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The *Book and Paper Group Annual* is a non-juried publication. Papers presented at the Book and Paper Session of the annual meeting of the American Institute for Conservation are selected by committee based on abstracts. After presentation, authors have the opportunity to revise their papers before submitting them for publication in the *Annual*; there is no further selection review of these papers. Independent submissions are published at the discretion of the BPG Publications Committee. Publication in the *Annual* does not constitute official statements or endorsements by the BPG or AIC.

Abstracts presented during the Book and Paper Group Session

Expanding Access: Inclusive Conservation and Education Engagement at the UK National Archives

Natalie Brown and Sarah Petter

The Collection Care department at the UK National Archives ensures continued access to 11 million archival records. But the idea of "access" within a heritage context is changing as organizations work to become equitable and inclusive spaces. As a result, our preservation decision making is changing with this, aided by a dedicated engagement team within the department.

Historically, conservation was rarely at the forefront of public or institutional view, and to our detriment, we were often viewed as a barrier to increased access. Over the past 3 years, however, we have made a concentrated effort to shift this narrative toward one of partnership and mutual benefit, innovative heritage science and conservation practice that has wide appeal, and collective responsibility to care for our collection.

This presentation will focus on a key area of our ongoing work—supporting increased engagement with school-age children and audiences with additional needs. Through several case studies, we explore how we are trying to meet the needs of these audiences, increasing the reach of our work digitally as well as through on-site displays, and building deeper relationships through effective engagement activities based on the materiality of our collection and role of the conservator. These include the following:

- A collaboration with education researchers, teachers, museum education teams, and heritage scientists across the UK to align heritage science to the UK primary school science curricula. We investigated how heritage science can help to break down silos between the teaching of arts and sciences, creating curricula maps and lesson plans that can be led by nonspecialist museum staff and teachers.
- A collaborative research project exploring how multisensory experiences can be used to access, engage with, and understand the materiality of archival collections. Through this already impactful pilot project, we are now working with SEND specialists to center materiality in our SEND education lessons; we are also working with our outreach team to deliver enriching activities for people who have dementia based around smell; we are collaborating with PurpleStars, a group of researchers with and without learning disabilities, to develop inclusive and empowering research practices based on materiality of our collection; and creating multisensory, inclusive displays.
- Our object lessons for "high use records" used regularly by our education team to approach holistic decision making for access. Here, we bring together multiple internal and external stakeholders to create audience-driven decision-making frameworks that not only support our conservation team's work but also provide accountability and responsibility across the organization.
- A project to create lesson plans with increased tactile access for students who are partially sighted or blind. This novel project challenged our assumptions on how our records will be used.

Each case study will include an overview of the projects, focusing on the collaborative approach of each, as well as their benefits and challenges. More broadly, the presentation will also reflect on how we navigate internal relationships within a large organization with competing priorities to create these opportunities, and how we built processes to evaluate the impact of our engagement activities.

Blueprint for Growth: A Journey of Architecture Designs

Sanira Karim Gani, Pei Shyuen Chua, and Tay Jam Meng

The National Library Board and National Archives of Singapore (NAS), together with the Urban Redevelopment Agency, Singapore's urban planning authority, embarked on an extensive 5-year architecture collecting project in 2023. The momentous effort primarily seeks to encapsulate the history of prominent architecture designs in Singapore. The paper-based items included sketches on translucent tracing and butter paper, building plans, watercolor presentations, diazo prints, and printed images on copier paper.

The conservators from Archives Conservation Lab (ACL) of NAS play an essential role in this cross-functional collaborative project. Two conservators were engaged to support this project in carrying out conservation treatments and rehousing

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of the plans, which numbered 75,000 pages in the first round of collecting. From conceptualizing the storage of the items given their large format to formulating a decision-making matrix for conservation approaches, close consultations with the donors team in charge of the collecting was extremely important, particularly in setting up new workflows for this unique collection. A one-size-fits-all approach did not apply here, as each donated box of plans came with different conditions and required customized attention. It was imperative to streamline decision making and prioritize treatment and housing solutions for the collection that was coming to the laboratory in staggered bursts. Such efforts provided much clarity for conservators who were new to the profession, as well as for our colleagues in the donors team, so that subsequent batches of plans could be processed, conserved, and housed efficiently, with purpose and confidence.

