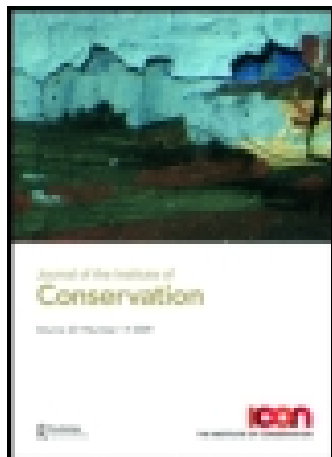


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A decision framework for the preservation of transparent papers

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Helen Wilson

A decision framework for the preservation of transparent papers

Keywords

transparent papers; tracing paper; condition survey; preservation decision framework; colour rating scale; treatment/rehousing decision tree

Introduction

The National Archives is the official archive and publisher for the UK government, and for England and Wales. Its role is to collect and secure the future of the government record, both digital and physical, to preserve and make it accessible for future generations. The archives' extensive collection of over 11 million records is stored on over 200 km of shelving, and continues to grow annually. It contains a wide variety of materials including paper, plastics, photographs, parchment, leather, and textiles, although over 90% is paper, including an unknown proportion of transparent paper.¹

Transparent papers are frequently found in collections, often dispersed among other materials, and can be in need of some degree of treatment or rehousing, thus proving a significant preservation challenge. Without a clear strategy to tackle the large number, many remain untreated. When treatment is possible the focus is usually idiosyncratic and limited to treating single sheets. This problem is further compounded because transparent papers respond differently to conventional paper conservation treatments, for example exposure to solvents can alter dimensions, transparency, and surface texture.² It is against this background that a project was initiated to provide practical and ethical guidance for the treatment of transparent papers in The National Archives. A brief review of transparent paper is presented here along with the decision framework and tools developed in this project. While these have been applied to transparent paper, the underlying assumptions can be adapted to other types of collection materials. Specific treatment recommendations for transparent paper are beyond the scope of this article.

Introducing transparent paper

1 Definition

For the purpose of this project transparent papers are defined as translucent papers, that is light passes through them, whose translucency was essential to meet the design requirements for their intended purpose. This includes for example trace designs, overlays, architectural and engineering drawings, and master copies used in photo-reproduction processes such as blueprinting or diazotype copying (Fig. 1). It excludes papers that are translucent because they are thin, for example copy papers, or non-paper based transparent materials such as films.

Transparent papers have been used for centuries, although their popularity gained ground from the 1860s when demand increased significantly.³ The inherent qualities of transparency, smooth surface, large sheets, and their versatility (they could be used with a variety of media—pencil, drawing inks, printing inks, and paint), made them popular with artists, architects, and engineers (Fig. 2). They are also used as speciality papers for luxury packaging and envelopes.

1 Jess Ahmon, 'The Collection Mapping Project: Collating and Mapping Data about Material Types at The National Archives (UK)', *Journal of Paper Conservation* 13, no. 4 (2012): 15–21.

2 Dianne van der Reyden, Christa Hofmann and Mary Baker, 'Effects of Aging and Solvent Treatments on Some Properties of Contemporary Tracing Papers', *Journal of the American Institute for Conservation* 32 (1993): 177–206.

3 Lois Olcott Price, 'From Sketch to Presentation: A Study of Drawing, Tracing and Speciality Papers used by American Architects', in *Looking at Paper: Evidence & Interpretation: Symposium Proceedings, Toronto 1999*, ed. J. Slavin, L. Sutherland, J. O'Neill, M. Haupt and J. Cowan (Ottawa: Canadian Conservation Institute, 1999), 82–7.

(Received 8 July 2014; Accepted 28 November 2014)

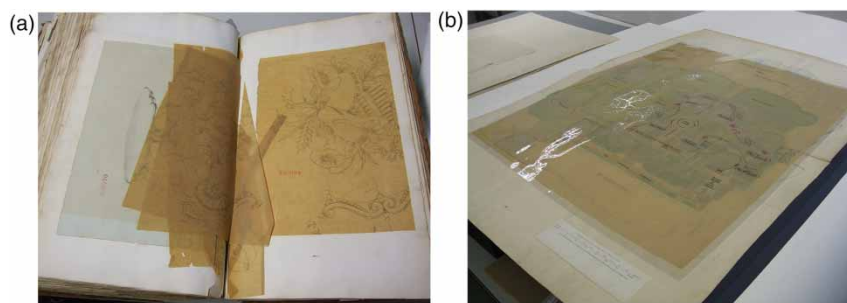


Fig. 1 Examples of transparent papers in The National Archives' collection. (a) A discoloured, torn, and fragmented transparent paper (1856) (BT43/57/105864). (b) A large, encapsulated transparent paper sketch detailing amusements and attractions overlaid on a complementary map for the Festival of Empire Exhibition, Crystal Palace, 1911 (CO1047/1068 Parts 1 and 2).



Fig. 2 A painted carpet design on transparent paper (1855) (BT43/117/99990).

2 Production methods

The manufacturing methods and materials used to make these papers will significantly influence the long-term preservation of transparent papers. Consequently, the main manufacturing methods are summarised here.

