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Izlaganje sa naučnog skupa

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PARCHMENT, PIGMENTS AND PERFORATIONS: DEVELOPING A TREATMENT METHODOLOGY FOR AN 8TH CENTURY QUR'AN MANUSCRIPT AT THE CHESTER BEATTY

Abstract

The pressing need to conserve an early eighth-century Qur'an manuscript at the Chester Beatty in Dublin has served as the catalyst for significant investigation of both early Islamic manuscript materials, and the most suitable contemporary conservation techniques for this manuscript.

CBL Is 1404 has suffered extensive water damage and subsequent corrosion of the iron containing ink it was written with. It has in turn been subject to numerous layers of previous repairs, many of which are now failing, ineffective, and incurring damage to the manuscript. This study will review the methodology of repair which has been employed to treat this manuscript.

Following experiments using a wide range of materials and techniques, the resulting treatment plan uses a delicate balance of both traditional and modern parchment conservation techniques to stabilise the fragile folios. Experiments have included traditional methods for old repair removal such as mechanical removal with scalpels and the application of paste poultices, as well as both rigid and formable granular gels. Losses and tears have then been repaired using traditional adhesives with toned Japanese paper.

Keywords: Parchment, Qur'an, conservation, iron-gall, gel

Introduction

The Chester Beatty houses the great collection of manuscripts, miniature paintings, prints, drawings, rare books, and decorative arts assembled by Sir Alfred Chester Beatty (1875-1968) in the first half of the twentieth century. The collection functions primarily as an art museum with both temporary and permanent exhibition galleries in which its Islamic, East Asian and Western collections are displayed. The Islamic collections consist of more than 6,000 individual items, predominantly manuscripts, single-page paintings and calligraphies, with some 260 Qur'ans from across the Islamic world.

1 Senior Conservator, Chester Beatty, Dublin

CBL Is 1404

Manuscript CBL Is 1404 is one of the museum's earliest Islamic manuscripts. Current scholarship suggests that this large Qur'an manuscript was made under the patronage of the Umayyad Dynasty (661–750 CE), before 750 CE[2]. Identifying the production place of early Islamic manuscripts is notoriously difficult, but according to scholarship by François Déroche, the thick strokes of the script suggest that this manuscript was made in the city of Sana'a in Yemen, rather than Damascus, the capital of the Umayyad caliphate[3].

CBL Is 1404 measures around 47 x 38 x c.10 cm in its current disbound state. It is comprised of 201 parchment folios, but it is not a complete Qur'an manuscript. Only 15 chapters, or *suras*, of the 114 in a complete Qur'an survive in their entirety, whilst a further 31 are partially preserved. However, due to the division of the Qur'ans 6,236 verses, or *ayah*, these surviving chapters represent around 59% of the original manuscript. As such, the sheer volume of material surviving in this single manuscript provides a wealth of material information through which our understanding of early Islamic manuscript production can be increased.

The 201 extant folios of CBL Is 1404 vary greatly in condition. They were stored loose, in no particular order, in the wooden packing crate in which they were originally shipped to Beatty when he acquired the manuscript from his dealer A.S. Yahuda in Cairo in March 1928. The manuscript travelled from Cairo to London, where Beatty was based at the time, arriving around one-month later at some point in April of that year. In light of Beatty's refined collecting tastes, the obviously poor condition of this manuscript indicates that it was of such significance, that Beatty chose to collect it *in spite* of its fragile condition.

Documentation

In order to facilitate an in-depth assessment of the manuscripts' condition, the folios were first returned to their correct order. As the parchment folios had been subject to several campaigns of foliation, it was decided that organising them by *sura*, rather than by the extant Arabic numerals, would be the most reliable method to maintain the correct order[4]. The existing foliation

2 François Déroche, Qur'ans of the Umayyads: A First Overview, Leiden: Brill, 2013, p. 109.

3 François Déroche, 'In the Beginning: Early Qur'ans from Damascus', The Art of the Quran: Treasures from the Museum of Turkish and Islamic Arts, (2016), p. 67.

4 The numbers given in this paper refer to the order of the extant folios organised by sura.

marks found throughout CBL Is 1404 give some suggestion of the various programmes of intervention that the manuscript has been subject to over its long lifetime.

Three distinct schemes have been observed so far. The first and easiest to identify, is marked in the top left-hand corner of the recto of a small group of folios which were repaired in the early 1960's (figure 1). Numbers one to 78 have been marked in pencil, in a small careful hand. The second sequence of Arabic numerals marks each of the 201 extant folios (figure 2). Large quickly drawn numbers in the bottom right-hand corner of the recto of each folio serve as individual folio identifiers, but the numbering sequence does not correlate with the order of the Qur'anic text. As such, their purpose remains unclear; they may simply have been added by a non-Arabic speaker unaware that the folios were in disarray. The third set of marks remains unidentified and has not yet been systematically recorded. Also written in pencil, it is again located in the bottom right-hand corner of the recto of folios. It is not present on every folio, so may indicate a particular portion or grouping of the manuscript, but this requires further investigation. In July 2015, Elizabeth Omidvaran, Assistant for the Arabic Manuscript Project, noted that it could be Hebrew numeration, perhaps added by someone who was working on the manuscript on Chester Beatty's behalf[5] (see figure 2).

Following the detailed textual study of the manuscript undertaken by Ms Omidvaran, it was slowly possible to put the folios in sequence. With careful on-going documentation, and a full collation map of all 201 folios, this order can be maintained by a non-Arabic reader by simply cross-referencing the existing foliation marks with tables of each folio's content. This also removes the need to introduce yet another physical numbering system to the manuscript.

Previous repairs

Once systematically organised, the overall condition of the manuscript could be assessed. It was immediately clear that the textblock had suffered extensive water damage, visible as dark staining and tidelines along the edges of the folios. This water damage had in turn catalysed the deterioration of the dark brownish-black iron-gall writing ink. Severe ink corrosion throughout the manuscript had perforated the majority of the parchment folios and incurred considerable losses throughout the manuscript.

Extensive efforts to repair the damaged parchment are visible throughout the manuscript, and at least five different programmes of intervention have

5 Elizabeth Omidvaran to Hyder Abbas, personal correspondence, 9 July 2015.

been identified so far. Thirteen folios[6] were repaired by the renowned Zaehnsdorf bindery of Catherine Street, London (c. 1842—1957)[7]. These repairs are characterised by the use of parchment, mottled toning achieved with dry pastel, and a bevelled join between the parchment repair and original folio, achieved by brutally paring down the edges of the original material (figure 3). The repairs were documented by Joan Kingsford Wood as the folios moved a few at a time between Beatty's residence at Baroda House in South Kensington, and the Zaehnsdorf workshop in Covent Garden, London, between 1928 and 1931.