The initial tranche of this project also culminated in an exciting exhibition, the first of a planned few, *To Draw an Idea: Retracing the Designs of William Lim Associates—W Architects*, which exhibited more than 550 multifarious design drawings covering 19 contemporary architectural projects from 1981 to 2015. ACL supported this exhibition by working closely with the curators from the planning and ideation, condition assessments, and installation stages—all of which required innovative problem solving. Every exhibition is different, and conservators increasingly must find a balance that works when working in unconventional exhibition spaces—without compromising the preservation needs of the items.

The Architecture Collection Project is an example emphasizing that the role of conservators today has transformed beyond simply providing one-off exhibition or conservation support. Collaboration with all stakeholders and partners means advocating for conservation principles, while balancing them sensibly with practicality and feasibility to ensure that objectives are met, and outcomes are achieved successfully for all groups involved. It sets the foundation for greater camaraderie among different functional groups and stakeholders, built on understanding, engagement, and synergy.

Archivists and Conservators: An Unlikely Love Story

Laura McCann and Weatherly Stephan

In this presentation, an archivist and a conservator will share their experiences working and learning together over the past decade, as well as their research on a persistent communication gap between their professions. This gap often leads to missed opportunities for collaboration that could benefit archivists and conservation, as well as the collections and the communities they serve. The gap widened in the wake of the seminal archival management article "More Product, Less Process," published by Mark Greene and Dennis Meissner in 2005, which advocated for more efficient practices to reduce backlogs and make collections more accessible. In this article, conservation activities were portrayed as excessive and unnecessary. As a result, many archivists became dismissive of conservation, leading to tensions and a sense of misrepresentation within the conservation community.

The presentation will introduce a model for integrating preventive conservation into a holistic collection management program. When building new workflows for archival accessioning and processing, the presenters worked together to proactively develop local standards for collection management. These standards address known legacy issues and improve collections care work going forward.

This model emphasizes the importance of archivists and conservators learning each other's professional ethics, standards, and training to improve communication and foster more effective collaboration, while embracing humility, curiosity, and mutual respect. This learning occurs through committee work, reading groups, collection planning meetings, after-action reviews, and events. Open discussion of our different priorities and perspectives pave the way for creating institutional programs that promote ethical, sustainable collection stewardship and have the potential for improving work experiences. The presenters will tell the stories of successes and challenges faced in their collaborations.

Manuscripts That Multiplied: Stories from the Parchment Partnerships

Fenella France, Meghan Hill, Anna Hoffmann, Pádraig Ó Macháin, and Cynthia Connelly Ryan

Multidisciplinarity draws on knowledge from different disciplines, but the context remains within those disciplines' boundaries. Interdisciplinarity analyzes, coordinates, and links knowledge between disciplines into a coherent composite. Inks and Skins (https://inksandskins.org) started as an interdisciplinary project dedicated to investigating the materiality of late medieval Gaelic manuscripts but became so much more. The diverse groups involved expanded the research scope into that of transdisciplinarity, fully integrating the industry, conservation, manufacturing, heritage science, and scholarly research into a humanities context that transcended traditional boundaries of each of the disciplines. While multidisciplinary and interdisciplinary are additive and interactive, respectively, transdisciplinary is holistic.

Sponsored by the Irish Research Council, Inks and Skins set out with the goal of increasing our understanding of the substrate (parchment) and the composition of inks and pigments used by secular scholars who created Gaelic vellum books in the period 1100–1600. The intent was to focus on one manuscript, the Book of Uí Mhaine, a large vellum manuscript of poetry and Irish tradition assembled

ca. 1390 for the Ó Ceallaigh (O'Kelly) family of Uí Mhaine in County Galway, Ireland. The synergy of more collaborating partners enriched the scope. Preservation Research and Testing Division (PRTD) Library of Congress staff, as part of a Memorandum of Understanding with University College Cork, undertook multispectral imaging (MSI) at the Royal Irish Academy (RIA). The MSI was intended to only be on the Book of Uí Mhaine. However, engagement through sharing initial processing to read text through stains led to further manuscripts added to the docket, including Ireland's oldest book, *The Cathach*, a late 6th century Psalter. Entrusting Inks and Skins with access to these precious manuscripts underlined the commitment of the RIA as partners in this innovative work.