Translucency, the unique quality of transparent paper, is achieved by filling the air gaps between the fibres of the paper pores with a material of similar refractive index to the fibres from which the paper is made. This allows light to pass through the paper rather than being scattered at

the boundaries between air and fibres. There are three main methods to create translucency in paper.⁴ These include using impregnating agents, mechanical treatment, and chemical treatment.

Impregnating agents, such as oils, resins, and waxes of similar refractive index to cellulose have been used and combined to fill paper pores. Linseed oil, walnut oil, colophony and Strasbourg turpentine, sandarac, shellac, copal resin, starch, and more recently mineral oil, and synthetic resins found favour to produce vellum paper, prepared tracing paper, and impregnated paper, for example.⁵ Using impregnating agents was the first method used to make paper transparent.

Mechanical treatment included overbeating the pulp. Tracing paper, glassine paper, and imitation parchment are made translucent by overbeating the paper pulp. This method was used to make transparent papers from the last quarter of the nineteenth century.⁶ Overbeating pulp defibrillates and shortens cellulosic fibres thereby improving inter-fibre bonding within the paper, decreasing pore size and quantity. Calendaring can improve translucency by eliminating more air from the paper structure as the fibres are pressed closer together.

Chemical treatment was undertaken using the process of sulfurisation. First developed in 1846 and mechanised around 1860, the sulfurisation process produces papers such as genuine vegetable parchment.⁷ This method involves treating pre-formed paper with acid, for example sulfuric acid, and subsequently neutralising it with alkali before washing it. This process swells the cellulose fibres and gelatinises the paper surface causing colloidal cellulose to fill the paper pores.⁸

A wide variety of transparent papers have been produced by varying the manufacturing method and materials in order to improve factors such as transparency, dimensional stability, erasability, media receptivity, and durability.⁹ Manufacturing methods such as overbeating and impregnating paper were often combined to improve transparency.¹⁰ Chemical wood pulp (sulfate and bisulfate pulp) was cheaper to produce than cotton pulp, so became the preferred pulp when introduced in the 1870s.¹¹ Transparent papers can also include impregnating or coating agents, blue pigment such as ultramarine blue,¹² rust inhibitors, defoamers, and fillers.¹³

3 Damage

Transparent papers are often found to be in poorer physical condition than non-transparent papers of the same age. Brittleness, extreme discolouration, tears, cracks, creases that become white in colour, losses, deformation, cockling, and fragmentation are common.¹⁴ Mould has been found¹⁵ but biological deterioration less so than physical and chemical deterioration.

Paper quality, handling, and storage can affect physical and chemical degradation processes occurring in transparent papers.¹⁶ As with non-transparent papers, oxidation and acid hydrolysis cause a loss of mechanical properties and yellowing over time.¹⁷ Papers containing drying oils, such as many impregnated papers from the late nineteenth and early twentieth century, before the introduction of acrylic resins in the 1950s, can become highly discoloured and brittle as a result of oxidation of the drying oils.¹⁸ This type of chemical degradation may have occurred soon after paper production so further chemical degradation is unlikely.¹⁹ The presence of oils in paper has been suggested to inhibit mould growth.²⁰ As transparent papers were often used as working documents, and therefore considered ephemeral, they are often extensively damaged before being accessioned into collections.

4 Claude Laroque, 'Transparent Papers: A Technological Outline and Conservation Review', *Reviews in Conservation* 2 (2000): 21–31.

5 Hildegard Homburger and Barbara Korbel, 'Architectural Drawings on Transparent Paper: Modifications of Conservation Treatments', *The Book and Paper Group Annual* 18 (1999): 25–33.

6 Laroque, 'Transparent Papers', 21–31.

7 Laroque, 'Transparent Papers', 21–31.

8 Laroque, 'Transparent Papers', 21–31; Christa Hofmann, Dianne van der Reyden and Mary Baker, 'The Effect of Three Humidification Flattening and Drying Techniques on the Optical and Mechanical Properties of New and Aged Transparent Papers', in *3rd Institute of Paper Conservation Conference at the University of Manchester Institute of Science and Technology, Manchester, UK, 1–4 April 1992*, ed. S. Fairbrass (London: The Institute of Paper Conservation, 1992), 247–56.

9 Price, 'From Sketch to Presentation', 82–7.

10 Homburger and Korbel, 'Architectural Drawings on Transparent Paper', 25–33.

11 Homburger and Korbel, 'Architectural Drawings on Transparent Paper', 25–33; F. Flieder, B. Guineau, C. Laroque, B. Liebard and P. Richardin, 'Analysis and Restoration of Old Transparent Papers', in *Conference Symposium 88—Conservation of Historic and Artistic Works on Paper, Ottawa, Canada, 3–7 October 1988*, ed. H.D. Burgess (Ottawa: Canadian Conservation Institute, 1994), 235–44.

12 Flieder et al., 'Analysis and Restoration of Old Transparent Papers', 235–44.

13 van der Reyden, Hofmann and Baker, 'Effects of Aging and Solvent Treatments', 177–206.

