Current Solutions for Mutual Issues:

postprints from the
Book and Paper Group's
sessions at the
Icon *Positive Futures* conference

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Introduction

After several months of intricate negotiation, planning and attention to detail, the Book and Paper Group fielded a broad-based programme of presentations at Icon's 2013 conference *Positive Futures in an Uncertain World*, all of which were designed to hold interest for every area of the Group's diverse membership demographic. The variety, quality and quantity of abstracts we received proved the vitality and interest we have for sharing the collective knowledge that is such a key feature of our vibrant and inclusive group.

The overriding principle of the Group's presence at PF2013 was co-operation and collaboration. We built the programme under the title *Current Solutions for Mutual Issues* and our aim was to look at the innovative ways group members and colleagues in other disciplines approach the challenges that we all meet in our professional practice. Within this, we chose to divide the two sessions into four distinct areas: the Clare Hampson Showcase, Collaborative Conservation, Moving Issues and Storage Solutions alongside the Joint Adhesives Session, a poster-based session organised by the Book and Paper Group in close collaboration with the Ethnography, Photographic Materials, Textiles and Science Groups. We are pleased to be able to bring you a comprehensive selection of the papers presented in Glasgow in this postprint publication.

The Joint Adhesives session epitomised the ethos of both the session theme and the Book and Paper Group committee's ongoing work to benefit group members, which continues to be focused on our Co-operative Training Register (CTR) scheme. The concept of a cross-disciplinary session on adhesive use and applications for the similar materials that several groups' members encounter first came about through discussions between myself and my colleagues in the Textile Group following the Book and Paper Group's successful CTR courses on adhesives in 2012. As both groups work with cellulose- and protein-based materials, it was clear that we faced common issues surrounding our use of adhesives and that we could learn a great deal from each others' practice in this area. Thinking laterally, it was also clear that, in the Venn diagram that is Icon, there were other groups who could provide valuable input into such a discussion. And so the Joint Adhesives Session grew. This collaboration and sharing of knowledge is ***the*** essential benefit of the mutuality of our dynamic and vibrant conservation community under Icon and it was good to see this working so well in practice in the form of this session.

The Book and Paper Group hopes that you enjoy the postprints from PF2013 and that, whether you were able to attend the conference in person or not, you too can benefit from the knowledge and willingness to collaborate across the conservation community that was demonstrated in these sessions.

Victoria Stevens ACR

Outrageous fortune: conservation and the Bodleian's First Folio

Nicole Gilroy ACR, **Julie Sommerfeldt, Arthur Green, Andrew Honey** ACR, **Sabina Pugh** ACR

Abstract

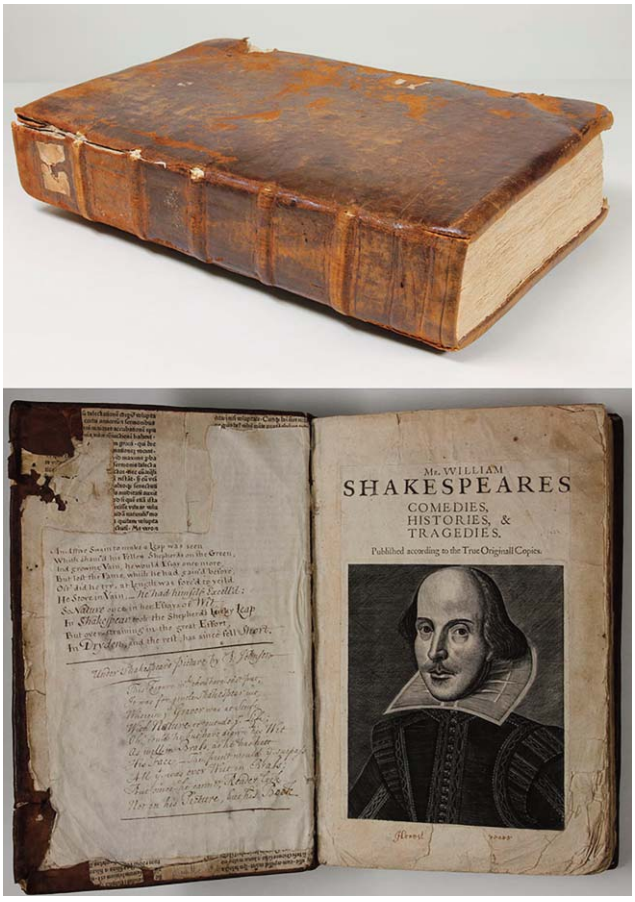
This paper tells the story surrounding the Bodleian Library's copy of *Mr. William Shakespeares comedies, histories, & tragedies*, known as the First Folio. It describes two public fundraising campaigns, 106 years apart, both of which focused on conserving the book in the fullest sense of the word. The role of conservation, whether by conservators and book-binders or by librarians and book collectors, in the story of the Bodleian's First Folio, is crucial: the damage to the pages of the book tells us an enormous amount about the plays that are printed on them and demonstrates which plays were popular with the seventeenth-century reader (*Romeo and Juliet*) and which were ignored (*King John*). The paper discusses the role of the conservator as an enabler of scholarship and as an advocate for fundraising and widening access as well as a repairer of books and paper.

Keywords:

book conservation, Shakespeare, digitisation, fundraising, access, minimal intervention

Introduction

The story of the Bodleian Library's copy of *Mr. William Shakespeares comedies, histories, & tragedies* (1623) is both a great detective story and an astonishing lost-and-found tale. It is also a study of the history of *conservation* in the widest sense of the word, at the Bodleian and elsewhere. Although the remit of the Book Conservation team was to carry out minimal repairs – a familiar enough role for book conservators – this project turned out to be remarkable as much for the repairs that we did not do as for those that we did. This attitude echoes the approach the Library took with respect to this particular book long before the concept of minimal intervention became part of conservation's vocabulary: the Library exercised notable restraint in not having this volume repaired at a period when repairing a book with this level of damage would have been routine.



The Bodleian's copy of the First Folio of Shakespeare. The Bodleian Libraries, University of Oxford, Arch. G c.7, binding (above), title page and left flyleaf (below)

This paper describes the role of the Bodleian Book Conservation team in the *Sprint for Shakespeare* fundraising campaign launched in Summer 2012 to enable digitisation of the Bodleian's copy of the First Folio (as it will be called throughout this paper).[1,2] The project mirrored an earlier campaign in 1905 to buy back the book from private ownership.[3] Both campaigns were innovative in their appeal to the public for modest donations, their emphasis on the importance of the story surrounding the book's return, and in their appreciation of the significance of physical damage as evidence of its history. The story of the 2012 campaign can only be fully understood when set in the context of a much longer story, and so we will now set the scene.

The First Folio at the Bodleian

The Bodleian Library was founded in 1602 by Sir Thomas Bodley and is the principal library of Oxford University, housing a vast collection of rare books and manuscripts as well as modern academic holdings.[4] In 1612 an agreement was reaffirmed between Sir Thomas Bodley and the London Stationers' Company requiring that a copy of every new book published in England and registered at Stationers' Hall be sent to the Bodleian Library. This agreement has evolved into the legal deposit rights currently shared by the Bodleian and five other libraries throughout the British Isles under the Legal Deposit Libraries Act 2003.[5]

In 1623 a copy of the First Folio came to the library unbound in sheets. It is not known whether it came under the Stationers' Company agreement or by other means.[6] Records of binding in the Bodleian Library's daybook of 1621–1624 show that on 17 February 1624, the First Folio was one of nine titles sent out to Oxford binder, William Wildgoose.[7] The signature of Wildgoose acknowledges their receipt, and beside each title is the letter 'R' signifying its return.

Once bound, the First Folio was chained in place in the library, and an early twentieth-century photograph records the exact spot where it was shelved, fore-edge outwards. The First Folio essentially made Shakespeare accessible to Bodleian readers for the first time and the fragile and tattered pages, worn away entirely in places, stand as testimony to the extremely heavy use it first received. This heavy use can be explained by both its subject matter and its position within the library.

English plays and ephemera were not the kind of books that Sir Thomas Bodley wanted in the library and, in a 1612 letter to Bodley's first librarian, Thomas James, he states, '… the more I think upon it, the more it doth distaste me that such kind of books should be vouchsafed a room in so noble a Library'.[8] Half of the plays in the First Folio, including *Julius Caesar, Macbeth, The Tempest* and *As You Like It*, had not previously been in print, and those already in print in quarto format were entirely absent from the Bodleian Library in accordance with Sir Thomas Bodley's wishes.

During the seventeenth century in the Bodleian Library, access to books belonging to the Faculties of Law, Medicine and Theology was directly supervised. Arts books, however, were housed in Arts End (an early-seventeenth-century addition to the library) where access was freely available to all readers. The First Folio was shelved just opposite the only break in a long line of seating. At that time in the Library, the First Folio was not only a rare example of what was often dismissed as 'light literature' but was physically very accessible. These factors combined could partially account for its popularity within the Library with Bodleian readers looking for distraction.

Much is revealed about the reading habits of these mid-seventeenth-century audiences and the contemporary reception of Shakespeare's plays, by studying the damage to the pages of the First Folio. The extensive wear and tear to the pages of tragedies such as *Romeo and Juliet*, *Julius Caesar* and *Macbeth* testify to their being the most read plays in the volume. Histories such as *King John* and *Richard II*, by comparison, are almost pristine. The most thumbed and worn page in the volume faces the now famous balcony scene in *Romeo and Juliet*.

As far as we know, the volume remained in use within the library for the next 40 years. The Second Folio (1632) contained only minor changes from the first and does not appear in any of the Library's catalogues. The concept of first editions as collectable items was not yet part of the cultural zeitgeist and after the new and improved Third Folio (with the inclusion of new material) arrived in 1664, the First Folio was regarded as out of date. The Library was struggling for space and had already needed to build an extension to house the bequest of thousands of books from John Selden. An entry in the Bodleian accounting records for 1663–1664 states that £24 was received from an Oxford bookseller, Richard Davis, for 'superfluous Library Books sold by order of the Curators'. It is assumed that the First Folio was amongst these, and it does not appear in Library catalogues after this date.

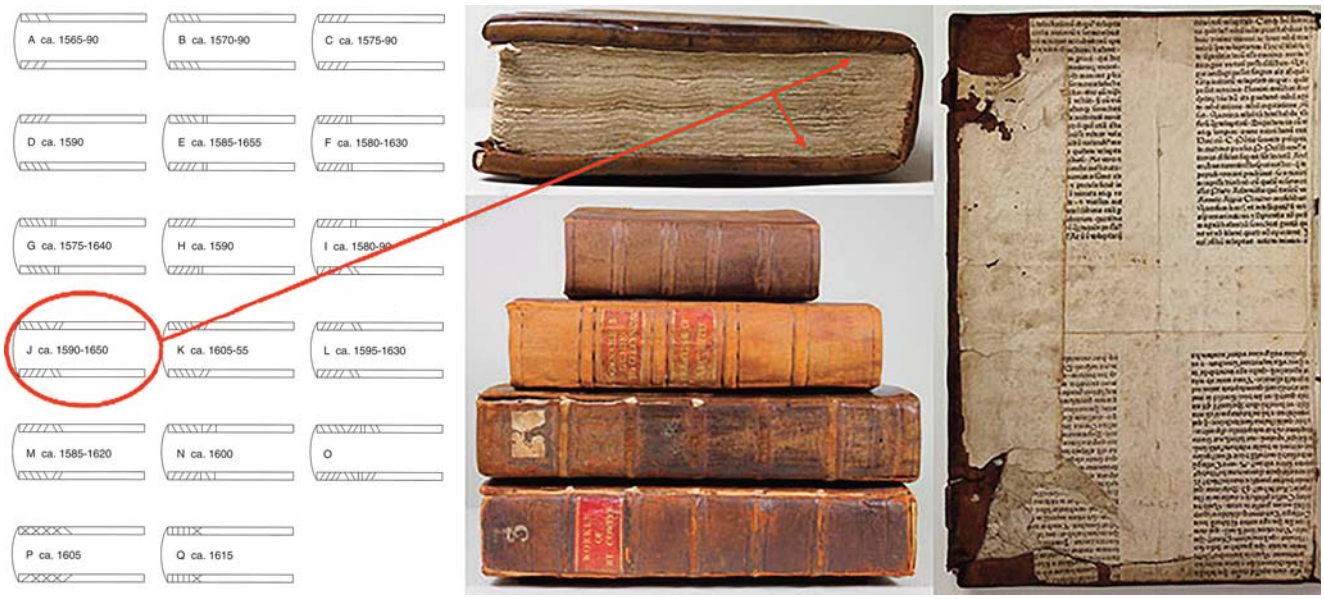
Our story now jumps ahead to January 23, 1905 when Mr Gladwin Turbutt (1883–1914), an Oxford

undergraduate student at Magdalen College, brought a worn and battered copy of the First Folio to the Bodleian for advice on its value. Strickland Gibson, Assistant Librarian at the Bodleian, examined the binding and the pattern of oblique hatching blind-tooled on the tail edge of both boards and spine immediately told him he was looking at a seventeenth-century Oxford binding.[9] He had published *Early Oxford Bindings* just two years before and had registered that a First Folio had existed within a group of titles sent for binding by the Bodleian but that it was no longer in the Library.[10] This knowledge allowed Gibson to piece together certain features of the Turbutt First Folio and to identify it without doubt as the missing Bodleian copy. The distinctive mark on the upper fore-edge of the left board showed that the book had come from a chained library but the definitive feature proved to be the printed waste used as pastedowns. Identified as a Dutch incunable, it matched other pastedowns in the group sent by the Bodleian to be bound by William Wildgoose in 1624.[11]

The whereabouts of the First Folio after 1664 are unknown. After the presumed sale to Richard Davis, it appears to have made its way to London where it was probably purchased during the early eighteenth century by Gladwin's great-great-grandfather, Richard Turbutt (1681–1758) of Ogsden Hall, Derbyshire. Interest in Shakespeare was growing and Richard was an avid book collector with a specific interest in the stage. He made regular visits to London, buying approximately one thousand volumes of plays between 1724 and 1740.[12] Unfortunately, although his accounts make frequent mention of books purchased, they rarely name individual volumes. The First Folio remained in the library at Ogsden Hall until Gladwin Turbutt brought it back to the Bodleian in 1905. The Turbutts were considering the possibility of selling their copy as they realised it was of value and were concerned about death duties payable on the estate.

The 1906 Bodleian fundraising campaign

The Bodleian wanted the volume back despite already owning one copy of the First Folio, received in 1821 as part of the bequest of the Shakespearean scholar Edmund Malone (1741–1812).[13] The Malone copy was in very good condition: it could be handled and read safely and had been neatly bound in the eighteenth century. The 'Turbutt First Folio' was very different: its handling evidence was that of an early audience rather than that of later textual scholars and the evidence of this use had survived largely without interference. It had its original Oxford binding, commissioned by the Library itself, with all the paperwork to prove it. Most importantly of all, perhaps, it was a prodigal son returned home and the story of its survival was almost as significant as what was contained between the boards. The academic study of the plays and the textual history of the volume's production are of course critically important to Shakespearean scholarship but it was the story of the book itself that captured the imagination of the public then as well as now.



Evidence identifying the copy as bound by Wildgoose for the Bodleian (clockwise from left): diagram of edge-hatching patterns from Pearson (2000), courtesy of Oxford Bibliographic Society; blind-tooled hatching on tail edge; printed waste from incunable, seen here as left board-sheet; the Bodleian's First Folio (third from top) with three other volumes bound in the same batch. The Bodleian Libraries, University of Oxford, Arch. G c.7, BB 12 Th., C 18.11 Th., C 2.3 Th.

Word spread in the bookselling world that the copy might be on the market, and media interest in the story was immediate. The publicity led to an anonymous American buyer offering the then unprecedented sum of £3000 for the volume. The Turbutt family generously stalled, giving the Bodleian time to match the offer, and, of necessity and in great haste, the first public fundraising campaign in the library's history was born.

Edward Nicholson, the Bodleian's Librarian, wrote an impassioned open letter to *The Times* newspaper. In it he stated unequivocally, 'For the Bodleian to pay £3,000 or even £1,000 for any printed book is simply impossible'. The letter appealed to 'Oxford Men' for contributions to raise the money to buy back the First Folio, stating, 'unless it can be recovered, there will be an indelible blot on our scutcheon'.[14]

The campaign to save the First Folio for the Bodleian touched the hearts and minds of the public. Letters and cards from contributors survive in the Library attesting to donations large and small, not just from Oxford graduates, but from men and women from all walks of life. Over 80 subscribers pledged money, on average around one guinea, which is approximately £60 today, and, at the last minute, the Bodleian was able to match the offer and buy it back.[15] Subsequently, it was revealed that the rival bidder was Henry Clay Folger, who then owned 23 copies of the First Folio and would subsequently buy over 50 more. His collection now forms the basis of the Folger Shakespeare Library in Washington D.C.

The 2012 Bodleian campaign

1. Origins of the project

In 2010, Dr Emma Smith of Oxford University's English Faculty gave a talk to Oxford Alumni called 'A Treasure lost … and regained', telling the remarkable story of the Bodleian's First Folio.[16] Dr Smith was keen to widen knowledge of this copy and longed for her students to be able to study it. The book, however, was not in a fit state to be handled. The pages were worn through in many places and could only be turned safely using a spatula. The left board was partially detached and simply opening the book risked causing significant damage.

The First Folio is a high profile Library Treasure and, no doubt, money could be raised for its repair and conservation. The significance of this copy does not lie in the texts contained within the volume: despite its iconic status there are 228 copies of the First Folio surviving, four of them in Oxford. The importance of the Turbutt First Folio lies in the evidence of the wear to the leaves left by early readers of Shakespeare and of its original binding, it is possibly the only surviving copy that has not been rebound. To repair this damaged textblock fully would be an enormous undertaking, which would probably entail resizing, and possibly relining, some of the most heavily worn leaves as well as carrying out a full reback to reattach the boards. Such extensive treatments would destroy the very essence of what the book can tell us.

Dr Smith suggested that digitising the volume and publishing it on the web would allow full and unrestricted access to readers both in Oxford and further afield. Digitising the First Folio is not a new idea. The Folger Shakespeare Library has already digitised two of their copies and made them available online.[17] This project would be different: we would be digitising damage as much as text and making the unique physical evidence presented by this copy available for research by a much wider audience than had hitherto been permitted.

The project to digitise the volume clearly required the expertise of various departments working collaboratively. *The Sprint for Shakespeare* team that was consequently formed was made up of academics including Dr Smith and her English Faculty colleagues, representatives from the Rare Books department at the Bodleian, the Imaging Studio, the Library's digital publishing section (BDLSS), Communications and Publishing, Oxford University Development Office and Conservation and Collection Care.

Oxford University's Development Office began to plan the fundraising and the combined cost of photography and the necessary input from the Conservation team was estimated at just under £20,000. The fundraisers suggested an internet-only campaign with the advantages of minimal set-up and administrative costs. The launch was planned to coincide with the London 2012 Olympic Games and Cultural Olympiad and the name *Sprint for Shakespeare* was coined.[18] The Development Office secured the support of high-profile Shakespeare lovers Steven Fry, Peter Hall and Vanessa Redgrave, whose statements to the press kick-started the campaign.

The aim was to encourage individual donations of £25. This was considered to be an affordable sum for many and would approximate to the cost of digitising one page of the First Folio. Supporters would have their name and dedication published on the project website and would be entered into a prize draw for a specially commissioned letterpress keepsake, printed in the Bodleian's Hand-Printing Workshop.[19]

Damage to the leaves of the textblock: this page faces the famous balcony scene in Romeo and Juliet and is the most heavily worn leaf in the book. The Bodleian Libraries, University of Oxford, Arch. G c.7, Tragedies p. 69

Clive Hurst, the Bodleian's Head of Rare Books, was well aware of the extreme fragility of the leaves and voiced the need for some urgent stabilisation treatment before photography, as well as handling assistance during the process. The Book Conservation team was asked to assess the volume and to see what could be done to safeguard it during photography.

The stabilisation work needed to be completed before the volume could be photographed, and was allocated a two-week window prior to the photographic studio booking. These two weeks were an ideal opportunity for visitors and media to see the book and so the conservation workshop quickly became the public face of the project, hosting visitors, journalists, television crews and photo shoots. The

The condition of the binding: left, in 1905 as published in The Turbutt Shakespeare and in 2012 on the right. The Bodleian Libraries, University of Oxford, Arch. G c.7, left board

Book Conservation team blogged daily on the progress of the conservation work and some of the visitors contributed guest blog posts adding their expertise and opinion to the mix.[20]

2. Why did the book need to be stabilised?

The textblock of the First Folio is extremely vulnerable. There is significant evidence to suggest that the damage occurred early in the book's history and that handling during the Turbutt years, and after its return to the Library, was minimal.[21] This evidential damage is of great importance and it was critical that we did not interfere with it.

The paper itself is rather thin, and has evidence of very heavy wear in places, leading to tattered edges and corners, often with small areas of paper folded over at the edge of the damage. At some point some of the text-leaves have been carefully repaired with cut patches of a heavy white paper; this probably happened shortly after its acquisition by Richard Turbutt.[22] There are few actual tears and comparison of 1906 photographs of the most heavily damaged leaf in its current condition suggests that the damage has not worsened since its return to the library.[23]

The First Folio survives in its 1624 blind-tooled in-board binding of brown calf over pulp boards.[24] This is possibly the only copy of the First Folio to survive in an original, unrestored binding. The binding is worn and has a textblock break in the middle but the main danger to the structure is that the five alum-tawed sewing supports are all completely broken at the left joint and the covering leather at this joint is torn at head and tail. The 1906 photographs show that most of the damage has been present since then, even scratches and scrapes on the surface of the boards are not new. However, the tear in the joint has worsened despite extremely restricted handling. This means that the strain of opening the board is placed entirely on the remaining worn and damaged leather and the risk of further tearing or even board detachment during the handling necessary for photography was significant.

Notwithstanding the evidential value of the damage to the binding and textblock, the proposed digitisation called for some involvement from the Book Conservation team. The Bodleian's photographic studio uses a Grazer book cradle, which is configured to support the book in the required position, and uses a finely adjustable vacuum bar to hold the leaf being photographed flat and at the correct angle. The studio has devised a method to minimise handling of the book during photography and to take the necessary shots in the most efficient

way. This involves the camera being set up to take all of the recto shots consecutively and then repositioning the book to take all of the verso shots. Even with this highly specialised cradle and handling by an experienced book photographer, the volume must be gone through page by page twice during digitisation, representing a significant risk.

A risk assessment was carried out by Clive Hurst and the Book Conservation Supervisor and the principles of conservation were established: the board attachment should be protected so that it would not deteriorate during handling; the leaves should be supported so that no tear or damage would get worse nor fragments be detached and, as photography represented such a significant handling risk, the areas of obscured text should be straightened so that the digital copy would be as complete as possible and future demands for imaging would be minimised.

Access to the volume has been heavily restricted since its return to the library and it is very rare that a reader would be granted access to it. All handling of the book, whether by conservators or librarians, is minimal and the initial assessment was no exception. The examination was done very cautiously, only opening the book in three or four places, as the condition of the board attachment was of great concern. This meant that the full extent of the damage to the paper could only be roughly estimated at the planning stage.

The Book Conservation team was permitted access to the volume for a ten-working-day period before the scheduled photography and a treatment plan was devised to fit safely within that window. The strategy was to devise a method of supporting the board attachment before opening the textblock then to work through the entire volume leaf-by-leaf, straightening out creases and folds that were causing text to be obscured. The time needed for these two activities could be estimated with some confidence by assuming that approximately ten per cent of the leaves might need some attention. Whilst going through the volume, we would note leaves that we felt needed further support and once this process was complete we would assess the feasibility of carrying out the suggested number of supporting splints in the time remaining. The risk of this approach was that more leaves would be flagged than we would have time to complete.

The Book Conservation team spent a lot of time examining the volume and thinking carefully about the details of the stabilisation treatments before carrying out any intervention. We also thought hard about terminology and found that we were reluctant to use the terms 'repair' or 'conservation' as these led to expectations of significantly higher intervention than we considered either possible or desirable. The term 'stabilisation' was our preferred description, as it reflects the minimal approach and the intention not to change or improve the presentation beyond what was absolutely necessary.