Then the pandemic arrived, and we adapted to moving forward on collaborative research remotely. Data-sharing challenges were but one of the barriers we had to work through. Industry partners in Ireland assisted with x-ray fluorescence spectroscopy (XRF) of the RIA manuscripts and then sent the data to PRTD for interpretation. Exhausting all we could from MSI and XRF data still left challenges with understanding the organic components of the inks and pigments in the manuscripts. PRTD staff created new ink and pigment reference samples for the Center for Heritage Analytical Reference Materials. Utilizing instrumentation at the Library of Congress, we essentially worked backward to link fiber optic reflectance spectroscopy (FORS) reference curves with what we had captured from the MSI on the manuscripts. The addition of collaborators continued to expand the wealth of information extracted from the data. Connecting the MSI-processed images of the manuscripts with Trinity College conservators, parchmenters, and creators, greatly assisted our ability to recognize tears, scraping patterns, poorly prepared skins, veining, and other features related to construction techniques. Further collaborators and research partners included two doctoral fellows, archivists, calligraphers, ink makers, and Irish humanities scholars. The breadth of the collaboration was enriched by the willingness of all to listen, learn, and share ideas from diverse perspectives. The transdisciplinarity of this heritage research enabled creating new knowledge.

A History of the Books in Taiwan: The Transformation of Bookbinding Formats During the Period Under Japanese Rule (1895–1945)

Lois Su and Fei-Wen Tsai

Taiwan is a country located in East Asia, lying on the northwestern side of the Pacific Ocean and off the southeastern coast of China. Its geographic position has historically made it a crucial crossroads for trade and cultural exchange among China, Japan, and Southeast Asia. The period of Japanese rule in Taiwan (1895–1945) stands out as an era of profound multicultural interaction and significant transformation. This period was marked by modernization and infrastructural development initiated by the Japanese government. Combined with the flourishing of Taiwanese art and literature in multiple languages, the island's book publishing industry underwent a transformative evolution. This project employs both documentation of binding formats and historical research methodologies to explore the evolution of bookbinding. We have documented various bookbinding formats, including their structures, materials, and conditions, to analyze how they transformed over time and the historical reasons and impacts of these changes.

Before this era, books in Taiwan were predominantly printed and bound outside the island. The Japanese period marked a significant shift, heralding the beginning of local book publishing, printing, and binding industries. By the 1920s, there was a greater emphasis on Japanese language and culture led by the government. Influenced by movements outside the island, Chinese-language books became a means for intellectuals to express self-identity and spread new ideologies. The development of libraries also reflects the transformation. The first library established during the Japanese period was the Taiwan Library (1898). As the demand for books and Taiwan's relation to the world changed, one of the most notable aspects of this period is the transition in binding formats. Over the 50 years of Japanese rule, there was a marked shift from predominantly East Asian side-stitched bindings to a variety of Western European bookbinding styles. It is interesting to observe the shift also in Western styles from a small amount of leather or cloth bindings to mostly modern case bindings. In the later years of this period, it was also common to see a mixture of Western materials with side-stitched bindings. This is one of the first detailed studies on this subject, yet the transformation connects with broader changes in Taiwanese society during this time.

Bookbinding formats reflect the economy and cultural movements of the period, showcasing a piece of history that is often overlooked. To gain a comprehensive understanding of bookbinding practices, the project involves documenting hundreds of books from the period of Japanese rule, collected from the National Taiwan University Library, Tainan National University of the Arts Library, and the National Taiwan Library. We recorded information on binding structures and materials, and we are analyzing this data in conjunction with historical records to understand the frequency of different bindings and their relationship to social changes of the time. Additionally, we are compiling condition reports on the books to understand common deterioration, which will provide valuable insights for future conservators and enhance our understanding of bookbinding formats from this important historical period.

Sympathetic to Synthetics: Developing Tear Repairs for Matte Laminated Papers in Twenty-First Century Periodical Covers

Cancy Chu

Plastic-coated papers can be found in the covers of paperbacks, periodicals, and other commercial books of the 21st century. These books are potentially collected in libraries and archives containing contemporary print materials, likely becoming more prevalent with time. While synthetic coatings provide added strength and durability to book covers, the waterproof and adhesive-resistant properties of plastic present challenges to the application of conventional treatments for the mending or stabilization of tears. Adhering synthetic papers with wheat starch paste is likely to be unsuccessful due to the low surface energy of certain plastic coatings.