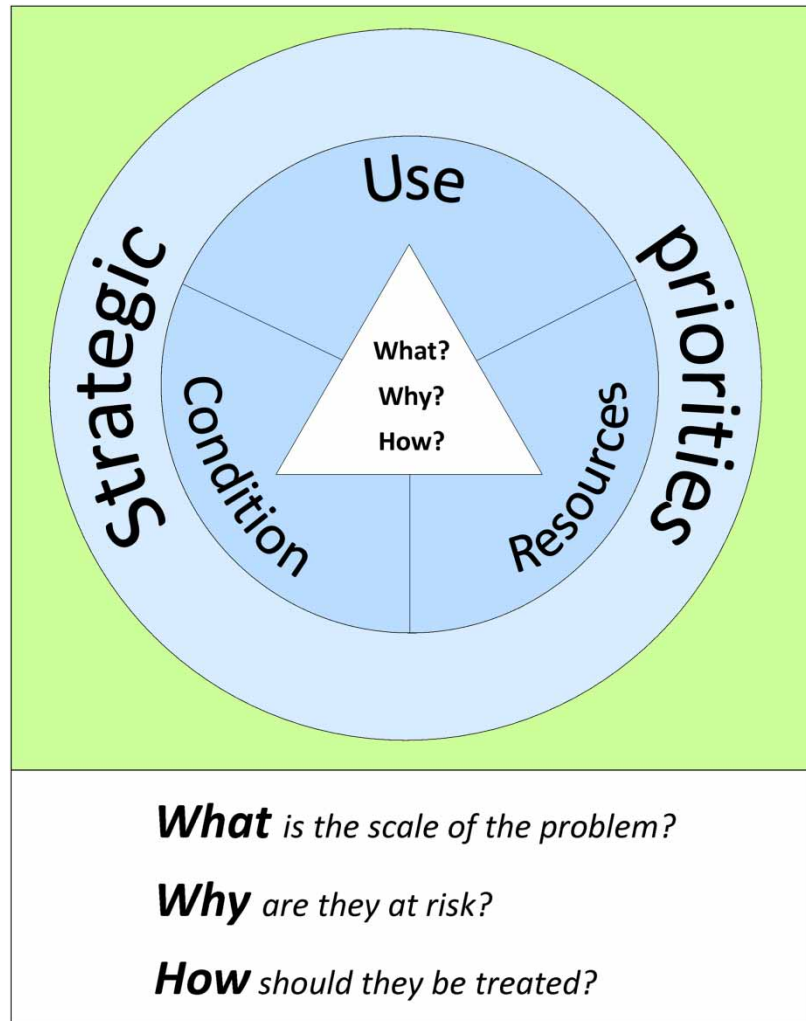


Fig. 3 The preservation decision framework.

14 Catherine G. Asher, 'The Conservation of a Large Collection of Architectural Drawings: The Howard Ship Yards & Dock Company Mss.', in *American Institute for Conservation of Historic and Artistic Works 9th Annual Meeting, Philadelphia, Pennsylvania, 27–31 May 1981* (Washington: American Institute for Conservation, 1981), 20–7; Sally Ann Yates, 'The Conservation of Nineteenth-Century Tracing Paper', *The Paper Conservator* 8 (1984): 20–39; Mary Baker, Dianne van der Reyden and Nancie Ravenel, 'FTIR Analysis of Coated Papers', *The Book and Paper Group Annual* 8 (1989): 1–12; Marina Bicchieri, Paola Brusa and Giovanna Pasquariello, 'Tracing Paper: Methods of Study and Restoration', *Restaurator* 14 (1993): 217–33; Michele E. Hamill, 'Washingtoniana II: Conservation of Architectural Drawings at the Library of Congress', *The Book and Paper Group Annual* 12 (1993): 24–31; Paul Cook and Julia Dennin, 'Ships Plans on

4 Approaches to conserving transparent papers

A wide range of conservation treatments have been reported²¹ and reviewed.²² These include lining, flattening, surface cleaning, removal of pressure-sensitive tape, washing, deacidification, filling losses, and local repairs. Rehousing and the use of surrogates (digital and non-digital) have also been reported as well as methods for treating multiple items.²³

Project aims

The aim of the project discussed in this article was to develop tools that help conservation professionals to evaluate the scale of the preservation problem presented by transparent papers and to decide the most appropriate conservation treatment. The tools aimed to support the conservation professional's thinking and decision-making rather than dictate conservation treatments.

Project outcomes

Frameworks in different forms have proved useful in guiding conservation decisions.²⁴ The Preservation Decision Framework (Fig. 3) was developed as a visual aid to help evaluate the many factors involved in deciding appropriate treatments. These factors include resources, use, and the con-

Table 1 Factors guiding treatment options for transparent papers.

Factors to be considered	Influences
<i>Resources</i>	Policy, finance, collection needs, staff recruitment, staff retention, staff training
<i>Condition</i> —transparent paper, media, and housing	Past use, resources, previous conservation treatments, storage environment, manufacturing process
<i>Use</i> —past, present, and future	Accessibility and demand

dition of the paper (Table 1) and are used to answer key planning questions: what is the scale of the problem? Why are they at risk? How should they be treated?

Five tools were developed to support this overarching framework. The transparent paper surveys and transparent paper database gather and store data that help conservation professionals understand the scale of the problem. The condition rating scale and colour rating scale help to explain why the papers are at risk, and the treatment/rehousing decision tree helps conservation professionals decide how the papers should be treated.

1 The transparent paper surveys for readers and conservators

The purpose of the surveys was to gather information from users of the collection (readers) in the reading rooms (Fig. 4) and conservators (Fig. 5). Questionnaires were developed for the two distinct groups to record information about the format and condition of transparent papers. Additional information was solicited from readers to ascertain the value of using the original and whether they would be satisfied with a surrogate copy. The conservators were asked to report in more detail on paper condition and any conservation treatment undertaken. The surveys were carried out over 12 months.