The most recent repairs took place in the early 1960's, when 78 of the folios in the best condition were removed from the packing crate, repaired, and sewn on five tapes in a modern European style with kettle stitch at head and tail, by Beatty's 'wizard repairer,' Miss Ida Dyson[8] (figure 4). Miss Dyson was a repairer employed by Zaehnsdorf but seconded by Beatty from the 1940's onwards. As such, her work is common throughout the Chester Beatty Islamic collection where her use of a soft, fibrous, dark cream wove paper, and sewing on silky synthetic textile tapes can be seen in numerous manuscripts—some fully repaired and rebound, others simply repaired and resewn, awaiting a new binding. In a letter to Chester Beatty dated 20th April 1960, Evanna McGilligan, Beatty's Librarian at the time, records the work which was in hand:

'One of the Korans which you selected to be repaired by Miss Dyson last year is an Arabic 8th-9th century MS written in Cufic on vellum. There are 201 folios and it is in quite a bad state and needs a lot of Miss Dyson's attention and skill. 14 folios were mended by Zaehnsdorf but that still leaves a large number which require repairing. As this will be an extremely long job if the mending is done with vellum, Miss Dyson suggests that she could repair the vellum pages with Japanese paper. She has never before used paper to repair your vellum MSS, but she thinks that paper would do the job nicely and would also be much quicker to use. Using vellum the repair work necessary for this MS would take her about a year, she thinks, and this is an exceedingly long time to spend on one MS. Miss Dyson is confident that paper would serve the purpose very well instead of vellum, but she would like your approval before starting on this MS.'[9]

6 CBP KIN (CON) 1300, box 26, ARC. BOOK, ff. 4, 8, 10, 23, 34, 37, 59, 83, 122, 125, 149, 154, 155.

7 Frank Broomhead, The Zaehnsdorfs (1842-1947): Craft Bookbinders, Ravelston: Private Libraries Association, 1986.

8 Wilfred Blunt to Mr Wilkinson, 26 July 1949, Chester Beatty Papers [CBP] 1091, Chester Beatty Archives, Dublin.

9 Evanna McGilligan to Sir Alfred Chester Beatty, 20 April 1960, Chester Beatty Papers [CBP] 1131, Chester Beatty Archives, Dublin.

Following Beatty's agreement to proceed with paper repairs, and praise of Ms Dyson's skills, Ms McGilligan writes to Beatty with an update at the end of the same month:

'Miss Dyson has repaired one folio of the vellum Cufic Koran with Japanese paper, and she has made an excellent job of it. During the month of May she will do two more so that you can have an idea of how the finished MS would look, having been repaired with paper. Dr Hayes thinks that you will settle for this method, as repairing with vellum takes such a long time'. [10]

Repairs carried out before the Qur'an reached Chester Beatty's collection in the twentieth century are found sporadically throughout the manuscript. These include small Islamic paper patch repairs, usually located along the spine edge of the folios, and large collage-type repairs made using parchment fragments taken from elsewhere in the manuscript to crudely repair the most severely damaged folios. These repairs frequently lie beneath the heavy paper repairs which form the fifth and most extensive campaign of repair to the manuscript (figure 5).

The fifth series of repairs is by far the most obtrusive, and is found on more than half of the 201 folios. Unusually, we have a specific record of when they were applied, preserved as an inscription on a fragment of pasteboard alongside the manuscript (figure 6):

'The Amir Muhammad Gawargy Ghanim Gharban has renovated this 'Uthmani honoured Mus'haf, attributed to the Imam 'Uthman Bin 'Affan (as) written by his own hand, since looking at it he realised it was totally dismembered and it was about to be destroyed and lost. He wanted to please God and restored it in 1140 (hijra). Detached pieces of papers have been pasted between the other pages, on these sheets and on the ones at the end of this Mus'haf. May God bless him for his enterprise, Amen.'[11]

The date of these repairs, 1140 Heijira or 1728 CE, is further substantiated by the paper they are made from, much of which contains *tre lune* watermarks. These watermarks are typical of the seventeenth and eighteenth-century European papers made for export to the Islamic world from centres in Venice and France during this period. So far only two varieties of the tre lune form have been documented in the repairs of CBL Is 1404. These are a tre lune centred on a vertical chain line, with a single line of text below (figure 7); and a tre lune fitting snuggly in-between, and placed at right angles to, three vertical chain lines (figure 8). In addition to these tre lune watermarks a single example of a third watermark design, three cups with the initial AB

10 Evanna McGilligan to Sir Alfred Chester Beatty, 29 April 1960, Chester Beatty Papers [CBP] 1131, Chester Beatty Archives, Dublin.

11 Translation by Marco di Bella, personal correspondence, 21 February 2018.

beneath, was documented on folio 29 (figure 9). This mark is the counter to an unclear shape visible further across the repair.

Although tre lune watermarks are documented in several publications and on-line databases, it has as yet not been possible to confirm the identity of these examples. It is hoped that through careful analysis it will eventually be possible to localise these papers and determine the mill they were made in, and perhaps the most likely destination they were exported to.

Developing a treatment methodology

The heavy paper repairs applied in the eighteenth century have caused localised deformation and cockling of the parchment manuscript folios. Many obscure large tracts of the text, and are incurring further damage to the already vulnerable and fragmentary parchment substrate. Now failing and ineffective, the weight and extent of these repairs severely restricts the natural movement of the parchment folios, causing them to buckle and distort unevenly. This in turn has further aggravated the embrittled and ink-damaged parchment which continues to flex and fragment.

On many folios, the script has been lost due to a combination of water damage, corrosion and physical abrasion. In some instances, the media has been retouched and outlined by later hands, attempting to maintain the legibility of the text, whilst other folios are untouched and appear barely legible where the ink has been lost from the parchment surface. The tendency for ink to be lost from the flesh-side of the parchment more readily than the hair-side, is clearly apparent. In order to stabilise the folios, and facilitate access, study and display of this beautiful Umayyad manuscript, it was clear that the old repairs would need to be released.

The removal of old repairs is ethically and physically testing. Arguably, these layered repairs are part of the manuscript's provenance, dramatically illustrating the travels and trials the folios have endured over the past 1,250 plus years. Physically, the repairs are firmly attached to the surface of the folios with a heavy application of dark brown animal glue. This adhesive was applied when warm, allowing it to penetrate the surface of the previously creamy white parchment, discolouring it, and compromising its physical integrity. As such, any efforts to remove these old repairs must be carefully evaluated to ensure they strike a balance between the preservation of the physical manuscript materials, namely the delicate parchment and fugitive ink, and the long-term stability and future preservation of the manuscript.

