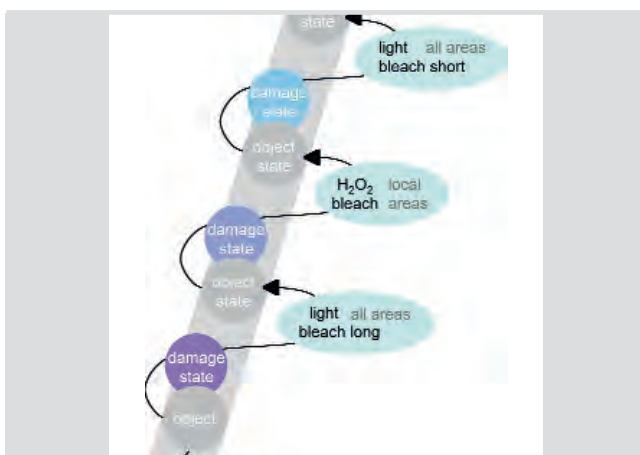


Fig 1: Object (grey) and state of damage removal (discolouration) considered at each stage of bleaching treatment (purple to blue) (© Brückle/Henniges)



Fig 2: Object in preparation for light bleaching on a slant washer in the process of being masked in areas to be protected from light exposure (© Brückle/Henniges)

V. Rouchon\*<sup>1</sup>, O. Belhadji<sup>1</sup>, A. Martin<sup>1</sup>, F. Vanmeert<sup>2</sup>, K. Janssens<sup>2</sup>



# Gelatine and iron gall ink corrosion

Evidence of a 'stabilizing' effect

In Northern European countries, gelatin has numerous applications in the conservation of iron gall ink manuscripts (tears mending, re-sizing agent, etc.). It is often put forward that gelatin has a 'stabilizing' effect on iron gall ink corrosion. Yet this point has never been experimentally evidenced. Gelatin denaturates over 50-60°C, thus impeding artificial ageing experiments.

This work reports experiments performed on Whatman n°1 papers impregnated with iron gall inks and sized with four types of gelatine of different origins and different Bloom values (Fig 1). The ability of gelatine to size the paper was estimated by measuring the time necessary for a drop of water to be absorbed (Fig 2). The cellulose depolymerisation at ambient temperature was monitored by viscosimetry throughout one year. The Fe(II)/Fe(III) ratio was measured by Fe K-Edge Xanes analysis.

These experiments showed that the ability of gelatine to make the paper less permeable to water strongly depends on its type and concentration. However most gelatines have a great ability to limit cellulose depolymerisation, giving experimental evidence that gelatine has a 'stabilizing' impact on iron gall ink corrosion. It additionally favours oxidation of Fe(II) to Fe(III). These two points are probably correlated.

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Fig 1: Application of a solution of gelatine on iron gall ink impregnated papers (© CRC)

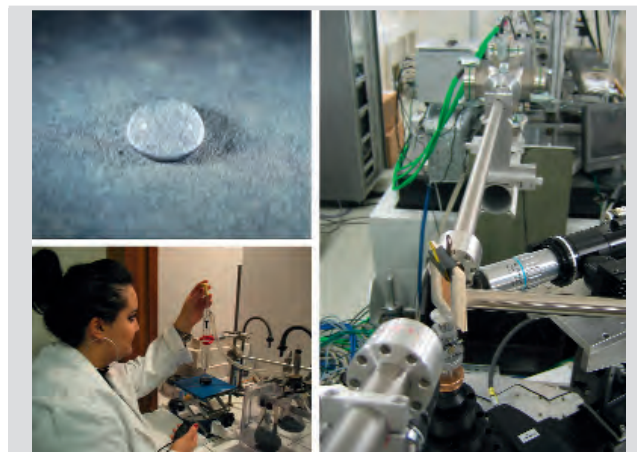


Fig 2: Estimating the water permeability of paper by measuring the time necessary for a drop of water to be absorbed (left, above); viscosity measurements (left, bottom); Fe K-Edge Xanes measurements (right) (© CRC)

H. Porck\*

# Looking at letters

## Unfolding hidden information



Examination of letters often reveals remnants of the techniques by which these documents were prepared for transport. Although usually stored in stretched-out form, the folds applied to close a letter and secure its written content are often still discernible. Before the envelope became available, a series of letterfolds was used in such a sequence that an unwritten part of the paper was at the exterior, providing space for the name of the addressee (Fig 1). Besides crease patterns, also other material features disclose distinctive 'letterlocking' methods. Some letters show, for instance, several specific incisions, additional strips of paper that sometimes appear to be cut-off from the margin of the letter itself, and traces of sealing-wax.

Despite the obviously rich variation in letter folding and closing methods, it is remarkable that the subject has not yet received much scholarly attention. In the past decades the significance of letter folding has been

recognized by the Envelope and Letter Folds Association (ELFA), erected in 1988, and by Jana Dambrogio from the Massachusetts Institute of Technology (MIT) in Boston, who has done pioneering research in letterlocking techniques and traditions.

The importance of letter folding and closing has been highlighted in preserving the so-called Prize Papers, letters captured by English privateers from Dutch ships in the 17<sup>th</sup> and 18<sup>th</sup> centuries. These letters are still mainly kept in their folded state at the National Archives in London. Awareness of the potential risks of losing significant letterlocking-markers as a consequence of conservation and digitization treatments deserves to be recommended (Fig 2).

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Fig 1: Examples of 18<sup>th</sup> century Dutch folded letters in the collection of 'Prize Papers' (box HCA 30/766), The National Archives, London (© Koninklijke Bibliotheek, The Hague)



Fig 2: Preserving the crease pattern in the paper allows for the reconstruction of the folding mechanism of the original letter (© Koninklijke Bibliotheek, The Hague)



A. Fohs\*

# Are books ready for the museum?

Conservation meets museum education



The exhibition *'Druckfrisch' / 'Hot Off The Press'* which ran in the Tyrolean State Museum from June to October 2014 focused on the 'black art', the art of printing (Fig 1).

In our fast moving time, how can appreciation for the manufacturing and the end-product made of paper, leather and printing ink be evoked, conveyed and communicated?

The exhibition intended to bring to life the beauty of books, to point out that each book carries its own history and has its own aura, which touches people and moves them emotionally.

During the planning phase of the exhibition the cross-departmental coordination and preparation of ideas, contents and their presentation were therefore crucial.

During the exhibition, a book-workshop was installed in the Atelier of the Ferdinandeum (Fig 2).

Students from school level 9 upwards were instructed by a professional book-conservator to test and experience the typical hand movements of a printer and bookbinder. Finally, the students were asked to take over their active part.

The young Tyrolean visitors were not only invited to learn more about the craft of making books, but were also asked to answer some questions, e.g.: What do you think – are books ready for the museum? Will they survive as a communication medium? What's about your own readings? Would an exhibition without originals still be interesting? And many more. After the exhibition the questionnaires were evaluated revealing some surprising and partly stunning new findings.

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Fig 1: Flying tools in the exhibition *'Druckfrisch'* (© Wolfgang Lackner)



Fig 2: Book-workshop in the atelier of the Ferdinandeum (© Tiroler Landesmuseen)

# Project development and management

## New opportunities for preventive conservation consultants



Running cultural heritage institutions has become an increasingly complex matter. Collection development and collection care are nowadays very often determined by financial and economic parameters and regulations.

On the other hand, growing scientific knowledge and insight have made clear that for cultural heritage to survive very high standards of preventive conservation will have to be maintained. Many threats, including climate change, will become more and more important in the future.

Whereas preventive conservation consultants were until now mostly involved in a limited institutional context, the growing complexity of collection care is leading to the emergence of a new type of such consultants.

These consultants will work nationally and internationally and are involved in risk assessment, conservation policy development, initiating new sustainable building concepts, implementing disaster plans and organising emergency preparedness. They work as a team with experts from different fields, sometimes developing preventive conservation programs, but possibly also

managing projects, often acting as coach or mediating between cultural heritage clients and construction/technical parties.

Preventive conservation consultants are well placed to act in this capacity because of their extensive background in cultural heritage, knowledge of materials and deterioration factors, scientific and technical insights, analytic and educational skills (Figs 1 and 2).

In this presentation we will illustrate some new opportunities by presenting two cases: the development and implementation of a project including collection condition assessment, cleaning, removal and re-housing of 4,000 old printed books, and a collection-need assessment and new storage building proposition for archaeological and museum collections, archive and library materials.

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Fig 1: Collection condition assessment as part of a cleaning, removal and re-housing project for ancient printed books (© De Zilveren Passer)



Fig 2: Training of institutional staff providing in-house knowledge and experience for future projects (© De Zilveren Passer)

## Papers for Prayers

The use and conservation of paper and cardboard in the production of devotional objects in Provence



For several years the Museon Arlaten, a museum in Arles dedicated to the ethnography of Provence has been carrying out a conservation programme of its collection of devotional objects dating from the 18<sup>th</sup> and 19<sup>th</sup> centuries. A set of approximately 150 items has already been treated. It includes nativity scenes, child Jesus, representations of heaven, convent cells, reliquaries, paper quillings, paper cuts, etc. Most of these objects, the fruit of an ancient tradition spread all over Europe, were made in convents by cloistered nuns. The nuns used various materials, but principally paper and cardboard as these were less expensive and easy to use.

Even if it serves as a basis for these three-dimensional objects, paper is often combined with other materials (textiles, ceramics, glass, breadcrumbs, wood, ...) which require the skillful intervention of different specialists (Fig 1). Paper conservation techniques have remained predominant however and have guided the main conservation procedures. It has been necessary though to harmonize the levels of intervention, to choose adhesives and pasting methods which are compatible with the other materials, sufficiently resistant while meeting requirements for reversibility.

Our objective was to respect the traces of manufacturing and usage present, while ensuring the readability of works and restoring their cohesion and their stability.

The conservation work undertaken has revealed an astonishing collection of papers and cardboards used at the time (Fig 2). Some are recycled materials (wall paper, manuscripts, prints, ...), others are the result of a specific production (gilt edged strips of paper for quillings, small engravings, embossed or perforated papers).

Documenting them is all the more interesting since they are a testimony of a knowledge which has otherwise disappeared for a lack of interest in these modest objects.

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Fig 1: Conservation work on a cloister cell (© Laurence Caylux)



Fig 2: Sample of papers used for devotional objects (© Laurence Caylux)



# Filling of losses in old master prints

A new method using digital reconstruction



The filling of losses in old master prints is a continuous task in paper conservation. In some cases, it seems necessary to go beyond an infill with minimal or neutral re-touching, especially when losses are eye-catching. Instead of using the traditional retracing of missing parts by hand, a modern technique making use of digital photography and laser printing was developed. For the reconstruction a digital photograph is taken of either another intact copy of the same print or a repeating pattern within the artwork (Fig 1).

The photo is digitally processed and printed true to scale with a monochrome laser printer on a paper chosen and toned to match the paper of the historic print (i.e. Japanese paper). The printout is then fitted into the loss and attached either to the original print or onto the supporting mounting board.

With the aid of digital reconstructions, convincing visual results can be achieved especially for black-and-white prints (Fig 2). The digital printing grain helps to

distinguish the added parts from the original print and is clearly visible on closer inspection. The technique is time saving compared to traditional methods and is reversible, particularly when the infill is mounted on the backboard rather than to the print itself. The long term stability of laser printouts on Japanese or other infill papers is arguable. However, under application of a high quality toner it can be considered to be appropriate. The technique is suitable for an effective completion and can be adapted to varying requirements.

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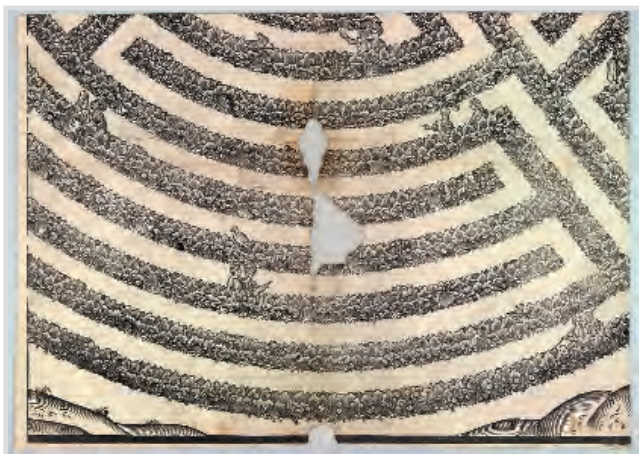


Fig 1: G. A. Vavassore: Labyrinthus, woodcut, ca. 1530/1540. Lower middle piece of a unique impression on nine sheets with large losses in the image before treatment (© SMB, Kupferstichkabinett, G. J. Dietz)



Fig 2: The same print as Fig 1 after treatment. The losses were filled with a digital processed outprint of the repeating pattern from an adjacent area (© SMB, Kupferstichkabinett, G. J. Dietz)



# Volatile organic compounds in collections of drawings and prints

Cause, effects and mitigation strategies



Numerous collections with paper-based objects in museums, archives and libraries are housed or exhibited in wood-based furniture. These can act as emission sources for volatile organic compounds (VOC's). The collection of drawings and prints of Karl Friedrich Schinkel (1781-1841) at the Kupferstichkabinett was investigated regarding the VOC concentration in its existing storage situation (Fig 1). The emission potential of current and future storage materials was also tested, as well as the effect of the identified VOC's on artworks on paper.

It was shown that, while acetic acid was present in the highest concentration, the risk formic acid poses for paper-based objects is more severe. It was further demonstrated that different papers adsorb different levels of volatile organic acids; their alkalinity is of special influence. In-situ analysis of original artworks on paper and additionally of samples charged with acetic acid showed that the accumulation of VOC's is hardly avoidable when storing the papers stacked and inside folders either of archival cardboard or of polyester film. In any stacked

storage situation, the limitation of air exchange between the folder interior and the surrounding air has a greater effect on the VOC concentration in the object's environment than the permeability and alkalinity of the folder materials.

The Schinkel collection was transferred into a new storage system involving adapted furniture and new housing (Fig 2) that reduces the VOC concentration in the artworks surroundings, protects them from further mechanical damage, and facilitates the handling and viewing especially of objects that are large in format.

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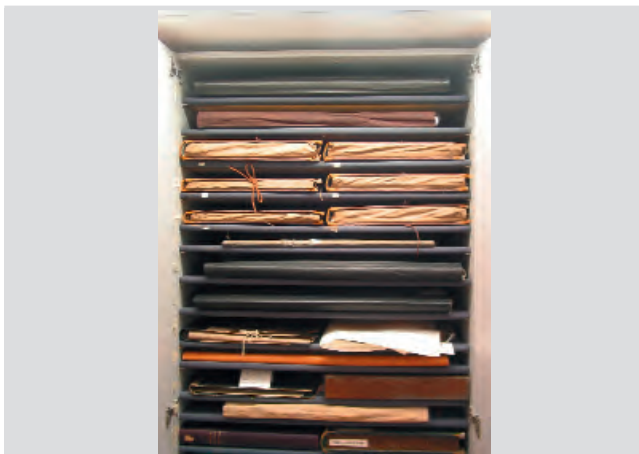


Fig 1: Previous storage situation of the Schinkel collection in wood-based cabinets inside historical folders (© Staatliche Museen zu Berlin; Kupferstichkabinett / Irene Brückle)



Fig 2: Rehousing the collection in folders, made of polyester film and archival cardboard (© Staatliche Museen zu Berlin; Kupferstichkabinett / Fabienne Meyer)

L. O'Connor\*

# Hugh Douglas Hamilton

A pastel portraitist in an European market



Hugh Douglas Hamilton (c. 1740-1808) is one of Ireland's most prolific portrait artists. He established a busy practice studio, specialized in small ovals in pastel with a characteristic use of graphite, first in Dublin and later in London, and became known as '*pastel Hamilton*'. In Italy during the 1780's, he created larger pastel portraits for wealthy Grand Tour patrons. Over 20 large rectangular pastel works are now attributed to the artist, in public and private collections scattered across the globe.

Close examination of Hamilton's two large pastels in the National Gallery of Ireland revealed that he created these portraits using an interesting technique (Fig 1). The sitter's face is on a separate circular or oblong piece that is adhered to the larger sheet (Fig 2).

The 'cut-out' or 'insert' may have links to the preparation technique used in oil painting and was used by De la Tour at the Parisian Court. In Rome, Hamilton may have learned the technique from fellow European artists.

In lieu of surviving primary written evidence, this paper explores Hamilton's materials and techniques and recounts research into identifying the technique in Hamilton works in public collections. It will discuss how Hamilton's methods were influenced by both the established European tradition of pastel portraiture and the desires of the art market in 18<sup>th</sup> century.

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Fig 1: Pastel Portrait '*Reclining woman with child in an interior, Naples*', by Hugh Douglas Hamilton (NGI 19622) (© National Gallery of Ireland)



Fig 2: Detail showing seam joins of oval paper insert around the faces (© National Gallery of Ireland)

# Deacidification and reduction

Treating a copper corroded, 18<sup>th</sup> century engraving



During the conservation of an 18<sup>th</sup> century, hand-coloured engraving by Joannes Volpato, part of the Belmonte Collection at the Galleria Interdisciplinare Regionale della Sicilia 'Palazzo Abatellis' (Inv.No.G23), a deacidification and reduction with borane *tert*-butylamine was performed. The subject of the engraving represents the frescoes of the Raphael Sanzio Loggias at the Vatican. On the verso of the artwork, corresponding to the green painted surface, copper corrosion was observed (Fig 1). This degradation phenomena is caused by oxidation and hydrolysis, and results in browning and severe brittleness of paper. Scientific surveys were carried out to investigate such phenomena.

By applying X-Ray fluorescence (XRF) and Raman spectroscopy, the green pigment was identified as Verdigris, a basic copper acetate. Spectrophotometric investigations were used to monitor the colour changes during the cleaning treatments and after the restoration works.

The simultaneous treatment of alcoholic deacidification with calcium propionate and reduction with borane *tert*-butylamine (TBAB) was performed by spray nozzle

and brush on the verso of the artwork with the aim of counteracting the degradation induced by oxidative agents (Fig 2). This methodology allowed us to carry out the treatment without any risk to the fiber structure and the pigments.

The paper pH and the chromatic coordinates of pigments were measured before and after treatment, and again two years later, in order to check the state of conservation of both, the paper and the water colour. Starting from an average pH value of 5.46, after treatment the pH increased to an average value of 7.97 and stabilized at pH 7.32 after two years. After the treatment, the paper was lighter ( $\Delta L$  increase of 4 points) and the pigments did not change colour. After two years no significant changes of  $\Delta E$  values occurred. This indicates that the conservation treatment has positively altered the colour of the paper and has no negative effect on the painting surface of the artwork.

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Fig 1: Condition before treatment recto (left), verso (right). Hand-coloured engraving by J. Volpato, Galleria Interdisciplinare Regionale della Sicilia 'Palazzo Abatellis', Inv. No.G23 (© AmbraD'Aleo)



Fig 2: Spray- and brush application of the combined deacidifying-reducing solution on the back of the engraving (© AmbraD'Aleo)



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## Halos of hollowness

How air pockets in window mounts can cause discolourations – and how to best prevent them



In 1988 a disturbing phenomenon of rectangular brown discolourations in stacks of museum board window mounts stored in print boxes was discovered by paper conservators working at the Amsterdam City Archives. When viewed under ultra-violet illumination the peculiar patterns appeared more distinct (Fig 1) and were found to occur widespread in many different boxes of the prints and drawings collection of the Archives. For some unknown reason, the presence of individual air pockets from the window areas of the mounts had induced or 'radiated' homogeneous rectangular discolourations up to several layers deep in the stack. In typical stacks of mounts these window areas are of different dimensions, resulting in partially overlapping areas when combined. The resulting patterns consisting of combinations of partly overlapping rectangles in different shades of brown are reminiscent of Mondriaan paintings.

The phenomenon was therefore coined the '*Mondriaan Effect*'. Most disturbingly, these discolourations did not confine themselves to the cardboard, but were found to be present, although less pronounced, in some prints and drawings as well. Inconclusive results after several years of scientific investigation forced Dutch paper conservators to trust their own precautionary

intuition which lead them to the recommendation to discontinue the use of window mounts in storage situations.

Now, almost two decades later, we ask if the abandonment of window mounts for storage purposes is a decision we still believe to be best. Which magnitude of fluctuating conditions should be considered dangerous? How does the discolouration risk compare to side risks like abrasion and other costs associated to storage in folders instead of window mounts? To answer these questions we did research applying thermal imaging (Fig 2) combined with heat and moisture transport modelling. We revisited the unaltered stacks of original prints using UV-photography to characterize the phenomenon more carefully. Furthermore we assessed historic environmental conditions and evaluated current storage and exhibition practices.

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Fig 1: The Mondriaan Effect: an UV-photo of the brown discolouration in a print (Amsterdam City Archive Nr. K17) originating from the adjacent window mount (© Gauthier Patin & Frank Ligterink)

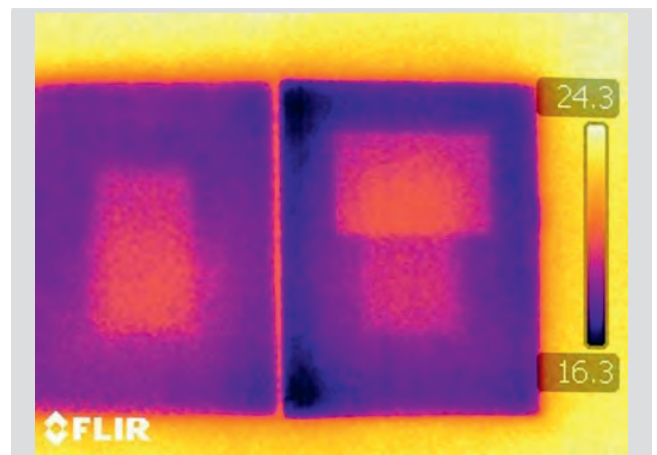


Fig 2: False colour thermal image showing thermal distribution within a window mount from a stack exposed to a thermal gradient (© Gauthier Patin & Frank Ligterink)

M. Röhrle\*

# A life-cycle approach

From creation to archiving of born-digital documentation  
in paper conservation



Digitization has long passed through the doors of the conservator's workshop. Nowadays documentation in restoration is mainly created digitally. The continuously changing digital world, however, contradicts the sustainability of the conservation of art and cultural assets. To prevent a breakage between these two worlds appropriate measures have to be taken during the creation, processing and storage of digital documents and research data to ensure the continued accessibility of digital assets.

Based on these issues the staff members of the degree course 'Conservation of Works of Art on Paper, Archives and Library Materials' at Stuttgart State Academy of Art and Design developed different workflows to address these pressing challenges.

This includes, for example, setting up a system that is easy to handle and enables a paper conservator to

streamline the process of carrying out the required documentation of objects, including the steps: image capture (Fig 1), choosing file formats, applying colour management, file naming, adding metadata and finally the preservation of the files (Fig 2).

The talk presents examples of the developed strategies and implementations for the authentic long-term preservation of digital assets in conservation and restoration that can be seamlessly incorporated in everyday activities.

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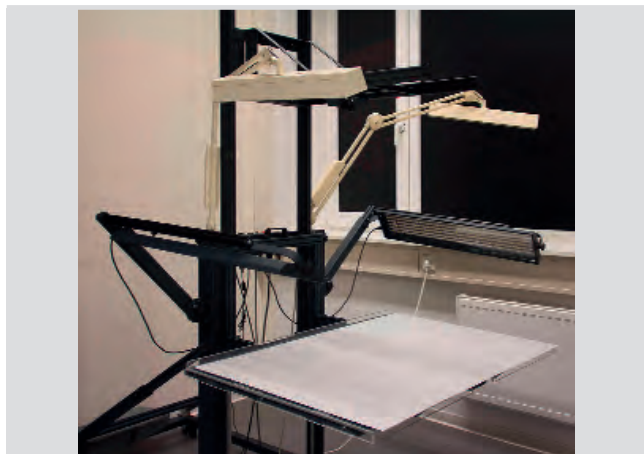


Fig 1: DIFLEX 8060: custom product, DI Manfred Mayer, Graz  
(© Mario Röhrle)

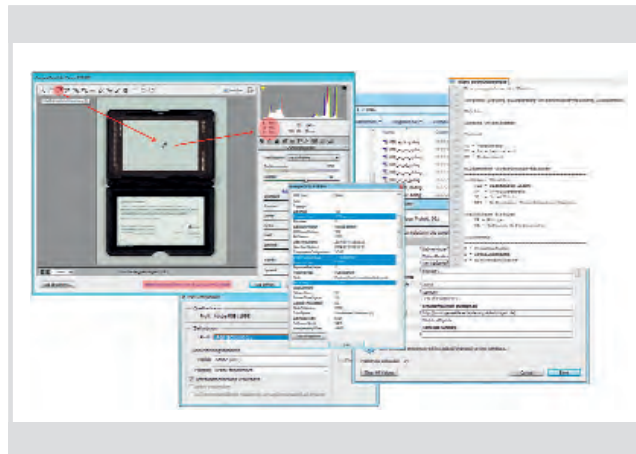


Fig 2: Working with the digital asset (© Mario Röhrle)

# Coated paper – a multivariate system

## A novel approach to the kinetics of its degradation



Coated papers are widespread cellulosic materials with special surfaces used for high-quality printing.

A great deal of literature has focused on the technology of coated papers but studies on degradation mechanisms are limited. Besides, the presence of several interacting components makes such evaluation difficult.

Nevertheless, coated papers are a key challenge for forward-looking conservators and understanding their degradation will lead to proper conservation.

For this reason, a kinetic study on coated papers was performed to ascertain processes, rates and effects of ageing. The experimental approach was developed by studying the synergistic effect of different components (AKD sizing, styrene-butadiene latex, two pigments and an optical brightener) and carrying out a thermal oven ageing of 1,400 hours (ventilated oven at 120°C and environmental RH) (Fig 1). Viscometric and colourimetric analyses were exploited to investigate mechanisms and kinetics of degradation, while FT-IR investigations allow the evaluation of chemical changes.

The kinetics of degradation revealed two simultaneous processes that have been modeled to obtain comparable

parameters from all the samples: a fast degradation of the surface and a slower progressive oxidation of the bulk (Fig 2).

The polymeric layer increases both the degradation rate and colour variations of cellulose, as yellowing phenomena are the greatest. The addition of pigments slows down the degradation, stabilizing the coating. However, ageing induces a decomposition of the binder thus causing the dusting of pigments and the loss of mechanical and aesthetical performances.

Finally, the presence of a brightener affects optical properties, even compromising the paper stability with an increased degradation rate in the early stages of the ageing.

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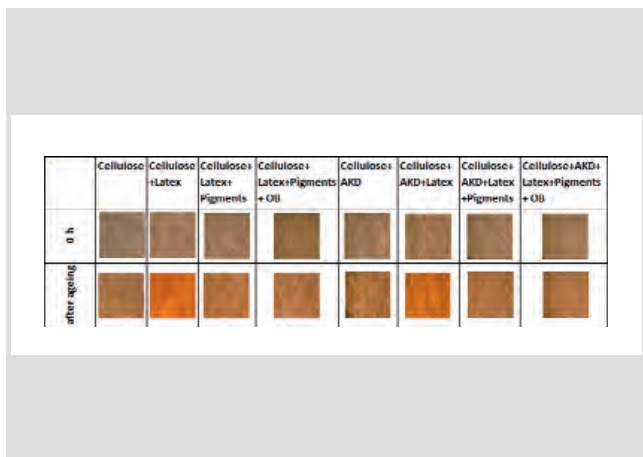


Fig 1: Microscopic images of samples before and after the thermal ageing. Taken with stereo microscope LEICA MZ6 in reflection (4x), camera CANON PC1049 POWERSHOT G5 (© Busnardo Barbara)

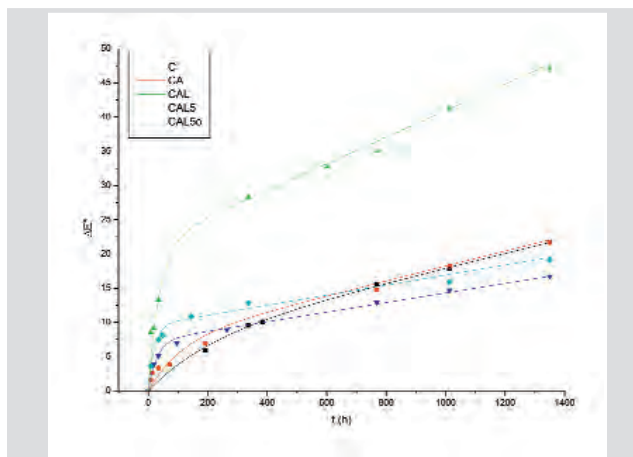


Fig 2: Simulation of colourimetric data to compare samples: C basis paper; CA sized paper; CAL as CA with a latex layer; CAL5 as CAL plus pigments; CAL5o as CAL5 with addition of optical brightener (© Busnardo Barbara)



C. Ma. Ordoñez Montoya\*

## Ignorance and neglect

Administrative management in preventive conservation of Guatemalan documentary patrimony



Guatemala is located in Central America and once was the centre of the Maya civilization. We hold numerous public records which bear witness to historical events and are a rich resource for scholarly and legal research into our political, religious, economic and cultural heritage.

The country's geographical location, tropical weather and high mountains, with diversity of microclimates, have caused severe and irreversible damage to the collections housed in inappropriate storage facilities. Furthermore, we face other problems such as: abandonment, unawareness of proper measures, and lack of technical, scientific and economic resources, as well as the absence of professional conservators in order to implement conservation projects.

Many collections are stored in poor housings and often under pestilent and hazardous conditions (Fig 1). The total number of archival collections in Guatemala remains unknown as well as their current condition. Random inspections show the severity of this situation in various repositories (Fig 2). Being located in a tropical region that is disaster prone, Guatemala suffers from constant tremors, earthquakes, tropical storms and possible hurricanes.

The mismanagement and terrible conditions of the collections are the result of the negligence and ignorance. Several Latin-American countries share this situation.

Our country urgently needs professional advise through international expert cooperation in order to formulate an adequate risk management strategy, preventive conservation, temperature and humidity control guidelines, disaster response and recovery plans, and the prevention and reduction of bio-deterioration measures.

Natural disasters are unpredictable and cannot be prevented. However, we need your advise and guide to implement the processes you execute to offer a line of defense for collections in our country. Our objective is to increase the awareness about the risks involved and create collaborations with the worldwide conservation community to rescue Guatemalan documentary collections.

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Fig 1: SCEP administrative archive, July 2015 (© Claudia Ordoñez, Guatemala City)



Fig 2: Escribanía de Gobierno, sección de tierras, Ministerio de Gobernación, archive, August 2008 (© Claudia Ordoñez, Guatemala City).