This project aimed to identify conservation materials and methods for stabilizing tears in early 21st century periodical journals with matte laminated covers, a type of synthetic-coated paper that was identified in analysis to contain polyethylene. Analytical examination of the paper was conducted with microscopy, infrared spectroscopy, x-ray fluorescence, the Photographic Activity Test (PAT), and pH testing. Next, a range of nine common conservation adhesives were trialed for adhesion to matte laminated papers with an adapted peel testing method. Successful candidates were artificially aged, tested for reversibility, and compared using visual examination, colorimetry, and gloss measurements. Adhesive candidates were then applied in more than 160 blends with varying methods of brushed wet application, precoated tissues, and cast films. Results were ranked for adhesion and visual properties to select for the most successful methods.

Results indicate that while repairs with most cellulosic adhesives are likely to fail, a strong and reversible bond can be achieved with certain synthetic polymer-based adhesives (e.g., Aquazol 500, Lascaux 303 HV, and ethylene vinyl acetate (EVA)). Performing a successful repair is dependent on blend ratios and application techniques that avoid both weak adhesion and high surface tack, the latter of which could cause blocking. Three techniques using a Japanese tissue carrier and compatible adhesive blends were refined for application, namely brushing through, brushing on, and reactivating precoated tissues with ethanol. A practical workshop for conservators and related roles was conducted to demonstrate and disseminate the techniques.

The presented tear repair techniques are proposed based on test findings on matte laminated papers and may be suitable for use with other papers containing polyethylene. Further research is needed to address additional deterioration pathways of synthetic papers, such as deformation and abrasion. There is a need for conservators to be equipped with adapted techniques for synthetic papers, as these materials can and do form part of present and prospective collections.

This project was supported by the 2022–2023 Fulbright-National Archives Heritage Science Fellowship.

Adhesive Kinetics: The Folding Endurance of Wheat Starch Paste, Cellulose Ethers, and Photo-Grade Gelatin

Catherine E. Stephens

Books are kinetic objects that perform finely engineered movements to reveal their contents. If a book's structure is broken or compromised, its information cannot be experienced in the manner that its creator intended. Loss of mechanical function is particularly disruptive for manuscripts, artist's books, photograph albums, and scrapbooks, in which unique, intimate narratives may be presented. In some ways, 19th century photograph albums present worst-case treatment scenarios to conservators; these albums tend to be both heavy and very fragile, due to inherent vice, yet these albums may be frequently requested by researchers. Furthermore, photographs are physically and chemically sensitive, and 19th century papers are often quite water sensitive, which limits treatment options. As heavy leaves and delicate hinges embrittle with age, a 19th century album may pull itself apart, posing many questions; is it possible to restore mechanical function to this album without frequent reinterventions? Which materials are best for reinforcing the connections between heavy leaves and delicate hinges? Do adhesive mixtures, such as 75% wheat starch paste and 25% methylcellulose, provide better flexibility when dry?

The preceding questions inspired this study, in which the author, a book conservator, collaborated with paper conservators, photograph conservators, and conservation scientists at the Metropolitan Museum of Art. This presentation will discuss the methodology and results of the study, in which the relative folding endurances of Jin Shofu wheat starch paste, photo-grade gelatin, and six cellulose ethers were evaluated, before and after artificial aging. Additionally, 3:1 mixtures of wheat starch paste, methylcellulose, and/or photo-grade gelatin were studied to observe the mechanical performances of these mixtures, once dry. To inform the methodology of this study, a self-selecting survey of 75 AIC Book and Paper Group members was conducted. Survey participants were asked to indicate their adhesive preferences for certain treatment scenarios, and whether they are in the habit of combining two or more adhesives to alter their wet and/or dry properties. In this study, all adhesives were prepared at concentrations that would normally be used by book, paper, and photograph conservators, or at viscosities that would allow a conservator to reline the spine of a book or repair its hinges. Strips of naturally aged

chromatography paper (pure cotton linters, manufactured in 1959) were impregnated with these adhesives and evaluated with a Tinius Olsen folding endurance machine. Although folding endurance machines do not perfectly replicate a book's normal range of motion, these machines offer insight into the effects that adhesives and sizing agents may have on the mechanical strength of a standard paper.

