

## Afghanistan Digital Library: Conservation Challenges

### ABSTRACT

The Afghanistan Digital Library is a collaborative cultural heritage project established to preserve the printed history of Afghanistan from the advent of Afghan book printing in 1871, through 1950. The project is led by New York University Division of Libraries and funded through the National Endowment for the Humanities and private foundations. The long-term preservation standards for digitization, metadata, imaging and storage were implemented to provide full and free access to the digital collection throughout the world. Private collectors and libraries throughout the world provided the texts for imaging.

Consultant conservators and the staff of NYU Division of Libraries Barbara Goldsmith Preservation and Conservation Department prepared the physical materials for digitization while working to ensure that all text and imagery were accessible. The majority of the volumes were stab sewn rather than sewn through the existing folds. If the text was obscured by the sewing, or by the limited opening of the text block, disbinding was necessary. Volumes disbound prior to imaging were rebound after digitization.

This paper describes how conservation treatment decisions were directly influenced by the access to the texts provided by the digital library. This paper will cover the various binding styles encountered and how the quality of the digitization effort allowed conservators to return the volumes to their pre-scan structures even though those structures often restricted content accessibility. The Afghanistan Digital Library project is an example of a complex global collaborative digitization effort that required conservators to re-examine assumptions and rethink the role of accessibility in treatment.

### PROJECT BACKGROUND

In 2002, Robert D. McChesney, then New York University (NYU) Professor of Middle Eastern Studies and History at the Department of Middle Eastern and Islamic Studies proposed the creation of the Afghanistan Digital Library with the intent of providing free unfettered access to texts printed in Afghanistan from the advent of book printing there in 1871 through 1930. To support the project, Professor McChesney generated an exhaustive bibliography of works published in Afghanistan including monographs, serials and documents. Few of the publications in the bibliography are available in publicly accessible libraries or archives in the United States, Europe or Russia, and decades of war and upheaval have left the copies of the publications inside Afghanistan uncataloged and inaccessible (The Afghanistan Digital Library, 2004, 2005).

NYU Division of Libraries (NYU Libraries), with Professor McChesney as a project advisor, was awarded funding from the National Endowment for the Humanities, the Reed Foundation, the W.L.S. Spencer Foundation and the Gladys Brooks Foundation to create the Afghanistan Digital Library in 2005. In addition to some texts provided by NYU Libraries, publications identified in the bibliography were borrowed from a number of private collectors and research libraries worldwide. Once received by the staff at NYU Libraries, the materials underwent conservation treatment when necessary and were cataloged, digitized and made publicly accessible through the Afghanistan Digital Library web-site (<http://afghanistandl.nyu.edu/>).

The project was expanded in 2006 to include a partnership between NYU Libraries and the Afghanistan Ministry of Information and Culture to allow for the digitization of publications in Kabul. Additional funding awarded by the National Endowment for the Humanities supported the establishment of conservation and digitization facilities at the National Archives in Kabul and the training of personnel by NYU Libraries staff and consultants. Digital image files generated in Kabul were forwarded to NYU Libraries for processing into the Afghanistan Digital Library.

Although external funding expired in 2009, the project continues and has expanded to include publications printed in Afghanistan until 1950. As of May 2010, full access is available to 383 Afghani publications through the Afghanistan Digital Library web-site. NYU Libraries is committed to the long-term preservation and continuance of the Afghanistan Digital Library. NYU Library staff continue to collaborate with private collectors and research libraries to digitize publications as they become available and carry out digital preservation activities to ensure long-term accessibility and preservation.

#### HISTORY OF PUBLISHING IN AFGHANISTAN

The fact that printing was not adopted in Afghanistan prior to 1871, is not surprising given the practical and social constraints at that time. Arabic script, the script used for the languages written in Afghanistan, is cursive and therefore presents a typographical problem for letterpress printing as spaces between characters comprise the legibility of the script. In Islamic societies, Arabic script and the act of writing are revered and scribes and calligraphers are esteemed professionals (Bloom, 2001; Schimmel, 1970). Only with the development of lithography, and later, off-set lithography, was a printing technology available that allowed for the exact replication of script. Many of the initial publications in Afghanistan were lithographic reproductions made in the hand of revered scribes (Heravi, 1972). Lithography was widely adopted in the 19th century in Islamic societies for printing texts, except for the reproduction of the Qur'an, which continued to be mostly hand copied by scribes.