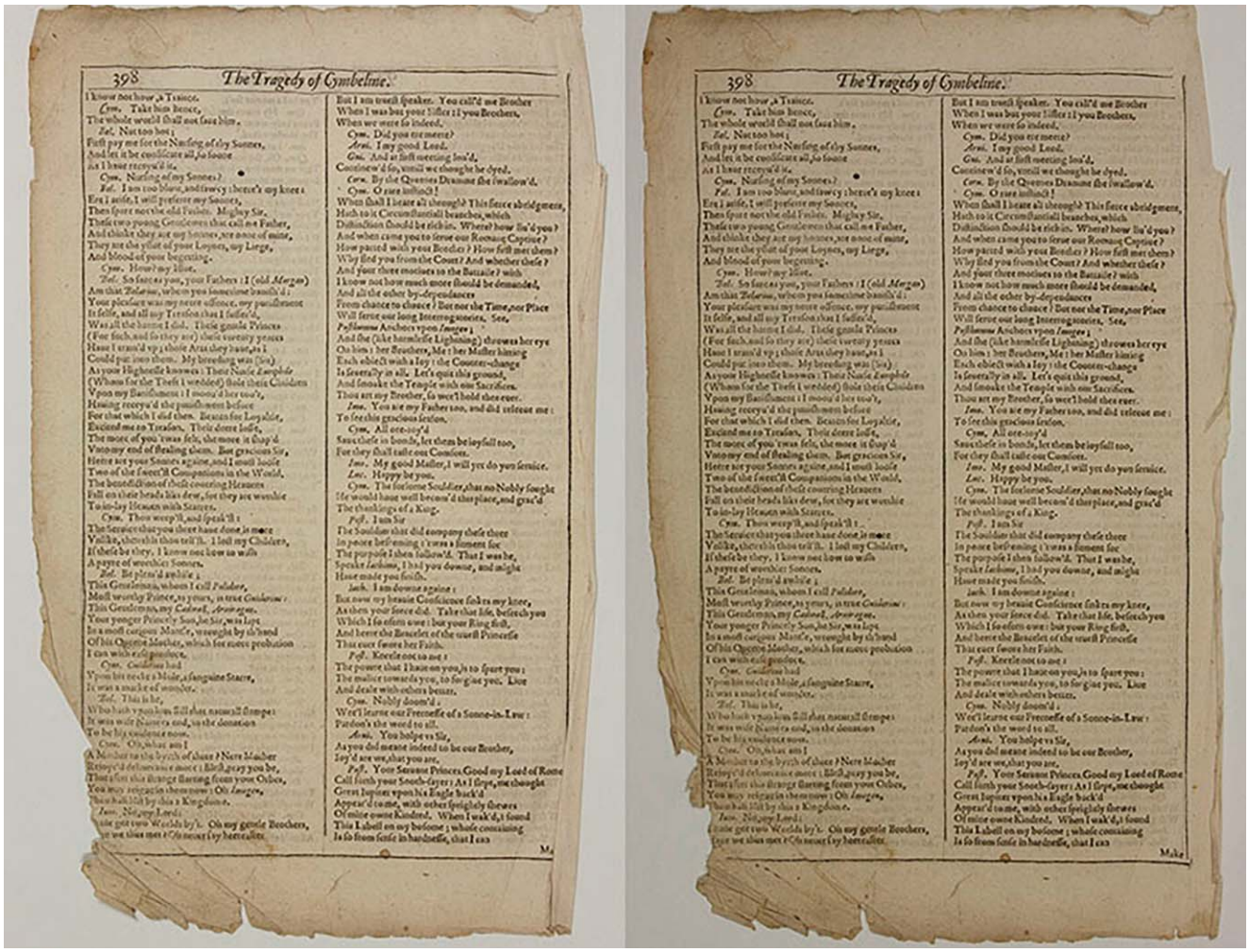
3. Conservation

Before opening the book, we needed to address the issue of the vulnerable board attachment. The team decided to apply a laminated Japanese paper patch to bridge the broken left joint and provide support for the fragile board attachment. The papers used for the laminate were carefully chosen to create stiffness as well as flexibility. The patch was positioned across the upper left outer joint, where it could easily slide underneath the lifting spine leather and fit into existing splits in the delaminated board. A template was used to check correct size, shape and positioning before the patch was secured in place, using wheat starch paste. Supporting the board attachment was technically a simple task but the challenge was to judge positioning and pressure so that the board function was supported without creating tensions elsewhere in the joint.

The patch was left to dry overnight, held in place with padded clamps. The next day we reviewed the mechanics of the joint, not fully opening the book until the reinforcement of the board attachment was deemed successful. It was at this early stage that the temptation to 'tidy things up' became apparent and the team became aware that each act of intervention would have a knock-on effect on the functioning of the joint, making more and more work necessary. After much discussion, a communal decision was made to go no further in the structural or cosmetic treatment of the joint.

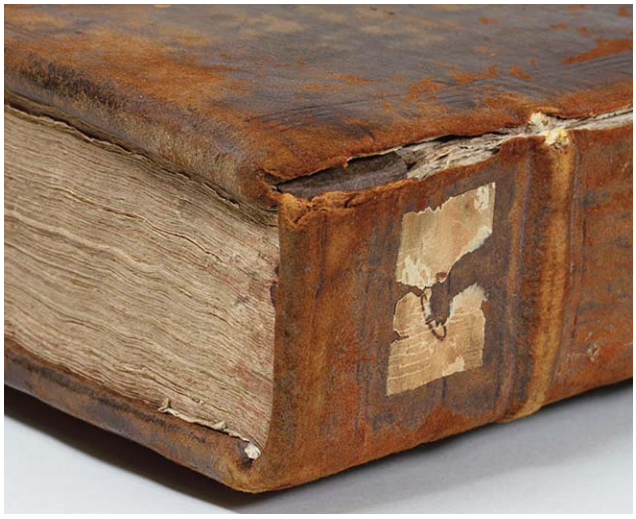
Once the board attachment had been protected the volume could be opened with more confidence and the team was able to proceed with treatment of the textblock. The leaves of the volume were assessed one by one and treated where necessary, relaxing areas of obscured text using a 50% mixture of IMS (Industrial Methylated Spirits) and water and noting leaves that required additional treatment. The final three leaves had become detached and so these could be worked on outside the volume. They were loosely inserted into the volume at the end of the treatment but not re-attached: this was in line with our ethos of minimal intervention and was considered to be safe bearing in mind the restrictions on reader access.

Creases and folds were relaxed and straightened on twenty leaves in the volume as well as the three



Revealing obscured text with minimal interference: before (left) and after (right). The Bodleian Libraries, University of Oxford, Arch. G c.7, Tragedies p. 398

detached leaves but only in places where text was obscured and stopping once the text was revealed. In many places, this meant leaving significant damage



Stabilisation treatment: the joint support patch in place inserted underneath the spine leather and secured between layers of the pulp board. The Bodleian Libraries, University of Oxford, Arch. G c.7

untouched and it was surprisingly difficult to maintain this level of restraint. One advantage of working in frequently changing pairs was that a kind of natural self-regulating mechanism was attained, ensuring as much consistency in the work as possible. To ensure that the original guidelines established for the conservation work were strictly maintained, it was necessary to reinforce the idea in our own minds, time after time, that the volume was not being treated to make it safe for regular handling but only to the point of enabling digitisation and absolutely no further.

Fourteen leaves were noted as being unsafe to turn, even with great care. These leaves had severe edge damage combined with heavy historic repair patches that weighed down the leaf and meant that the paper would tear further as the leaf was turned. Before treatment, the leaves could only be turned by inserting a support sheet under the leaf but this was extremely difficult and would not have been feasible during digitisation, as it would not have been possible to position the leaf safely on the vacuum bar of the Grazer cradle. Tiny Japanese paper splints were

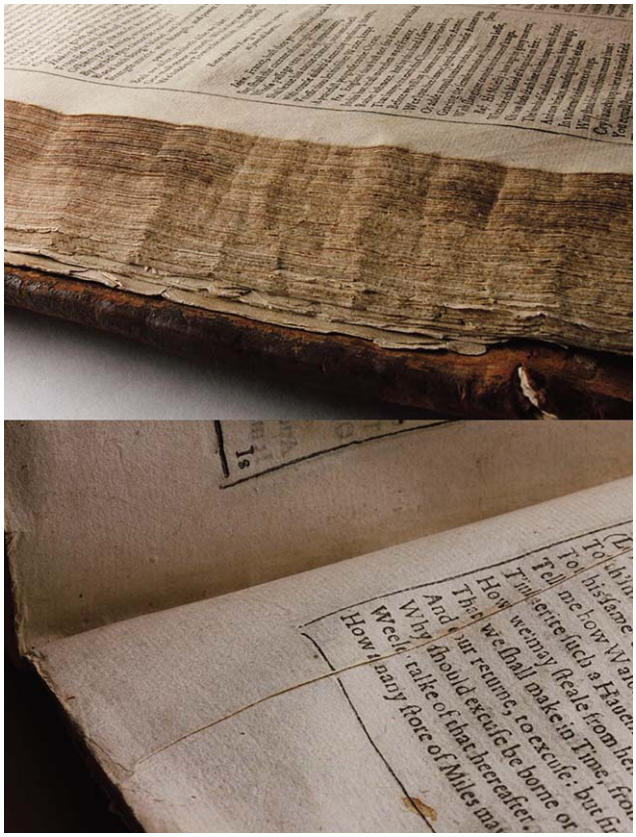
applied to support these damaged areas, providing just enough support to allow safe turning. These splints were extremely unobtrusive in size and colour and very few in number.

4. Digitisation

After the stabilisation work was complete, the book was still extremely fragile. During the digitisation process, the Book Conservation team worked in shifts alongside the imaging studio staff to assist in positioning, supporting and handling the First Folio on the cradle. The book had to be set up each morning and the position adjusted as work progressed throughout the textblock. Pages where tears were held together by splints were carefully turned without further damage and the painstaking process was completed in five days.

5. Boxing

The final part of the conservation treatment was to provide new housing for the volume. A presentation box had been commissioned in 1906 by the Library for the Turbutt First Folio from the Oxford bookbinding firm, Maltby's, still trading today. The box is now damaged and no longer serves the needs of the volume, so a new box was designed. This bespoke box is constructed from archival board and covered with Islandreagh double-warp linen cloth and is designed to be shelved horizontally, which is how the book is stored in our strongroom. The tray of the box is made with a platform and shaped with cut-outs such that the book has to be removed using both hands and can be grasped without the fingers digging into the edges of the textblock. The old presentation box has been kept and is available to readers for reference.



Features triggering further research: suspected drawknife trim marks on fore-edge of textblock (above) and papermaking flaw (below). The Bodleian Libraries, University of Oxford, Arch. G c.7, Tragedies p. 381

Further research

During stabilisation, the Book Conservation team took the opportunity to note features of interest that may warrant further research, and many of these caught the attention of the academics involved with the project.

When identifying damage to the text leaves, we realised that many of what, at first, looked like tears were in fact papermaking flaws. The same was true of what looked like turned-over corners. Recent work has looked at the status of the First Folio as an edition and though it had been assumed that an 'exemplar copy' was presented to the Bodleian on publication, a closer look might suggest that this was not the case.[25] Research into the paper stocks of this and other First Folios has begun in collaboration with Shakespeare experts within and without the University.

The Library still holds several volumes sent to the binder Wildgoose at the same time as the First Folio. The trim is minimal: many deckle edges survive and the Bodleian's First Folio is one of the largest copies to survive. Examination of the edges of the textblock revealed marks that appear to have been caused by trimming with a drawknife.[26] It is possible that trimming with a drawknife rather than a plough might indicate a certain economy in the binding but perhaps it was a deliberate attempt to minimise the amount trimmed from the edges. It would be fascinating to study the binding further to try to shed further light on these questions.

Media response

The University's Development Office sent out the project's press release to coincide with the start of the Olympic games. This was a bold move as the publicity for the games filled the newspapers. Nevertheless, the launch was covered by *The Times*, as the first campaign had been, and featured in the *Telegraph*, *The New York Times*, *MSN News* and many blogs and other online media. Journalists from the *Guardian*,

Publicity and media response to the project: project champion Vanessa Redgrave with actors from Oxford University Dramatic Society (above) and BBC Oxford film crew (below). The Bodleian Libraries, University of Oxford

BBC Radio 4 and the local news visited the workshops with their photographers and published and broadcast interviews with the project team and the much-amplified sound of the leaves of the First Folio being turned on national radio! This media storm helped kick-start the fundraising but, equally importantly, it enhanced the profile of the University, the Bodleian Libraries and, ultimately, the Book Conservation team. Such focused attention increased awareness of what we do and why and caught the imagination of the public, both about Shakespeare and about the value and significance of books in academia and in wider society.

Conclusion

The Sprint for Shakespeare project successfully met its basic stated outputs: the money was raised by the deadline of Christmas 2012, the book was digitised and the images were mounted on the project website on Shakespeare's birthday, 23rd April. From the point of view of the Book Conservation team, our role was also successful: the volume was photographed without damage to the board attachment and without tearing or loss of fragments. There were, in addition, many more outcomes from the project which has become the start of something much bigger than a ten-day repair job. Conservation played a pivotal role in enabling and supporting scholarship as well as simply sticking things together. The workshop became a natural hub for the project as scholars and visitors gravitated to the area as the book was being worked on and new research questions were raised from the unique viewpoint of the conservator examining the materiality of the volume as well as its contents. The role of the conservator was not only to safeguard the physical book but was extended to one of outreach and communication, facilitating exchange between the project's many and varied stakeholders.

The book was extremely fragile and seriously damaged but, despite publically noting this, the Bodleian librarians of 1906 did not have it repaired in any way, even though their peers at a contemporary British library recommended that Gladwin Turbutt have the book rebound in full morocco.[27] How did binders and conservators manage to keep their hands off it for so long? And what does this tell us about the history of attitudes to repair and what was considered important by collectors, bibliographers and librarians at various points in the volume's history? What is the significance of the flawed paper stock and what can we learn from the study of the Wildgoose bindings? All of these are questions we plan to address in the continued development of this fascinating and multi-disciplinary project.

Footnotes

1 Bodleian Libraries, University of Oxford, *Sprint for Shakespeare*, http://shakespeare.bodleian.ox.ac.uk

2 William Shakespeare, *Mr. William Shakespeares comedies, histories, & tragedies*. Published according to the true originall copies. (London: Printed by Isaac Jaggard, and Ed. Blount, 1623). Bodleian shelfmark: Arch. G c.7.

3 Falconer Madan, Gladwin Turbutt and Strickland Gibson, *The Original Bodleian Copy of the First Folio of Shakespeare (The Turbutt Shakespeare)* (Oxford: The Clarendon Press, 1905). The story leading up to the first campaign is described in detail.

4 Bodleian Libraries, University of Oxford, 'History of the Bodleian', http://www.bodleian.ox.ac.uk/bodley/about-us/history

5 United Kingdom Parliament, *The Legal Deposit Libraries Act 2003*, Chapter 28, http://www.legislation.gov.uk/ukpga/2003/28/contents

6 Bodleian Library staff during the 1906 campaign did assume the First Folio came to the library under the Stationers' Company agreement and called it an 'exemplar copy'. However, the evidence for this is currently being questioned.

7 Bodleian Libraries, University of Oxford, 'The Bodleian's original First Folio of Shakespeare', in *The Conveyor: News from Special Collections at the Bodleian Libraries,* http://blogs.bodleian.ox.ac.uk/theconveyor/2012/09/11/the-bodleians-original-first-folio-of-shakespeare/. Bodleian Library Records consist of the library's archive of its own history. MS. Library Records e.528 is the Bodleian Library Binders Book from 1621–1624, and the relevant entry is on fol. 45r.

8 Sir Thomas Bodley to Thomas James, 1612, in 'Companion Text: Renaissance Theatre', *Routledge Anthology of Renaissance Drama,* ed. Simon Barker and Hilary Hinds, http://cw.routledge.com/textbooks/0415187346/companiontext/pdf/LetterfromSirThomasBodley.pdf

9 David Pearson, *Oxford Bookbinding 1500–1640* (Oxford: Oxford Bibliographical Society, 2000), 38, table 2. The hatching pattern on the binding most closely resembles edge pattern 'J', found on Oxford bindings *c.*1590–1650.

10 Strickland Gibson, *Early Oxford Bindings* (Oxford: OUP printed for the Bibliographical Society, 1903).

11 Marcus Tullius Cicero, *De officiis, et al*. (Deventer: Richard Pafraet, between 1480 and 1485).

12 Madan, Turbutt, and Gibson, *The Original Bodleian Copy,* 7.

13 Bodleian Libraries, University of Oxford, 'Rare Books Named Collection Descriptions: Malone, Edmund, 1741–1812', http://www.bodleian.ox.ac.uk/bodley/finding-resources/special/catalogues/rare_books_named_collections/rare_books_named_collection_descriptions

14 Open Letter by E. Nicholson, Bodley's Librarian, The Times, March 12, 1906, accessed as an original clipping included in Madan, Turbutt, and Gibson, *The Original Bodleian Copy.*

15 Bodleian Libraries, University of Oxford, 'The Bodleian's First Folio', *Sprint for Shakespeare*, http://shakespeare.bodleian.ox.ac.uk/the-bodleians-first-folio/

16 University of Oxford, Podcasts, 'The Bodleian Shakespeare: A treasure lost … and regained', http://podcasts.ox.ac.uk/bodleian-shakespeare-treasure-lost-and-regained-video

17 The Folger Shakespeare Library, 'The First Folio', http://www.folger.edu/template.cfm?cid=436

18 The Official site of the London 2012 Olympic and Paralympic Games, http://www.london2012.com/about-us/cultural-olympiad/. The London 2012 Cultural Olympiad is the largest cultural celebration in the history of the modern Olympic and Paralympic Movements.

19 Bodleian Libraries, University of Oxford, 'Prize Draw', *Sprint for Shakespeare*, http://shakespeare.bodleian.ox.ac.uk/the-project/prize-draw/

20 Bodleian Libraries, University of Oxford, 'The Bodleian's First Folio', *Sprint for Shakespeare,* http://shakespeare.bodleian.ox.ac.uk/the-bodleians-first-folio/

21 Madan, Turbutt, and Gibson, *The Original Bodleian Copy*, 7.

22 It is impossible to prove when this repair happened, though it looks like the work of an enthusiastic amateur rather than that of a binder, suggesting that it was done after the sale rather than while the book was still at the Bodleian.

23 Madan, Turbutt, and Gibson, *The Original Bodleian Copy,* plates IV and VI.

24 Nicole Gilroy, Arthur Green, Andrew Honey, Sabina Pugh and Julie Sommerfeldt, Arch. G c.7 Conservation Report (working document, Conservation and Collection Care, Bodleian Library, University of Oxford, UK, 2012). A full binding description of the First Folio is included in this document.

25 Madan, Turbutt, and Gibson, *The Original Bodleian Copy,* 6.

26 J. A. Szirmai, *The archaeology of medieval bookbinding* (Aldershot: Ashgate, 1999), 197, figure 9.14, and J. A. Szirmai, 'Carolingian bindings in the Abbey Library of St Gall', in *Making the medieval book: techniques of production*, ed. Linda Brownrigg (London: Anderson-Lovelace, 1995), 157–180 at 166, figure 16. These photographs of textblock edges with score marks caused by the drawknife have been used for comparison.

27 Madan, Turbutt, and Gibson, *The Original Bodleian Copy*, 13.

Appendix 1: Materials and Suppliers

Hosokawa Ohban Japanese Paper, Preservation Equipment Ltd, Vinces Road Diss, Norfolk IP22 4HQ, http://www.preservationequipment.com

Hasegawa 1.6 monme Japanese paper, purchased directly from the maker Satoshi Hasegawa, hasegawa@minogami.com, http://www.minogami.com/index.html

Islandreagh double warp linen cloth is no longer available from suppliers. The Bodleian purchased a stock many years ago which is still in use.

Wheat Starch powder, catalogue number 21146.290, VWR International, https://uk.vwr.com/app/Home

Speedry Magic Colour liquid acrylics, Broad Canvas Art Supplies Shop, 20 Broad Street, Oxford, OX1 3AS, http://www.broadcanvas.net/

Grazer Conservation Copy Stand 6545, Icam Archive Systems Ltd, 3 The Old Mill, Blisworth Hill Barns, Stoke Road, Blisworth, Northamptonshire NN7 3DB, http://www.icamarchive.co.uk/grazer.htm

Bespoke Archival Book Boxes, Bridget Mitchell, ACR, 70–71 The Street, Helhoughton, Fakenham Norfolk NR21 7BP, http://www.arcapreservation.co.uk

Maltby's the Bookbinders, Horspath Trading Centre, Pony Road, Oxford OX4 2RD, http://www.maltbysbookbinders.com/

The conservation of a seventeenth-century *Carta Ejecutoria de Hidalguia*

Lucy Crombie

From about the twelfth century, Spanish nobles could prove their status by having the crown offices at Granada or Valladolid validate their lineage. Hundreds of official documents were produced over the years for this purpose, called *Carta Ejecutoria de Hidalguia*, which translates as something like 'Official Documents of Nobility'. It was common practice for the noble family to bind the originals or certified copies of these documents together, and the elaborate style of these bindings – which were most frequently covered in richly coloured velvet – signified the nobility and high status of the owner.

This paper outlines the conservation treatment of a *Carta Ejecutoria* of the Sanz family, completed as part of an MA project at Camberwell College of Arts.

An illustration of Don Rodrigo Sanz on his horse, which takes prime position at the front of the manuscript.

The manuscript dated to the end of the seventeenth century and was primarily on paper. It consisted of the transcription of six official documents relating to various members of the Sanz family. These were bound together with herringbone sewing on double cords, between beech boards covered in pink velvet.

The opulent appearance of the volume had diminished over the centuries since its binding: the velvet covering no longer remained across the spine; and the book had been squashed, distorting the spine shape and pushing the boards out of alignment. But most concerning was the deterioration of the textblock. Iron gall ink corrosion was evident throughout, particularly affecting the ruled borders on every page of the manuscript. The damage was so serious that on some folios the area of manuscript within the borders was almost detached from the binding.

Treatment of the manuscript required decisions about all three of these issues: the iron gall ink-induced corrosion of the textblock; the misalignment of the spine, and the damage to the textile covering. These key areas of consideration are discussed in the following.

Iron gall ink corrosion

Options for the treatment of iron gall ink corrosion remain limited – even more so if the object affected is bound, and the use of wet treatments such as calcium phytate is prohibited. In this case, it was clear that the textblock should not be disbound because of the stability of the original herringbone sewing. A fugitive red pigment, used adjacent to the iron gall ink borders on every page, also ruled out any kind of aqueous, chemical treatment.

Within institutional collections, the best option for similar severely corroded bound manuscripts may often be to stabilise the damage sufficiently for the book to be digitised, before confining the original to favourable conditions of low relative humidity and strictly limiting its availability to readers. But for this manuscript, part of a private collection, digitisation and restricted use was not an option: it needed to be able to withstand occasional handling.

It was concluded that low-moisture, mechanical repair by means of a remoistenable tissue was the most suitable means of stabilising the textblock and allowing the continued functioning of the manuscript. Series of tests were carried out to select the type of remoistenable tissue most appropriate for the repairs. On the basis of the results of extensive testing carried out by Andrea Pataki and Eliza Jacobi amongst others, three types of adhesive were chosen for trialling – gelatine, methylcellulose, and Klucel G – and two types of tissue – Berlin tissue, and Paper Nao RK00. The outcome of these trials was the selection of a gelatine-coated Berlin tissue for the repair tissue.

This decision was based on the strength, tone and even structure of Berlin tissue; the strength of the gelatine adhesive, and the potential capacity for type B gelatine to fix iron (II) ions.

The process of repairing the folios.

The process of repairing the folios.

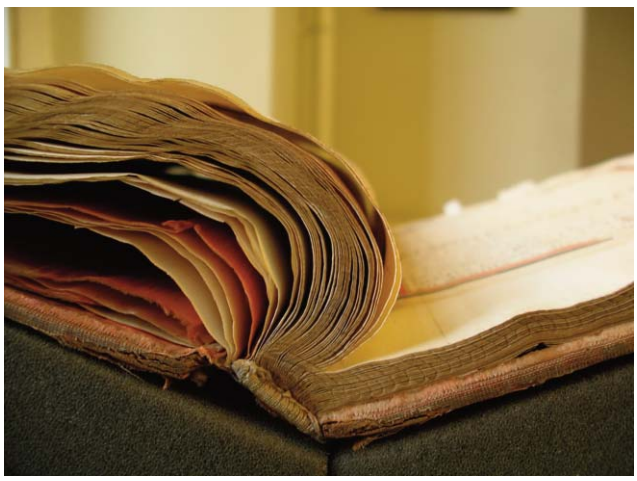
The tendency for the broken edges of the borders to catch against one another made it necessary to use the remoistenable tissue to support areas of loss entirely, rather than bridging losses with smaller splints. Strips of prepared tissue were reactivated on a reservoir of deionised water, and applied them to both the recto and verso of damaged areas. Larger losses were infilled with toned Usumino tissue. The amount of moisture transferred to the ink and the level of iron (II) migration caused by application of the remoistened tissue was monitored and controlled with a tool developed by Eliza Jacobi: an indicator paper impregnated with bathophenanthroline, and stamped with iron gall ink. If a strip of remoistened tissue applied to the indicator paper results in pink haloing of the iron gall stamp, then too much moisture has been used to reactivate the adhesive on the tissue, and migration of iron ions has occurred. The level of moisture can then be reduced by reducing the amount of moisture in the reactivation reservoir, or lifting the tissue away from the reservoir more quickly.

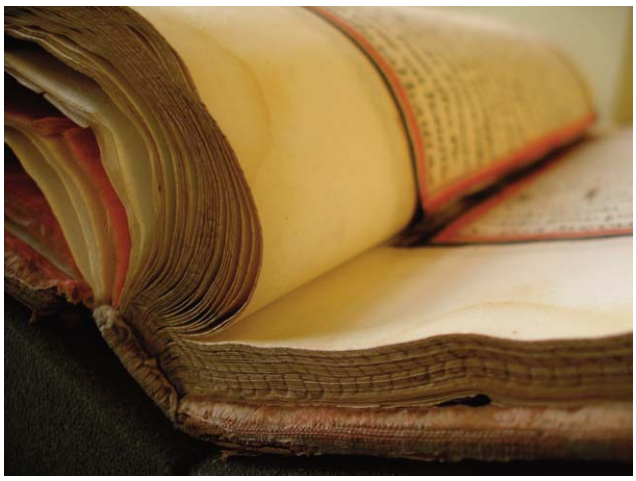
Spine misalignment

The decision to try to realign the distorted spine was influenced significantly by the requirements of the vulnerable textblock. A major potential benefit of attempting realignment was the improvement that could be achieved in the opening of the book, reducing the strain on fragile areas of the folios after repair, and lessening the risk to the manuscript through future use.

Treatments to alter the spine shape were attempted beginning with less interventive approaches. Firstly, during periods of treatment to the folios, the spine was manipulated into a more suitable position.

The book was also stored with slight pressure on the spine encouraging it into improved alignment. Although these measures improved the spine's potential for movement towards a more suitable position, the tendency remained to slip back out of alignment. This seemed to be down to the strong memory of the skewed shape retained by the





The awkward opening of the manuscript put particular strain on the breaking borders in the gutter of the textblock.

Adjusting the angle of the spine whilst working on repairs to the textblock.

parchment panels adhered across the spine. In order to enable the spine to retain its new shape the joints of these panels were humidified with poultices of set gelatine, and re-set with the spine secured in position.

Small strips of aerocotton lined with Tengujo were adhered over the spine and onto the boards to give further support. These were cut to fit between the parchment and the sewing cords, avoiding covering or applying adhesive to any of the structural or most vulnerable components of the spine. In combination, these treatments had an immediate impact on the spine's shape and alignment, allowing it to remain straight whilst unsupported, improving the opening of the textblock, and ultimately lessening strain on the folios.