2 The transparent paper database

The database, a Microsoft® Excel spreadsheet, was designed to provide a searchable source of data to inform preservation planning (Table 2). The inclusion of drop down boxes with pre-determined answers minimises the time required to input data, minimises human error during data input, and enables easier data evaluation. The data included in the database were selected for relevance to immediate preservation needs, for example condition (see Table 2), and to potential future research into transparent paper, for example colour (Table 2).

Over time, the database will provide a comprehensive picture of the condition of transparent papers in the collection. Papers made for specific purposes, for example maps and artistic designs, and displaying specific types of damage, for example tears and losses, will be quickly identified and the scale of the problem easily quantified. This will support the selection and prioritisation of transparent papers for preservation and research purposes.

3 The condition rating scale

The condition rating scale can be used to assess the range and severity of specific damage types that could compromise the structural integrity of an object and which may lead to loss of information (Fig. 6). The scale consists of two matrices, one of which is to be used depending on whether the damage relates to an information area of text or image, or not. Each matrix consists of four damage severity values dependent on the extent of damage and the risk of further damage based on future use.

Oil and Resin Impregnated Tracing Paper: A Practical Repair Procedure', *The Paper Conservator* 18 (1994): 11–9; Susan Page, 'Conservation of Nineteenth-Century Tracing Paper: A Quick Practical Approach', *The Book and Paper Group Annual* 16 (1997): 67–73; Homburger and Korbel, 'Architectural Drawings on Transparent Paper', 25–33; Amy L. Lubick, 'Architectural Drawings—Valuable Records Requiring TLC', *Cultural Resource Management* 7 (1999), 40–2.

15 Bicchieri, Brusa and Pasquariello, 'Tracing Paper', 217–33.

16 Homburger and Korbel, 'Architectural Drawings on Transparent Paper', 25–33.

17 Laroque, 'Transparent Papers', 21–31.

18 Konstanze Bachmann, 'The Treatment of Transparent Papers: A Review', *The Book and Paper Group Annual* 2 (1983): 3–14; Price, 'From Sketch to Presentation', 82–7.

19 Cook and Dennin, 'Ships Plans on Oil and Resin Impregnated Tracing Paper', 11–9.

20 Yates, 'The Conservation of Nineteenth-Century Tracing Paper', 20–39.

21 Mary Todd Glaser, 'Conservation of Drawings by Frank Lloyd Wright at the New England Document Conservation Center', in *American Institute for Conservation of Historic and Artistic Works 8th Annual Meeting, San Francisco, California, 22–25 May 1980* (Washington, DC: American Institute for Conservation of Historic and Artistic Works, 1980), 20–5; Asher, 'The Conservation of a Large Collection of Architectural Drawings', 20–7; Bachmann, 'The Treatment of Transparent Papers', 3–14; Glen Ruzicka, 'Polyester Encapsulation in Signatures', *The Book and Paper Group Annual* 2 (1983): 88–92; Yates, 'The Conservation of Nineteenth-Century Tracing Paper', 20–39; Diana Alper, 'Archives Preservation Update—Making a Molehill Out of a Mountain: The Olmsted Plans and Drawings Processing Project', *The Book and Paper Group Annual* 11 (1992): 173–8; Hofmann, van der Reyden and Baker, 'The Effect of Three Humidification Flattening and

Document reference:		How many transparent paper items?	
Date of document:		Date of viewing:	
Location of viewing	A reading room	Invigilation room	Collection Care Department
Record type	Map	Technical drawing (e.g. plans of buildings or structures)	Other (please specify)
Document format on arrival (Circle as many as apply)			
Folded Rolled Flat In a plastic sleeve In a volume In a file			
Approximate size of record (unfolded)	Smaller than A4	A4 (the size of this sheet)	Larger than A4
Is the record larger than the file/folder/volume it is stored in?	Yes	No	
Is the record attached to something?	Yes	No	
If Yes please say to what:			
Tags Pins Sellotape Staples Adhesive			
Attachment method:	Other (please specify)		
Condition: (Circle as many as apply)			
Torn at edges Split along folds Creased Missing parts Discolouration			
Other (please specify)			
Would viewing a surrogate/copy of the original document have been sufficient for your needs?			Yes No
Any comments?			

Fig. 4 The transparent paper survey for users of the archives.

Drying Techniques on Transparent Papers', 247–56; Bicchieri, Brusa and Pasquariello, 'Tracing Paper', 217–33; Hamill, 'Conservation of Architectural Drawings', 24–31; van der Reyden, Hofmann and Baker, 'Effects of Aging and Solvent Treatments', 177–206; Cook and Dennin, 'Ships Plans on Oil and Resin Impregnated Tracing Paper', 11–9; Flieder et al., 'Analysis and Restoration of Old Transparent Papers', 235–44; Page, 'Conservation of Nineteenth-Century Tracing Paper', 67–73; Homburger and Korbel, 'Architectural Drawings on Transparent Paper', 25–33; Lubick, 'Architectural Drawings', 40–2; Laroque, 'Transparent

Only two categories, 'high' and 'low', are used to assess the extent of damage and the risk of further damage and these are determined based on professional experience and the context of use. The resulting range (1–8) of damage severity values was deemed sufficient to enable a broad assessment of the collection and to prioritise planning, while at the same time being simple to use. The subjectivity and granularity in the scale means that the damage severity values only indicate condition and do not replace detailed condition assessments. Subjectivity can be decreased if required by further defining what constitutes 'high' and 'low' extent of damage and risk of further damage. This would need to be agreed within each context of use of the scale and used consistently.