Printing in Afghanistan began in 1871 with the purchase of a lithographic press by the Amir Shir 'Ali Khan (r. 1863–1866; 1868–1879) and the publication of a tract against the Wahhabi movement. His successor, Amir Abd Al-Rahman Kahn (r. 1880–1901), purchased a new lithographic press in India in 1884 and commissioned numerous works, including administrative manuals and propaganda addressing the geo-political situation in Afghanistan at the time. Texts that promoted Islam and the Amir's reign along with warning about the dangers of the neighboring Christian imperial powers of Russia and Great Britain, as well as literary and historical works were printed.

The Amirs of the twentieth century expanded printing beyond Kabul to Herat and Mazar-i Sharif and published governmental decrees, laws, military manuals, text books, as well as historical, literary and scientific works. The majority of these publications were in the Dari Persian or Pashto languages, although some later works included texts in French and English. Subsequent printing developments included illustrated newspapers and periodicals.

#### DIGITIZATION WORKFLOW AND STANDARDS

Specific standards were selected for each aspect of digitization to ensure ongoing preservation and access of the Afghanistan Digital Library. The workflow for the creation of the Afghanistan Digital Library is based on the Open Archival Information System (OAIS) model, which is an open source conceptual model that allows for preservation of material, management of the material and delivery of content (Garrett, 2006).

Imaging standards used in the creation of the Afghanistan Digital Library allow for full representation of the appearance of the materials. To enable full color imaging a bit depth of three channels of eight bit color (often called 24 bit color) is used. The digitization stations are calibrated end to end to insure that the color of an artifact is correct on capture. The file masters are Tiff 6 uncompressed using a CIE RGB as its color space for master files. The long-term color stability of files is crucial and CIE RGB is among the few color spaces that has the following characteristics: it is non-proprietary; it is an open international standard; it is in broad usage; and it is a large color space.

Items are photographed at a pixel per inch setting that captures all surface detail and is responsive to the original object and the human vision system<sup>1</sup>. Images are captured using either an Epson 10000xl flat bed scanner or a PhaseOne P65+ camera. Equipment is calibrated on a scheduled basis using a photo-spectrometer to insure that the entire system, the monitor, scanner and any peripherals are all calibrated. The targets are Xrite ColorChecker Chart by Gretag/Macbeth and either the Kodak Q-13 or Kodak Q-14. The PhaseOne P65+ hi-resolution camera allows the photographers enough control of the chip that calibration can be done directly to the camera with an appropriate target.

After image capture the master files are viewed in Adobe Photoshop to verify that the target values are colormetrically correct. Upon creation, the master files are validated using Harvard University's jHove tool. A cropped and straightened derivative-making file is created from the master. All access copies, either jpeg or jpeg2000 are made from this intermediary file and derivative jpeg files are produced.

NYU Libraries Digital Library staff collects and encodes extensive metadata at all points in the life cycle of a digital file to ensure its ongoing viability as a preservation master file. Descriptive metadata for the Afghanistan Digital Library project is provided by the Librarian of Middle East Studies in MARCXML, which is then converted to the metadata scheme MODS. Technical metadata on the files conforms to the Library of Congress MIX 2.0 and includes additional NYU defined fields. A METS Rights file is used to contain appropriate copyright information. All the metadata files are associated with the digitized assets through the METS file, which also provides the structural metadata and provenance

information. The metadata files are kept separately from the master files but are united by unique identifiers.

Once all the metadata is assembled and the files are validated, the files are submitted to the NYU Libraries Preservation Repository. The files are actively managed by the NYU Libraries Digital Library team and tests such as checksums are regularly scheduled to verify the authenticity of the files. Access to the files and descriptive metadata are provided through an HTML web-page. Images are currently presented as jpeg derivatives, and as a navigable jpeg2000 file. Users are able to download copies of the original TIFF as there are no access restrictions to the Afghanistan Digital Library.

#### CONSERVATION

All conservation treatments supporting the Afghanistan Digital Library, from September 2005 through August 2009, were developed, documented, and performed by consulting conservators funded by the National Endowment for the Humanities. During this time, 390 individual volumes were treated and/or rehousing in the Barbara Goldsmith Conservation Laboratory of NYU Libraries. After 2009, all conservation work has been carried out by the staff of the Barbara Goldsmith Conservation Laboratory.

To support the project goal of complete capture of the text during imaging, conservation treatments were performed on selected individual volumes. Conservation treatments were required when physical damage, planer distortions and restrictive binding structures prevented full image capture of the text. Treatments ranged from the intensive, such as disbinding, to the very slight, such as flattening dog-eared corners.