# Program



## Morning session

### 09:00 – 10:20 Full lectures

- > Niels Borring et al. (DK, UK, FR, DE, AT): *A triumph of collaboration: Preserving and exhibiting the 'Triumphal Arch' by Albrecht Dürer* **p 25**
- > Thomas Klinke (DE): *Cut, copy & paste: Creative image concepts in historic master drawings* **p 26**
- > Georg Josef Dietz (DE): *Ink or ink? How to distinguish between iron-gall ink and carbon ink in old master drawings* **p 27**
- > Doris Müller-Hess et al. (AT): *Into the blue – into the brown: Conservation strategies for permanent exhibition of 212 gouache drawings at Vienna's Schönbrunn Palace* **p 28**

### 10:20 – 11:00 Coffee break

### 11:00 – 12:20 Full lectures

- > Juliane Hofer et al. (AT): *On fixative: Historic methods and their practical implementation; a study based on eight cartoons by Eduard Bitterlich (1871-72)* **p 29**
- > Tina G. Poulsson, Birgit Reissland et al. (NO, NL): *'En route': Identifying Thomas Fearnley's fixatives on early 19<sup>th</sup> century pencil drawings* **p 30**
- > Daniel Kirby and John Slavin (USA, CA): *John Constable's drawing fixative: Identification of a proteinaceous surface coating by peptide mass fingerprinting* **p 31**
- > Eva Hummert (DE): *Stabilisation treatments with aerosols: Evaluating the penetration behaviour of gelatine and methyl-cellulose* **p 32**

### 12:20 – 13:00 Lunch break

## Afternoon session

### 13:00 – 14:40 Poster session **p 87**

### 14:00 – 16:00 Full lectures

- > Marlen Börngen et al. (DE): *'Intensif-Station': Conservation of the installation by Thomas Hirschhorn at the Kunstsammlung Nordrhein-Westfalen* **p 33**
- > Cécile Gombaud et al. (FR, NL): *Pastel conservation at the Rijksmuseum Amsterdam: Conservation treatments of 18<sup>th</sup> century pastels* **p 34**
- > Emily O'Reilly (UK): *When goats that glitter are not always good: An observation on the effects of Chloramine T on a watercolour* **p 35**
- > Christine Göppinger (DE): *1989 Berlin demonstration banners: A storage concept* **p 36**

### 16:00 – 16:40 Coffee break

### 14:00 – 16:00 Full lectures

- > Markus Krön (AT): *Paintings from a stage scenery artist: A coulisse for a ballroom* **p 37**
- > Catherine Rickman (UK): *'The meeting of Wellington and Blücher after the Battle of Waterloo' by Daniel Maclise: Conservation treatment of 10 full-size cartoons on paper for wall paintings in the Palace of Westminster, London* **p 38**
- > Julia Bischoff et al. (FR): *Decoding Chinese wallpaper: A technological approach with 3D microscopy* **p 39**
- > Stephan Lohrengel and Markus Gross (DE, CH): *Conserving 'Acanthes': A large-sized paper cut-out by Henri Matisse* **p 40**

### 19:00 – 22:00 Evening reception

Berlinische Galerie, Alte Jakobstraße 124-128





N. Borring<sup>\*1</sup>, C. Barry<sup>2</sup>, J. Kosek<sup>2</sup>, V. Dubard<sup>3</sup>, G. J. Dietz<sup>4</sup>, E. Thobois<sup>5</sup>

# A triumph of collaboration

Preserving and exhibiting the 'Triumphal Arch' by Albrecht Dürer



The '*Triumphal Arch*' by Albrecht Dürer (1471-1528) is one of the most important European achievements in print-making. Designed by Dürer at the height of his career it was printed between 1517 and 1518 out of 195 woodblocks onto 35 sheets of paper to make a giant woodcut measuring nearly 4m x 3m (Fig 1). Predictably, considering the use and storage problems with the enormous and delicate material, not many copies have survived to our times.

Undertaking conservation or display of a work of this size inevitably becomes a major project and contemplating even standard treatment for the print becomes an exercise in resource planning, project planning, risk assessment and documentation. In these circumstances there is no point in 're-inventing the wheel' and consultation with colleagues in a similar situation can have great benefits and save a lot of time.

In recent years conservators working in major European institutions had to address the conservation, display and storage of their copies of the Arch. For conservators

in the Statens Museum for Kunst, Copenhagen and the British Museum, London, who have been conserving their prints over the past 18 months, information gathered from these fellow Institutions has formed an important part of the decision-making process (Fig 2).

This talk will present an overview of these stimulating discussions about analysis, assessment, treatment, and display and storage options and the key benefits they brought to their respective projects.

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Fig 1: The Triumphal Arch by Albrecht Dürer, detail showing Maximilian I. (© Jakob Skou-Hansen)

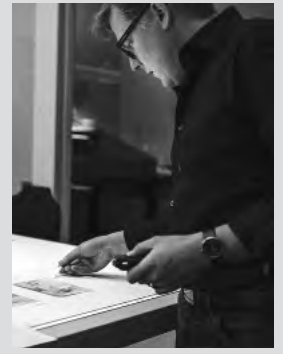


Fig 2: Co-authors at a meeting 2014, examining the Arch at SMK in Copenhagen (© Jakob Skou-Hansen)

T. Klinke\*

# Cut, copy & paste

Creative image concepts in historic master drawings



The history of drawing by hand on paper is also a history of copying and duplicating, of cutting out and putting back in. For centuries paper has allowed artists to visualize their compositions in variations, be it to try out aesthetic effects, or to prepare the technical processes of implementation for further techniques, for example prints.

Using concrete examples from the Department of Prints and Drawings at the Wallraf-Richartz-Museum & Fondation Corboud, it is possible to follow the development of the drawing as a concept – concetto – for the idea of a picture from the late sixteenth century until well into the nineteenth. In the process, novel techniques of design, transfer and duplication were introduced which innovatively expanded the traditional idea of artistic practice; from the early seventeenth century Italian

design drawings, worked as collages, to the counterproof, klecksography, tracing and all the way to monotyping (Figs 1 and 2).

What all these techniques have in common is that they mobilized the artists' inspiration in new ways. The unique morphology of paper provided the physical preconditions. Thanks to its 'magic', the medium of paper, as the sole authentic original, supplied characteristics that digital media today are seeking, retrospectively, to imitate.

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Fig 1: Technical examination of a drawing (© Costa Belibasakis)



Fig 2: Various drawings, cut up, counterproofed, copied, blotted and pasted over (© Thomas Klinke)

G. J. Dietz\*

## Ink or ink?

How to distinguish between iron-gall ink and carbon ink in old master drawings



The identification of inks in old master drawings is a challenging task. When it comes to decision-making or risk assessment for conservation treatments, storage and display, or when art technological questions get involved, however it is crucial to determine materials more precisely.

For a very long time – and often until today – the classification of inks was limited to visual examination with the naked eye, possibly supported by magnifying glasses. The colour of the ink, brown (iron-gall ink) or black (carbon ink), is an important feature for identification, even though it is a very vague one. Additional characteristics like morphology of deposits, surface lustre, penetration behaviour or indication of iron-gall ink corrosion might support a more reliable visual classification. For further evidence scientific analysis of the elemental composition of inks is necessary. Micro-X-ray fluorescence ( $\mu$ XRF) has proved to be a very helpful tool, but interpreting the resulting data is not easy since its significance is limited to inorganic compounds. The  $\mu$ XRF analysis of an

early drawing by Albrecht Dürer (Fig 1) almost resulted in the wrong conclusion that both inks, the black and brown ink, were identified as iron gall ink since both contained iron.

The conservator's visual examination followed by an infrared reflectography (IRR) revealed a significant carbon content in the black ink (Fig 2). Subsequent research in historical treatises confirmed the practice of adding iron sulphate to black carbon inks or mixing carbon and iron-gall inks. As a consequence a combination of visual examination, imaging techniques and complementary analytic methods supplemented by art technological source research is highly recommended to avoid misinterpretations.

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Fig 1: Detail of 'The Virgin and Child' by A. Dürer, pen with brown and black ink, heightened with pink watercolour, 1485. XRF analysis revealed iron content in the black and the brown ink (© SMB, G. J. Dietz)

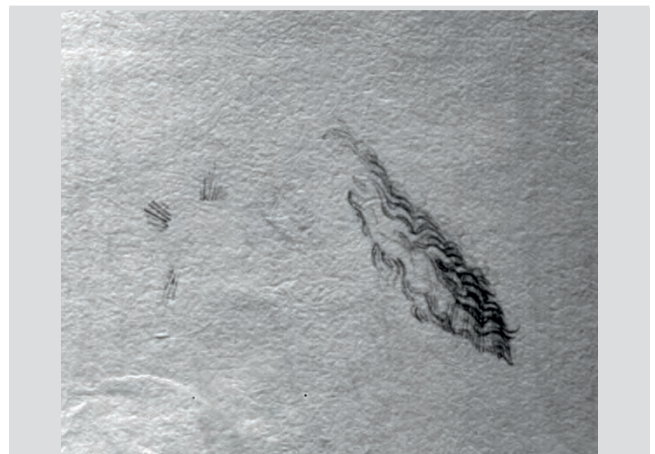


Fig 2: Digital IRR of Fig 1 solely showing the black, carbon-containing ink in Christ's halo and the Virgin's hair and preliminary drawing in charcoal in her face. Lines in pure iron-gall ink are not visible (© SMB, C. Schmidt)



D. Müller-Hess<sup>\*1</sup>, M. Nief<sup>1</sup>, K. Troschke<sup>1</sup>, U. Henniges<sup>2</sup>, G. Krist<sup>3</sup>

## Into the blue – into the brown

Conservation strategies for permanent exhibition of 212 gouache drawings at Vienna's Schönbrunn Palace



212 blue gouaches are a main part of the original baroque interior decoration of the so called 'Porcelain Room' (Fig 1). They are carried out in Prussian blue and Permanent white on underlying sketches in graphite on hand-made rag paper. Each gouache is framed and glazed. Within a research project funded by the Austrian Science Fund (FWF) on East Asian interior decorations in Schönbrunn palace, which also includes the implementation of preservation plans in the 'Porcelain Room', the drawings were examined and conservation strategies for further permanent exhibition were established.

The drawings had been restored in 1978 because the paper showed severe brownish discolouration due to long term direct contact with the wooden backing of the frames. Discolouration could successfully be removed then by chlorine dioxide bleaching, washing and the introduction of an alkaline reserve. Housing was improved by inlaying acid-free heavyweight paper between originals and wooden backings, direct contact between paper object and glazing remained. When the sheets were examined in 2013, patterns of discolouration were the same as in 1978 (Fig 2). The inlayed papers showed no discolouration.

All materials examined were within a pH range from neutral to alkaline, and no chlorine residues could be detected. Several treatment options were tested and discussed. Priority was given to the removal of discolouration compounds. So far, the absence of Chlorine and sound mechanical properties of the papers led to a conservation strategy which concentrated on the optimization of mounting and re-housing. Precise documentation, digitalization, and long term photometric monitoring of selected objects were further focal areas of the conservation campaign.

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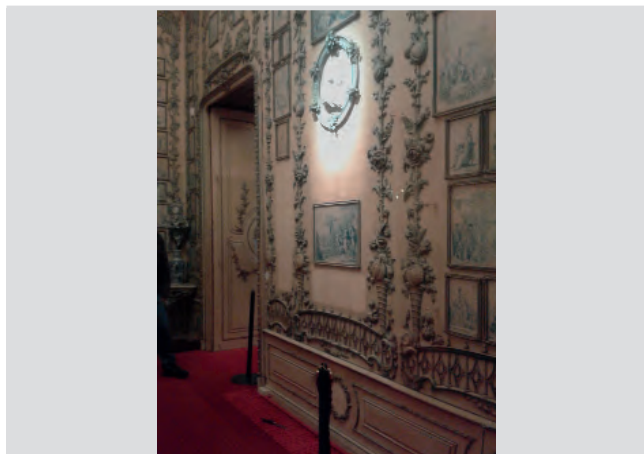


Fig 1: Part of west wall of the porcelain room during remounting (© SKB, photo: Hess)

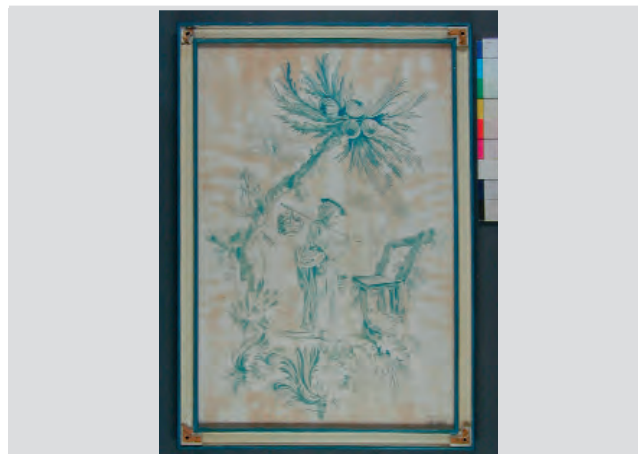


Fig 2: Drawing MD056776 before conservation (© Bundesmobilienvverwaltung, Schloss Schönbrunn, photo: Hess)

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## On fixative

Historic methods and their practical implementation; a study based on eight cartoons by Eduard Bitterlich (1871/1872)



This study focuses on art technological aspects of eight cartoons from the collection of the Kupferstichkabinett of the Academy of Fine Arts, Vienna. The cartoons were created in 1871/72 by Eduard Bitterlich as templates for ceiling paintings in the reception hall of the Palais Epstein, one of the most prominent palais of Vienna's Ringstraße. The cartoons are executed in charcoal and black chalk on machine made paper.

They were studied and compared with regard to their material composition, drawing technique, traces of usage and other technological features. Special attention was given to the fixation methods applied on the drawings which were carried out with various materials and different application techniques (Figs 1 and 2). Traces of fixatives were found on some drawings, but analytical methods provided conclusive results only in few cases.

In order to better understand practices of fixation, historic recipes from 19<sup>th</sup> and early 20<sup>th</sup> century written sources were collected and reconstructed, comparing their applicability, the effectiveness of fixatives and their ageing characteristics. Testing fixative materials and application methods on test papers helped to understand phenomena observed on the originals.

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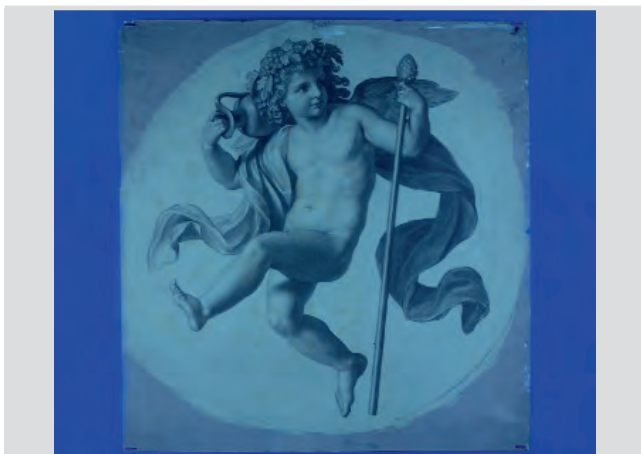


Fig 1: One of the cartoons by E. Bitterlich under UV-light, showing the applied fixative as fluorescing area (© Juliane Hofer)



Fig 2: Traces of the application by brush on one of the cartoons by E. Bitterlich (© Juliane Hofer)

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## 'En route'

Identifying Thomas Fearnley's fixatives on early 19<sup>th</sup> century pencil drawings



Our knowledge on fixatives applied onto drawings is very limited since their identification requires specialized analytical equipment. A case-study of two pencil drawings by Thomas Fearnley gave us the unique possibility to study fixatives used by 19<sup>th</sup> century artists.

Thomas Fearnley (1802-1842) was a Norwegian romantic painter and gifted draughtsman. His short artistic life included several long journeys through Europe. Pencil, easily available to artists since the early 19<sup>th</sup> century, was convenient for drawing and sketching outdoors. Fearnley utilized this opportunity. The National Museum of Art, Architecture and Design in Oslo possesses about 750 of Fearnley's drawings.

Today, many of Fearnley's drawings are badly disfigured by a fixative. Areas where the fixative was applied are either severely discoloured, or on the contrary, locally protected (Fig 1). This discrepancy suggested the use of different fixatives. Attempts in the 1990s to remove the fixative(s) were unsuccessful. Identification of the applied fixative(s) would allow a sound conservation strategy to be developed.

While the two drawings appeared different in day light, areas with fixative fluoresced similar in UV, 365 nm (Fig 2). Micro-chemical spot testing excluded starch. Gas chromatography – mass spectrometry (GC-MS), determined amino acids, galactose and glucose. No hydroxyproline was present, ruling out animal glue and, by absence of arabinose and rhamnose, Gum Arabic as well.

While phosphoric acid and calcium (XRF) suggested the use of milk, neither the ratio of galactose and glucose, nor the amino acids matched lactose and casein.

Tests with cow milk on reference papers showed that analysis of surface samples was misleading since part of the milk penetrates into the paper substrate and remains there. What is left on the surface perfectly matched the results of the GC-MS analysis of both Fearnley drawings. Why one paper was protected and the other not, is not yet established.

This was probably the first time that milk was identified as fixative on pencil drawings. This result was in agreement with various early 19<sup>th</sup> century sources, which advised the artists to use skimmed milk for this purpose. Easily available everywhere, milk was the choice of Thomas Fearnley himself when traveling and in need to protect his pencil drawings. The fixative is therefore an integral part of the artwork. Future research might reveal whether other artists applied this technique as well.

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Fig 1: Fixative protects the paper (left) or is discoloured (right). Thomas Fearnley, 'Tree, Ramsau' and 'St. Sebastian, Ramsau', The National Museum of Art, Architecture and Design in day light (© B. Reissland)



Fig 2: Fluorescence of the fixative is similar in both drawings (© B. Reissland)



D. P. Kirby\*<sup>1</sup>, J. Slavin<sup>2</sup>

## John Constable's drawing fixative

Identification of a proteinaceous surface coating by peptide mass fingerprinting



Although best known for his oil paintings, 19<sup>th</sup>-century artist John Constable also created an extensive catalog of drawings from nature. Of these, a large number were fixed by the artist (Fig 1). What is exceptional is the unique appearance of the fixative – a clear, non-uniform coating with an iridescent sparkle. Variations in its concentration suggest a pooling of liquid fix over the drawing surface with sharply defined areas where fixative is absent. Attempts to identify the fixative by ATR-IR, commonly used for surface coating analysis, were inconclusive but did indicate the presence of a proteinaceous material. As a result, this study presents a method of protein identification that is relatively new to conservation – peptide mass fingerprinting (PMF).

PMF uses enzymatic digestion to cleave proteins at specific amino acid sites, producing a mixture of peptides. Since protein sequences are unique, the mixture of peptides is unique and can be used as the basis of identification. The peptide mixture is analysed by MALDI-TOF-MS, resulting in a spectrum of characteristic marker ions – a 'peptide mass fingerprint.' Markers are compared with

those from reference materials for identification of the protein source.

Samples consisting of small surface fibers from four Constable drawings were analysed and compared with PMF's from reference materials. Constable's fixative was identified as fish-based, and other sources, such as gelatin, casein and ovalbumin, were conclusively ruled out (Fig 2). Correlating a specific protein with the visual characteristics of a surface coating leads to a more sympathetic and informed conservation treatment. The effort Constable made to finish and preserve his drawings is indicative of the value he placed on them.

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Fig 1: John Constable 'Coleorton Hall, 1823,' graphite drawing on wove paper (private collection) (© 2015 John Slavin)

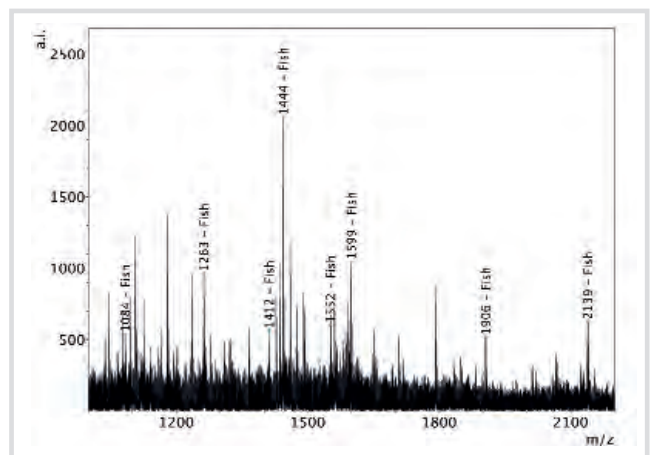


Fig 2: PMF from fixative on a John Constable drawing indicating fish-based protein (© 2015 Daniel P. Kirby)

# Stabilisation treatments with aerosols

## Evaluating the penetration behaviour of gelatine and methylcellulose



Friable media or weakened paper are stabilised using dilute adhesive solutions, treatments that are known as paint consolidation or paper resizing. The adhesive penetration behaviour is crucial to optimize the stabilisation effect and avoid colour changes or tidelines.

The penetration behaviour of gelatine and methylcellulose was studied with a fluorescence labelling method using fluorescent dyes (Texas Red™ and Texas Red™ C<sub>2</sub>-dichlorotriazine). It allowed visualization of the distribution of low-concentrated adhesives (0.5–1% w/v) required for aerosol application. The labelled adhesives were applied on specially prepared pigment-on-paper samples (Fig 1) and separate paper samples.

Fluorescence microscopy of sample thin sections revealed that the application technique has a significant influence on the distribution of dilute adhesives in porous paint and paper substrates. Intermediate drying between multiple aerosol applications diminished the penetration of a 1% w/v gelatine solution (Fig 2). The porosity of the substrate plays a vital role: aerosol-misted gelatine (0.5% w/v) penetrated surface-sized papers only to a

small extent and was mainly distributed on the paper surface; it penetrated unsized papers in their entire thickness. In resizing paper, immersion offered less control over the degree of penetration of the adhesive than aerosol application: paper immersed in gelatine or methylcellulose (0.5% w/v), was invariably fully penetrated by the adhesives; at the same time, part of the adhesives were preferentially adsorbed on the paper surface.

The study describes key parameters that determine the adhesive distribution in powdery paint and paper. This simplifies the development of treatment protocols for aerosol application techniques and adapting the method to the particular requirements of individual treatment contexts.

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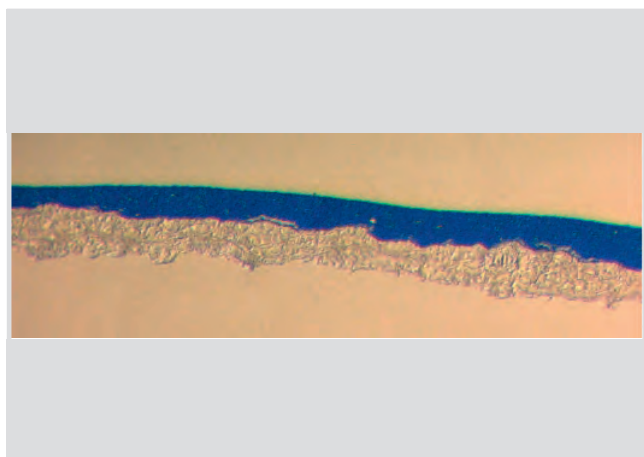


Fig 1: Thin-section of a sample simulating a gouache (ultramarine blue in gum arabic 8% w/v on rag paper, surface sized with gelatine) in visible light before application of the labelled adhesives (© E. Hummert)

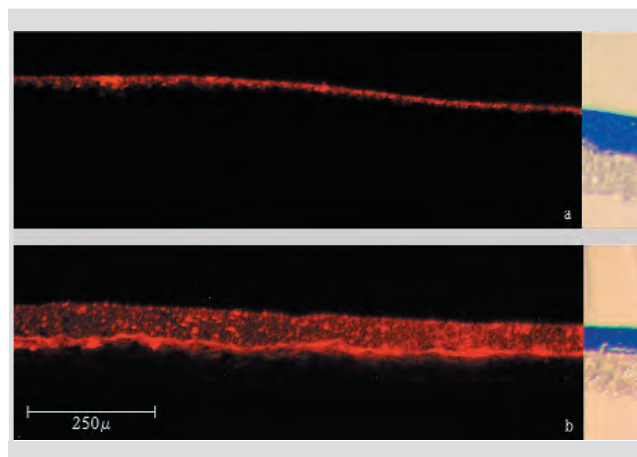


Fig 2: Distribution of fluorescent-labelled gelatine (1% w/v) in samples simulating a gouache. Above: application of 4x aerosol with intermediate drying, below: application without intermediate drying (© E. Hummert)

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## 'Intensif-Station'

Conservation of the installation by Thomas Hirschhorn at the Kunstsammlung Nordrhein-Westfalen



The project presents the decision-making process for preserving twenty large-format collages by Thomas Hirschhorn that are part of an artist room '*Intensif-Station*' which is on permanent display at the Kunstsammlung Nordrhein-Westfalen. The collages feature cut-out magazines illustrations and digital print-outs from online sources, some of them photocopied for enlargement. All are adhered onto white paper. The collage images are surrounded by writing and drawing in red felt tip- and ballpoint pens (Fig 1).

The collages are wrapped entirely in florist plastic foil, which is secured on the reverse with brown self-adhesive packing tape. According to the artist's stipulation, the works have been permanently exhibited under daylight fluorescent bulbs, six days a week (light levels ca. 100-850 lux) since 2010. The red media has faded significantly.

The project explored different conservation options, taking into account the opinions of the artist, curators and conservators, and the approach of other collections in dealing with the artist's comparable works. The preservation solution reflects a compromise of the decision-making parties.

The artist selectively reworked the collages in his Paris studio. Prior to that, several red pens had been tested for their light fastness. The artist agreed to use one of the felt-tip pens that yielded good test results for reworking the faded collage parts (Fig 2). The works were documented in-house in advance; high-end digitization of the artist-reworked collages for documentation were carried out.

The artist's assistant will assist the conservators in reinserting the collages in an appropriate foil package and reinstalling them at the Kunstsammlung.

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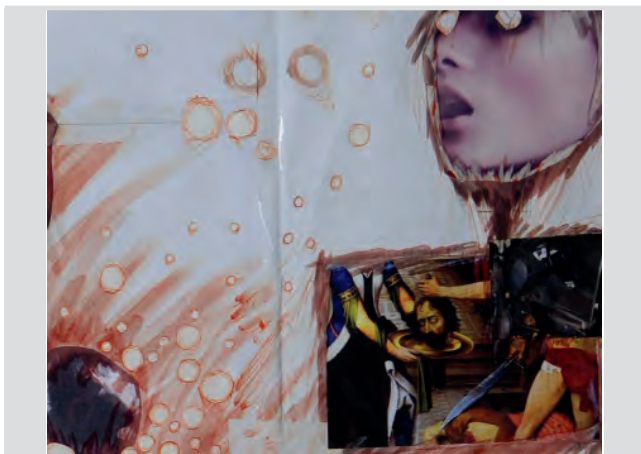


Fig 1: Detail before the revision (© Marlen Börngen)



Fig 2: Detail after the revision (© Marlen Börngen)



# Pastel conservation at the Rijksmuseum

## Conservation treatments of 18<sup>th</sup> century pastels



The Rijksmuseum (Amsterdam) houses an important collection of framed pastels from the 17<sup>th</sup> century to the 20<sup>th</sup> century.

In 2007 a conservation project was initiated in order to treat the 18<sup>th</sup> century pastels that would be exhibited after the museum's renovation. Nine pastels by Johann Friederich Tischbein (1750-1812) and thirteen pastels by Jean-Etienne Liotard (1702-1789) were treated between 2007 and 2014.

A systematic methodology based on a thorough documentation was implemented. The old treatment reports from the Rijksmuseum painting studio provided us with an insight of former condition and conservation methods applied to pastels. Infrared reflectography and ultraviolet photography were used for the first time on these objects and attempts were made to identify the presence of fixatives on Liotard's pastels. This initial work contributed to the conservation phase. This lecture focusses on the two most challenging conservation issues of this project:

**Cleaning of the fragile powdery surface:** Most of the frames were not properly sealed. This induced dust accumulation at the medium's surface, and a former mould outbreak had left fluffy mycelia spots at the surface of most pastels.

**Partial restretching of several vellum supports:** Because the iron nails holding vellum onto the strainer were corroded, the pastels became partially loose. Tensions in the supports were unbalanced causing severe cockling (Fig 1).

New specific tools and techniques were developed and applied in the conservation of the objects (Fig 2). The treatments gave very satisfactory results with an improvement of the pastels' planar condition and readability.

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Fig 1: 'Lady Tyrell', Jean-Etienne Liotard, ca 1738, pastel on parchment, before and after cleaning and restretching. Raking light, SK-A-236 (© Rijksmuseum Amsterdam)

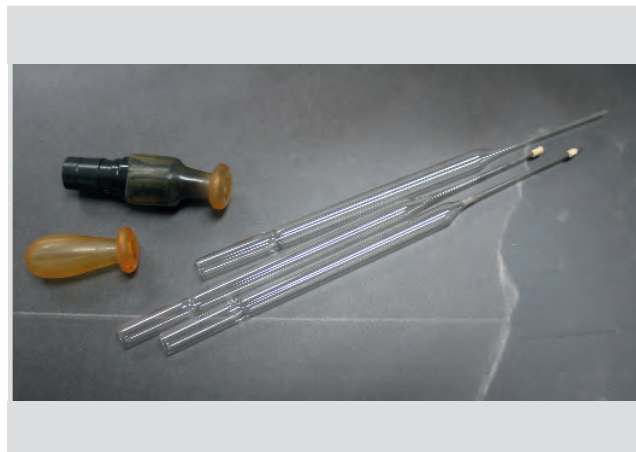


Fig 2: Suction tool for surface cleaning: Pasteur pipettes used to remove dust particles and mould mycelia from the medium. A few hairs are attached at the pipettes' end (© Rijksmuseum Amsterdam)

E. O'Reilly\*

## When goats that glitter are not always good

An observation on the effects of Chloramine T on a watercolour



A framed water colour arrived at Amgueddfa Cymru – National Museum Wales as part of a bequest in 2010 depicting a young girl with goats. Curators supposed that the glitter was the artist's intent, but it looked too clean and bright. It had been obviously treated, possibly bleached, and across the surface, particularly on the white goats, was a light dusting of transparent material giving the appearance of glitter (Figs 1 and 2).

The author set out to prove what the glittery material was and that it was not intentional. After consultation with colleagues a suggestion was made that it could have been caused by the use of Chloramine T. Analysis of the glittery material was carried out using FTIR and was confirmed as Para Toluene Sulphonamide – produced due to poor washing after the use of Chloramine T.

Chloramine T is not now widely used or taught in the field of paper conservation but can still be purchased on the internet for the use of cleaning paper. This paper

presents a review of the history of Chloramine T in paper conservation and aims to highlight the phenomena of the glittering not as artist's intent but as a conservator's intervention. Previous research in this phenomena focused on the powdery material (not glittery) being a potential bio hazard. The difference in appearance could indicate how Chloramine T was used or misused. Although a treatment of the past it may still be in use, so future generations of conservators and curators should be made aware of the facts and be able to recognise it.

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Fig 1: 'Girl with Goats in a Landscape', Watercolour, NMWA 24410  
(© Emily O'Reilly)



Fig 2: Glittering crystal, close up of NMWA 24410  
(© Emily O'Reilly)

C. Göppinger\*

# 1989 Berlin demonstration banners

A storage concept



590 demonstration banners originating from the big demonstration on 4th November 1989 at Berlin Alexanderplatz might range among the most significant objects representing contemporary history in the collections of the Stiftung Deutsches Historisches Museum, Berlin.

Intended for ephemeral use only, they were made of everyday material such as paper, cardboard, wallpaper, cloth, wooden boards and slats or broom sticks, fastened with ropes, sticky adhesive tapes, staples, nails or wire etc. Especially all non-paper elements bear increased risk of causing local pressure, tears or scratches on neighbored objects.

Strong traces of use occur on most of them. They are warped, worn, torn and generally often unstable. The uncomplicated ones without sticks, nails etc. lie flat in drawers, while for ca. 140 banners of large size or with 'special needs' an appropriate storage concept was to be developed (Fig 1).

The solution in 2014 was to store the banners standing upside down. An appropriate powdercoated steel shelf with open vertical compartments was purchased.

Because of the limited space available in the storage room, individual housing, preventing any further mechanical damage and giving protection against light and dust, had to be designed without large increase of volume and at minimum effort and cost (Fig 2).

Accurately fitting envelopes made of 180 x 245 cm corrugated museumboard in combination with archival paper, both in a dirt-preventing blue-grey colour, were preferred to Tyvek-envelopes to ensure more stability and physical protection. Magnetic locks were preferred to hook-and-loop fasteners for less pull on the material.

The enclosures were designed for easy use, i. e. easy opening and closing. Their light weight and plain surface allow easy sliding in and out of the shelf to facilitate handling by museum staff.