In addition to this, standard conservation methods for the removal of animal glue and old repairs from manuscript material, generally utilise water. As water is a catalyst of iron-gall ink corrosion, using it to remove the old repairs

risks accelerating the already severely deteriorated iron-gall ink. As such, all repair removal methods and techniques under consideration were tested with extreme caution.

Simple experiments were carried out on Iron (II) Ion indicator paper in order to assess the suitability of some common poultices. Wheat starch paste, Sodium CMC Carboxymethyl Cellulose (SCMC), and a rigid gel formed with Agar were applied directly to a line of iron-gall ink drawn on the indicator paper, in order to assess the migration of iron ions incurred (figure 10). Each poultice was applied in various concentrations, and using a range of application techniques. These included semi-permeable barrier layers such as Bondina®, and Japanese paper enclosures. At the end of this initial testing period, all of these water-based poultices were found to incur some degree of migration of the Iron (II) Ions. However, as agar was found to induce the lowest level of ion movement when compared with the more traditional poultices such as methyl cellulose, it was decided it should be tested on the manuscript.

Folio 167 was chosen on which to test the old repair removal, and overall treatment methodology (figure 11). This folio exemplified the deterioration challenges of the manuscript as a whole; the tail and foredge of the folio was marked by dark tidelines and the ink had perforated the parchment substrate. All edges of the folio had undergone previous repair and were now distorted as the parchment fought against its restrictive frame. The heavy paper strips were adhered with a generous layer of dark brown animal glue, fixing a number of deep and ingrained folds and creases in place. In addition to this, the folio was one of 34 examples in the manuscript bearing a band of geometric illumination, further complicating any proposed treatment.

As such, mechanical removal of the old repairs was tested before any poultices were introduced. However, due to the firm attachment between the repairs and the parchment substrate, it soon became clear that mechanical removal of the old repairs would be slow and unsuitable. Next, cast blocks of agar were tried, however, the flat plane of the rigid gel offered inconsistent contact with the distorted surface of the repaired parchment, making removal of the old repairs uneven and unsatisfactory. Thankfully, it was at precisely this point that I was given a sample of a new product called Nevek® from the Italian supplier CTS[12].

Old repair removal

Nevek® is an Agar and Isopropanol based gel[13] developed for use on wall paintings. It is supplied in a ready to use granular form, which makes it very

12 CTS Nevek® product page, Italy, available at: https://www.ctseurope.com/en/scheda-prodotto.php?id=4002 (deposited 04 August 2019).

13 CTS Nevek® Safety Data Sheet, 20th May 2016.

suitable for forming to the undulating contours of parchment. After conducting further experiments on Iron (II) Ion indicator paper[11], I tested Nevek® on the manuscript (figure 12). First, a small amount of the gel was decanted into a container to work from. Using a spatula the granular gel was moulded to the shape of the old repair to be removed and left in place for between 30 seconds and one minute before being lifted away. The softened old repair and adhesive were then carefully released from the parchment substrate using a blunted surgical knife. Excess adhesive deposits can be reduced with the same tool, or with barely dampened swabs as necessary. On a practical level, the old repair acts as a barrier which prevents the gel from coming into contact with the object directly. In addition to this, the gel can be reused several times before it becomes dark and ineffective, making it an economically viable material to use. However, it must be noted that the speed at which the Nevek® reactivates will vary depending on its freshness. Although this technique leaves a small amount of animal glue residue on the substrate, the reduced levels of moisture the manuscript is exposed to during treatment and overall improvement of the parchment flexibility once the old repairs were lifted was considered a reasonable compromise.

Once the old repairs were removed the parchment was placed between light blotters and allowed to settle. In the case of folio 167, I decided to undertake very gentle humidification of the folio in a chamber prepared with a wet blotter reservoir and Gore-Tex® inside an acrylic dome. The humidity was raised from an ambient humidity of 52% RH to 75% RH over one hour. The parchment reacted quickly and evenly—so much so that I was able to remove the folio from the chamber after this short period of time and begin flattening, gently manipulating the folio by hand to realign tears and creased or folded areas. Due to the extent of losses and tears across the folio, tension drying was not undertaken. Instead, I chose to dry the parchment between blotter and Bondina® under light glass weights. I used temporary Japanese paper splints secured with wheat starch paste to bridge the tears and losses before humidification. The small splints hold the damaged areas in place and prevent distortion during both humidification and drying. The splints can then be removed before the folio is repaired.

Although the results from the humidification and flattening of folio 167 were satisfying, I have decided that in future humidification will not be undertaken as standard given the extent of loss and ink corrosion to the folios. Instead, folios will be gently flattened between blotters under light weight. Leaving the folios to settle under light weights for an extended period of time will reduce more significant planar distortions gradually, but severe or ingrained creases in the parchment might be eased with the application of controlled localised humidification using a nebuliser or damp blotters and Gore-Tex®.

Contemporary parchment repair

Two phases of repair have been designed to stabilise the manuscript once the old repairs are removed. Firstly, losses to the text area are supported with toned RK-00 remoistenable tissue prepared with Isinglass. Although the traditional brownish-yellow natural dye Yasha[14] was tested on folio 167, further batches of remoistenable tissue have been toned with a dilute solution of buff titanium acrylic. The use of this synthetic dye ensures repeatable results and consistency between batches[15].

When the toned tissue is ready, remoistenable tissue can be prepared in the typical way; strips of toned Japanese paper c.20 x 35cm in size are gently laid onto slightly bigger Melinex® sheets which have been brushed with a layer of the viscous isinglass solution. The toned tissue will not fall or drape as easily as untoned Tengujo, but wrinkles in the paper can be reduced by simply blowing them down onto the adhesive. Once dry, the prepared remoistenable repair paper can be stored in a folder until needed.

Application of remoistenable tissue repairs to the fractured surface of CBL Is 1404 has been informed by the sponge-blotter system first discussed in the 2011 article, 'Rendering the Invisible Visible,' by Eliza Jacobi et al[16]. The prepared remoistenable tissue, still on the backing Melinex®, is placed over the area of loss to be repaired and the tissue is scored through following the contour of the loss using a sharp scalpel. Care is taken to maintain a border of around two millimetres around the edge of the loss, and not to cut through the Melinex® support. Next the shaped tissue is released from the Melinex® and the adhesive is reactivated by placing it face down on a pad of dampened cotton wool (or sponge) covered with Bondina®. After around 20 seconds, or when it is visible that the adhesive has been reactivated, the shaped repair can be lifted from the pad and carefully positioned over the area of loss using tweezers (figure 13). The repair is then allowed to dry under a Bondina®-covered felt pad and light weight. The repairs are applied to the flesh-side of the folios where the paler colour and matte surface of the parchment help them to blend into the surface of the object.