In the transparent paper database, damage severity values between 1 and 8 are assigned to individual sheets of transparent paper or a group for each of the damage types present (tears, creases/folds, fragmentation and losses,

(a) **Transparent Paper Survey**

Reference number		Number of transparent papers found						
Viewing date (dd/mm/yy)		Is the record on the unfit list?		Yes	No			
Format of record	File	Bound volume	Individual sheet	Other (please specify)				
Purpose of viewing	Reader's enquiry	Survey	Digitisation preparation	Project (Please specify)	Other (please specify)			
Transparent paper record type	Map	Technical drawing ¹	Artistic design	Other (please specify)				
Date of record								
Approximate size of transparent paper (unfolded)	<A6	A6	A5	A4	A3	A2	A1	>A1
Alternatively, please give dimensions (cm):								
The transparent paper was... (circle as many as apply)	Folded	Rolled	Flat	Encapsulated	Lined	Laminated	Fragmented	In one piece
Other (please specify)								
Attached to other documents?	Method of attachment		Adhesive	Tags	Staples	Pressure-sensitive tape	Other (please specify)	
Yes	No							
Surface appearance		Smooth	Shiny	Matt	Other (please specify)			
Condition (tick as many as apply)	Location		On edges	On folds	Internally	Other (please specify)		
Tears								
Creases								
Losses								
Distortion (other than from folding)								
Pressure-sensitive tape								
Other (please specify)								
Was stabilisation and/or rehousing of this/these transparent paper/s needed? Yes No								
If Yes, what did you do to stabilise and/or rehouse it/them? (Please write on the other side of this sheet)								
And approximately how long did this process take (hours)?								

(b) **Further comments/treatment details**

The table below lists the most common treatment types for transparent papers at TNA. Please select as many method details as apply and write in details where possible when space (.....) is provided. If the method used is not provided here (e.g. rehousing, making a surrogate, and pressure-tape removal) or you wish to expand on the descriptions given, please do so in the 'Further details' section below the table.

Treatment type	Method (select as many as apply or detail)		
Humidification	Sympatex or hard-soft sandwich	Local application of water (water pen or brush)	Other (please specify)
Flattening	Hot spatula	Bone folder	Pressing under boards
Splint repair	Remoistenable tissue	Paste application	Other (please specify)
	Repair material:	Japanese paper (.....gsm)	Glass fibres
	Adhesive: Gelatine (.....%)	Wheat starch (.....%)	Isinglass (.....%)
	Reactivation solution:	Water	Other (please specify)
Encapsulation	Number of edges sealed (.....)	Air gaps left (around edges, pin pricks through polyester, other.....)	Support material included (paper, polyester, other.....)
	One pocket needed	Multiple pockets needed because record broken into multiple pieces	Other (please specify)

Further details

Fig. 5 The transparent paper survey for conservators. (a) Page 1. (b) Page 2.

Table 2 Table of the column headings, subheadings and pre-determined answers used in drop down boxes contained in the transparent paper database.

Heading	Sub-heading	Valid answers (if applicable)
Series or piece level		S, P
Most recent entry		Yes, No
Date of condition assessment		
Document reference		
Location in repository		
Year of origin	Earliest Latest	
Approximate quantity		
Approximate contribution to pieces/series (%)		
Record type	Type	Map, artistic design, technical drawing, overlay, other
Format		Rolled, folded, flat, bound
Largest size		
Attachment method		None, tags, adhesive, pins, staples, tying tape, other
Is there a copy?		Digitised, Other, No
Housing	Type Encapsulated?	Folder, box, folder in box, volume in box, portfolio, other All, some, none
Conserved		All, some, none
Unfit list	Category	No, fit for production, to be seen in Collection Care, to be seen in the invigilation room, unfit for production, mould treatment needed
Condition—damage severity values	Damage code	1–6
	Tears	0–8
	Losses	0–8
	Fragmentation	0–8
	Creases/folds	0–8
	Pressure-sensitive tape/tape residue	0–8
Colour	Most prevalent	0, A1–7, B1–7, C1–7, D1, D2, D4, D5, D7, 8, Discoloured
	2nd most prevalent	0, A1–7, B1–7, C1–7, D1, D2, D4, D5, D7, 8, Discoloured
	3rd most prevalent	0, A1–7, B1–7, C1–7, D1, D2, D4, D5, D7, 8, Discoloured
	Comment	
Overall housing condition	Fit for purpose?	Yes, No
	Comment	
Treatment/rehousing decision tree	Outcome	Treatment, rehousing, initiate Project Planning Timeline, fit for purpose, other
	Completion date of outcome	

Papers', 21–31; Peter Verheyen, Carolyn Davis and Debra Olson, 'Storage of Architectural Materials at the Syracuse University Library', *The Book and Paper Group Annual 22* (2003): 131–6; Amy L. Lubick, *Conservation Treatment of Tracing Paper Survey Results*, <http://cool.conservation-us.org/byauth/lubick/tracing.html> (accessed 15 February 2013); Eva Glück, Irene Brückle and Eva-Maria Barkhofen, eds, *Paper Line Light—The Preservation of Architectural Drawings and Reproductions from the Hans Scharoun Archive* (Berlin: Akademie Der Kunste, 2013).