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Fig 1: Banners on Trolleys (© DHM, Göppinger)



Fig 2: New Storage Situation (© DHM, Göppinger)



M. Krön\*

# Paintings from a stage scenery artist

A coulisse for a ballroom



In 1804 the scenic painter Alois Gleichenberger created a wallpaper that covered the walls of a historic ballroom in Graz (Austria). The painting was not carried out on plaster, as it had been on the ceiling, but on paper.

The wallpaper depicts architectural porticos and views of Mediterranean landscapes (Fig 1). This is certainly a very unusual occurrence and, to my knowledge, unique in Central Europe. The scenic painter Gleichenberger seemed to be more familiar with this media. The loose, relaxed painting technique of the artist is noteworthy.

It is a rare stroke of luck that the mounted wallpaper has been preserved for over 200 years. It is certainly worth taking a closer look at the techniques used. In describing the conservation the author would like to focus on the following aspects:

Methods of partial surface facing (according to the results of the MA thesis of K. Wildman) in practice, surface cleaning of soot that has heavily polluted the animal glue based colour and the remounting of the wallpaper.

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Fig 1: Total view of the west wall after conservation (© Krön)

C. Rickman\*

## 'The meeting of Wellington and Blücher after the Battle of Waterloo' by Daniel Maclise

Conservation treatment of 10 full-size cartoons on paper for wall paintings in the Palace of Westminster, London



June 18th 2015 is the 200th anniversary of the Battle of Waterloo, a decisive moment in European history. Wall paintings by the British Royal Academician, Daniel Maclise, were commissioned in 1858 for the newly built Palace of Westminster, London home of Parliament. The subject shows the commanders of the British and the Prussian allied armies meeting after the battle. Rare, full-scale drawings survive and were purchased from the artist by the Royal Academy of Arts. Because of their huge format and fragility they are kept in permanent off-site storage and have not been seen since 1972. In 2012-13, conservators and art historians began to study the drawings. Their appearance and condition gave cause for concern, even before a decision was made to exhibit the cartoons in 2015.

The author was responsible for devising a treatment campaign, to be carried out over a two-week period in August 2014, based in the Royal Academy Schools where Maclise himself was a student. This paper will present an account of the preparation for the project, relevant

experience, research and planning, collaboration with curators, management of a team of conservators and art handlers, the treatment itself and the outcome. The cartoons were cleaned, stabilised, repaired and their appearance improved, while knowledge of the artist's working methods and the technical history of the drawings emerged (Figs 1 and 2). The lecture will focus on the challenges of working on a virtually unknown object, huge and hard to handle, within a very limited timescale. Reconciling the requirement for careful conservation work with the constraints of time and place, as well as the unexpected interest from news media and historians, called for rigorous and swift decision making.

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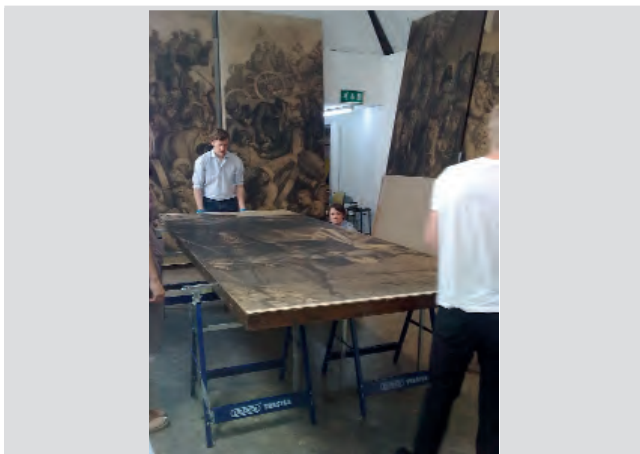


Fig 1: Positioning the Maclise panels before conservation  
(© Catherine Rickman)



Fig 2: The conservation team working on one of the 10 panels  
(© Catherine Rickman)

J. Bischoff\*<sup>1</sup>, N. Coural<sup>2</sup>, D. Robcis<sup>3</sup>

# Decoding Chinese wallpaper

A technological approach with 3D microscopy



Since the early 18<sup>th</sup> century, the French Compagnie des Indes introduced exquisite Chinese wallpapers to the French court. However, despite of being objects of remarkable quality and high value, only few original sources on their arrival in Europe exist, and moreover, no further research on their techniques of fabrication has been done.

Hence, our multi-institutional research project – based on the expertise of the Centre de Recherche et de Restauration des Musées de France (C2RMF), the Musée des Arts Décoratifs, as well as on the École du Louvre – tries to decode the original manufacturing practices of the notable, high-quality Chinese wallpapers.

Primarily wanting to avoid destructive measurement methods, the 3D digital microscopy (HIROX KH 8700) was used to detect the different layers of colour, their thickness ( $\approx 10\text{-}20\mu\text{m}$ ), and the white shining ground layer ( $\approx 100\mu\text{m}$ ) applied to isolate the paper and render it more solid (Figs 1 and 2). In addition, it can help to determine whether the colour has been applied mechanically or by hand.

The advantages of this technique are in particular its high precision and its rapidness. Nonetheless, it has to be taken into consideration that papers of large format are not suited perfectly to this technique. The best results, therefore, have been delivered by Chinese paper fragments of small or medium format.

Summing up, we ascertained technologically that the Arts Décoratifs' Chinese wallpapers of the 18<sup>th</sup> century consist of three distinct components: (1) the paper base with a film of alum and glue, (2) the stabilizing and shining ground layer and (3) the colour coat.

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Fig 1: The 3D microscopy on Chinese wallpaper using the HIROX KH 8700 technology (© Julia Bischoff, 2015)

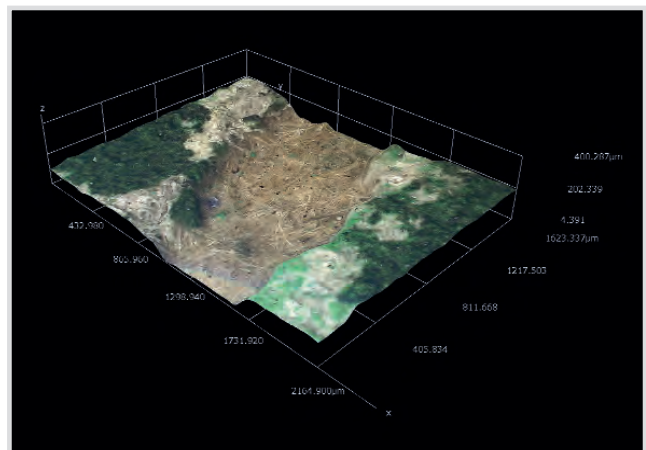


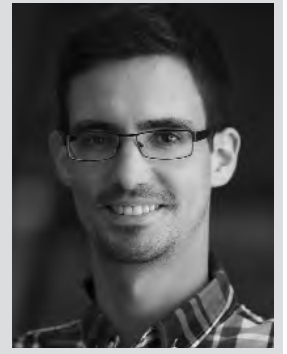
Fig 2: Surface structure of the Chinese wallpaper showing 5 layers: the paper support with a transparent coating, the white ground layer, and two green paint layers (© Dominique Robcis, C2RMF Paris, 2015)



S. Lohrengel\*<sup>1</sup>, M. Gross<sup>2</sup>

## Conserving 'Acanthes'

A large-sized paper cut-out by Henri Matisse



The cut-outs of Henri Matisse (1869-1954), created during the last decade of his life, are highly appreciated in art history, whereas little was known about the history, manufacture, condition and long term stability of these works. Therefore between 2009 and 2012 comprehensive research was done in an interdisciplinary conservation project at the Fondation Beyeler, Riehen/Basel (Switzerland).

Central was one of the largest cut-outs 'Acanthes' from 1953 (311 x 349 cm). Like many other cut-outs it consists of several layers of gouache painted and cut-out papers, which are glued onto a canvas and mounted on a stretcher. Extensive art technological research lead to a better understanding of the complex manufacture and structure of 'Acanthes' and the other paper cut-outs by connecting the fields of paper and paintings conservation, art history and science (Fig 1). Nearly one third of all cut-outs in collections worldwide were examined on site. To let the museum visitors participate at the conservators work, an exhibition gallery within the museum was rebuilt into a temporary conservation studio.

For the first time characteristics of the working methods and processes of Matisse were understood and reconstructed in detail and distinguished from later damages. For the long term stability more attention is given to the light sensitivity of paper and gouache as the colour balance is essential for the Matisse cut-outs. The combination of paper, canvas and glue is secondary.

Finally only small conservation treatments on 'Acanthes' were undertaken (Fig 2). A new frame and glazing were applied to meet both aesthetic and conservation requirements.

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Fig 1: Examining 'Acanthes' in raking light in the conservation studio (© Mark Niedermann)



Fig 2: The conservators Stephan Lohrengel and Markus Gross working on the edges of the cut-out (© Andri Pol)

# Program



## Morning session

### 09:00 – 10:20 Full lectures

- > Robert Fuchs (DE): *Conservation of the burnt archive of Tucher family: Techniques of humidification and flattening of gelatinated hard parchments* p 43
- > Andrea Giovannini (CH): *Antiphonarium Bernensis – cum glossa: Conservation as an opportunity for research* p 44
- > Andrea Pataki-Hundt et al. and Karin Eckstein (DE): *Mokvi Gospel: Consolidation of miniatures on gold / Brush Work: Examples of paint layer consolidation* p 45 and p 46
- > Katherine Beaty (USA): *'Tackets, overbands, and buckles': Survey and stabilization of tacketed account books of the Medici family* p 47

### 10:20 – 11:00 Coffee break

### 11:00 – 12:20 Full lectures

- > Art Proaño Gaibor de Vries and Birgit Reissland et al. (NL): *A novel in-situ sampling technique: Identification of inks and other media* p 48
- > Chiara Palandri et al. (IT, NO): *An integrated non-invasive spectroscopy study: Modern inks and papers from the manuscript collection of The National Library of Norway* p 49
- > Sarah Fiddymment et al. (UK, USA, IE, DK): *Illuminating the hidden secrets of parchment: Application of non-invasive biomolecular techniques* p 50
- > Magdalena Grenda (PL): *Conservation treatment solutions for historic herbaria of Michal Fedorowski: Modern analytical techniques and dessicated plant material* p 51

### 12:20 – 13:30 Lunch break

## Afternoon session

### 13:30 – 14:50 Full lectures

- > Nicholas Pickwood (UK): *Coming to terms: Guidelines for the description of historical bookbindings* p 52
- > Aurelie Martin (UK): *The Ligatus Decorated Paper Project: A new digital tool to identify and record decorated papers* p 53
- > Claudia Benvestito (IT): *Scaleboards or not: Wooden board permanence in Italian bookbinding* p 54
- > Élodie Lévêque et al. (FR): *Digitization versus conservation: Outcomes of the Clairvaux Abbey digital library project at Montpellier University* p 55

### 14:50 – 15:30 Short lectures

- > Maren Dümmler (DE): *White seals: Degradation phenomena and conservation* p 56
- > Paola Fagnola et al. (IT, UK): *Creating tomorrow's past: A new approach and a proposal for rebinding ancient books* p 57
- > Elzbieta Gorska-Wiklo (UK): *Ethical challenges in conservation treatment: Industrial heritage archival materials* p 58
- > Gayane Eliazyan et al. (AM, DE): *Inflexible spine-plates at Armenian bindings: Are the mechanic and conservation problems answerable?* p 59
- > Konstantina Konstantinidou et al. (UK): *Treating the Audubon plates: One item, two approaches* p 60
- > Angeliki Stassinou (GR): *Archive Bindings: A neglected style of binding* p 61
- > Izabela Zajaç (PL): *Classification versus preservation: Technique, materials & conservation problems of photo albums from Polish collections* p 62

### 15:30 – 16:10 Coffee break

### 16:10 – 17:30 Full lectures

- > Roos Kliphuis et al. (NL): *Technical drawings in the Netherlands: An overview* p 63
- > Tessa Rietveld and Monica Marchesi (NL): *To hang or not to hang? The conservation history of the poster collection of the Stedelijk Museum Amsterdam* p 64
- > Istvan Kecskeméti and Johanna Fries-Markiewicz (FI, SW): *200 years of separation: A comparison between archival collections with the same origin in Finland and Sweden* p 65
- > Marie A. Nielen and Agnès Prévost (FR): *Discoveries on Merovingian sealed parchments: Contribution of multidisciplinary for heritage preservation* p 66

### 19:30 Evening program

#### Lecture and historic recordings of conservation ateliers of famous Berlin museums before WW II.

Historisches Museum, Zeughauskino (cinema), Unter den Linden 2





R. Fuchs\*

# Conservation of the burnt archive of Tucher family

## Techniques of humidification and flattening of gelatinated hard parchments



The patrician family Tucher was of great influence in late mediaeval and early modern Nürnberg. Throughout the centuries the Tucher family has continuously owned a great archive of documents and precious cultural legacies. During World War II the most precious documents were stored in a safe in their city palace in Nürnberg. This building was destroyed during the bombardment of the city on the second of January 1945. It is reported that the safe became red-hot from the heat so that the fire brigade sprinkled water over it to cool it down and take the contents out. When the hot steam penetrated into the safe it provoked the enveloped parchment documents to shrink so that they agglomerated to a clump a quarter of the original size and formed a very hard mass which could not be opened without serious losses of material (Fig 1).

These recovered document lumps were stored on permanent loan from the family foundation untouched in the city archive of Nürnberg. Nobody wanted to do the delicate conservation. In a project with students we

succeeded to develop an appropriate method to restore the flexibility of the parchment and open the folded and conglutinated mass. One of the most spectacular of the recovered documents is the doctoral diploma of Sixtus Tucher executed in Bologna. Even if it has shrunk to one quarter of its original size, the now flattened document still demonstrates the splendour of university documents from 15<sup>th</sup>-century Bologna (Fig 2).

The paper will present different techniques of humidification and flattening of gelatinated hard parchments. Various methods of flattening will be shown. The results can convince many doubts of archivists who have resigned because of the seemingly unsolvable problems of stiff parchment lumps.

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Fig 1: Doctoral diploma for Sixtus Tucher 1485, before conservation  
(© Robert Fuchs)



Fig 2: Doctoral diploma for Sixtus Tucher, after conservation  
(© Robert Fuchs)

A. Giovannini\*

# Antiphonarium Bernensis – cum glossa

## Conservation as an opportunity for research



The Berne Antiphonaries, which date from about 1485-1490, were made for the chapter of the collegiate church of St Vincent by two renowned scribes and illuminators, one of whom is even known by name. Today, two of the six volumes are kept in Vevey, the remaining four in Estavayer-le-Lac.

During the recent conservation of the two Vevey volumes, close investigation by binocular loupe made it possible to identify the details of the work processes in the Berne scriptorium, based on minimal local overlaps between the layers of the ruling, text, decoration and music notes (Figs 1 and 2). This reconstruction sheds new light on the complexity of the work that went on inside the scriptorium, about which little has been known to date.

A conservator who applies his knowledge and his tools in codicological research is in a uniquely privileged position for uncovering new knowledge about an object. Such opportunities should not be missed. What are the motives for conservators to engage in this kind of research process?

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Fig 1: The broad ink lines of the initial and the red lines of the staff superimpose the fine ink lines and coloured washes of the illumination, indicating that they were applied in a later phase of production (© Giovannini)



Fig 2: The red rubric is superimposed on the ink lines of the caricature within the initial. It was therefore added at a later stage of manufacture. Vol. 1346 et seq. 413 (© Giovannini)

# Mokvi Gospel

## Consolidation of miniatures on gold



The 'Mokvi Gospel' (ca.1300) is stored at the National Centre of Manuscripts in Tbilisi, Georgia. The parchment manuscript is adorned with canon tables, headpieces, initial letters and 157 illuminations. Because of its high value it is incorporated in the 'Memory of the World Programme' by UNESCO.

All miniatures are painted on polished gilding. This results in heavy flaking of the paint layers as well as of the gilding. The adhesion power between paint layer and polished gold is poor and is unique in the tradition of illuminations. A continuous loss of original material can be observed throughout the years (Figs 1 and 2).

In October 2011 an international group of experts investigated the condition of the manuscript and developed a rescue programme. 73.2% of the illuminations urgently needed consolidation. In 2013 all miniatures were consolidated with sturgeon glue and polyvinyl alcohol (PVOH). The latter synthetic adhesive was applied for detached paint layers when the sturgeon glue did not develop a sufficient adhesive power. PVOH is a known

adhesive in objects conservation and rather seldom used for pigment consolidation in manuscripts. The application was done with either brushes or aerosols. Within another part of the project the common medieval pigments were detected by SEM. ELISA analysis was performed for the identification of the binding media. Small samples could be taken because of the overall flaking.

The analysis identified a natural gum as historic binding media. This is one reason for the extreme flaking, another is the gold-leaf layer, which impedes adhesion. The analysis of binding media in medieval manuscripts is challenging and needs highly specific scientific resources.

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Fig 1: Before consolidation, Mokvi Gospel, page 268r  
(© Pataki-Hundt)



Fig 2: Before consolidation, Mokvi Gospel, page 50r  
(© National Centre of Manuscripts)



K. Eckstein\*

## Brush work

Examples of paint layer consolidation



In recent years the work of the Institut für Bestandserhaltung und Restaurierung (IBR) of the Bavarian State Library in Munich is largely determined by exhibitions and loan requests and in particular by digitization projects. Of the 97,000 manuscripts in the library collection, illuminated objects are often requested. Unfortunately, unstable areas in the paint layers that require stabilization were detected consistently during the mandatory condition report (Figs 1 and 2).

The lecture will focus on the consolidation of paint layers with isinglass in different cases. The handling of treasure bindings during consolidation is considered as well as the work on oversized objects. In the latter case it deals with the conservation of a magnificent manuscript (1557-1559), which was prepared for the private use of Albrecht V., Duke of Bavaria, the founder of the Bavarian State Library. The music of the Flemish composer Cipriano de Rore was illuminated on 82 pages by the painter at court Hans Mielich, who was considered an excellent portraitist and master in miniature painting as well as in

large format panel painting. Together with the Flemish humanist Samuel Quiccheberg he created an amazing iconography for this manuscript.

Due to its size (H. 62, W. 45 cm) and weight, as well as its fragility this highlight of Renaissance miniature painting is difficult to handle and needs well-adapted equipment during consolidation.

In this case the consolidation and subsequent digitization represent the first steps in a research project on a European level on this and two other manuscripts, the penitential psalms of Orlando di Lasso, illuminated by Mielich according to the same formal principles.

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Fig 1: Paint layer with severe flaking, detail. Munich, Bavarian State Library, Mus.ms. B, fol. 9 recto (© Bavarian State Library Munich)

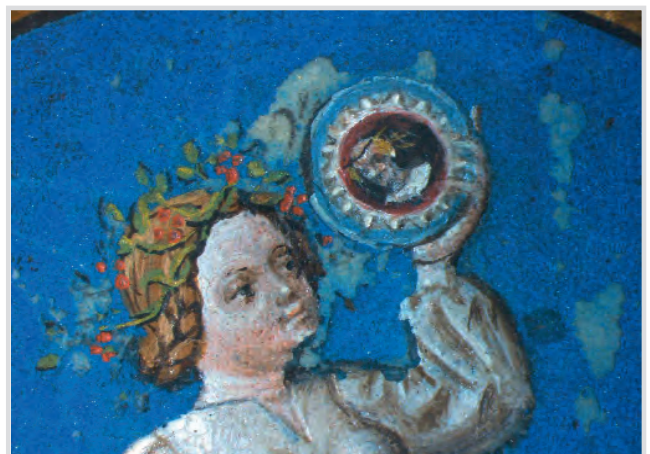


Fig 2: Paint layer with severe flaking, detail. Munich, Bavarian State Library, Cgm 7269, fol. 16 recto (© Bavarian State Library Munich)

K. Beaty\*

## 'Tackets, overbands, and buckles'

Survey and stabilization of tacketed account books of the Medici family



The Harvard Business School's Baker Library houses 145 account books and day books recording the business activities of several generations of the Medici Family dating from 1406 to 1597. Combining survey and treatment, this project sought to record unique binding features and to stabilize vulnerable elements of the binding.

The survey documented structural features, such as information about overbands, lacing patterns, spine and endband tackets, and fastenings (Fig 1). Illustrating trends of 15<sup>th</sup>-16<sup>th</sup> century Italian tacketed bindings, the survey also shed light on unexpected binding variations. With the help of the survey, unique features that could have been easily over-looked were noted (Fig 2), which stressed the importance of a thoughtful approach and minimally invasive repairs.

Ultimately, conservation treatment aimed to stabilize vulnerable elements, while preserving historical binding evidence. Most bindings had broken alum tawed spine tackets and overband lacings, which if handled could be further damaged or lost. Repairing broken tackets and lacings preserved the lacing design and restored the

structure. Additionally, many parchment covers were severely damaged by rodents, resulting in large losses that left the textblock vulnerable to soiling and wear. One challenge was filling losses to the cover without disturbing evidence of manufacture. 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.

This paper will share survey results, explain the conservation project methodology, and describe several repair techniques for tacketed bindings.

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Fig 1: Early 16<sup>th</sup> century Italian account book with fore-edge flap, buckle and leather strap extending from center overband. Left cover, spine. Medici 544 v.1 (© K. Beaty)



Fig 2: Covers are inscribed with ownership marks and indexing letters. Center overband and iron buckle. Medici 544 v.1 detail (© K. Beaty)

# A novel in-situ sampling technique

## Identification of inks and other media



Identification of inks is a key priority for addressing questions of dating, attribution, and studio practices of drawing techniques. Also, it is essential to predict risks like ink fading, colour changes or ink corrosion. Until now, ink analysis is limited to determine the inorganic part of inks with microchemical tests, or X-ray fluorescence spectroscopy (XRF). This only allows a rough estimation of the nature of the ink: presence of iron indicates an iron-gall ink, presence of chrome a chrome-logwood ink. The organic part of inks remains undetermined. In addition, coloured inks made of natural or synthetic dyes can not be identified, because an appropriate micro-sampling technique is lacking, as is an analytical technique, sensitive and reproducible enough to analyse micro-size samples.

Therefore, a new technique has been developed which significantly improves the sampling of original inks. By gently rubbing a pointed, fine grained, inert, magnesium-oxide rod onto an ink surface, a minute ink sample is obtained. The sampling area is visible only under magnification if at all. The test is immediate, cheap and easy to carry out in situ (Fig 1).

Taken ink samples can be examined first with XRF and Raman spectrometry, before destructive analysis is performed. Subsequently, the sample is dissolved with a two-step extraction method and analysed with ultra-performance liquid chromatography (UPLC) attached to a photodiode array detector. The sample is compared to our reference library of late 19<sup>th</sup> century synthetic

components, and natural organic colourants. In addition, self made reference inks, and 50 historic inks from ink bottles dating between 1850 and 1950 from different countries (Fig 2) have been analysed.

The analyses have shown that historic inks from bottles often contain synthetic dyes. Studies on original manuscripts prove that the new sampling method is very easy to use. The taken sample is large enough to be analysed and gives reliable results. It is even possible to identify traces of faded inks, and to determine the colourants used in the paper-making process (Fig 1).

The developed techniques were used to study drawings and letters of Vincent van Gogh. Since the sampling technique is easy to apply, conservators can take samples of inks, but also of other media like water colour, wax crayon, pastel, ball points etc. and send them to specialized laboratories for identification. This will usher in a new era of investigating the origin and history of master drawings, medieval illuminations, art on paper, and documents.

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Fig 1: Sampling of a document from 1869. Red ink contains cochénille, the blue paper is dyed with indigo (© Birgit Reissland)



Fig 2: Some historic ink bottles of the Cultural Heritage Agency of The Netherlands (© Birgit Reissland)



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## An integrated non-invasive spectroscopy study

Modern inks and papers from the manuscript collection of The National Library of Norway



The National Library of Norway (NB) takes care of an extensive collection of manuscripts by major authors in the Norwegian language. Iron-gall inks, which constituted the standard writing and drawing ink in Europe prior to 1850, have been extensively studied both in terms of their chemical composition, chemical instability and degradation. From 1850 onwards, the production and use of inks dramatically changed with the introduction of new ink formulas, a variety of additives and aniline colours. A similar change affected the production of paper, which was mass produced using new chemical methods.

All these changes are reflected in the papers and inks kept in the Manuscript Collection of the NB (Fig 1). The variety is enormous and in many cases can be followed in the oeuvre of a specific author. Present are metal-containing inks, which at times might damage the paper they are written on, blue ball-point oil-based inks on very thin paper, etc. Letters, memoirs or major works can be written on strong, hand-made and expensive paper or on machine made, short fibred paper, which was made cheap and would not preserve its colour, flexibility and resistance to damage.

This research is aimed at providing an insight into the material composition of different modern inks and papers from the collections of NB. Manuscripts were selected spanning from 1850 to 1950, with multiple samples at 10 year intervals.



Fig 1: Letters from the Manuscript Collection of the National Library of Norway (© Chiara Palandri)

Preliminary analysis on samples is being performed at the NB using a commercial multispectral scanning device in order to assess and document fluorescence and reflectance properties of the inks and papers (Fig 2). Elemental and molecular characterization of samples using X-ray fluorescence and Raman spectroscopy will be performed at the Physics Dept. of Politecnico di Milano within the LaserLab Europe project. In parallel, time-resolved optical fluorescence measurements will provide valuable information on the presence of additives, previous conservation treatments or oxidation phenomena. The research will provide a first step for selecting useful parameters for the differentiation and identification of inks and papers from the industrial era, which will be valuable for documents dating and preservation of the collections of the National Library of Norway.

The present research has received funding from LASERLAB-EUROPE (grant agreement no. 284464, EC's Seventh Framework Program).

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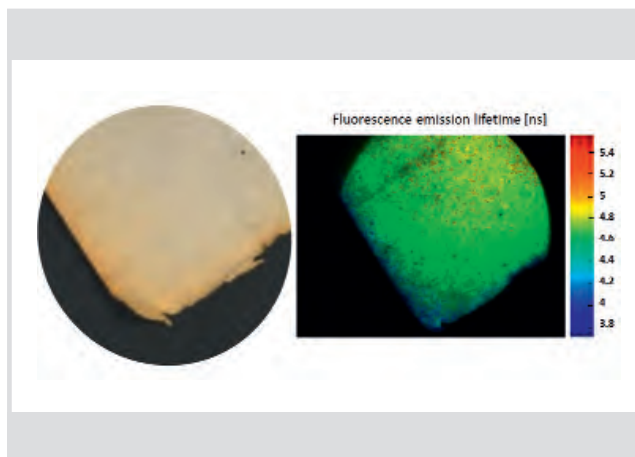


Fig 2: Fluorescence lifetime map of a paper surface, suggesting that novel short-life fluorophores have developed followed by paper yellowing, Sample: Eiker, 1809-11, NB Norway (© Daniela Comelli)

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## Illuminating the hidden secrets of parchment

Application of non-invasive biomolecular techniques

The potential information to be obtained from the large corpus of codices and documents written on parchment is immense. Aside from the obvious textual information, there is a wealth of biomolecular information trapped in the fibres of the parchment itself (Fig 1). By analysing the collagen molecules that form the basic structure of skin we can determine what animal was used to make the parchment and even assess its quality by specifically measuring the deamidation of certain residues in the molecule.

In collaboration with conservation staff at the Borthwick Institute for Archives at the University of York, we have developed a non-invasive method for sampling parchment (Fig 2). Using conventional conservation erasers we are now able to 'dry sample' parchment in libraries and archives using a non-invasive procedure that requires no specialist training. From the eraser waste collected we are able to extract minute amounts of collagen that are sufficient to be analysed by mass spectrometry. We are not only able to determine the species of animal used but also the level of deamidation present in collagen molecules. This allows us to estimate the level of damage present in the parchment, likely due to the liming process, which could prove useful when deciding what conservation treatments to implement.

A wealth of untapped information remains locked in libraries and archives and we believe that with our non-invasive sampling method we are a step closer to unlocking all that information. Benefitting the humanities, the scientific community and conservators all in one stroke, never has such a wealth of information been obtainable from such a small amount of waste.

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<sup>9</sup> Royal Library of Copenhagen, DK



Fig 1: Legal documents are both – a textual and a biomolecular archive  
(© Norfolk Record Office)

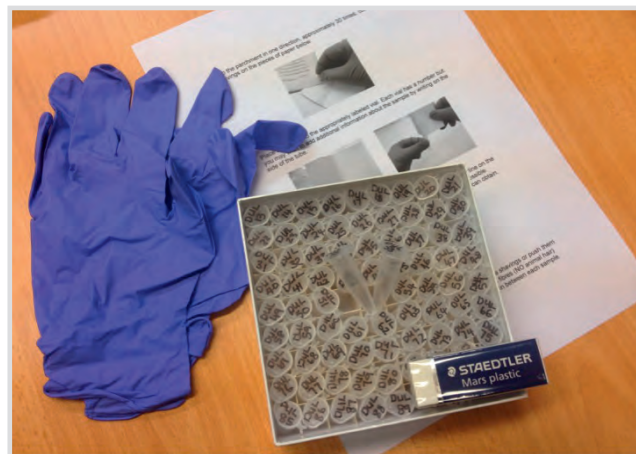
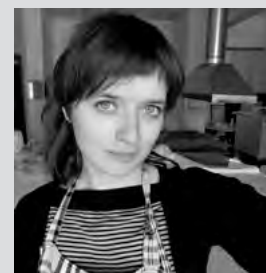


Fig 2: Sampling kit (© Sarah Fiddymment)

M. Grenda\*

# Conservation treatment solutions for historic herbaria of Michal Fedorowski

Modern analytical techniques and dessicated plant material



This paper presents the problems concerning the conservation of historic herbaria of Michal Fedorowski, dating from the 1890's. The herbaria are compiled in albums and comprise dessicated plant specimens mounted onto the paper support. The presence of dessicated plant material within paper pages poses a set of specific problems when it comes to the conservation, storage and handling of the items due to the different properties of dried plant specimens and the paper itself.

The objects were subjected to treatment because they were to be used by ethnobotanists and researchers. Therefore they were supposed to be brought back into the public after several years of oblivion.

The items were analysed by a X-Ray Fluorescence (XRF) scanner to investigate if they had been contaminated with pesticides used as a means of preventive treatment. The XRF scanner enables not only an identification of elements but also provides information about the distribution, which can be helpful when assessing health and safety risks for the conservation treatment (Figs 1 and 2). Microfading tests were also carried out to

estimate the vulnerability of the herbaria to light exposure and to compare the lightfastness of the paper and dessicated plants. Microfading enabled an individual assessment of the risk of colour fading.

The XRF scanning and microfading tests set up a methodology of safe and precise identification of possible hazards and sensitivity to light exposure. The following conservation treatment concerned dry cleaning, securing loose plant material, infilling and mending tears in the paper support, resewing and making individually designed boxes to safely store the albums.

The project was carried out thanks to the Polish Ministry of Culture and National Heritage, as a part of the Creativity Promotion Fund Scholarship.