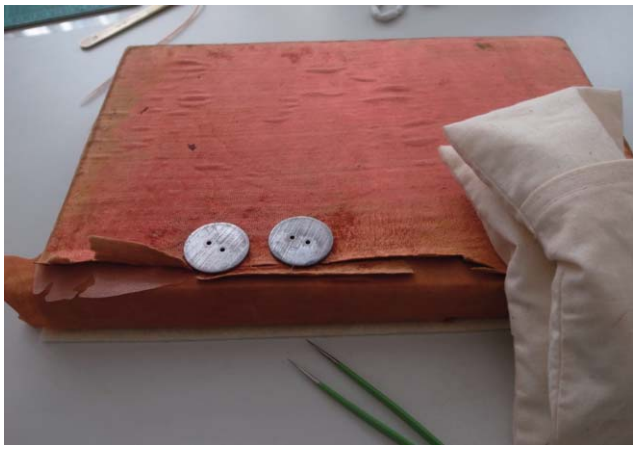
Damage to the velvet covering

The last issue addressed in conservation of the volume was the damage to the velvet covering, and the vulnerability of the exposed spine. Various solutions were considered for protecting the spine structure, such as making a chemise to cover the entire volume, but ultimately it was decided to repair the loss in the velvet. Consultation with textile conservators and others with experience of textile bindings was critical for this stage of treatment.

One hundred per cent linen was chosen to cover the spine, because of its strength and the size of the weave, which closely resembled the ground weave of the velvet. The linen was toned to the colour of the velvet using screen printing pigments. These were used in preference to fabric dye, as it was possible to apply different shades of pigment locally, and in successive layers, creating a tone more sympathetic to the varied fading of the velvet.

The broken edges of the velvet were adhered onto the linen using silk crepeline coated with a mix of Lascaux 360 HV and 498 HV. This was reactivated with a solvent rather than heat to avoid causing further damage to the already degraded pile. The crepeline was also toned prior to coating with Lascaux, to minimise the visual impact of any areas that might be exposed.

This paper aimed to illustrate how conservation treatments in this project were employed to allow the



continued functioning of an extremely damaged manuscript. Treatment of the textile cover and binding aimed to prevent further damage to the book, without overly impacting on original structures. By repairing the iron gall ink damage to the textblock, and providing for continued – if careful – use of the volume, access to the information contained in the manuscript text was preserved. Importantly, the repairs also allowed for continued access to the information evidenced by the elaborate physicality of the binding, an aspect that might have been lost had interventive treatment been rejected in favour of transmuting the manuscript into a digital record.

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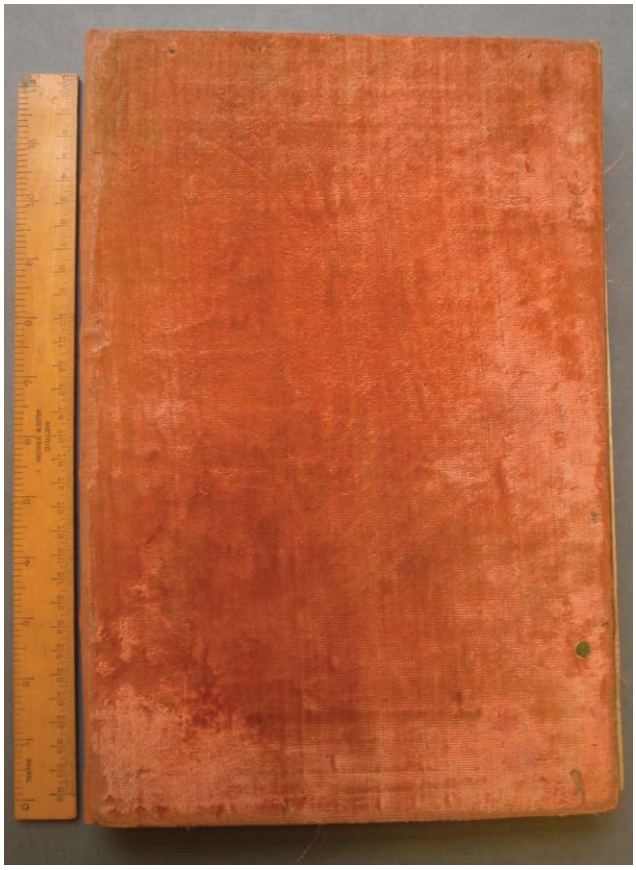
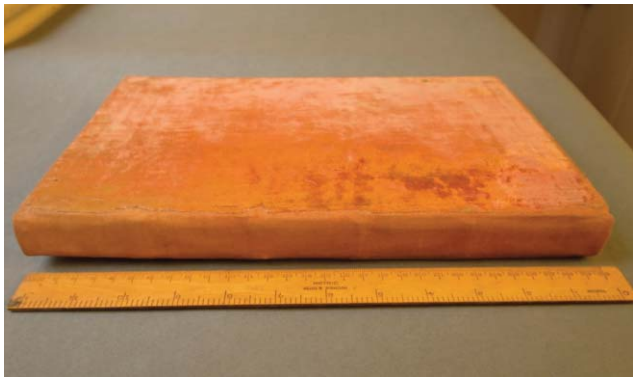
September 2013





The manuscript after realignment of the spine and repair of the velvet covering.

Forward-looking tradition: mounting a calligraphy as a Chinese hanging scroll

Carol Weiss

Introduction

As part of the final project for my MA in Conservation at Camberwell College of Arts, University of the Arts London, I mounted a calligraphy as a hanging scroll following traditional Chinese procedures. My objective was to identify some of the key principles of traditional Chinese scroll mounting that may have been somewhat overlooked by Western conservators, in spite of the growing common interest in the transfer of Eastern and Western conservation skills.

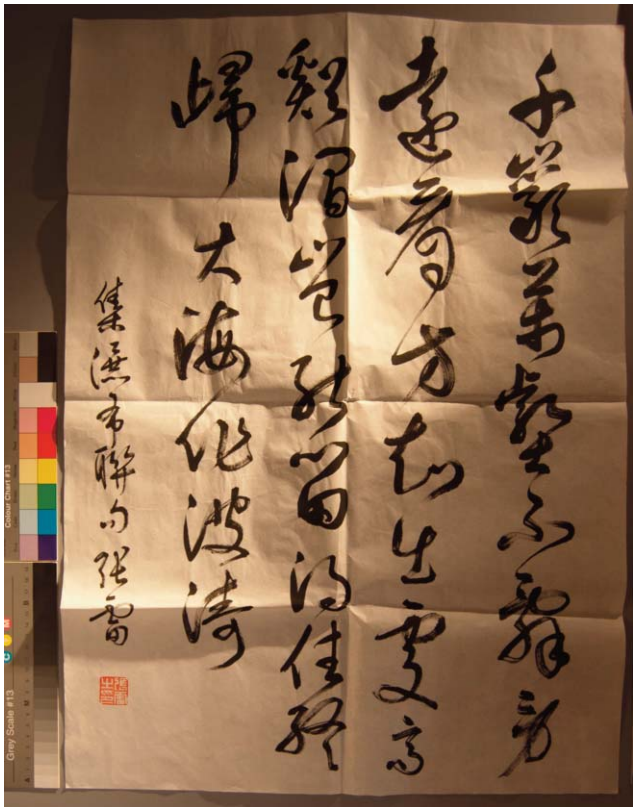
A craft that has existed for two millennia is obviously too huge a subject for such short discussion, yet I hope this paper will be able to: firstly describe the reasons why Chinese scroll mounting, or, in fact, any Eastern specialism, should be viewed holistically; secondly, briefly describe the treatment undertaken in this particular practical project; and thirdly, focus on training – just one aspect of this unique traditional system that all conservators face, be they working in Eastern or Western fields. In particular, I will look at how differences in training impact on innovation in conservation.

Before continuing I must thank and acknowledge my teacher, Qiu Jin Xian, hereafter Qiu Laoshi (Teacher Qiu), for generously sharing her many years of scroll mounting experience with me and for taking me on as a student to train in this unique field. I must also extend my thanks to those both within Camberwell College and the British Museum who allowed me to combine my MA course with working and training under Qiu Laoshi at the Hirayama Studio, and the HLF/Icon internship scheme, which first introduced me to this specialism.

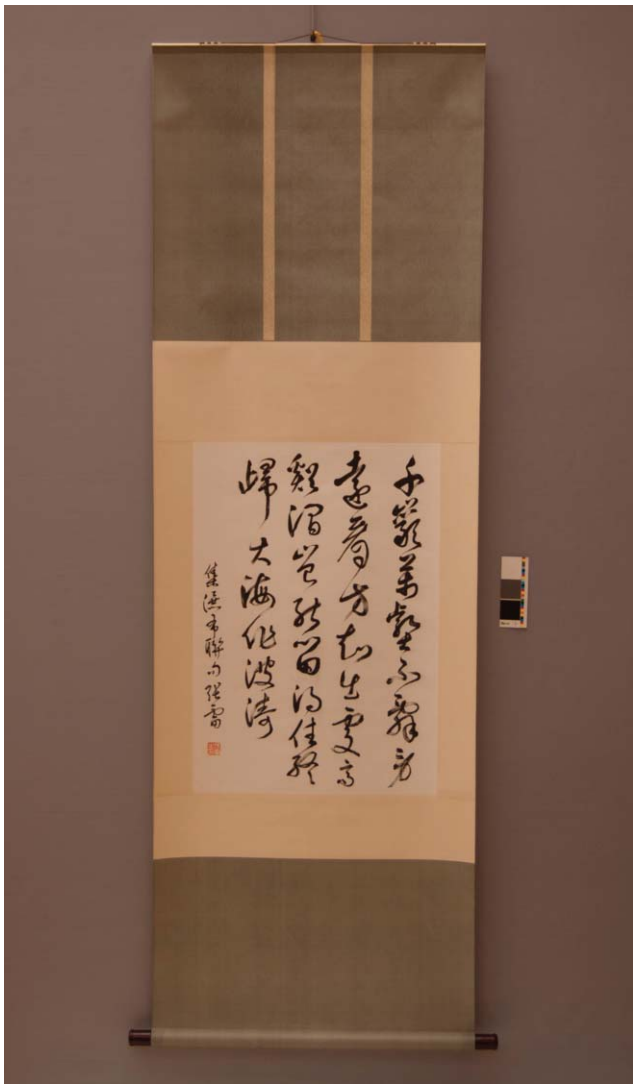
A new approach to viewing Eastern techniques

It is clear that over recent decades there has been a real interest in the practices of the Eastern scroll mounter, as evidenced by the number of Western paper conservators attending training courses specialising in Eastern techniques and the growing body of literature, seminars and conferences dedicated to the subject.[1]

Yet the majority of these sources are rather piecemeal in their approach and are focused on the application



The calligraphy before mounting (in raking light) / Lining the calligraphy with xuan paper and wheat starch paste



The finished hanging scroll, on display (left) and rolled up (above)

of *individual* techniques or the uses of *particular* Eastern tools and materials. Many of these techniques are, in this context, quite reasonably adapted to suit Western objects, yet they are then separated from the craft framework in which they are integrated and were originally formed.

It is not disputed that value is clearly derived from the increasing adoption of individual Eastern techniques, tools, and materials utilised in Western conservation studios, yet it is proposed that greater benefits may be achieved by moving away from this individualistic approach and appraising Chinese scroll mounting, or indeed any Eastern scroll mounting field, as a whole, with three safeguards in place that have developed over centuries of practice. With all three safeguards in place, conceivably interventive processes have their risks massively reduced. These safeguards are:

(i) the absolute importance placed on the correct use of traditional tools and materials;

(ii) the precise execution of complex nuanced techniques;

(iii) the overarching importance of the intensive training process. It is this last safeguard that I shall focus on.

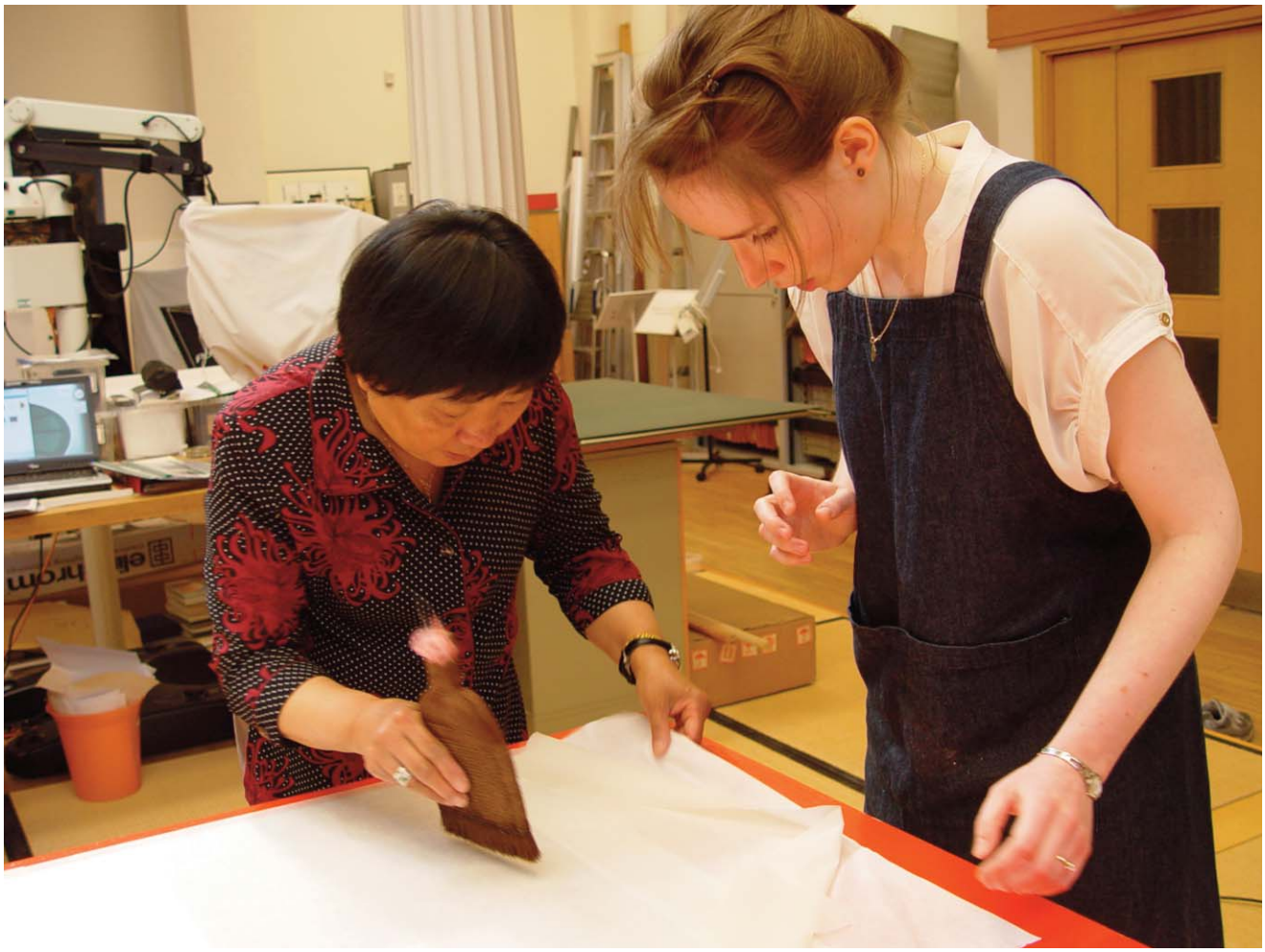
Practical case study

But first to briefly describe the treatment that was undertaken in this project as an example of Chinese scroll mounting practice, I quote an extract from the seminal Western writer on Chinese scroll mounting – Robert Van Gulik, writing in the late 1950s:

> An unmounted picture or autograph does not look very attractive. The paper … is all crumpled up by the wrinkles that develop there where ink or colours were heavily applied, and the canvas seems too thin to lend body to the brush stroke. It needs the art of the mounter to show its beauty … When the scroll has been properly mounted all the wrinkles will have disappeared, the ink shows a deep black tone … and the picture is fittingly framed by assorted strips of coloured paper and silk cut to harmonious proportions (Van Gulik, 1958, p. 57).

This passage could well have been written about the calligraphy in question. It was in fairly good condition, yet was vulnerable due to its folded storage, suffering from prominent creasing and folds throughout. There was risk of damage to the object in handling and unfolding, as well as a high risk of squashing whilst in storage – all issues stemming from its major vulnerability – the *xuan* paper substrate's fineness.

It was thus proposed to mount this twentieth-century calligraphy as a Chinese hanging scroll as Van Gulik



Observing Qiu Jin Xian at work, here brushing backing papers on to a hanging scroll's verso

describes, to demonstrate the need for all three safeguards to be in place to create a successful mount for combined aesthetic and conservation reasons.

In recording this treatment for my own learning, I detailed hundreds of individual steps in the mounting process. But in summary: the calligraphy had its inks tested for fugitivity which were found to be stable. The object was lined with *xuan* paper using a thin consistency wheat starch paste before being placed on a *karibari* board to dry. A mount was designed and appropriate silks were selected to form the frame; a two-coloured mount with *jingyan* was chosen. These silks were lined with *xuan* paper and thicker wheat starch paste and after drying on the *karibari* board, were cut to size and attached to the trimmed calligraphy by means of *chuzhu* (*xuan* paper joining strips). After the scroll was assembled, a backing paper to cover the entire verso was produced by lining two layers of *xuan* paper together. This was then applied to the scroll's verso using thin wheat starch paste, as well as other decorative and structural elements including cover silk to protect the scroll when rolled. The scroll was then adhered to the drying board with a thick paste margin where it remained for six weeks. After this drying period the scroll was taken down and burnished before having a wooden top stave and bottom roller with wooden *zhoutou* (rolling knobs) attached with thick wheat starch paste. A braid and ribbon were attached to enable hanging and tying.

In order to facilitate the appropriate use of tools and materials and master the precision with which the complex series of procedures and techniques must be executed, an intensive training period of around ten years is needed before one can properly call oneself a mounter. During that time, training under the direction of a scroll mounting Master is absolutely essential – the third safeguard of Chinese scroll mounting.

Training styles and the impact on innovation

I have observed Qiu Laoshi perform these processes numerous times before, and it is through assisting and

copying what is observed, without questioning, that a scroll mounter must train.

Copying one's teacher exactly is the fundamental mode of training in many Eastern fields; for example, in Chinese painting, an artist can spend a lifetime copying the art of Masters before he ever attempts his own style. To understand this concept, one must realise, as Van Gulik does when speaking about the manufacture of pictorial art, that 'in China original and copy are not separated by as wide a gulf as with us in the West' (1958, p. 215).

The Australian conservator Colin Pearson complained when visiting conservation studios in Chinese museums in the late 1970s that although 'the level of traditional skills carried out was very high … the most disappointing aspect of the work seen was the emphasis on replica production' (1978, p. 55). He did not recognise that replica work is itself a form of preservation in China, not just in recreating versions of heritage objects as facsimiles, but by honing the skills necessary to preserve the originals; it is through this copying that the craft is learnt.

Mastering traditional techniques means using only materials very similar to those developed centuries ago (Van Gulik, 1958, p. 215; Schmitt, 2011, p. 199). Western conservators are increasingly interested in the long-term behaviour of the materials they use, as evidenced by numerous research studies using accelerated ageing, yet the materials and techniques of the scroll mounter have already been proved to provide lasting, reversible protection over real time (Masuda & Oryū, 2000, p. 231; Oka, 2004, p. 17). This overarching and all-consuming respect for tradition differs greatly to the approach found in many Western conservation training programs, where students are encouraged to formulate new practices early on in their training. To play devil's advocate, if viewing conservation work from a risk management perspective, surely the tried-and-tested approach must be deemed safer?

Some, like Richard Smith in his 1999 paper, 'Reversibility: A questionable philosophy', have implied that traditional crafts following the tried and tested techniques are static since 'conservators are not encouraged to create, develop, evaluate, or apply new technologies' (p. 99). Yet this assumes that copying excludes innovation. In the field of Chinese art, because of reverence to tradition, when a new innovation or style emerges it is usually without the idea of breaking away from the past, but as Van Briessen puts it in his book on Chinese brush painting, emerging gradually from it (1962, p. 32).

Chinese scroll mounting is by no means static. Scholars recognise that the lining techniques that initially started Chinese scroll mounting were no way as refined as they are now; they took 'several centuries of experimenting' to develop from the first lined book rolls in 100 AD (Van Gulik, 1958, p. 172, p. 177 & p. 135). Innovations in Chinese scroll mounting are now coming from an increased openness with scientists and other conservation specialists. But developments must first pay respect to tradition and evolve only once technical skill is mastered, sanctioned by a wide materials knowledge. Innovations therefore come in slower and subtler form than in Western practice, but with reduced risks. Alongside this, traditional practical skills are preserved – skills honed over centuries which would be difficult to recover if ever lost.

Conclusion

Returning to the calligraphy from this project, although I am generally pleased with this hanging scroll, there are many areas which could be improved upon. The areas for improvement stand testament to the need for long-term training under the discerning eye of the Master.

I am not advocating in any way that every Western conservator enter an Eastern apprentice system, never innovate new treatments, or that all Asian objects should be mounted in traditional Asian formats. But rather that Chinese scroll mounting when viewed as a whole with its three safeguards in place, can be used as a prism through which Western conservators can re-evaluate certain aspects of their own work, including amongst them: the duration and intensity of conservation training programmes, the never-ending search for 'new' ideas at the expense of mastering traditional crafts, and conservators' relationships with materials and the time invested into deep practical familiarisation with them.

Endnotes

1 Evidence includes: two volumes of the *The Paper Conservator* dedicated solely to the conservation of East Asian art (vol. 9, 1985 & vol. 30, 2006) including bibliographies by Bennett and Minte respectively; Tobunken and Masuda's ICCROM courses on the Conservation of Oriental Art from 1982–2002, continuing now in Japan; Koyano's *Handbook of Mounting Techniques* (1979); the 1988 IIC conference on the Conservation of Far Eastern Art held in Kyoto, right up to the recent 2011 Chinese Heritage Conference, Paper from the East; and the ongoing work of the Tokyo National Research Institute for Cultural Properties, notably in 1977 & 1988. There have also been many other additional papers including amongst them the work of: Johnson, 1972; Wills, 1987; McClintock, 2006; Huxtable & Webber, 1987; Meredith, 1995a&b, Nicholson & Page, 1988; Toishi & Washizuka, 1987; Hare, 2006; Gu, Hou & Gouet, 1999; Webber, 2006, 2001 & 1997; Kite & Webber, 1995; Burdett & Thomson, 2002; Green & Qiu, 2005; Landwehr, 2006; Masuda; 2001; Nishio, 2001 & 1993.

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Think big?! A look into the possibilities and limitations of large-scale treatments in paper conservation

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Based on a thesis submitted in support of MA Conservation – Art on Paper Camberwell College of Arts, UAL

Introduction

This paper outlines the concept of large-scale treatments in paper conservation. The possibilities and limitations of large-scale treatments are derived from research into their history and current application. A case study of a collection of the Church of England Record Centre (CERC) underpins this research.

The CERC collection comprises more than 7,400 architectural reproductions and drawings, photographs, maps and plans of various age, material and condition. A collection of architectural drawings is a very good example of the possibilities and limitations of the large-scale treatment approach, as their preservation 'is frequently complicated beyond that of other paper-based materials by the large size and poor condition of collections, the variety of materials present, and the kind of access many users require' and can 'overwhelm limited preservation resources' if good planning and management is not present (Price 2010, p. 223). A part of the collection surveyed, the National Society's (NS) School Plans (Fig. 1), were treated within the practical part of this project. Within this project, the objects were treated in batches according to previously defined treatment standards with the aim of making them accessible. The research and the case study showed that large-scale treatments are a systematic and efficient approach to conservation. They allow, even within small institutions with limited resources, the preservation and conservation of our collections to a high standard. A discussion of both the theoretical research and practical work concludes this paper.

Large-scale treatments in paper conservation

Even though the term 'large scale' or similar terms are used by several authors in connection with preservation and conservation, no clear description of the term itself and its characteristics has been given. To find out about these properties, as well as possibilities and limitations of the large-scale approach, it is necessary to look at both the history and current application of large-scale treatments in paper conservation.[1]

Fig. 1: Maps of the National Society in their storage environment at the Church of England Record Centre before treatment (drawer F2).

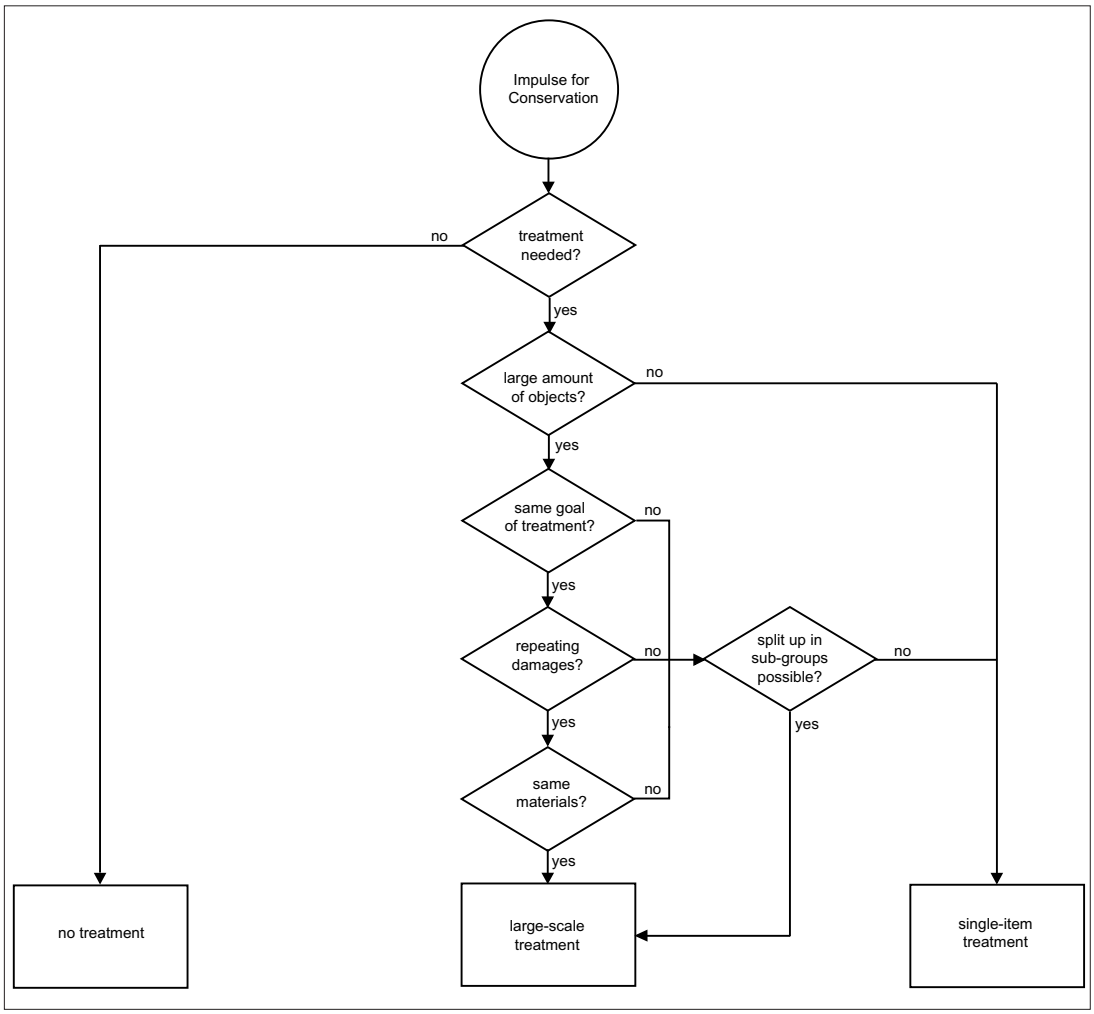


Fig. 2: Requirements a collection has to meet for a successful large-scale treatment as concluded from its past and present application.