22 Lubick, *Conservation Treatment of Tracing Paper Survey Results*; Bachmann, 'The Treatment of Transparent Papers', 3–14; Laroque, 'Transparent Papers', 21–31.

23 Hamill, 'Conservation of Architectural Drawings', 24–31; Alper, 'Archives

pressure-sensitive tape and adhesive residue). Consequently, a transparent paper may have tears of damage severity value 8, losses of value 7, and pressure-sensitive tape of value 2 while another has only tears of damage severity 4.

4 The colour rating scale

The colours of transparent papers vary greatly from white to grey, to shades of yellow, orange, and/or brown. To some extent the colour is a result of the manufacturing process and subsequent use, and may indicate the presence of oils, resins, or waxes. The colour rating scale provides a system for capturing information on the approximate colour of transparent papers (Fig. 7).

The colour rating scale includes 26 different colours printed on contemporary transparent paper. The colours represent the range of colours found in transparent paper collections and were derived statistically from colorimetric data of transparent papers in The National Archives' collection.

To use the scale a single sheet of transparent paper is placed against the colours in the scale and the closest match found. The colour of the sheet is assigned the letter and number value, e.g. A1, C6, or B4, of this closest match.

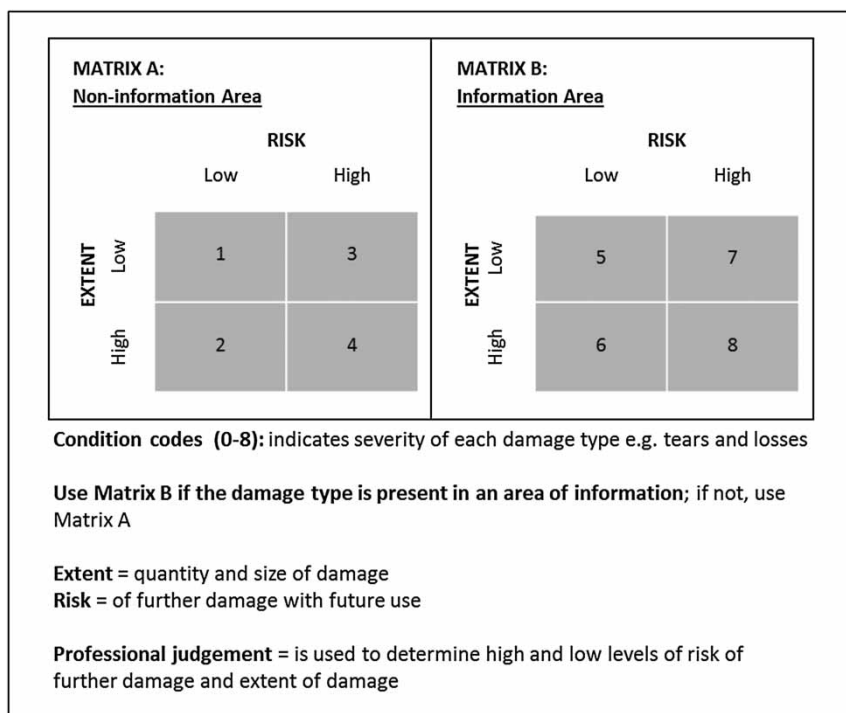


Fig. 6 The condition rating matrices that together form the condition rating scale.

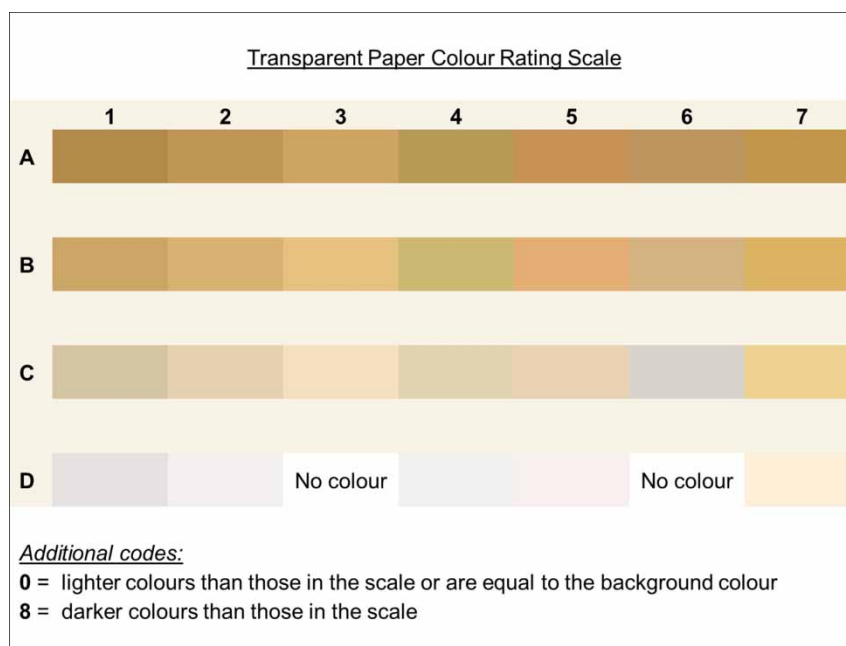


Fig. 7 An uncalibrated image of the transparent paper colour scale as of August 2013.