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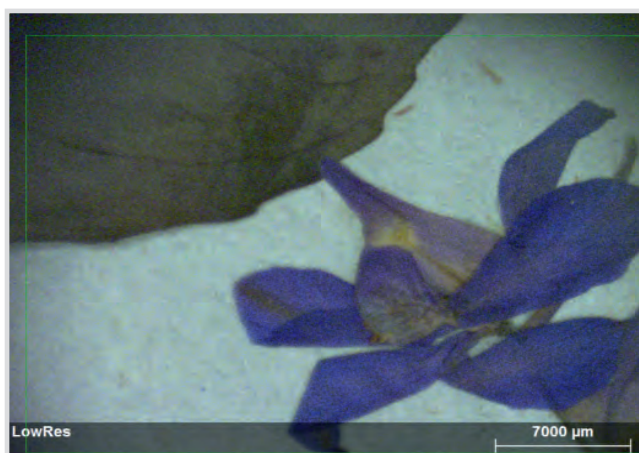


Fig 1: Scan from Macro-XRF M6 JetStream (Bruker) (© Piotr Targowski)

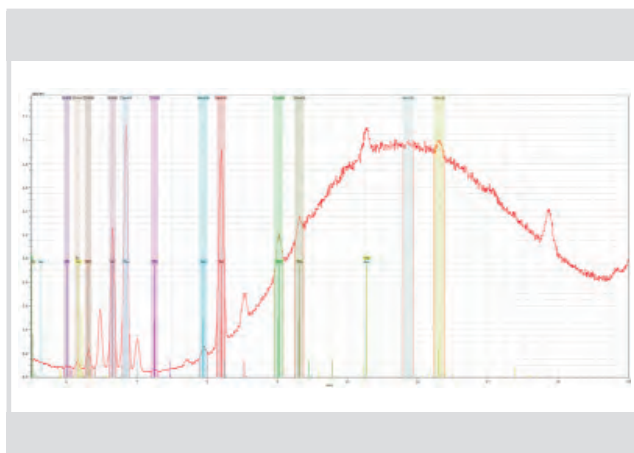


Fig 2: The X-Ray Fluorescence scanning proved the absence of mercuric chloride and arsenic in the herbarium. Identification of elements from MacroXRF M6 JetStream (© Piotr Targowski)



N. Pickwood\*

# Coming to terms

## Guidelines for the description of historical bookbindings



The need to describe bindings is common to many who work with early books, for catalogue entries, descriptions of books in academic research, booksellers' catalogues and, above all, for conservators who need to record the bindings on books that are about to be repaired, where a detailed record of books in their original, albeit damaged, state will be the only record of what may be lost in the process of repair.

For such descriptions to be of more than local interest, the process of description needs to be formalized and ordered to allow consistent records to be made that can be compared directly one with another at an appropriate level of detail. A common language is a first requirement, which the Ligatus Research Centre has addressed with its thesaurus of terms, the Language of Binding, all the terms in which are used in the forthcoming guidebook: '*Coming to Terms: guidelines of the description of historical bookbindings*', to be published by the end of 2015 and which this paper will introduce and describe.

Compiled with input from an advisory panel chosen from the international team working on the Language of Binding project, it attempts to explain the processes, both practical and theoretical, by which accurate and consistent descriptions can be made, based on a methodology developed over many years, but especially on the surveys carried out in the monastery of Saint Catherine on Mount Sinai, but here expanded to include the types of binding made across Europe up to the early nineteenth century. An example is shown in Figs 1 and 2.

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Fig 1: The exterior (left) and interior (right) of the laced-case on a copy of '*Pandectarvm ivris civilis pars quinta: quae de testamentis appellatur*', Lyon: Apud Gulielmum Rouillium, 1550 (© Nicholas Pickwood)

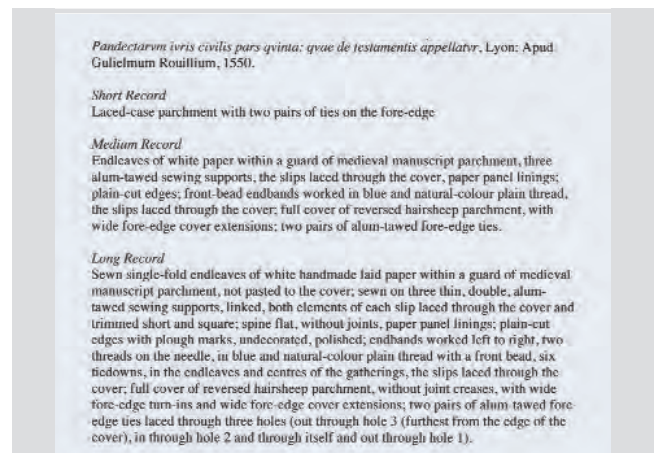


Fig 2: Descriptions of the binding at three levels of detail (from: Nicholas Pickwood, '*Coming to Terms: guidelines for the description of historical bookbindings*', forthcoming)

A. Martin\*

# The Ligatus Decorated Paper Project

A new digital tool to identify and record decorated papers



Decorated papers constitute material evidence that can provide valuable information for the history of the book, its provenance, and chronology, which are important to record. However, anyone willing to describe a paper will need to rely on written descriptions or attempt to describe it themselves, which often requires time and a certain level of expertise (Fig 1).

This observation has led the Ligatus Research Centre, in collaboration with specialists in the field, to develop a new digital tool for identifying and recording decorated papers. The project aims to compile a database of described and photographed papers in order to provide a reference collection and a tool to assist any user (expert or non-specialist) in the identification and recording of decorated papers. Each paper will be attributed a reference number in the database and users can simply refer in their record to the number of the paper having the closest appearance to that of the observed paper (Fig 2).

To allow categorisation and keyword searching, the images are accompanied by terms. The terminology, which forms part of a larger thesaurus of bookbinding

terms, is founded on the existing literature and organised according to the SKOS standard, so the project's output can easily be shared.

Once set up, this resource will be open to submissions from its user-group of both pictures and bibliographical information, thus expanding the range and specificity of the examples held in the database. Our intention is to collect as many pictures and bibliographical references as possible and therefore create a comprehensive and versatile tool with potential material for research in paper history.

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Fig 1: 'Marbled paper, Tree-root pattern': imprecise description. 'Marbled' is usually used to describe Figs 1 and 2, although two different techniques were used for their manufacture (© A. Martin)

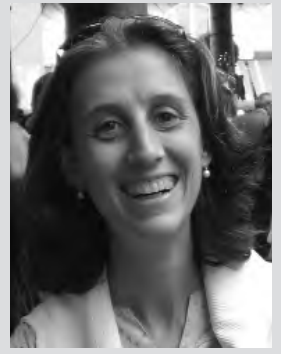


Fig 2: 'Marbled paper', unnamed pattern: identified in the database by its technique of manufacture ('trough-marbling') and its URI to which users can refer directly without lengthy descriptions (© A. Martin)

C. Benvestito\*

# Scaleboards or not

## Wooden board permanence in Italian bookbinding



The widespread use of wooden boards is an acknowledged feature in medieval bookbinding (Fig 1). Less investigated is its permanence throughout the printing press era when pulpboard is thought to have become a substitute for wood. Recently, the use of very thin wooden boards, known as scaleboards, has been identified as an American Colonial bookbinding custom.

According to a general definition, sometimes the only way to identify scaleboards with certainty is to be able to see through the cover if damaged (Fig 2), because their thickness is comparable with cardboard (1-3mm). On the other hand, the manufacturing technique, implying fast and economical measures, should be taken into account. But it is quite hard to distinguish whether a board has been planed or split or both, even when bare or plainly visible.

Currently more than 200 wooden board bindings from the 15<sup>th</sup> to the end of the 18<sup>th</sup> century have been detected at Biblioteca Marciana in Venice. A substantial number of these books are strongly bonded with the city,

being Venetian imprints or very typical manuscripts such as Mariegole, Commissioni Dogali, and music books. Greek books printed in Venice are significantly represented too.

Boards of every thickness have been included in the study, with a particular overview on thinner scaleboards, showing the constant presence of wooden boards and the progressive thickness decrease from the medieval to modern times. A reliable relationship between the choice of wooden board and bookbinding structure including changes in sewing, board connection, covering, and finishing has been worked out to identify how and why this material has been used continuously over time.

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Fig 1: Medieval wooden board binding (© Biblioteca Nazionale Marciana)



Fig 2: Plain paper over wooden board (© Biblioteca Nazionale Marciana)



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# Digitization versus conservation

Outcomes of the Clairvaux abbey digital library project at Montpellier University



Montpellier University Library's heritage collections consist of about 800 manuscripts, 85,000 early printed books and 7,000 prints and drawings. The Library's conservation team (3 conservators) recently started working closely with the internal digitization team (3 technicians) on various large-scale projects.

In 2013-2014, our conservation and digitization departments were involved in the Clairvaux Abbey virtual library project initiated by the Médiathèque du Grand Troyes. The aim of this very challenging project was to make available online images of all the remaining Clairvaux manuscripts (UNESCO *'Memory of the World'*). Most of the manuscripts – more than 1,000 – are held by the Troyes Public Library and 70 out of the remaining 98 manuscripts spread throughout Europe are held in Montpellier.

The risk of damage that the digitization process can cause to fragile medieval items, the short timeframe allowed, and the high quantity of precious documents which must be handled required rigorous conservation planning and a new custom-made assessment system. To

prioritise and optimise our treatments and meet deadlines, a treatment classification was defined in accordance with:

- the type of bindings
- their physical state
- the presence of illuminations
- the book's opening

This new approach was rather satisfying, both in terms of lowering the risk of damage from digitization and making rational decisions, including the use of minimal treatment procedures (Figs 1 and 2). As a pilot, the Clairvaux Abbey digitization project was an opportunity to improve how we deal with future projects of an equivalent scale and complexity in the library.

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Fig 1: Fold in the parchment and pigment loss preventing digitization (© BIU Montpellier)



Fig 2: Pigment consolidation to lower the risk of damage during the digitization process (© BIU Montpellier)

# White seals

## Degradation phenomena and conservation



The damage and treatment of a specific group of medieval wax seals, known as '*Blättereig-Siegel*' ('puffpaste' seals, white seals), was the subject of my Master's thesis. The sealing wax splits off in small layers parallel to the surface. If the flaking damage is very advanced, the seal could disintegrate completely with the slightest pressure put on it. The current theories on the origin of the damage were not satisfactory. An extensive literature study was the basis for further scientific research (Scanning Electron Microscopy, Infra Red Spectroscopy and Gas Chromatography by Doerner Institute Munich). The poor mechanical properties are caused by a change of composition. The quantity of alkanes with a low melting point and wax esters significantly decreased in the wax. These low molecular weight components function as plasticizer.

Based on the results, different tests with consolidating compounds were carried out. The main problem was to find an application method and a consolidant which completely would penetrate the fragile texture. If not, a hard shell would form on the outer face, which would produce a predetermined breaking point to the brittle, flaky interior.

Because wax has no sufficient capillary effect to obtain this result, consolidation by means of underpressure has been successfully tested.

Results from different test series have shown that Aquazol 200, a high-performance water-soluble polymer (Polymer Chemistry Innovations), is a suitable consolidant. The small molecules penetrate well into and between the wax lamella. It can be dissolved in water or alcohol and has comparable thermoplastic properties to wax. Therefore, it renders consolidation possible, as well as cleaning and fusing of wax to protect spoiled edges.

The newly developed consolidation technique has been successfully tested on some white seals of the Landeshauptarchiv Koblenz (LHAK) (Figs 1 and 2). The long-term stability was tested on test samples with artificial ageing (4 weeks, 30°C, RH changing from 30 to 85%, intervals of 1.5h). No optical changes occurred, mechanical tests were not carried out.

Further investigation into the development of suitable treatment equipment for seals is planned.

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Fig 1: White seal before treatment. Inv.No. 1A 4987, LHAK (© Maren Dümmler)

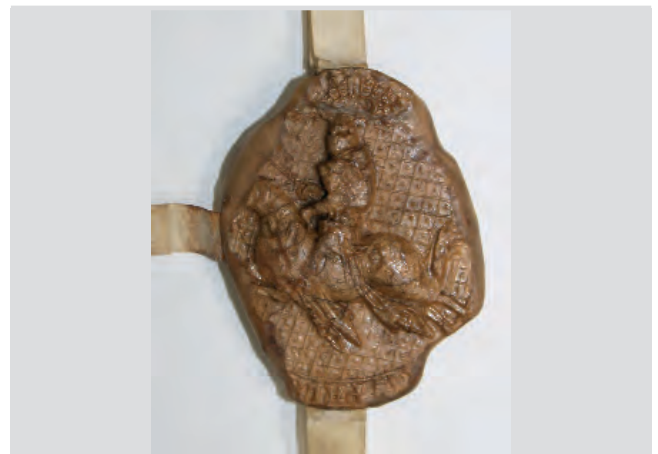
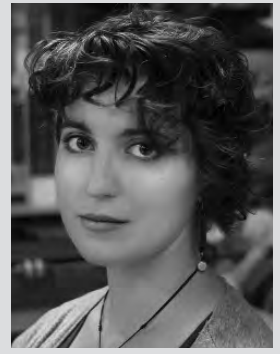


Fig 2: White seal, dated A.D. 1339, after conservation. The original image locally is lost. Inv.No. 1A 4987, LHAK (© Maren Dümmler)

# Creating tomorrow's past

A new approach and a proposal for rebinding ancient books



Current book conservation tends to favour the conservation of the original cover and treatments that avoid dismantling the book structure. In case of incomplete or missing covers, however, it is often necessary to insert new elements on the original ones or a rebinding intervention.

Every age has found different solutions, even opposites to one another: nowadays, while conceiving a new cover, original binding residues are taken into consideration, or elements that are coeval with the print date. Private collectors also ask for historical fine bindings, or design bindings structurally different from the original.

'Tomorrow's Past', an international group of bookbinders and book conservators, propose contemporary design binding made to be in harmony with the ancient, according to a manifesto and specific ethic principles. This is expressed through an approach innovative for the book field, answering the question 'What should a new cover on an ancient book be like?'

In this presentation Tomorrow's Past's method will be explained, underlining its accordance with current conservation theory, its applicability as a practice in book conservation, the difficulties that can occur and the comparisons with other current approaches (Figs 1 and 2). The aim is to propose Tomorrow's Past's work as a valid alternative that can combine preservation and enhancement of book heritage, which can be applied in conservation treatments that involves rebinding or filling losses in the original book cover.

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Fig 1: The cover of Sacred Dramas, Hannah More (c. 1818), before treatment (© Kathy Abbott)



Fig 2: The binding of Sacred Dramas, Hannah More (c. 1818), made in 2013 following Tomorrow's Past manifesto (© Kathy Abbott)



E. Gorska-Wiklo\*

# Ethical challenges in conservation treatment

Industrial heritage archival materials



This paper focuses on the issues associated with ethical challenges in the conservation treatment of industrial heritage archival materials and importance of ethics in the decisions a conservator makes when choosing a suitable treatment.

The focus is on the preservation and conservation treatment of the 19<sup>th</sup> century ship plans constructed by William Simons & Co in Greenock, Inverclyde, Scotland (Fig 1). This collection consists of 680 plans of 156 vessels built from 1820 until 1926.

The collection provides over 85% of the total of pre-1870 ship plans held by the University of Glasgow Archives Service. The national importance of these plans draws from the significance of blockade running to the Clydeside, economy throughout the American Civil War (1861-1865).

Shipbuilders based on the Clyde built a great many of the ships that ran the blockade. This project is to ensure the ongoing preservation of these plans, allowing researchers to access information on the full extent of the Clyde's ship-building industry in the nineteenth century.

As the industrial heritage ship plans were working documents, and as such were made with so-called 'ready-use' elements. Due to their past storage and handling, a process of minimum intervention is necessary in the conservation program to respect the ship plan's authenticity and protect their historic substance (Fig 2).

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Fig 1: The William Simons Ship Plans stored in Glasgow University Archive Services repository at the beginning of the preservation project (© E. Gorska-Wiklo)



Fig 2: Two plans of the paddle steamer 'Will o the Wisp' built by William Simons & Co Ltd in 1863 (UGD 114/117/3 and UGD114/117/1) on the PlanoLux™ Conservation Light Wall (© E.Gorska-Wiklo)

# Inflexible spine-plates at Armenian bindings

Are the mechanic and conservation problems answerable?



Since 2001 we have been working with the Conservation Department of the Institute for Ancient Manuscripts, Matenadaran (Yerevan/Armenia) on the maintenance and repair of metal fittings on the covers of medieval Armenian manuscripts. Objects which are equipped with three- or four-sided, hinge-jointed silver plates are a specific group that required attention. In case of inflexible rounded spine-plates, the appropriate opening of those books is extremely affected. This is caused due to partially damaged metal spine-plates or the adjoining silver-plates on the cover.

The basic evil, caused by silversmiths' ignorance of mechanical laws concerning the hinges between covers and spine, is progressive (Figs 1 and 2). Either with or without conservation efforts, we are confronted with a double-bind dilemma. The opening of such a book is severely restricted. Each trial will deteriorate either the aggrieved metal fittings, the coherence and solidity of the manuscript, or both. Assuming that the object should

stay approachable for scientists, archival employees or others, it is nearly inescapable not to raise further damage.

Nevertheless, often the purchaser wants a successful reduction of visible damages. The question is, what can be done respecting contemporary conservation rules and ethics?

We will show examples of historical attempts trying to avoid these problems and some of our own efforts and approaches and explain what we learned by this.

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Fig 1: Curved spine-plate made of decorated metal, centre of upper edge partially broken. Ms. 5580 (© M. Jaschke)



Fig 2: Metal spine-plate with hinges, entirely detached from front-cover. Left edge damaged, signs of former repair measures. Ms. 7699 (© M. Jaschke)

K. Konstantinidou<sup>1</sup>, P. Räder<sup>2</sup>, S. Schwoll<sup>3</sup>

## Treating the Audubon plates

One item, two approaches



'Not only does a prescribed conservation treatment methodology not impose uniformity, it actually supports different results, appropriate to the many variables that treatments must address... the same object in different settings should receive different treatments based on the differing use and meaning...' (Barbara Applebaum, *Conservation Treatment Methodology*).

This paper will discuss the different approaches taken by conservators in two separate UK institutions, the Natural History Museum and the Royal Collection, in the treatment of John James Audubon's *The Birds of America*. The aim is to highlight some of the factors that influence decision-making in conservation, including how the use of an item within its particular holding institution contributes to the direction of conservation treatment.

The 435 hand-coloured engraved and aquatint plates of *The Birds of America* were printed between 1827 and 1838 on double elephant-folio wove paper and usually oversewn into four volumes with tight-back bindings.

The Natural History Museum acquired a set on 22 June 1885. The volumes were rebound in the 1970s. In 2010 the Library chose to disbind and keep the individual plates in sets of ten, inside purpose-made folders within a bespoke Planorama® chest of drawers (Fig 1).

The Royal Collection's copy in Windsor Castle is one of the few remaining in the hands of original subscribers. The circa 1843 bindings sustained considerable handling damage and degradation of materials over time (Fig 2). They were conserved and rebound in a new flexible style with facsimilie covers in 2011/2012.

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Fig 1: Audubon's *The Birds of America*, On display in National History Museum, London (© The Trustees of the Natural History Museum, London, 2015. All Rights Reserved)



Fig 2: Audubon's *The Birds of America*, On display in Windsor Castle during a state function (© Royal Collection Trust / © Her Majesty Queen Elizabeth II 2015)



A. Stassinou\*

# Archive bindings

A neglected style of binding



Although various types of binding structures (i.e. Romanesque, Carolingian, Byzantine bindings etc.) have been extensively described, the simple yet stable binding structures of archive bindings have been ignored by researchers in the past. Even in the cases where an archive binding is recorded in a catalogue, descriptions are focused on the context of the gathered documents, paying no attention to the binding structure and its condition. Furthermore, the once common practice of dismantling the existing binding structure for certain purposes like rebinding or digitization vanished the only evidence of archive practices in a certain era.

This paper discusses issues concerning the study and preservation of archive bindings that belong to the collections of the General State Archives of Greece, dating from the seventeenth to nineteenth centuries. The main characteristics of these plain bindings are the usually flexible covers made of paper, leather or parchment and the exposed sewing structure without any decorative elements, such as endbands or elaborated decorations (Figs 1 and 2).

Documentation of the various materials and techniques used in the bookbinding processes (e.g. type of binding, materials and technique used for sewing, covering, ties etc.) and the detailed description of their present condition have proved to be indispensable for the decision of potential conservation treatments and preservation practices. Finally, the evaluation of practical and ethical issues raised indicate the conservation treatment should be limited to minimal interventions in order to preserve the individual features of these bindings for researchers of the history of bookbinding.

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Fig 1: Archive notary binding from Naxos, end of 18<sup>th</sup> century  
(© Angeliki Stassinou)



Fig 2: Exposed sewing, Ministry of Interior, 19<sup>th</sup> century  
(© Angeliki Stassinou)

I. Zajaç\*

# Classification versus preservation

Technique, materials & conservation problems of photo albums from Polish collections



Photo albums can be found in most archives, libraries and museum collections in Poland. Still they did not get any complex study concerning the techniques, materials and conservation problems. While working on my dissertation, I conducted studies on the history of photo albums and got to know the variety of their constructions. I prepared a new classification system, dividing photo albums into a few categories based on the context, of which three will be discussed here.

The first category consists of scrapbooks, albums of tags or albums of trifles, which include unique photos taken by different authors together with watercolours, prints and drawings, for example albums by Marcin Olszyński. The second category contains author- and edited photo albums with back and white (B&W) and/or hand coloured photographs, such as albums by Felice Beato, Karol Beyer or William Fox Talbot. The third category are conventional family photo albums comprising format photographs like 'cartes de visite' or in cabinet format, in B&W and/or hand coloured, with photographs usually taken by different authors.

Mass production of classical family- and edited photo albums had a great influence on the way they were prepared, and on characteristic decay patterns. Examples shown are based on my doctor's thesis and a contemporary research project (National Science Centre, Poland; 2014/13/D/HS2/02755). I will discuss common conservation problems in context of the albums' indivisibility and integrity (Figs 1 and 2).

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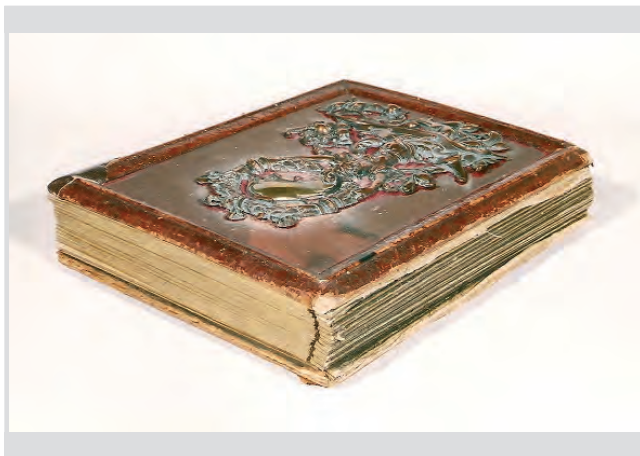


Fig 1: Classical family photo album – before treatment (© R. Stasiuk)



Fig 2: Classical family photo album – after treatment (© R. Stasiuk)

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# Technical drawings in the Netherlands

## An overview

Many cultural institutions in the Netherlands possess large quantities of technical drawings. However, frequently information about the size, techniques, value, usage and the condition of these collections is not precise, known or available. In an attempt to shed light on these ambiguities and to explore how Dutch cultural institutions are coping with implementing adequate conservation strategies, a team comprised of Dutch book and paper conservation students and junior paper conservators conducted concise research on the quantitative and qualitative aspects of technical drawings in several Dutch collections (Figs 1 and 2).

Through interviews with both conservators and curators and by paying visits to various institutions such as archives, libraries and museums the data were gathered.

The general lack of knowledge about and awareness of these collections gave rise to the idea that technical drawings are neglected parts of collections. Surprisingly, this view turned out to be far too negative. It can not be denied that the knowledge on how to handle or preserve these objects is sometimes absent or the extensive nature of most collections poses (financial or logistic) problems,

however in some cases technical drawings were considered to be treasured parts of many collections and institutions proved to be quite resourceful in an effort to document and preserve them appropriately.

By discussing the '91' status quo '92 of technical drawings in the Netherlands, this research aims at creating more awareness for this formidable but often somewhat unrecognized part of our cultural heritage, hoping to move it forward into an area of more knowledge and care.

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Fig 1: An extraordinary example of a technical drawing (© Ilse Korthagen)



Fig 2: Storage of technical drawings (© Ilse Korthagen)



# To hang or not to hang?

The conservation history of the poster collection of the Stedelijk Museum Amsterdam



The Stedelijk Museum Amsterdam has one of the main poster collections in the Netherlands, with circa 20,000 items, stored with a vertical hanging system (Fig 1). This method was used from the 1950s because of a lack of space. As a result of mechanical damage to the system, from 1960-1980 the museum reinforced the edges of all the posters with pressure-sensitive tapes as a preventive measure (Fig 2). Of a total of 20,000 posters, 52% have tape around the edges, which created massive paper damage with, in retrospect, disastrous effects. From the 1980s onwards encapsulating the posters in Melinex sleeves was introduced to prevent further physical damage, but that solution turned out to be time-consuming and costly.

In 2014 the paper conservation department assessed the materials, workflow, and manpower needed for the hanging system. The goal was to investigate if this method complies with the requirements of today's preservation standards, also taking into account the museum's current financial constraints.

The examination consisted of: sampling the condition of the posters, mapping the developments in the hanging system, interviewing past employees, researching the museum's archive over the last fifty years, and reconstructing various chemical methods (white spirit, petroleum ether) that were used as a tape-removal treatment during the mass-conservation of the 1990s. This comprehensive effort resulted in understanding the development of the hanging system together with its advantages and disadvantages, its history, and the consequences of both the tape and its removal.

This overview is a starting point in order to evaluate if the hanging system should be continued for storing a growing poster collection. The lecture will focus on the history of the hanging storage and its implications for the future.

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Fig 1: Vertical hanging system (© Tessa Rietveld)

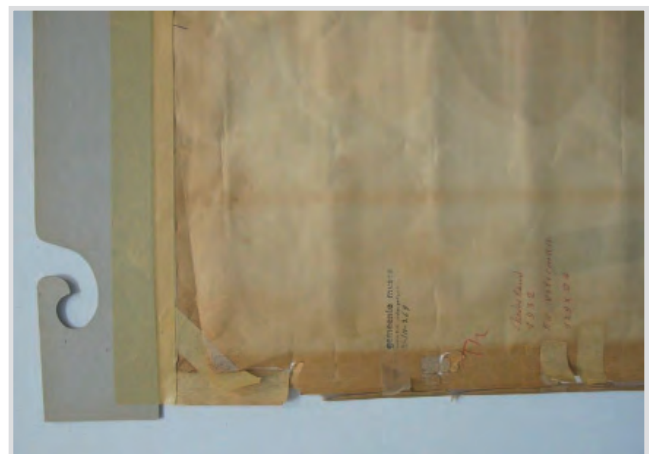


Fig 2: Verso of poster reinforced with pressure-sensitive tape before 1980 (© Tessa Rietveld)

## 200 years of separation

A comparison between archival collections with the same origin in Finland and Sweden



Three archival collections, once of the same origin, have been divided and stored in two different countries, Finland and Sweden, since the early 19<sup>th</sup> century. They have been chosen for a case study from the point of view of preservation, conservation and digitization. Once very similar, the collections are today quite different in their physical form, both when looking at the descriptions of the collections as well as in strategies of preservation. At the same time, digital reproductions could be seen as a way of uniting the collections again, bringing them back together but in another format.

Until 1809 Finland and Sweden were one country. After Sweden lost The Finnish War against Russia, Finland was an autonomous Grand Duchy of the Russian Empire. From the 16<sup>th</sup> century, King Gustav Vasa of Sweden formalised the Swedish archival tradition. State officials created archival records related to taxation, population registers and land owning. From this time and onwards, large amounts of records, both maps and written documents, were created. Until the years around 1810 most of them were kept in Stockholm, but from 1812 and onwards most of the archival records related to Finland where transported to Finland.

In this study we have chosen three different collections, comparing preservation, conservation and digitization projects done. The main subject of the presentation is how the choices made by the two institutions are visible in earlier decisions of preservation, and today's strategies concerning conservation and digitization.

The collections chosen are among the most used and of the most historical importance. The eldest series of documents, the '*fogderäkenskaper / voudintilit*' are documents created by early bailiffs between 1530's to 1630's. Due to the reformation, the covers of the bindings were often reused folios from earlier catholic manuscripts. The '*länsräkenskaper / läänintilit*' are the later series of taxation documents between 1630's-1809. The so called '*geologisk jordeböcker / maakirjakartat*' are cadastral maps, which were drawn in the 17<sup>th</sup> century.

All these collections bear a lot of visible traces from earlier history. The first significant differences after the collections were separated were caused already during the transport from Stockholm to Finland. The conditions during the wet winter in 1812 caused mould growth, which has later been treated with several conservation treatments.

The storage and use of these collections today differs also depending on the two institutions ways of dealing with large collections of cultural heritage, making them accessible to the public (Figs 1 and 2). Digitization will unite the collections again after more than 200 years of separation.

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Fig 1: Swedish collections: The earlier taxation documents '*Fogderäkenskaper*', kept their original parchment binding (© Swedish National Archives)



Fig 2: Finnish collections: '*Blue series*' taxation books '*Fogderäkenskaper*'. Once parchment bindings, they were unbound around 1840 and again in the 20<sup>th</sup> century for conservation purposes (© Finnish National Archives)

M. A. Nielen\*<sup>1</sup>, A. Prévost\*<sup>2</sup>

## Discoveries on Merovingian sealed parchments

Contribution of multidisciplinary for heritage preservation



While Merovingian sealed documents of the French National Archives (Paris) were prepared for an exhibition, 'fibres' of unknown origin were discovered inside the wax seals (Figs 1 and 2). Their presence could not be a happenstance, because the fibres were numerous and arranged in an orderly way in the wax.

This discovery was first done at the National Archives, but later also in quite different patrimonial institutions which take care of comparable artifacts. This pointed to a sigillary practice evoked in the past which had never been the object of thorough examination. A vast research project was undertaken to study parchments of the early middle ages and their sealing processes. The project has a multidisciplinary approach and includes several professions (archivists, conservators, curators, chemists), working in different institutions, all with complementary knowledge and facilities. The interpretation of the results and their valuation were shared with the public.

The first results gave the opportunity to formulate a number of hypotheses which improve our knowledge of the validation's practices of the royal diplomas from the Early Middle Ages. To date, the studies verified the existence of a specific practice in royal diplomas of the Early Middle Ages: the voluntary inclusion of human hair (the 'fibres') in their seals.

The corpuses of seals, often based on plaster moldings made during nineteenth century seem to have engendered errors of understanding and analysis. Besides being incomplete, the information provided sometimes rests on bad reconstructions of the original seals. We shall show that restorations made in the past might originate wrong conclusions and a bad understanding of Merovingian seals.

Merovingian documents and their seals still seem to have secrets to deliver to us. An accurate examination can provide information on technological as well as on diplomatic practices.

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Fig 1: Seal of Childebert III (© Archives Nationales Paris)

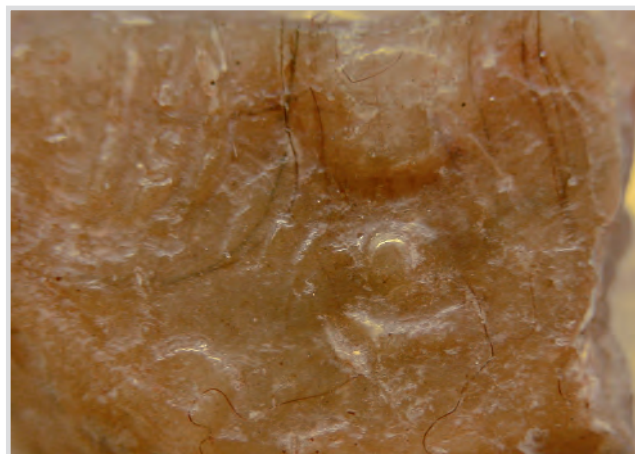
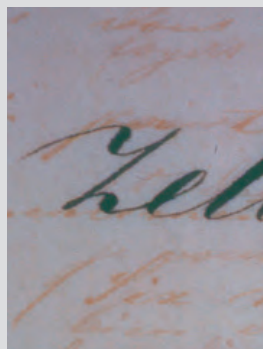
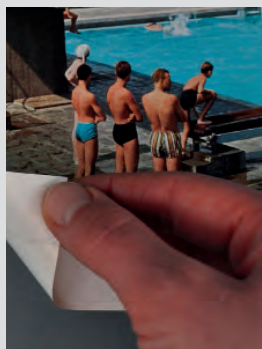
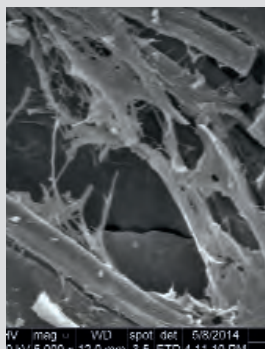


Fig 2: Detail of Chilpéric II seal, with hairs included in the wax (© Archives Nationales Paris)



# Program



## Morning session

### 08:30 – 10:30 IADA General assembly

All IADA members are invited to attend the General Assembly. The General Assembly is the opportunity to influence the strategic orientation of IADA, to elect the representatives of the board for a term of four years, to approve the budget, and to learn more about IADA's activities and members.