Characteristics and definition

Whilst the impulse for, and the specifics of, a conservation treatment change with every collection, the arguments for a decision towards a large-scale treatment remain the same: a large number of objects have to be treated, mostly within a certain time frame, and often within restricted resources. Objects considered for treatment on a large scale do not necessarily have to be part of only one collection. It is, however, vital that the objects chosen for treatment have the same goal of treatment[2] as this inevitably defines the degree to which the objects will be treated (Muñoz-Viñas 2005) and is the basis for choosing methods and materials and setting treatment standards (Appelbaum 2007).

The whole, often complex, treatment process is divided into single steps to allow batching according to the treatment needed – a very important phase in the large-scale treatment approach (Waters & McComb 1974, Alper 1992, Merril-Oldham & Schrock 2000, Lindsay 2003, Ritzenthaler 2010).

Therefore, homogenous damages and materials are a pivotal requirement (Brinkhus 1987, Feindt 1997, Lindsay 2003, Frankenstein 2012). The batching can be very general (Waters 1990), or more specific and divided into single treatment steps that are used alone or in combination as required (Evans 1993, Homburger & Korbel 1999, Glück & Barkhofen 2012, Henze 2012, Hoffmann 2012). The building of batches ideally takes place before treatment is started, but if all objects have to undergo the same first treatment step they could be divided into further treatment groups subsequently. In any case, treatment standards are required to reach the treatment goal and maintain the same high quality of work throughout the process. Ideally, the treatment standards reflect the treatment groups for batch building. The treatment is undertaken within treatment groups according to the standards set, which also allows division of labour, another feature of large-scale treatments and vital to their efficiency (Carmenati 1997, Feindt 1997, Waters 1990, 1998). Based on the information researched, a decision tree (Fig. 2) was produced by the author that

illustrates the treatment decision and highlights the main requirements for successful treatment on a large scale.

Possibilities and limitations

Even though the implementation of standards and the building of batches might be time-consuming in the first place, it will save resources over the long term: no time is needed for time-consuming single-item-based decisions or testing during the actual treatment and the preparation time per item is reduced to a minimum.

The idea that '[r]ather than spending a long time conserving and restoring a single object, [the conservator] could be undertaking the preventive conservation work safeguarding the long-term future of many objects' (Caple 2000, p. 66), is a strong argument for treating on a large scale. Even though in his statement, Caple divides between conservation and preservation, this approach can be seen as the main advantage of the large-scale treatment approach: many objects are treated in one process so that the cost per item is reduced which allows more objects to be treated within the budget. Hill (1997) states that with a large-scale stabilisation approach, 'more material has been treated than ever before, providing long-term preservation and greater accessibility to the public' (Hill 1997, p. 301), a thought expressed by many other authors (Waters 1990, 1998, Grant 1994, Bélaval & Renoult 1997, Glauert & Ruhnau 2005, Ritzenthaler 2010, O'Brien Miller & Tedone 2011). In general, conservation techniques that are applied on a single-item basis can be adapted to large-scale projects but, often, 'solutions valid for the treatment of individual items are far too expensive for use in solving mass-scale problems' (Banik & Pataki 2001, p. 45f) and have to be adapted for use. While use of standardised treatments will result in an efficient workflow and help to maintain the desired level of quality over a long period of time and within a diverse team (Feindt 1997),[3] this also requires the chosen treatment method to be appropriate for all objects with a certain damage.

Therefore, large-scale treatments are 'nonetheless characterized by compromise' to a larger extent than the treatment of single items (Merril-Oldham & Schrock 2000, p. 235) and simplified to allow the treatment of many items (Grant 1994). Simplification makes treatment processes easily applicable even by non-conservation staff (Waters 1990, Lindsay 2003), which means that conservator time can be retained 'for complex treatment of materials used in other

Fig. 3: (left) Map cabinet F, drawer 4, containing some of the NS School Plans. Before treatment.

Fig. 4: (below) The NS School Plans after their move to Camberwell College, after examination, before treatment.

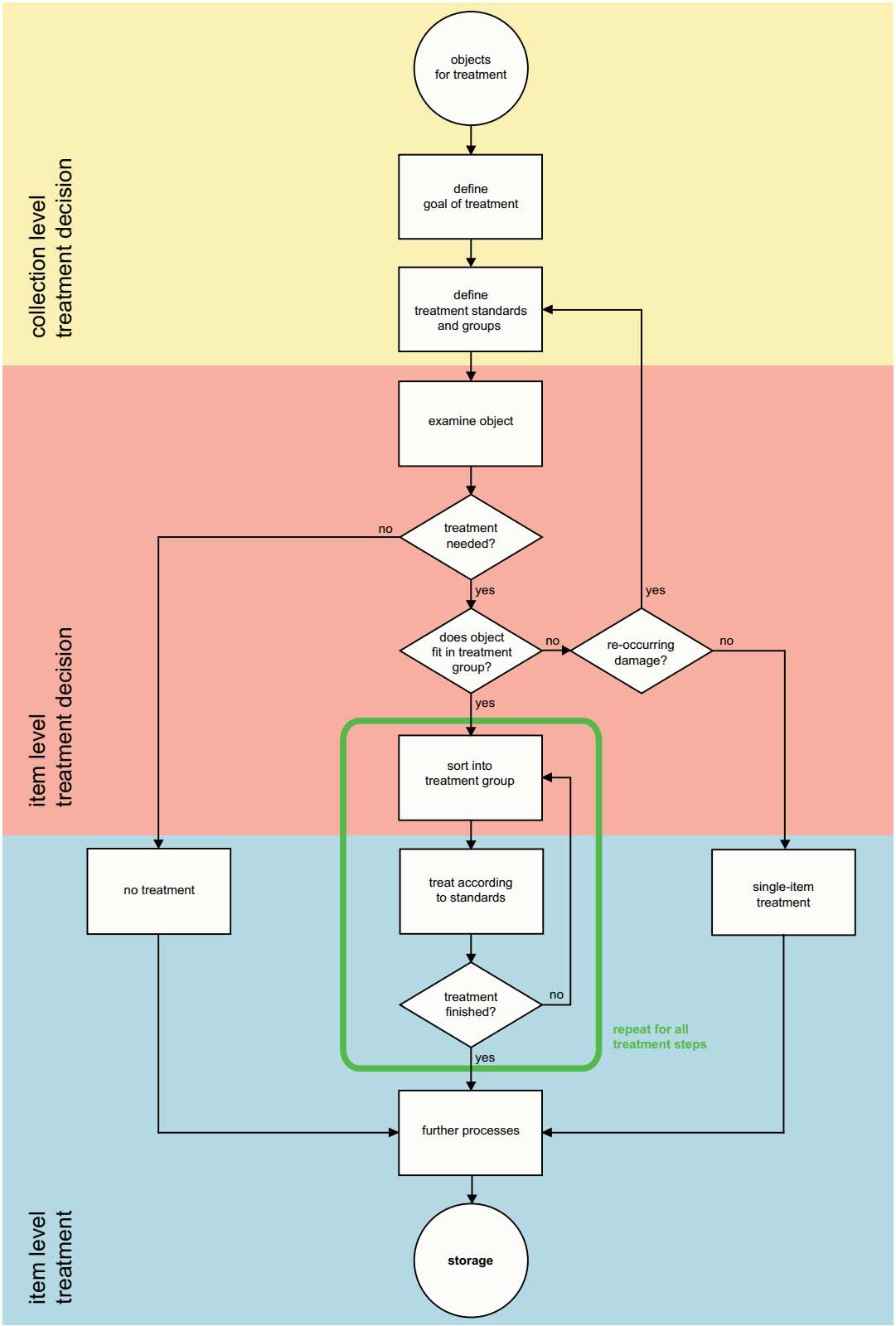


Fig. 5: Flowchart demonstrating the decisions and actions to be undertaken within the large-scale process and as demonstrated on the NS maps collection.

contexts' (Knowlton in O'Brien Miller & Tedone 2011, p. 119). Often, large-scale treatments are undertaken on a stabilisation or preservation level only, which some conservators regard as a limitation, fearing a loss of skills and experience (Hill 1997). A low degree of conservation treatment for a high number of objects is, however, exactly the idea behind Waters' phased preservation (Waters 1990, 1998) and can be associated with the minimum treatment approach Muñoz-Viñas describes: 'a conservation process

should consist of the minimum intervention required to achieve its goals' (Muñoz-Viñas 2005, p. 189).

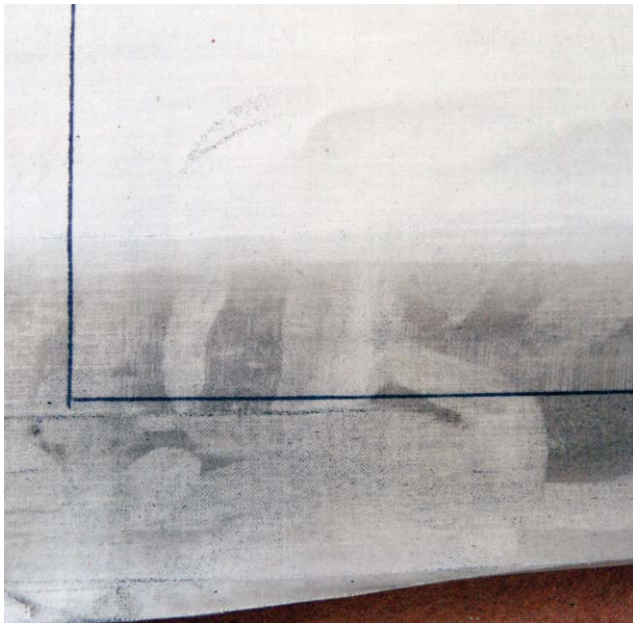
As mentioned earlier, decisions have to be made before any treatment starts that are valid for every object treated. This means that any wrong decision will have a major impact as it affects a whole collection rather than an individual object. The extensive washing of archives in the past that probably further damaged many iron gall ink objects (Beindtker 2004) and the collection-wide lamination with various types of materials from man-made fibre textiles and self-adhesive plastic film to heat-set products that were used in many institutions (Kresh 1996, Galinsky 2001)[4] are only two of probably many examples of wrong decisions that continue to affect collections. Test-runs can be helpful to standardise treatments and to prove decisions.

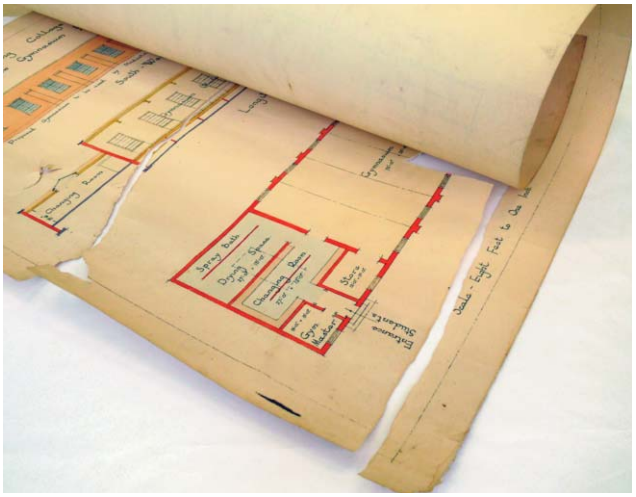
As with every conservation treatment, a large-scale treatment should not be undertaken just for the sake of the treatment or 'just because we can'.[5] There are many objects and collections that are not suitable for being treated in such a way (Feindt 1997) and the implementation of large-scale treatment is 'not intended to eliminate the option of full treatment, but rather to attempt to strike a balance' (Hill 1997, p. 303).

Conservation treatment: the National Society's School Plans

The NS map collection is a mixture of church school plans from the early days of the NS until recent times. It consists of 158 items, stored in drawers of map cabinet F. Following the decision tree in Fig. 2, it was found that the NS School Plans could be treated

Figs. 6 and 7 (from left to right): The objects were tightly rolled. While most items only showed minor to medium damage (left), some items had very brittle paper and were heavily damaged (right).





Figs. 8 and 9 (from left to right): Objects showing surface dirt (left) and tears (right).

within a large-scale treatment process. This process developed on the basis of the steps, sample survey and research as illustrated (Fig. 5).

Goal of treatment

The goal of treatment was to make the NS School Plans accessible for staff and external researchers and to treat them so that they could be used with only minimal risk of further damage. The methods chosen provided a degree of archival conservation that allowed the use of objects after treatment while aesthetics were set aside. As the collection is not catalogued, it is important to invest only the minimum of time and cost into conservation to make them accessible.

Defining treatment standards

All objects were tightly rolled, except one which was folded. The majority of items contained different grades of surface dirt, with some being heavily soiled. Almost two thirds (65.2%) showed tears and losses, with most objects being only slightly damaged. Figs. 6–9 demonstrate the common damage types.

Examination of the objects and grouping into treatment groups

Once the standards had been defined, the items were surveyed item by item (Keene 1991, Lindsay 2003) and grouped according to the treatment they needed (Fig. 10). While the decision tree leaves the opportunity for no treatment, this was not an option within this collection, as every object had at least to be flattened. A few objects had to be treated on a single-item level or could not be treated within this treatment scope, but no new treatment standards had to be defined during the examination process. An interesting result was that the objects could be grouped in very few treatment groups, with the majority of objects needing surface cleaning, flattening and tear repair.

Preparation for treatment

Once the items had been sorted into batches according to the standards, the material needed was prepared before the treatment was started to enable an efficient treatment process. Chemical sponges

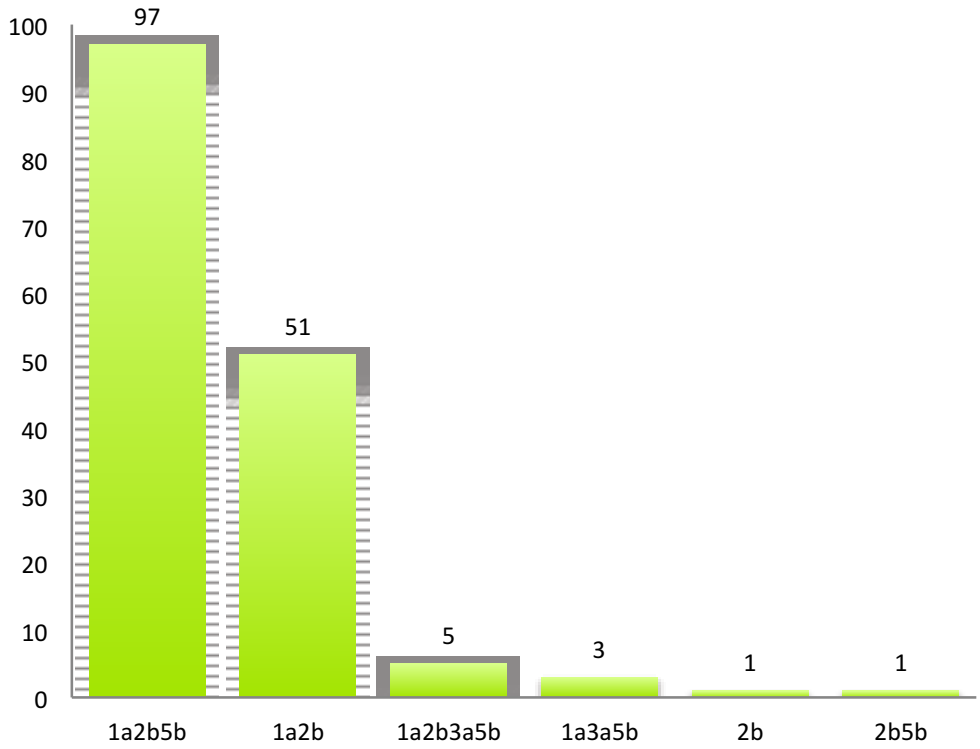


Fig. 10: Distribution of objects per treatment group (absolute numbers).
1a2b5b = Surface cleaning, flattening and tear repair
1a2b = Surface cleaning and flattening
1a2b3a5b = Surface cleaning, flattening, removal of pressure sensitive tape and tear repair
1a3a5b = Surface cleaning, removal of pressure sensitive tape and tear repair
2b = Flattening
2b5b = Flattening and tear repair.

were cut to quarters; a cedar-wood chamber was set up for humidification (Brückle & Banik 2011) and Bondina was cut to fit the size of two blotter papers, a size that proved to fit the vast majority of the objects.[6] It was decided to use only one type of Japanese paper (Kozo Shi 23 g/m^2) which was water-cut in strips of two different widths. Wheat starch paste was prepared once a week. To be able to mend tears on as many of the maps as possible at a time, flexible magnets were prepared with blotter and Bondina to be used instead of weights (Blaser & Peckham 2006).

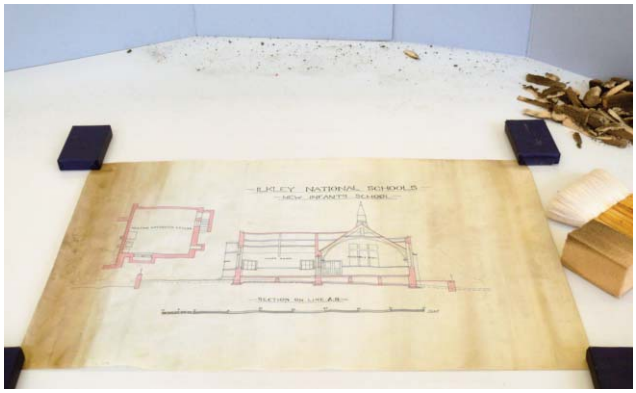
Treatment of objects

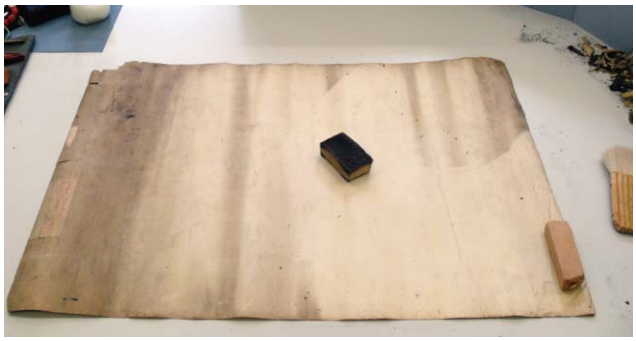
Every object ran through the treatment circle until every treatment proposed was undertaken and the object finished. Ideally, every object should run only once through each treatment group; for example from surface cleaning to flattening to tear repair to finished objects/further processes. In some cases, however, objects had to be placed back in the same treatment group, as, for example, the flattening was not successful and the objects had to humidified and pressed again or when a tear was missed out during the mending treatment. A decision as to whether the treatment is finished depends on quality control at the very end of the treatment process: an object is only finished if the treatment meets the quality set by the treatment standards. This is a vital step in the process. Figures 11–18 show the main treatment steps undertaken and results of the conservation treatment.

Amendments of the treatment workflow and special cases

Large treatment batches were further divided into smaller batches of around 20 to 30 objects, an amount that could be placed in the cedar wood chamber at once and which also was the quantity of objects that could be pressed simultaneously with the number of blotters and Bondina sheets available. This allowed an efficient workflow and was easier to keep track of than with a larger number of objects and allowed for intertwined and simultaneous work processes. Heavily torn objects were separated from the less damaged ones by sorting them in a different batch; this made for a very fast and efficient completion of the less damaged items and a special focus on the heavy damaged ones (Figs. 19, 20) without altering the treatment standard.

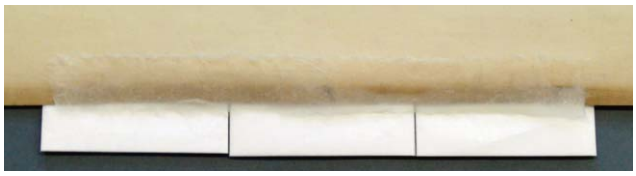
Some of the objects were so tightly rolled and of such brittle paper that they could not be opened without humidification. Most of these objects also had to be humidified longer than usual, and some of them had to be opened gradually in the cedar wood chamber, as humidification in a rolled state was not sufficient. This required a more single-item-focused treatment



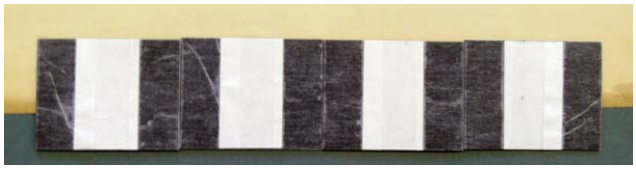


Figs. 11 and 12: Set-up for surface cleaning (left), and result of surface cleaning with a chemical sponge on one of the more heavily soiled objects (right).

Figs. 13 and 14: The first batch of surface cleaned maps in the cedar wood chamber for humidification (left) and two of the maps after pressing between blotter and Bondina (right).



Figs. 15–17 (above and below): Tear repair using a pre-cut strip of Japanese tissue and wheat starch paste; the repair is pressed between flexible magnets prepared with Bondina and blotter.



approach, as objects had to be on their own or with only few more in the chamber, and each object required a very careful treatment during opening as the paper tended to crack very easily even in humidified state. The treatment standard for these objects remained the same.

Objects made of tracing cloth[7] had originally been grouped into treatment code 2a, flattening by pressing without humidification, as they are very sensitive to humidity due to their starch sizing and the media used (Price 2002, 2011). However when the tracing cloths of the NS collection were pressed without humidity, it became clear that pressing alone was not enough to flatten them. To find out whether a humidification treatment according to standard 2b[8] would be successful without harming the objects, three slightly different tracing cloth objects of the collection were humidified and pressed in a test run. They were visually examined and compared to similar, non-humidified tracing cloth objects after treatment. The comparison showed that there was only a very slight loss of gloss on the verso of the objects, which was decided to be acceptable for this collection; the fact that they were sufficiently flattened was given priority to the very small loss of gloss. All objects on tracing cloth were grouped into standard 2b and treated accordingly. As with the humidification, a trial was done with the tear repair according to standard 5b with tracing cloth and tracing paper objects, which was successful (Figs. 22, 23).

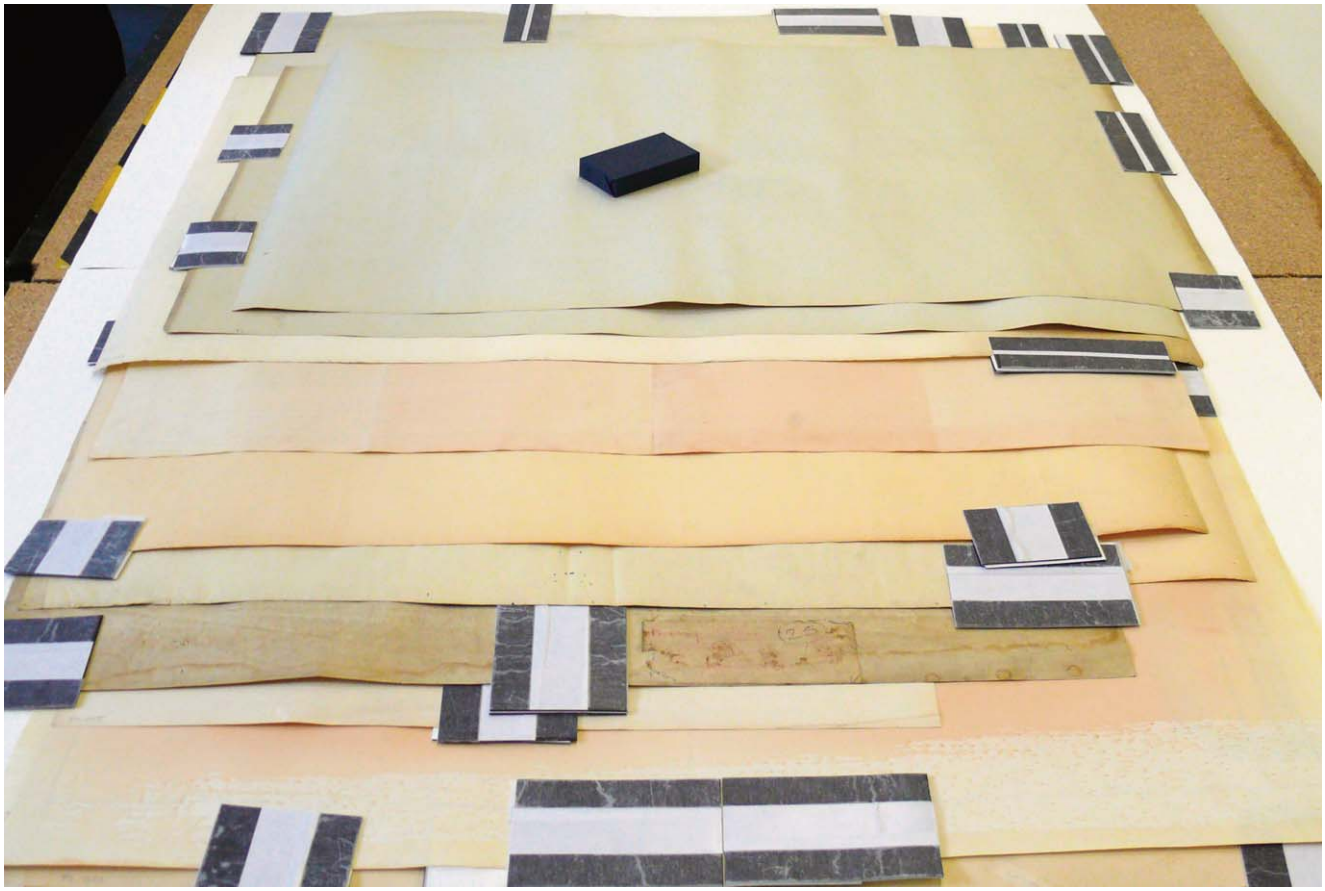


Fig. 18: The use of flexible magnets allows the piling of mended objects to save space.