Preservation Update', 173–8; Verheyen, Davis and Olsen, 'Storage of Architectural Materials', 131–6; Cook and Dennin, 'Ships Plans on Oil and Resin Impregnated Tracing Paper', 11–9; Page, 'Conservation of Nineteenth-Century Tracing Paper', 67–73; Glück, Brückle and Barkhofen, 'Paper Line Light'; Natasha Shannon Hogan, 'Conservation of British Domestic Designs on Thin Paper Supports' (Master's thesis, Camberwell College of Arts, 2010).

24 J.K. Sheehan, 'Making the Most of What We Have: A Framework for Preservation Management in Rare Book Collections', *RBM: A Journal of Rare Books, Manuscripts, and Cultural Heritage* 10, no. 2 (2009): 111–21; C. Costain, *Canadian Conservation Institute: Framework for Preservation of Museum Collections*, <http://www.cci-icc.gc.ca/cci-icc/about-afropos/action/15-eng.aspx> (accessed 31 January 2013); N. Pickwood, 'Determining How Best to Conserve Books in Special Collections', *The Book and Paper Group Annual* 13 (1994): 35–41; Leslie E. Coombs, 'Removing Mounts from Works of Art on Paper—Case Histories to Illustrate the Decision-Making Process', *The Book and Paper Group Annual* 13 (1994): 25–30; C. Dekle and M.E. Haude, 'Iron-Gall Ink Treatment at the Library of Congress: Old Manuscripts—New Tools', *The Book and Paper Group Annual* 27 (2008): 15–26; J. Koerner and K. Potje, 'Testing and Decision-Making Regarding the Exhibition of Blueprints and Diazotypes at the Canadian Centre for Architecture', *The Book and Paper Group Annual* 21 (2002): 15–23; J.L. Biggs, Y.R. Khan, S.R. Albro, C. Dekle, M.E. Haude and C. Karnes, 'Treatment Trees for Iron-Gall Ink on Paper: Using Flow Charts to Develop Treatment Protocols', in *5th International Conference of The Institute of Paper Conservation and 1st International Conference of The Institute of Conservation, Book and Paper Group*, ed. S. Jaques (2007); S. Albro, J.L. Biggs, C. Dekle, M.E. Haude, C. Karnes and Y. Khan, 'Developing Guidelines for Iron-Gall Ink Treatment at the Library of Congress', *The Book and Paper Group Annual* 27 (2007): 129–65; Irene Brückle, 'Chapter 14: Aqueous Treatment in Context', in *Paper and Water*, ed. Gerhard Banik and Irene Brückle (Oxford: Butterworth-Heinemann, 2011); J. Ashley-Smith, *Risk Assessment for Object Conservation* (Oxford: Butterworth-Heinemann, 1999); S. Keene, *Managing Conservation in Museums* (Oxford: Butterworth-Heinemann, 1996); Chris Caple, *Conservation Skills: Judgement, Method and Decision Making* (London: Routledge, 2000).

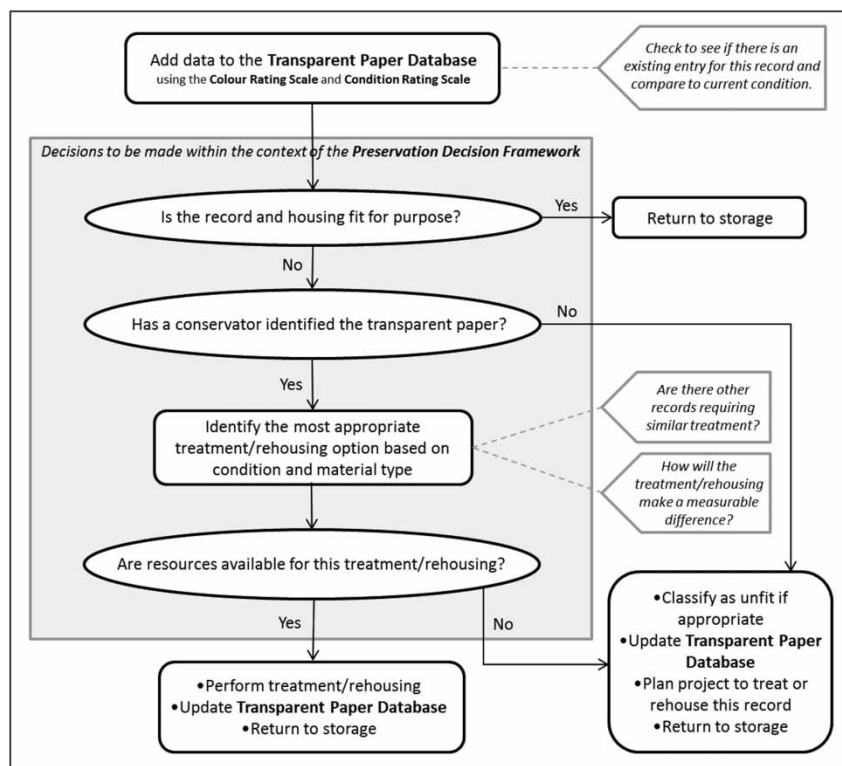


Fig. 8 The transparent paper treatment/rehousing decision tree.