### 10:30 – 11:00 Coffee break

### 11:00 – 12:20 Full lectures

- > Christa Hofmann et al. (AT): *Stabilisation of verdigris: Application of research in conservation practice* p 69
- > Anna E. Bülow et al. (UK, NL): *Pride and prejudice: Developing a shared understanding of priorities* p 70
- > Bert Jacek (DE): *Soft particle blasting: A gentle dry cleaning method for sensitive surfaces* p 71
- > Jasna Malešič and Jana Kolar (SL): *Mass deacidification: Treatment of endangered books in the National and University Library of Slovenia* p 72

### 12:20 – 13:30 Lunch break

## Afternoon session

### 13:30 – 14:50 Full lectures

- > Annegret Seger and Philipp Kochendörfer (DE): *Bacterial cellulose: A new material in paper conservation* p 73
- > Takayuki Okayama et al. (JP): *A new technique for strengthening degraded paper: Application of cellulose nanofiber coating on a paper surface* p 74
- > Maroussia Duranton and Gaëlle Hennion (FR): *Application of Silicagel M®: A moistening treatment of a water-sensible starched textile and its decoration* p 75

### 14:50 – 15:30 Short lectures

- > Julia Roller (DE): *Rewin®EL and Mesitol®NBS: How to remove ionic fixatives (aqueous washing treatment aids) from paper* p 76
- > Darejan Gogashvili (GE): *The oriental collections of the Georgian National Museum: Re-housing and conservation of the miniatures, manuscripts and drawings* p 77
- > Isobel Griffin and Kenneth McMillan (UK): *Housing Library Collections: The development of a risk-based approach at the National Library of Scotland* p 78
- > Ute Henniges et al. (AT, DE): *Hydrogen peroxide bleaching of papers containing iron ions: Discussing the viability of a potentially harmful system* p 79
- > Rebecka Thalmann and Matthias Frankenstein (DE): *Moving history: Planning and realizing the move of 100km of archives* p 80
- > Marion Verborg and Pavlos Koemtzidis (DE): *How we work: The Conservation and Digitization Centre of the Historical Archive Cologne* p 81
- > Bogdan Filip Zerek et al. (PL): *Microbiological sampling of library objects: Comparison of impress, dry swab and ATP methods* p 82

### 15:30 – 16:10 Coffee break

### 16:10 – 17:30 Full lectures

- > Christina Meier-Wolff (DE): *How clean is my object? The bioluminescence measurement (ATPIAMP) – Method, practice and opportunities* p 83
- > Antje Potthast et al. (AT): *Paper and fire: How stable is cellulose after surviving a disaster?* p 84
- > Agathi Anthonou Kaminari and Athena Alexopoulou (GR): *Heinrich Schliemann's copy-books in the Gennadius Library: A non-destructive imaging documentation for assessing the condition of the archive* p 85
- > David Mills et al. (UK): *Revealing the unreadable: Using non X-ray imaging to reveal text on damaged and inaccessible manuscripts* p 86

### 17:30 – 18:00 Closing remarks



C. Hofmann\*<sup>1</sup>, A. Hartl<sup>1</sup>, K. Ahn<sup>2</sup>, K. Druceikaite<sup>2</sup>, U. Henniges<sup>2</sup>, A. Potthast<sup>2</sup>

# Stabilisation of verdigris

Application of research in conservation practice



Verdigris pigments on paper can change their colour from green to brown and degrade cellulose fibres depending on different factors.

In a project funded by the forMuse-Program of the Austrian Ministry of Science and Research chemical and mechanical methods to stabilise verdigris pigments were investigated on samples and evaluated before and after accelerated ageing. Benzotriazole (BTA), a copper complexing agent, was proven to stabilise cellulose chemically in the presence of copper ions. Regarding mechanical strengthening of the degraded paper, coated Japanese tissue papers were developed that can be reactivated with a minimum of moisture or with solvents.

The results of the project were applied in practice in the conservation of a 16<sup>th</sup> century printed book with engravings, and an 18<sup>th</sup> century atlas with celestial maps. Green coloured areas showed different stages of colour change and degradation in each of the volumes (Fig 1).

The decision-making process and the treatments chosen for the three books are described and discussed. In two cases a solution of BTA in ethanol was applied locally.

BTA has the advantage of rapid complexation and the high potential to deactivate copper ion-induced degradation. The disadvantages of BTA include a possible yellowing during light ageing and the lack of practical experience with BTA on cellulose. A copper indicator paper was adapted to monitor the complexation process. The coated tissue papers can be adjusted by using different adhesives (Fig 2). Activation with a minimum of moisture reduces the risk of copper ion migration.

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Fig 1: Andreas Cellarius, *Harmonica Macrocosmica*, 1708, detail of discoloured and degraded verdigris colouration (© Conservation Department, Austrian National Library)



Fig 2: Stabilisation of degraded areas with Japanese tissue papers (© Conservation Department, Austrian National Library)



A. E. Bülow\*<sup>1</sup>, A. W. Brokerhof<sup>2</sup>, C. Barry<sup>1</sup>, H. Chapman<sup>1</sup>

## Pride and prejudice

Developing a shared understanding of priorities



Making the best use of time has become increasingly important within the heritage sector. Prioritising objects for conservation treatment or preventive conservation remains a challenge for the conservation professional in the context of ever increasing exhibition schedules. Different risk management methodologies have been used in the field of heritage conservation for some years. However, often curators and conservators have clear but diverging ideas about priority of work based on the value of the object in one case, or the damage of the object in the other. Finding common ground based on the highest potential loss of value has been the subject of a series of stakeholder group discussions at the British Museum.

Using only elements of value and vulnerability assessment out of common risk management methodologies, curators were asked to assess the value of their collection in a first step. In a second step, these assessments and the

vulnerability of objects were discussed with colleagues from science and conservation. As a result, a visual map of priorities emerged, which had buy-in from all sides, and which formed the basis of a future work plan.

This method has helped to develop a shared understanding of priorities amongst different heritage professionals, and dealt effectively with prioritising objects based on potential loss of value objects and perceived risks.

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B. Jacek\*

## Soft particle blasting

A gentle dry cleaning method for sensitive surfaces



For dry cleaning of paper, parchment, leather and seals, many conservators use different types of rubbers and soft brushes, which have significant drawbacks. The rubbers contain sulphuric compounds and plasticizers. The intensive treatment of dirty surfaces can change their texture. Brushes can remove a lot of dust, but some part of the dust particles and mould spores will be rubbed into the surface.

A new method provides a solution to those problems: The 'soft particle blasting' with different types and derivatives of cellulose and starch powder. These materials are chemically stable, inert and harmless. Fortunately, the blasting agents have a variety of structural properties, making it possible to select suitable types of agents for specific cleaning problems.

With this method one can work very gently and effectively on sensitive prints (lithographics, digital prints), photographs, drawings, moulded papers, parchments and fragile seals (Fig 1). The last step is to simply remove the soft particles with an airbrush.

For three years many students and a number of conservators made experiments and used this technique for many different objects with convincing results (Fig 2).

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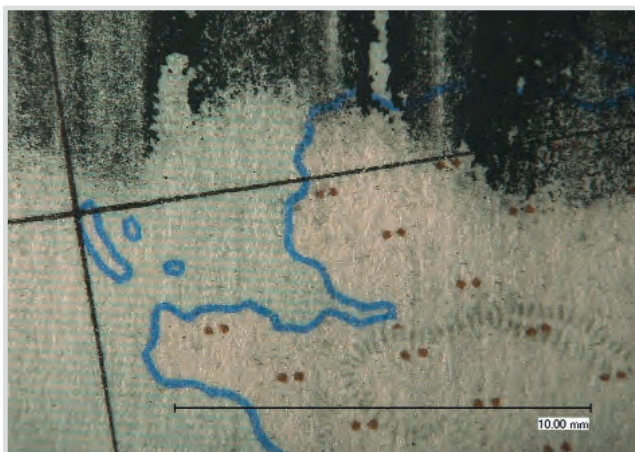


Fig 1: Removal of soot on a lithography (© Bert Jacek)

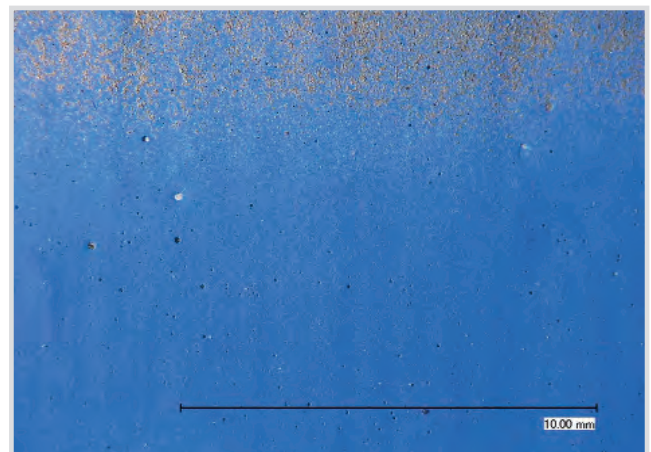


Fig 2: Removal of dust on Ultramarine on parchment (© Bert Jacek)

# Mass deacidification

Treatment of endangered books in the National and University Library of Slovenia



In the 19<sup>th</sup> century, the traditional method of paper manufacturing was replaced by industrial processes. Wood pulp as the raw material and alum rosin as a sizing agent were introduced. The changes resulted in the reduction of pH in the paper, leading to a chemical breakdown of cellulose fibers, which resulted in a massive decay of library and archival holdings (Fig 1). Research has shown that adding alkaline compounds to the acidic paper when it is still in usable condition, known as deacidification of paper, can extend the life expectancy of the papers.

The survey of monographs in the National and University Library, performed in 2006 during 6th Framework Programme EU project PaperTreat, revealed the startling condition of the collection. In the collection of approximately 125,000 books, produced between 1850 and 2000, approximately one third of the books were already in a severe state of degradation with degree of polymerization (DP) less than 400.

In 2013 a mass deacidification programme was introduced (Preservation Technologies B.V., Netherlands). The

primary focus was on a selection of archival copies of the monographic print collection '*Slovenika*', with the date of publication from the middle of the 19<sup>th</sup> century onwards.

Selection criteria for mass deacidification of the books were physical condition of the items, pH value of the paper and paper strength. Non-destructive analysis using Karakta portable Near Infra-Red Spectrometer (Karakta d.o.o., Ljubljana) was performed in order to determine pH before and after deacidification and degree of polymerization of paper (Fig 2).

On a smaller amount of the samples, which could be tested destructively, comparison of NIR technique for determination of pH of paper with standard methods was also performed in order to evaluate the method.

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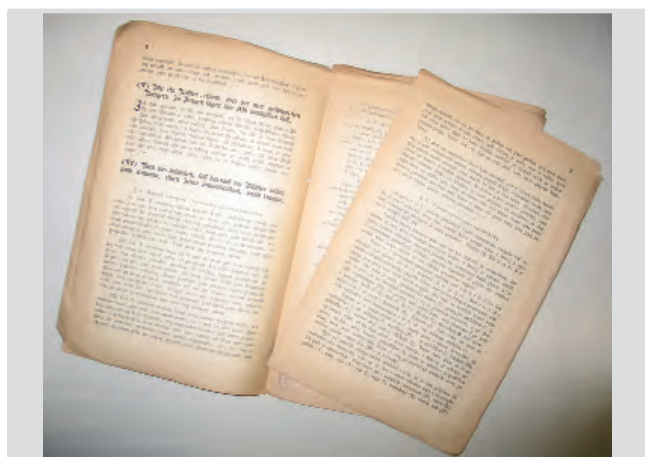


Fig 1: Example of book, printed on acidic paper  
(© Conservation and preservation centre, NUL)



Fig 2: Near Infra-Red Spectrometer (© Conservation and preservation centre, NUL)



A. Seger\*<sup>1</sup>, P. Kochendörfer\*<sup>2</sup>

# Bacterial cellulose

A new material in paper conservation



Bacteria can not only be a dangerous microorganism, but also a useful organism producing cellulose. This biotechnologically produced cellulose differs from vegetable cellulose by its nanofibrillated structure, chemical purity, high mechanical stability and ability to be modified (Fig 1).

Preliminary studies show that bacterial cellulose (BC) can produce papers with a remarkable surface strength and outstanding surface quality presenting an interesting alternative to the traditional papers used for mending modern papers such as coated and transparent paper (Fig 2). The surface property of these papers especially are a major challenge for conservators. Up to now no adequate supply was available for this kind of loss repair. With the new BC fibers, the feel and look of coated papers is reproduced without further additives. It can also produce papers that are suitable for mending transparent papers.

The development of this novel mending paper began in July 2011 with a three-year project at the University of Applied Sciences in Cologne. The project is conducted in close cooperation with partners from the industry and is funded by the Zentrale Innovationsprogramm Mittelstand (ZIM). The variability of the material required the development of new manufacturing and processing methods. Final results of the research project will be presented with recent findings in regards to the preparation, extensive material testing and different applications in paper conservation.

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Fig 1: Purified moist layer of bacterial cellulose (© Annegret Seger)

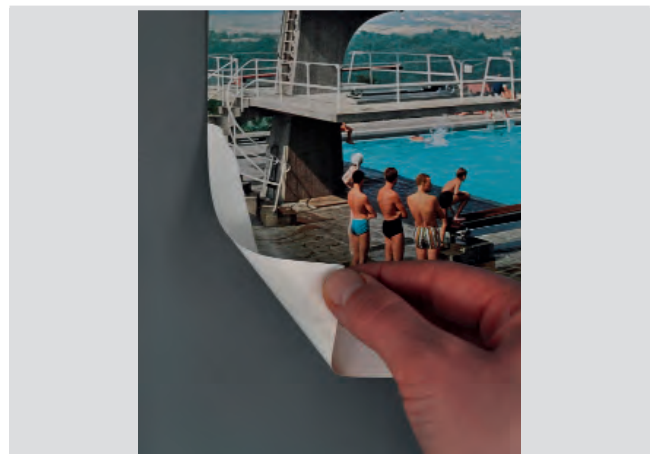


Fig 2: Detail of a coated paper mended with bacterial cellulose paper (© Annegret Seger)

T. Okayama\*<sup>1</sup>, C. Kadoya<sup>1</sup>, R. Kose<sup>1</sup>, M. Seki<sup>2</sup>, N. Sonoda<sup>3</sup>

# A new technique for strengthening degraded paper

Application of cellulose nanofiber coating on a paper surface



Many book and paper documents written on acidic wood-based papers have degradation problems. While conservation techniques such as mass deacidification have been developed to address the issue, the strengthening of degraded paper documents is receiving less attention. The 'fleece' method is a typical strengthening method involving a homogenous application of a small amount of fibers on the surface of degraded paper documents.

In this paper, a cellulose-nanofiber coating process is performed along with the 'fleece' method for strengthening naturally degraded acidic papers. A sample paper to be treated is put on a leaf-casting stand and a small amount of water is poured on it (Fig 1). Two types of cellulose nanofibers were mechanically prepared from wood fibers. Application of the cellulose nanofiber onto the wet degraded paper was done using a coating rod to spread a small amount of nanofibers evenly over the substrate. The cellulose nanofiber coating on the wet degraded paper is compared with that on the air-dried degraded paper. After the coating is performed drying is done with a rotary dryer.

For the degraded paper coated with cellulose nanofibers along with the 'fleece' method, we observed an increase in tensile strength just after the treatment (Fig 2). The tensile strength of the nanofiber coated paper showed more than 1.2 times that of the uncoated paper. To evaluate the efficiency of the nanofiber coating, physical tests were undertaken before and after accelerated ageing.

The nanofiber coated paper gave better results for tensile strength, tearing strength and folding endurance compared with the uncoated paper.

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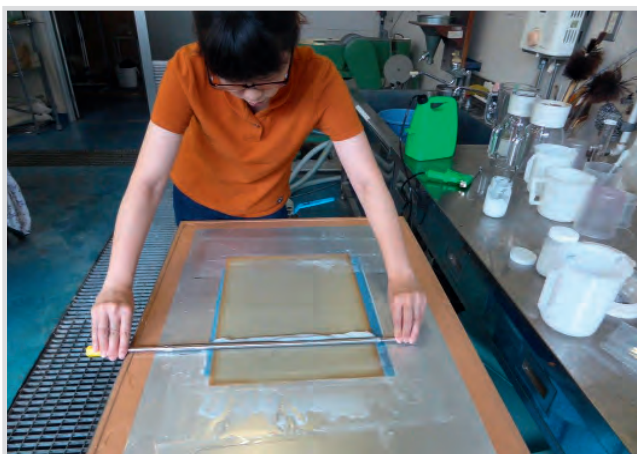


Fig 1: Cellulose nanofiber coating (© Takayuki Okayama)

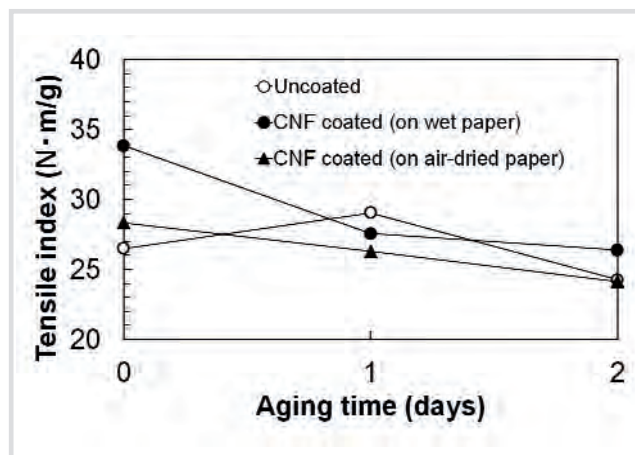


Fig 2: Changes in tensile strength of naturally degraded papers treated by cellulose nanofiber coating as a result of accelerated ageing. (© Takayuki Okayama)

M. Duranton\*1, G. Hennion\*2

## Application of Silicagel M®

A moistening treatment of a water-sensible starched textile and its decoration



In the last few years, much research has been conducted to provide new treatments for the conservation of graphic arts in particular to limit the use of water on inks that can migrate causing significant damage to the paper. But what about a textile covered with a water sensitive decoration?

This question arose in the case of a talismanic tunic from the Guimet Museum (Paris, FR), restored during a degree course in the Institut national du patrimoine (Inp, Paris, FR). This Iranian tunic from the 19<sup>th</sup>-20<sup>th</sup> century is made of a cotton fabric coated with starch (Fig 1). It is covered on both sides with drawings and calligraphies made with inks of various natures (Fig 2). Over time, it lost the appearance of clothing and its texture became more like one of a very brittle paper. It was therefore necessary to consider a treatment able to limit the folds and to fill the existing gaps.

According to a study carried out on iron gall inks used in graphic arts, an exposure at 80% RH was necessary to minimize the risk of ink migration. It was therefore considered appropriate to place the tunic in a closed chamber with a controlled relative humidity (RH) environment to avoid the presence of water in liquid form even in small droplets.

It seemed interesting to divert the common use of silica gel (dehumidify museum showcases) to set up this treatment consistent with the water sensitivity of the

tunic without risk of condensation on the surface of materials. Among all kinds of silica gels, different with properties and specific humidity values, the Silica gel type M®, sold by the company 'Long life for art' (Eichstetten, DE), was chosen for its properties to stabilize a closed environment between 60% and 90% RH.

The artwork was placed for 10 days twice (two sides), at 70% RH for the relaxation of the tissues which was really effective. This duration is reasonable for a textile conservation treatment and takes into account all the materials present.

This treatment can be applied to the humidification of composite objects in various fields, for example archaeology and ethnography. In graphic arts, this humidification controlled processing could be an option for the treatment of iron based inks. Since the study of the tunic, it has started to be used in the paper and book conservation laboratory of the school.

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Fig 1: General view of the talismanic shirt (© G.Vanneste)



Fig 2: Details of calligraphies (© G.Vanneste)



J. Roller\*

# Rewin®EL and Mesitol®NBS

## How to remove ionic fixatives (aqueous washing treatment aids) from paper



The ionic fixatives Rewin®EL and Mesitol®NBS are in established use to prevent bleeding of water-sensitive media during aqueous treatment. Their single or combined application, as well as the inclusion and intensity of any subsequent rinsing varies among practitioners.

Lack of rinsing and local fixative application is known to risk paper discolouration. This study investigates the function of aqueous rinsing subsequent to fixative application to avoid these side effects and optimize the treated paper's future stability. It examines whether and how effectively subsequent rinsing steps benefit the fixative-treated paper. In particular it is determined if fixative residues are removed, if discolouration formation is diminished, how cellulose ageing with respect to oxidative and hydrolytic degradation is benefitted and if the paper's electrostatic load caused by fixative residues is changed.

Experimental results on 119 treated and artificially aged test papers show that rinsing is of importance for diminishing the residue and thereby any negative effect of remaining fixatives on the stability of the paper. Rewin® EL residues showed negative side effects; Mesitol®NBS had no negative side effects, and even may have a positive effect on the paper condition (Figs 1 and 2). In conclusion, one 15-min aqueous rinse is the minimum required, while three 10-min rinses are recommended when using the fixatives on paper objects.

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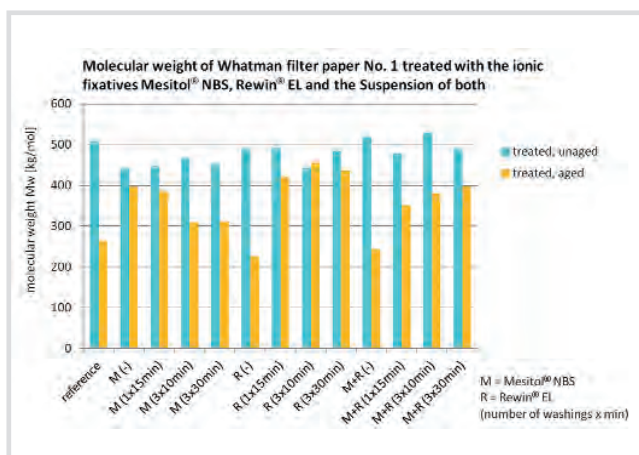


Fig 1: Molecular weight of filter paper treated with ionic fixatives (© Julia Roller)

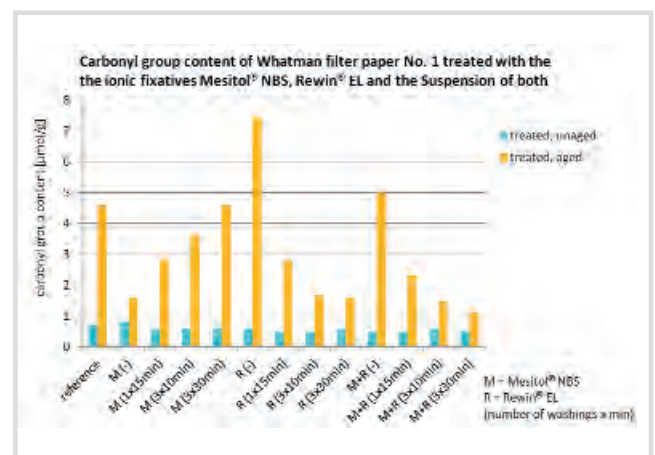


Fig 2: Carbonyl group content of filter paper treated with ionic fixatives (© Julia Roller)

D. Gogashvili\*

## The oriental collections of the Georgian National Museum

Re-housing and conservation of the miniatures, manuscripts and drawings



The Oriental Collections of the Georgian National Museum (GNM) are significant for their extensive chronological and geographical range. The Collections include miniatures, manuscripts and drawings dated by 8<sup>th</sup>-9<sup>th</sup>, 16<sup>th</sup>-19<sup>th</sup> centuries. For decades the collection was kept in unsatisfying conditions: absence of space for proper storage, fluctuating temperature and relative humidity, improper security, poor ventilation and fire detector system, no appropriate storage equipment, etc. (Fig 1).

The unsuitable environments posed a danger to the collection. GNM made it a priority to undertake urgent measures aiming to rescue the collections. In 2010-2012 GNM received support from the European Union to carry out a Twinning Project entitled '*Support to the institutional development of the Georgian National Museum*'. European partner institution of the GNM was the Stiftung Preussischer Kulturbesitz and its Staatliche Museum zu Berlin. The project had 4 components. Component 3 of the project was '*Collection re-housing pilot case*'.

It involved conservation and re-housing of the collection in a specially arranged storage facility.

During the collaboration with the German specialists the analytical scheme determined, the risks assessed, and the volume of work was calculated.

Throughout the project the following actions were taken: a data-base for documentation, a list of objects, and a photo documentation were created; the condition of each object was evaluated; the materials for preventive conservation were chosen; the packing and cleaning spaces were prepared; each object was cleaned, flattened, the damaged parts were consolidated, and packed. After the treatment the artefacts were placed in special storage boxes and positioned in a new storage room (Fig 2).

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Fig 1: Old storage facility before re-housing (© GNM)



Fig 2: After conservation, the collection was re-housed in a new storage facility (© GNM)

I. Griffin\*<sup>1</sup>, K. McMillan<sup>1</sup>

# Housing library collections

The development of a risk-based approach at the National Library of Scotland



The housing of library collections inside archival boxes and enclosures is often considered desirable because the enclosures provide a stable, dust-free environment for the items inside, and give some protection against damage in the event of a fire or flood. They also facilitate handling, and for enclosures such as fascicles and mounts, where the item is hinged into the enclosure, collections security is improved.

However, in an institution with vast collections, there are many factors to consider when determining a housing strategy. Which parts of the collections should be prioritised for re-housing (Fig 1)? What types of boxes and enclosures give the best performance, and how can this be tested? And what are the pros and cons of making enclosures in-house rather than buying them from a conservation supplier?

This paper describes the risk-based approach which the National Library of Scotland has taken towards housing its collections. The current practice is to box all

incoming paperbacks, to store all maps inside plan chests, and to re-house existing collections through project work, with priority given to special collections and to collections where a space saving can be made, for example by transferring CDs from jewel cases into custom-made wallets. Nearly all boxes and enclosures are made in-house, as this is considered to be more cost effective and to give greater flexibility (Fig 2). The designs of the enclosures are constantly changing and developing, and their performance is assessed through visual inspections and more formal research including environmental monitoring and sprinkler simulations.

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Fig 1: Un-boxed library books, showing evidence of soiling and physical wear and tear (© Kenneth McMillan)



Fig 2: Some of the boxes and enclosures which are manufactured and used at the National Library of Scotland (© Kenneth McMillan)



# Hydrogen peroxide bleaching of papers containing iron ions

Discussing the viability of a potentially harmful system



When it comes to improving the visual appearance of works of art on paper, surface cleaning and washing may not be sufficient to remove all discolouration (Fig 1). Bleaching could then be considered to achieve the desired aesthetic result. Among the available bleaching agents, hydrogen peroxide is a versatile choice that has many advantages: rather low toxicity and easy handling, to name but a few.

However, well-known radical formation when in contact with iron or other transition metal impurities in paper might seriously impair the outcome of a treatment. Cellulose degradation and colour reversion might occur after only a few months of storage. Thus, the question arises if and how hydrogen peroxide can be applied in a safe way when the precise iron ion content in the paper remains unknown.

Several historic papers were analysed by combining iron ion quantification, molar mass, and brightness determination. Treatments that actively decrease the iron ion content were applied before bleaching with hydrogen peroxide to the selected historic papers.

None of the pre-treatments removed all detectable iron ions, thus, no iron-free paper was obtained (Fig 2). Still, the hydrogen peroxide bleaching with and without pre-treatments and including post-treatment washing steps was comparably successful. The achieved paper colour is stable and no significant impact on cellulose integrity occurred in most papers.

In conclusion, even though almost all historic papers contain iron ions, the majority of them can be bleached with hydrogen peroxide, because not only the amount of iron ions, but also their accessibility influences the bleaching result.

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Fig 1: Intense tidelines and foxing require the intervention of the conservator. But can we bleach this print safely with hydrogen peroxide? (© Irene Brückle)

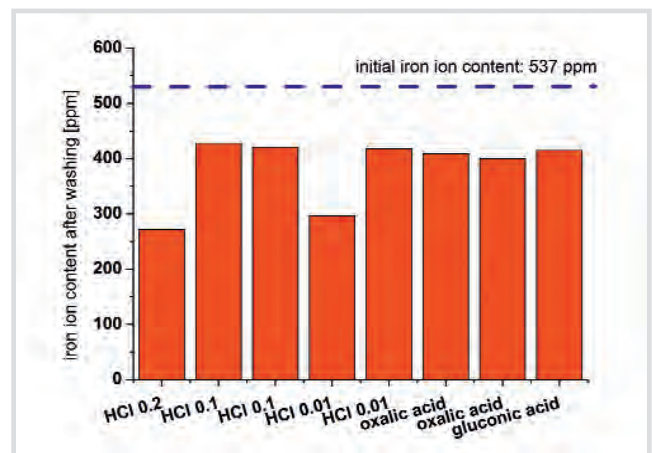


Fig 2: Impact of different pre-treatments on the iron ion content in historic paper

R. Thalmann\*<sup>1</sup>, M. Frankenstein\*<sup>2</sup>

## Moving history

Planning and realising the move of 100km of archives



In early 2014, one of Germany's largest archives, the State Archive of North Rhine-Westphalia (Landesarchiv Nordrhein-Westfalen) moved its collections from six different locations to its newly built main building in Duisburg.

The Archive keeps records of Rhenish history from as early as the 9<sup>th</sup> century until today, comprising a wide range of materials – from parchment and vellum deeds to modern records, from glass plate negatives to modern data storage devices.

This presentation will talk about the experiences gained and lessons learned from planning, realisation, and evaluation of this large-scale collection move.

One of the major challenges was the safe and secure transport of the collection items, avoiding any mechanical damage due to vibrations, shock or fluctuating climate. Collections containing very vibration sensitive items were noted and additionally protected by collection care staff prior to the move. The main focus was on minimising or avoiding movement within the storage boxes. As some collections contained as many as several thousand items, practical, efficient and economic solutions had to be found.

In addition to these in-house preparations, the tender document precisely defined general handling and transport guidelines as well as specific criteria for various materials. Collection care staff were present throughout the move to check the moving company's compliance with these guidelines. Data loggers were used for climate and vibration spot checks. Working in interdisciplinary teams greatly contributed to the success of this project.

This presentation will share both drawbacks and positive outcomes of this large-scale collection move.

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Fig 1: The State Archive of North Rhine-Westphalia – Germany's largest archive building (© Foto: LAV NRW, Peter Fröhlich)



Fig 2: Transport of a climate-controlled crate (© Foto: LAV NRW, Rebecka Thalmann)

M. Verborg\*<sup>1</sup>, P. Koemtzidis\*<sup>2</sup>

## How we work

The Conservation and Digitization Center of the Historical Archive Cologne



The duties of conservators are clearly different in various Institutions. Some conservators work on single objects while some manage large amounts of projects. At the Historical Archive of Cologne, due to the catastrophic collapse in 2009, we faced a wide range of archival material showing various damages to an extent that nobody was prepared for. We needed to find a way to treat all these damaged objects immediately and in a very conscientious way.

Neither the condition of an artefact, which could vary from just slightly dusty to entirely torn to fragments, nor their age were a criteria for treatment. Recovered objects were first stored mixed up in temporary boxes and then registered in our database. We had to adapt our workflow in order to treat boxes containing photographs as well as paper charters with seals from the 17<sup>th</sup> century, and modern photocopies. The decision to use a database with a barcode system to simplify the documentation procedure was an important and vital step. We are constantly adjusting how each conservator rates the damages to achieve a homogeneous documentation. The

treatment and storage facilities are modern and in accordance with the newest standards (Figs 1 and 2). We have the privilege to develop our workflow processes with an international team of conservators on site with different backgrounds and expertise. In addition the conservator's team works closely with assistants, teaching them conservation procedures and the meaning of taking care of cultural heritage.