Figs. 19 and 20: A heavily torn object after flattening and tear repair from verso (left) and recto (right).

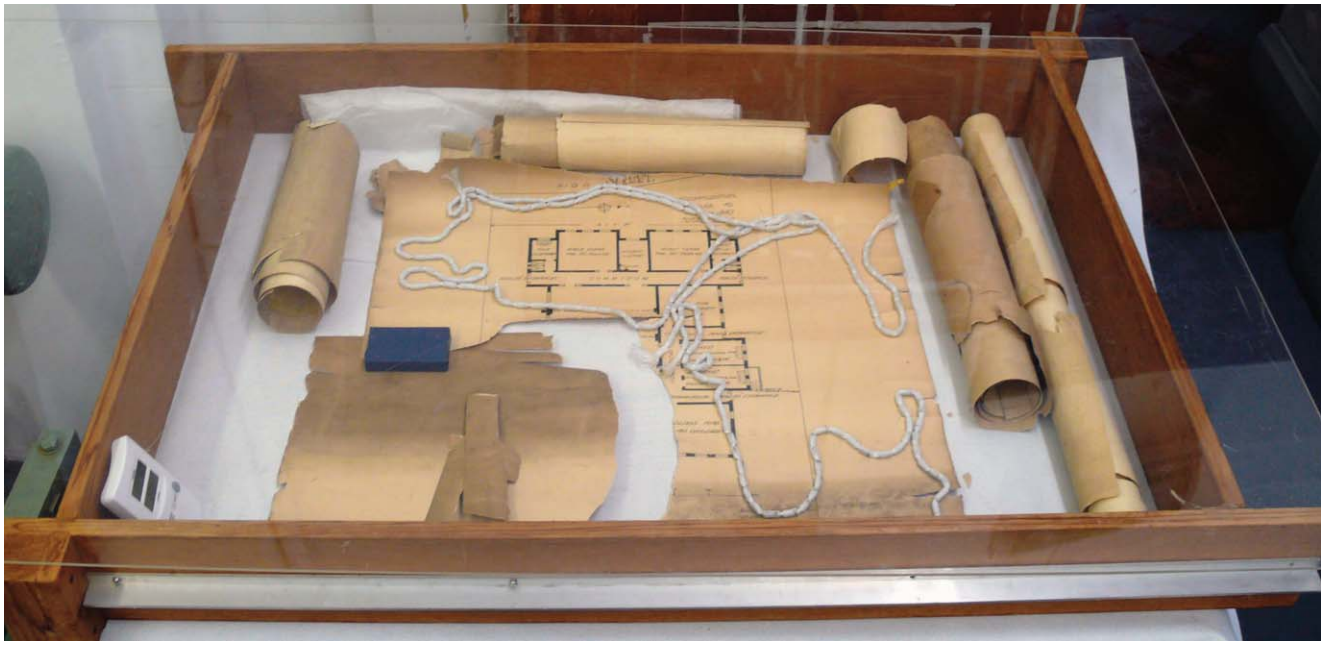


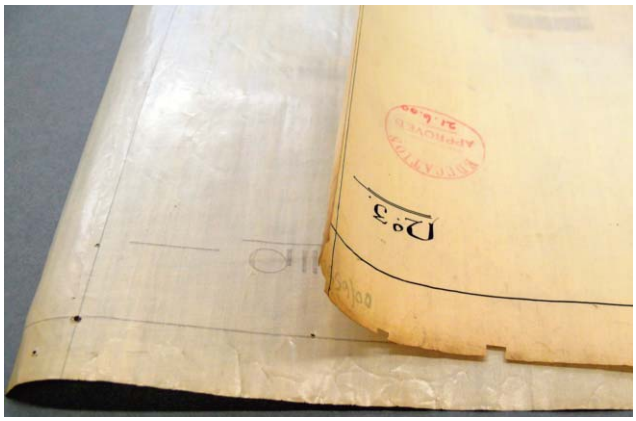
Fig. 21: Very brittle and heavily damaged objects during humidification in the cedar wood chamber.

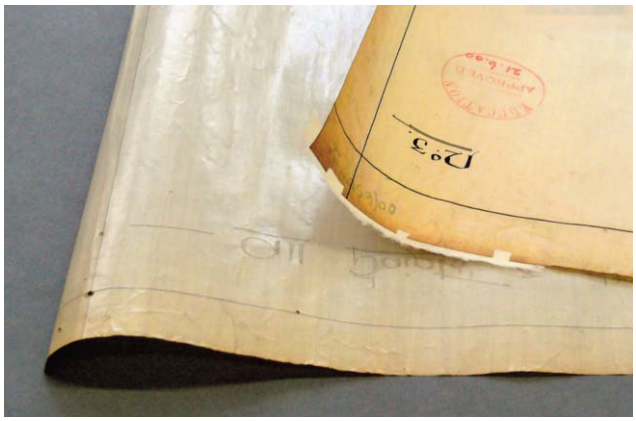
Further processes

The finished objects were sorted according to their number for a final check (Fig. 24). The long-term housing of the collection has yet to be decided, but this has to fit the general preservation programme of the CERC and be feasible within the budget. It would be advisable to use folders without flaps made from archival-quality cardboard, storing approximately ten items per folder (Glück & Barkhofen 2012, Weigel 2012). The folders can either have two or three formats, e.g DIN A0, DIN A1 and DIN A2, which would require the objects to be sorted according to their size. If this is not possible due to archival reasons, only one size that fits most of the maps, in this case DIN A0, should be used. The housing of the objects that exceed DIN A0 has to be discussed and depends on the CERC's ability to provide flat storage for oversized objects.

The case study at the CERC and the following treatment of the NS School Plans demonstrated both the decision process that leads to a large-scale treatment and the single steps that are necessary for a successful application of a large-scale conservation treatment. 158 objects could be grouped in only four treatment groups (surface cleaning, flattening, removal of pressure sensitive tape and tear repair) with the vast majority of items requiring only three treatment steps. The objects were successfully treated and are now accessible for the CERC's staff and researching public.

The CERC will provide a new storage area for the NS School Plans once they are back at the CERC, showing that the conservation treatment had already led to a higher appraisal of those plans. It is hoped that the CERC will continue to care for the preservation and conservation of the maps collection.[9]





Figs. 22 and 23 (left to right): A tracing cloth object before (left) and after tear repair with Japanese tissue and wheat starch paste (right).

Fig. 24: Some of the finished objects sorted according to their number and drawers, waiting to be housed and delivered to the CERC maps collection.

Conclusion

The main characteristics of the large-scale approach are the standardisation of the treatment steps and the building of batches according to the treatment needed, resulting in a highly efficient process. Based on research into their history and current application, the possibilities and limitations of large-scale treatments were determined. A decision tree diagram was developed which illustrates the main decisions that can lead either to a large-scale or single-item-based treatment of a chosen collection.

Large-scale treatments are a very systematic approach to conservation. They encompass a whole collection of objects rather than focusing on single items and are therefore a very sustainable conservation measure (Caple 2000). The large-scale treatment approach is a useful strategy not only for institutions with large collections, but also for institutions with a small work force – the case study showed that the decisive factor is the concept rather than the actual number of staff involved or items treated per day. A large-scale treatment can also be planned in-house with outsourcing the actual treatment (Drüppel 1997, Frankenstein 2012) or viewed as part of a long-term preservation policy with a phased conservation approach (Waters 1990, 1998). This presents a major opportunity: the sorting into treatment groups can be

used as a time-based grouping with some treatments being delivered immediately, and others being postponed until further resources are available (Weigel 2012). Large-scale treatments are an excellent method to work according to resources available while still following an overall treatment concept and therewith 'achieving the best possible result within the time, expertise, funding and facilities available'. (Caple 2000, p. 65).

Every decision that is made on a large scale has a high impact on the collection and a wrong treatment decision might cause (future) damage to thousands of objects. This imposes a high responsibility on conservators involved in large-scale treatment decisions, and it might be a challenging task to keep the balance between efficient work and at the same time honouring the unique value of objects treated (Janis 2005).

With the right decisions being made, large-scale treatments result in a high quality of work: 'thinking big!' is a chance for conservation, no matter what size the institution is.

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Credits, bibliography and footnotes

All pictures and illustrations were produced by the author. The bibliography is available on request.

1 The history of large scale treatments is discussed in the full version of this thesis.

2 The term 'goal of treatment' is used by Appelbaum (2007); Janis (2005) mentions the term 'Restaurierungsentscheidung' (decision about conservation treatment / conservation decision) in a similar context (p.125). The conservation decision or the definition of the goal of treatment is vital for every conservation treatment and requires the careful consideration of things like material, present and future function, concept, value of an object.

3 However, the maintenance of standards can be very challenging as it implies permanent quality control (Personal communication with Anna Bülow, The National Archives, 2012).

4 This does not mean that lamination is generally inappropriate; in recent years, materials such as Archibond tissue have been developed that have good aging properties.

5 Personal communication with Anna Bülow, The National Archives, 2012.

6 The approximate size of each object had been recorded during the initial item-by-item survey for reasons of future housing/storage.

7 Tracing cloth is a plain woven cotton fabric. A sizing with starch makes the fabric transparent and stiff. Tracing cloth was used from the mid nineteenth century onwards until the 1950s, when it was replaced by the less expensive polyester film. Media used on tracing cloths were pencils and inks, the drawings often being coloured with watercolours from the verso, and photoreproduction techniques (Price 2002, 2010).

8 Standards are explained in the full version.

9 Meanwhile, the CERC has installed new Polytunnels to improve the environmental conditions of the map storage area as well as invested in new plan chests.

An unusual treatment solution: the author led by example

Sonja Schwoll ACR

In this presentation I will describe the unusual conservation treatment solution for the Journal and Commonplace Book of Sir Thomas Barlow, a famous British royal physician. The journal dates from 1862–90 and is held at the Wellcome Library's Archives and Manuscript collection. I will briefly introduce the object, talk about the damage and then discuss the decision-making process and the treatment solution for its conservation.

This project would not have been possible without the great collaboration of several conservators:

Stefania Signorello, the Conservator at the Wellcome Library who asked me and my colleague Lara Speroni to conserve this journal and Bridget Mitchell, ARCA Preservation, who suggested the discussed option to treat the journal. Unfortunately Lara Speroni cannot be here today to give the presentation with me.

Sir Thomas Barlow, 1845–1945

Sir Thomas Barlow was a British royal physician known for his research on infantile scurvy. He made his name as a specialist in childhood diseases in the 1870s and '80s. In his honour, infantile scurvy was named 'Barlow's disease' – a disease distinct from rickets, with which it was routinely confused prior to the 1880s.

Barlow was medical registrar and then physician at the Great Ormond Street Hospital for Sick Children. He also held posts at Charing Cross Hospital, the London Hospital and at University College Hospital. Barlow also enjoyed a successful private practice. His patients included members of the highest social circles. In 1896 he was appointed physician to the royal household treating several of its members, and was present at Queen Victoria's deathbed. Barlow was a Methodist and a lifelong teetotaller. From 1923 to 1930 he was President of the National Temperance League.

His family gave a large part of his papers, professional and private, to the Wellcome Library. The journal discussed here is now part of the Wellcome Library's Archives and Manuscript collection.

Journal and Commonplace Book, 1862–90, (PP/BAR/A/1 and A/4–13)

This Journal and Commonplace Book forms part of Barlow's personal papers and family correspondence, which have survived in bulk and form a rich source of material on both his private and family life as well as his public career. There are travel journals and sketchbooks from his earlier years, mainly documenting visits to the Continent during 1869–83.

The journal is a large format stationery binding with a full parchment cover over stiff boards. It measures 300 × 330 mm and counts 185 folios. The pages are covered with Barlow's handwriting in iron gall ink. The folios 60–185 were left blank. There are ten small notebooks attached to its pages.

When you look up the object in the catalogue of the Wellcome Library you will find that PP/BAR/A/1 is the journal itself and A/2–13 are the notebooks. However, notebooks 2 and 3 are kept separate.

Fig. 1 – The journal

Before we treated the volume the catalogue tells you, under Access Condition, that:

> the papers are available subject to the usual conditions of access to Archives and Manuscripts material. Currently only A.2–3 are available. A.1, A.4–13 are in a fragile condition and can only be consulted by appointment and under supervision of the Wellcome Library Conservation Department. Please contact the Archives and Manuscripts Department for further information. It is advisable to provide a minimum of five working days advance notice if you wish to make an appointment to view these manuscripts.

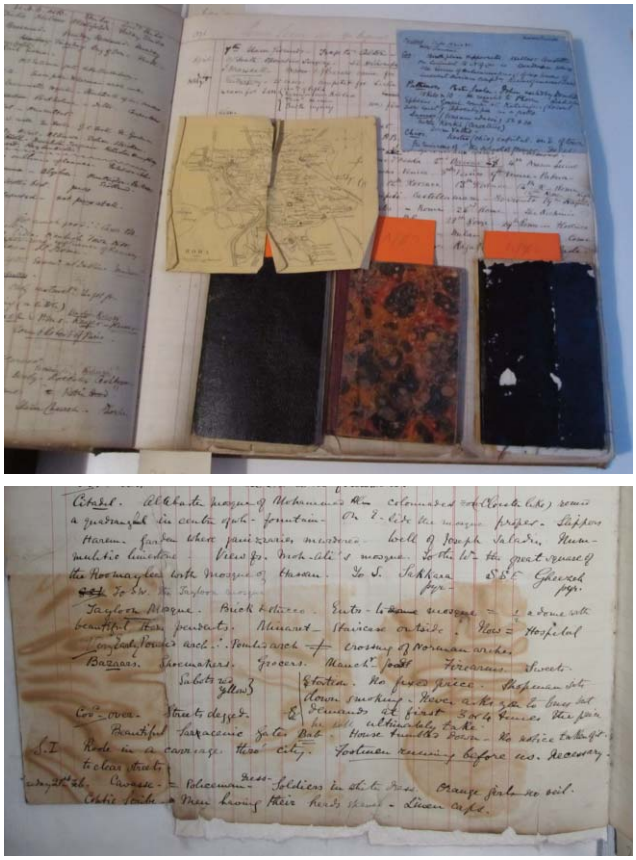
Our project was to make these objects accessible and, as A/2 and 3 were already available, we dealt only with the journal itself and the ten notebooks, which are still attached to the journal pages.

Barlow used this book as a diary in which he glued small notebooks from his travels to Egypt, Palestine, Belgium, the Rhineland, France, Switzerland and Italy. These contain notes about his travels, sketches, some notes for later sermons, accounts, notes on hospitals and some case notes. The notebooks vary in weight, size and thickness and some of them were attached with, and some without, their covers.

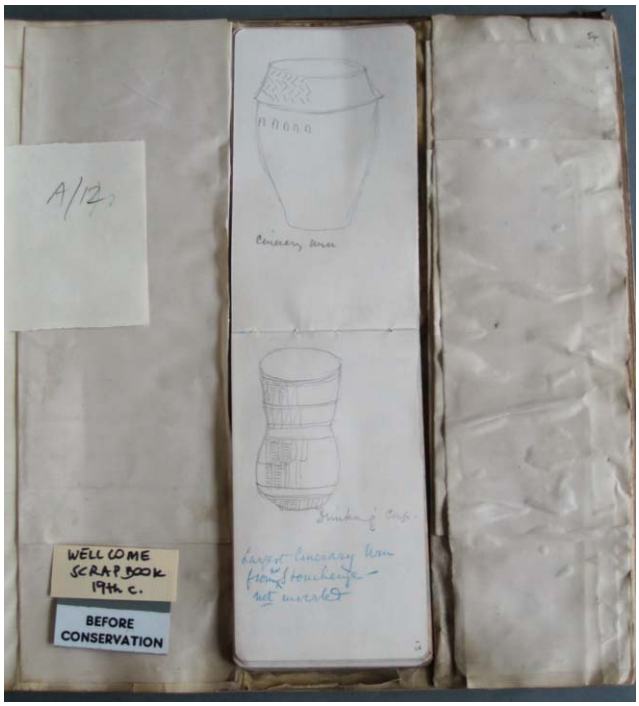
They vary in height between 85–130 mm, in width between 75–150 mm, and consist of between 18 and 90 folios. They are made from paper of various thicknesses with covers of different weights. Some of them are portrait format and some are in landscape.

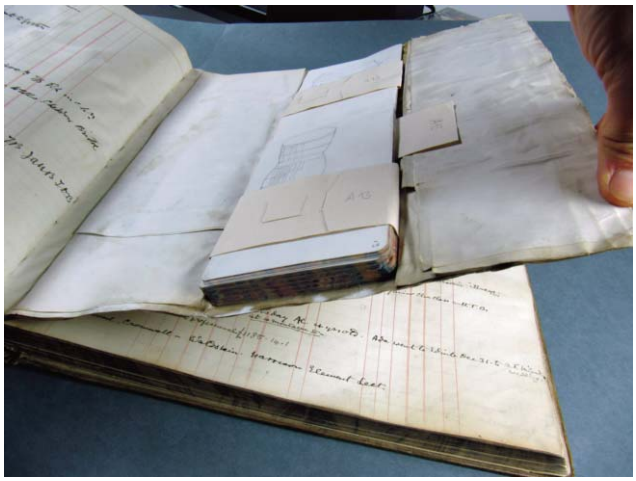
The damage

Right from the start these notebooks were too heavy for the individual page to which they had been



Figs. 2, 2.1, 2.2, 2.3 – p. 42, notebooks damaging the journal page





Figs. 3, 3.1 (left) – p. 54, reinforced by Barlow

attached. When the pages were turned, most of these small books splayed open and pulled away from their carrier page. The extra bulk between the pages makes the textblock gape open on the bottom edge and leaves individual page edges unprotected and exposed.

In addition to this mechanical stress the paper substrate had suffered from chemical degradation. This originated from environmental pollution and the adhesives used for the attachment of the notebooks. With the mechanical and chemical damages the paper could not hold the weight of the attached notebooks and some of them were tearing away part of the paper to which they were glued; others were about to cause the same damage.

The author leads by example

Probably Barlow himself must have realised the problem at its inception. He strengthened one page, to which a heavy notebook is attached, by laminating it with several layers of paper. Figure 5 shows the heavy notebook and the very simple and quick application of several layers of Western paper to either side of the sketchbook. (These photographs were taken before and after conservation. However, the only treatment this page received was surface cleaning and securing the pages of the notebooks so they would not splay open.) Barlow's simple solution supports the notebook very well and led to consideration of whether this idea could be the basis for a treatment solution of the volume.

The decision-making process regarding the treatment solution started with the specification of the conservation goals. The first goal was to keep the volume intact and the notebooks attached. Discussion with the librarians and conservators revealed that this object is unique and that it was, therefore, important to keep it in its original format. On the other hand, the second goal was to make the volume accessible. Until the treatment this volume was only accessible – if at all – under the supervision of a conservator.

With these two goals in mind the treatment decisions were made.

The conservation of the cover followed the generally recognised approach of strengthening corners with gelatine and Japanese papers. It was also decided to repair damages and weak areas of the parchment cover with the same materials.

The difficult treatment decisions concerned the repair and consolidation of the textblock and the notebooks. The first step would always be surface cleaning. The attached notebooks kept the textblock of the journal open at the edges, which had allowed even more particulate dirt to settle on the pages than in the case of a textblock that is tightly held together by its boards.

The next treatment step was to repair and consolidate all tears, losses and weak areas with Japanese paper and cold gelatine. This would keep everything in place but would still not allow unsupervised access to the journal. The weight and movement of the notebooks would immediately lead to new damage.

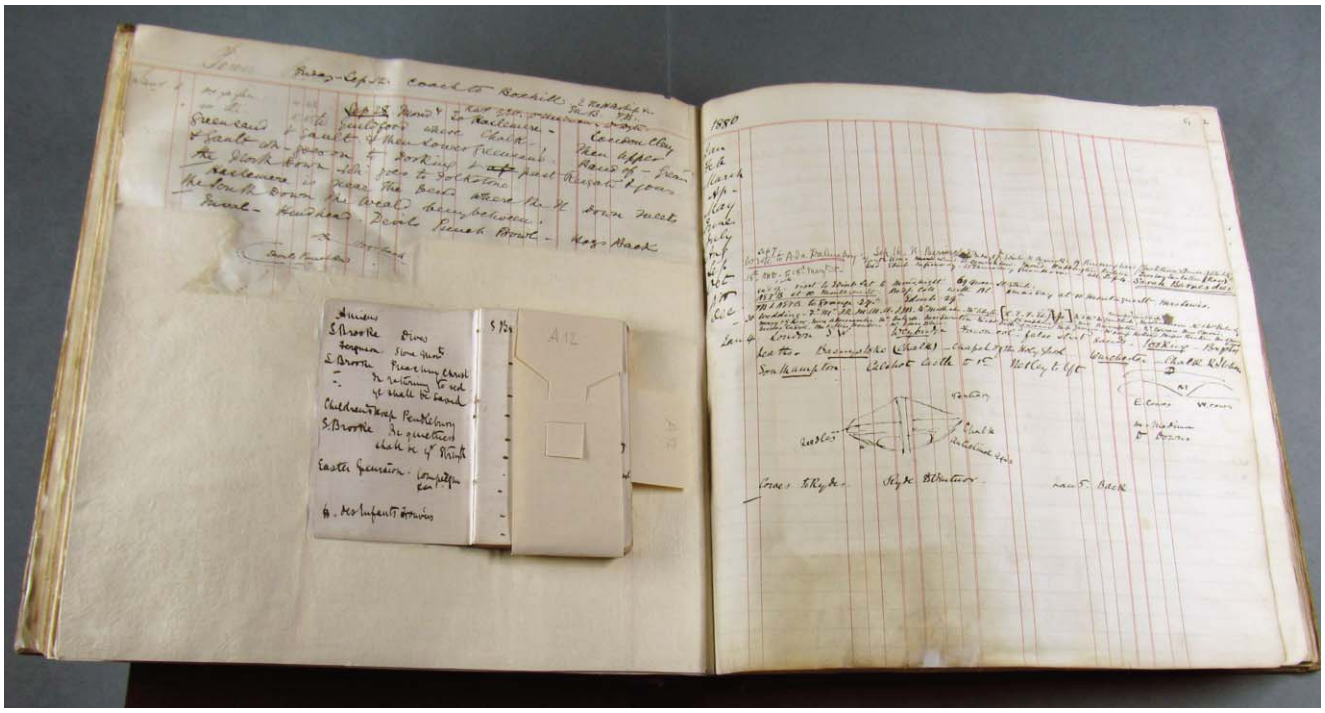


Fig. 4 – Wrapper

Therefore the next step in the treatment was to follow Barlow's example and to strengthen the pages with paper linings around the notebooks. This was a decision not easily made as, within our current conservation ethics, lining and therefore covering up original areas is only a last resort treatment as it considerably changes the object.

However, in the case of this journal, it was found that to support the pages with this method kept it in line with Barlow's original approach and use of his journal. The goal of keeping the journal in its current format superseded any doubts regarding the ethics of this approach.

In order to realise this the following practical considerations had to be taken into account: looking at the attached notebooks it was obvious that the paper of the textblock was moisture sensitive. The application of a water-based adhesive has resulted in strong cockling around the attachments. It also showed that this short-fibred paper with a very smooth surface would, when moistened, adopt the surface texture of a lining paper. Most pages up to f. 59 contained writing on both sides and, in most cases, were almost completely covered in manuscript. This restricted the areas that could be lined. The fact that Barlow had written his journal in iron gall ink meant that, in terms of adhesives, the only possible choices were either non-aqueous adhesives or gelatine.

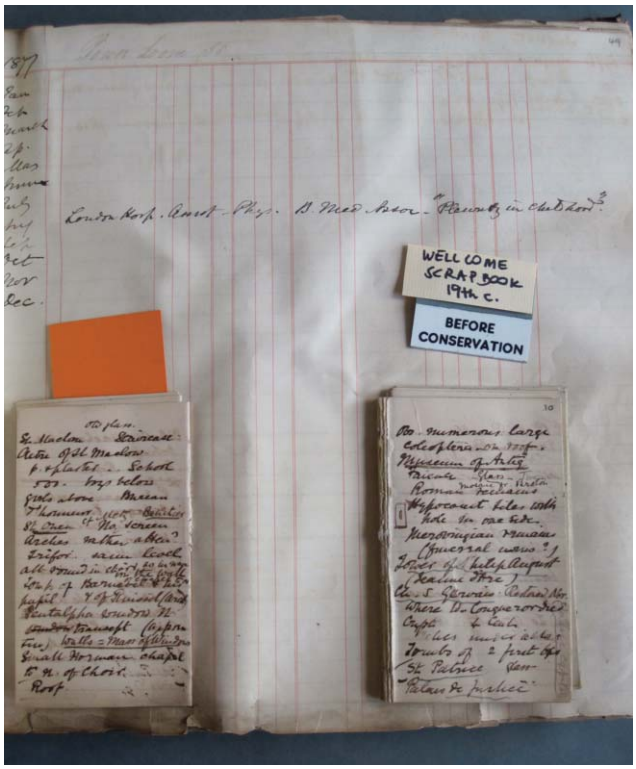
In order to achieve good adhesion and the required strengthening of the pages, we decided to use gelatine in both its warm and cold forms and, therefore, as both a liquid and a gel.