14 Yasha is a brownish-yellow natural dye derived from cones of the alder tree, *Alnus japonica*. It has been in use in Japan since the eighth century and continues to be used in traditional Japanese scroll conservation.

15 Recent research into Yasha has also suggested that it may be less stable than previously indicated, personal correspondence, Juliet Baines, August 2018.

16 Eliza Jacobi, Birgit Reissland, Claire Phan Tan Luu, Bas van Velzen, Frank Ligterink, 'Rendering the Invisible Visible: Preventing Solvent-Induced Migration During Local Repairs on Iron Gall Ink,' Journal of Paper Conservation, (2011), Vol. 12, No. 2.

Phase two of manuscript repair, namely infilling larger losses to the folios, will not be undertaken until the entire textblock has had all old repairs removed, and all losses to the script area repaired with remoistenable tissue. It is my belief that the best results will be achieved if all folios are treated systematically, and brought to the same level before moving to the next stage of the treatment procedure.

As the extent of repairs will be directly related to the final treatment of the codex, for example whether the manuscript is rebound or fasciculed, it is not possible to accurately gauge the level of repair necessary without looking at the textblock as a whole. A single exception to this is folios 124 and 125, which were requested for inclusion in the exhibition *Gift of a Lifetime* (19 October 2018 - 28 April 2019). After completing phase one of repair, I have infilled the large edge losses with a single layer of water-cut toned Japanese paper adhered to the parchment substrate using wheat starch paste. In order to help the folios to appear more coherent to the viewer the repairs have been extended at the spine edge to offer the appearance of an intact opening in the manuscript (figure 14). However, they are not joined, as there is no evidence that the folios were ever conjoint. The final outcome is a more supple and flexible folio, stabilised, but undoubtedly still delicate. However, the long-term suitability of these repairs will be re-evaluated when the entire textblock is ready for phase two repair to begin. Only once the entire textblock has been repaired, will it be possible to decide on a rehousing solution. Whether this will entail binding the manuscript, fasiculing the folios in albums, or storing them in another conservation enclosure, remains to be decided.

Media

In addition to the text obscured by old repairs on each of the 201 folios, diacritical marks, verse markers in bright red with black outlines, and 34 illuminated bands can be found throughout the manuscript. Whilst the verse markers were probably a later addition to the manuscript, and evidence of simple hatched lines can be seen below the red paint[17], the illuminated bands are original. Each marks the end of a *sura* with a bold line of colourful vegetal and geometric pattern bearing considerable Coptic influence[18].

The palette for these decorative bands appears to be restrained and rather homogeneous throughout the manuscript. Analytical examination in collaboration with the EU-funded MOLAB (Integrated Platform for the European

17 Estelle Whelan, 'Writing the Word of God: Some Early Qurʾān Manuscripts and Their Milieux, Part I,' Ars Orientalis, vol. 20, 1990, pp. 113–147. Available on: *JSTOR*, www.jstor.org/stable/4629403 (deposited 31 January 2017).

18 Whelan, 'Writing the Word of God,' p.131.

Research Infrastructure ON Cultural Heritage Mobile LABoratory) has used non-invasive analysis to identify Cinnabar, Red lead, natural Ultramarine, a Copper-containing green, Gold and Orpiment, along with a small amount of carbon-based black used in the outlines and preparatory drawings—again indicating they were part of the manuscript's original layout and design[19].

There is some cracking, flaking, powdering and loss across the folios, but no evidence of retouching. Seven of the 34 illuminated folios appear glossy and discoloured due to a thick coating of the same animal glue[20] with which the eighteenth century repairs were attached—probably applied as a consolidant—but otherwise, with the single exception of the decorative band found beneath an historic lining on folio two verso, the illuminated bands are in good condition.

Conclusions

The conservation of Qur'an manuscript CBL Is 1404 at the Chester Beatty is still very much a work in progress. The scale of the task in hand, alongside other commitments in the lab, mean that complete repair and ultimately rehousing for this enormous manuscript are still some way off! However, this manuscript presents a unique opportunity to investigate the materiality of an extremely early Islamic manuscript, whilst also developing a contemporary methodology for the removal of historic repairs, and the stabilisation of iron-gall ink damaged parchment.

The techniques discussed will undoubtedly be refined as work continues through the 201 extant folios of CBL Is 1404, but I am hopeful that the final outcome will be a stable and fully accessible witness to the earliest decades of Islamic manuscript production.

Acknowledgements

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19 Kristine Rose-Beers, 'Preparing to conserve an early Qur'an manuscript in the collections of Sir Alfred Chester Beatty: Exploring the materiality of the early Islamic book,' Care and Conservation of Manuscripts 17, (2020), forthcoming.

20 A dark yellow coating is visible over the illuminated bands on folios 2v, 59r, 83v, 125r, 127v, 135v and 142r.

Pergament, pigmenti i perforacije: Razvoj metodologije tretmana za rukopis Kur'ana iz 8. vijeka u Chester Beattyju

Sažetak

Hitna potreba da se sačuva rukopis Kur'ana iz 8 vijeka u biblioteci Chester Beatty u Dublinu poslužila je kao katalizator značajnog istraživanja i ranih islamskih rukopisnih materijala, kao i najprikladnijih savremenih tehnika za očuvanje ovog rukopisa.

Dokument pod oznakom Is 1404 u biblioteci Chester Beatty pretrpio je velike štete od vode i naknadnu koroziju tinte kojom je tekst napisan, a koja sadrži željezo. Izloženi su brojni slojevi prethodnih popravaka, od kojih su mnogi oštećeni, te su postali neučinkoviti i kao takvi nanose štetu rukopisu. Ovaj će rad predstaviti metodologiju koja je korištena za restauraciju ovog rukopisa.

Slijedeći eksperimente korištenjem širokog spektra materijala i tehnika, rezultirajući plan tretmana koristi osjetljivu ravnotežu tradicionalnih i modernih tehnika očuvanja pergamenta za stabilizaciju krhkih folija. Eksperimenti su uključivali tradicionalne metode uklanjanja starih popravaka, poput mehaničkog uklanjanja skalpelima i nanošenja obloga, kao i krutih i oblikovanih granuliranih gelova. Oštećenja su zatim popravljana korištenjem tradicionalnih ljepila i sa toniranim japanskim papirom.

Ključne riječi: Kur'an, konzervacija, tinta, gel.