Our work takes into account a very specific surrounding. It is this special experience that we would like to convey today to the conservation world.

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Fig 1: The main conservation workshop at the Center for Conservation and Digitization at the Historical Archive Cologne (RDZ) (© Historical Archive Cologne, RDZ)



Fig 2: The storage at the Center for Conservation and Digitization at the Historical Archive Cologne (© Historical Archive Cologne – RDC)



# Microbiological sampling of library objects

## Comparison of impress, dry swab, and ATP methods



The microbiological sampling of objects in the laboratory of the National Library of Poland has been executed for over 25 years. The presence of active fungi (mould) is the greatest concern. Microbiological sampling is essential for the conservator's decision on further treatment. This includes the choice of a potential disinfection method, taking into account the safety of objects and personnel.

Traditionally, sampling is done by pressing a dry filter paper against a potentially contaminated surface, the so called 'filter-paper impress' method' (Fig 1). In the last few years 'dry swab' and Adenosine-TriPhosphat (ATP) methods have been introduced (Fig 2). 'Wet swab' is used in industrial sampling.

Although the 'filter-paper impress method' is still commonly used in conservation in Poland, there are no experimental data on its detection limits. In the 'dry swab' method, a single colony on a Petri dish equals approx. 160 CFU/dm<sup>2</sup> on the sampled surface (CFU = colony forming units), but the question: 'How much of the material present on the surface can we really acquire during sampling?' has still waited for an answer.

The four methods were compared on four different surfaces: Whatman filter paper, Whatman filter paper sized with 2% gelatine, contemporary printing paper, glass Petri dish as a reference (control) surface. They were infected with five species of moulds isolated from library materials:

- *Penicillium funiculosum*
- *Penicillium ochraceum*
- *Aspergillus awamori*
- *Aspergillus versicolor*
- *Botryotrichum piluliferum*

The impress method collects on average about 10<sup>-3</sup> of the material present on the sampled paper surface. The dry swab sampling method collects on average <10<sup>-3</sup> to 10<sup>-1</sup> of the material present on the sampled paper surface.

The ATP tests need a special protocol of sampling for moulds to be applied in practice.

Even a single colony on swab or impress sample could indicate very high presence of CFU's on the sampled surface. Additional tests suggested that leaving an ATP swab humid for 2 hours before the ATP measurement provides more reliable results.

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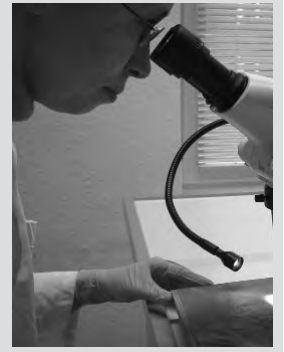
Fig 1: Impress sampling with Whatman filter paper (© Jakub Piechal)



Fig 2: ATP sampling with kikkoman® Lumitester PD-20 (© Jakub Piechal)

# How clean is my object?

## The bioluminescence measurement (ATP/AMP) – Method, practice and opportunities



Using the conventional germination measurements no statement about the actual cleanness of a surface can be made after a sterilisation or an old contamination. All dead cells cannot be detected. At this moment the question comes up: 'Is this object safe or not?'. (Figs 1 and 2)

The non-invasive measurement of ATP (adenosine triphosphate) and AMP (adenosine monophosphate) is a determination of the total energy content of intact and not intact (dead) cells, and it indicates the total contamination of suspect objects with all health allergenic and toxic potential for human beings. The readings can be the basis for finding the necessary cleaning method or areas of ineffective cleaning can be accurately determined. The technology of ATP-AMP measurement is based on a natural enzymatic chain reaction. The produced light is proportional to the ATP-AMP quantity and can be quantified with a Luminometer without cultivation.

This real-time sampling is very simple and is carried out with a sterile LuciPac™PEN and a Lumitester™ PD20 (Kikkoman Japan). This method, used in the food industry for determining the cleanness of surfaces, was adapted

for book and paper art objects by conservators. The assessment of the presence of mould will no longer be based on guessing or dependent on humans' vague intuition, because the scientific readings can help to eliminate diffuse fears of mould, and can replace disinfection as the only solution.

The ATP-AMP method has been gaining acceptance in the last six years and libraries, archives and conservators in Germany have used it. The fast results and the determination of a really clean surface facilitate a safer handling of contaminated objects.

The paper will present the method, opportunities, and limits, its practice and references. All examples are taken from the everyday work of the author as a conservator in cooperation with various German institutions.

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Fig 1: Measurement on a textile book to clarify the reason of damage (© Meier-Wolff)



Fig 2: Measurement on a book edge to clarify the degree of contamination (© Meier-Wolff)

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## Paper and fire

How stable is cellulose after surviving a disaster



A fire breaking out in a library is a worst-case scenario for everyone, the paper conservator and the simple user. Nevertheless, fires – however sad – do happen. Two recent examples for blazes in libraries are the case of the Anna Amalia Library 2004 in Weimar, and the fire in the library of the Glasgow School of Art.

For the present study, we have obtained a rag paper which partly survived the fire of the Anna Amalia Library – it belongs to the so-called ‘ashbooks’ (Figs 1 and 2). We have comprehensively analysed the chemical changes brought about by the fire and the subsequent extinguishing. In order to better compare the information to the naturally aged state of the paper before the catastrophic event we related the data to an identical copy of the same book unaffected by the fire. Special focus was placed on the presence of low molar mass degradation products. The key issue was how cellulose integrity suffered from high temperature impact and how this finally affected the long term stability of the material. Did residues from the fire itself and/or from the extinguishing influence cellulose structure? Is an immediate conservation action necessary to prevent further damage?

In order to tackle those problems we applied a number of established chemoanalytical techniques. In addition, also very recent developments in paper analysis, such as DESI-MS for mapping of polyaromatic hydrocarbons were employed.

The integrity of cellulose changes depending on the temperature profile induced by the fire. The rather limited thermal conductivity of paper protects cellulose still in close proximity to the burning edges. Size-exclusion chromatography coupled to light scattering analysis (SEC-MALS) revealed conformational changes of the cellulose molecule after impact of fire – a pre-stage of damage leading to higher brittleness in paper. The distribution of low molar mass degradation products of paper itself changes significantly. Different washing treatments (water, ethanol), used to remove a variety of degradation products shows beneficial results for the non-burned, natural aged paper, but has a limited beneficial effect on burned paper areas. Reasons for this behaviour will be discussed. Based on the experimental results, paper stability and degree of damage were assessed and recommendations for conservation measures were issued.

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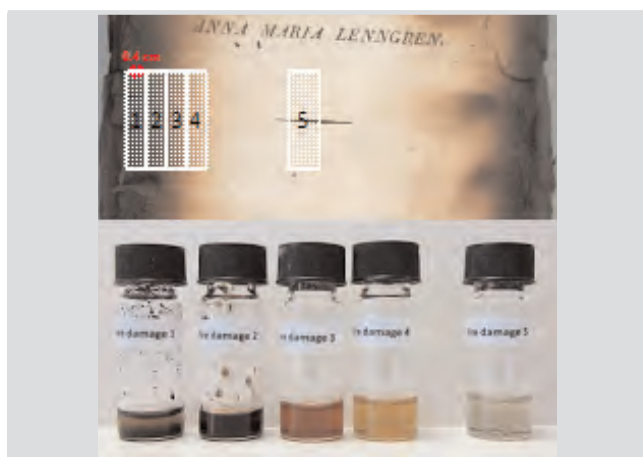


Fig 1: Historic rag paper samples, collected from areas in different proximity to the origin of fire, dissolved in DMAc/LiCl 9% (w/v) ready for determination of molar mass by SEC (© Kyujin Ahn, BOKU)

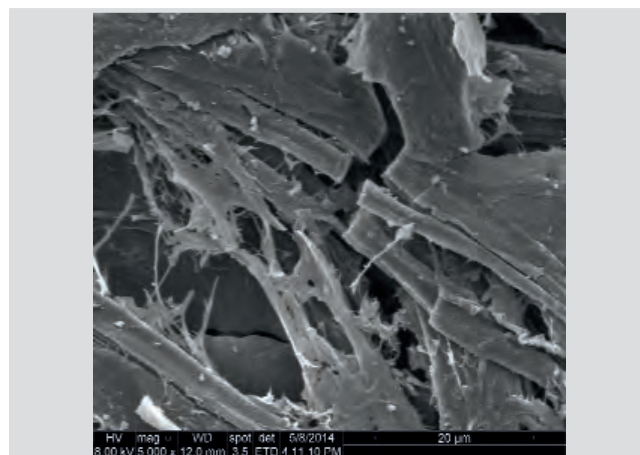


Fig 2: SEM image of a black broken piece of a burned paper part having lost all strength of cellulose, but still showing a fiber network in the micrograph (© Kyujin Ahn, BOKU)



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## Heinrich Schliemann's copy-books in the Gennadius Library

A non-destructive imaging documentation for assessing the condition of the archive



Heinrich Schliemann (1822-1890) is well known for his keen interest in ancient Greece that led him to conduct major excavations in Troy, Mycenae and Tiryns. Due to his profession as a well established tradesman, he spoke and wrote fluently more than ten different languages, including Greek, Russian and Arabic. He was very meticulous in his correspondence and used the copy press procedure for maintaining copies of his outbound mail (Fig 1). The majority of Schliemann's copy-books are now kept in the Gennadius Library in Athens, Greece. There are 43 volumes of a period within 1845 and 1890. They cover a wide variety of different copy techniques and materials, as Schliemann showed particular interest in the technological developments.

By using non-destructive imaging techniques, this research recorded the condition of Heinrich Schliemann's copy-books archive regarding the covers, spine, textblock and in some cases loose copy papers, as well as indicated

the different types of ink and methods employed in acquiring these copies (Fig 2). The techniques included examination in the ultra-violet (UV, UV photography, UV fluorescence colour photography and UV fluorescence black and white photography), visible, and infrared region (IR, IR reflectography and false colour IR imaging) of the spectrum, at both front (recto) and back (verso) sides of the selected pages. In addition, close-up photographs of single characters were taken.

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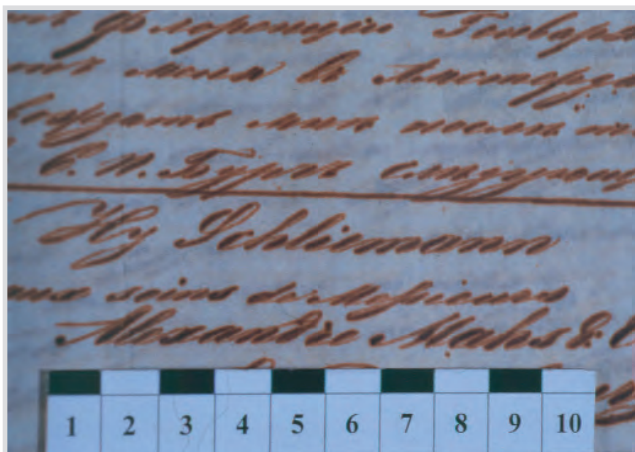


Fig 1: The signature of Heinrich Schliemann, Volume 1, page 23, detail (© Kaminari)

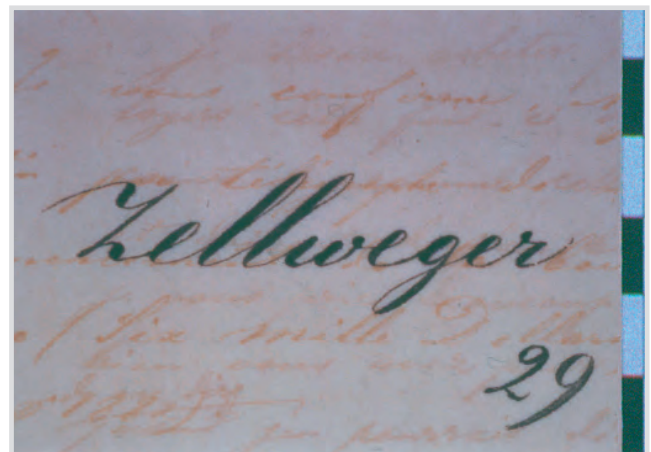
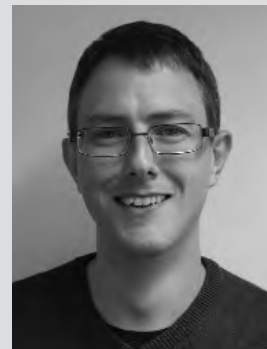


Fig 2: The offset of the next page's copied letters are distinguishable, Volume 27, page 491, detail (© Kaminari)

D. Mills<sup>\*1</sup>, A. Curtis<sup>2</sup>, P. Rosin<sup>3</sup>, Y.-K. Lai<sup>3</sup>, G. Davis<sup>4</sup>

## Revealing the unreadable

Using non X-Ray imaging to reveal text on damaged and inaccessible manuscripts



'Can modern imaging and image processing techniques retrieve textual content from damaged parchment rolls?'

The Institute of Dentistry at Queen Mary University of London is the leading centre for very high contrast X-Ray Microtomography imaging. The 'Apocalypso' (Greek for Revelation) Project is our collaboration with experts in Computer Vision systems in the Computer Science department at Cardiff University. This collaboration has developed techniques and a workflow that allows us to reveal some textual content from damaged parchment rolls.

In initial results we have produced a virtual unrolling of the full length of the left-hand third of a fused parchment roll (Fig 1), amounting to in excess of 50 lines of text – a five-fold increase over that accessible by traditional means. The remaining two thirds of the roll will be accessible to virtual unrolling as image-processing techniques improve, without the need for any more X-Ray scanning of the original document (Fig 2).

Further results from a range of different heritage objects will be presented – these are from on-going investigations and represent work in progress.

We have investigated the potential for damage to be caused to the document by the scanning process and show that we are confident there is quantifiable extra damage after scanning.

We think this article will conclusively show that we can apply our techniques to heritage objects and produce information of value to the conservation and archivist communities.

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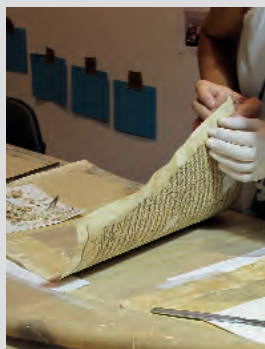


Fig 1: Damaged, non-unrollable parchment document (© David Mills)



Fig 2: Example output from our technique (right) compared with visible imaging (left) (© David Mills)

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A. Bainbridge\*

# Non-destructive analysis of paper

An investigation of selective discolouration in books



Selective discolouration in a codex offers a unique opportunity to examine reasons why some paper may have discoloured and not the rest. The binding, if original and contemporary to the paper, means the papers have all been in the same environment since near the time of making (Fig 1).

Using only nondestructive analysis (spectrophotometry, pH determination using agarose gel, infrared spectroscopy including Fourier transform infrared spectroscopy (FTIR), X-ray fluorescence (XRF), gas chromatography-mass spectrometry (GC-MS), and inductively coupled plasma mass spectrometry (ICP-MS), this study investigated two copies of an early seventeenth century printed book that exhibited severe browning of only one section, the same in each. The results indicated that the browned gatherings have elevated levels of iron, which is known to cause cellulose degradation. The pH between the normal and

browned papers was not statistically different as measured but FTIR results confirmed that the browned paper was more degraded.

The use of XRF in the analysis of inorganic components in paper is relatively new, and this study presents options for employing XRF spectrometry on a small scale. Additionally, the technique of testing pH through agarose gel, introduced by Richard Wolbers, is also new to the field and presents particular usefulness where material is sensitive to moisture but pH readings must be taken (Fig 2).

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Fig 1: Two copies of the same book, both with the same single gathering severely darkened (© Abigail Bainbridge)

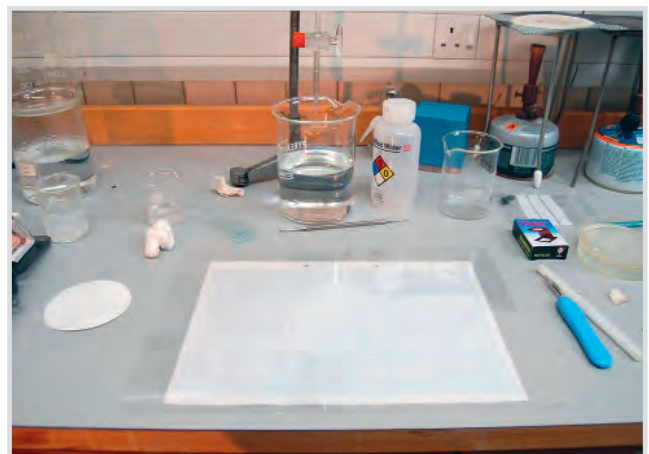


Fig 2: Set-up for making the agarose gel for testing pH (© Abigail Bainbridge)

P. Banou<sup>\*1</sup>, A. Alexopoulou<sup>2</sup>, A. A. Kaminari<sup>2</sup>, A. Moutsatsou, A. Terlix, S. Zervos<sup>3</sup>, B. W. Singer<sup>4</sup>



## Oil media on paper

Investigating the effect of oil mediums on paper supports of works of art

Oil paintings, oil sketches and studies on paper supports, as well as black and white and coloured prints, printed books, etc. present evidence of damage that has been associated with the presence of oil medium in the paint or printing ink used. The most common problems are absorption and diffusion of the oil medium by the paper support, which are related with discolouration, loss of mechanical strength, fragility and embrittlement of the support (Figs 1 and 2).

The research project *'Oil paintings on paper support: Documentation of the state of preservation using Multi-spectral imaging and chemical analysis. Determination of evaluation criteria – conservation treatment proposals'*, aimed at the investigation and physico-chemical documentation of the problems occurring in oil paintings on paper substrates. It was executed within the framework of the program *'Archimedes III: Funding of Research Groups'* in the Technological Educational Institute of Athens.

The research was carried out on original artworks and artificially aged mock ups, involving colourimetry (Lab\* colour space), measurements of light-level transmittance, testing tear resistance, and applying Headspace Solid-Phase Microextraction (SPME) combined with Gas chromatography – Mass spectrometry (GC-MS). These investigations provide indications on the optical, mechanical and chemical changes caused by the absorption of the oil binder by the paper substrate upon ageing.

In particular, GC-MS analysis of the volatile organic compounds (VOC's) emitted from the artificially aged mock ups, as well as areas of discolouration on the support of original oil sketches, indicated that linseed oil causes the degradation of cellulose upon ageing. Research showed that the presence of linseed oil is principally responsible for the changes in colour and transparency of paper upon ageing, which are also associated with physico-chemical and morphological changes of the system paper – oil. The quantity of the oil absorbed and the paper content have also an input in the changes recorded. Finally, impregnation of the paper with linseed oil initially provided mock ups with extra mechanical strength, which was reduced dramatically upon ageing.

These results elucidate the effect of oil binders on the paper substrate and the decay phenomena that occur respectively. They aided to the identification and interpretation of the specific type of damage present on artworks with oil media on paper and provided criteria for the assessment of their condition.

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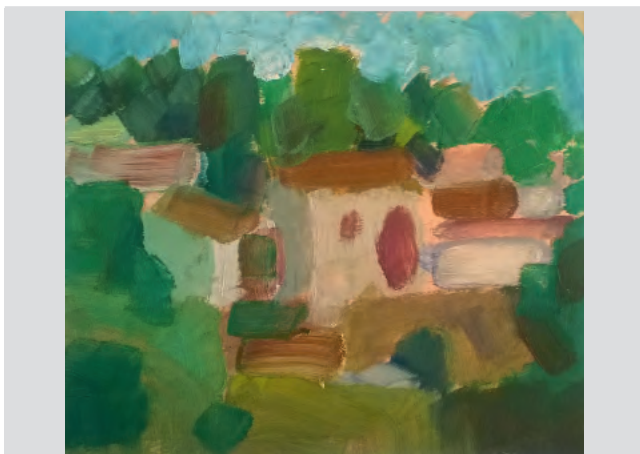


Fig 1: 'Houses', oil painting on paper (recto), S. Stasinopoulos, private collection (© Penelope Banou)



Fig 2: 'Houses', oil painting on paper (verso), S. Stasinopoulos, private collection (© Penelope Banou)



# Conservation papers as a barrier to volatile organic components

## Comparing the effect of fillers



Conservation papers used to protect paper artefacts are often filled with calcium carbonate and sometimes incorporate sorbent materials, such as activated carbon or zeolites, in an attempt to 'capture' undesirable pollutants. Among these, volatile organic components (VOC's) emitted by the paper itself are of primary importance. This work aims to compare the ability of different fillers to limit the paper damage provoked by these VOC's.

Laboratory papers were manufactured under identical conditions incorporating similar amounts of fillers. They were used to wrap Whatman samples. Their ability to protect these samples was evaluated by exposing the whole system to VOC's emitted by iron gall ink impregnated papers (Fig 1). A first experiment monitored at 85°C with mechanical testing showed high and similar performances of calcium carbonate and activated carbon while zeolithe x13 appeared inefficient. Another experiments performed at 50°C considering DP measurements led to noticeably different results: activated carbon showed the

best performance while calcium carbonate appeared partially efficient, and zeolithe x13 remained totally inefficient. These different results illustrate the difficulty to extrapolate to ambient conditions data obtained at 85°C, mainly because mechanisms involved in VOC's contamination are not only chemical, but also physical (Fig 2). They cannot be regulated by a close-to-Arrhenius law. Physisorption increases with decreasing temperatures. As a result, activated carbon fillers are the most efficient at 50°C. Chemisorption decreases with decreasing temperature consistent with the fact that calcium carbonate is less efficient at 50°C than at 85°C. These considerations could however not explain the poor performance of zeolithe x13.

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Fig 1: General view of the sample set before ageing. The blue paper is impregnated with an iron gall ink (© CRC)



Fig 2: General view of the sample-set after ageing (© CRC)

C. Brossard\*

# The conservation of textile bookbindings

## What approach for the paper conservator?



For a few years, the Conservation Service of the National Library of France investigated and developed methods to preserve and conserve textile bookbindings. In our collections, the damage to these more or less luxurious bindings have rarely been treated because of the unusual nature of the covering material. This year, the construction of a bookbinding database and an exhibition focused on the French king François I<sup>st</sup> gave us the opportunity to conserve several textile bindings.

First of all, the paper conservator must understand and adapt his or her work techniques to the textile material.

The prior study requires the help of an ancient fabric specialist to identify the type of weaving. This study is also based on a scientific analysis to characterize the textile fibers, the dyeing products and the adhesives.

The technical approach involves, besides a bibliographical study, the close collaboration of a textile con-

servator, and the services of a dyeing workshop, especially in the case of textile integration with the aim to infill losses in the fabric. This intervention requires sewing and using adhesives.

We have applied two different approaches: preservation and conservation treatment. An example for the preservation solution is an embroidered binding (17<sup>th</sup> century) stabilized by sewing and storing it in an adapted preservation box. This binding is now online ([reliures.bnf.fr](http://reliures.bnf.fr)). A local treatment was applied on a brocaded damask binding of the 15<sup>th</sup> century (Figs 1 and 2) which has been exhibited in the summer of 2015 in Blois, FR.

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Fig 1: Latin 6520, BnF-MSS, before conservation (© BnF)



Fig 2: Latin 6520, BnF-MSS, after conservation (© BnF)

C. Hilby\*<sup>1</sup>, N. Borring<sup>2</sup>

## Enzymes in conservation

Separating the 'Triumphal Arch' by Albrecht Dürer with  $\alpha$ -amylase embedded in Agarose gels



In the last two decades enzymes have been greatly developed to become more specific and efficient for use in the food and detergent industry. Even though enzymes have been used in paper conservation for decades now, this development does not seem to have had much impact in conservation. It is however easy to adopt enzymes in paper conservation using the now better and more specific chemical characteristics, although it is needed to know some of the basics of enzymes.

The poster will discuss the benefits of making your own enzyme gels compared to commercial products, and covers enzyme activity, pH- and temperature-optimum. The challenge of denaturation and inactivation of enzymes will briefly be outlined.

Selected results from the thesis ' *$\alpha$ -Amylase in viscous mediums – DIY*' by paper conservator Carola Hilby, will be presented: The viscous media of Agarose is mixed with liquid  $\alpha$ -amylase and tested on artificially aged mock-up

samples that are bonded with starch paste. The effectiveness of this easily applicable 'do it yourself' (DIY) method is compared to the commercial Albertina Compress®.

The 'do it yourself' (DIY) method described was used to separate the 36 sheets of paper that the mounted '*Arch of Honour of Maximilian I*' (1515) by Albrecht Dürer consists of. The Agarose-gels were used to treat areas in which the adhesive did not release its grip when treated by mechanical means or by applying a little moisture (Figs 1 and 2). This will be shown and explained by photos and text. Advantages and disadvantages of the Agarose-enzyme method will be discussed.

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Fig 1: An agarose-gel with the enzyme  $\alpha$ -amylase is placed upon the overlap of the leaves (© J. Skou-Hansen and R. Buccarella, SMK)



Fig 2: The enzyme dissolves the adhesive on the verso of the leaves, and the leaves can be separated easily (© J. Skou-Hansen and R. Buccarella, SMK)



D. Jutrzenka-Supryn<sup>\*1</sup>, J. Czuczko<sup>2</sup>, J. Sroka<sup>3</sup>

# Saving the past for the future

## Ethical and methodological issues in the plan of conservation of incunabula



The main topic of the presentation are the ethical and methodological issues related to the project and realisation of the conservation – restoration of three volumes with the incunabula from the collection of the Diocese Library in Pelplin.

A historical book in the form of a codex is the source of knowledge in many ways of its understanding. The content included within the text was always appreciated and protected, yet the form in which it is transmitted deserves attention as well (Fig 1).

We have a new tool for the protection of the content and visual side of the book, which enables safe access. This tool is digitalisation. Its execution is conditioned by the original object's condition, which commonly needs conservation treatment of the endangered construction elements in order to avoid further damages.

Conservation treatment is always a chance of enriching the knowledge on a historical object by access to and documentation of elements, which for the reason of their function in well preserved books, are hidden. At present we can use a continuously growing range of non-invasive in-situ techniques or techniques requiring just samples on a micro-scale. Research based on such analyses creates a better understanding of technological

details and the condition of objects. Results gathered in documentation are the starting point for the development of proper preservation and conservation strategies.

In this conservation project values such as authenticity, integrity, documentation value, and historical value were especially underlined (Fig 2). It was assumed that not only the historical matter is protected, but also the manner of execution, even if it is far from the present aesthetical feelings. Therefore it was crucial to decide not which treatments are to be undertaken, but rather which ones should be omitted.

Implementation of such an attitude needed the confirmation of the owner himself to an understanding of the heritage care.

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Fig 1: Volumes with incunabula, condition before conservation treatment. Collection of the Diocese Library in Pelplin (© J. Czuczko)

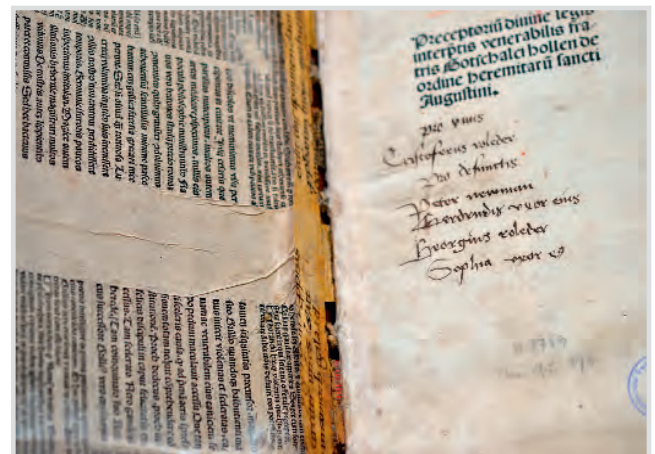


Fig 2: Incunabula after conservation, the original way of pasting the endpaper is maintained. Joannes Nider, 'Præceptorium divinæ legis, sive expositio decalogi', Nürnberg, 1496, Inc.Qu.277 (© J. Czuczko)

# Value Management Scan

Setting priorities in management and care of collections



Technical developments, globalisation and the increased demand for objects, documents, and their information, have put entirely new pressures on heritage organisations: they now have to provide physical and digital access to their collections to an extent never known before. At the same time, the requirements to preserve the collections remains unchanged. This, in combination with diminishing resources, requires institutions to set priorities and take a more strategic approach to collection management.

The *Value Management Scan* is a method that helps organisations to quickly develop an overview over their collections, their current values, opportunities to develop value, and threats for loss of value. This new methodology combines insights into values with condition and access to collections, as well as their vulnerability, exposure to environment and use, changes over time, and possible loss of value. It consists of four steps:

- setting the context and assessing current value of the collection
- assessing potential for value development
- a quick risk scan (*QuiskScan*) to assess risks leading to loss of value (see abstract Bülow et al.)
- assessing and prioritizing actions based on their return on investment or 'value for money'

In order to implement the methodology successfully, it requires stakeholder consultation and expert input from colleagues across the organisation, including curatorial, conservation and management staff. The approach creates commitment and support for decisions as each expert will place his own contribution within the bigger aims of the organisation.

The *Value Management Scan* will be explained and practiced during the IADA workshop '*Risks and Priorities in Conservation and Collection Management for Archives, Libraries, and Museums*' where also the changing role of the conservator in collection management will be discussed.

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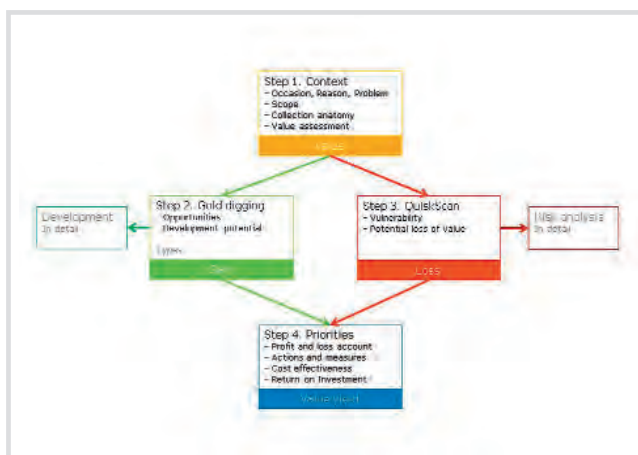


Fig 1: The Value Management Diamond – schematic representation of the Value Management Scan (© A. Brokerhof, RCE)



Fig 2: Groupdiscussion at the Amsterdam City Archives, July 2015, led by Agnes Brokerhof (© Amsterdam City Archives)

# Rubber cement

What are we dealing with?



Rubber cement, generously used as adhesive in the sixties, nowadays is a recurring challenge in paper conservation.

Although the dramatic discolourations and visual changes inflicted on paper by rubber cement are well-known among paper conservators and various treatments for its removal can be found in conservation literature, little is known about its composition. Therefore, the damage potential of rubber cement for paper is not yet clear. Which harmful components may be present in rubber cement?

This question also arose during the decision making for an appropriate strategy for the preservation of a series of drawings by H.E. Roodenburg (1895-1987). The drawings were executed in black ink and were mounted, with rubber cement, on secondary supports of cardboard (Figs 1 and 2). By doing literature research, gathering the manufacturing information of more than twenty different brands of rubber cement, and analysing samples

with Fourier transform infrared spectroscopy (FTIR) and Pyrolysis gas chromatography mass spectrometry (Py-GC-MS) an attempt in answering this question was made.

One of the main outcomes of this research is that, even though both synthetic and natural elastomers are used, crepe rubber seems to be commonly used as the backbone for rubber cement and manufacturers sometimes add resins to increase its tack.