The surprising results of this study indicate that wheat starch paste has a much lower folding endurance than cellulose ethers with comparable bonding strengths, and that mixing two adhesives together significantly impacts the folding endurance of a standard paper, both before and after artificial aging. The author hopes that the results of this study may assist book, paper, and photograph conservators when selecting resizing agents and when repairing the flexible components of books and movable paper objects.

Evaluating the Effectiveness of Alum-Tawed Parchment as a Repair Material

Gwen dePolo and Kathryn Kenney

The selection of appropriate repair materials is a primary factor in the long-term success of interventive treatment. This is particularly challenging for parchment repairs in which we must find a material that is comparable in rigidity, color, and weight as well as compatible with the hygroscopic nature of the original parchment. When parchment repairs are needed in bound materials, these repairs must also be able to withstand repeated flexing from use. Following a 2019 cross-disciplinary workshop hosted by the Folger Shakespeare Library, "Biocodicology: The Parchment Record and the Biology of the Book," conservators at the Folger became interested in recreating an historic preparation of tawed parchment for use as a repair material. It was immediately apparent that this project would require extensive collaboration. The outline for the project included processing the skins, making sample repairs, and carrying out a suite of analytical and aging tests.

As a small independent research library, the Folger does not have the analytical capabilities necessary to evaluate the skins, nor do we have a scientist to help guide testing and interpret results, so we began reaching out to other institutions for assistance. The Folger collaborated with Jesse Mayer at Pergamena to prepare 12 skins of varying thicknesses using a historic recipe. Once the skins were prepared, conservators at the Folger worked with William Minter and the Penn State University Libraries to begin accelerated aging tests on samples from the skins. The Preservation Research and Testing Division (PRTD) at the Library of Congress has an extensive array of analytical equipment and a staff of highly trained conservation scientists. In the spring of 2024, conservators at the Folger began working with Dr. Gwen dePolo at PRTD to analyze the tawed skins. With the specific use case of the repair material in mind, the analytical testing has focused on the mechanical properties, physical properties, thermal stability, and investigating the source of a residue exuding from the skins. Dr. dePolo and Kathryn Kenney have had regular meetings about the skins, types of tests to perform, and how the results impact the usability of the alum tawed parchment as a repair material. The collaboration between the Folger Library and PRTD has proved mutually beneficial, as the methods applied to analyzing the alum-tawed skins will also be used in other parchment-related research projects that will be pursued at the Library of Congress.

This talk will discuss the benefits and challenges of a large collaborative project. We will discuss how we defined the scope and scale at an institutional level and have been able to draw on the strengths and expertise of all participants at an individual level. Specifically, we will focus on how we used our different but complementary knowledge to evaluate a potential new repair material considering usability and long-term stability.

Reconsidering Klucel M: A Comparative Study of Commonly Used Cellulose Ethers in Paper Conservation

Grace Walters, Christopher Bolser, Andrew Davis, Gwenanne Edwards, and Kelli Stoneburner

This study investigates characteristics of three cellulose ethers in the search for a stronger solvent-based adhesive to add to the options available to paper conservators. Cellulose ethers are available in various polymer chain lengths (corresponding to strength), can be water and/or solvent soluble, and often have desirable aging properties. Two of the most widely used cellulose ethers in paper conservation are methylcellulose (Methocel) and hydroxypropyl cellulose (Klucel). This research compares commonly used Methocel A4M (water soluble, long polymer chain) and Klucel G (water/solvent soluble, short polymer chain) with overlooked Klucel M (water/solvent soluble, long polymer chain). Klucel M has the potential to be a crucial tool in the toolbox of paper conservators, as it has a similar polymer chain length and adhesive strength to Methocel A4M, but has the advantage of being soluble in solvent, like the much shorter length and weaker adhesive Klucel G. Older research indicated that Klucel M is inappropriate for long-term use with collections; however, more recent research indicates that it could be an acceptable option. Using analytical techniques including accelerated aging, colorimetry and UV-vis-NIR spectroscopy, size-exclusion chromatography, Oddy testing, and the Photographic Activity Test (PAT), this study compares the adhesives Methocel A4M, Klucel G, and Klucel M and offers case studies for the use of Klucel M.