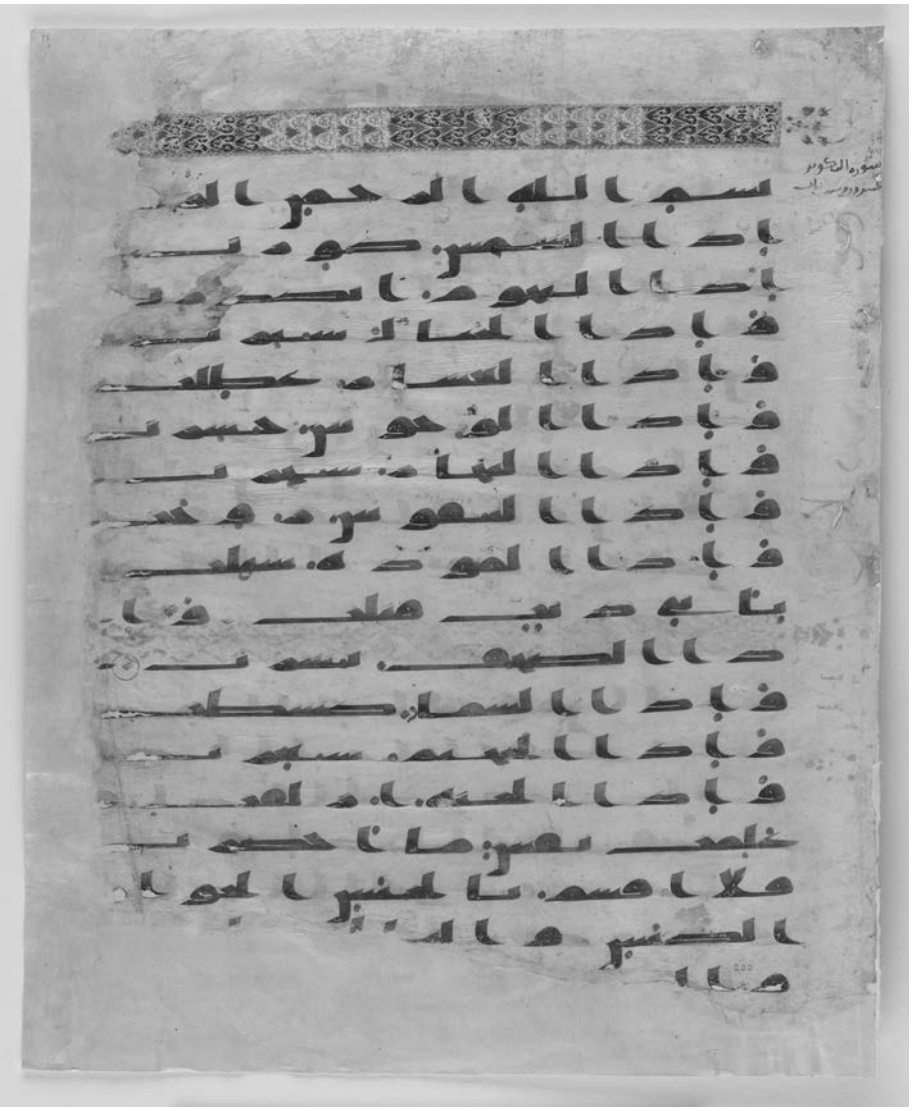

Figure 1, CBL Is 1404, f. 199r, Arabic numerals are marked in pencil in the top left-hand corner of the recto of the 78 folios repaired with soft, dark cream wove paper by Ms Ida Dyson in the 1960s.

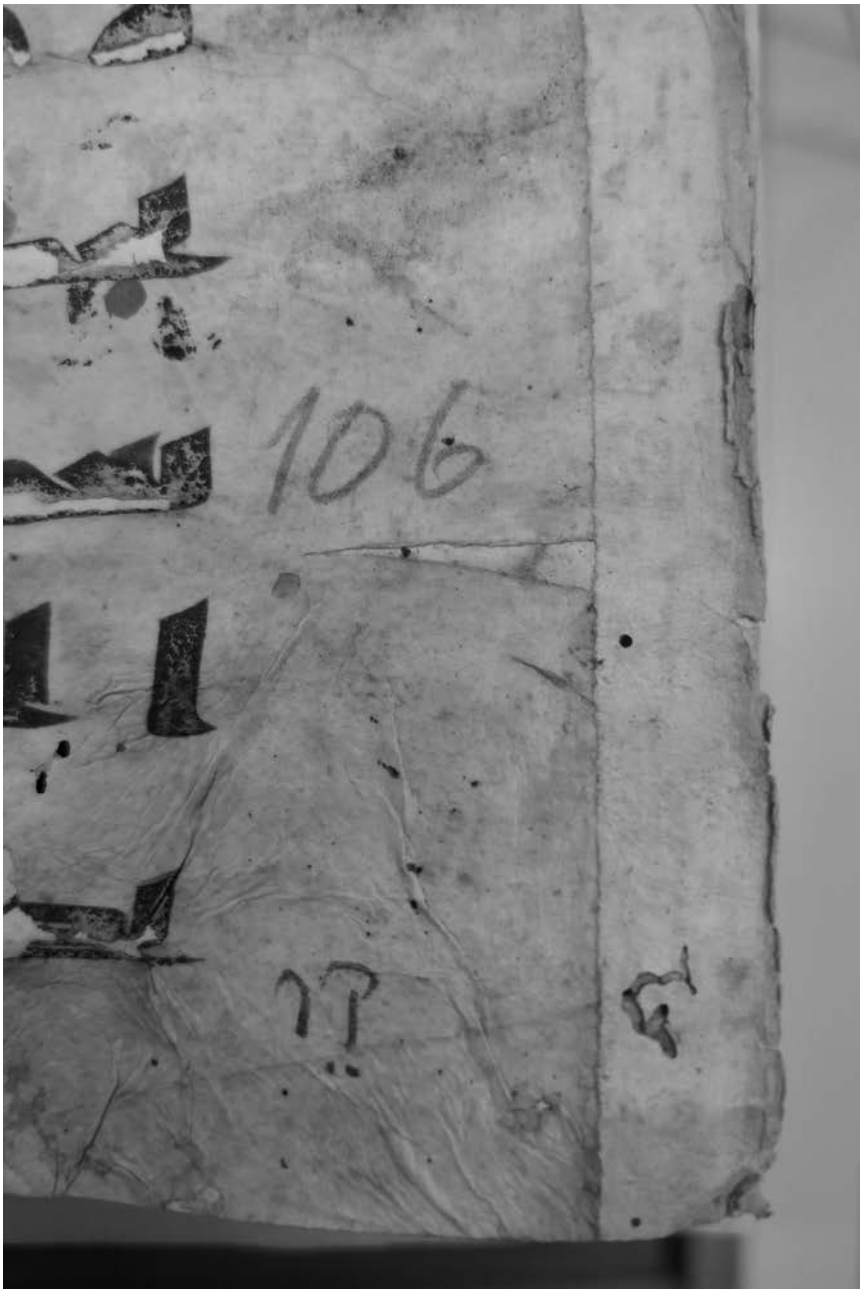

Figure 2, CBL Is 1404, f.6r, two schemes of foliation are visible: Arabic numerals extant on all 201 folios, and a series of unidentified marks - possibly Hebrew - written in pencil in the bottom right-hand corner of the recto of the folio.