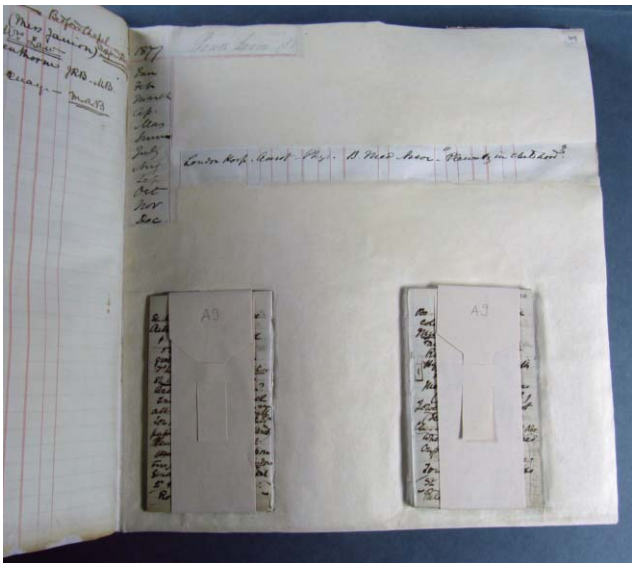
This meant that while lining the unwritten areas, we had to work with, and prevent running of, the soluble inks used for the ruling of the pages as well as having to control cockling of the moisture sensitive paper. The latter was made more difficult by the fact that we were working on leaves of a bound volume. Any planar changes due to the introduction of moisture would be restricted by the sewing, which holds the pages in fixed in place.

One way to achieve this was to work in small sections and to build up the lining in small parts and layers. This enabled the control of cockling, planar movement and the changes of the surface texture.

As already mentioned, for repair materials we used gelatine as an adhesive and a range of Japanese papers of various weights, all in natural colours. For the lining, and to achieve appropriate stiffness of the pages, we chose a 210 gsm Khadi rag paper which came gelatine sized. This was then covered with Japanese papers in order to blend it in with the colours and surface texture of the original paper.

As a final step we secured all notebooks with handmade paper wrappers. This will stop them from





Figs. 5, 5.1 (From left to right) – (left) Page without support; (right) page with support

splaying open and from pulling on the pages to which they are attached.

With this treatment we managed to support all pages with notebooks without disguising any manuscript. The repair papers blend in well with the original. We avoided further cockling and changes of the surface texture or movement of any inks. Now reinforced, the exposed edges of the textblock are no longer as vulnerable.

The journal is now safe for further research.

Sonja Schwoll ACR
Book conservator
London
sophie@zedat.fu-berlin.de

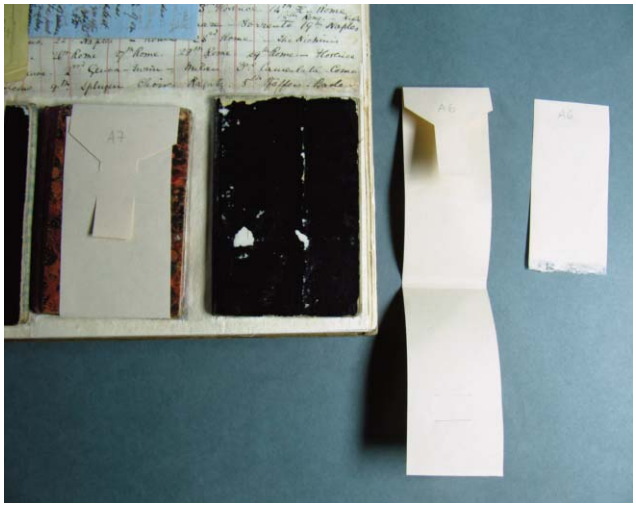


Fig. 6 – p. 42 notebooks with wrappers

Fig. 7 – p. 42 with support

Poster submission on *Current Projects*, the West Dean blog

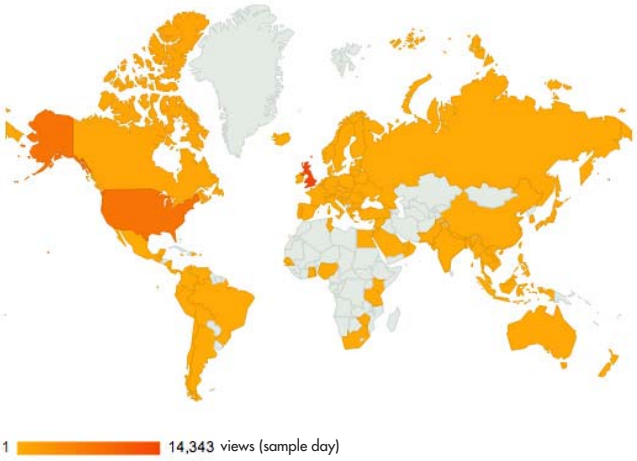
Abigail Bainbridge

In 2011 I started *Current Projects*, a blog for conservation students at West Dean College, with a few goals in mind. Primarily, I wanted a platform for students to begin talking professionally about their work both with 'normal people' and with colleagues in conservation and related fields. For those students new to conservation, this is less intimidating than publishing in a journal or giving a talk.

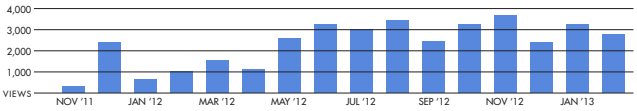
Another benefit of the blog is that both practising conservators and prospective students can see what West Dean students learn, and how. Hopefully this will help to make West Dean more connected to the professional world, which naturally has a vested interest in the conservation training of future colleagues. It can also make it easier for prospective employers to see what the students can do, how articulate and knowledgeable they are, and how involved they are in their education before even having an interview.

Finally, the blog is becoming a valuable tool for outreach. Non-conservator readers find us through family and friends, Google searches, links on social media, etc., sometimes asking questions about how to care for their own collections or just commenting on how interesting they found the posts. We try to have posts that are addressed to a non-specialist audience for this reason: to pull people in, get them interested in what we do and motivated to take better care of their objects or to hire us to do it!

The following pages are excerpts from a selection of blog posts current and available at the time of the conference, April 2013.



Our visitors come from all over the world, although the US and UK are usually top.



90 followers, 125 comments, 39,035 total views as of March 10, 2013

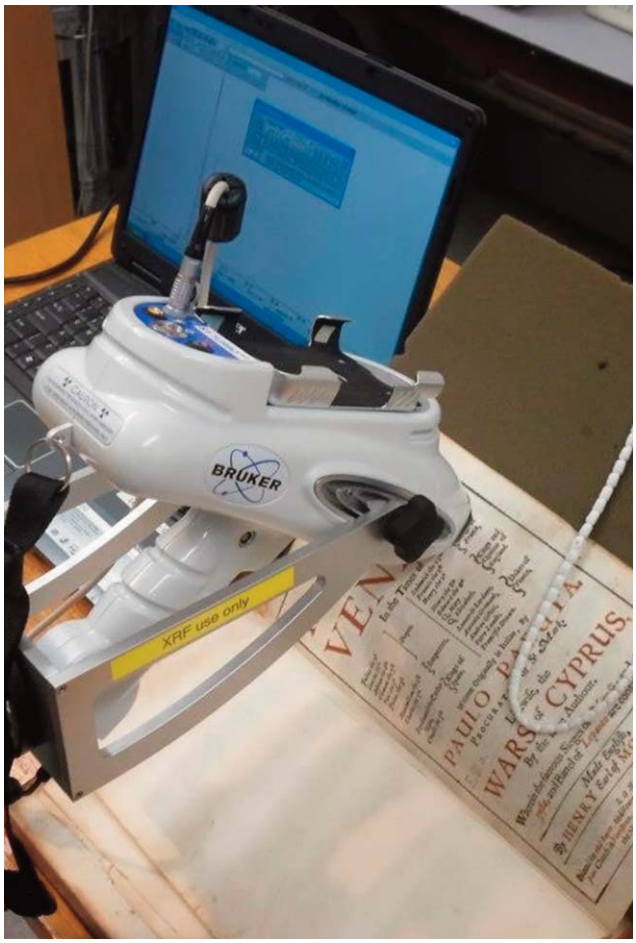
Contributors come from these departments:
Books & Library Materials
Ceramics & Glass
Clocks & Related Objects
Furniture & Related Objects
Metalwork

At these levels:
Masters of Arts
Postgraduate Diploma
Graduate Diploma
Professional Development

The Croll testimonial

Scarlett Hutchin

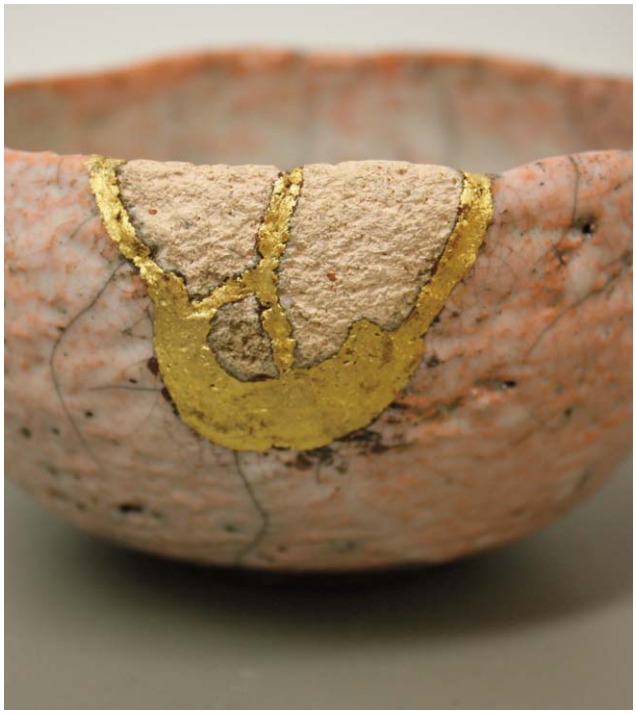
I have spent much of the past week getting the Croll completely dismantled, assessing, labelling and photographing each component as I go. This might sound like a morning's work but giving individual attention to a total of one hundred and ten pieces (not counting nuts) is a slow and methodical process. All the components now have numbered tags to make sure everything goes back together the same way it came apart, and the tags are made from thick copper foil rather than paper so they won't disintegrate in water or solvents.



Safety in analysis: XRF and radiation

William Bennett

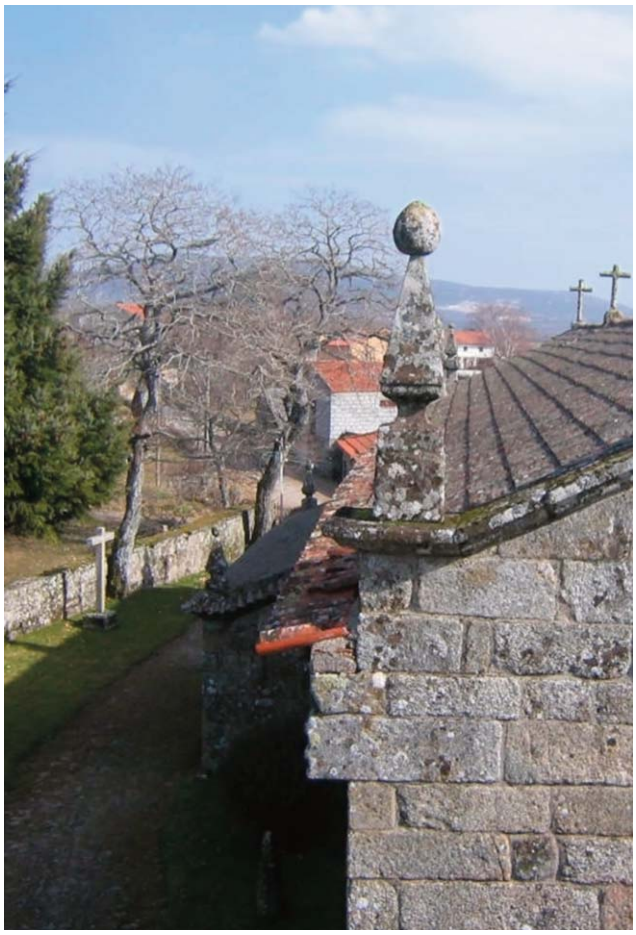
Identifying the composition of both objects needing conservation and the materials used in their conservation is an important facet of the treatment process. Proper identification can elucidate the original state of an object, the nature of degradation present, and the possible effects of different conservation treatments on the object. Students at West Dean are therefore fortunate to have the opportunity to learn how to make use of the some of the different analytical equipment available and useful to conservators in our modest but growing analytical laboratory.



Japanese gold lacquer repair

Chie Yoshi

Have you seen a ceramic object repaired with gold? The technique of repairing ceramics with lacquer and gold is called gold lacquer repair. This is a traditional Japanese technique of repairing ceramics. The gold join may seem too obvious compared to almost-invisible Western repairs! However, there are some fair reasons. Before gold lacquer repair was invented, riveting was a main method of repairing ceramics. One of the problems with this method was that a vessel repaired in this way could never again hold water because water would leak fom the joins.



Conservation within religious communities

Tiago Oliveira

(The following text is a shortened version of a presentation done at West Dean about conservation advocacy.) Having worked as a conservator within a religious community in the past, to see the media success of a disfigured Christ is, unfortunately, a familiar episode. A situation like this makes us wonder why and how this happens in what we call a 'well-informed' society such as today's. A situation like this makes us wonder if the correct information is reaching those in charge of heritage's care and protection.

A Romanesque English rood figure

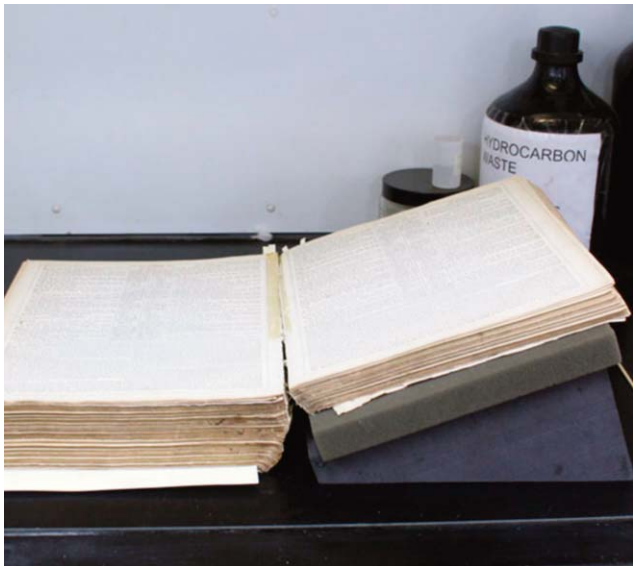
Helen Robertson

This early English rood figure is believed to date prior to the middle of the 12th century and may even be late Anglo Saxon. As there are only a few surviving examples, it is hard to visually compare like with like. However, aesthetically, it does bear a striking resemblance to stone carvings and brass work of the period, which have survived in greater numbers, to place it in the Romanesque era. Carved from oak, this figure would have been at the heart of its religious community and placed on, or above, the Rood Screen.

Verge re-conversion: Alex Giroust table clock

Tim Hughes

It is the end of week 5 already, halfway through the term one! Surely it was only a couple of days ago that I was discussing the projects to turn my hand to on return from summer break with my tutor Matthew Read. It was decided that I would undertake a verge reconversion to a spring driven table clock by Alex Giroust, London, ca. 1730. His name suggests that he may be a descendant of French Huguenots who fled France during and after the 17th century Protestant uprising.



Sellotape: why it's bad to put on paper

Sibel Ergener

Sellotape: the go-to, easy to use fix-it when there's a tear through the page of your book. Tape, you may be surprised to find, actually causes quite a lot of damage to paper and when brought to a book conservator its removal is a tedious procedure. What exactly does it do when left there long term? What is sellotape, actually? How does it work? To start with, sellotape is made up of a few layers. On top there is a clear film, called the carrier, which is traditionally cellophane.

Rack and roll: an investigation into storage options

Susan Catcher ACR

Rack and roll

Storage of rolled objects can often be a problem, and the Victoria and Albert (V&A) Museum is no exception to this. Lack of space, numerous large objects and insufficient racking on which to put them can lead to rolled objects being inappropriately stored, resulting in the risk of damage. The V&A Museum is committed to improving its storage. The Clothworkers' Centre for Textiles and Fashion Study and Conservation has been the main focus during the last few years. Looking forward, 'StorePlan' is part of the current strategic planning for the museum, which aims to improve both physical and digital access to its collections.

For the purpose of this paper I am going to concentrate on some of the areas of storage within the main museum building and the stores at Blythe House: the Word and Image Department (WID) rolled object store, poster store and wallpaper store, the Theatre and Performance Collections incorporating the Matcham Plans, large posters including general rolled storage and the Asian Collections scrolls, some of which are now housed in the new Clothworkers' Centre.

The problem

The WID rolled object store predominantly contains large format rolled prints and designs, with the exception of a few very large flat drawings. There are approximately 856 objects located in the store, but there are also an estimated 148 which are either not accessioned or have no visible numbering system, with a further 50 that are too fragile to unroll without further damage. The late Merryl Huxtable, a former Senior Conservator at the museum, surveyed this store several years ago and, as a result, we had an idea of the size if not always the condition of the objects. A visual diagram was produced and the rolls were wrapped and labelled 'FRAGILE Do Not Unroll', which tends to suggest that the problem is more than just storage. Many of the rolls are loosely covered with acid-free archival paper and/or acid-free tissue paper; some are inserted into cardboard tubing. All are stacked onto open shelving in a non-environmentally controlled space. It has been recently suggested that most of the objects would benefit from being unrolled and stored flat, but that

Rolled object storage: mixed and rolled flat storage

Poster store: poster rolls on a pallet

Blythe House wallpaper store

begs the question as to where they would be stored. Ideally this storage would be in large plan chests and Melinex® envelopes but these are both expensive and take up space, two things that most museums would find challenging.

Within WID we have a very large poster collection, approximately some 35,000, and a slightly smaller wallpaper collection. The oversized posters are mainly attached to an antiquated rolling racking system with drawing pins through tab extensions. They are then covered with plastic sheeting sealed by Velcro® to reduce dust. The space is large and again not environmentally controlled. Until recently this storage solution, though not ideal, has kept the posters contained, but this storage system is now unable to cope as the collection has grown. Some posters are rolled but not adequately stored and others are held onto display boards awaiting de-installation and insertion into Melinex® bags, which have been sized to each poster, and a storage space identified.

In the wallpaper store, racking is also used to house framed sections of wallpapers, but many loose rolls are stacked in a makeshift space beneath some stairs. This has been recognised as an area of priority mainly due to the rolls not being easy to identify. The wallpaper storage at Blythe House could also be improved. Some rolls are temporarily stacked on a pallet and some framed wallpapers are resting on blocks against the wall. This space has been measured for a new storage system. It is expected that a storage system similar to the Whitworth Art Gallery at the University of Manchester will be put in place when funds are available.

Previously, curators and conservators have got together to explore other methods of rolled storage: the Matcham designs, the Theatre and Performance Collection's rolled storage and oversized poster designs all demonstrate alternative methods of storage. The Matcham Collection is comprised of architectural plans of various London variety theatres, for example, the Hackney Empire, Victoria Palace and the Savoy Theatre constructed during *c.*1890–1910. These plans are considered important because they contain information on all aspects of the building design from the bricks and mortar to the electrical layout. Unfortunately, there are approximately 139 rolls with between 9,000 and 10,000 drawings. Two thousand have been conserved and are now housed in Melinex® envelopes and folders, which are kept flat on shelves. However, there are still problems: firstly, the lack of space between the shelving means that the folders cannot be easily accessed. The Reading Room is on the ground floor and the collection is to be found on the first floor. The lift is too small to take the large flimsy folders and the stairs are too narrow and turn back on themselves, not to mention the single doors leading into the Reading Room. It is

Blythe House staircase: narrow stairs for moving large objects

almost impossible to navigate with the folders unless the plan required for viewing is removed and rolled. Many of the other plans are still rolled and covered with archival paper but have no internal rigidity and the weight of the roll can cause it to collapse on itself. Flat, smaller plans are often stacked and open to particulate dirt and dust in a non-environmentally controlled space.

Whitworth Art Gallery rolled storage: rolls housed within drawers

The Asian Collection scrolls, including Japanese, Chinese and Korean paintings on both paper and silk, are stored in various locations. As is often the case, the original box has been discarded, a policy of old, and the scrolls are loose in drawers or put into trays. Collection movement due to planned extensive building work during 2014–16 has forced the issue and the textile scrolls have been decanted to new storage in the Clothworkers' Centre at Blythe House. Scrolls painted on paper are destined for new storage when building work is completed.

A solution

A few years ago the Whitworth Art Gallery at the University of Manchester underwent a complete refurbishment of their wallpaper collection and contacted the V&A Museum to discuss various storage methods. Rolled wallpaper storage within the V&A had been partially addressed, but these ideas were utilised and developed by the Whitworth Art Gallery to support their collection. They have various roll sizes from complete runs of contemporary wallpaper to larger, canvas-backed, older papers and rolls of smaller fragments. Using shelving that had two sizes of custom-shaped Plastazote® linings, the rolls were interleaved with acid-free paper, wrapped with Melinex® and tied with cotton tape. The use of two sizes was considered necessary in order to accommodate all the various wallpaper formats. Oversized papers were threaded onto metal poles and suspended. These were also wrapped with Melinex® and tied with cotton tape whilst smaller fragments were placed flat in drawers. The smaller collection and designated budget enabled the Whitworth Art Gallery to conceive a complete storage programme suited to the gallery's needs.

The result

In 2011 conservators and curators at the V&A organised interns from the Camberwell College of Arts MA Conservation Course and interns from the Institute of Conservation HLF scheme to spend two weeks tackling the WID rolled object store. This project was an opportunity to unroll and accession objects which had been stored unseen for many years. Use was made of the Prints and Drawings Study Room, which had conveniently closed for its two-week annual stock take. The area naturally divided into two sides: one for cleaning and the other for remedial conservation work. Another room was put aside for oversized drawings requiring more space. Humidification chambers were constructed and a pressing area kept clear. The Curator of

Rolled object store: interns at work

Documentation and Digitisation identified the most vulnerable rolls and a 'conveyor belt' system was put into place. The success of this project was immediately obvious with some 67 rolls containing multiple objects being opened up to reveal 459

Small poster store: vertical storage system

Theatre and Performance Collections hanging storage: oversize posters in custom-made envelopes

drawings, designs, prints and wallpaper samples. The wide range of media and paper objects were often fragmented requiring remedial conservation. The accomplishment of this programme has led to other collections asking for a similar agenda and this will be repeated in the Theatre and Performance Collections during the summer of 2013.

Theatre posters are often very large and, due to the ephemeral nature of their usage, fragile objects. A hanging storage method has been devised whereby the conserved posters are put into custom-made Melinex® bags that are sealed around the edges, providing a dust-free environment. These have metal eyelets punched into the top margin and are then suspended on hooks to hang free and give easy access. A cotton cover is used to keep off dust and an inventory is kept up to date at the side for easy identification. Other smaller posters are kept in secondary paper or thin board folders flat in drawers or on shelving.

Within WID we have a new method of housing small posters using a vertical stacking system. Each poster is attached to an acid-free mount board by Japanese paper hinges and inserted into a Melinex® sleeve. Each sleeve is then pegged into a plastic runner and suspended vertically. Although this system is better

Boxed storage for scrolls and wallpapers

than most, as it is easy to access and catalogue, it is not without its problems as the rails do not always run well and the pegs are very fiddly to use. Often, in order to enhance the visitor experience, the objects have to be removed from their housing to be photographed because the Melinex® creates a distortion. This in turn causes a handling issue. Larger-sized posters are put into the drawers located beneath the suspended posters. The room is environmentally controlled and has OCEAN (Object Centred Environmental Analysis Network) whose data is acquired via telemetry. Some framed sections of wallpapers are hung on a racking system whilst complete rolls are boxed if possible during the acquisition process or when required for loan/exhibition.

The new Clothworkers' Centre, due to open in October 2013, is in the process of being installed. Some collections are already in place, such as the large rolled tapestries, hats and smaller textiles that are rolled onto metal tubes and posted onto protruding metal poles, affectionately known as the 'bed of nails'. This is actually a reuse of an old system and with it come some inherent storage issues: the poles are located too close together than would be considered ideal, leaving little room for manoeuvring the rolls on and off the poles, and the top poles cannot be used because they are too high to reach comfortably, which becomes a health and safety issue.

But in the times of tight budgets and recycling, this system does serve a purpose. The Asian Collection's textile hand and hanging scrolls have also been decanted to this storage facility. The silk scrolls are firstly covered with custom-made Tyvek® bags to protect them before being boxed and stored whereas paper scrolls will be wrapped in lightweight natural cotton.

This boxing project mirrors that of the WID wallpaper storage scheme whereby the boxing technique becomes part of the display method, as well as being a storage solution. The wallpaper is held on acid-free board rollers that have a solid wooden end in which a pig nose bolt is screwed. This bolt enables the wallpaper to be held onto a Perspex® bracket/handle that also creates a gap underneath to stop the crushing of the roll. The pig noses form part of the display system where brackets are used to hold the roller at the top and bottom allowing for minimal

'Bed of nails', a recycled storage system in the new Clothworkers' Centre for Textiles and Fashion Study and Conservation

object handling as well as boxed storage. Construction of the boxes is carried out on a Zund M-1600 machine using acid-free corrugated board. They are stackable and easily transportable when required for loan to other museums.

The future?

Due to the problems of vast numbers of objects, lack of storage space and an ever-dwindling budget, the V&A is constantly looking at more inventive and innovative methods of tackling the issue of oversized object storage. In an ideal world, collections would all have a designated storage facility, such as the wallpapers at the Whitworth Art Gallery. The V&A is moving toward this ideal, as is evidenced by the Clothworkers' Centre, but even this facility has had to reuse difficult spaces such as the old lavatory cubicles, which were unable to be knocked out as Blythe House is a Grade II listed building. Existing racking was recycled, as demonstrated by the 'bed of nails', to make best use of a limited resource, with the new racking under a weight restraint due to the loading of the Victorian floor.

Methods of rolled and racked storage as outlined in this paper can be readily adopted and adapted: firstly, the Whitworth Gallery's system of storage of oversized rolled objects on poles. The V&A Museum also uses this method to store tapestries. Secondly, rolled wallpaper storage on rollers wrapped in Melinex® with an image for easy identification on the outside supported on shelves by shaped Plastazote®. Lastly, smaller flat works suspended or placed on racking in Melinex® bags with a secondary folder.