Copies of volumes described in Professor McChesney's bibliography were identified and borrowed from individuals or institutions and deposited with the ADL Project Manager. The Digital Content Manager and the Conservation Librarian assessed each volume and when a volume required conservation prior to imaging, it was routed to the Barbara Goldsmith Conservation Laboratory for pre-scan treatment. Following digitization, items were routed back to the conservation lab for evaluation and necessary treatment. Individual custom boxes and folders were constructed for all pamphlets, paper-bound books and fragile bindings, which constituted the majority of the volumes.

From 2007 until 2009 the majority of the 390 volumes were treated in the lab by consulting conservator Georgia Southworth. The volumes treated were categorized into four distinct groups: pamphlets; western bindings; vernacular bindings; and Kabul Binder bindings. These groups were defined by their binding structures, materials, and type of treatment required for imaging.

The simplest volumes were either unbound or bound pamphlets of one to twenty pages. Some pamphlets had paper wrappers attached with staples or adhesives. The



Fig. 1. A pamphlet binding

lithographically printed text blocks were composed of thin machine-made paper. Wrappers, when present, were either of the same stock as the text block, or a brightly colored and block-printed paper (fig. 1).

The volumes from the second group, lent to the project from a private collection, were bound in western style case bindings. The lithographically printed text blocks on off-white machine-made paper, in bifolia, were sewn through the folds, and tightly cased into full cloth cases. Some volumes had original wrappers bound as part of the text block. The bindings had relatively thick boards in relation to the size of the text blocks, with covering material of strong woven linen book cloth, and machine-made tipped on endpapers. These bindings usually had stuck on endbands and stamped leather labels adhered to either the spine or the front board. Although the text blocks of these volumes were sewn through the folds, there was clear evidence that previous stab sewing threads had been removed (fig. 2).

Volumes bound in Afghanistan using locally available materials in a consistent binding style were referred to as the vernacular bindings group. These bindings, though structurally similar, were highly individualized due to the variety of materials used in covering the boards. As with the previous categories, all of the text blocks were composed of bifolia, printed lithographically on thin machine-made paper, and stab sewn. None of the text blocks were rounded and

backed, nor did they have spine linings or endbands. When present, flyleaves were tipped onto the first and last pages of the text block and onto the boards, but did not continue as full pastedowns. The water-soluble adhesives used to attach the flyleaves adhered the papers from beyond the stab sewing threads over the hinges and onto the inside board faces approximately 3–4 cm. Dyed linen cloth or goatskin spine coverings were adhered directly to the backs of the sections. Binding adhesives were found to be water-soluble, and had left little or no staining on the papers and cloths, even in heavy application. Most of the vernacular bindings were ¼- or ½-bound, constructed roughly with card stock or paper boards and covered in re-purposed cloths and a wide variety of papers, including decorative papers, newspapers and wallpapers. A few employed ill-fitting re-purposed bindings of heavier card stock covered with plasticized papers, bookbinding cloth, or leather (fig. 3).

The final group of volumes was the most challenging in regard to conservation treatment. The contemporary bindings on these volumes were almost entirely uniform in style and appearance, and were bound by a bookbinder currently working in Kabul (fig. 4). The books bound by the binder, or under his supervision, are referred to here as the Kabul Binder bindings<sup>2</sup>. During May 2007, when members of the Afghanistan Digital Library team traveled to Kabul and established conservation and digitization facilities at the National Archives they met the Kabul Binder<sup>3</sup>. The project conservation consultant, John Dean, gained valuable insight into the Binder's working practices and the materials used. According

to Dean; "Local binding materials tend to be idiosyncratic because of the unavailability of conventional supplies. Local binding cloth is either made from Rexine (a furniture covering) or unsized cotton fabric from the market. Local adhesive seems to be regionally-made polyvinyl acetate, which is not internally plasticized, or a gum-like paste which sets very hard. Local board is from Pakistan and is very fibrous and absorbent and is designed to cater to the shoe making industry" (Dean, 2007, 2–3).

The bindings on the Kabul Binder volumes included in the project were not original to the text blocks. They exhibited signs of earlier sewing, evidenced by at least one, and sometimes multiple, sets of empty stab sewing holes. Some volumes included electrostatic copies, often of the title page, but occasionally of entire sections. These copies appeared to be replacements for damaged or missing leaves, most likely created and inserted to complete the lithographed texts. Kabul Binder text blocks were newly stab-sewn through three holes with a double pass of thick stiff thread, knotted in back at the center hole. These text blocks were aggressively trimmed, stuck on endbands were adhered, and single bifolio endpaper sections of poor quality machine-made paper were tipped on to the first and last pages. Text blocks were cased into the bindings using just the newly added endpapers. The case bindings were covered with a blue-black plasticized textured bookcloth. Most volumes were blind stamped on the boards and some had bibliographic information written in white paint.