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Acknowledgements to:  
Stadsarchief Amsterdam, Jochem Kamps, Cristina Duran



Fig 1: Drawing mounted on cardboard support with rubber cement  
(© Roos Kliphuis)



Fig 2: Verso drawing, severely discoloured rubber cement stains  
(© Roos Kliphuis)



# The writing material papyrus

Its production, structure and quality



The importance of the Papyrus Collection Berlin is not only shown by its great size of about 40,000 objects, but also by its countless number of unique objects. The collection has diversity in languages (Hieratic, Demotic, Coptic, Greece, Latin, Pahlavi, Arabic, etc.) as well as writing materials (papyrus, parchment, leather, textile, paper, pottery, lime stone, wooden and wax tablets).

Papyrus is the main writing material of ancient Egypt, used from the Old Kingdom (ca. 2700 BC) to the Arabic Period (from the 9<sup>th</sup>-10<sup>th</sup> century). During a period of over 4000 years, the quality of the material changed and will be illustrated by prominent examples.

They will prove the statement of Pliny the Elder about the connection between quality and production place. In many cases the production place deviates from the archaeological site, which could be an indication for traffic and trade routes.

The significant criteria of papyrus enabled a chronological assignment. Based on material and technical observations (Figs 1 and 2), the way in which the papyrus plant was used to first create single sheets, then the papyrus rolls, and finally double sheets for the early codices is described. In addition, an overview of 40 years of conservation of papyrus is given.

If we 'read' the material and technique we learn more and more about this fascinating writing material. This knowledge helps us to understand the ancient handwritings in their historical context.

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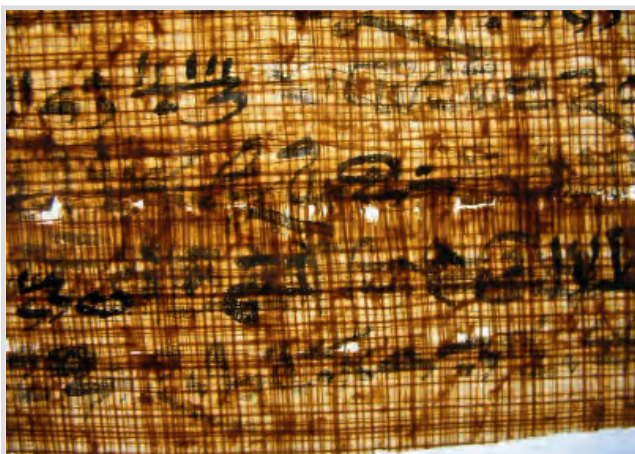


Fig 1: Sheet join, detail, transmitted light. Letter from Sennefer in Hieratic, 1400 BC, P 10463 (© M. Krutzsch)

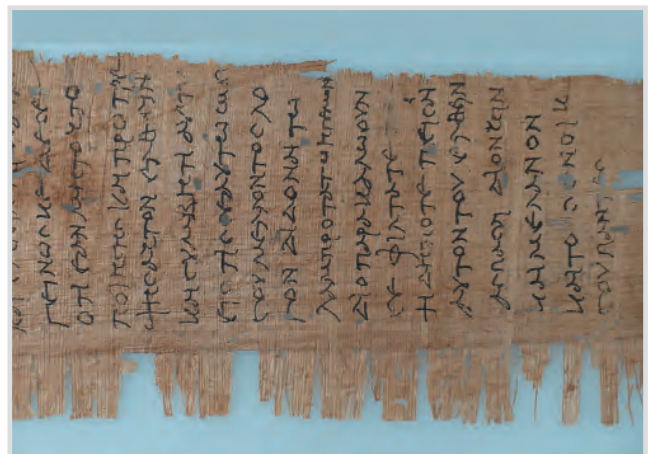
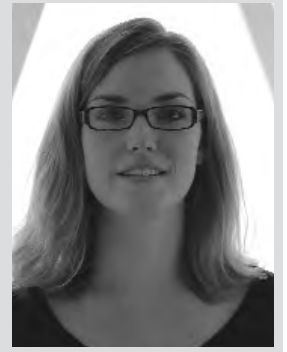


Fig 2: A special margin, detail, raking light. Privat letter in Greece, 2./3. century AD, P 6785, (© M. Krutzsch)

L. Leroy-Banti\*<sup>1</sup>, M. Gacquière<sup>1</sup>

## Designed, cut, folded

Use of a computer controlled cutting table to create specific conservation packaging



The new building for the National Archives in the north of Paris, which opened in 2012, allowed us to rethink our approach to packaging (Fig 1). Thanks to the new space we can now create packaging around documents instead of wedging the records in standard boxes.

Very large documents and awkward objects need specific packaging. The manufacturing of customized packaging is time consuming and quite expensive if out-sourced.

In 2013, thanks to the allocation of funds for fitting out of the new site, a computer controlled cutting table was purchased for the preservation studio, and some of the conservators have been trained to use it. The machine allowed the conservation studio to work on particular and unusual packaging, and create neat, reproducible designs.

The table enables us to save time in projects when numerous or customized packagings are required. For example, the packaging of a very large and fragile,

18<sup>th</sup> century transparent paper with iron gall ink or the packaging for 176 ancient relics. The manufacture of polyester stretchers and of tubes allows us to roll large documents (Fig 2).

Regarding the price of this machine, only institutions can afford it and make it profitable. We still prepare hand-made customized packaging, but only for single items, or when a format is beyond the capabilities of the table. When numerous packagings need to be made, the machine is very useful. Even though the templates were designed for the table, it is possible to hand-make all of them.

The taming of this tool enabled us to save time and money.

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Fig 1: Large document folded so as to be stored in a standard box  
(© Ludivine Leroy-Banti)



Fig 2: Positioning the document on the machine-made roll  
(© Ludivine Leroy-Banti)

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# Optimized measurement of dirt removal efficiency for books and archival documents

Comparison of different measurement and cleaning methods by using an adapted X-ray fluorescence spectrometer



In libraries and archives books, records and other items are stored under varying storage conditions. During storage, but also through disasters, materials can be covered with a wide variety of dirt or dust.

In regard to the different archived items and their degree of dirt (Fig 1) one needs to apply different methods of dirt or dust removal. The method of cleaning also depends on the chemical composition of the material to be cleaned.

Over all it should be our aim to use a process through which we can clean a high number of books and archival documents. In order to document a successful dirt removal, a variety of measurement methods are currently used. These are for example optical analysis and microscopic examination, measuring and sizing methods and chemical analysis which usually destroy or damage the original material.

For the classification of the dirt and to monitor the success an X-ray fluorescence spectrometer (XRF) was adapted to the conditions and parameters of archives at the Research Centre for Mass Conservation and Processing Systems for written cultural heritage (Member of IVEK at the University of applied sciences and arts, Hanover). The optimized contact-free and non-destructive chemical analysis can be used before and after the

cleaning process. This method can be used regardless of whether the dirt particles are embedded or layered on the paper structure.

In order to compare the different measurement methods and cleaning processes, documents from various national archives are treated and examined. The results have shown significant differences in quality and quantity of dirt on the examined material (Fig 2).

The following non-destructive examination of these documents with the adapted XRF produces accurate and precise results in regard to the dirt removal efficiency of the cleaning process. This method enables us to compare the different cleaning methods for books and archival documents. Furthermore the usage of the adapted XRF has shown also accurate results in regard to the evaluation of deacidification.

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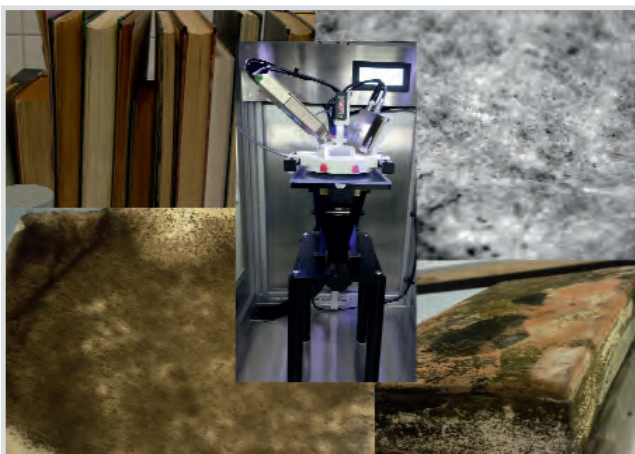


Fig 1: Surface dirt on different surfaces (© HsH)

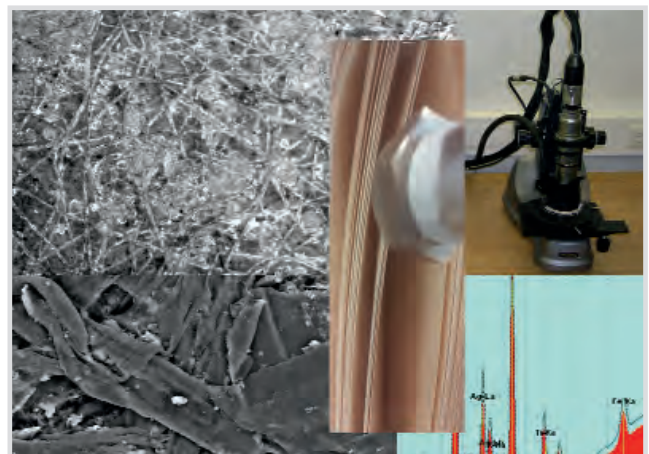


Fig 2: Measurement methods (© HsH)



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# The Palace-Theatre of Ostankino wallpaper project

18<sup>th</sup> century interior paper finish techniques – challenging conservation problems



The Palace-Theatre of Ostankino, built and decorated between 1792 and 1798, represents a unique collection of late 18<sup>th</sup> century wallpapers manufactured in Europe: from monochrome with vivid colours to exquisite panel borders printed with the use of 10 or more wooden blocks.

Such an exceptional set of wallpapers is not only interesting for its own quality of design and printing, typical of the French wallpapers of this period, but also for the uncommon skill of its installation on the walls and the ceilings: on canvas, on wooden base directly or over a layer of plaster. No extended scientific exploration has ever been done on these wallpapers, on their origins, and their installation. Some wallpapers are still hidden under newer installations like papers or textile wall coverings. Such multilayer wallpaper hanging issues are considered the most severe from the point of view of the forthcoming works (Figs 1 and 2).

Painted paper is another widely used finish in Ostankino. Potential conservation techniques for the famous painted ceiling of the theatre ballroom cause numerous disputes.

Some real numbers:

- The total area of the Palace is 6,500m<sup>2</sup>
- The total area of the Theatre ballroom and auditorium is 578m<sup>2</sup>
- The total area of the interiors decorated with wallpaper is 2,925m<sup>2</sup> (45%)
- The total amount of decorative and applied art objects in the Palace collections is 3,400 pieces: paintings, graphic arts, furniture, light fittings, statuary arts etc.
- Estimated project timing: 10 years

The unique character of the Ostankino wallpaper collection offers a challenge to art conservators: How shall we preserve the wallpapers and adapt the interiors to further museum operation?

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Fig 1 Italian Pavilion ceiling with decoupage appliques (©BaltStroy JSC)

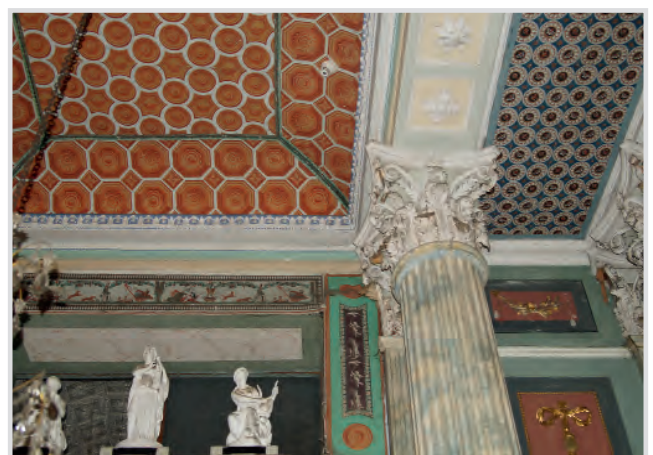


Fig 2: A wooden column decorated with paper imitating stone formations (© BaltStroy JSC)

B. Murr<sup>\*1</sup>, A. Hartl<sup>2</sup>

# Matteo Ripa's '36 Views of Jehol', the garden of the Emperor of China

Engravings of the early 18<sup>th</sup> century – a technique  
between two worlds



From 1711 to 1723 the Italian missionary Matteo Ripa was a member of a papal legation at the court of the Chinese Kangxi emperor. In 1713 the emperor commissioned him to print 36 views of the imperial garden in Jehol (now Chengde) in engraving technique. Ripa never had made an engraving, and had watched the technique only once in Italy. However, he mastered it and created 70 printouts, of which very few have survived. One copy Ripa brought to London in 1724 and presented it to King George I. and the English nobility. The views of the imperial garden in Jehol were so well received and inspired the landscape architect William Kent to introduce a new style of garden design – the '*Jardin Anglo-Chinois*'.

One copy of Ripa's engravings is a unique hand-coloured exemplar that belongs to the Museum für Angewandte Kunst, Vienna (MAK). Although originally bound as a book, the pages have been cut and remain loose as single sheets in the book cover. The album is not complete. The pages were extremely fragile; the use of

verdigris caused degradation of the paper with multiple tears and fractures, loose patches of paper, and lacunae as a result (Fig 1).

Japanese papers sprayed with the adhesive Plextol D 498 were used to support the original paper for mechanical stabilization. The support paper is just slightly adhered to the original in order to ensure reversibility. Loose patches of paper were re-fixed, and lacunae were completed and retouched (Fig 2). The prints are now mounted in mat boards to avoid mechanical stress.

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Fig 1: Matteo Ripa, View of Jehol: before conservation/consolidation  
(© MAK/ Beate Murr)



Fig 2: Matteo Ripa, View of Jehol: after conservation/consolidation  
(© MAK/ Georg Mayer)

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# A conservation project at the Academy of Fine Arts of Brera

A methodological approach



The Conservation School at the Brera Academy of Fine Arts in Milano recently acquired *'Théâtre de la Passion'*, a series of engravings made by Grégoire Huret in 1664. Originally it belonged to the Convent of Santa Maria al Carrobiolo in Monza. This acquisition induced an ambitious historical, technical and analytical investigation as a basis for a thorough conservation project. This project was made possible through interdisciplinary co-operation between the Academy students, scholars, teachers, and external researchers from other institutions.

Precise visual inspection allowed us to identify and record the works' characteristics and the conservation problems present. Historical research was carried out through consulting archival documents from the Department for Artistic and Historical Heritage, comparing other engravings by Huret preserved in European museums, and studying the preparatory drawings preserved in the National Library of Spain. With this background information, we could place the engravings in a correct context.

Technological study of paper and watermarks allowed us to identify the origin of the papers, and gave insight into 17<sup>th</sup> century French papermaking methods (Fig 1). By comparing papers from different origins and verifying the authenticity of their components, the diagnostic investigation formed a solid basis for further studies.

A number of analytical techniques were applied, such as colourimetry to determine the paper colour, densitometry

and measurement of paper's thickness to check the non-homogeneity of the sheets. The smoothness or roughness of the paper and board was determined, the pH measured and the surface wettability in relation to the different states of conservation were tested. Optical microscopy in combination with micro chemical analysis allowed for the identification of natural fibres, and Infra-red Micro-Spectroscopy FTIR-ATR identified adhesives. Scanning Electron Microscopy with X-ray microanalysis (SEM-EDS) and microbiological research contributed significantly to the knowledge of the paper composition and the degradation phenomena present.

The conservation project was planned using the collected data and was verified by microscopic observation of the results of the conservation procedures on the engravings (Fig 2).

This multidisciplinary research approach has allowed us to ensure an effective conservation, and contributed to the valuation of Huret's engravings.

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Fig 1: Watermark analysis by students (© Laura Barzaghi)



Fig 2: Conservation procedure testing (© Laura Barzaghi)



# Nanosilver as a disinfection method

## A new and effective method for treating contaminated paper material



Historical paper materials are very susceptible to biodegradation. The consequences can be inhibited by applying a disinfection method.

The purpose of the study was the assessment of the influence of silver nanoparticles (AgNPs) misting disinfection on mechanical and optical properties of paper materials (Fig 1). The tests were carried out on a historic paper map (18<sup>th</sup>-19<sup>th</sup> century), and on five model paper samples: chemi-thermomechanical pulp (CTMP), bleached spruce sulphite pulp (Sy); bleached pine kraft pulp (Sa), bleached hemp kraft pulp (Hmp), bleached groundwood from spruce (GW).

The historic paper map and the five sample papers were disinfected using AgNPs misting (90ppm, 10-80nm). Antimicrobial properties were determined for pure culture collection microorganisms by using AATCC 100 method. Materials were subjected to accelerated light ageing that simulated 24 years of museum exposure. Moreover, mechanical and optical parameters were determined. The historical paper map was contaminated by applying 10<sup>9</sup> CFU/cm<sup>2</sup>.

The AgNPs misting resulted in the reduction of moulds (*A.niger*, *C.herbarum*) by 99.9–100%. The process was not efficient for bacteria (*B.subtilis*).

In model studies, the fungal number (*A.niger*) was reduced by 46-96% and bacterial (*B.subtilis*, *E.coli*, *S.aureus*) by 28-98%. The best disinfection results were obtained on groundwood paper (82-97%), while the lowest were for hemp pulp (28-73%) (Fig 2).

Strength and colour tests showed that AgNPs misting is safe for spruce and pine papers. The artificially aged disinfected materials showed no changes of colour parameters, but their mechanical properties changed by 0-15%. However, those changes were mostly connected with ageing, not the disinfection process.

AgNPs misting is an effective and safe method of paper disinfection. The process should be performed carefully considering the possible occurrence of damage.

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Fig 1: The chamber for silver nanoparticles misting, front (© Katarzyna Pietrzak)

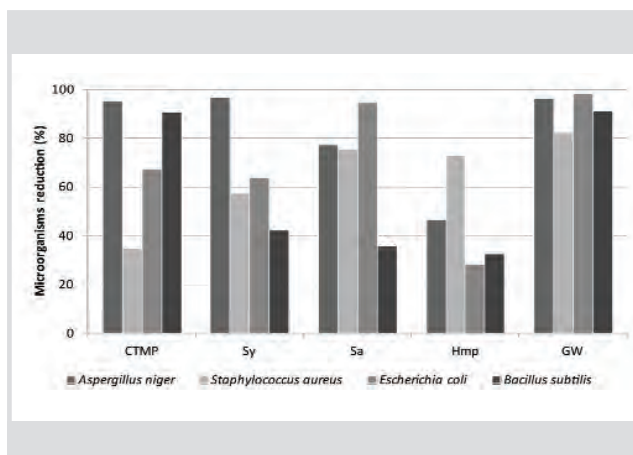


Fig 2: The microorganisms reduction on 5 different kinds of papers (© Katarzyna Pietrzak)

M. Pronobis-Gajdzis\*

# From restoration to conservation

Past and present in the field of conservation of historical codices



Transformation of the principles of conservation and restoration of historical monuments took place in Poland after World War II. This phenomena was observed in many European countries damaged during the war. In 1946, Jan Zachwatowicz, a leading Polish architect, postulated the thorough reconstruction of destroyed monuments. This perspective was quite exceptional in Europe and led to large reconstruction projects all over Poland.

In western Europe, the field of conservation started to be normalized quite soon. In 1963 the *'Theory of conservation'* by Cesare Brandi was published. Papers and lectures of Brandi influenced the content of the Venice Charter in 1964.

On the contrary, Poland continued to follow the principles once established by Zachwatowicz, which were formulated in an exceptional, post-war situation. Conservation measures were based on intuition and subjective assessment of the conservator. In the 1980s, it was hard to accept a situation in which rules of acting in dramatic circumstances suspended any up-to-date and internationally agreed conservation ethics.

At present in Poland situation has changed. The most important trend in conservation theory is the philosophy of preventive conservation, which can be defined within three main rules:

1. Do not intervene with the historical substance until necessary
2. Assure optimal climate / microclimate
3. Assure continuous monitoring of the condition of objects

This new way of thinking has changed the conservation environment and treatment decision making. This allows us academic teachers to create new ways of conservation teaching, which include not only the traditional focus on a single object – but modern conservation thinking. These changes influence also my particular field of interest – preservation and conservation of historical book collections. Special attention should be paid to the development of preventive measures of archival and library collections in Poland.

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Fig 1: To achieve a simultaneous strengthening and deacidification of individual pages of a book with this traditional technique requires to debind the book block beforehand (© M.Pronobis-Gajdzis)

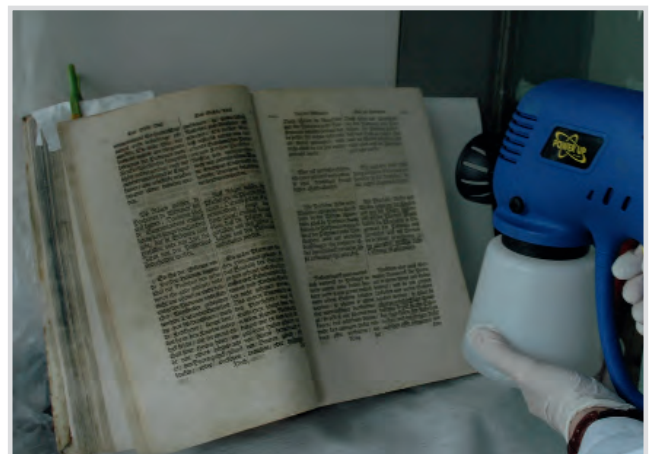


Fig 2: With this technique, a simultaneous strengthening and deacidification of individual pages of a book is possible while keeping the original binding intact (© J. Czuczko)

# Mounting an illuminated parchment document with a wax seal

Use of magnets and a Perspex seal shell to enable presentation in an upright position



This contribution focuses on an illuminated crest letter issued in Tyrol in 1610. It is written in black ink on parchment, and has a large wax seal which is broken in several pieces (Fig 1). The focus of this work was to develop a mounting system for the document that would also stabilise the wax seal without the introduction of glue.

For this purpose, a plaster cast of the seal was made and a sheet of thin Perspex was then shaped to fit the cast. The finished shell was cut into two halves that can be re-assembled with a puzzle-like system. This allowed the careful placement of the wax seal parts in the Perspex shell which fits tightly enough to hold the parts together.

For mounting the parchment document, stripes of Japanese tissue were adhered along the edges of the parchment and were attached at the other end with small earth magnets to a strip of magnetic tape sunk flush into

a honeycomb panel. Thus, the magnets are not in direct contact with the parchment. Flat earth magnets were also attached to the bottom of the Perspex seal shell and are held in place by another piece of magnetic strip. The mounting elements are covered by a passe-partout, and the honeycomb panel backing was mounted in a frame. This mounting system allows for the presentation of the document together with its seal in an upright position (Fig 2).

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Fig 1: Folded document before mounting (© Sophie Rabitsch)



Fig 2: Mounted document (© Sophie Rabitsch)



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# FRAGILE! Handle with care!

The effects of vibrations on pastels during transport – research methodology



Pastel paintings are considered some of the most fragile artworks. Because the medium is barely attached to the support, each movement is a risk. In theory, museums don't lend pastels; in practice, the number of exhibitions including pastels has increased, which means that pastels are moved (Fig 1).

Standards exist for light, relative humidity and temperature, but risks related to vibrations are still misunderstood and underestimated (Fig 2). A collaboration between the Rijksmuseum, the Cultural Heritage Agency of the Netherlands, and the Technical University of Delft launched a research project in 2010, including a PhD project, to provide standards for vibrations,

The research methodology, which for the first time brought together vibration-monitoring technologies from aerospace engineering and conservation, will be presented in this poster. The tools available for conservators to monitor vibrations and their effects will be shortly introduced. Damage monitoring methods based on image

processing software and surface micro-roughness measurements will be highlighted. The concept of 'fatigue life' or 'transport history' will finally be proposed to predict cumulative damage due to vibrations.

This relationship between vibration levels, duration and damage will help answer two questions: 'What is the maximum vibration level acceptable for one transport?' and 'How long and how many times can one pastel be transported this way?'

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Fig 1: Internal transport of a pastel painting from the Rijksmuseum, Amsterdam (© Leila Sauvage, Rijksmuseum Amsterdam)



Fig 2: Detail of the bottom rebate of a framed pastel showing loss of medium after internal transport (© Rijksmuseum, Amsterdam)

# In velvets and satins

Book and textile conservators – where do we meet?



Used for covering books, delicate textiles like silk often show severe deterioration. Intense use results in superficial abrasion and in weakened or torn joint and spine areas. At this point, the different approaches of book and textile conservators – sticking versus sewing – should be discussed.

This study focused on two bindings from the collection of the Staatsbibliothek zu Berlin-PK bound: (1) A 13<sup>th</sup> century parchment manuscript with a silk-velvet hardcover from the 18<sup>th</sup> century (Fig 1) and (2) an incunabula with a limp-leather binding with a sewn-on silk-jacket (Fig 2). Both bindings shared the ‘typical’ spine damages of severely thinned out and torn textiles.

*Case study 1:* The conservation treatment included underlaying the large missing areas with dyed silk. Additionally, a fine transparent conservation net made of monofilament nylon tulle was stretched over the damaged spine. The textile conservators endeavoured to protect the fragile original fabric using special stitches to connect the layers. Most important was the dialogue between book and textile conservators in order to find a solution that secures the fragile textile as well as enables

the function of spine and joint while opening the book. As optional methods for the mechanical removal of residual adhesives from the textile spine of the 13<sup>th</sup> c object were considered: laser cleaning, ultrasonic chisel, or traditional cleaning with moisture and scalpel.

*Case study 2:* The silk-jacket of the limp binding was torn at the spine and along its original sewing attachment to the leather cover. As it wasn’t possible to treat the textile in situ, it was jointly decided to remove the jacket, underlay it and sew it on a new silk twill carrier. It was then re-sewn onto the bookcover.

Some codicological aspects of the extraordinary material assembly will be highlighted.

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\*2 Freelance Textile Conservator, Art Detox GmbH, Berlin, DE.

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Fig 1: Velvet hardcover binding with badly damaged spine (© B. Schütrumpf)

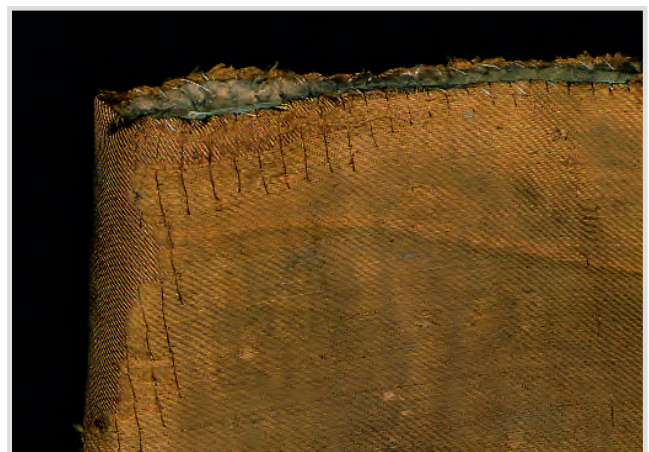


Fig 2: Limp binding after treatment (© B. Schütrumpf)

M. Carme Sistach<sup>\*1</sup>, J. Jiménez<sup>2</sup>, M. Clemente<sup>2</sup>, G. García<sup>2</sup>, E. Marín<sup>2</sup>, J. F. García<sup>2</sup>

## Gelatine GEOL with alkaline compounds

Treating ink corroded manuscripts by simultaneous deacidification and reinforcement



Acidic hydrolysis and oxidation of cellulose are the chemical processes that describe manuscript corrosion promoted by iron gall ink. Where the corrosion is advanced, the mechanical strength of the paper is lost and manipulation impossible. Therefore, the conservation treatment requires sometimes besides deacidification also additional reinforcement of the paper material. Gelatine has already been tested as a compound that provides reinforcement to the paper manuscripts. At pH range 5.5–7.0 the iron ions show the lowest oxidation activity.

Our research compiles results obtained by using GEOL gelatine (alkaline extraction, Bloom 210-240, Net 20, pH = 4.2-6.5, Henkel Iberica), dissolved in a mixture of 40% water: 60% ethanol, at a concentration of 3-4.2%. Different deacidifying compounds are added to the GEOL gelatine. GEOL gelatine permits calcium propionate to dissolve at several concentrations and keeps micro calcium carbonate particles and calcium hydroxide nanoparticles (CSGI, University of Florence) in suspension.

Each alkaline compound in this GEOL media was used for a combined deacidification / lining treatment on extremely corroded manuscripts (Fig 1). The treatment was

carried out in the regular way by brushing a very thin tissue (NAO-KOO: 3g/m<sup>2</sup>) onto an ink corroded document using the alkaline gelatine mixture (Fig 2).

The surface pH values before and after the deacidification / lining process suggest local activity for each alkali tested. SEM-EDX shows a homogeneous surface distribution of the nano- or micro alkaline particles. The pH values obtained are different in the ink and the paper. Acidity and alkalinity as well as the kinetic of extraction, show the local activity of the paper alkaline reserve. The raising of pH in inked areas also reduces the oxidative corrosion.

Acknowledgment: We want to thank CGSI, University of Florence that provided the calcium hydroxide nanoparticles.

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<sup>2</sup> Analytical Chemical Department University of Barcelona, Barcelona, ES



Fig 1: Corroded manuscript before treatment (© Ministerio de Educación Cultura y Deportes, Spain)



Fig 2: Manuscript after treatment: GEOL+ alkali +tissue (© Ministerio de Educación Cultura y Deportes, Spain)



# Disinfecting storage facilities of historic paper

Microbial air quality and comparison of three air disinfection methods



Microbial contamination of libraries and museums may cause biodegradation of stored historical paper objects as well as employe health problems (Fig 1).

The aim of this study was the quantitative and qualitative assessment of air microbial contamination in library and museum storage facilities, and comparing the disinfection effectiveness of 3 methods: > photocatalytic ionization ('FreshAir' air purifiers), > UV irradiation (MEDIVENT flow lamps) and > chemical disinfection by misting with quaternary ammonium compounds (QACs) (Mgla-E TURBO electrical sprayer).

The air was sampled with a MAS-100 Eco Air Sampler. Microorganisms was determined by culture and molecular methods based on microscopic, biochemical and 16RNA or ITS1/ITS2 sequences.

In the library, the microorganisms number was  $3.0 \times 10^2$ – $6.9 \times 10^2$  CFU/m<sup>3</sup> prior to the disinfection process. In the museum, the number of microbes was higher,  $5.4 \times 10^2$ – $4.0 \times 10^4$  CFU/m<sup>3</sup>. In both environments the prevalent microorganism group was fungi. In museum and libraries, the most commonly isolated microorganisms were: *Bacillus*, *Kocuria*, *Micrococcus*, *Paenibacillus*, *Pseudomonas*, *Staphylococcus*, *Aspergillus*, *Cladosporium*, *Mucor*, *Rhizopus*.

Photocatalytic ionization and UV irradiation were found to be highly effective in reducing the microorganisms number (reduction R=73–99%). Chemical disinfection showed lower efficiency (R=0–84%), but it was found to be superior in terms of mould elimination, especially to those resistant to other methods. Longer disinfection time of photocatalytic ionization and UV irradiation increased the process effectiveness (minimum duration of 2 or 3 days at continuous process), while the microorganisms elimination due to QAC disinfection was short-term (up to 1 day).

All tested disinfectant methods efficiently eliminate pathogenic or potentially pathogenic microorganisms from storage areas (Fig 2).