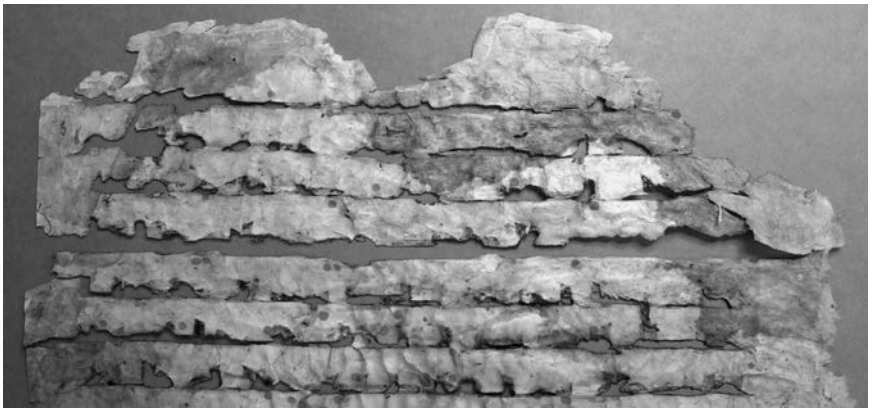

Figure 3, CBL Is 1404, f.4v (formerly f.6v), the pared-down bevelled edge of an original parchment folio is characteristic of repairs carried out to thirteen folios at the Zaehnsdorf bindery in London between 1928-31.

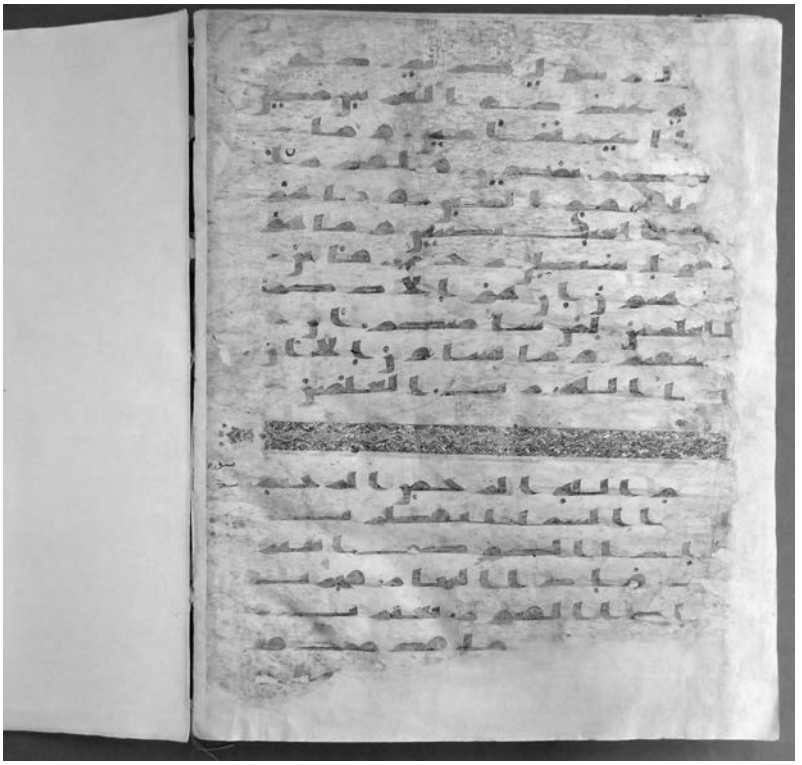

Figure 4, 78 folios repaired and sewn in a Western-European style by Ms Ida Dyson in the 1960s.