LEFT TO RIGHT

Fig. 2. Detail of a western-style case binding with previous stab-sewing holes visible in gutter

Fig. 3. A vernacular binding with cloth spine and paper covered board

Fig. 4. A Kabul Binder binding

## PRE-IMAGING TREATMENTS

During the pre-imaging phase of conservation, minimally invasive treatment options were employed to permit full imaging of text and maintain the project timeline, while respecting the preservation needs of the objects. Treatments ranged from simple wheat starch paste mends of tears at risk of becoming more severe during imaging and mold remediation, to local humidification and flattening of text-obscuring creases and folds. More complex treatments involved the removal of old mends and adhesives in the gutters that concealed text, and the complete disbinding of volumes with particularly restrictive binding structures. Despite having text blocks made up of bifolia, the volumes were deeply stab-sewn, and the constraint of these volumes' opening action made imaging of the text impossible. A number of text blocks contained extremely water-soluble stamps or manuscript inscriptions. The stamps are important evidence of provenance. The few water-soluble stamps that interfered with aqueous removal of adhesives during disbinding were temporarily fixed with cyclododecane (Brückle et al. 1999).

The pamphlets were the least challenging for imaging and conservation. Staples, many of which were deteriorating, were removed to allow imaging on the Epson 10000xl flat bed scanner. Those held together with adhesives did not require any pre-imaging disbinding, as their leaves proved flexible enough to image without disbinding using the PhaseOne P65+ camera and a customized book cradle. The western style cased bindings were lent from a collector who rarely permitted conservation treatment as part of the lending agreement. Yet, with text blocks that were sewn through the bifolia folds, combined with the case binding structure, most of these borrowed volumes were flexible enough upon opening to allow scanning without requiring any pre-imaging conservation treatments. A small number of thinner volumes were returned to the lender without imaging as the bindings were too restrictive to allow imaging of the complete text.

The vernacular bindings were constructed from generally poor quality materials and revealed evidence of heavy use. They required extreme care during handling, as their conditions included delaminating and bumped boards, torn and delicate papers within the text blocks, deteriorating cloth coverings, and weakened or broken joints and hinges. Treatments included bridging or mending tears in pages that might worsen with handling, using sympathetic kozo-fibered Japanese papers and wheat starch paste, mold removal with a HEPA-filtered vacuum, and the stabilization of headcaps or board corners at risk of further damage. Endpapers tipped onto the front and back of the text blocks very often obscured text. Testing revealed that the adhesives were water soluble. Lifting the tipped-on leaves was best achieved using poultices of warm deionized water and/or a three percent solution of methyl cellulose. Cyclododecane

was employed to fix water soluble stamps in the text blocks of the vernacular bindings when necessary. Careful monitoring of water temperature during aqueous treatment was required to avoid exceeding the melting point (60.7 °C) of the cyclododecane fixative (Kremer, 2005).

As stated earlier, the Kabul Binder bindings presented the greatest conservation challenge in the project. The restrictive binding structures and tipped on endpapers hindered imaging of the text. When it was not possible to find other copies of these works in less restrictive bindings, the volumes were disbound. The Kabul Binder bindings were constructed with newer materials, using a tenacious adhesive, stiff new threads and tight stab-sewing, all of which slowed down disbinding. The binding adhesives were not water-soluble, but did swell in warm or hot water. This swelling was likely assisted by the relatively recent application of the adhesive<sup>4</sup>. Swelling the adhesives combined with mechanical action successfully released the adhered pages allowing for full text imaging using either the Epson 10000xl flat bed scanner or the PhaseOne P65+ camera.

## POST-IMAGING TREATMENT

Following digitization, volumes that had been disbound were returned to the Barbara Goldsmith Conservation Laboratory to be rebound. Pamphlets were sewn with protective acid-free, medium weight paper wrappers (Zerkall Nideggen) through the original staple holes with tackets of linen thread. If the staple holes required mending prior to resewing, repairs were made with kozo-fibered Japanese paper and wheat starch paste. Rebinding the disbound Kabul Binder volumes and some of the disbound vernacular bindings was complicated by the fact that the original structures hindered access to the text. In some cases, the sewing threads passed directly through text. Rebinding the volumes in a manner that would allow full readability needed to be weighed against preserving the integral qualities of the volumes without radically altering the structures and materials. While the grant stipulation required returning borrowed volumes to their original structures, the majority of the disbound Kabul Binder and disbound vernacular volumes belong to NYU Libraries allowing for more flexibility in post-imaging treatment. Though some of the sewing may not have been original to the text blocks and restricted text access, the bindings as a group are a tangible example of hand bookbinding in the 20th and early 21st century Afghanistan.