Susan Catcher
Senior Conservator
Victoria and Albert Museum

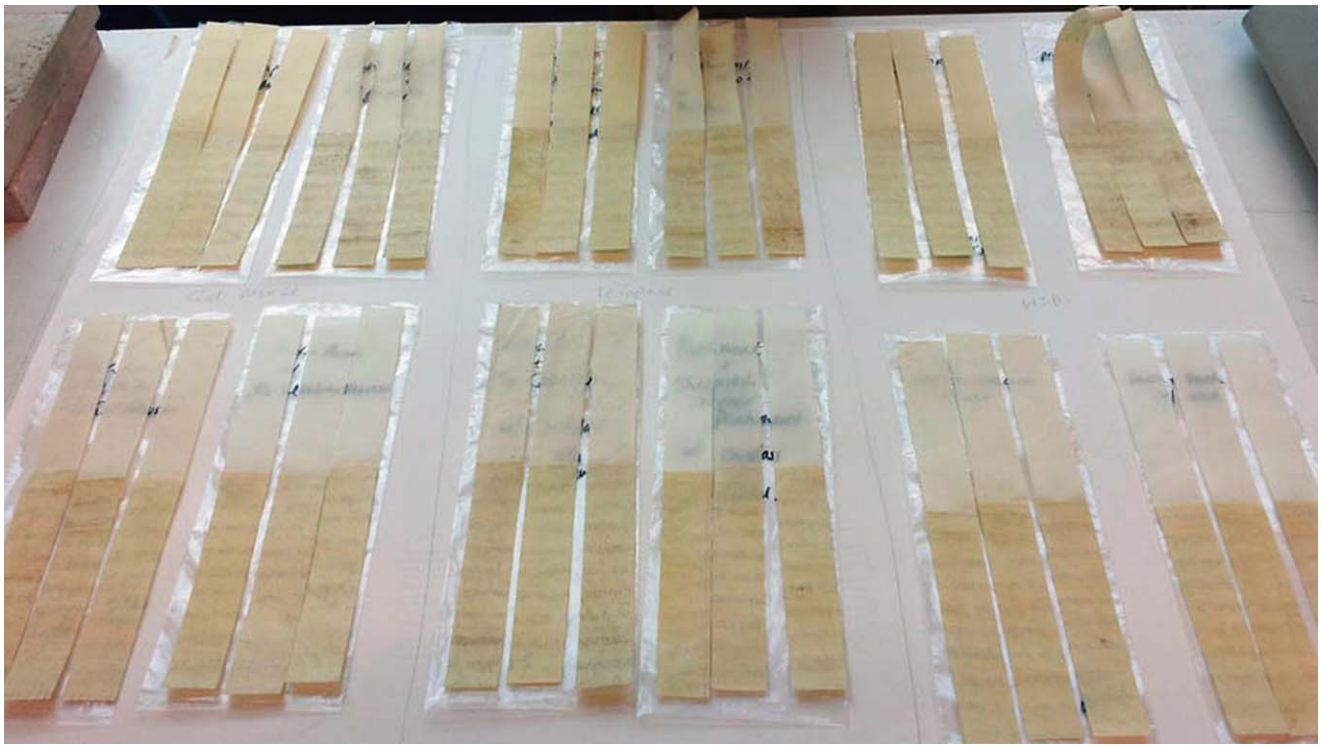
Adhesives for parchment repair: an exploration

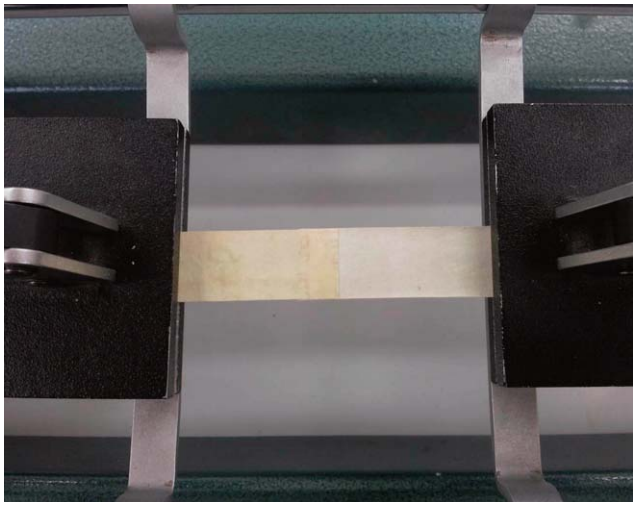
Liz Ralph

This article accompanies the poster of my MA research into preferences for adhesives and materials in the conservation treatments of parchment, specifically in the area of book conservation.

One of the three bindings that formed my final MA project was a late eighteenth-century account ledger from the Barings Bank Archive in London. There was severe damage to the head edge of the spine as well as to the front joint due to consistent wear and tear of the binding. There were losses to the parchment covering of the spine at the head, which extended down the joint to the third sewing support. All three leather panels had sheared on the front joint with some loss of leather and all were missing tackets. The parchment on the tail edge of the spine was scuffed and torn and there was a split forming along the tail edge of the front and back joints. Internally the textblock was sound and it was decided that no repairs were necessary, as the binding was not used often.

To inform the treatment of the account ledger, research was undertaken in the form of a survey. It was created to be anonymous using the web-based program SurveyMonkey. The survey was circulated using the Conservation DistList as well as being sent to personal contacts in conservation studios. The survey asked which materials and adhesives were used for parchment repair, where the recipient studied and in which area of conservation they specialised, amongst other questions. The survey yielded 45 responses and these responses were collated into charts. The most popular adhesives as chosen by the recipients were wheat starch paste (the most popular), then gelatine liquid, isinglass and





gelatine mousse as the top four choices. A chart was also created for the most popular repair materials.

As a large proportion of the answers did not specify the percentages of their chosen adhesives, additional research, discussion and experimentation were carried out to determine their advisable strengths. These were the adhesives chosen: 10% Jin Shofu wheat starch paste, 5% gelatine liquid, 5% gelatine mousse,

and a 4% isinglass. The mousse was created by letting the gelatine liquid set and then passing it through a Terylene cloth. This forms a white, mousse-like substance which is then applied like paste.

Mechanical tests were carried out based on the results from the completed survey. After the results were collated, the top four preferences for materials and adhesives were looked at in more detail. Samples were created for basic tensile strength testing to determine whether the repair materials were weaker than the original parchment and if the adhesives had a strong enough adhesion to attach the repair material to the parchment. The following materials were used: a three-layer caecum,[1] buffed sheepskin repair parchment, Atsukuchi, a 57gsm kozo-based Japanese paper (70% kozo fibres and 30% wood pulp) and a three-layer caecum lined with a 23 gsm kozo paper using Jin Shofu paste. The adhesives tested were those mentioned previously. The relative tensile extensions between Atsukuchi paper and the kozo/caecum pasted to parchment with 5% gelatine mousse were comprehensively analysed.

To repair the parchment losses, pre-dyed caecum was adhered to the underside of the original parchment using the 5% gelatine mousse. Care was taken to ensure that the repairs were adhered only to the parchment and not to the spine. The lined and dyed caecum was also used to repair the corners of the boards.

The relatively undocumented use of caecum as a parchment repair material is a surprise. This material lends itself incredibly well to repairs and can be worked and manipulated with ease, without tearing or stretching. It is as simple to use as Japanese paper but has the added advantage of being a like-for-like material. It has been very effective as a repair material for this project, strong enough to support the more fragile areas of the spine and flexible enough to move easily with the opening characteristics of the binding.

Please contact me with any requests or for more information about this project at elizabethralph@hotmail.co.uk or through my blog lizralphconservation.wordpress.com

Acknowledgements

Jocelyn Cuming, tutors, technicians and fellow students at Camberwell College of Art. David Dorning and Maureen Duke at West Dean College, Christopher Harvey and the Conservation Department at the College of Arms, Lara Webb at Barings Bank Archive and all those who completed my anonymous survey.

1 Caecum is alum-tawed goldbeater's skin and is made from the split linings of a cow's large intestine. It is available in three different thicknesses – 1, 2 and 3 layers.

The repair of an Alaskan Inupiaq sealskin mat with Lascaux 360 HV and 498 HV

Francis Lukezic

During my internship in the conservation laboratory at the Smithsonian National Museum of the American Indian, the laboratory was preparing several hundred objects from the museum's collection for an exhibit titled *Infinity of Nations*. The exhibit opened in the National Museum of the American Indian's George Gustav Heye Center in New York City in October 2010. One of the objects I treated for the exhibition was a mat (193371.000), made from sealskin by the Inupiaq in Cape Prince Wales, Alaska, dated circa 1890 to 1920 (Fig. 1). The mat is comprised of numerous squares hand sewn together with cotton thread. Each square is embellished with a circular motif appliquéd to the surface. In addition to surface cleaning and minimising a heavy crease in the mat, sections of appliqué that were partially detached and in danger of breaking away needed to be secured (Figs. 2 and 3). For the purpose of this article, I will focus on the method chosen to stabilise sections of the appliqué.

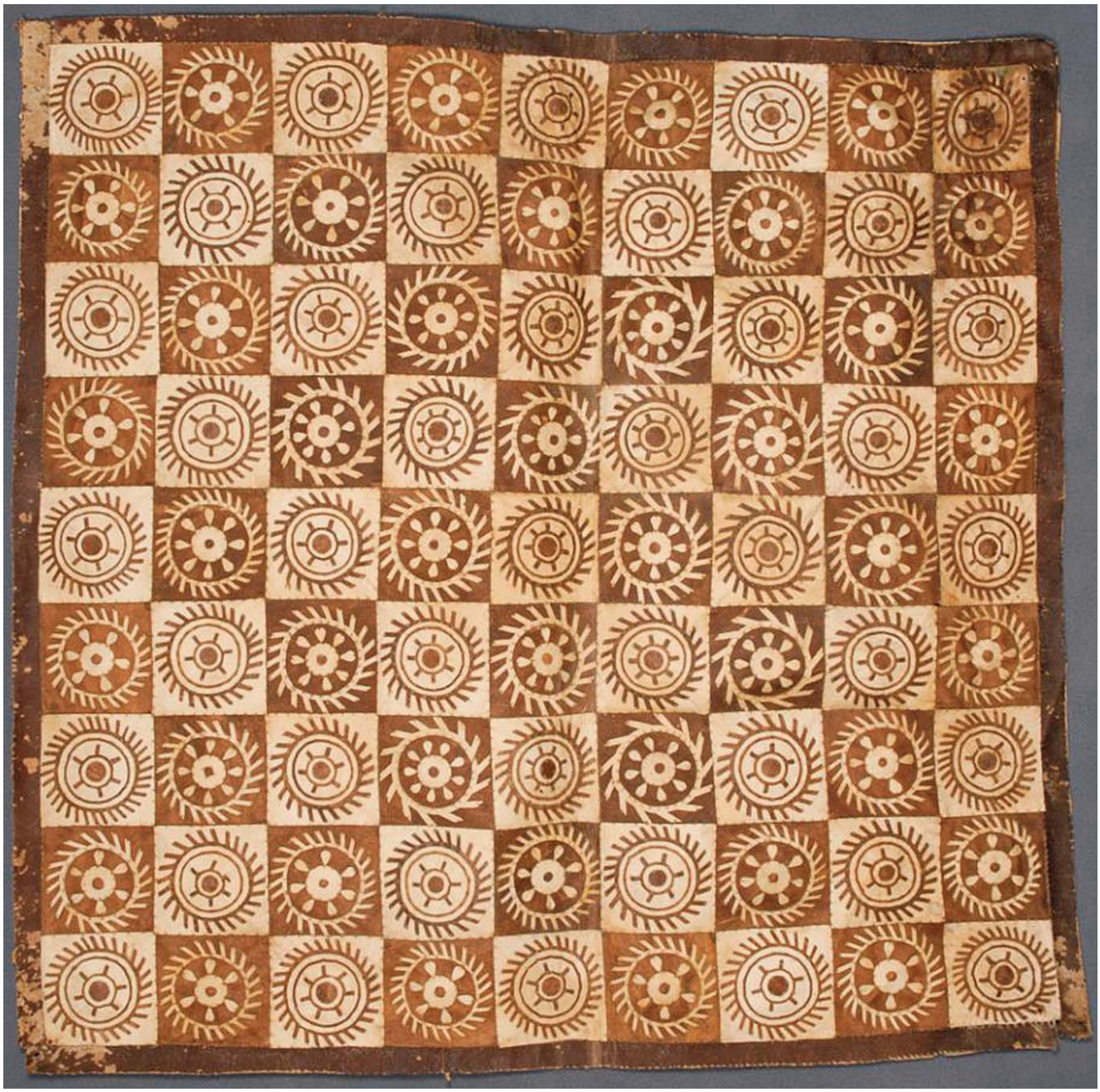


Photo Courtesy of Smithsonian National Museum of the American Indian, Conservation Department 2010, 193371.000.

Fig. 1: Mat before treatment.

Photos: Francis Lukezic.

Figs. 2 and 3: Examples of partially detached appliqué before treatment

After considering the working properties of BEVA 371 film and Lascaux 360 HV and 498 HV adhesives, I selected a mixture of three parts Lascaux 360HV:498HV 50:50 with one part water. Lascaux 360 HV and Lascaux 498 HV are thermoplastic acrylic resins comprised of a water-based dispersion containing butyl acrylate and methyl methacrylate, thickened with acrylic butylester. They can be applied wet or as a dry film reactivated by solvent. Additionally, Lascaux 360 HV performed well in adhesive testing carried out by the Canadian Conservation Institute, displaying flexibility and favorable ageing properties (Down, et al., 1996). A 50:50 mixture of Lascaux 360 HV and 498 HV produced desirable working properties. Together, 360 HV and 498 HV increased tack but the mixture remained smooth and easy to apply. I used the following technique to secure the partially detached sections of appliqué:

- First, the diluted mixture of 50:50 Lascaux 360HV:498HV was brushed onto both sides of a sheet of 4 mil (~100 µm) Reemay (spunbonded polyester). The Reemay acts as a carrier for the adhesive, which minimises the amount of moisture introduced to the sealskin. In addition, the adhesive-coated Reemay piece is more reversible than BEVA 371 film.
- While the Reemay sheet dried, templates were created using Melinex (transparent polyester sheet) of the appliqué sections requiring repair.
- After the Reemay sheet was dry, the templates were used to cut shapes out of the Reemay to fit the corresponding appliqué sections.
- The adhesive-coated Reemay pieces were solvent-reactivated by applying a few drops of acetone.

Photos: Francis Lukezic.

Fig. 4: During treatment. Weights placed on top of repaired sections.

Fig. 5: Example of appliqué section after treatment.

Photo Courtesy of Smithsonian National Museum of the American Indian, Conservation Department 2010, 193371.000.

Fig. 6: Mat after treatment.

- Then, the Reemay pieces were inserted beneath the appliqué sections using tweezers.
- A small weight was placed over the top of the repairs to provide some pressure to the section while the adhesive set (Fig. 4).

Fig. 5 illustrates a section of applique after treatment while Fig. 6 provides an overall view of the mat after treatment. Lascaux adhesive has been used in a variety of conservation disciplines, including paintings, textiles, and objects. Perhaps the use of Lascaux adhesive in this case study will prompt further thoughts on its application within the context of book and paper conservation.

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Down, J., et al., 1996. Adhesive testing at the Canadian Conservation Institute: an evaluation of selected poly(vinylacetate) and acrylic adhesives. *Studies in Conservation*, 41, pp. 19–44.

The history, application and stability of adhesives used in the mounting and presentation of photographs and criteria for their conservation treatment

Ian L. Moor ACR The Centre for Photographic Conservation

Outline

The evolution of the photographic print in all its diverse process forms is mirrored by changes in attitudes and approaches to its mounting and presentation; stylistically, aesthetically, materially and constructionally. This paper will focus on the evolution and usage of the various adhesive systems and application techniques for the mounting and presentation of photographic prints, their effect on image and materials stability and reversibility and how this impacts approaches to their interventive conservation treatment and reversal as part of a broader interventive conservation treatment strategy for mounted photographic prints.

Within the history of photography, the development and choice of adhesive systems, mounting techniques, materials, and presentation styles went hand in hand with the development of the photographic print process and its subsequent commercialisation. These developments began with the salted paper print, evolved via the albumen, collodion and gelatine print processes and included the plethora of mainstream non-silver printing processes that were also introduced in response to differing material and behavioural properties. The introduction of the gelatine print period in the late 1870s, with its more complex process stratigraphy and material make-up, for example, demanded different mounting techniques and different adhesives if the visual and material qualities of the process were not to be marred by the mounting process itself.

The many and varied uses of photography gave rise to many presentation scenarios on a wide range of material bases (adherends) in addition to paper and board, such as plastic, glass, metal, ceramic, textile, leather, wood, ivory, bone, stone and mica.

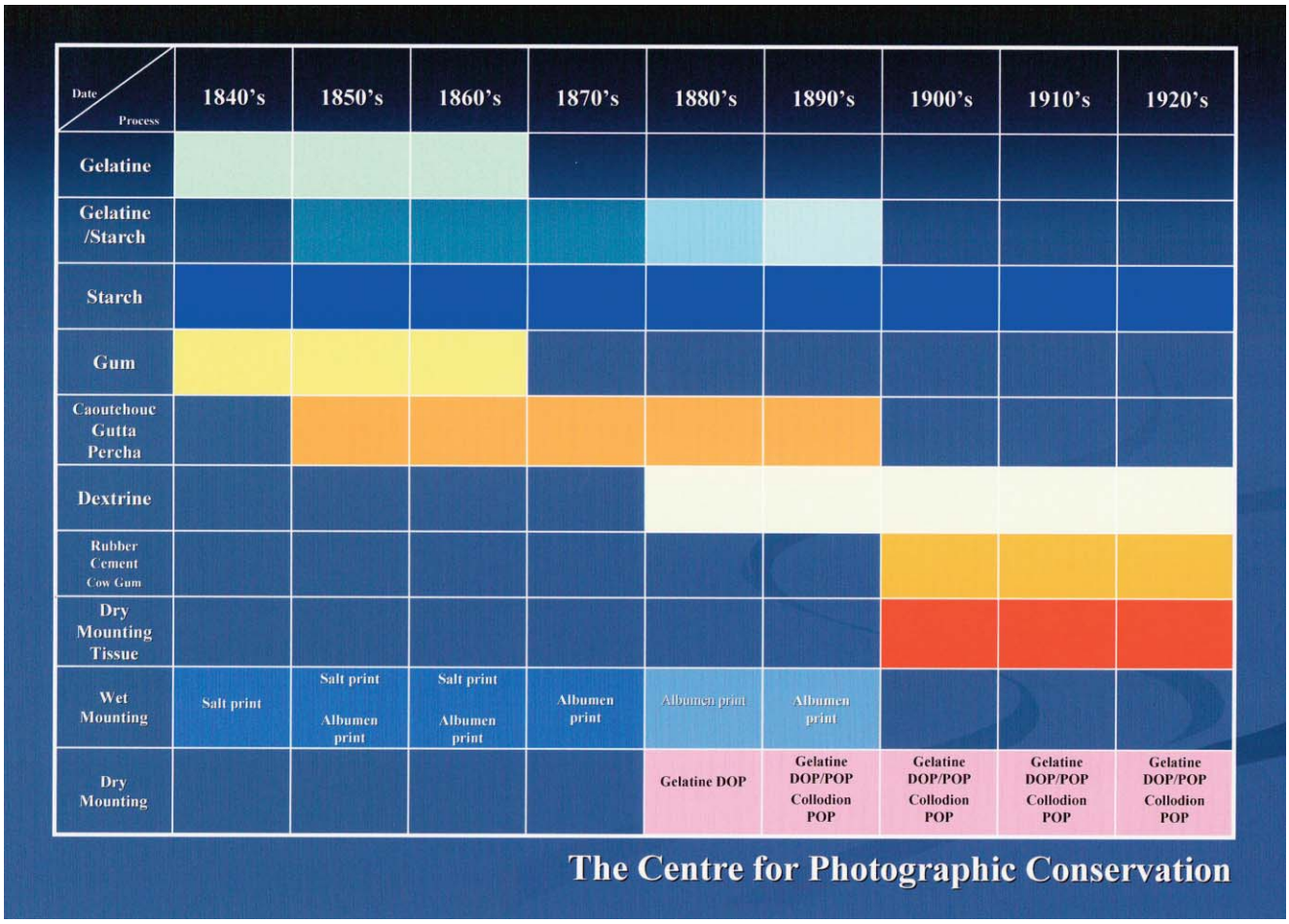
Initially practitioners simply adopted the adhesives and the papers, boards and book forms that were already available and in common usage. Adhesives such as gelatine and starch were widely and commonly used in the mounting and presentation of paper-based prints. Starch, in its various processed forms and mixtures, combined with other adhesives, was the most widely used adhesive for the mounting of photographs.

It is also extremely important to emphasise that both aqueous and non-aqueous adhesives were also used throughout the history, development and manufacture of photography as sizing agents, fillers, binders and subbing layers in predominantly paper- film- and glass-based photography in the application of their chemistries, light sensitive colloids, emulsions and coatings.

Adhesive application techniques for 'paste-down' photographs fall into two basic approaches 'wet mounting' and 'dry mounting'.

Wet mounting

This is the application of a water-based adhesive to a pre-soaked, fully wetted photograph which is then



1840–1920 timeline of adhesives used in the wet and dry mounting of photographs, presented as a poster

applied whilst wet to a preconditioned or wetted support. The combined photograph and support were then dried under pressure.

Wet mounting methods of attachment include:

- Drum mounting
- Full contact – paste-down

Dry mounting

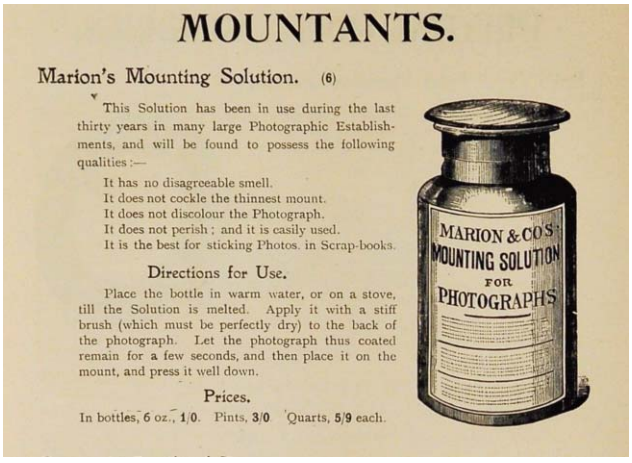
This is the application of an aqueous, or non-aqueous, solvent-based adhesive to a dry photograph and/or its dry adherend/support without the necessity for preconditioning or wetting. This includes the use of heat in the application of thermoplastic adhesives (melt-freeze adhesives) and the use of pressure for PSA (pressure sensitive adhesive), cold set, contact adhesives. The subsequent use of drying pressure was optional and usually determined by adhesive and process type.

Dry mounting methods of attachment include:

- Spot/corner attachment
- Hinging or hinges
- Inlaying
- Drum mounting
- Partial/incomplete contact
- Full contact

The demands of the rapidly developing medium soon gave rise to the introduction of many commercial adhesive preparations each boasting of their superior qualities and purity.

Commercial adverts for adhesives and sample of Derepas tissue


MOUNTANTS.

Marion's Mounting Solution. (6)

This Solution has been in use during the last thirty years in many large Photographic Establishments, and will be found to possess the following qualities :—

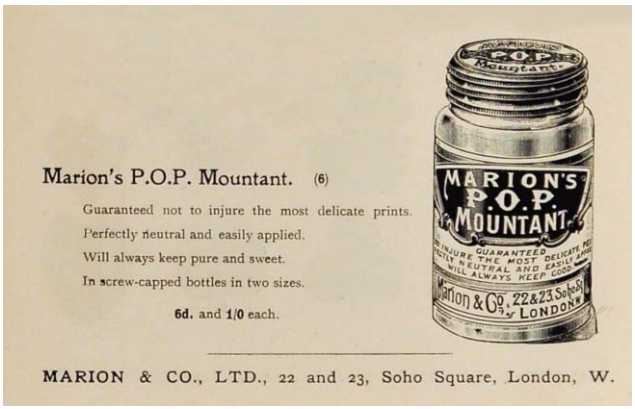
It has no disagreeable smell.
It does not cockle the thinnest mount.
It does not discolour the Photograph.
It does not perish ; and it is easily used.
It is the best for sticking Photos. in Scrap-books.

Directions for Use.

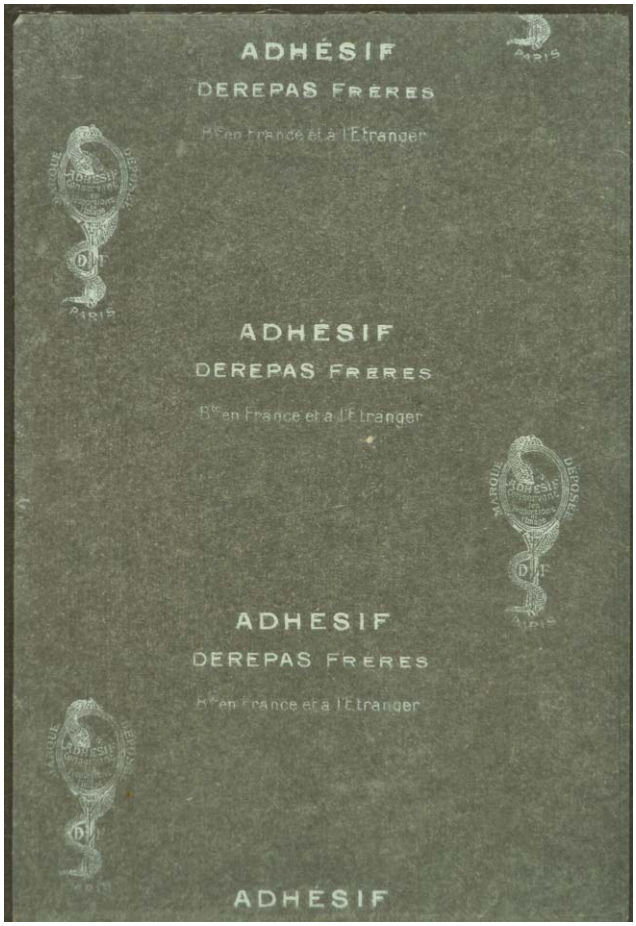
Place the bottle in warm water, or on a stove, till the Solution is melted. Apply it with a stiff brush (which must be perfectly dry) to the back of the photograph. Let the photograph thus coated remain for a few seconds, and then place it on the mount, and press it well down.