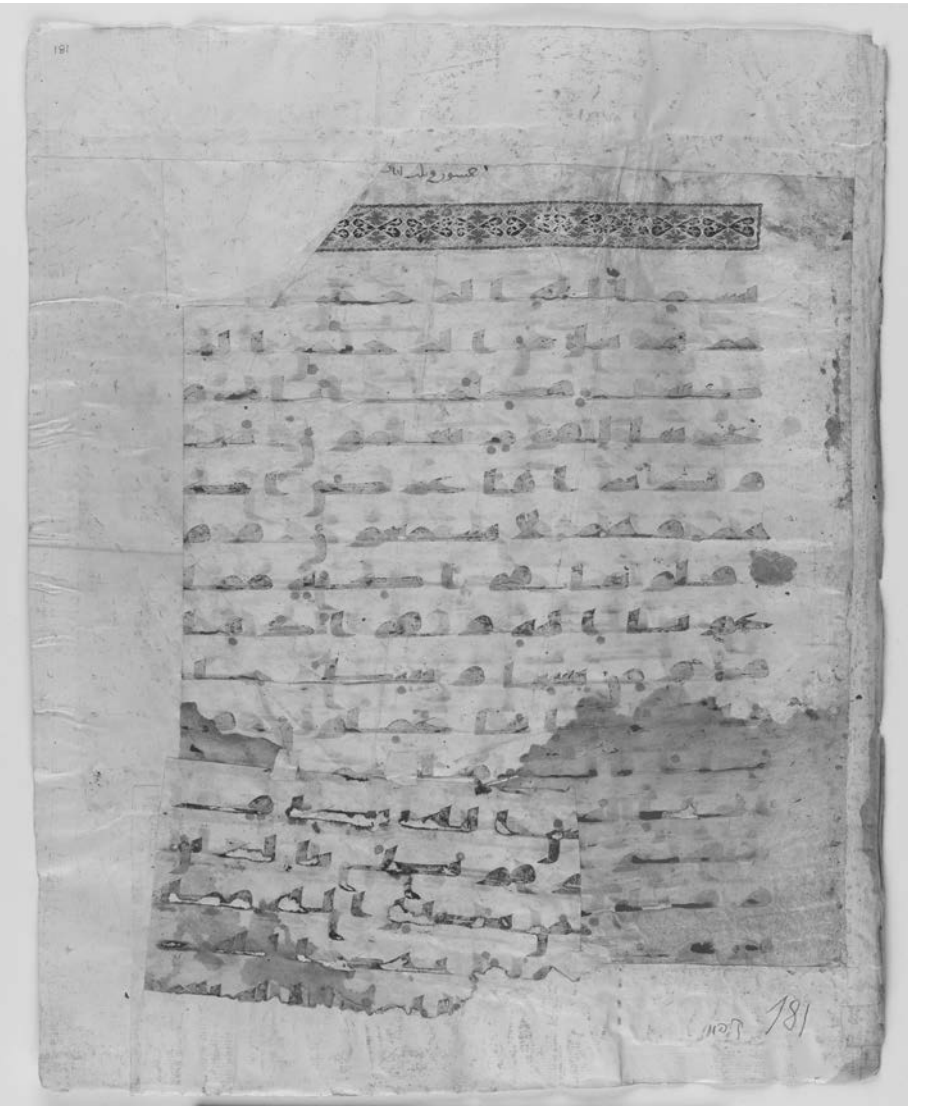

Figure 5, CBL Is 1404, f. 181r, Heavy paper repairs applied in the eighteenth century form the most extensive campaign of repair to the manuscript. These repairs often cover earlier collage-type repairs made using parchment fragments taken from elsewhere in the manuscript.

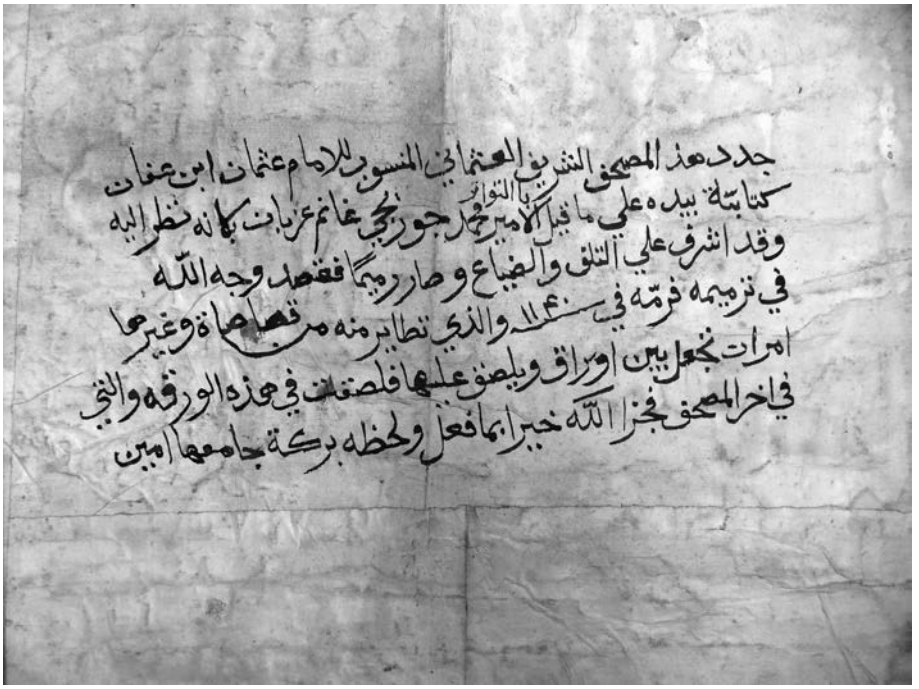

Figure 6, A dated inscription written in a sloping *Naskh* hand records Amir Muhammad Gawargy Ghanim Gharban's pious restoration of the manuscript in 1140 AH/ 1728 CE.

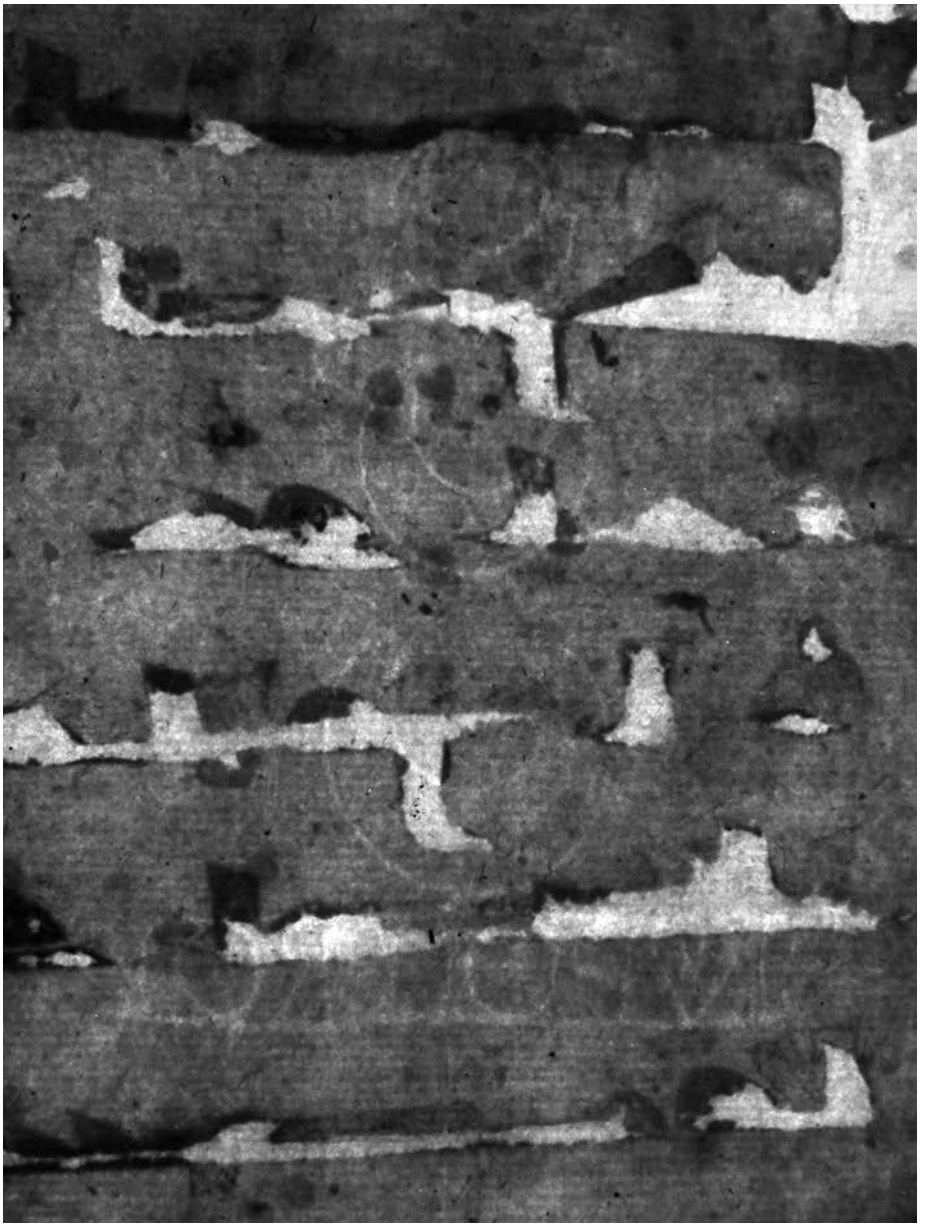

Figure 7, CBL Is 1404, f. 179, A *tre Lune* centered on a vertical chain line with a single line of text below viewed with transmitted light.