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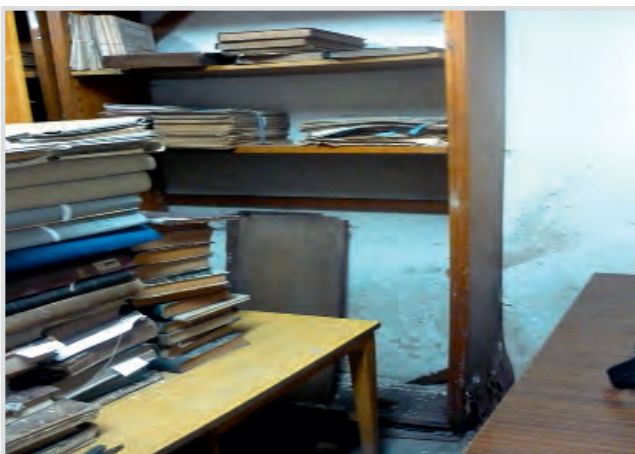


Fig 1: Storage room in tested library (© J. Skóra)

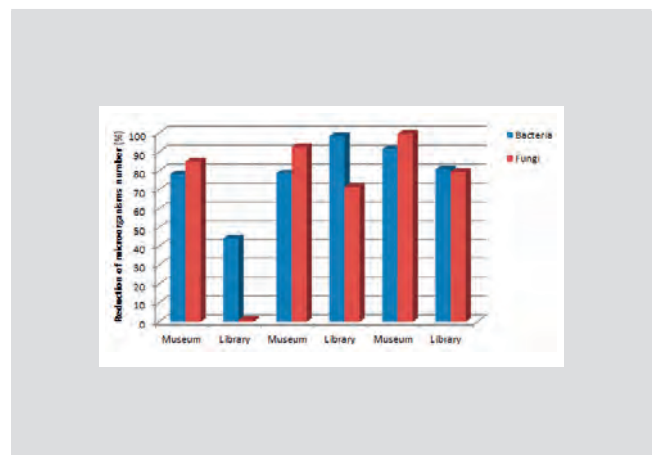


Fig 2: Effectiveness of disinfection methods. Left: chemical misting, Middle: UV irradiation, Right: photocatalytic ionization (© J. Skóra)

# Cellulose derivative nano-fibers

## Applicability as strengthening agent for paper materials



In this paper, a strengthening method involving the homogenous application of nano-fibers on the surface of degraded paper using the electrospinning (ES) method was investigated. We examined the strengthening effect of electrospan nano fibers made from cellulose derivatives. Naturally aged books, published in 1960 and aged for 50 years in a favorable environment, were used for this study.

Cellulose derivatives used to make nano fibers were hydroxypropyl cellulose (HPC), methyl cellulose (MC), and carboxymethyl cellulose (CMC). Nano-fibers were generated using an ES labo machine (Fig 1). Four injectors were used in order to generate threads of approximately 2g/m<sup>2</sup> on the surface of the target paper.

To evaluate the effectiveness of the treatment, we measured the physical properties of the sample before and after undertaking artificial ageing. Accelerated ageing was performed in compliance with ISO 5630-5. An acoustic emission monitoring test was also carried out for comparison.

Through these investigations, it became clear that a nano fleece layer is a good compromise between the strengthening effect and an ease of reading written information. Strengthening using cellulose derivatives all gave satisfactory results with tearing strength and acoustic emission monitoring (AE), but not with tensile strength. The strengthening effect of tearing strength, AE, and folding endurance was better with CMC nano fibers than with HPC or MC nano fibers (Fig 2).

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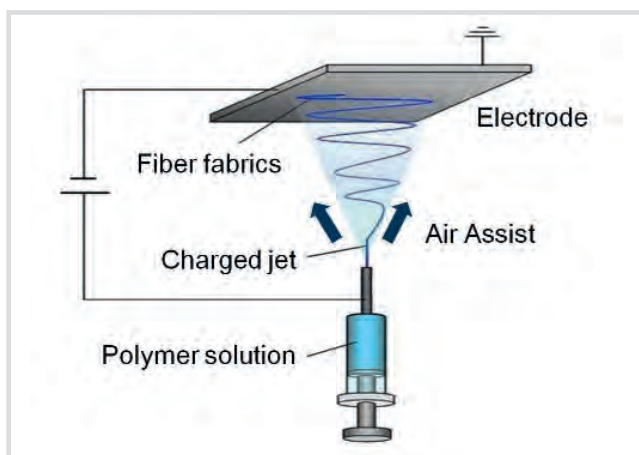


Fig 1: Schematic views of electrospinning equipment  
(© Kochi Prefectural Paper Technology Center)

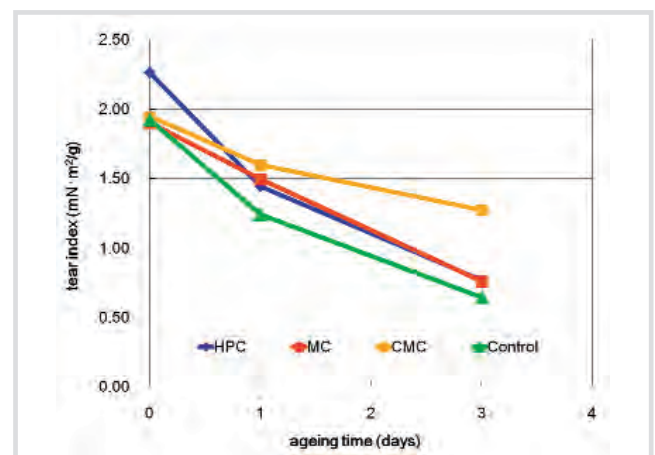


Fig 2: Changes in tearing strength (© Kochi Prefectural Paper Technology Center)

# Nanocelluloses for paper stabilisation

## Compatibility and stability of paper-nanocellulose composites



Historical manuscripts and documents of the early modern period are often locally damaged by exogenous influence and mechanical load during their usage. Modern papers are also degraded in their paper structure by exogenous and likewise endogenous degradation processes of cellulose or suffer from poor quality of materials. The stabilisation of such papers is very important because further use of the object can cause additional damage. This applies in particular to rather exposed parts such as edges of paper sheets.

Different types of nanocellulose are interesting as a novel stabilising material for paper due to their close structural relation to the paper matrix. This can lead to high compatibility between the paper substrate to be treated and the compounds used for their repair. The structural similarity together with the extremely fine morphology of nanocelluloses should allow for little optical interference, hence low visibility, of the overall treatment. The aim of the present study was to compare two different nanocelluloses, i.e. bacterial nanocellulose and a mechanically nanofibrillated cellulose, with regard to their performance in stabilisation of fragile papers.

In order to judge the applicability of this treatment in paper conservation, the general handling was tested and optimized first. This step is necessary as nanocelluloses are in the form of aqueous suspensions with a very large ratio of water to cellulose and thus behave differently from classical cellulose suspensions.

With regard to material handling and application in conservation steps, different ways of reducing the water content have been tested as well. The resulting suspensions have been applied to historical papers from several centuries with different forms of damage. The paper-nanocellulose composites from these tests were further characterized by different physical and chemical analyses. Besides addressing the issue of an overall mechanical stabilisation effect, focus was placed on long-term stability and the behavior of the newly generated fiber-fiber network during accelerated ageing and its effects on the historic material.

In order to get a deeper insight into the system, not only mechanical tests have been performed, but the newly formed composite was also analysed by means of microscopic (SEM) (Figs 1 and 2) and chromatographic techniques (SEC-MALLS with carbonyl group profiling) before and after accelerated ageing.

The paper will discuss the applicability and stability of the differently prepared nanocellulose suspensions with regard to their long-term performance. Advantages and limitations will be discussed in detail.

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<sup>2</sup> University of Natural Resources and Life Sciences, Department of Chemistry, Vienna, AT

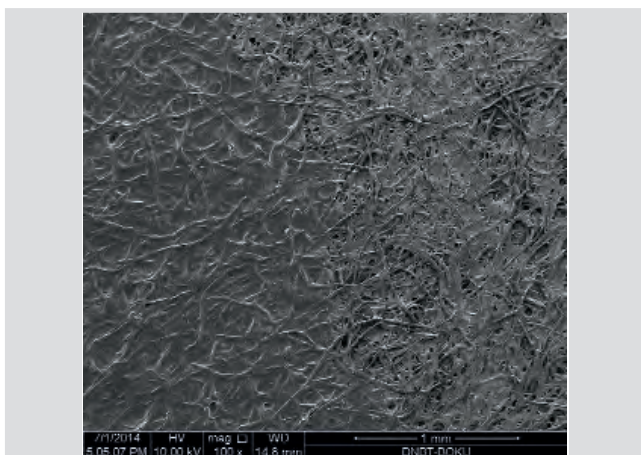


Fig 1: SEM image of a Whatman no. 1 paper treated with bacterial nanocellulose. A clear borderline between the treated (left) and the untreated (right) areas is visible (© K. Ahn, BOKU Vienna)

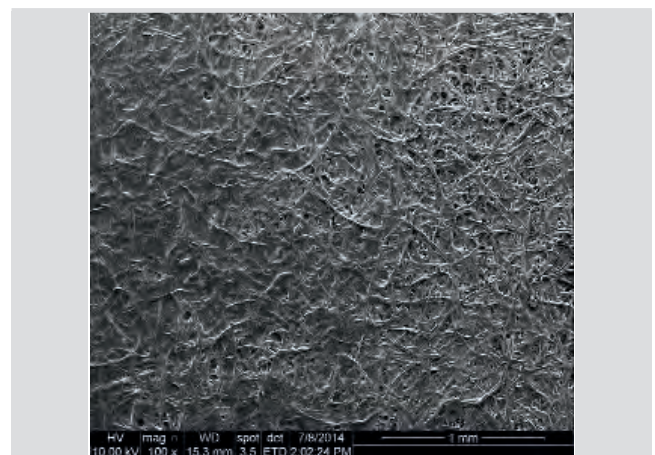


Fig 2: SEM image of a Whatman no.1 paper treated with nanofibrillated cellulose. The borderline between the treated (left) and untreated (right) areas is not as clear as with bacterial nanocellulose (Fig 1) (© K. Ahn)



# Autocatalytic kinetics of a multivariate system

A degradation study of ancient papers in sealed vessels



Several studies have documented that sealed-vessel ageing more closely mimics that of papers in libraries and archives. However, the kinetic equation describing the process is quite difficult to model owing to the complexity of the system. An approximate autocatalytic-kinetic equation has been suggested, but insufficient studies have ascertained its effective suitability. Moreover, no study has so far experimentally evaluated how sizing materials and iron-gall inks influence the degradation mechanism and kinetics of cellulose in sealed vessels.

This research aims at filling the gap of knowledge about the degradation kinetics of a multicomponent cellulose-system in closed environments by experimentally evaluating the applicability of the proposed autocatalytic equation. To this end, a gelatin sizing and different iron-gall inks were considered and their interactions with cellulose were investigated (Fig 1). A long-lasting approach was explored by a more than 400 days process of sealed-system ageing in order to fully unravel the degradation pathway.

Results clearly underpin an autocatalytic mechanism of pure cellulose breakdown, greatly enhanced by iron-gall inks through the release of degrading volatile organic compounds in a very short time, as compared to the whole process. Emissions visibly deform the autocatalytic shape, causing a degeneration to an apparently auto-retardant curve in the initial steps of the process. Experimental evidences show the protective role of the size with a reduction of the rate of degradation and the autocatalysis as the dominant mechanism even if iron-gall inks are present (Fig 2). Thus, the proposed autocatalytic equation suitably describes the degradation of papers in closed environments.

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<sup>2</sup> School of Cultural Production and Conservation of the Cultural Heritage – Università Ca' Foscari, Venice, IT



Fig 1: Scheme of the multivariate paper-system characterizing archival holdings (books, bundle, stacks, ...). The sealed-system ageing was exploited by using heat-sealed glass tubes (above right) (© Zaccaron Sara)

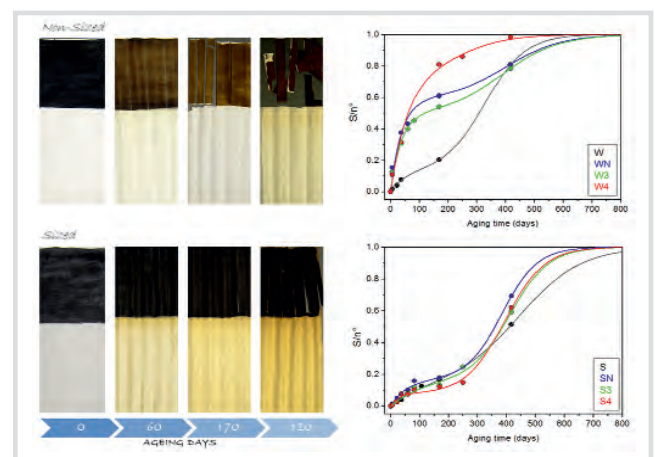


Fig 2: Samples with iron-gall ink N over a long-lasting sealed-system ageing (left). Autocatalytic mechanism of degradation (right) for non-sized (above) and sized (bottom) samples (© Zaccaron Sara)

# Vendors



## **Belo Restaurierungsgeräte GmbH**

<[www.belo-restauro.de](http://www.belo-restauro.de)>

## **Beskid Plus**

<[www.beskidplus.com.pl](http://www.beskidplus.com.pl)>

## **Conservation by Design Limited**

<[www.conservation-by-design.com](http://www.conservation-by-design.com)>

## **Deffner & Johann Restaurierungsbedarf und Denkmalpflege – seit 1800**

<[www.deffner-johann.de](http://www.deffner-johann.de)>

## **Docusave**

<[www.docusave.ch](http://www.docusave.ch)>

## **Gangolf Ulbricht, Werkstatt für Papier**

<[www.gangolfulbrichtpapier.com](http://www.gangolfulbrichtpapier.com)>

## **GMW, Werkzeuge für Papierrestauratoren**

<[www.gmw-gabikleindorfer.de](http://www.gmw-gabikleindorfer.de)>

## **Lichtblau e.K.**

<[www.lichtblau-germany.com](http://www.lichtblau-germany.com)>

## **Lup AG**

<[www.lup-ag.de](http://www.lup-ag.de)>

## **Rheinmetall Nitrochemie**

<[www.nitrochemie.com](http://www.nitrochemie.com)>

## **Römerturm Feinstpapiere**

<[www.roemerturm.de](http://www.roemerturm.de)>

## **Schempp Bestandserhaltung GmbH**

<[www.schempp.de](http://www.schempp.de)>

## **Talas**

<[www.talasonline.com](http://www.talasonline.com)>

## **Tru Vue**

<[www.tru-vue.com](http://www.tru-vue.com)>





# Tours...



## Tours, visits and workshops

Thanks to our colleagues in Berlin, we are able to offer a great variety of activities like tours, visits and workshops in and around Berlin. These will be held in English and/or German.

### 1 Archaeological Centre Berlin and German Historical Museum (DHM)

#### Storing concepts: papyri, posters, banners and more

Archaeological Centre Berlin: The new papyri depot – an insight into the storage of objects

German Historical Museum (DHM): An insight in the storage of objects. Mounting of objects in paper conservation, poster conservation, demonstration banners – storage concept at the DHM

- > Led by: Anne Schorneck, Barbara Korb, Matthes Nützmann, Christine Göppinger
- > **09:00 – 11:15** / German
- > Number of attendees: max. 12
- > Meeting point: Depot der Papyrussammlung, Archäologisches Zentrum, SMB / SPK, Geschwister-Scholl-Straße 6, 10117 Berlin



### 2 New Museum / Neues Museum and German Historical Museum (DHM)

#### Exhibiting papyri / Mounting and storing at DHM

New Museum: exhibition of papyri in the Niobidensaal: Innovative exhibition cases which are designed for the presentation of light-sensitive ancient documents.

Paper Conservation at the German Historical Museum (DHM): Mounting of objects in paper conservation, poster conservation, demonstration banners – storage concept in the DHM.

- > Led by: Myriam Krutzsch, Barbara Korb, Matthes Nützmann, Christine Göppinger
- > **09:00 – 11:15** / German
- > Number of attendees: max. 12
- > Meeting point: Neues Museum, Niobidensaal, Bodestraße 1-3, Museum Island / Museumsinsel, 10178 Berlin



### 3 German Historical Museum (DHM)

#### Paper Conservation at the German Historical Museum (DHM)

Mounting of objects in paper conservation, poster conservation, demonstration banners – storage concepts

- > Led by: Barbara Korb, Matthes Nützmann, Christine Göppinger
- > **10:15 – 11:15** / English
- > Number of attendees: max. 15
- > Meeting point: Deutsches Historisches Museum (DHM), Geschwister-Scholl-Straße 8, 10117 Berlin

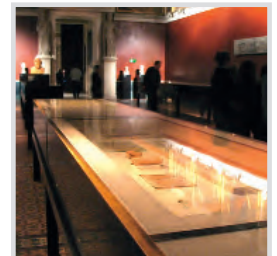


### 4 New Museum / Neues Museum

#### Exhibition of papyri in the Niobidensaal

Innovative exhibition cases which are designed for the presentation of light-sensitive ancient documents are shown.

- > Led by: Myriam Krutzsch
- > **10:00 – 10:45** / German  
**11:00 – 11:45** / English  
**14:00 – 14:45** / English
- > Number of attendees: max. 12
- > Meeting point: Neues Museum, Niobidensaal, Bodestraße 1-3, Museum Island / Museumsinsel, 10178 Berlin



### 5 The new papyri depot in the Archaeological Centre Berlin

#### An insight in the new storage of papyrus objects

Five archaeological collections of international renown use the modern building of the Archaeological Centre Berlin as an interdisciplinary platform for their staff, for their research and scientific work, and for their laboratories and research instruments. You will visit the new storage rooms of the Ägyptisches Museum und Papyrussammlung.

- > Led by: Anne Schorneck
- > **10:00 – 10:45** / German  
**11:00 – 11:45** / English  
**14:00 – 14:45** / English
- > Number of attendees: max. 12
- > Meeting point: Depot der Papyrussammlung, Archäologisches Zentrum, Geschwister-Scholl-Straße 6, 10117 Berlin

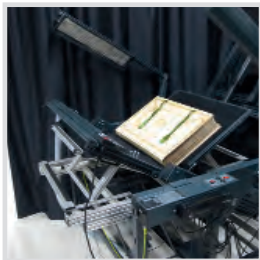


## 6 Staatsbibliothek zu Berlin

### Digitization – a challenge for conservators

The workflow of digitization of the special collections is presented. The complex role of conservators is emphasized: from reviewing of objects to the training of staff.

- > Led by: Marie Grotewohl, Barbara Haßler
- > **10:00 – 11:00** / German and English
- > Number of attendees: max. 15
- > Meeting point: Staatsbibliothek zu Berlin, Restaurierungswerkstatt, Dorotheenstraße 27, 10117 Berlin



## 7 Staatsbibliothek zu Berlin

### Safe for the future – a large scale conservation project

A new concept for housing a large collection of musical manuscripts from the 17<sup>th</sup> to 19<sup>th</sup> century will be presented including the dry cleaning, minimal stabilization treatments and the complete rehousing of approximately 17,000 objects.

- > Led by: Katarzyna Schirmacher
- > **10:00 – 11:00** / German  
**12:00 – 13:00** / English
- > Number of attendees: max. 10
- > Meeting point: Staatsbibliothek zu Berlin, Conservation studio, Dorotheenstraße 27, 10117 Berlin



## 8 Staatsbibliothek zu Berlin

### Islamic manuscripts – the conservation support and monitoring of a digitization project

At this meeting the project will be introduced as start for an exchange of experiences among the participants. Some experience with the conservation of Islamic manuscripts is desired. Discussions and exchange are welcome!

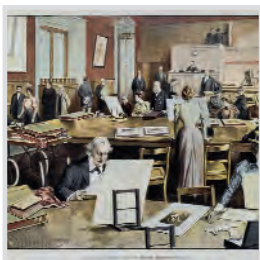
- > Led by: Ira Glasa, Katharina Wewerke, Christine Theuerkauf-Rietz
- > **10:00 – 11:00** / English
- > Number of attendees: max. 15
- > Meeting point: Staatsbibliothek zu Berlin, Conservation studio, Unter den Linden 8, 10117 Berlin



## 9 Museum of Prints & Drawings / Kupferstichkabinett

### Development of mounting and storage systems and their adaptation to the frequent use in the study room

- > Led by: Georg Josef Dietz
- > **10:00 – 11:30** / German  
**12:30 – 14:00** / English
- > Number of attendees: max. 18
- > Meeting point: Kupferstichkabinett, Matthäikirchplatz 8, 10785 Berlin



## 10 Prussian Secret State Archives / Geheimes Staatsarchiv

### Guided tour through the storage area as well as the conservation workshop from a preservation and conservation perspective

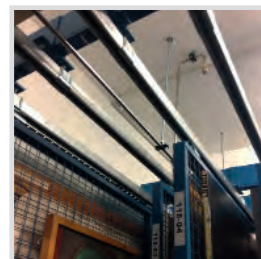
- > Led by: Hinrich Peters
- > **13:00 – 16:00** / German and English
- > Number of attendees: max. 15
- > Meeting point: Geheimes Staatsarchiv, Archivstraße 12-14, 14195 Berlin



## 11 Berlin Gallery / Berlinische Galerie

### A new high pressure fire-suppression system

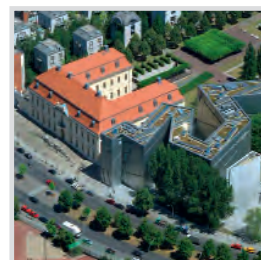
- > Led by: Maria Bortfeldt
- > **10:00 – 10:45** / German
- > Number of attendees: max. 20
- > Meeting point: Berlinische Galerie, Landesmuseum für Moderne Kunst, Fotografie und Architektur, Alte Jacobstraße 124-128, 10969 Berlin



## 12 Jewish Museum / Jüdisches Museum

### Permanent change – Presentation of objects in the permanent exhibition

- > Led by: Stephan Lohrengel
- > Please arrive 15 minutes early for security check!  
**10:00 – 11:30** / German  
**11:45 – 13:15** / English.
- > Number of attendees: max. 15
- > Meeting point: Jüdisches Museum, Lindenstraße 9-14, 10969 Berlin



## 13 Bauhaus Archives / Bauhaus Archiv, Museum für Gestaltung

### Guided tour through the new permanent exhibition of the Bauhaus Collection (newly conceived in February 2015)

Focus: Care of a mixed collection of the early 20<sup>th</sup> century, view of single objects and their specifics

- > Led by: Antje Möller
- > **10:00 – 11:00** / German  
**12:00 – 13:00** / German
- > Number of attendees: max. 15
- > Meeting point: Bauhaus Archiv, Museum für Gestaltung, Klingelhöferstraße 14, 10785 Berlin





#### 14 Stiftung Stadtmuseum

##### Exhibition preparation at the Adolf-Menzel-Workshop in the Art on Paper Collection

- > Led by: Katharina Plate
- > **10:00 – 11:30** / German, **14:00 – 15:30** / German
- > Number of attendees: max. 15
- > Meeting point: Stiftung Stadtmuseum, Poststraße 16, 10178 Berlin

#### 15 State Archives of Brandenburg / Brandenburgisches Landeshauptarchiv

##### Moving an archive – Opportunities for conservation and restoration

- > Led by: Ingrid Kohl
- > **10:00 – 11:30** / German  
**13:00 – 13:30** / German
- > Number of attendees: max. 15
- > Meeting point: Brandenburgisches Landeshauptarchiv, Restaurierungswerkstatt, Am Mühlenberg 3, 14476 Potsdam OT Golm



#### 16 Peacock Island Palace / Pfaueninsel Schloss

##### Study trip island and castle with focus on historic wall papers of Berlin manufacture

Inspired by Jean Jacques Rousseau's idea 'back to nature' and the discovery of the South-See Islands in the late 18<sup>th</sup> century, an enthusiasm for islands in Europe started. The Peacock Island is an extension of the landscape design 'New Gardens' on the banks of the Sacred Lake in Potsdam, built by King Friedrich Wilhelm II. We will first visit the 1795 completed Peacock Island Palace, where we find unspoiled references of Berlin wallpaper production of this time (Berlin, Pfaueninsel, Schloss, Erinnerungszimmer, Blick in Raumecke. © Stiftung Preußische Schlösser und Gärten Berlin-Brandenburg/Wolfgang Pfaufer), followed by a walk on the island, where we will enjoy beautiful views of historic buildings and a unique landscape. Lunch break is possible in the 'Wirtshaus zur Pfaueninsel'.

- > Led by: Wiebke Müller
- > **10:15 – 13:00** / German  
**14:15 – 17:00** / English
- > Number of attendees: max. 20
- > Meeting point: at the ferry to Peacock island. Go to station S-Bahnhof Wannsee and take the bus No. 218 which stops at the ferry

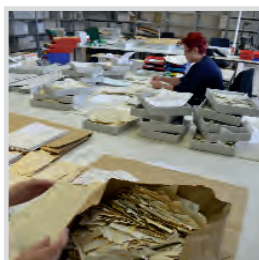


#### 17 State Security Service of the former GDR / Archiv der Staatssicherheit

##### The history of the State Security Service of the former GDR (BSStU)

Guided tour of the archives and the restoration workshop

- > Led by: Angela Börnge
- > **10:00 – 12:00** / German  
**10:00 – 12:00** / English
- > Number of attendees: max. 20
- > Meeting point: Ruschestraße 103, 10365 Berlin



#### 18 Gangolf Ulbricht Werkstatt für Papier

##### Identification of European handmade paper, tools and raw materials

- > Led by: Gangolf Ulbricht
- > **10:00 – 12:00** / English  
**13:00 – 15:00** / German
- > Number of attendees: max. 8
- > Meeting point: Werkstatt für Papier, Mariannenplatz 2, Bethanien, 10997 Berlin



#### 19 Workshop: Christina Meier-Wolff

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##### Mold versus cleanliness and climate – a salutary challenge or is the dry cleaning sufficient as decontamination?

In addition to the fundamentals, we will conduct cleaning tests on different surfaces. With the bioluminescence (ATP/AMP) method the participants can verify their effectiveness and discuss their own mold problems.

- > Led by: Christina Meier-Wolff
- > **10:00 – 13:00** / German
- > Number of attendees: max. 10
- > Meeting point: Atelier Gesine Siedler, Köpenicker Straße 175, Fabrikgebäude im 2. Hinterhof 3. Etage, 10997 Berlin
- > Workshop fee: Euro 20.00 (to be paid on site directly)

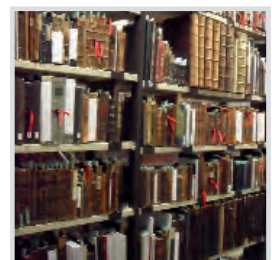


#### 20 Library / Bibliothek für Bildungsgeschichtliche Forschung (BBF)

##### 'Preservation and Conservation in Libraries, archives and museums without in-house conservation studios'

Talk and guided tour at the Research Library for the History of Education: share experiences, develop ways of cooperation between freelance conservators and libraries, archives and museums without in-house workshops. Guided tour through the collections of the Research Library for the History of Education from a preservation/conservation perspective.

- > Led by: Cornelia Hanke
- > **10:00 – 13:00** / German
- > Number of attendees: max. 15
- > Meeting point: Bibliothek für Bildungsgeschichtliche Forschung (BBF) des Deutschen Instituts für Internationale Pädagogische Forschung, Warschauer Straße 34-38, 10243 Berlin





## 21 Staatsbibliothek zu Berlin

### Detecting watermarks with thermal imaging (IR)

This innovative system uses an infrared camera which allows detection and recording of watermarks on historic sources like music autographs or handwritten manuscripts. Without harming the object, the thermal camera records exceptional clear images of watermarks. It is a digital technology which permits the imaging of watermarks from various sources under conservation guidance.

- > Led by: Hagen Immel
- > **10:00 – 11:00** / German with English translation
- > Number of attendees: max. 15
- > Meeting point: Staatsbibliothek zu Berlin SPK, Restaurierungswerkstatt, Unter den Linden 8, 10117 Berlin

## 22 Mirah von Wicht: Free-lance conservation studio

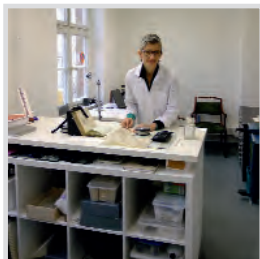
### Yesterday's Trash, Tomorrow's Treasure: A Basic Conservation Treatment Reveals Complexities

A conservation treatment of three 16<sup>th</sup> century bindings printed in the Netherlands uncovered some extraordinary boards. The removal of the pastedowns revealed boards which were completely made out of single leaves including incunables and manuscripts. The pros and contras were deliberated, whether to separate the boards into its single leaves for research or keep them in their original state.

Further the decision had to be made – if once separated into their single leaves – whether they should be returned into their original state as a board or housed single leaved and kept with the bindings.

Decision: The boards were separated into their single leaves, photographed (recto/verso) and housed in a clamshell box to be kept with the bindings available for research. The original boards were replaced with acid-free binder's boards. I will talk about the complex conservation treatment, display the object(s) and further present unusual equipment used for the separation of the original boards. Participants' discussions and opinions are highly requested after the presentation.

- > Led by: Mirah von Wicht
- > **10:00 – 11:00** / German
- > **12:00 – 13:00** / English
- > **14:00 – 15:00** / German
- > **16:00 – 17:00** / English
- > Number of attendees: max. 12
- > Meeting point: Buch- und Papierrestaurierung, Mirah von Wicht, Poststraße 13/14, Nikolaiviertel, 10178 Berlin



## 23 Workshop: Katharina Siedler

### Papermaking in the Conservation Lab – How to Produce Mending Tissues: Hands-on workshop

- > Led by: Katharina Siedler
- > **10:00 – 13:00** / German
- > **15:00 – 18:00** / English
- > Number of attendees: max. 10
- > Meeting point: Papiermühle Berlin, Gensler Straße 13a, Studio 108, 13055 Berlin
- > Material costs: Euro 10.00 (to be paid on site directly)



## 24 Workshop: Henk Porck

p 11

### Letterfolding: Techniques, Value and Conservation

A selection of historic letterfolding techniques will be presented and practiced. The workshop aims to reveal the variety and importance of the mechanisms used traditionally to fold and close letters. Conservation issues will be discussed.

- > Led by: Henk Porck
- > **10:00 – 11:30** / English
- > **13:30 – 15:00** / English
- > Number of attendees: max. 15
- > Meeting point: still to be decided
- > Workshop fee: Euro 5.00 (to be paid on site directly)



## 25 Workshop: Agnes Brokerhof, Janien Kemp, Anna E. Bülow

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### Risks and Priorities in Conservation and Collection Management for Archives, Libraries, and Museums

This workshop is about setting priorities for conservation and collection care, weighing the opportunities for improving the collection against the threats for preservation. It follows-up on Anna Bülow's presentation '*Pride and prejudice: Developing a shared understanding of priorities*' during the conference which sketches how at the British Museum priorities in conservation are determined with the help of risk management. It features Janien Kemp with a presentation on '*The changing role of the conservator in collection management*' as experienced in the Amsterdam City Archives which have combined risk management with opportunities to improve the quality of the collection. In a series of practical exercises participants will learn to assess and rank collections based on their significance and identify opportunities to increase value using the methodology developed by the Cultural Heritage Agency of The Netherlands. They will be introduced to the newly developed *QuiskScan* methodology for a quick risk assessment and apply it to identify and rank threats to the collection. Ultimately, risks and opportunities are compared to determine priorities for conservation and collection management. The workshop will be concluded with a discussion of what this value-based approach to collection management means for archives and museums, for managers of conservation departments and for conservators.

In co-operation with University of Applied Sciences, Class of Conservation and Restoration / Hochschule für Technik und Wirtschaft Berlin, Studiengang Konservierung und Restaurierung / Grabungstechnik

- > Led by: Agnes W. Brokerhof, Janien Kemp, Anna E. Bülow
- > **10:00 – 16:00** / German and English
- > Number of attendees: max. 40
- > Meeting point: University of Applied Sciences, Class of Conservation and Restoration / Hochschule für Technik und Wirtschaft Berlin, Wilhelminenhofstraße 75a, 12459 Berlin
- > Workshop fee: Euro 50.00 (to be paid on site directly)



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