Prices.

In bottles, 6 oz., 1/0. Pints, 3/0 Quarts, 5/9 each.



Commercially produced adhesives proliferated



Sheet of Derepas shellac-coated dry mounting tissue *c.*1905

Classes of adhesive used historically in the mounting and presentation of photographs

Proteins

- Gelatine (mixture of peptides and proteins produced by partial hydrolysis of collagen)
  - Animal glue (bone/hide/connective tissues – unrefined)
  - Gelatine (refined)
- Isinglass (gelatine from fish air bladders especially sturgeon [fish glue])
- Bull's blood (globular protein groups: albumins, globulins, and fibrinogens)

Polysaccharides

- Starch (vegetable)
  - Wheat
  - Corn
  - Rice
  - Potato
  - Arrowroot
  - Starch plus preservatives such as mercuric chloride, potassium carbonate (carbonate of potash), oil of cloves and carbolic acid
  - Dextrine (British gum: a heat- or heat and acid-modified starch producing an adhesive with lower viscosity and a higher solids content for faster drying)
- Plant gums and mucilages (sugar and uronic acid). Water-soluble or water-dispersible materials
  - Gum arabic (gum acacia, acacia senegal)
  - Tragacanth
  - Cherry gum
- Modified cellulose – nitrate and acetic esters

Terpenoids

- Resins
  - Shellac (insect resin)
  - Canada balsam
  - Gum elemi

Polyisoprenoids

- Caoutchouc (latex – an al-cis isomer: India rubber, gum elastic)
- Rubber cement (Cow Gum)
- Gutta-percha (an all-trans isomer)

Synthetic – drying adhesives

- Heat-set/seal dry mounting tissue
- Cold-set PSA films (1920s rubber-based)
- SprayMount (solvent-based aerosol)
- Contact adhesives
- Glue sticks
    - Caprolactam (with hydrogen peroxide and sodium hydroxide)
    - PVP (polyvinylpyrrolidone, a water soluble polymer)

Mixtures of adhesive used (commercial and non-commercial)

- Gelatine/starch mixtures
- Gelatine and arrowroot
- Gelatine and other additives (gums)
- Dextrine/gum
- Shellac/mastic
- Shellac/gum elemi
- Shellac, gum elemi/Canada balsam
- Shellac/borax (a water-based adhesive)
- Shellac/wax

Dry Mounting tissue (heat-set/seal (melt-freeze) adhesive)

- Shellac and additives – gum elemi and Canada balsam
- Acrylic

Dry mounting tissue and adhesives (cold-set contact adhesive)

- Cold-set, double-sided PSA film
- SprayMount/PhotoMount
- Cold-set, single-sided PSA coating (magnetic albums)
- Glue stick (Pritt Stick): caprolactam with hydrogen peroxide and sodium hydroxide or PVP

Additives

Many adhesives, commercial preparations, home-made preparations, preparations used by photographers, photographic studios, camera clubs, print sellers, binders and stationers, etc., contained a variety of additives such as:

- Preservatives, which were added to prevent the adhesive from:
    - Putrefying (or going mouldy)
    - Oxidising
    - Breaking down
    - Hydrolysing
    - Becoming brittle (embrittlement)
- Modifiers, which were added to alter essential adhesive properties such as:
    - Flexibility
    - Absorbency
    - Slip
    - Grab, tack (tackiness) and adhesivity
    - Drying rate
    - Clarity
    - Solubility

Adhesive additives

Typical adhesive additives included gums, resins, humectants, plasticisers, glycerine/glycerol, sorbitol, preservatives such as mercuric chloride and potassium carbonate, driers, acids such as carbolic acid, carboxylic acid and oxalic acid, oil of cloves, oil of wintergreen (methyl salicylate: a decolouriser and fragrant, anti-herbivore defence against plant pathogens [fungi, bacteria, protists]), ammonia, chloral hydrate (a binder [bonding agent], solvent and clearing agent), sodium carbonate (washing soda), alcohol (ethanol), methylated spirit, sugar, borax and alum (potassium aluminium sulphate).

The use of even the most commonplace adhesives such as gelatine and starch was not without its potential problems given the inherent nature and sensitivity of silver-based photographs, particularly those processes based upon photolytic silver, known as the printing-out processes.

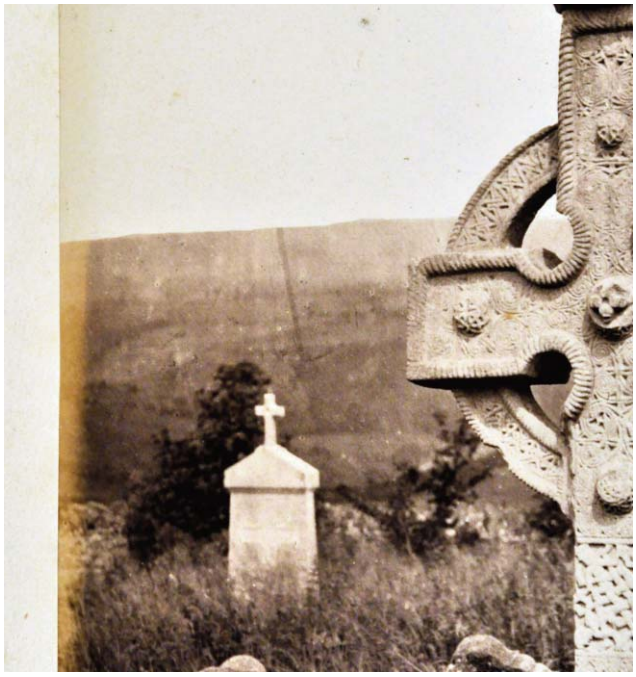
The deleterious effect of adhesive systems on silver image stability was a factor identified by the Photographic Society of London's 'Fading Committee' of 1855, chaired by Roger Fenton. The committee's report identified 'adhesives' as a major cause of fading in positive proofs (prints), a fact all-too evident in the condition of historic photographs today.

This Samuel Bourne albumen print (Neg. 1218 Amar Singh Gate, The Fort Agra 1860s) shows oxidation staining arising from the gutta-percha adhesive

Physical and chemical changes in adhesives in response to inherent material chemistries and external environmental factors that can lead to adhesive degradation, oxidation and insolubility are well documented and understood for most common adhesive systems.

Physical changes arising from diffusion and solubility factors result in:

- Shrinkage
- Embrittlement
- Hardening
- Stress-related fissures and shear



Loss of image density and discolouration to the edge of this albumen print (Anon. Irish Cross, Kilklispeen, County Tipperary 1866) arising from drum-mounting the print with unrefined gelatine

This Samuel Bourne albumen print (Neg. 1064 Cemetery in Residency Lucknow 1860s) clearly shows image silver degradation arising from the caoutchouc adhesive

Chemical changes result in:

- Oxidation
- Polymerisation
- Cross-linking
- Acid hydrolysis
- Insolubility (affecting permeability)
- Loss of diffusion (affecting permeability)
- Loss of flexibility

However, the production, fabrication and mounting for presentation and storage of photographs introduces additional degradatory influences that can also affect the stability and solubility of the various adhesive systems used. Photographs are not only adversely affected by adhesives; adhesives are also adversely affected by photographs, their chemistries and their adherends.

Other contributory factors that affect adhesive stability, permeability and solubility include the following.

The pH factor

The acid hydrolysis of paper cellulose, sizes, additives, dyes, mordants, fillers, loadings, coatings, etc. will affect adhesive solubility.

- The pH stability of the photographic process itself as photographs are either acid or alkaline stabilised
- Residual processing chemistry
- Metal ions in photographic base papers or paper and board secondary supports can cause localised, sporadic acid hydrolysis (foxing) which, in turn, will result in localised, sporadic adhesive insolubility in

an otherwise soluble/reversible adhesive such as starch

The adhesive

The inherent physical and chemical nature of the adhesive will affect its stability, permeability and solubility:

- Mixtures of adhesives formulated to take full advantage of their combined individual properties of slip, grab, flexibility and diffusion will also affect stability, permeability and solubility
- The addition of modifiers, pH buffers, preservatives, lubricants and plasticisers, not uncommon in commercial preparations, will also affect stability and solubility

The photograph

The inherent physical make-up and chemical nature of the photograph can affect an adhesive's stability, permeability and solubility through the following factors:

- The degree of adhesive diffusion
- The pH of the process
- The presence of metal ion chemistry
- The presence of residual processing chemistry

The adherend/support

Degradation of the various adherends, that is the photograph and its support(s), can also result in degradation of an applied adhesive.

Whilst photographic base papers are historically fabricated from high-grade cellulose, their secondary supports are invariably fabricated from essentially low-grade materials finished more for show than stability or functionality (low-grade core with good quality cover and backing paper).

Adhesives can be affected by the following adherend properties:

- Their material stratigraphy, i.e. solid caste, duplex, triplex or multiplex (pasteboard) boards with or without finishes and coatings
- Their make-up, i.e. fibre content, can be either singular, using 100% virgin pulp or waste paper, as in chipboard, mill board, straw board, mechanical (ground) wood-pulp board, chemical pulp boards (kraft or soda processes) or mixed fibre content, with layered combinations of high- and low-grade materials
- The presence of sizings, binders, loadings and fillers in papers and boards
- The presence of finishes and coatings

Photo-oxidation (photo-degradation)

Photographs are meant to be seen and are often displayed, sometimes for long periods of time involving exposure to light (UV through to infra-red wavelengths), which can result in their oxidative degradation as the differing materials' Thermal Linear Expansion (TLE) values are exceeded, or thermal gain accelerates oxidation reactions in all materials.

Interventive conservation treatment criteria for photographs and their adhesives

Adhesive and adherend degradation has huge implications for the photographic conservator today faced with the preventive or interventive conservation treatment of historic mounted photographs. Interventive conservation treatment may necessitate the removal, or reattachment, of a photograph from its secondary support(s). The ability to successfully reverse an historic adhesive is determined by a proper assessment of the following factors:

- The adhesive – its identification, type, makeup (as it could be a mixture), condition, stability and potential solubility
- The photographic process – its identification/process type, condition, material nature, makeup and stratigraphy
- The adherend/secondary support – its material make-up, structure/stratigraphy and condition
- The stability of all relevant, component materials to potential treatment solvents, aqueous and non-aqueous

Barriers to treatment/adhesive reversal

The photograph itself can present a number of impermeable barriers that can prevent or inhibit solvent diffusion to the adhesive layer. Such barriers might include:

- The colloid
- The base
- Its stratigraphy and makeup
- A baryta layer
- Resin Coated (RC) polyethylene layers to the paper base
- Where photographs are mounted to both sides of a secondary support

Coupled with a photograph, an adherend/support can also present an impermeable barrier to solvent diffusion. Such barriers might include:

- Its material stratigraphy, i.e. solid caste, duplex, triplex or multiplex (pasteboard) boards with or without finishes and coatings
- Its make-up, i.e. fibre content can be singular, using 100% virgin pulp, or multi-fibred as in chipboard, mill board, straw board, mechanical (ground) wood-pulp board, chemical pulp boards (kraft or soda processes), or mixed fibre content with layered combinations of high- and low-grade materials
- The presence of sizings, binders, loadings and fillers in papers and boards
- The presence of finishes and coatings

A thorough assessment of all the aforementioned factors should enable the formulation of a treatment proposal that:

- Targets the adhesive
- Utilises adhesive-specific solvents
- Utilises physical manipulative release techniques where appropriate
- Identifies and targets the quickest and most effective access route to the adhesive layer
- Minimises treatment time and its potential impact on the photograph through:
    - Effective pre-treatment dry cleaning techniques
    - Dry delamination
    - The use of aqueous (non-basic) and non-aqueous surfactants
- Uses appropriate process- and condition-determined treatment controls such as temperature, water quality, pH and duration
- Ensures the stability, integrity and preservation of all inherent material and visual qualities of the artefact being treated

The original presentation is integral to the provenance and integrity of the photograph and should be preserved. All interventive treatments involving aqueous and non-aqueous solvents with photographs are potentially hazardous and must therefore be carried out only when deemed absolutely necessary for the extended-term preservation of the photograph and only with appropriate treatment-based controls in place.

This paper has briefly outlined the history, application and stability of adhesives used in the mounting and presentation of photographs and the criteria for their conservation treatment. The identification and assessment of adhesive systems used in the mounting and presentation of photographs is paramount to all preventive and interventive conservation treatments for photographs.

Zenzie Tinker ACR, Textile Group

The re-treatment of the green velvet bed at the National Trust's Hardwick Hall and the State bed at Clandon Park

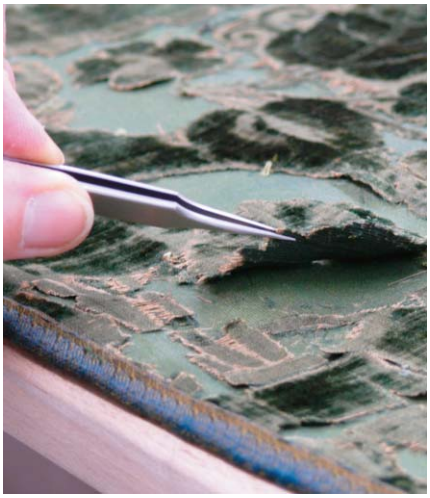
This paper, based upon a poster presentation for the Icon *Positive Futures 2013* conference, focused on the approach taken with the re-treatment of two National Trust beds: an early eighteenth-century green velvet bed at Hardwick Hall and the State bed at Clandon Park which dates from around 1705. Both treatments resulted in full 'adhesive-stitched' supports being used but their specific treatments followed differing routes to reach that same destination.

One past treatment was reversed and the original textiles were re-treated using up-to-date adhesive techniques whilst the other past treatment was retained and supplemented with extensive stitching. In exploring the differing approaches to these two large-scale adhesive projects, this paper aims to illustrate how the decisions regarding choice of application method and materials were influenced by the specific nature of the textiles involved as well as their respective past treatments, ethical and budgetary considerations and the equipment available.

Hardwick Hall bed

Clandon Park bed

Dust and the failing adhesive support



Delamination of detaching adhesive-treated fragments

The use of sticky threads

The existing treatment of the green velvet bed at Hardwick Hall

The existing treatment consisted of a complex, three-dimensional velvet supported on a double-sided thermoplastic adhesive film cast on polyester Stabiltex with a silk support layer behind. The images above show examples of areas where the adhesive support was failing, resulting in dust getting in behind the delaminated areas and exacerbating the problem, and areas of the curtains where adhesive had been used without supplementary stitching, allowing the velvet to lift from its support as the adhesive bond failed. Furthermore, 'sticky' threads had been used in the historic treatment, a technique that has subsequently shown itself to be unsuitable for this type of scenario.

The existing treatment of the State bed at Clandon Park

The satin curtain linings had been repaired onto heavy cotton patches. The adhesive used in the repair appeared to have been applied as a ready-made film in some areas but had also been brushed on as a liquid in others to form a combination of laminating layers and fully penetrating layers of adhesive.

Additionally there was failing adhesive and fragments of adhesive falling out from the hems of the curtains.

These three images show some of the issues relating to the previous repair of the satin linings on the bed hangings.

Comparative chart of previous adhesive treatments of the bed textiles

Previous adhesive treatment of silk velvet Hardwick bed hangings	Previous adhesive treatment of silk linings of Clandon bed hangings
1980s treatment	Treatment date unknown, possibly C19th or early/ mid C20th
Professional conservation	Non-professional repair
Full support of polyester Stabiltex and dyed silk backing layer applied with no reference to original seamed construction	Patch support of heavy cotton only applied to damaged areas
Reasonably heavy thermoplastic film (probably Mowilith DMC2) cast double-sided onto polyester Stabiltex support, allowed to dry and then laid by hand onto reverse of textile with silk interlining laid on top. Adhesive reactivated with heat via vacuum hot table	Heavy, unevenly applied adhesive (mix of gutta-percha, wax and clay) had been both directly painted wet onto reverse of satin linings (brush marks visible) and applied as a ready-made film, possibly reactivated with heat
A few tension problems where adhesive support is too tight and causing small bubbles or pleats in velvet	Badly-applied patch support causing tension problems; weakness and splitting around edges of patches. Patches creased and grain of weave not aligned to object
No supplementary stitching	No supplementary stitching
Majority of adhesive support remains well-bonded to textile and silk interlining layer	Adhesive has penetrated fibres of textile yet does not hold support in close contact with textile
Bond remains fairly good throughout but is delaminating from textile along splits and holes	Bond breaking down unevenly. Adhesive film delaminating and pieces dropping from object
Adhesive treatment still providing good overall support as intended; textile still able to hang but with specific areas of vulnerability	Adhesive treatment not providing support intended
Support could not easily be removed mechanically without causing extensive damage to textile, meaning that adhesive bond is stronger than weakened structure of textile	Support can be peeled from textile without too much damage if removed along direction of splits, meaning that adhesive bond is weaker than textile. After removal of support, most of adhesive remains embedded in structure of textile
Adhesive would be fully reversible by using an appropriate solvent if required	Adhesive residue is fully reversible where condition of satin allows

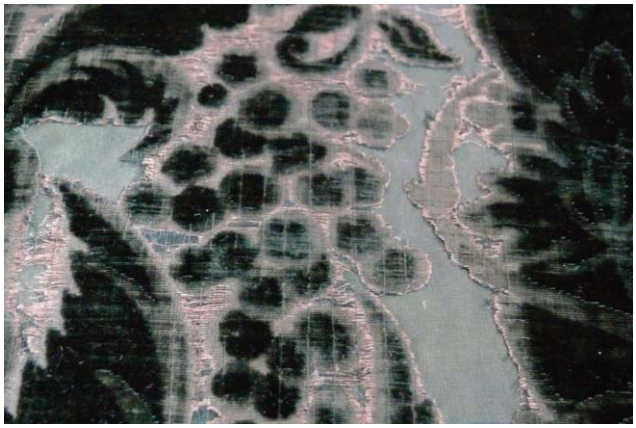
The evidence supplied by this chart shows that textiles with past adhesive treatments may present a complex combination of contradictory factors, and suggests that reversibility is both desirable and ill-advised! In short, the reversal of adhesive treatments is never a simple decision to make.

The conservation decisions for the treatment of the Hardwick bed

It was decided to leave the past adhesive treatment in place and supplement with stitching. The main purpose of the introduction of stitching was to reattach loose fragments and improve flexibility and drape.

The major considerations that shaped this decision were:

- The size of the textiles: there was a total of 33 m² of textile in the four bed hangings
- The weak, powdery condition of the silk
- The overall strength of the adhesive bond
- The economics of reversal and re-treatment
- Overall, the previous treatment was still sound and could be supplemented to good effect



New supplementary stitching worked through the textile and the previous adhesive treatment, front (above) and back (below)

Completed treatment

The treatment to stabilise the green velvet bed curtains involved approximately 2,000 hours' work.

The conservation decisions for the treatment of the Clandon State bed

It was decided to remove the existing adhesive treatment and replace it with a modern adhesive treatment. The major considerations that shaped this decision were:

- The unsuitable adhesive patch supports were failing
- The existing conservation treatment was badly applied involving non-professional repairs and using an unsuitable adhesive

- Replacement linings were considered but the original silk linings are integral to the original structure of the bed
- Areas of these linings were very soiled and in need of wet cleaning
- Large areas of linings were in good condition but with sufficiently significant areas in a very poor condition
- A replacement adhesive support would reduce the amount of stitching required in brittle areas
- A full, rather than a patch, support would provide the overall strength required

Head curtain lining after manual removal of patches: full view (above) and detail (below)

The overall importance of the bed and its original completeness played a large part in the desire to conserve the linings rather than replace them. It was also the case that, particularly with the foot curtains, there were many panels of lining that were still in very good condition. Furthermore, manually removing the cotton patches was a relatively quick and easy part of treatment.

Adhesive removal

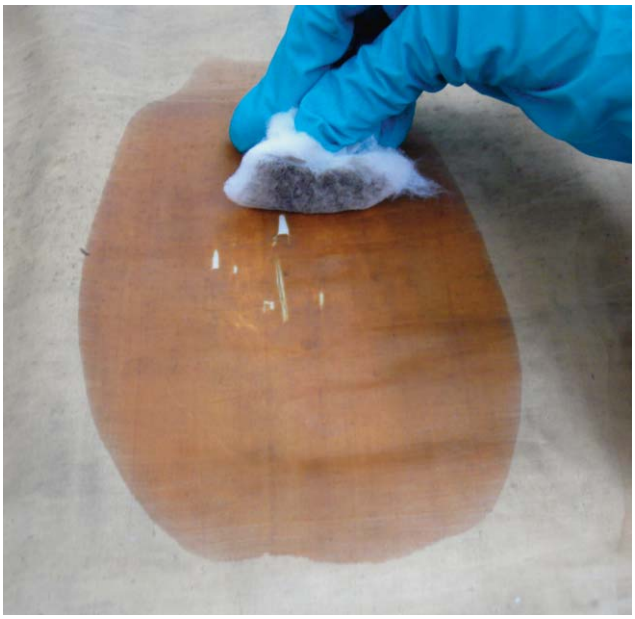
Removing the adhesive, which was a mix of wax, clay and rubber, was an enormous challenge. It was also essential to extensively test to find the right solvents for the removal of the adhesive layer and to develop an economic mobile extraction system that we could use for health and safety compliance.

Mobile extraction chamber

Although initial tests had indicated some individual solvents worked fairly well, we had to consult a solvent specialist due to the composite nature of the adhesive components and the fragility of the affected areas of silk which would have made mechanical action too damaging. Solvent application was in two stages: an initial application to soften the adhesive to allow gentle scraping to remove any excess, and then a further application to dissolve the embedded adhesive.

Wet cleaning followed the solvent treatment. Alcohol was used to aid the initial wetting out of the fibres and then the power of the water and detergent was enough to remove almost all of the final residues of adhesive.

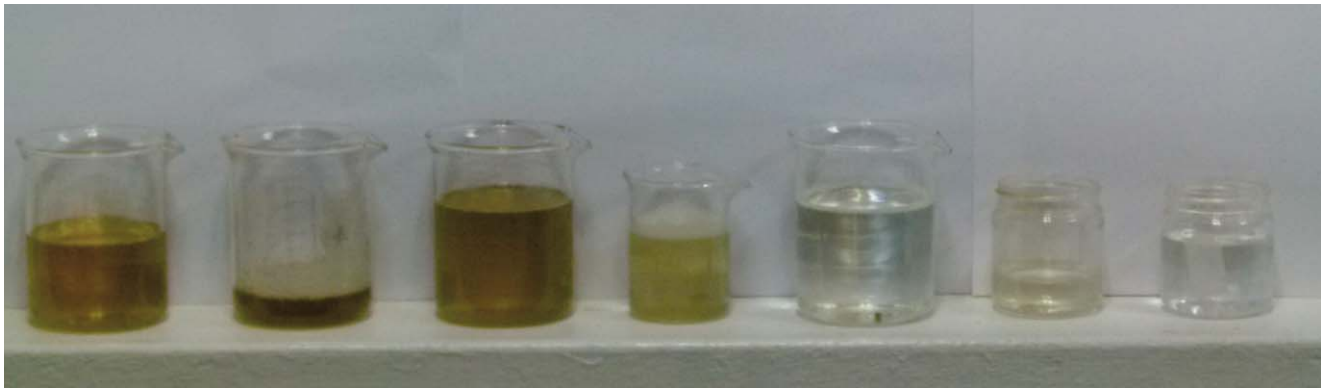
Wet cleaning proved to be very successful as it not only removed a huge amount of soil and black silk dust from the embroidered curtains but restored the body and lustre to the silk satin.



Manual removal of softened adhesive residue after applying a solvent mix of alcohol, xylene, IMS and heptane (left), dissolving adhesive embedded in the weave structure using the same mix of solvents (right). The adhesive residue and solvent mix was then flushed out with Cyclohexane followed by IMS

View after removal of adhesive prior to wet cleaning

View during wet cleaning



Wash bath samples

Application of new adhesive support to the reverse of one panel of the curtain lining

Delicate hand application of adhesive support along original seams

Making and applying a new adhesive support

Adhesive film preparation

An adhesive film of 2:1 Lascaux 360 HV:498 HV diluted with four parts water was applied via rollers to a dyed silk crepeline support. More than 30 m of dyed silk crepeline were carefully prepared and each panel of lining was then supported by hand with the adhesive film. The lack of access to a vacuum hot table meant that we had to work with spatula irons and the very careful use of flat irons to ensure an even application.

Detail of the adhesive report in place with the addition of supplementary stitching

In addition to the adhesive film, stitching was worked in fine polyester to supplement the bond between the adhesive crepeline and the weak areas of loss in the linings. Additionally fixing lines and seams were also stitched through to a dyed silk interlining used to visually fill areas of loss and provide some dust protection for the reverse side of the adhesive film layer.

It is at this junction that the two treatments meet up on the same path: both objects now have a full adhesive treatment and a dyed silk interlining layer. An essential difference was the time that each support treatment required. By incorporating supplementary stitching at the outset of the treatment rather than as a means to stabilise an existing treatment, the amount of stitching required for the treatment of the Clandon bed was minimal compared with the green velvet bed at Hardwick Hall.

Both treatments also required the application of overlays of dyed nylon net in the most vulnerable areas. As both beds were to be returned to open display in an historic house setting, and as such will need to be cleaned and handled a little in the future, the net will offer some protection from normal maintenance, housekeeping and storage.

A postscript to the original poster presentation is that discussions with photographic conservator Ian Moor at PF13 seems to confirm our supposition that the adhesive originally used to treat the Clandon bed linings was very similar to adhesive manufactured in the nineteenth and early twentieth centuries and commonly used to laminate photographs to card mounts.

Views of a foot and a head curtain lining after conservation

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www.zenzietinker.co.uk