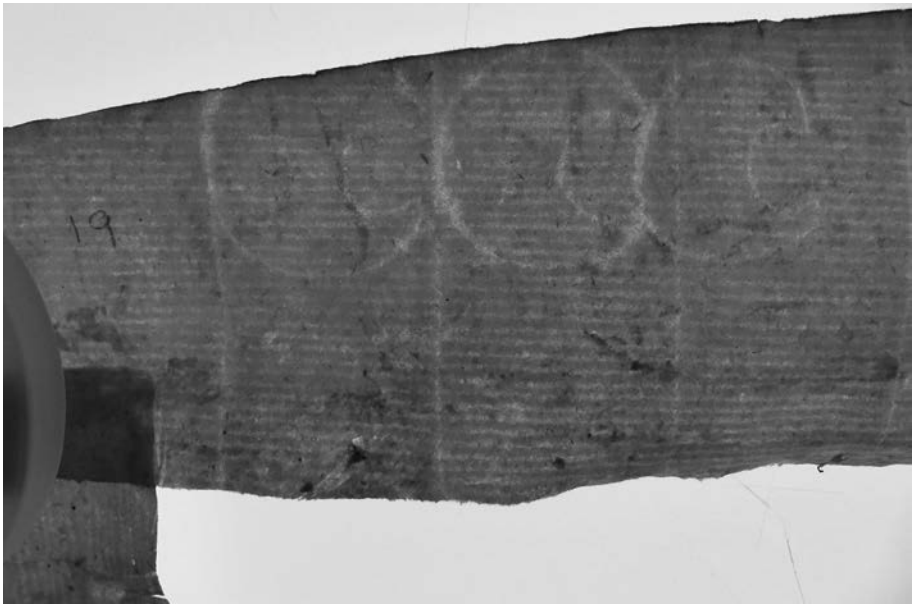

Figure 8, CBL Is 1404, f. 51, A *tre lune* fitting snuggly in-between, and placed at right angles to, three vertical chain lines viewed with transmitted light.

Figure 9, CBL Is 1404, f. 63, A third watermark design of three cups with the initial 'AB' beneath it viewed with transmitted light.

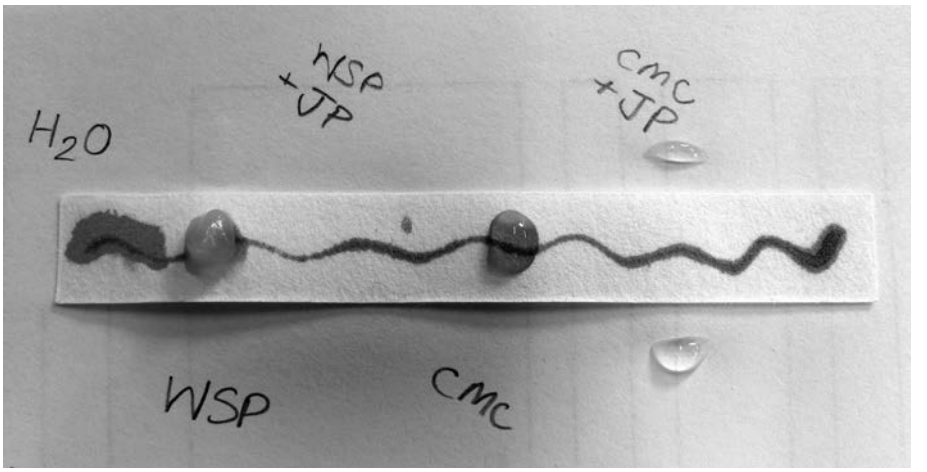

Figure 10, Experiments showing the degree of ion migration incurred from a line of iron gall ink drawn on Iron (II) Ion indicator paper when exposed to (left to right) water; wheat starch paste; wheat starch paste in a Japanese paper enclosure; Sodium CMC Carboxymethyl Cellulose (SCMC); Sodium CMC Carboxymethyl Cellulose (SCMC)in a Japanese paper enclosure; and rigid Agar gel.

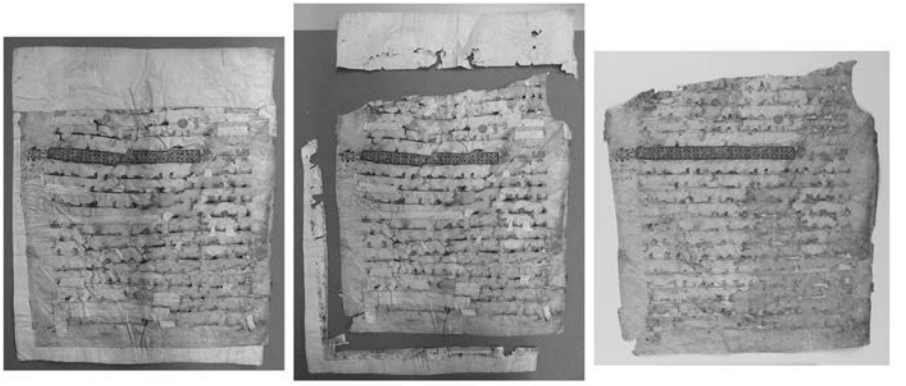

Figure 11, CBL Is 1404, f.167r, (left) Before conservation; (centre) after mechanical removal of old repairs; (right) after light surface cleaning, old repair removal with Nevek®, gentle flattening, and repair with toned remoistenable Japanese paper. Note the considerable gain to legible text.

Figure 12, CBL Is 1404, f.77r, A layer of Nevek® reactivates the old repair it is moulded to.

Figure 13, CBL Is 1404, f.124r, Placing a toned remoistenable tissue repair over the damaged, ink-corroded text. The repair is applied to the flesh-side of the parchment.

Figure 14, CBL Is 1404, ff. 124 and 125, Large edge loss repairs using a single layer of water-cut toned Japanese paper were carried out on in advance of display.