Correlation of colour data with other data such as age and condition is planned. This second phase of research and development aims to develop the colour scale as an easy-to-use indicator of papers at high risk of physical damage. The National Archives is investigating how to make this scale widely available.

5 The treatment/rehousing decision tree

When a transparent paper is identified, a decision of how to treat it is made using the treatment/rehousing decision tree (Fig. 8) and the skills, experience, and knowledge of conservation professionals. The decision tree provides a means of incorporating the preservation decision framework and its tools into daily conservation decision-making practice long-term.

Conclusions

This project is one of many at The National Archives that applies scientific research to inform conservation practice. The framework and tools developed in this project are the first step of an on-going commitment to improve the preservation and conservation treatment of transparent papers. They will be periodically reviewed and provide a new and well-defined strategy that can be adapted for use at other institutions and for other materials.

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Abstract

Brittleness, discolouration, translucency, and solvent sensitivity are a few of the factors that need consideration when conserving transparent papers. These considerations coupled with the large format and the volume of transparent papers in collections makes effective preservation planning difficult. To address this problem a project was initiated to improve the standard of preservation for transparent papers in The National Archives' collections. The significant outcomes of this one year project were a framework for preservation decision-making, and complementary tools designed to gather information to support better planning and treatment. The tools include survey questionnaires, a condition rating scale, a colour rating scale, and a database to capture information about the condition and types of transparent papers held by The National Archives.

Résumé

«Un cadre de décision pour la conservation des papiers transparents»

Fragilité, changement de couleur, translucidité et sensibilité aux solvants sont quelques-uns des facteurs qui doivent être pris en considération lors de la conservation des papiers transparents. Ces considérations associées avec celle des grands formats et le volume des papiers transparents dans une collection rendent difficile la mise en œuvre d'une conservation efficace. Pour remédier à ce problème, un projet a été lancé pour améliorer le degré de conservation des papiers transparents dans les collections des Archives nationales. Le résultat significatif de ce projet porté pendant un an est l'élaboration d'un cadre pour la prise de décision quant à la conservation et des outils complémentaires conçus pour recueillir des informations en vue d'améliorer la planification et le traitement. Les outils comprennent des questionnaires d'enquête, une échelle de notation de l'état matériel, une échelle de notation de la couleur et une base de données pour saisir des informations sur l'état et les types de papiers transparents détenus par les Archives nationales.

Zusammenfassung

„Eine Entscheidungsmatrix für die Erhaltung von Transparentpapieren“

Brüchigkeit, Verfärbung, Transparenz und Lösemittlempfindlichkeit sind ein paar der Faktoren, die berücksichtigt werden

müssen bei der Konservierung/Restaurierung von Transparentpapieren. Diese Faktoren zusammen mit den großen Formaten und der Menge an Transparentpapieren in den Sammlungen machen eine effektive Planung für die Erhaltung schwierig. Um dieses Problem angehen zu können, wurde ein Projekt zur Verbesserung der Erhaltungsstandards der Transparentpapiere in den Beständen der National Archives ins Leben gerufen. Wichtige Ergebnisse dieses einjährigen Projekts sind die Erhaltungs-Entscheidungsmatrix und mit ihr verbundene Werkzeuge, die entwickelt wurden um eine bessere Planung und Behandlung zu unterstützen. Unter anderem enthalten in diesen Werkzeugen sind Zustandserhebungsfragebögen, eine Zustandskategorisierung, eine Farbmessskala und eine Datenbank, um Informationen über den Zustand und die Art von Transparentpapieren in den National Archives festzuhalten.

Resumen

“Un marco de decisión para la preservación de papeles transparentes”

La conservación de papeles transparentes exige tener en cuenta factores como: la fragilidad, decoloración, translucidez y la sensibilidad a los disolventes. Estas consideraciones, junto con el gran formato y el volumen de papeles transparentes en las colecciones, hacen que planificar una preservación efectiva sea complejo. Con el fin de hacer frente a este problema, se inició un proyecto para mejorar el nivel de conservación de papeles transparentes en las colecciones de los Archivos Nacionales. Los significativos resultados de este proyecto de un año se constituyeron en un marco para la toma de decisiones sobre la preservación, y de forma complementaria, en herramientas diseñadas para recopilar información con la que elaborar una mejor planificación y tratamiento. Las herramientas incluyen cuestionarios para peritajes, una escala para calificar la condición de la obra, una escala de clasificación de color, y una base de datos para recoger información sobre las condiciones y tipos de papeles transparentes guardados en los Archivos Nacionales.

Biography

Helen Wilson has a Masters in Chemistry (University of Oxford, 2007) and completed an Icon HLF Conservation Science Internship at The Pigmentum Project (now Art Access & Research), London (2007–2008). In 2012 Helen was awarded a PhD (The University of Manchester), made possible by the Science & Heritage Programme AHRC/EPRSC Collaborative Doctoral Award scheme. Her PhD, which researched non-aqueous remedial conservation treatments for iron-tannate dyed textiles, was a collaboration with The British Museum. Following a post-doctoral fellowship at The National Archives, focussing on the preservation of transparent paper (2012–2013), Helen is now Conservator (Research and Development) at The National Archives.

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