Conservation in consultation with Afghanistan Digital Library Project staff and NYU Libraries special collections curatorial staff decided that the binding structures should be preserved rather than rebinding the volumes in conservation style bindings. The Afghanistan Digital Library's preservation quality images and commitment to ongoing access informed this decision. While rebinding the volumes in their original



Fig. 5. Ethafoam sewing jig constructed to ease resewing of stab-sewn text blocks

structures would hinder physical access, the digital library images provided are adequate surrogates.

Given the poor quality of the boards in the Kabul Binder volumes and the discovery from surface pH tests that the endpapers were acidic, a decision was made to rebind these volumes in the post-scan treatment phase with new endpapers. This treatment involved applying new acid-free, lignin-free, buffered endpaper bifolia that physically resemble the Kabul Binder endpapers. It is important to emphasize that these endpapers visually resemble the discarded end-sheets and serve as an important physical barrier, blocking direct contact between the binding boards and the text blocks. The final treatment protocol was to re sew the text blocks through the existing sewing holes with hand-softened linen thread. The bifolio endpapers and medium weight Kitikata Japanese paper hinges, used to strengthen the case binding attachment, were bound with the text block. Wheat starch paste was the adhesive used in the attachment of the hinges and endpapers to the case.

The sewing holes were very rarely perpendicular to the text block resulting in a difficult rethreading of the sections. For thicker texts, a sewing jig was created out of an Ethafoam base with a binders' board deck to accommodate the text block. Resewing through the angled holes of the text blocks was eased by the ability to set pre-threaded binding needles into the Ethafoam at the angles of the stab-sewing, and to then ease the end sheets, hinges, and bifolia onto the deck one by one, recreating the text block. (fig. 5).

## CONCLUSION

Conservators are well aware of the influence that digital imaging requirements have on pre-imaging treatment of bound volumes, often requiring invasive treatment processes such as disbinding. As access to the physical text is no longer a primary objective, conservators are free to employ

more conservative treatments in the post-imaging treatment phase. Providing a preservation quality digitally imaged record allows conservators to approach the volumes under consideration as artifacts to be preserved and not exclusively as volumes to be rendered accessible to scholars interested in the content. Conservation treatment decisions can be directly influenced by the high quality access provided by the digital library, and more specifically, the quality of the digitization effort allows conservators to return the volumes to their pre-scan structures even if these structures restricted content accessibility. Thus content and artifact are preserved with limited compromise.

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## NOTES

1. All reflective items 8 x 10 inches or smaller are photographed at 600 ppi; items larger than 8 x 10 and smaller than 12 x 18 are photographed at 400 ppi; items larger than 12 x 18 are evaluated individually and often such items need to be photographed in sections resulting in several master files associated with one item, which are then stitched to create a use file that represents the object.
2. The pseudonym Kabul Binder is used to protect the identity of the individual.

3. The team included Melitte Buchman, New York University Digital Content Manager, Peter Magierski, New York University Middle Eastern Studies Librarian, and John Dean, Project Conservation Consultant.
4. It is estimated that the majority of the Kabul Binder volumes included in the project were bound within a year or two of treatment.

## REFERENCES

- The Afghanistan Digital Library. 2004. An Occasional Newsletter. The Afghanistan Digital Library: A Project of New York University. Volume 1, Number 1, July 1.
- The Afghanistan Digital Library. 2005. An Occasional Newsletter. The Afghanistan Digital Library: A Project of New York University. Volume 1, Number 2, September 1.
- Brückle, I., J. Thornton, K. Nichols, and G. Strickler. 1999. Cyclododecane: Technical note on some uses in paper and objects conservation. *Journal of the American Institute for Conservation* 38: 162–75.
- Bloom, J.M. 2001. *Paper Before Print: The History and Impact of Paper in the Islamic World*. New Haven: Yale University Press, 2001.
- Dean, J. 2007. *Conservation of Afghan Books and Manuscripts*. Report to New York University Libraries.
- Garrett, John. 2006. *US Efforts Towards ISO Archiving Standards—Overview*. The National Aeronautics and Space Administration (NASA). Accessed June 2, 2010. <http://ssdoo.gsfc.nasa.gov/nost/isoas/us/overview.html>
- Heravi, M. 1972. Book-Making in Afghanistan during the Last Century. *Afghanistan*. 25:3. 68–77.
- Kremer Pigmente. 2005. Safety data sheet 87100. March 7. Aichstetten, Germany.
- Schimmel, Annemaire. *Islamic Calligraphy*. Leiden: Brill, 1970.

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